SBML Model Report

Model name: "Smallbone2013 - Yeast metabolic model with modular rate law, merged with Pritchard 2002"

May 5, 2016

1 General Overview

This is a document in SBML Level 2 Version 4 format. This model was created by the following three authors: Nick Juty[1], Vijayalakshmi Chelliah[2] and Kieran Smallbone[3] at February 20th 2008 at 10:05 a. m. and last time modified at April 29th 2014 at 11:47 a. m. Table 1 gives an overview of the quantities of all components of this model.

Table 1: Number of components in this model, which are described in the following sections.

Element	Quantity	Element	Quantity
compartment types	0	compartments	2
species types	0	species	713
events	0	constraints	0
reactions	298	function definitions	1
global parameters	0	unit definitions	10
rules	0	initial assignments	0

[1]EMBL-EBI, juty@ebi.ac.uk
[2]EMBL-EBI, viji@ebi.ac.uk
[3]University of Manchester, kieran.smallbone@manchester.ac.uk

2 Unit Definitions

This is an overview of 14 unit definitions of which four are predefined by SBML and not mentioned in the model.

2.1 Unit substance

Name mmol

Definition mmol

2.2 Unit mM

Name mM

Definition $\mathrm{mmol} \cdot \mathrm{l}^{-1}$

2.3 Unit mM_per_s

Name mM per s

Definition $\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$

2.4 Unit mM_squared

Name mM squared

Definition $\mathrm{mmol}^{2} \cdot \mathrm{l}^{-2}$

2.5 Unit mM_cubed

Name mM cubed

Definition $\mathrm{mmol}^{3} \cdot \mathrm{l}^{-3}$

2.6 Unit per_mM

Name per mM

Definition $\mathrm{mmol}^{-1} \cdot \mathrm{l}$

2.7 Unit per_mM_squared

Name per mM squared

Definition $\mathrm{mmol}^{-2} \cdot \mathrm{l}^{2}$

2.8 Unit per_mM_cubed

Name per mM cubed

Definition $\mathrm{mmol}^{-3} \cdot \mathrm{l}^{3}$

2.9 Unit per_s

Name per s

Definition s^{-1}

2.10 Unit per_mM_per_s

Name per_mM_per_s

Definition $\mathrm{mmol}^{-1} \cdot \mathrm{l} \cdot \mathrm{s}^{-1}$

2.11 Unit volume

Notes Litre is the predefined SBML unit for `volume`.

Definition l

2.12 Unit area

Notes Square metre is the predefined SBML unit for `area` since SBML Level 2 Version 1.

Definition m^{2}

2.13 Unit length

Notes Metre is the predefined SBML unit for `length` since SBML Level 2 Version 1.

Definition m

2.14 Unit time

Notes Second is the predefined SBML unit for `time`.

Definition s

3 Compartments

This model contains two compartments.

Table 2: Properties of all compartments.

Id	Name	SBO	Spatial Dimensions	Size	Unit	Constant	Outside
`cell`	cell	0000290	3	1	litre	☑	
`extracellular`	extracellular	0000290	3	1	litre	☑	

3.1 Compartment `cell`

This is a three dimensional compartment with a constant size of one litre.

Name cell

SBO:0000290 physical compartment

3.2 Compartment `extracellular`

This is a three dimensional compartment with a constant size of one litre.

Name extracellular

SBO:0000290 physical compartment

4 Species

This model contains 713 species. The boundary condition of 403 of these species is set to `true` so that these species' amount cannot be changed by any reaction. Section 7 provides further details and the derived rates of change of each species.

Table 3: Properties of each species.

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
s_0002	(1->3)-beta-D-glucan	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0004	(1->6)-beta-D-glucan	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0008	(2R,3R)-2,3-dihydroxy-3-methylpentanoate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0009	(2R,3S)-3-isopropylmalate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0010	(2S)-2-isopropyl-3-oxosuccinate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0015	(N(omega)-L-arginino)succinic acid	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0016	(R)-2,3-dihydroxy-3-methylbutanoate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0018	(R)-5-diphosphomevalonic acid	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0019	(R)-5-phosphomevalonic acid	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0025	(R)-lactate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0028	(R)-mevalonate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0033	(R)-S-lactoylglutathione	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0037	(S)-2,3-epoxysqualene	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0039	(S)-2-acetyl-2-hydroxybutanoate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0056	(S)-3-methyl-2-oxopentanoate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0061	(S)-dihydroorotate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0062	(S)-lactaldehyde	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0063	(S)-lactate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0066	(S)-malate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
BPG	1,3-bisphospho-D-glycerate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
s_0076	1-(2-carboxyphenylamino)-1-deoxy-D-ribulose 5-phosphate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0077	1-(5-phospho-D-ribosyl)-5-[(5-phospho-D-ribosylamino)methylideneamino]imidazole-4-carboxamide	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0078	1-(5-phosphoribosyl)-5'-AMP	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0082	1-acyl-sn-glycerol 3-phosphate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0086	1-C-(indol-3-yl)glycerol 3-phosphate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0089	1-phosphatidyl-1D-myo-inositol	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0118	1-pyrroline-5-carboxylate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0120	10-formyl-THF	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0122	14-demethyllanosterol	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0126	1D-myo-inositol 1-phosphate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0141	2,5-diamino-4-hydroxy-6-(5-phosphoribosylamino)pyrimidine	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0142	2,5-diamino-6-(5-phosphono)ribitylamino-4(3H)-pyrimidinone	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0145	2-acetamido-5-oxopentanoate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0146	2-acetyllactic acid	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0158	2-hydroxy-3-oxobutyl phosphate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0162	2-isopropylmalate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0165	2-isopropylmaleic acid	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0176	2-oxoadipic acid	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0178	2-oxobutanoate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0180	2-oxoglutarate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
P2G	2-phospho-D-glyceric acid	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0190	farnesyl diphosphate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0201	3'-phospho-5'-adenylyl sulfate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0204	3-(4-hydroxyphenyl)pyruvate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0207	3-(imidazol-4-yl)-2-oxopropyl dihydrogen phosphate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0209	3-dehydro-4-methylzymosterol	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0210	3-dehydroquinate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0211	3-dehydroshikimate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0218	3-hydroxy-3-methylglutaryl-CoA	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0231	3-ketosphinganine	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0232	3-methyl-2-oxobutanoate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
P3G	3-phosphoglycerate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0261	3-phosphoshikimic acid	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0262	4,4-dimethyl-5alpha-cholesta-8,14,24-trien-3beta-ol	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0291	4-methyl-2-oxopentanoate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0295	4-phospho-L-aspartate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0296	4alpha-methylzymosterol	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0297	4beta-methylzymosterol-4alpha-carboxylic acid	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0298	5'-adenylyl sulfate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0299	5'-phosphoribosyl-4-(N-succinocarboxamide)-5-aminoimidazole	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0300	5'-phosphoribosyl-5-aminoimidazole	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0301	5'-phosphoribosyl-N-formylglycineamide	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
s_0302	5'-phosphoribosyl-N-formylglycineamidine	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0304	5,10-methenyl-THF	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0306	5,10-methylenetetrahydrofolate	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0312	5-[(5-phospho-1-deoxy-D-ribulos-1-ylamino)methylideneamino]-1-(5-phospho-D-ribosyl)imidazole-4-carboxamide	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0313	5-amino-6-(5-phosphoribitylamino)uracil	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0314	5-amino-6-(D-ribitylamino)uracil	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0322	5-methyltetrahydrofolate	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0324	5-O-(1-carboxyvinyl)-3-phosphoshikimic acid	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0325	5-phospho-ribosyl-glycineamide	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0326	5-phosphoribosyl-ATP	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0327	5-phosphoribosylamine	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0328	6,7-dimethyl-8-(1-D-ribityl)lumazine	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0335	6-O-phosphono-D-glucono-1,5-lactone	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0340	6-phospho-D-gluconate	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0349	7-phospho-2-dehydro-3-deoxy-D-arabino-heptonic acid	cell	$mmol \cdot l^{-1}$	⊟	⊟
AcAld	acetaldehyde	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0360	acetaldehyde	extracellular	$mmol \cdot l^{-1}$	☑	☑
s_0362	acetate	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0367	acetoacetyl-CoA	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0373	acetyl-CoA	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0380	acyl-CoA	cell	$mmol \cdot l^{-1}$	⊟	⊟

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
s_0386	adenosine	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0390	adenosine 3',5'-bismonophosphate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0393	adenylo-succinate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
ADP	ADP	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0403	AICAR	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0404	Ala-tRNA(Ala)	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0409	alpha,alpha-trehalose 6-phosphate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0419	ammonium	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0420	ammonium	extracellular	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
AMP	AMP	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0427	anthranilate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0428	Arg-tRNA(Arg)	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0430	Asn-tRNA(Asn)	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0432	Asp-tRNA(Asp)	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
ATP	ATP	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0445	bicarbonate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0454	but-1-ene-1,2,4-tricarboxylic acid	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0455	carbamoyl phosphate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
CO2	carbon dioxide	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0458	carbon dioxide	extracellular	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
s_0467	CDP	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0471	CDP-diacylglycerol	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0478	ceramide-1 (C26)	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0505	cerotate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0515	chorismate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0516	cis-aconitate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0522	citrate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
s_0526	CMP	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0529	coenzyme A	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0539	CTP	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0542	Cys-tRNA(Cys)	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0550	D-erythro-1-(imidazol-4-yl)glycerol 3-phosphate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0551	D-erythrose 4-phosphate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
F16bP	D-fructose 1,6-bisphosphate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
F6P	D-fructose 6-phosphate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
GLC	D-glucose	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
GLCx	D-glucose	extracellular	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
s_0567	D-glucose 1-phosphate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
G6P	D-glucose 6-phosphate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0573	D-mannose 1-phosphate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0574	D-mannose 6-phosphate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0577	D-ribulose 5-phosphate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0581	D-xylulose 5-phosphate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0582	dADP	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0584	dAMP	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0586	dATP	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0587	dCDP	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0589	dCMP	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0595	decanoate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0602	decanoyl-CoA	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0613	dGDP	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0615	dGMP	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0619	diglyceride	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
s_0625	dihydrofolic acid	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
DHAP	dihydroxyacetone phosphate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0633	diphosphate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0644	dolichyl D-mannosyl phosphate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0645	dolichyl phosphate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0649	dTMP	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0654	dUMP	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0656	dUTP	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0657	episterol	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0662	ergosta-5,7,22,24(28)-tetraen-3beta-ol	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0666	ergosterol	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0672	ergosterol ester	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
EtOH	ethanol	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0681	ethanol	extracellular	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
s_0700	fecosterol	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0709	ferricytochrome c	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0710	ferrocytochrome c	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0722	formate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0725	fumarate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0739	GDP	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0743	GDP-alpha-D-mannose	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0745	geranyl diphosphate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0747	Gln-tRNA(Gln)	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0748	Glu-tRNA(Glu)	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0750	glutathione	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0757	Gly-tRNA(Gly)	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
GAP	glyceraldehyde 3-phosphate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
GLY	glycerol	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_0766	glycerol	extracellular	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
s_0767	glycerol 3-phosphate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_0773	glycogen	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_0779	glyoxylate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_0782	GMP	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_0785	GTP	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_0816	hexacosanoyl-CoA	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_0832	His-tRNA(His)	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_0835	homocitrate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_0836	homoisocitrate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_0841	hydrogen sulfide	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_0847	Ile-tRNA(Ile)	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_0849	IMP	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_0897	inositol-P-ceramide A (C26)	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_0940	isocitrate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_0943	isopentenyl diphosphate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_0951	keto-phenylpyruvate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_0953	L-2-aminoadipate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_0955	L-alanine	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_0959	L-allysine	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_0965	L-arginine	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_0969	L-asparagine	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_0973	L-aspartate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_0978	L-aspartate 4-semialdehyde	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_0979	L-citrulline	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_0980	L-cystathionine	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
s_0981	L-cysteine	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0991	L-glutamate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_0999	L-glutamine	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1003	L-glycine	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1006	L-histidine	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1010	L-histidinol	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1011	L-histidinol phosphate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1012	L-homocysteine	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1014	L-homoserine	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1016	L-isoleucine	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1021	L-leucine	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1025	L-lysine	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1029	L-methionine	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1032	L-phenylalanine	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1035	L-proline	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1038	L-saccharopine	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1039	L-serine	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1045	L-threonine	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1048	L-tryptophan	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1051	L-tyrosine	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1056	L-valine	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1059	lanosterol	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1065	laurate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1073	lauroyl-CoA	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1077	Leu-tRNA(Leu)	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1084	lignoceric acid	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1099	Lys-tRNA(Lys)	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
s_1101	malonyl-CoA	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1107	mannan	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1148	Met-tRNA(Met)	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1151	methylglyoxal	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1153	myo-inositol	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1161	myristate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1176	myristoyl-CoA	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1182	N(2)-acetyl-L-ornithine	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1187	N-(5-phospho-beta-D-ribosyl)anthranilate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1191	N-acetyl-L-gamma-glutamyl phosphate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1192	N-acetyl-L-glutamate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1194	N-carbamoyl-L-aspartate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
NAD	NAD	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
NADH	NADH	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1207	NADP(+)	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1212	NADPH	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1233	O-acetyl-L-homoserine	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1238	O-phospho-L-homoserine	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1255	octanoyl-CoA	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1266	ornithine	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1269	orotate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1270	orotidine 5'-(dihydrogen phosphate)	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1271	oxaloacetate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1275	oxygen	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1277	oxygen	extracellular	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
s_1286	palmitate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1302	palmitoyl-CoA	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
s_1314	Phe-tRNA(Phe)	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
PHO	phosphate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1324	phosphate	extracellular	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
s_1331	phosphatidate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1337	phosphatidyl-L-serine	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1342	phosphatidyl-N,N-dimethylethanolamine	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1343	phosphatidyl-N-methylethanolamine	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1346	phosphatidylcholine	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1351	phosphatidylethanolamine	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
PEP	phosphoenolpyruvate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1364	phosphoribosyl-carboxy-aminoimidazole	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1365	phosphoribosyl-formamido-carboxamide	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1376	prenyl diphosphate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1377	prephenate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1379	Pro-tRNA(Pro)	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1386	PRPP	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
PYR	pyruvate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1405	riboflavin	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1408	ribose-5-phosphate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1413	S-adenosyl-L-homocysteine	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1416	S-adenosyl-L-methionine	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1426	sedoheptulose 1,7-bisphosphate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1427	sedoheptulose 7-phosphate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1428	Ser-tRNA(Ser)	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1429	shikimate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1445	sphinganine	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
s_1447	squalene	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	⊟	⊟

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
s_1449	stearate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1454	stearoyl-CoA	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1458	succinate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1459	succinate	extracellular	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
s_1467	sulphate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1468	sulphate	extracellular	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
s_1469	sulphite	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1487	THF	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1491	Thr-tRNA(Thr)	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1520	trehalose	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1524	triglyceride	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1527	Trp-tRNA(Trp)	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1533	Tyr-tRNA(Tyr)	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1535	ubiquinol-6	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1537	ubiquinone-6	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1538	UDP	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1543	UDP-D-glucose	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1545	UMP	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1559	UTP	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1561	Val-tRNA(Val)	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1565	xanthosine-5-phosphate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1569	zymosterol	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1576	zymosterol intermediate 1a	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1577	zymosterol intermediate 1b	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1578	zymosterol intermediate 1c	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1579	zymosterol intermediate 2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1582	tRNA(Ala)	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
s_1583	tRNA(Arg)	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1585	tRNA(Asn)	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1587	tRNA(Asp)	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1589	tRNA(Cys)	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1590	tRNA(Gln)	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1591	tRNA(Glu)	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1593	tRNA(Gly)	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1594	tRNA(His)	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1596	tRNA(Ile)	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1598	tRNA(Leu)	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1600	tRNA(Lys)	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1602	tRNA(Met)	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1604	tRNA(Phe)	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1606	tRNA(Pro)	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1607	tRNA(Ser)	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1608	tRNA(Thr)	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1610	tRNA(Trp)	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1612	tRNA(Tyr)	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1614	tRNA(Val)	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1616	TRX1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
s_1620	TRX1 disulphide	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐
e_0001	COX1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0002	ATP8	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0003	ATP6	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0004	COB	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0005	OLI1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0006	COX2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
e_0007	COX3	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0008	CYS3	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0010	PMT2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0011	CDC19	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0012	GCV3	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0017	ADE1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0020	SCT1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0022	ACH1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0025	RIB1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0026	URA7	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0028	COR1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0030	PRS4	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0031	ILS1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0033	ATP1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0038	IPP1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0045	CDS1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0051	ATP3	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0053	FAT1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0054	TSC3	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0057	MIS1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0062	LYS2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0063	TKL2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0064	GRS1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0065	TPS1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0066	VMA2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0069	ADH5	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0071	RIB7	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
e_0074	TYR1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0079	PGI1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0084	PYC2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0087	HIS7	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0088	ARO4	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0089	DUT1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0090	RIB5	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0091	SHM1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0092	TSC10	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0100	ILV6	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0101	LEU2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0103	HIS4	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0106	GLK1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0107	APA1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0109	CHA1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0111	CIT2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0113	PGK1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0117	FEN1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0122	THR4	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0124	TRX3	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0127	ATP16	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0128	TSC13	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0129	GPD1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0133	SLC1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0134	PSA1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0135	IDP1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0136	COX9	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
e_0137	MDH3	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0141	PMT5	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0142	PMT1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0146	LYS21	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0151	DLD1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0152	DLD2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0154	LYS20	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0155	VMA1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0160	GDH2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0165	TRP1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0167	GCV1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0168	SES1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0169	ARO3	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0171	KRS1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0175	TPI1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0176	TGL2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0177	LCB2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0179	TPS2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0182	ARO1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0183	YCF1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0186	HOM2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0188	SDH4	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0194	ADK1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0196	LYS4	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0202	GLO2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0203	DPP1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0204	INM2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
e_0207	ATP5	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0213	TIM11	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0214	YDR341C	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0218	TRR1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0219	TRP4	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0220	KEI1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0223	ATP17	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0231	ADE8	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0234	GUK1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0237	RIB3	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0239	SAM2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0243	QCR7	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0249	URA3	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0250	RIP1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0251	VMA3	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0255	CYC7	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0260	GLY1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0263	VMA8	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0268	DLD3	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0269	PMI40	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0271	YND1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0273	FAA2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0276	PRO3	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0278	CHO1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0280	SAH1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0281	HOM3	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0283	HIS1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
e_0288	HOR2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0289	ICL1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0290	ARG5,6	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0291	RNR1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0293	ALD5	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0295	ILV1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0296	AIM10	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0297	TRP2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0298	MET6	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0299	PRS2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0303	ADK2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0311	LPD1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0312	FRS2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0313	AGX1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0314	SEC53	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0317	GSY1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0320	HIS2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0321	MET10	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0322	QCR6	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0325	HXK1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0326	ERG26	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0328	LEU1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0329	ERG4	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0330	TRP5	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0334	PYC1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0340	MET13	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0342	ARO2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
e_0343	LYS5	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0346	COX4	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0347	COX13	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0348	ARO8	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0352	ADE5,7	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0353	GUS1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0355	HXK2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0356	ADH4	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0362	VMA7	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0364	GSC2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0365	ACB1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0367	ERG25	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0368	ADE6	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0370	PDC6	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0372	VAS1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0376	ASN2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0379	SKN1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0380	CYS4	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0381	CHO2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0382	PSD2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0385	ERG1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0387	RNR4	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0389	QCR9	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0390	TYS1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0392	TDH3	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0396	ADE3	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0398	TRX2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
e_0401	PFK1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0404	SOL4	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0405	ENO1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0407	GND2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0409	MES1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0417	LAG1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0418	PRS3	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0422	QCR10	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0424	ERG11	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0425	DIA4	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0426	ARG4	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0427	DED81	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0428	THR1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0429	VMA16	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0431	PUT2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0432	VMA10	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0434	NCP1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0435	INM1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0436	COX6	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0440	ERG7	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0447	GRE3	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0448	TRR2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0452	DCD1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0453	SOL3	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0454	ENO2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0455	GND1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0456	ERG9	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
e_0457	BAT1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0458	IMD2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0462	FAA3	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0465	HIS6	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0466	RHR2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0467	RNR3	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0470	THS1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0472	LYS12	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0475	COX5B	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0476	HIS5	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0489	LYS1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0492	RNR2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0494	YJL045W	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0495	TDH1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0496	BNA3	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0499	ARG3	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0506	RPE1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0508	URA2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0510	GLG2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0512	INO1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0514	QCR8	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0515	ERG20	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0525	TDH2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0528	ILV3	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0531	CYC1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0536	OPI3	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0540	URA8	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
e_0541	ADO1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0542	CPA2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0544	ATP2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0545	STR2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0547	MET5	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0548	HOM6	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0549	PMT4	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0550	BAT2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0556	MET14	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0557	AUR1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0558	LAC1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0559	ATP7	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0561	URA6	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0565	UGP1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0567	FBA1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0568	YNK1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0569	VMA5	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0571	MDH1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0574	AAT1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0576	PGM1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0578	TGL1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0579	SDH3	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0581	SDH1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0582	GPM1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0585	PRS1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0586	FAS1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0588	PXA2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
e_0591	TRP3	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0594	URA1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0601	SHB17	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0603	GLG1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0607	GPT2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0610	MTD1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0611	TGL4	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0612	PCK1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0613	YEH1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0615	DPS1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0619	SDH2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0621	YBT1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0629	AAT2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0631	ADE16	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0632	COX12	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0633	TRX1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0636	PDC1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0638	SHM2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0639	FRS1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0642	ALT1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0644	ERG27	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0647	PDC5	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0658	SAM1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0667	GSY2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0671	ATP14	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0674	MET17	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0675	ACO1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
e_0682	FKS1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0684	TAL1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0685	ILV5	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0686	ADE13	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0687	SUR4	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0690	COX8	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0692	URA4	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0693	IMD3	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0695	VMA6	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0697	HMG2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0698	GLO1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0699	ERG6	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0704	CYB2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0705	IMD4	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0708	HMG1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0709	ATP18	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0711	TSL1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0712	URA5	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0716	ERG13	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0727	STV1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0729	ARG7	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0730	ADH3	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0733	PGM2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0734	ILV2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0736	ADE17	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0740	ALD2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0741	GCV2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
e_0742	ERG2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0743	PFK2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0744	HFA1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0745	ERG12	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0746	GUA1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0747	ERG8	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0750	FAA4	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0752	COX7	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0753	TPS3	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0754	PPA2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0755	URA10	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0757	PGM3	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0761	LCB1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0762	LIP1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0763	ADE4	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0765	TGL3	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0769	IDP3	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0771	IDH1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0774	COX5A	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0778	LEU4	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0788	PSD1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0791	ADE12	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0792	ZWF1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0793	YNL247W	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0799	MET2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0800	ERG24	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0802	PHA2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
e_0805	CIT1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0808	ACC1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0812	MVD1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0813	LYS9	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0826	ARG1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0827	GPD2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0829	PRS5	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0830	MET22	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0832	RIB2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0834	ADH1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0836	WRS1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0838	MDH2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0840	ARG8	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0841	RIB4	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0842	GRE2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0846	GLO4	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0848	CYT1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0850	CDC21	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0851	TGL5	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0852	RKI1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0855	LEU9	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0860	ADE2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0862	IDH2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0867	GLN4	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0869	ALE1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0875	HIS3	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0880	DFR1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
e_0883	DGA1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0884	VPH1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0888	CPA1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0889	FAA1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0890	PMT3	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0892	VMA4	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0894	ALA1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0895	PYK2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0898	ALD4	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0903	MET12	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0904	ERG10	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0911	ALD6	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0913	ATP4	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0915	GLR1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0922	IDI1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0924	PXA1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0926	CDC60	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0934	FAS2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0935	VMA11	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0940	FUM1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0944	ATP15	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0947	CIT3	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0950	ATP20	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0953	HTS1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0955	GLN1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0956	VMA13	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0959	ARO7	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
e_0962	TKL1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0963	GRS2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0964	PIS1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0970	ASN1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0973	KRE6	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0975	MET16	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0976	DPM1	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0978	QCR2	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
e_0980	YER152C	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑	☑
F26bP	beta-D-fructose 2,6-bisphosphate	cell	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☐	☐

5 Function definition

This is an overview of one function definition.

5.1 Function definition `max`

Arguments x, y

Mathematical Expression

$$\frac{x + y + |x - y|}{2} \tag{1}$$

6 Reactions

This model contains 298 reactions. All reactions are listed in the following table and are subsequently described in detail. If a reaction is affected by a modifier, the identifier of this species is written above the reaction arrow.

Table 4: Overview of all reactions

№	Id	Name	Reaction Equation	SBO
1	r_0001	(R)-lactate:ferricytochrome-c 2-oxidoreductase	s_0025 + 2 s_0709 $\xrightleftharpoons{\text{e_0151, e_0268, e_0255, e_0531, e_0152, s_0025, s_0709, s_0710, P}}$ PYR	0000176
2	r_0004	(S)-lactate:ferricytochrome-c 2-oxidoreductase	s_0063 + 2 s_0709 $\xrightleftharpoons{\text{e_0704, e_0531, e_0255, s_0063, s_0709, s_0710, PYR}}$ 2 s_0710 + PYR	0000176
3	r_0005	1,3-beta-glucan synthase	s_1543 $\xrightleftharpoons{\text{e_0682, e_0364, s_1543, s_0002, s_1538}}$ s_0002 + s_1538	0000176
4	r_0006	1,6-beta-glucan synthase	s_1543 $\xrightleftharpoons{\text{e_0973, e_0379, s_1543, s_0004, s_1538}}$ s_0004 + s_1538	0000176
5	r_0007	1-(5-phosphoribosyl)-5-[(5-phosphoribosylamino)methylideneamino)imidazole-4-carboxamide isomerase	s_0077 $\xrightleftharpoons{\text{e_0465, s_0077, s_0312}}$ s_0312	0000176
6	r_0008	1-acyl-sn-gylcerol-3-phosphate acyltransferase	s_0082 + s_0380 $\xrightleftharpoons{\text{e_0869, e_0133, e_0117, s_0082, s_0380, s_0529, s_1331}}$ s_0529 + s_1331	0000176
7	r_0012	1-pyrroline-5-carboxylate dehydrogenase	s_0991 + NADH $\xrightleftharpoons{\text{e_0431, s_0991, NADH, s_0118, NAD}}$ s_0118 + NAD	0000176
8	r_0014	2,5-diamino-6-ribitylamino-4(3H)-pyrimidinone 5'-phosphate deaminase	s_0142 $\xrightleftharpoons{\text{e_0832, s_0142, s_0313, s_0419}}$ s_0313 + s_0419	0000176

№	Id	Name	Reaction Equation	SBO
9	r_0015	2,5-diamino-6-ribosylamino-4(3H)-pyrimidinone 5'-phosphate reductase (NADPH)	s_0141 + s_1212 $\xrightleftharpoons{\text{e_0071, s_0141, s_1212, s_0142, s_1207}}$ s_0142 + s_1207	0000176
10	r_0016	2-aceto-2-hydroxybutanoate synthase	s_0178 + PYR $\xrightleftharpoons{\text{e_0734, e_0100, s_0178, PYR, s_0039, CO2}}$ s_0039 + CO2	0000176
11	r_0018	2-aminoadipate transaminase	s_0176 + s_0991 $\xrightleftharpoons{\text{e_0348, e_0496, e_0980, s_0176, s_0991, s_0180, s_0953}}$ s_0180 + s_0953	0000176
12	r_0020	2-deoxy-D-arabino-heptulosonate 7-phosphate synthetase	s_0551 + PEP $\xrightleftharpoons{\text{e_0169, e_0088, s_0551, PEP, s_0349, PHO}}$ s_0349 + PHO	0000176
13	r_0023	2-isopropylmalate hydratase	s_0162 $\xrightleftharpoons{\text{e_0328, s_0162, s_0165}}$ s_0165	0000176
14	r_0024	2-isopropylmalate synthase	s_0232 + s_0373 $\xrightleftharpoons{\text{e_0778, e_0855, s_0232, s_0373, s_0162, s_0529}}$ s_0162 + s_0529	0000176
15	r_0027	2-methylcitrate dehydratase	s_0835 $\xrightleftharpoons{\text{e_0196, s_0835, s_0454}}$ s_0454	0000176
16	r_0029	2-oxo-4-methyl-3-carboxypentanoate decarboxylation	s_0010 $\xrightleftharpoons{\text{e_0550, e_0457, s_0010, s_0291, CO2}}$ s_0291 + CO2	0000176
17	r_0032	3',5'-bisphosphate nucleotidase	s_0390 $\xrightleftharpoons{\text{e_0830, s_0390, AMP, PHO}}$ AMP + PHO	0000176
18	r_0038	3,4-dihydroxy-2-butanone-4-phosphate synthase	s_0577 $\xrightleftharpoons{\text{e_0237, s_0577, s_0158, s_0722}}$ s_0158 + s_0722	0000176
19	r_0039	3-dehydroquinate dehydratase	s_0210 $\xrightleftharpoons{\text{e_0182, s_0210, s_0211}}$ s_0211	0000176
20	r_0040	3-dehydroquinate synthase	s_0349 $\xrightleftharpoons{\text{e_0182, s_0349, s_0210, PHO}}$ s_0210 + PHO	0000176
21	r_0041	3-dehydrosphinganine reductase	s_0231 + s_1212 $\xrightleftharpoons{\text{e_0092, s_0231, s_1212, s_1207, s_1445}}$ s_1207 + s_1445	0000176

№	Id	Name	Reaction Equation	SBO
22	r_0060	3-isopropylmalate dehydratase	s_0165 $\rightleftharpoons$ s_0009 (e_0328, s_0165, s_0009)	0000176
23	r_0061	3-isopropylmalate dehydrogenase	s_0009 + NAD $\rightleftharpoons$ NADH (e_0101, s_0009, NAD, s_0010, NADH)	0000176
24	r_0065	3-phosphoshikimate 1-carboxyvinyltransferase	s_0261 + PEP $\rightleftharpoons$ PHO (e_0182, s_0261, PEP, s_0324, PHO)	0000176
25	r_0079	5'-phosphoribosylformyl glycinamidine synthetase	s_0301 + ATP + s_0999 $\rightleftharpoons$ ADP + s_0991 + PHO (e_0368, s_0301, ATP, s_0999, s_0302, ADP, s_0991, PHO)	0000176
26	r_0080	5,10-methylenetetrahydrofolate reductase (NADPH)	s_0306 + s_1212 $\rightleftharpoons$ s_0322 + s_1207 (e_0340, e_0903, s_0306, s_1212, s_0322, s_1207)	0000176
27	r_0091	6-phosphogluconolactonase	s_0335 $\rightleftharpoons$ s_0340 (e_0453, e_0404, s_0335, s_0340)	0000176
28	r_0096	acetohydroxy acid isomeroreductase	s_0146 + s_1212 $\rightleftharpoons$ s_1207 (e_0685, s_0146, s_1212, s_0016, s_1207)	0000176
29	r_0097	acetolactate synthase	2 PYR $\rightleftharpoons$ s_0146 + CO2 (e_0734, e_0100, PYR, s_0146, CO2)	0000176
30	r_0103	acetyl-CoA C-acetyltransferase	2 s_0373 $\rightleftharpoons$ s_0367 + s_0529 (e_0904, s_0373, s_0367, s_0529)	0000176
31	r_0108	acetyl-Coa carboxylase	s_0373 + ATP + s_0445 $\rightleftharpoons$ s_1101 + PHO (e_0744, e_0808, s_0373, ATP, s_0445, ADP, s_1101, PHO)	0000176
32	r_0110	acetyl-CoA hydrolase	s_0362 + s_0529 $\rightleftharpoons$ s_0373 (e_0022, s_0362, s_0529, s_0373)	0000176
33	r_0115	acetylglutamate kinase	ATP + s_1192 $\rightleftharpoons$ ADP + s_1191 (e_0290, ATP, s_1192, ADP, s_1191)	0000176
34	r_0118	acteylornithine transaminase	s_0145 + s_0991 $\rightleftharpoons$ s_0180 + s_1182 (e_0840, s_0145, s_0991, s_0180, s_1182)	0000176

№	Id	Name	Reaction Equation	SBO
35	r_0142	adenosine kinase	s_0386 + ATP $\xrightleftharpoons{\text{e\_0541, s\_0386, ATP, ADP, AMP}}$ ADP + AMP	0000176
36	r_0144	adenosylhomocysteinase	s_1413 $\xrightleftharpoons{\text{e\_0280, s\_1413, s\_0386, s\_1012}}$ s_0386 + s_1012	0000176
37	AK	adenylate kinase	2 ADP $\xrightleftharpoons{\text{e\_0194, e\_0303, ADP, AMP, ATP}}$ AMP + ATP	0000176
38	r_0150	adenylate kinase (GTP)	AMP + s_0785 $\xrightleftharpoons{\text{e\_0303, AMP, s\_0785, ADP, s\_0739}}$ ADP + s_0739	0000176
39	r_0151	adenylosuccinate lyase (AICAR)	s_0299 $\xrightleftharpoons{\text{e\_0686, s\_0299, s\_0403, s\_0725}}$ s_0403 + s_0725	0000176
40	r_0152	adenylosuccinate lyase	s_0393 $\xrightleftharpoons{\text{e\_0686, s\_0393, AMP, s\_0725}}$ AMP + s_0725	0000176
41	r_0153	adenylosuccinate synthase	s_0785 + s_0849 + s_0973 $\xrightleftharpoons{\text{e\_0791, s\_0785, s\_0849, s\_0973, s\_0393, s\_0739, PHO}}$ s_0393 + s_0739 + PHO	0000176
42	r_0154	adenylyl-sulfate kinase	s_0298 + ATP $\xrightleftharpoons{\text{e\_0556, s\_0298, ATP, s\_0201, ADP}}$ s_0201 + ADP	0000176
43	r_0156	alanine glyoxylate aminotransferase	s_0779 + s_0955 $\xrightleftharpoons{\text{e\_0313, s\_0779, s\_0955, s\_1003, PYR}}$ s_1003 + PYR	0000176
44	r_0157	alanyl-tRNA synthetase	ATP + s_0955 + s_1582 $\xrightleftharpoons{\text{e\_0894, ATP, s\_0955, s\_1582, s\_0404, AMP, s\_0633}}$ s_0404 + AMP + s_0633	0000176
45	ADH	mitochondrial alcohol dehydrogenase	AcAld + NADH $\xrightleftharpoons{\text{e\_0730, e\_0356, e\_0069, e\_0834, AcAld, NADH, EtOH, NAD}}$ EtOH + NAD	0000176

№	Id	Name	Reaction Equation	SBO
46	r_0173	aldehyde dehydrogenase (acetaldehyde, NADP)	$\mathrm{AcAld} + \mathrm{s\_1207} \rightleftharpoons^{\mathrm{e\_0911,\ e\_0898,\ e\_0293,\ AcAld,\ s\_1207,\ s\_0362,\ s\_1212}} \mathrm{s\_0362} + \mathrm{s\_1212}$	0000176
47	r_0174	aldehyde dehydrogenase (acetylaldehyde, NAD)	$\mathrm{AcAld} + \mathrm{NAD} \rightleftharpoons^{\mathrm{e\_0898,\ e\_0740,\ AcAld,\ NAD,\ s\_0362,\ NADH}} \mathrm{s\_0362} + \mathrm{NADH}$	0000176
48	r_0195	alpha,alpha-trehalose-phosphate synthase (UDP-forming)	$\mathrm{G6P} + \mathrm{s\_1543} \rightleftharpoons^{\mathrm{e\_0711,\ e\_0065,\ e\_0179,\ e\_0753,\ G6P,\ s\_1543,\ s\_0409,\ s\_1538}} \mathrm{s\_0409} + \mathrm{s\_1538}$	0000176
49	r_0202	anthranilate phosphoribosyltransferase	$\mathrm{s\_0427} + \mathrm{s\_1386} \rightleftharpoons^{\mathrm{e\_0219,\ s\_0427,\ s\_1386,\ s\_0633,\ s\_1187}} \mathrm{s\_0633} + \mathrm{s\_1187}$	0000176
50	r_0203	anthranilate synthase	$\mathrm{s\_0515} + \mathrm{s\_0999} \rightleftharpoons^{\mathrm{e\_0297,\ e\_0591,\ s\_0515,\ s\_0999,\ s\_0427,\ s\_0991,\ PYR}} \mathrm{s\_0427} + \mathrm{s\_0991} + \mathrm{PYR}$	0000176
51	r_0207	argininosuccinate lyase	$\mathrm{s\_0015} \rightleftharpoons^{\mathrm{e\_0426,\ s\_0015,\ s\_0725,\ s\_0965}} \mathrm{s\_0725} + \mathrm{s\_0965}$	0000176
52	r_0208	argininosuccinate synthase	$\mathrm{ATP} + \mathrm{s\_0973} + \mathrm{s\_0979} \rightleftharpoons^{\mathrm{e\_0826,\ ATP,\ s\_0973,\ s\_0979,\ s\_0015,\ AMP,\ s\_0633}} \mathrm{s\_0015} + \mathrm{AMP} + \mathrm{s\_0633}$	0000176
53	r_0209	arginyl-tRNA synthetase	$\mathrm{ATP} + \mathrm{s\_0965} + \mathrm{s\_1583} \rightleftharpoons^{\mathrm{e\_0214,\ ATP,\ s\_0965,\ s\_1583,\ AMP,\ s\_0428,\ s\_0633}} \mathrm{AMP} + \mathrm{s\_0428} + \mathrm{s\_0633}$	0000176
54	r_0211	asparagine synthase (glutamine-hydrolysing)	$\mathrm{ATP} + \mathrm{s\_0973} + \mathrm{s\_0999} \rightleftharpoons^{\mathrm{e\_0970,\ e\_0376,\ ATP,\ s\_0973,\ s\_0999,\ AMP,\ s\_0633,\ s\_0969,\ s\_0633} + \mathrm{s\_0969} + \mathrm{s\_0991}}$	0000176
55	r_0212	Asparaginyl-tRNA synthetase	$\mathrm{ATP} + \mathrm{s\_0969} + \mathrm{s\_1585} \rightleftharpoons^{\mathrm{e\_0427,\ ATP,\ s\_0969,\ s\_1585,\ AMP,\ s\_0430,\ s\_0633}} \mathrm{AMP} + \mathrm{s\_0430} + \mathrm{s\_0633}$	0000176
56	r_0214	aspartate carbamoyltransferase	$\mathrm{s\_0455} + \mathrm{s\_0973} \rightleftharpoons^{\mathrm{e\_0508,\ s\_0455,\ s\_0973,\ s\_1194,\ PHO}} \mathrm{s\_1194} + \mathrm{PHO}$	0000176

№	Id	Name	Reaction Equation	SBO
57	r_0215	aspartate kinase	ATP + s_0973 $\xrightleftharpoons{\text{e\_0281, ATP, s\_0973, s\_0295, ADP}}$ s_0295 + ADP	0000176
58	r_0216	aspartate transaminase	s_0991 + s_1271 $\xrightleftharpoons{\text{e\_0629, e\_0574, s\_0991, s\_1271, s\_0180, s\_0973}}$ s_0180 + s_0973	0000176
59	r_0219	aspartate-semialdehyde dehydrogenase	s_0295 + s_1212 $\xrightleftharpoons{\text{e\_0186, s\_0295, s\_1212, s\_0978, s\_1207, PHO}}$ s_0978 + s_1207 + PHO	0000176
60	r_0220	Aspartyl-tRNA synthetase	ATP + s_0973 + s_1587 $\xrightleftharpoons{\text{e\_0615, ATP, s\_0973, s\_1587, AMP, s\_0432, s\_0633}}$ AMP + s_0432 + s_0633	0000176
61	r_0225	ATP phosphoribosyltransferase	ATP + s_1386 $\xrightleftharpoons{\text{e\_0283, ATP, s\_1386, s\_0326, s\_0633}}$ s_0326 + s_0633	0000176
62	r_0226	ATP synthase	ADP + PHO $\xrightleftharpoons{\text{e\_0950, e\_0944, e\_0005, e\_0033, e\_0207, e\_0003, e\_0671, e\_0002, e\_005}}$	0000176
63	ATPase	ATPase, cytosolic	ATP $\xrightleftharpoons{\text{e\_0727, e\_0569, e\_0432, e\_0263, e\_0956, e\_0155, e\_0892, e\_0362, e\_0251, e\_069}}$ PHO	0000176
64	r_0231	C-14 sterol reductase	s_0262 + s_1212 $\xrightleftharpoons{\text{e\_0800, s\_0262, s\_1212, s\_0122, s\_1207}}$ s_0122 + s_1207	0000176
65	r_0234	C-3 sterol dehydrogenase	s_1207 + s_1578 $\xrightleftharpoons{\text{e\_0326, s\_1207, s\_1578, CO2, s\_1212, s\_1579}}$ CO2 + s_1212 + s_1579	0000176
66	r_0235	C-3 sterol dehydrogenase (4-methylzymosterol)	s_0297 + NAD $\xrightleftharpoons{\text{e\_0326, s\_0297, NAD, s\_0209, CO2, NADH}}$ s_0209 + CO2 + NADH	0000176
67	r_0236	C-3 sterol keto reductase (4-methylzymosterol)	s_0209 + s_1212 $\xrightleftharpoons{\text{e\_0644, s\_0209, s\_1212, s\_0296, s\_1207}}$ s_0296 + s_1207	0000176
68	r_0237	C-3 sterol keto reductase (zymosterol)	s_1212 + s_1579 $\xrightleftharpoons{\text{e\_0644, s\_1212, s\_1579, s\_1207, s\_1569}}$ s_1207 + s_1569	0000176

№	Id	Name	Reaction Equation	SBO
69	r_0238	C-4 methyl sterol oxidase	s_0296 + s_1212 + s_1275 $\xrightleftharpoons{\text{e\_0367, s\_0296, s\_1212, s\_1275, s\_1207, s\_1576}}$ s_1207 + s_1576	0000176
70	r_0239	C-4 methyl sterol oxidase	s_1212 + s_1275 + s_1576 $\xrightleftharpoons{\text{e\_0367, s\_1212, s\_1275, s\_1576, s\_1207, s\_1577}}$ s_1207 + s_1577	0000176
71	r_0240	C-4 methyl sterol oxidase	s_1212 + s_1275 + s_1577 $\xrightleftharpoons{\text{e\_0367, s\_1212, s\_1275, s\_1577, s\_1207, s\_1578}}$ s_1207 + s_1578	0000176
72	r_0241	C-4 sterol methyl oxidase (4,4-dimethylzymosterol)	s_0122 + 3 s_1212 + 3 s_1275 $\xrightleftharpoons{\text{e\_0367, s\_0122, s\_1212, s\_1275, s\_0297, s\_1207}}$ s_0297 + 3 s_1207	0000176
73	r_0243	C-8 sterol isomerase	s_0700 $\xrightleftharpoons{\text{e\_0742, s\_0700, s\_0657}}$ s_0657	0000176
74	r_0244	C-s24 sterol reductase	s_0662 + s_1212 $\xrightleftharpoons{\text{e\_0329, s\_0662, s\_1212, s\_0666, s\_1207}}$ s_0666 + s_1207	0000176
75	r_0250	carbamoyl-phosphate synthase (glutamine-hydrolysing)	2 ATP + s_0445 + s_0999 $\xrightleftharpoons{\text{e\_0508, e\_0542, e\_0888, ATP, s\_0445, s\_0999, ADP, s\_0455, s\_0991, PHO}}$ 2 A s_0455 + s_0991 + PHO	0000176
76	r_0257	CDP-diacylglycerol synthase	s_0539 + s_1331 $\xrightleftharpoons{\text{e\_0045, s\_0539, s\_1331, s\_0471, s\_0633}}$ s_0471 + s_0633	0000176
77	r_0264	ceramide-1 synthase (26C)	s_0816 + s_1445 $\xrightleftharpoons{\text{e\_0558, e\_0417, e\_0762, s\_0816, s\_1445, s\_0478, s\_0529}}$ s_0478 + s_0529	0000176
78	r_0278	chorismate mutase	s_0515 $\xrightleftharpoons{\text{e\_0959, s\_0515, s\_1377}}$ s_1377	0000176

№	Id	Name	Reaction Equation	SBO
79	r_0279	chorismate synthase	$s\_0324 \xrightleftharpoons{e\_0342,\ s\_0324,\ s\_0515,\ PHO} s\_0515 + PHO$	0000176
80	r_0280	cis-aconitate(3-) to isocitrate	$s\_0516 \xrightleftharpoons{e\_0675,\ s\_0516,\ s\_0940} s\_0940$	0000176
81	r_0300	citrate synthase	$s\_0373 + s\_1271 \xrightleftharpoons{e\_0947,\ e\_0805,\ e\_0111,\ s\_0373,\ s\_1271,\ s\_0522,\ s\_0529} s\_0522 + s\_0529$	0000176
82	r_0302	citrate to cis-aconitate(3-)	$s\_0522 \xrightleftharpoons{e\_0675,\ s\_0522,\ s\_0516} s\_0516$	0000176
83	r_0307	CTP synthase (NH3)	$s\_0419 + ATP + s\_1559 \xrightleftharpoons{e\_0540,\ e\_0026,\ s\_0419,\ ATP,\ s\_1559,\ ADP,\ s\_0539,\ PHO} AD$ $s\_0539 + PHO$	0000176
84	r_0309	cystathionine beta-synthase	$s\_1012 + s\_1039 \xrightleftharpoons{e\_0380,\ s\_1012,\ s\_1039,\ s\_0980} s\_098$	0000176
85	r_0310	cystathionine g-lyase	$s\_0980 \xrightleftharpoons{e\_0008,\ s\_0980,\ s\_0178,\ s\_0419,\ s\_0981} s\_0178$ $s\_0419 + s\_0981$	0000176
86	r_0311	cystathionine gamma-synthase	$s\_0981 + s\_1233 \xrightleftharpoons{e\_0545,\ s\_0981,\ s\_1233,\ s\_0362,\ s\_0980} s\_036 + s\_0980$	0000176
87	r_0313	cysteinyl-tRNA synthetase	$ATP + s\_0981 + s\_1589 \xrightleftharpoons{e\_0793,\ ATP,\ s\_0981,\ s\_1589,\ AMP,\ s\_0542,\ s\_0633} AMP + s\_0542 + s\_0633$	0000176
88	r_0317	cytochrome P450 lanosterol 14-alpha-demethylase (NADP)	$s\_1059 + 3\,s\_1212 + 3\,s\_1275 \xrightleftharpoons{e\_0434,\ e\_0424,\ s\_1059,\ s\_1212,\ s\_1275,\ s\_0262,\ s\_0722,\ s\_1207} s\_0262 + s\_0722 + 3\,s\_1207$	0000176
89	r_0326	dCMP deaminase	$s\_0589 \xrightleftharpoons{e\_0452,\ s\_0589,\ s\_0419,\ s\_0654} s\_0419 + s\_0654$	0000176
90	r_0330	deoxyguanylate kinase (dGMP:ATP)	$ADP + s\_0613 \xrightleftharpoons{e\_0234,\ ADP,\ s\_0613,\ ATP,\ s\_0615} ATP + s\_0615$	0000176

№	Id	Name	Reaction Equation	SBO
91	r_0336	diacylglycerol acyltransferase	s_0529 + s_1524 $\xrightleftharpoons{\text{e_0883, s_0529, s_1524, s_0380, s_0619}}$ s_0380 + s_0619	0000176
92	r_0337	diacylglycerol pyrophosphate phosphatase	s_1331 $\xrightleftharpoons{\text{e_0203, s_1331, s_0619, PHO}}$ s_0619 + PHO	0000176
93	r_0344	dihydrofolate reductase	s_0625 + s_1212 $\xrightleftharpoons{\text{e_0880, s_0625, s_1212, s_1207, s_1487}}$ s_1207 + s_1487	0000176
94	r_0349	dihydroorotase	s_1194 $\xrightleftharpoons{\text{e_0692, s_1194, s_0061}}$ s_0061	0000176
95	r_0352	dihydroxy-acid dehydratase (2,3-dihydroxy-3-methylbutanoate)	s_0016 $\xrightleftharpoons{\text{e_0528, s_0016, s_0232}}$ s_0232	0000176
96	r_0353	dihydroxy-acid dehydratase (2,3-dihydroxy-3-methylpentanoate)	s_0008 $\xrightleftharpoons{\text{e_0528, s_0008, s_0056}}$ s_0056	0000176
97	r_0355	dimethylallyltranstransferase	s_0943 + s_1376 $\xrightleftharpoons{\text{e_0515, s_0943, s_1376, s_0633, s_0745}}$ s_0633 + s_0745	0000176
98	r_0361	dolichyl-phosphate D-mannosyltransferase	s_0645 + s_0743 $\xrightleftharpoons{\text{e_0976, s_0645, s_0743, s_0644, s_0739}}$ s_0644 + s_0739	0000176
99	r_0362	dolichyl-phosphate-mannose–protein mannosyltransferase	s_0644 $\xrightleftharpoons{\text{e_0141, e_0549, e_0010, e_0890, e_0142, s_0644, s_0645, s_1107}}$ s_0645 + s_1107	0000176
100	r_0364	dUTP diphosphatase	s_0656 $\xrightleftharpoons{\text{e_0089, s_0656, s_0633, s_0654}}$ s_0633 + s_0654	0000176
101	ENO	enolase	P2G $\xrightleftharpoons{\text{e_0405, e_0454, P2G, PEP}}$ PEP	0000176
102	r_0386	fatty acid synthase (n-C12:0)	s_0595 + s_1101 + 2 s_1212 $\xrightleftharpoons{\text{e_0808, e_0365, e_0586, e_0934, s_0595, s_1101, s_1212, CO2, s_0529, s_10}}$ s_0529 + s_1065 + 2 s_1207	0000176

№	Id	Name	Reaction Equation	SBO
103	r_0387	fatty acid synthase (n-C14:0)	$\text{s\_1065} + \text{s\_1101} + 2\,\text{s\_1212} \xrightleftharpoons{\text{e\_0808, e\_0365, e\_0586, e\_0934, s\_1065, s\_1101, s\_1212, CO2, s\_0529, s\_11}} \text{s\_0529} + \text{s\_1161} + 2\,\text{s\_1207}$	0000176
104	r_0389	fatty acid synthase (n-C16:0)	$\text{s\_1101} + \text{s\_1161} + 2\,\text{s\_1212} \xrightleftharpoons{\text{e\_0808, e\_0365, e\_0586, e\_0934, s\_1101, s\_1161, s\_1212, CO2, s\_0529, s\_12}} \text{s\_0529} + 2\,\text{s\_1207} + \text{s\_1286}$	0000176
105	r_0391	fatty acid synthase (n-C18:0)	$\text{s\_1101} + 2\,\text{s\_1212} + \text{s\_1286} \xrightleftharpoons{\text{e\_0808, e\_0365, e\_0586, e\_0934, s\_1101, s\_1212, s\_1286, CO2, s\_0529, s\_120}} \text{s\_0529} + 2\,\text{s\_1207} + \text{s\_1449}$	0000176
106	r_0393	fatty acid synthase (n-C24:0), lumped reaction	$3\,\text{s\_1101} + 6\,\text{s\_1212} + \text{s\_1449} \xrightleftharpoons{\text{e\_0128, e\_0117, e\_0687, s\_1101, s\_1212, s\_1449, CO2, s\_0529, s\_1084, s\_120}} 3\,\text{s\_0529} + \text{s\_1084} + 6\,\text{s\_1207}$	0000176
107	r_0394	fatty acid synthase (n-C26:0)	$\text{s\_1084} + \text{s\_1101} + 2\,\text{s\_1212} \xrightleftharpoons{\text{e\_0128, e\_0117, e\_0687, s\_1084, s\_1101, s\_1212, CO2, s\_0505, s\_0529, s\_12}} \text{s\_0505} + \text{s\_0529} + 2\,\text{s\_1207}$	0000176
108	r_0397	fatty acyl-CoA synthase (n-C10:0CoA)	$\text{s\_1101} + 2\,\text{s\_1212} + \text{s\_1255} \xrightleftharpoons{\text{e\_0808, e\_0365, e\_0586, e\_0934, s\_1101, s\_1212, s\_1255, CO2, s\_0529, s\_060}} \text{s\_0529} + \text{s\_0602} + 2\,\text{s\_1207}$	0000176
109	r_0398	fatty acyl-CoA synthase (n-C8:0CoA), lumped reaction	$\text{s\_0373} + 3\,\text{s\_1101} + 6\,\text{s\_1212} \xrightleftharpoons{\text{e\_0808, e\_0365, e\_0586, e\_0934, s\_0373, s\_1101, s\_1212, CO2, s\_0529, s\_12}} 3\,\text{s\_0529} + 6\,\text{s\_1207} + \text{s\_1255}$	0000176
110	r_0399	fatty-acid–CoA ligase (decanoate)	$\text{AMP} + \text{s\_0602} + \text{s\_0633} \xrightleftharpoons{\text{e\_0273, AMP, s\_0602, s\_0633, ATP, s\_0529, s\_0595}} \text{ATP} + \text{s\_0529} + \text{s\_0595}$	0000176
111	r_0400	fatty-acid–CoA ligase (dodecanoate)	$\text{ATP} + \text{s\_0529} + \text{s\_1065} \xrightleftharpoons{\text{e\_0273, ATP, s\_0529, s\_1065, AMP, s\_0633, s\_1073}} \text{AMP} + \text{s\_0633} + \text{s\_1073}$	0000176

№	Id	Name	Reaction Equation	SBO
112	r_0406	fatty-acid–CoA ligase (n-C26:0)	$\mathrm{ATP} + \mathrm{s\_0505} + \mathrm{s\_0529} \xrightleftharpoons{\text{e\_0053, ATP, s\_0505, s\_0529, AMP, s\_0633, s\_0816}} \mathrm{AMP} + \mathrm{s\_0633} + \mathrm{s\_0816}$	0000176
113	r_0407	fatty-acid–CoA ligase (octadecanoate)	$\mathrm{AMP} + \mathrm{s\_0633} + \mathrm{s\_1454} \xrightleftharpoons{\text{e\_0750, e\_0889, e\_0462, AMP, s\_0633, s\_1454, ATP, s\_0529}} \mathrm{s\_0529} + \mathrm{s\_1449}$	0000176
114	r_0432	fatty-acyl-CoA synthase (n-C12:0CoA)	$\mathrm{s\_0602} + \mathrm{s\_1101} + 2\,\mathrm{s\_1212} \xrightleftharpoons{\text{e\_0808, e\_0365, e\_0586, e\_0934, s\_0602, s\_1101, s\_1212, CO2, s\_0529, s\_10}} \mathrm{s\_0529} + \mathrm{s\_1073} + 2\,\mathrm{s\_1207}$	0000176
115	r_0433	fatty-acyl-CoA synthase (n-C14:0CoA)	$\mathrm{s\_1073} + \mathrm{s\_1101} + 2\,\mathrm{s\_1212} \xrightleftharpoons{\text{e\_0808, e\_0365, e\_0586, e\_0934, s\_1073, s\_1101, s\_1212, CO2, s\_0529, s\_11}} \mathrm{s\_0529} + \mathrm{s\_1176} + 2\,\mathrm{s\_1207}$	0000176
116	r_0434	fatty-acyl-CoA synthase (n-C16:0CoA)	$\mathrm{s\_1101} + \mathrm{s\_1176} + 2\,\mathrm{s\_1212} \xrightleftharpoons{\text{e\_0808, e\_0365, e\_0586, e\_0934, s\_1101, s\_1176, s\_1212, CO2, s\_0529, s\_12}} \mathrm{s\_0529} + 2\,\mathrm{s\_1207} + \mathrm{s\_1302}$	0000176
117	r_0435	fatty-acyl-CoA synthase (n-C18:0CoA)	$\mathrm{s\_1101} + 2\,\mathrm{s\_1212} + \mathrm{s\_1302} \xrightleftharpoons{\text{e\_0808, e\_0365, e\_0586, e\_0934, s\_1101, s\_1212, s\_1302, CO2, s\_0529, s\_120}} \mathrm{s\_0529} + 2\,\mathrm{s\_1207} + \mathrm{s\_1454}$	0000176
118	r_0438	ferrocytochrome-c:oxygen oxidoreductase	$4\,\mathrm{s\_0710} + \mathrm{s\_1275} \xrightleftharpoons{\text{e\_0632, e\_0007, e\_0774, e\_0436, e\_0136, e\_0001, e\_0347, e\_0255, e}}$	0000176
119	r_0439	ferrocytochrome-c:oxygen oxidoreductase	$2\,\mathrm{s\_0709} + \mathrm{s\_1535} \xrightleftharpoons{\text{e\_0514, e\_0978, e\_0422, e\_0250, e\_0004, e\_0243, e\_0389, e\_0255, e}} \mathrm{s\_1537}$	0000176
120	r_0446	formate-tetrahydrofolate ligase	$\mathrm{ATP} + \mathrm{s\_0722} + \mathrm{s\_1487} \xrightleftharpoons{\text{e\_0396, e\_0057, ATP, s\_0722, s\_1487, s\_0120, ADP, PHO}} \mathrm{s\_0} + \mathrm{ADP} + \mathrm{PHO}$	0000176
121	FBA	fructose-bisphosphate aldolase	$\mathrm{F16bP} \xrightleftharpoons{\text{e\_0567, F16bP, DHAP, GAP}} \mathrm{DHAP} + \mathrm{GAP}$	0000176
122	r_0451	fumarase	$\mathrm{s\_0725} \xrightleftharpoons{\text{e\_0940, s\_0725, s\_0066}} \mathrm{s\_0066}$	0000176

№	Id	Name	Reaction Equation	SBO
123	r_0462	geranyltranstransferase	s_0745 + s_0943 $\xrightleftharpoons{\text{e\_0515, s\_0745, s\_0943, s\_0190, s\_0633}}$ s_0190 + s_0633	0000176
124	r_0466	glucose 6-phosphate dehydrogenase	G6P + s_1207 $\xrightleftharpoons{\text{e\_0792, G6P, s\_1207, s\_0335, s\_1212}}$ s_0335 + s_1212	0000176
125	PGI	glucose-6-phosphate isomerase	G6P $\xrightleftharpoons{\text{e\_0079, G6P, F6P}}$ F6P	0000176
126	r_0470	glutamate dehydrogenase (NAD)	s_0180 + s_0419 + NADH $\xrightleftharpoons{\text{e\_0160, s\_0180, s\_0419, NADH, s\_0991, NAD}}$ s_0991 + NAD	0000176
127	r_0476	glutamine synthetase	s_0419 + ATP + s_0991 $\xrightleftharpoons{\text{e\_0955, s\_0419, ATP, s\_0991, ADP, s\_0999, PHO}}$ ADP + s_0999 + PHO	0000176
128	r_0478	glutaminyl-tRNA synthetase	ATP + s_0999 + s_1590 $\xrightleftharpoons{\text{e\_0867, ATP, s\_0999, s\_1590, AMP, s\_0633, s\_0747}}$ AMP + s_0633 + s_0747	0000176
129	r_0479	glutamyl-tRNA synthetase	ATP + s_0991 + s_1591 $\xrightleftharpoons{\text{e\_0353, ATP, s\_0991, s\_1591, AMP, s\_0633, s\_0748}}$ AMP + s_0633 + s_0748	0000176
130	TDH	glyceraldehyde-3-phosphate dehydrogenase	GAP + NAD + PHO $\xrightleftharpoons{\text{e\_0392, e\_0495, e\_0525, GAP, NAD, PHO, BPG, NADH}}$ BPG + NADH	0000176
131	r_0489	glycerol-3-phosphatase	s_0767 $\xrightleftharpoons{\text{e\_0466, e\_0288, s\_0767, GLY, PHO}}$ GLY + PHO	0000176
132	r_0491	glycerol-3-phosphate dehydrogenase (NAD)	DHAP + NADH $\xrightleftharpoons{\text{e\_0129, e\_0827, DHAP, NADH, s\_0767, NAD}}$ s_0767 + NAD	0000176
133	r_0495	glycerol-3-phosphate/dihydroxyacetone phosphate acyltransferase	s_0380 + s_0767 $\xrightleftharpoons{\text{e\_0020, e\_0607, s\_0380, s\_0767, s\_0082, s\_0529}}$ s_0082 + s_0529	0000176

№	Id	Name	Reaction Equation	SBO
134	r_0499	glycinamide ribotide transformylase	s_0120 + s_0325 $\rightleftharpoons$ s_0301 + s_1487	e_0231, s_0120, s_0325, s_0301, s_1487 0000176
135	r_0501	glycine cleavage system	s_1003 + NAD + s_1487 $\rightleftharpoons$ s_0419 + CO2 + NADH	e_0741, e_0012, e_0167, e_0311, s_1003, NAD, s_1487, s_030 0000176
136	r_0502	glycine hydroxymethyltransferase	s_0306 + s_1003 $\rightleftharpoons$ s_1039 + s_1487	e_0638, e_0091, s_0306, s_1003, s_1039, s_1487 0000176
137	r_0510	glycogen (starch) synthase	s_1543 $\rightleftharpoons$ s_0773 + s_1538	e_0667, e_0510, e_0317, e_0603, s_1543, s_0773, s_1538 0000176
138	r_0512	glycyl-tRNA synthetase	ATP + s_1003 + s_1593 $\rightleftharpoons$ s_0633 + s_0757	e_0064, e_0963, ATP, s_1003, s_1593, AMP, s_0633, s_0757 0000176
139	r_0514	GMP synthase	ATP + s_0999 + s_1565 $\rightleftharpoons$ s_0633 + s_0782 + s_0991	e_0746, ATP, s_0999, s_1565, AMP, s_0633, s_0782, s_0991 0000176
140	r_0525	GTP cyclohydrolase II	s_0785 $\rightleftharpoons$ s_0141 + s_0633 + s_0722	e_0025, s_0785, s_0141, s_0633, s_0722 0000176
141	r_0528	guanylate kinase	ATP + s_0782 $\rightleftharpoons$ ADP + s_0739	e_0234, ATP, s_0782, ADP, s_0739 0000176
142	r_0529	guanylate kinase (GMP:dATP)	s_0586 + s_0782 $\rightleftharpoons$ s_0578 + s_0739	e_0234, s_0586, s_0782, s_0582, s_0739 0000176
143	HXK	hexokinase (D-glucose:ATP)	ATP + GLC $\rightleftharpoons$ ADP + G6P	e_0106, e_0325, e_0355, GLC, ATP, G6P, ADP 0000176
144	r_0536	histidinol dehydrogenase	s_1010 + 2 NAD $\rightleftharpoons$ 2 NADH	e_0103, s_1010, NAD, s_1006, NADH 0000176

№	Id	Name	Reaction Equation	SBO
145	r_0537	histidinol-phosphatase	$s\_1011 \xrightleftharpoons{e\_0320,\ s\_1011,\ s\_1010,\ PHO} s\_1010 + PHO$	0000176
146	r_0538	histidinol-phosphate transaminase	$s\_0207 + s\_0991 \xrightleftharpoons{e\_0476,\ s\_0207,\ s\_0991,\ s\_0180,\ s\_1011} s\_0180 + s\_1011$	0000176
147	r_0539	histidyl-tRNA synthetase	$ATP + s\_1006 + s\_1594 \xrightleftharpoons{e\_0953,\ ATP,\ s\_1006,\ s\_1594,\ AMP,\ s\_0633,\ s\_0832} AMP + s\_0633 + s\_0832$	0000176
148	r_0542	homoacontinate hydratase	$s\_0454 \xrightleftharpoons{e\_0196,\ s\_0454,\ s\_0836} s\_0836$	0000176
149	r_0543	homocitrate synthase	$s\_0180 + s\_0373 \xrightleftharpoons{e\_0154,\ e\_0146,\ s\_0180,\ s\_0373,\ s\_0529,\ s\_0835} s\_0529 + s\_0835$	0000176
150	r_0545	homoisocitrate dehydrogenase	$s\_0836 + NAD \xrightleftharpoons{e\_0472,\ s\_0836,\ NAD,\ s\_0176,\ NADH,\ CO2} s\_0176 + NADH + CO2$	0000176
151	r_0547	homoserine dehydrogenase (NADP)	$s\_0978 + s\_1212 \xrightleftharpoons{e\_0548,\ s\_0978,\ s\_1212,\ s\_1014,\ s\_1207} s\_1014 + s\_1207$	0000176
152	r_0548	homoserine kinase	$ATP + s\_1014 \xrightleftharpoons{e\_0428,\ ATP,\ s\_1014,\ ADP,\ s\_1238} ADP + s\_1238$	0000176
153	r_0549	homoserine O-trans-acetylase	$s\_0373 + s\_1014 \xrightleftharpoons{e\_0799,\ s\_0373,\ s\_1014,\ s\_0529,\ s\_1233} s\_0529 + s\_1233$	0000176
154	r_0553	hydroxyacylglutathione hydrolase	$s\_0033 \xrightleftharpoons{e\_0202,\ e\_0846,\ s\_0033,\ s\_0025,\ s\_0750} s\_0025 + s\_0750$	0000176
155	r_0558	hydroxymethylglutaryl CoA reductase	$s\_0218 + 2\,s\_1212 \xrightleftharpoons{e\_0697,\ e\_0708,\ s\_0218,\ s\_1212,\ s\_0028,\ s\_0529,\ s\_1207} s\_0028 + s\_0529 + 2\,s\_1207$	0000176
156	r_0559	hydroxymethylglutaryl CoA synthase	$s\_0367 + s\_0373 \xrightleftharpoons{e\_0716,\ s\_0367,\ s\_0373,\ s\_0218,\ s\_0529} s\_0218 + s\_0529$	0000176

№	Id	Name	Reaction Equation	SBO
157	r_0563	Imidazole-glycerol-3-phosphate synthase	s_0312 + s_0999 $\xrightleftharpoons{\text{e\_0087, s\_0312, s\_0999, s\_0403, s\_0550, s\_0991}}$ s_0403 + s_0550 + s_0991	0000176
158	r_0564	imidazoleglycerol-phosphate dehydratase	s_0550 $\xrightleftharpoons{\text{e\_0875, s\_0550, s\_0207}}$ s_0207	0000176
159	r_0565	IMP dehydrogenase	s_0849 + NAD $\xrightleftharpoons{\text{e\_0705, e\_0458, e\_0693, s\_0849, NAD, NADH, s\_1565}}$ NADH + s_1565	0000176
160	r_0566	indole-3-glycerol-phosphate synthase	s_0076 $\xrightleftharpoons{\text{e\_0591, s\_0076, s\_0086, CO2}}$ s_0086 + CO2	0000176
161	r_0568	inorganic diphosphatase	s_0633 $\xrightleftharpoons{\text{e\_0038, e\_0754, s\_0633, PHO}}$ 2 PHO	0000176
162	r_0570	inosine monophosphate cyclohydrolase	s_1365 $\xrightleftharpoons{\text{e\_0631, e\_0736, s\_1365, s\_0849}}$ s_0849	0000176
163	r_0591	IPC synthase	s_0089 + s_0478 $\xrightleftharpoons{\text{e\_0557, e\_0220, s\_0089, s\_0478, s\_0619, s\_0897}}$ s_0619 + s_0897	0000176
164	r_0658	isocitrate dehydrogenase (NAD+)	s_0940 + NAD $\xrightleftharpoons{\text{e\_0862, e\_0771, s\_0940, NAD, s\_0180, CO2, NADH}}$ s_0180 + CO2 + NADH	0000176
165	r_0661	isocitrate dehydrogenase (NADP+), peroxisomal	s_0940 + s_1207 $\xrightleftharpoons{\text{e\_0769, e\_0135, s\_0940, s\_1207, s\_0180, CO2, s\_1212}}$ s_0180 + CO2 + s_1212	0000176
166	r_0662	isocitrate lyase	s_0940 $\xrightleftharpoons{\text{e\_0289, s\_0940, s\_0779, s\_1458}}$ s_0779 + s_1458	0000176
167	r_0663	isoleucine transaminase	s_0056 + s_0991 $\xrightleftharpoons{\text{e\_0550, e\_0457, s\_0056, s\_0991, s\_0180, s\_1016}}$ s_0180 + s_1016	0000176
168	r_0665	isoleucyl-tRNA synthetase	ATP + s_1016 + s_1596 $\xrightleftharpoons{\text{e\_0031, ATP, s\_1016, s\_1596, AMP, s\_0633, s\_0847}}$ AMP + s_0633 + s_0847	0000176
169	r_0667	isopentenyl-diphosphate D-isomerase	s_0943 $\xrightleftharpoons{\text{e\_0922, s\_0943, s\_1376}}$ s_1376	0000176

№	Id	Name	Reaction Equation	SBO
170	r_0669	ketol-acid reductoisomerase (2-aceto-2-hydroxybutanoate)	s_0039 + s_1212 $\rightleftharpoons$ s_0008 + s_1207	0000176
171	r_0674	L-alanine transaminase	s_0991 + PYR $\rightleftharpoons$ s_0180 + s_0955	0000176
172	r_0678	L-aminoadipate-semialdehyde dehydrogenase (NADPH)	s_0953 + s_1212 $\rightleftharpoons$ s_0959 + s_1207	0000176
173	r_0688	L-lactaldehyde:NADP+ 1-oxidoreductase	s_1151 + s_1212 $\rightleftharpoons$ s_0062 + s_1207	0000176
174	r_0692	L-threonine deaminase	s_1045 $\rightleftharpoons$ s_0178 + s_0419	0000176
175	r_0696	lactaldehyde dehydrogenase	s_0062 + NAD $\rightleftharpoons$ s_0063 + NADH	0000176
176	r_0697	lactoylglutathione lyase	s_0750 + s_1151 $\rightleftharpoons$ s_0033	0000176
177	r_0698	lanosterol synthase	s_0037 $\rightleftharpoons$ s_1059	0000176
178	r_0699	leucine transaminase	s_0291 + s_0991 $\rightleftharpoons$ s_0180 + s_1021	0000176
179	r_0701	leucyl-tRNA synthetase	ATP + s_1021 + s_1598 $\rightleftharpoons$ AMP + s_0633 + s_1077	0000176
180	r_0711	lysyl-tRNA synthetase	ATP + s_1025 + s_1600 $\rightleftharpoons$ AMP + s_0633 + s_1099	0000176
181	r_0713	malate dehydrogenase	s_0066 + NAD $\rightleftharpoons$ NADH + s_1271	0000176

№	Id	Name	Reaction Equation	SBO
182	r_0722	mannose-1-phosphate guanylyltransferase	s_0573 + s_0785 $\rightleftharpoons$ s_0633 + s_0743	e_0134, s_0573, s_0785, s_0633, s_0743 0000176
183	r_0723	mannose-6-phosphate isomerase	F6P $\rightleftharpoons$ s_0574	e_0269, F6P, s_0574 0000176
184	r_0724	methenyltetrahydrifikate cyclohydrolase	s_0304 $\rightleftharpoons$ s_0120	e_0057, e_0396, s_0304, s_0120 0000176
185	r_0726	methionine adenosyltransferase	ATP + s_1029 $\rightleftharpoons$ s_0633 + PHO + s_1416	e_0239, e_0658, ATP, s_1029, s_0633, PHO, s_1416 0000176
186	r_0727	methionine synthase	s_0322 + s_1012 $\rightleftharpoons$ s_1029 + s_1487	e_0298, s_0322, s_1012, s_1029, s_1487 0000176
187	r_0729	methionyl-tRNA synthetase	ATP + s_1029 + s_1602 $\rightleftharpoons$ AMP + s_0633 + s_1148	e_0409, ATP, s_1029, s_1602, AMP, s_0633, s_1148 0000176
188	r_0731	methylenetetrahydrofolate dehydrogenase (NAD)	s_0304 + NADH $\rightleftharpoons$ s_0306 + NAD	e_0610, s_0304, NADH, s_0306, NAD 0000176
189	r_0732	methylenetetrahydrofolate dehydrogenase (NADP)	s_0306 + s_1207 $\rightleftharpoons$ s_0304 + s_1212	e_0396, e_0057, s_0306, s_1207, s_0304, s_1212 0000176
190	r_0735	mevalonate kinase (atp)	s_0028 + ATP $\rightleftharpoons$ s_0190 + ADP	e_0745, s_0028, ATP, s_0019, ADP 0000176
191	r_0736	mevalonate kinase (ctp)	s_0028 + s_0539 $\rightleftharpoons$ s_0190 + s_0467	e_0745, s_0028, s_0539, s_0019, s_0467 0000176
192	r_0739	mevalonate pyrophoshate decarboxylase	s_0018 + ATP $\rightleftharpoons$ ADP + CO2 + s_0943 + PHO	e_0812, s_0018, ATP, ADP, CO2, s_0943, PHO 0000176
193	r_0757	myo-inositol 1-phosphatase	s_0126 $\rightleftharpoons$ s_1153 + PHO	e_0204, e_0435, s_0126, s_1153, PHO 0000176

№	Id	Name	Reaction Equation	SBO
194	r_0758	myo-inositol-1-phosphate synthase	G6P $\xrightleftharpoons{\text{e\_0512, G6P, s\_0126}}$ s_0126	0000176
195	r_0759	N-acetyl-g-glutamyl-phosphate reductase	s_1191 + s_1212 $\xrightleftharpoons{\text{e\_0290, s\_1191, s\_1212, s\_0145, s\_1207, PHO}}$ s_0145 + s_1207 + PHO	0000176
196	r_0792	nucleoside diphosphatase	s_0467 $\xrightleftharpoons{\text{e\_0271, s\_0467, s\_0526, PHO}}$ s_0526 + PHO	0000176
197	r_0800	nucleoside diphosphate kinase	ATP + s_0739 $\xrightleftharpoons{\text{e\_0568, ATP, s\_0739, ADP, s\_0785}}$ ADP + s_0785	0000176
198	r_0811	nucleoside-diphosphate kinase (ATP:UDP)	ATP + s_1538 $\xrightleftharpoons{\text{e\_0568, ATP, s\_1538, ADP, s\_1559}}$ ADP + s_1559	0000176
199	r_0813	O-acetylhomoserine (thiol)-lyase	s_0841 + s_1233 $\xrightleftharpoons{\text{e\_0674, s\_0841, s\_1233, s\_0362, s\_1012}}$ s_0362 + s_1012	0000176
200	r_0816	ornithine carbamoyltransferase	s_0455 + s_1266 $\xrightleftharpoons{\text{e\_0499, s\_0455, s\_1266, s\_0979, PHO}}$ s_0979 + PHO	0000176
201	r_0818	ornithine transacetylase	s_0991 + s_1182 $\xrightleftharpoons{\text{e\_0729, s\_0991, s\_1182, s\_1192, s\_1266}}$ s_0362 + s_1266	0000176
202	r_0820	orotate phosphoribosyltransferase	s_1269 + s_1386 $\xrightleftharpoons{\text{e\_0755, e\_0712, s\_1269, s\_1386, s\_0633, s\_1270}}$ s_0633 + s_1270	0000176
203	r_0821	orotidine-5'-phosphate decarboxylase	s_1270 $\xrightleftharpoons{\text{e\_0249, s\_1270, CO2, s\_1545}}$ CO2 + s_1545	0000176
204	r_0851	phenylalanine transaminase	s_0951 + s_0991 $\xrightleftharpoons{\text{e\_0348, s\_0951, s\_0991, s\_0180, s\_1032}}$ s_0180 + s_1032	0000176
205	r_0852	phenylalanyl-tRNA synthetase	ATP + s_1032 + s_1604 $\xrightleftharpoons{\text{e\_0639, e\_0312, ATP, s\_1032, s\_1604, AMP, s\_0633, s\_1314}}$ A s_0633 + s_1314	0000176

№	Id	Name	Reaction Equation	SBO
206	r_0855	phopshoribosylaminoimidazole synthetase	s_0302 + ATP $\xrightleftharpoons{\text{e\_0352, s\_0302, ATP, s\_0300, ADP, PHO}}$ s_0300 + ADP + PHO	0000176
207	r_0858	phosphatidylethanolamine methyltransferase	s_1351 + s_1416 $\xrightleftharpoons{\text{e\_0536, e\_0381, s\_1351, s\_1416, s\_1343, s\_1413}}$ s_1343 + s_1413	0000176
208	r_0874	phosphatidylinositol synthase	s_0471 + s_1153 $\xrightleftharpoons{\text{e\_0964, s\_0471, s\_1153, s\_0089, s\_0526}}$ s_0089 + s_0526	0000176
209	r_0877	phosphatidylserine decarboxylase	s_1337 $\xrightleftharpoons{\text{e\_0788, e\_0382, s\_1337, CO2, s\_1351}}$ CO2 + s_1351	0000176
210	r_0880	phosphatidylserine synthase	s_0471 + s_1039 $\xrightleftharpoons{\text{e\_0278, s\_0471, s\_1039, s\_0526, s\_1337}}$ s_0526 + s_1337	0000176
211	r_0883	phosphoadenylyl-sulfate reductase (thioredoxin)	s_0201 + s_1616 $\xrightleftharpoons{\text{e\_0633, e\_0975, e\_0398, s\_0201, s\_1616, s\_0390, s\_1469, s\_1620}}$ s_0 s_1469 + s_1620	0000176
212	r_0884	phosphoenolpyruvate carboxykinase	ATP + s_1271 $\xrightleftharpoons{\text{e\_0612, ATP, s\_1271, ADP, CO2, PEP}}$ ADP + CO2 + PEP	0000176
213	PFK	phosphofructokinase	ATP + F6P $\xrightleftharpoons{\text{e\_0401, e\_0743, AMP, F26bP, F6P, ATP, AMP, F26bP, F16bP}}$ ADP + F16bP	0000176
214	r_0888	phosphoglucomutase	G6P $\xrightleftharpoons{\text{e\_0576, e\_0757, e\_0733, G6P, s\_0567}}$ s_0567	0000176
215	r_0889	phosphogluconate dehydrogenase	s_0340 + s_1207 $\xrightleftharpoons{\text{e\_0455, e\_0407, s\_0340, s\_1207, CO2, s\_0577, s\_1212}}$ CO2 + s_0577 + s_1212	0000176
216	PGK	phosphoglycerate kinase	BPG + ADP $\xrightleftharpoons{\text{e\_0113, BPG, ADP, P3G, ATP}}$ P3G + ATP	0000176
217	GPM	phosphoglycerate mutase	P3G $\xrightleftharpoons{\text{e\_0582, P3G, P2G}}$ P2G	0000176

№	Id	Name	Reaction Equation	SBO
218	r_0900	phospholipid methyltransferase	s_1342 + s_1416 $\xrightleftharpoons{\text{e_0536, s_1342, s_1416, s_1346, s_1413}}$ s_1346 + s_1413	0000176
219	r_0901	phospholipid methyltransferase	s_1343 + s_1416 $\xrightleftharpoons{\text{e_0536, s_1343, s_1416, s_1342, s_1413}}$ s_1342 + s_1413	0000176
220	r_0902	phosphomannomutase	s_0574 $\xrightleftharpoons{\text{e_0314, s_0574, s_0573}}$ s_0573	0000176
221	r_0904	phosphomevalonate kinase	s_0019 + ATP $\xrightleftharpoons{\text{e_0747, s_0019, ATP, s_0018, ADP}}$ s_0018 + ADP	0000176
222	r_0908	phosphoribosyl amino imidazolesuccinocarbozamide synthetase	ATP + s_0973 + s_1364 $\xrightleftharpoons{\text{e_0017, ATP, s_0973, s_1364, s_0299, ADP, PHO}}$ s_0299 + ADP + PHO	0000176
223	r_0909	phosphoribosyl-AMP cyclohydrolase	s_0078 $\xrightleftharpoons{\text{e_0103, s_0078, s_0077}}$ s_0077	0000176
224	r_0910	phosphoribosyl-ATP pyrophosphatase	s_0326 $\xrightleftharpoons{\text{e_0103, s_0326, s_0078, s_0633}}$ s_0078 + s_0633	0000176
225	r_0911	phosphoribosylaminoimidazole-carboxylase	s_0300 + CO2 + ATP $\xrightleftharpoons{\text{e_0860, s_0300, CO2, ATP, s_1364, ADP, PHO}}$ s_1364 + ADP + PHO	0000176
226	r_0912	phosphoribosylaminoimidazolecarboxamide formyltransferase	s_0120 + s_0403 $\xrightleftharpoons{\text{e_0631, e_0736, s_0120, s_0403, s_1365, s_1487}}$ s_1365 + s_1487	0000176
227	r_0913	phosphoribosylanthranilate isomerase	s_1187 $\xrightleftharpoons{\text{e_0165, s_1187, s_0076}}$ s_0076	0000176
228	r_0914	phosphoribosylglycinamidine synthetase	s_0327 + ATP + s_1003 $\xrightleftharpoons{\text{e_0352, s_0327, ATP, s_1003, s_0325, ADP, PHO}}$ s_0325 + ADP + PHO	0000176
229	r_0915	phosphoribosylpyrophosphate amidotransferase	s_0999 + s_1386 $\xrightleftharpoons{\text{e_0763, s_0999, s_1386, s_0327, s_0633, s_0991}}$ s_0327 + s_0633 + s_0991	0000176
230	r_0916	phosphoribosylpyrophosphate synthetase	ATP + s_1408 $\xrightleftharpoons{\text{e_0030, e_0299, e_0418, e_0585, e_0829, ATP, s_1408, AMP, s_1386}}$ A s_1386	0000176

№	Id	Name	Reaction Equation	SBO
231	r_0938	prephenate dehydratase	s_1377 $\xrightleftharpoons{\text{e\_0802, s\_1377, CO2, s\_0951}}$ CO2 + s_0951	0000176
232	r_0939	prephenate dehydrogenase (NADP)	s_1207 + s_1377 $\xrightleftharpoons{\text{e\_0074, s\_1207, s\_1377, s\_0204, CO2, s\_1212}}$ s_0204 + CO2 + s_1212	0000176
233	r_0941	prolyl-tRNA synthetase	ATP + s_1035 + s_1606 $\xrightleftharpoons{\text{e\_0296, ATP, s\_1035, s\_1606, AMP, s\_0633, s\_1379}}$ AMP + s_0633 + s_1379	0000176
234	r_0957	pyrroline-5-carboxylate reductase	s_0118 + s_1212 $\xrightleftharpoons{\text{e\_0276, s\_0118, s\_1212, s\_1035, s\_1207}}$ s_1035 + s_1207	0000176
235	r_0958	pyruvate carboxylase	ATP + s_0445 + PYR $\xrightleftharpoons{\text{e\_0334, e\_0084, ATP, s\_0445, PYR, ADP, s\_1271, PHO}}$ ADP + s_1271 + PHO	0000176
236	PDC	pyruvate decarboxylase	PYR $\xrightleftharpoons{\text{e\_0370, e\_0636, e\_0647, PYR}}$ AcAld + CO2	0000176
237	PYK	pyruvate kinase	ADP + PEP $\xrightleftharpoons{\text{e\_0011, e\_0895, PEP, ADP, PYR, ATP}}$ ATP + PYR	0000176
238	r_0967	riboflavin synthase	s_0158 + s_0314 $\xrightleftharpoons{\text{e\_0841, s\_0158, s\_0314, s\_0328, PHO}}$ s_0328 + PHO	0000176
239	r_0968	riboflavin synthase	2 s_0328 $\xrightleftharpoons{\text{e\_0090, s\_0328, s\_0314, s\_1405}}$ s_0314 + s_1405	0000176
240	r_0970	ribonucleoside-triphosphate reductase (ATP)	ATP + s_1616 $\xrightleftharpoons{\text{e\_0398, ATP, s\_1616, s\_0586, s\_1620}}$ s_0586 + s_1620	0000176
241	r_0973	ribonucleoside-triphosphate reductase (UTP)	s_1559 + s_1616 $\xrightleftharpoons{\text{e\_0398, s\_1559, s\_1616, s\_0656, s\_1620}}$ s_0656 + s_1620	0000176
242	r_0974	ribonucleotide reductase	ADP + s_1616 $\xrightleftharpoons{\text{e\_0467, e\_0492, e\_0387, e\_0291, ADP, s\_1616, s\_0582, s\_1620}}$ s_0582 s_1620	0000176

№	Id	Name	Reaction Equation	SBO
243	r_0976	ribonucleotide reductase	s_0467 + s_1616 $\xrightleftharpoons{\text{e_0467, e_0492, e_0387, e_0291, s_0467, s_1616, s_0587, s_1620}}$ s_0 s_1620	0000176
244	r_0978	ribonucleotide reductase	s_0739 + s_1616 $\xrightleftharpoons{\text{e_0467, e_0492, e_0387, e_0291, s_0739, s_1616, s_0613, s_1620}}$ s_0 s_1620	0000176
245	r_0982	ribose-5-phosphate isomerase	s_0577 $\xrightleftharpoons{\text{e_0852, s_0577, s_1408}}$ s_1408	0000176
246	r_0984	ribulose 5-phosphate 3-epimerase	s_0577 $\xrightleftharpoons{\text{e_0506, s_0577, s_0581}}$ s_0581	0000176
247	r_0986	S-adenosyl-methionine delta-24-sterol-c-methyltransferase	s_1416 + s_1569 $\xrightleftharpoons{\text{e_0699, s_1416, s_1569, s_0700, s_1413}}$ s_0700 + s_1413	0000176
248	r_0988	saccharopine dehydrogenase (NAD, L-lysine forming)	s_1038 + NAD $\xrightleftharpoons{\text{e_0489, s_1038, NAD, s_0180, s_1025, NADH}}$ s_0180 + s_1025 + NADH	0000176
249	r_0989	saccharopine dehydrogenase (NADP, L-glutamate forming)	s_0959 + s_0991 + s_1212 $\xrightleftharpoons{\text{e_0813, s_0959, s_0991, s_1212, s_1038, s_1207}}$ s_1038 + s_1207	0000176
250	r_0990	sedoheptulose 1,7-bisphosphate D-glyceraldehyde-3-phosphate-lyase	s_0551 + DHAP $\xrightleftharpoons{\text{e_0567, s_0551, DHAP, s_1426}}$ s_1426	0000176
251	r_0993	serine palmitotransferase	s_1039 + s_1302 $\xrightleftharpoons{\text{e_0054, e_0177, e_0761, s_1039, s_1302, s_0231, CO2, s_0529}}$ s_023 CO2 + s_0529	0000176
252	r_0995	seryl-tRNA synthetase	ATP + s_1039 + s_1607 $\xrightleftharpoons{\text{e_0168, e_0425, ATP, s_1039, s_1607, AMP, s_0633, s_1428}}$ A s_0633 + s_1428	0000176
253	r_0996	shikimate dehydrogenase	s_0211 + s_1212 $\xrightleftharpoons{\text{e_0182, s_0211, s_1212, s_1207, s_1429}}$ s_1207 + s_1429	0000176
254	r_0997	shikimate kinase	ATP + s_1429 $\xrightleftharpoons{\text{e_0182, ATP, s_1429, s_0261, ADP}}$ s_0261 + ADP	0000176

№	Id	Name	Reaction Equation	SBO
255	r_1010	squalene epoxidase (NAD)	NADH + s_1275 + s_1447 $\xrightleftharpoons{\text{e\_0385, NADH, s\_1275, s\_1447, s\_0037, NAD}}$ s_0037 + NAD	0000176
256	r_1012	squalene synthase	2 s_0190 + s_1212 $\xrightleftharpoons{\text{e\_0456, s\_0190, s\_1212, s\_0633, s\_1207, s\_1447}}$ 2 s_0633 + s_1207 + s_1447	0000176
257	r_1014	steryl ester hydrolase	s_0666 + 1 · 8 s_0595 $\xrightleftharpoons{\text{e\_0578, e\_0613, s\_0666, s\_0595, s\_0672}}$ s_0672	0000176
258	r_1021	succinate dehydrogenase (ubiquinone-6)	s_1458 + s_1537 $\xrightleftharpoons{\text{e\_0579, e\_0188, e\_0494, e\_0619, e\_0581, s\_1458, s\_1537, s\_0725, s\_1}}$ s_1535	0000176
259	r_1026	sulfate adenylyltransferase (ADP)	ADP + s_1467 $\xrightleftharpoons{\text{e\_0107, ADP, s\_1467, s\_0298, PHO}}$ s_0298 + PHO	0000176
260	r_1027	sulfite reductase (NADPH2)	3 s_1212 + s_1469 $\xrightleftharpoons{\text{e\_0547, e\_0321, s\_1212, s\_1469, s\_0841, s\_1207}}$ s_0841 + 3 s_1207	0000176
261	r_1038	thioredoxin reductase (NADPH)	s_1212 + s_1620 $\xrightleftharpoons{\text{e\_0633, e\_0218, e\_0398, e\_0448, e\_0915, e\_0124, s\_1212, s\_1620, s\_1}}$ s_1616	0000176
262	r_1040	threonine aldolase	s_1045 $\xrightleftharpoons{\text{e\_0260, s\_1045, AcAld, s\_1003}}$ AcAld + s_1003	0000176
263	r_1041	threonine synthase	s_1238 $\xrightleftharpoons{\text{e\_0122, s\_1238, s\_1045, PHO}}$ s_1045 + PHO	0000176
264	r_1042	threonyl-tRNA synthetase	ATP + s_1045 + s_1608 $\xrightleftharpoons{\text{e\_0470, ATP, s\_1045, s\_1608, AMP, s\_0633, s\_1491}}$ AMP + s_0633 + s_1491	0000176
265	r_1045	thymidylate synthase	s_0306 + s_0654 $\xrightleftharpoons{\text{e\_0850, s\_0306, s\_0654, s\_0625, s\_0649}}$ s_0625 + s_0649	0000176

№	Id	Name	Reaction Equation	SBO
266	r_1048	transaldolase	GAP + s_1427 $\overset{\text{e\_0684, GAP, s\_1427, s\_0551, F6P}}{\rightleftharpoons}$ s_0551 + F6P	0000176
267	r_1049	transketolase 1	s_0581 + s_1408 $\overset{\text{e\_0063, e\_0962, s\_0581, s\_1408, GAP, s\_1427}}{\rightleftharpoons}$ GAP + s_1427	0000176
268	r_1050	transketolase 2	s_0551 + s_0581 $\overset{\text{e\_0063, e\_0962, s\_0551, s\_0581, F6P, GAP}}{\rightleftharpoons}$ F6P + GAP	0000176
269	r_1051	trehalose-phosphatase	s_0409 $\overset{\text{e\_0711, e\_0065, e\_0179, e\_0753, s\_0409, PHO, s\_1520}}{\rightleftharpoons}$ PHO + s_1520	0000176
270	r_1052	triacylglycerol lipase	s_0619 + 2 · 6 s_0595 $\overset{\text{e\_0176, e\_0611, e\_0765, e\_0851, s\_0619, s\_0595, s\_1524}}{\rightleftharpoons}$ s_1524	0000176
271	TPI	triose-phosphate isomerase	DHAP $\overset{\text{e\_0175, DHAP, GAP}}{\rightleftharpoons}$ GAP	0000176
272	r_1055	tryptophan synthase (indoleglycerol phosphate)	s_0086 + s_1039 $\overset{\text{e\_0330, s\_0086, s\_1039, GAP, s\_1048}}{\rightleftharpoons}$ s_1048	0000176
273	r_1057	tryptophanyl-tRNA synthetase	ATP + s_1048 + s_1610 $\overset{\text{e\_0836, ATP, s\_1048, s\_1610, AMP, s\_0633, s\_1527}}{\rightleftharpoons}$ AMP + s_0633 + s_1527	0000176
274	r_1063	tyrosine transaminase	s_0204 + s_0991 $\overset{\text{e\_0348, e\_0629, s\_0204, s\_0991, s\_0180, s\_1051}}{\rightleftharpoons}$ s_0180 + s_1051	0000176
275	r_1066	tyrosyl-tRNA synthetase	ATP + s_1051 + s_1612 $\overset{\text{e\_0390, ATP, s\_1051, s\_1612, AMP, s\_0633, s\_1533}}{\rightleftharpoons}$ AMP + s_0633 + s_1533	0000176
276	r_1072	UMP kinase	ATP + s_1545 $\overset{\text{e\_0561, ATP, s\_1545, ADP, s\_1538}}{\rightleftharpoons}$ ADP + s_1538	0000176
277	r_1084	UTP-glucose-1-phosphate uridylyltransferase	s_0567 + s_1559 $\overset{\text{e\_0565, s\_0567, s\_1559, s\_0633, s\_1543}}{\rightleftharpoons}$ s_0633 + s_1543	0000176

№	Id	Name	Reaction Equation	SBO
278	r_1087	valine transaminase	s_0232 + s_0991 $\xrightleftharpoons{\text{e_0550, e_0457, s_0232, s_0991, s_0180, s_1056}}$ s_0180 + s_1056	0000176
279	r_1089	valyl-tRNA synthetase	ATP + s_1056 + s_1614 $\xrightleftharpoons{\text{e_0372, ATP, s_1056, s_1614, AMP, s_0633, s_1561}}$ AMP + s_0633 + s_1561	0000176
280	r_1115	ammonia transport	s_0420 $\xrightleftharpoons{\text{s_0420, s_0419}}$ s_0419	0000185
281	HXT	glucose transport	GLCx $\xrightleftharpoons{\text{GLCx, GLC}}$ GLC	0000185
282	r_1172	glycerol transport via channel	GLY $\xrightarrow{\text{GLY}}$ s_0766	0000185
283	r_1244	phosphate transport	s_1324 $\xrightleftharpoons{\text{s_1324, PHO}}$ PHO	0000185
284	r_1266	sulfate uniport	s_1468 $\xrightleftharpoons{\text{s_1468, s_1467}}$ s_1467	0000185
285	r_1633	acetaldehyde transport	AcAld $\xrightarrow{\text{AcAld}}$ s_0360	0000185
286	r_1664	bicarbonate formation	CO2 $\xrightleftharpoons{\text{CO2, s_0445}}$ s_0445	0000176
287	r_1682	cholestenol delta-isomerase, lumped reaction	s_1275 + s_1416 + s_1569 $\xrightleftharpoons{\text{s_1275, s_1416, s_1569, s_0662, s_1413}}$ s_0662 + s_1413	0000176
288	r_1697	CO2 transport	CO2 $\xrightarrow{\text{CO2}}$ s_0458	0000185
289	r_1704	cytidylate kinase (dCMP)	ADP + s_0587 $\xrightleftharpoons{\text{ADP, s_0587, ATP, s_0589}}$ ATP + s_0589	0000176
290	r_1729	deoxyadenylate kinase	ADP + s_0582 $\xrightleftharpoons{\text{ADP, s_0582, ATP, s_0584}}$ ATP + s_0584	0000176
291	r_1762	ethanol transport	EtOH $\xrightarrow{\text{EtOH}}$ s_0681	0000185
292	r_1936	methylglyoxal synthase	DHAP $\xrightleftharpoons{\text{DHAP, s_1151, PHO}}$ s_1151 + PHO	0000176
293	r_1979	O2 transport	s_1277 $\xrightleftharpoons{\text{s_1277, s_1275}}$ s_1275	0000185

№	Id	Name	Reaction Equation	SBO
294	r_2030	pyrimidine phosphatase	$\mathrm{s\_0313} \xrightleftharpoons{\mathrm{s\_0313,\ s\_0314,\ PHO}} \mathrm{s\_0314} + \mathrm{PHO}$	0000176
295	r_2057	succinate transport	$\mathrm{s\_1458} \xrightarrow{\mathrm{s\_1458}} \mathrm{s\_1459}$	0000185

№	Id	Name	Reaction Equation	SBO
296	r_2111	growth	$1 \cdot 1348$ s_0002 + $0 \cdot 046$ AMP + $59 \cdot 276$ ATP + $0 \cdot 0447$ s_0526 + $0 \cdot 0036$ s_0584 + $0 \cdot 0024$ s_0589 + $0 \cdot 0024$ s_0615 + $0 \cdot 0036$ s_0649 + $0 \cdot 5185$ s_0773 + $0 \cdot 046$ s_0782 + $0 \cdot 8079$ s_1107 + $9.9 \cdot 10^{-4}$ s_1405 + $0 \cdot 02$ s_1467 + $0 \cdot 0234$ s_1520 + $0 \cdot 0599$ s_1545 + $1 \cdot 1348$ s_0004 + $0 \cdot 4588$ s_0404 + $0 \cdot 1607$ s_0428 + $0 \cdot 1017$ s_0430 + $0 \cdot 2975$ s_0432 + $0 \cdot 0066$ s_0542 + $0 \cdot 1054$ s_0747 + $0 \cdot 3018$ s_0748 + $0 \cdot 2904$ s_0757 + $0 \cdot 0663$ s_0832 + $0 \cdot 1927$ s_0847 + $0 \cdot 2964$ s_1077 + $0 \cdot 2862$ s_1099 + $0 \cdot 0507$ s_1148 + $0 \cdot 1339$ s_1314 + $0 \cdot 1647$ s_1379 + $3.9 \cdot 10^{-4}$ s_1337 + $0 \cdot 001583$ s_0089 + $0 \cdot 1854$ s_1428 + $0 \cdot 1914$ s_1491 + $0 \cdot 0284$ s_1527 + $0 \cdot 102$ s_1533 + $0 \cdot 2646$ s_1561 + $5.6 \cdot 10^{-5}$ s_0122 + $5.1708 \cdot 10^{-4}$ s_0897 + $9.6 \cdot 10^{-5}$ s_0657 + $1.25 \cdot 10^{-4}$ s_0662 + $0 \cdot 0056$ s_0666 + $8.12 \cdot 10^{-4}$ s_0672 + $5.35599999999999 \cdot 10^{-4}$ s_0595 + $1.14 \cdot 10^{-4}$ s_0700 + $3.2 \cdot 10^{-5}$ s_1059 + $0 \cdot 00288$ s_1346 + $6.97 \cdot 10^{-4}$ s_1351 + $7.81 \cdot 10^{-4}$ s_1524 + $1.5 \cdot 10^{-5}$ s_1569 $\xrightarrow{\text{s\_0002, AMP, ATP, s\_0526, s\_0584, s\_0589, s\_0615, s\_0649, s\_0773}}$ $58 \cdot 70001$ PHO + $0 \cdot 4588$ s_1582 + $0 \cdot 1607$ s_1583 + $0 \cdot 1017$ s_1585 + $0 \cdot 2975$ s_1587 + $0 \cdot 0066$ s_1589 + $0 \cdot 1054$ s_1590 + $0 \cdot 3018$ s_1591 + $0 \cdot 2904$ s_1593 + $0 \cdot 0663$ s_1594 + $0 \cdot 1927$ s_1596 + $0 \cdot 2964$ s_1598 + $0 \cdot 2862$ s_1600 + $0 \cdot 0507$ s_1602 + $0 \cdot 1339$ s_1604 + $0 \cdot 1647$ s_1606 + $0 \cdot 1854$ s_1607 + $0 \cdot 1914$ s_1608 + $0 \cdot 0284$ s_1610 + $0 \cdot 102$ s_1612 + $0 \cdot 2646$ s_1614	0000176

№	Id	Name	Reaction Equation	SBO
297	r_2126	sedoheptulose bisphosphatase	s_1426 $\xrightleftharpoons{\text{e\_0601, s\_1426, s\_1427, PHO}}$ s_1427 + PHO	0000176
298	r_2127	dihydroorotate dehydrogenase	s_0061 + NAD $\xrightleftharpoons{\text{e\_0594, s\_0061, NAD, s\_1269, NADH}}$ NADH	0000176

6.1 Reaction r_0001

This is a reversible reaction of two reactants forming two products influenced by nine modifiers.

Name (R)-lactate:ferricytochrome-c 2-oxidoreductase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0025} + 2\,\mathrm{s\_0709} \xrightleftharpoons{\mathrm{e\_0151,\ e\_0268,\ e\_0255,\ e\_0531,\ e\_0152,\ s\_0025,\ s\_0709,\ s\_0710,\ PYR}} 2\,\mathrm{s\_0710} + \mathrm{PYR} \tag{2}$$

Reactants

Table 5: Properties of each reactant.

Id	Name	SBO
s_0025	(R)-lactate	
s_0709	ferricytochrome c	

Modifiers

Table 6: Properties of each modifier.

Id	Name	SBO
e_0151	DLD1	0000460
e_0268	DLD3	0000460
e_0255	CYC7	0000460
e_0531	CYC1	0000460
e_0152	DLD2	0000460
s_0025	(R)-lactate	
s_0709	ferricytochrome c	
s_0710	ferrocytochrome c	
PYR	pyruvate	

Products

Table 7: Properties of each product.

Id	Name	SBO
s_0710	ferrocytochrome c	

Id	Name	SBO
PYR	pyruvate	

Kinetic Law

Derived unit contains undeclared units

$$v_1 = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0025}] \cdot [\mathrm{s\_0709}]^2 - \frac{[\mathrm{s\_0710}]^2 \cdot [\mathrm{PYR}]}{\mathrm{Keq}} \right)}{\mathrm{Km0025} \cdot \mathrm{Km0709}^2}}{\left(1 + \frac{[\mathrm{s\_0025}]}{\mathrm{Km0025}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0709}]}{\mathrm{Km0709}}\right)^2 + \left(1 + \frac{[\mathrm{s\_0710}]}{\mathrm{Km0710}}\right)^2 \cdot \left(1 + \frac{[\mathrm{PYR}]}{\mathrm{KmPYR}}\right) - 1} \quad (3)$$

Table 8: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.165	dimensionless	☑
Vmax		0000324	4.940	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	36.306	dimensionless	☑
Km0025		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0709		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0710		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmPYR		0000323	1.815	$\mathrm{mmol \cdot l^{-1}}$	☑

6.2 Reaction r_0004

This is a reversible reaction of two reactants forming two products influenced by seven modifiers.

Name (S)-lactate:ferricytochrome-c 2-oxidoreductase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0063} + 2\,\mathrm{s\_0709} \xrightleftharpoons{\mathrm{e\_0704,\ e\_0531,\ e\_0255,\ s\_0063,\ s\_0709,\ s\_0710,\ PYR}} 2\,\mathrm{s\_0710} + \mathrm{PYR} \quad (4)$$

Reactants

Table 9: Properties of each reactant.

Id	Name	SBO
s_0063	(S)-lactate	
s_0709	ferricytochrome c	

Modifiers

Table 10: Properties of each modifier.

Id	Name	SBO
e_0704	CYB2	0000460
e_0531	CYC1	0000460
e_0255	CYC7	0000460
s_0063	(S)-lactate	
s_0709	ferricytochrome c	
s_0710	ferrocytochrome c	
PYR	pyruvate	

Products

Table 11: Properties of each product.

Id	Name	SBO
s_0710	ferrocytochrome c	
PYR	pyruvate	

Kinetic Law

Derived unit contains undeclared units

$$v_2 = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0063}] \cdot [\mathrm{s\_0709}]^2 - \frac{[\mathrm{s\_0710}]^2 \cdot [\mathrm{PYR}]}{\mathrm{Keq}} \right)}{\mathrm{Km0063} \cdot \mathrm{Km0709}^2}}{\left(1 + \frac{[\mathrm{s\_0063}]}{\mathrm{Km0063}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0709}]}{\mathrm{Km0709}}\right)^2 + \left(1 + \frac{[\mathrm{s\_0710}]}{\mathrm{Km0710}}\right)^2 \cdot \left(1 + \frac{[\mathrm{PYR}]}{\mathrm{KmPYR}}\right) - 1} \tag{5}$$

Table 12: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.051	dimensionless	☑
Vmax		0000324	1.532	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	36.306	dimensionless	☑
Km0063		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0709		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0710		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmPYR		0000323	1.815	$\mathrm{mmol \cdot l^{-1}}$	☑

6.3 Reaction r_0005

This is a reversible reaction of one reactant forming two products influenced by five modifiers.

Name 1,3-beta-glucan synthase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_1543} \xrightleftharpoons{\text{e\_0682, e\_0364, s\_1543, s\_0002, s\_1538}} \text{s\_0002} + \text{s\_1538} \tag{6}$$

Reactant

Table 13: Properties of each reactant.

Id	Name	SBO
s_1543	UDP-D-glucose	

Modifiers

Table 14: Properties of each modifier.

Id	Name	SBO
e_0682	FKS1	0000460
e_0364	GSC2	0000460
s_1543	UDP-D-glucose	
s_0002	(1->3)-beta-D-glucan	
s_1538	UDP	

Products

Table 15: Properties of each product.

Id	Name	SBO
s_0002	(1->3)-beta-D-glucan	
s_1538	UDP	

Kinetic Law

Derived unit contains undeclared units

$$v_3 = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_1543}] - \frac{[\text{s\_0002}] \cdot [\text{s\_1538}]}{\text{Keq}} \right)}{\text{Km1543}}}{1 + \frac{[\text{s\_1543}]}{\text{Km1543}} + \left(1 + \frac{[\text{s\_0002}]}{\text{Km0002}}\right) \cdot \left(1 + \frac{[\text{s\_1538}]}{\text{Km1538}}\right) - 1} \tag{7}$$

Table 16: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.049	dimensionless	☑
Vmax		0000324	0.488	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.200	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1543		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0002		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1538		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.4 Reaction r_0006

This is a reversible reaction of one reactant forming two products influenced by five modifiers.

Name 1,6-beta-glucan synthase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_1543} \xrightleftharpoons{\text{e\_0973, e\_0379, s\_1543, s\_0004, s\_1538}} \text{s\_0004} + \text{s\_1538} \tag{8}$$

Reactant

Table 17: Properties of each reactant.

Id	Name	SBO
s_1543	UDP-D-glucose	

Modifiers

Table 18: Properties of each modifier.

Id	Name	SBO
e_0973	KRE6	0000460
e_0379	SKN1	0000460
s_1543	UDP-D-glucose	

Id	Name	SBO
s_0004	(1->6)-beta-D-glucan	
s_1538	UDP	

Products

Table 19: Properties of each product.

Id	Name	SBO
s_0004	(1->6)-beta-D-glucan	
s_1538	UDP	

Kinetic Law

Derived unit contains undeclared units

$$v_4 = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_1543}] - \frac{[\text{s\_0004}] \cdot [\text{s\_1538}]}{\text{Keq}} \right)}{\text{Km1543}}}{1 + \frac{[\text{s\_1543}]}{\text{Km1543}} + \left(1 + \frac{[\text{s\_0004}]}{\text{Km0004}}\right) \cdot \left(1 + \frac{[\text{s\_1538}]}{\text{Km1538}}\right) - 1} \tag{9}$$

Table 20: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.049	dimensionless	☑
Vmax		0000324	0.488	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.200	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1543		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0004		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1538		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.5 Reaction r_0007

This is a reversible reaction of one reactant forming one product influenced by three modifiers.

Name 1-(5-phosphoribosyl)-5-[(5-phosphoribosylamino)methylideneamino)imidazole-4-carboxamide isomerase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0077} \xrightleftharpoons{\text{e\_0465, s\_0077, s\_0312}} \text{s\_0312} \tag{10}$$

Reactant

Table 21: Properties of each reactant.

Id	Name
s_0077	1-(5-phospho-D-ribosyl)-5-[(5-phospho-D-ribosylamino)methylideneamino]imidazole-4-carboxamide

Modifiers

Table 22: Properties of each modifier.

Id	Name
e_0465	HIS6
s_0077	1-(5-phospho-D-ribosyl)-5-[(5-phospho-D-ribosylamino)methylideneamino]imidazole-4-carboxamide
s_0312	5-[(5-phospho-1-deoxy-D-ribulos-1-ylamino)methylideneamino]-1-(5-phospho-D-ribosyl)imidazole-4-c

Product

Table 23: Properties of each product.

Id	Name
s_0312	5-[(5-phospho-1-deoxy-D-ribulos-1-ylamino)methylideneamino]-1-(5-phospho-D-ribosyl)imidazole-4-c

Kinetic Law

Derived unit contains undeclared units

$$v_5 = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0077}] - \frac{[\text{s\_0312}]}{\text{Keq}} \right)}{\text{Km0077}}}{1 + \frac{[\text{s\_0077}]}{\text{Km0077}} + 1 + \frac{[\text{s\_0312}]}{\text{Km0312}} - 1} \tag{11}$$

Table 24: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.003	dimensionless	☑
Vmax		0000324	0.017	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑

Id	Name	SBO	Value	Unit	Constant
Keq		0000281	2.000	dimensionless	☑
Km0077		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0312		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.6 Reaction r_0008

This is a reversible reaction of two reactants forming two products influenced by seven modifiers.

Name 1-acyl-sn-gylcerol-3-phosphate acyltransferase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0082} + \mathrm{s\_0380} \xrightleftharpoons{\mathrm{e\_0869},\ \mathrm{e\_0133},\ \mathrm{e\_0117},\ \mathrm{s\_0082},\ \mathrm{s\_0380},\ \mathrm{s\_0529},\ \mathrm{s\_1331}} \mathrm{s\_0529} + \mathrm{s\_1331} \tag{12}$$

Reactants

Table 25: Properties of each reactant.

Id	Name	SBO
s_0082	1-acyl-sn-glycerol 3-phosphate	
s_0380	acyl-CoA	

Modifiers

Table 26: Properties of each modifier.

Id	Name	SBO
e_0869	ALE1	0000460
e_0133	SLC1	0000460
e_0117	FEN1	0000460
s_0082	1-acyl-sn-glycerol 3-phosphate	
s_0380	acyl-CoA	
s_0529	coenzyme A	
s_1331	phosphatidate	

Products

Table 27: Properties of each product.

Id	Name	SBO
s_0529	coenzyme A	
s_1331	phosphatidate	

Kinetic Law

Derived unit contains undeclared units

$$v_6 = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0082}] \cdot [\text{s\_0380}] - \frac{[\text{s\_0529}] \cdot [\text{s\_1331}]}{\text{Keq}} \right)}{\text{Km0082} \cdot \text{Km0380}}}{\left(1 + \frac{[\text{s\_0082}]}{\text{Km0082}}\right) \cdot \left(1 + \frac{[\text{s\_0380}]}{\text{Km0380}}\right) + \left(1 + \frac{[\text{s\_0529}]}{\text{Km0529}}\right) \cdot \left(1 + \frac{[\text{s\_1331}]}{\text{Km1331}}\right) - 1} \tag{13}$$

Table 28: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.72166486160745 \cdot 10^{-4}$	dimensionless	☑
Vmax		0000324	0.004	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0082		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0380		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0529		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1331		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.7 Reaction r_0012

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name 1-pyrroline-5-carboxylate dehydrogenase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0991} + \text{NADH} \xrightleftharpoons{\text{e\_0431, s\_0991, NADH, s\_0118, NAD}} \text{s\_0118} + \text{NAD} \tag{14}$$

Reactants

Table 29: Properties of each reactant.

Id	Name	SBO
s_0991	L-glutamate	
NADH	NADH	

Modifiers

Table 30: Properties of each modifier.

Id	Name	SBO
e_0431	PUT2	0000460
s_0991	L-glutamate	
NADH	NADH	
s_0118	1-pyrroline-5-carboxylate	
NAD	NAD	

Products

Table 31: Properties of each product.

Id	Name	SBO
s_0118	1-pyrroline-5-carboxylate	
NAD	NAD	

Kinetic Law

Derived unit contains undeclared units

$$v_7 = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0991}] \cdot [\mathrm{NADH}] - \frac{[\mathrm{s\_0118}] \cdot [\mathrm{NAD}]}{\mathrm{Keq}} \right)}{\mathrm{Km0991} \cdot \mathrm{KmNADH}}}{\left(1 + \frac{[\mathrm{s\_0991}]}{\mathrm{Km0991}}\right) \cdot \left(1 + \frac{[\mathrm{NADH}]}{\mathrm{KmNADH}}\right) + \left(1 + \frac{[\mathrm{s\_0118}]}{\mathrm{Km0118}}\right) \cdot \left(1 + \frac{[\mathrm{NAD}]}{\mathrm{KmNAD}}\right) - 1} \tag{15}$$

Table 32: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.007	dimensionless	☑
Vmax		0000324	0.099	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	34.674	dimensionless	☑
Km0991		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

Id	Name	SBO	Value	Unit	Constant
KmNADH		0000322	0.087	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0118		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
KmNAD		0000323	1.503	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.8 Reaction r_0014

This is a reversible reaction of one reactant forming two products influenced by four modifiers.

Name 2,5-diamino-6-ribitylamino-4(3H)-pyrimidinone 5'-phosphate deaminase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0142} \xrightleftharpoons{\mathrm{e\_0832,\ s\_0142,\ s\_0313,\ s\_0419}} \mathrm{s\_0313} + \mathrm{s\_0419} \tag{16}$$

Reactant

Table 33: Properties of each reactant.

Id	Name	SBO
s_0142	2,5-diamino-6-(5-phosphono)ribitylamino-4(3H)-pyrimidinone	

Modifiers

Table 34: Properties of each modifier.

Id	Name	SBO
e_0832	RIB2	0000460
s_0142	2,5-diamino-6-(5-phosphono)ribitylamino-4(3H)-pyrimidinone	
s_0313	5-amino-6-(5-phosphoribitylamino)uracil	
s_0419	ammonium	

Products

Table 35: Properties of each product.

Id	Name	SBO
s_0313	5-amino-6-(5-phosphoribitylamino)uracil	
s_0419	ammonium	

Kinetic Law

Derived unit contains undeclared units

$$v_8 = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0142}] - \frac{[\text{s\_0313}] \cdot [\text{s\_0419}]}{\text{Keq}} \right)}{\text{Km0142}}}{1 + \frac{[\text{s\_0142}]}{\text{Km0142}} + \left(1 + \frac{[\text{s\_0313}]}{\text{Km0313}}\right) \cdot \left(1 + \frac{[\text{s\_0419}]}{\text{Km0419}}\right) - 1} \tag{17}$$

Table 36: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$4.25595995293758 \cdot 10^{-5}$	dimensionless	☑
Vmax		0000324	$4.25595995293516 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.200	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0142		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0313		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0419		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.9 Reaction r_0015

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name 2,5-diamino-6-ribosylamino-4(3H)-pyrimidinone 5'-phosphate reductase (NADPH)

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0141} + \text{s\_1212} \xrightleftharpoons{\text{e\_0071, s\_0141, s\_1212, s\_0142, s\_1207}} \text{s\_0142} + \text{s\_1207} \tag{18}$$

Reactants

Table 37: Properties of each reactant.

Id	Name	SBO
s_0141	2,5-diamino-4-hydroxy-6-(5-phosphoribosylamino)pyrimidine	
s_1212	NADPH	

Modifiers

Table 38: Properties of each modifier.

Id	Name	SBO
e_0071	RIB7	0000460
s_0141	2,5-diamino-4-hydroxy-6-(5-phosphoribosylamino)pyrimidine	
s_1212	NADPH	
s_0142	2,5-diamino-6-(5-phosphono)ribitylamino-4(3H)-pyrimidinone	
s_1207	NADP(+)	

Products

Table 39: Properties of each product.

Id	Name	SBO
s_0142	2,5-diamino-6-(5-phosphono)ribitylamino-4(3H)-pyrimidinone	
s_1207	NADP(+)	

Kinetic Law

Derived unit contains undeclared units

$$v_9 = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0141}] \cdot [\mathrm{s\_1212}] - \frac{[\mathrm{s\_0142}] \cdot [\mathrm{s\_1207}]}{\mathrm{Keq}} \right)}{\mathrm{Km0141} \cdot \mathrm{Km1212}}}{\left(1 + \frac{[\mathrm{s\_0141}]}{\mathrm{Km0141}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1212}]}{\mathrm{Km1212}}\right) + \left(1 + \frac{[\mathrm{s\_0142}]}{\mathrm{Km0142}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1207}]}{\mathrm{Km1207}}\right) - 1} \tag{19}$$

Table 40: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$4.25595995293758 \cdot 10^{-5}$	dimensionless	☑
Vmax		0000324	$5.95834393411522 \cdot 10^{-4}$	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0141		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1212		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0142		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1207		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.10 Reaction r_0016

This is a reversible reaction of two reactants forming two products influenced by six modifiers.

Name 2-aceto-2-hydroxybutanoate synthase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0178} + \text{PYR} \xrightleftharpoons{\text{e\_0734, e\_0100, s\_0178, PYR, s\_0039, CO2}} \text{s\_0039} + \text{CO2} \tag{20}$$

Reactants

Table 41: Properties of each reactant.

Id	Name	SBO
s_0178	2-oxobutanoate	
PYR	pyruvate	

Modifiers

Table 42: Properties of each modifier.

Id	Name	SBO
e_0734	ILV2	0000460
e_0100	ILV6	0000460
s_0178	2-oxobutanoate	
PYR	pyruvate	
s_0039	(S)-2-acetyl-2-hydroxybutanoate	
CO2	carbon dioxide	

Products

Table 43: Properties of each product.

Id	Name	SBO
s_0039	(S)-2-acetyl-2-hydroxybutanoate	
CO2	carbon dioxide	

Kinetic Law

Derived unit contains undeclared units

$$v_{10} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0178}] \cdot [\text{PYR}] - \frac{[\text{s\_0039}] \cdot [\text{CO2}]}{\text{Keq}} \right)}{\text{Km0178} \cdot \text{KmPYR}}}{\left(1 + \frac{[\text{s\_0178}]}{\text{Km0178}}\right) \cdot \left(1 + \frac{[\text{PYR}]}{\text{KmPYR}}\right) + \left(1 + \frac{[\text{s\_0039}]}{\text{Km0039}}\right) \cdot \left(1 + \frac{[\text{CO2}]}{\text{KmCO2}}\right) - 1} \tag{21}$$

Table 44: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.008	dimensionless	☑
Vmax		0000324	0.116	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	1.102	dimensionless	☑
Km0178		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmPYR		0000322	1.815	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0039		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmCO2		0000323	1.000	$\mathrm{mmol \cdot l^{-1}}$	☑

6.11 Reaction r_0018

This is a reversible reaction of two reactants forming two products influenced by seven modifiers.

Name 2-aminoadipate transaminase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0176} + \mathrm{s\_0991} \xrightleftharpoons{\mathrm{e\_0348,\ e\_0496,\ e\_0980,\ s\_0176,\ s\_0991,\ s\_0180,\ s\_0953}} \mathrm{s\_0180} + \mathrm{s\_0953} \tag{22}$$

Reactants

Table 45: Properties of each reactant.

Id	Name	SBO
s_0176	2-oxoadipic acid	
s_0991	L-glutamate	

Modifiers

Table 46: Properties of each modifier.

Id	Name	SBO
e_0348	ARO8	0000460
e_0496	BNA3	0000460
e_0980	YER152C	0000460
s_0176	2-oxoadipic acid	
s_0991	L-glutamate	

Id	Name	SBO
s_0180	2-oxoglutarate	
s_0953	L-2-aminoadipate	

Products

Table 47: Properties of each product.

Id	Name	SBO
s_0180	2-oxoglutarate	
s_0953	L-2-aminoadipate	

Kinetic Law

Derived unit contains undeclared units

$$v_{11} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0176}] \cdot [\text{s\_0991}] - \frac{[\text{s\_0180}] \cdot [\text{s\_0953}]}{\text{Keq}} \right)}{\text{Km0176} \cdot \text{Km0991}}}{\left(1 + \frac{[\text{s\_0176}]}{\text{Km0176}}\right) \cdot \left(1 + \frac{[\text{s\_0991}]}{\text{Km0991}}\right) + \left(1 + \frac{[\text{s\_0180}]}{\text{Km0180}}\right) \cdot \left(1 + \frac{[\text{s\_0953}]}{\text{Km0953}}\right) - 1} \tag{23}$$

Table 48: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.012	dimensionless	☑
Vmax		0000324	0.172	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0176		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0991		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0180		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0953		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.12 Reaction r_0020

This is a reversible reaction of two reactants forming two products influenced by six modifiers.

Name 2-deoxy-D-arabino-heptulosonate 7-phosphate synthetase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0551} + \text{PEP} \xrightleftharpoons{\text{e\_0169, e\_0088, s\_0551, PEP, s\_0349, PHO}} \text{s\_0349} + \text{PHO} \tag{24}$$

Reactants

Table 49: Properties of each reactant.

Id	Name	SBO
s_0551	D-erythrose 4-phosphate	
PEP	phosphoenolpyruvate	

Modifiers

Table 50: Properties of each modifier.

Id	Name	SBO
e_0169	ARO3	0000460
e_0088	ARO4	0000460
s_0551	D-erythrose 4-phosphate	
PEP	phosphoenolpyruvate	
s_0349	7-phospho-2-dehydro-3-deoxy-D-arabino-heptonic acid	
PHO	phosphate	

Products

Table 51: Properties of each product.

Id	Name	SBO
s_0349	7-phospho-2-dehydro-3-deoxy-D-arabino-heptonic acid	
PHO	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{12} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0551}] \cdot [\text{PEP}] - \frac{[\text{s\_0349}] \cdot [\text{PHO}]}{\text{Keq}} \right)}{\text{Km0551} \cdot \text{KmPEP}}}{\left(1 + \frac{[\text{s\_0551}]}{\text{Km0551}}\right) \cdot \left(1 + \frac{[\text{PEP}]}{\text{KmPEP}}\right) + \left(1 + \frac{[\text{s\_0349}]}{\text{Km0349}}\right) \cdot \left(1 + \frac{[\text{PHO}]}{\text{KmPHO}}\right) - 1} \tag{25}$$

Table 52: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.011	dimensionless	☑
Vmax		0000324	0.159	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Keq		0000281	3.163	dimensionless	☑
Km0551		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
KmPEP		0000322	0.063	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0349		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
KmPHO		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.13 Reaction r_0023

This is a reversible reaction of one reactant forming one product influenced by three modifiers.

Name 2-isopropylmalate hydratase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0162} \xrightleftharpoons{\mathrm{e\_0328,\ s\_0162,\ s\_0165}} \mathrm{s\_0165} \tag{26}$$

Reactant

Table 53: Properties of each reactant.

Id	Name	SBO
s_0162	2-isopropylmalate	

Modifiers

Table 54: Properties of each modifier.

Id	Name	SBO
e_0328	LEU1	0000460
s_0162	2-isopropylmalate	
s_0165	2-isopropylmaleic acid	

Product

Table 55: Properties of each product.

Id	Name	SBO
s_0165	2-isopropylmaleic acid	

Kinetic Law

Derived unit contains undeclared units

$$v_{13} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0162}] - \frac{[\text{s\_0165}]}{\text{Keq}} \right)}{\text{Km0162}}}{1 + \frac{[\text{s\_0162}]}{\text{Km0162}} + 1 + \frac{[\text{s\_0165}]}{\text{Km0165}} - 1} \tag{27}$$

Table 56: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.013	dimensionless	☑
Vmax		0000324	0.076	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0162		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0165		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.14 Reaction r_0024

This is a reversible reaction of two reactants forming two products influenced by six modifiers.

Name 2-isopropylmalate synthase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0232} + \text{s\_0373} \xrightleftharpoons{\text{e\_0778, e\_0855, s\_0232, s\_0373, s\_0162, s\_0529}} \text{s\_0162} + \text{s\_0529} \tag{28}$$

Reactants

Table 57: Properties of each reactant.

Id	Name	SBO
s_0232	3-methyl-2-oxobutanoate	
s_0373	acetyl-CoA	

Modifiers

Table 58: Properties of each modifier.

Id	Name	SBO
e_0778	LEU4	0000460
e_0855	LEU9	0000460
s_0232	3-methyl-2-oxobutanoate	
s_0373	acetyl-CoA	
s_0162	2-isopropylmalate	
s_0529	coenzyme A	

Products

Table 59: Properties of each product.

Id	Name	SBO
s_0162	2-isopropylmalate	
s_0529	coenzyme A	

Kinetic Law

Derived unit contains undeclared units

$$v_{14} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0232}] \cdot [\text{s\_0373}] - \frac{[\text{s\_0162}] \cdot [\text{s\_0529}]}{\text{Keq}} \right)}{\text{Km0232} \cdot \text{Km0373}}}{\left(1 + \frac{[\text{s\_0232}]}{\text{Km0232}}\right) \cdot \left(1 + \frac{[\text{s\_0373}]}{\text{Km0373}}\right) + \left(1 + \frac{[\text{s\_0162}]}{\text{Km0162}}\right) \cdot \left(1 + \frac{[\text{s\_0529}]}{\text{Km0529}}\right) - 1} \tag{29}$$

Table 60: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.013	dimensionless	☑
Vmax		0000324	0.178	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0232		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0373		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0162		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0529		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.15 Reaction r_0027

This is a reversible reaction of one reactant forming one product influenced by three modifiers.

Name 2-methylcitrate dehydratase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0835} \xrightleftharpoons{\text{e\_0196, s\_0835, s\_0454}} \text{s\_0454} \tag{30}$$

Reactant

Table 61: Properties of each reactant.

Id	Name	SBO
s_0835	homocitrate	

Modifiers

Table 62: Properties of each modifier.

Id	Name	SBO
e_0196	LYS4	0000460
s_0835	homocitrate	
s_0454	but-1-ene-1,2,4-tricarboxylic acid	

Product

Table 63: Properties of each product.

Id	Name	SBO
s_0454	but-1-ene-1,2,4-tricarboxylic acid	

Kinetic Law

Derived unit contains undeclared units

$$v_{15} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0835}] - \frac{[\text{s\_0454}]}{\text{Keq}} \right)}{\text{Km0835}}}{1 + \frac{[\text{s\_0835}]}{\text{Km0835}} + 1 + \frac{[\text{s\_0454}]}{\text{Km0454}} - 1} \tag{31}$$

Table 64: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.012	dimensionless	☑
Vmax		0000324	0.074	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0835		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0454		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.16 Reaction r_0029

This is a reversible reaction of one reactant forming two products influenced by five modifiers.

Name 2-oxo-4-methyl-3-carboxypentanoate decarboxylation

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0010} \xrightleftharpoons{\mathrm{e\_0550,\ e\_0457,\ s\_0010,\ s\_0291,\ CO2}} \mathrm{s\_0291} + \mathrm{CO2} \tag{32}$$

Reactant

Table 65: Properties of each reactant.

Id	Name	SBO
s_0010	(2S)-2-isopropyl-3-oxosuccinate	

Modifiers

Table 66: Properties of each modifier.

Id	Name	SBO
e_0550	BAT2	0000460
e_0457	BAT1	0000460
s_0010	(2S)-2-isopropyl-3-oxosuccinate	
s_0291	4-methyl-2-oxopentanoate	
CO2	carbon dioxide	

Products

Table 67: Properties of each product.

Id	Name	SBO
s_0291	4-methyl-2-oxopentanoate	
CO2	carbon dioxide	

Kinetic Law

Derived unit contains undeclared units

$$v_{16} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0010}] - \frac{[\text{s\_0291}] \cdot [\text{CO2}]}{\text{Keq}} \right)}{\text{Km0010}}}{1 + \frac{[\text{s\_0010}]}{\text{Km0010}} + \left(1 + \frac{[\text{s\_0291}]}{\text{Km0291}}\right) \cdot \left(1 + \frac{[\text{CO2}]}{\text{KmCO2}}\right) - 1} \tag{33}$$

Table 68: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.013	dimensionless	☑
Vmax		0000324	0.127	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0010		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0291		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmCO2		0000323	1.000	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.17 Reaction r_0032

This is a reversible reaction of one reactant forming two products influenced by four modifiers.

Name 3',5'-bisphosphate nucleotidase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0390} \xrightleftharpoons{\text{e\_0830, s\_0390, AMP, PHO}} \text{AMP} + \text{PHO} \tag{34}$$

Reactant

Table 69: Properties of each reactant.

Id	Name	SBO
s_0390	adenosine 3',5'-bismonophosphate	

Id	Name	SBO

Modifiers

Table 70: Properties of each modifier.

Id	Name	SBO
e_0830	MET22	0000460
s_0390	adenosine 3',5'-bismonophosphate	
AMP	AMP	
PHO	phosphate	

Products

Table 71: Properties of each product.

Id	Name	SBO
AMP	AMP	
PHO	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{17} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0390}] - \frac{[\mathrm{AMP}] \cdot [\mathrm{PHO}]}{\mathrm{Keq}} \right)}{\mathrm{Km0390}}}{1 + \frac{[\mathrm{s\_0390}]}{\mathrm{Km0390}} + \left(1 + \frac{[\mathrm{AMP}]}{\mathrm{KmAMP}}\right) \cdot \left(1 + \frac{[\mathrm{PHO}]}{\mathrm{KmPHO}}\right) - 1} \tag{35}$$

Table 72: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.002	dimensionless	☑
Vmax		0000324	0.025	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	0.586	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0390		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmAMP		0000323	0.293	$\mathrm{mmol \cdot l^{-1}}$	☑
KmPHO		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.18 Reaction r_0038

This is a reversible reaction of one reactant forming two products influenced by four modifiers.

Name 3,4-dihydroxy-2-butanone-4-phosphate synthase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0577} \xrightleftharpoons{\text{e\_0237, s\_0577, s\_0158, s\_0722}} \text{s\_0158} + \text{s\_0722} \tag{36}$$

Reactant

Table 73: Properties of each reactant.

Id	Name	SBO
s_0577	D-ribulose 5-phosphate	

Modifiers

Table 74: Properties of each modifier.

Id	Name	SBO
e_0237	RIB3	0000460
s_0577	D-ribulose 5-phosphate	
s_0158	2-hydroxy-3-oxobutyl phosphate	
s_0722	formate	

Products

Table 75: Properties of each product.

Id	Name	SBO
s_0158	2-hydroxy-3-oxobutyl phosphate	
s_0722	formate	

Kinetic Law

Derived unit contains undeclared units

$$v_{18} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0577}] - \frac{[\text{s\_0158}] \cdot [\text{s\_0722}]}{\text{Keq}} \right)}{\text{Km0577}}}{1 + \frac{[\text{s\_0577}]}{\text{Km0577}} + \left(1 + \frac{[\text{s\_0158}]}{\text{Km0158}}\right) \cdot \left(1 + \frac{[\text{s\_0722}]}{\text{Km0722}}\right) - 1} \tag{37}$$

Table 76: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$8.51191990587516 \cdot 10^{-5}$	dimensionless	☑
Vmax		0000324	$8.51191990587032 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.200	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0577		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0158		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0722		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.19 Reaction r_0039

This is a reversible reaction of one reactant forming one product influenced by three modifiers.

Name 3-dehydroquinate dehydratase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0210} \xrightleftharpoons{\text{e\_0182, s\_0210, s\_0211}} \text{s\_0211} \tag{38}$$

Reactant

Table 77: Properties of each reactant.

Id	Name	SBO
s_0210	3-dehydroquinate	

Modifiers

Table 78: Properties of each modifier.

Id	Name	SBO
e_0182	ARO1	0000460
s_0210	3-dehydroquinate	
s_0211	3-dehydroshikimate	

Product

Table 79: Properties of each product.

Id	Name	SBO
s_0211	3-dehydroshikimate	

Kinetic Law

Derived unit contains undeclared units

$$v_{19} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0210}] - \frac{[\text{s\_0211}]}{\text{Keq}} \right)}{\text{Km0210}}}{1 + \frac{[\text{s\_0210}]}{\text{Km0210}} + 1 + \frac{[\text{s\_0211}]}{\text{Km0211}} - 1} \tag{39}$$

Table 80: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.011	dimensionless	☑
Vmax		0000324	0.068	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0210		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0211		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.20 Reaction r_0040

This is a reversible reaction of one reactant forming two products influenced by four modifiers.

Name 3-dehydroquinate synthase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0349} \xrightleftharpoons{\text{e\_0182, s\_0349, s\_0210, PHO}} \text{s\_0210} + \text{PHO} \tag{40}$$

Reactant

Table 81: Properties of each reactant.

Id	Name	SBO
s_0349	7-phospho-2-dehydro-3-deoxy-D-arabino-heptonic acid	

Modifiers

Table 82: Properties of each modifier.

Id	Name	SBO
e_0182	ARO1	0000460
s_0349	7-phospho-2-dehydro-3-deoxy-D-arabino-heptonic acid	
s_0210	3-dehydroquinate	
PHO	phosphate	

Products

Table 83: Properties of each product.

Id	Name	SBO
s_0210	3-dehydroquinate	
PHO	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{20} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0349}] - \frac{[\text{s\_0210}] \cdot [\text{PHO}]}{\text{Keq}} \right)}{\text{Km0349}}}{1 + \frac{[\text{s\_0349}]}{\text{Km0349}} + \left(1 + \frac{[\text{s\_0210}]}{\text{Km0210}}\right) \cdot \left(1 + \frac{[\text{PHO}]}{\text{KmPHO}}\right) - 1} \tag{41}$$

Table 84: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.011	dimensionless	☑
Vmax		0000324	0.114	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.200	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0349		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0210		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmPHO		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.21 Reaction r_0041

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name 3-dehydrosphinganine reductase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0231} + \text{s\_1212} \xrightleftharpoons{\text{e\_0092, s\_0231, s\_1212, s\_1207, s\_1445}} \text{s\_1207} + \text{s\_1445} \tag{42}$$

Reactants

Table 85: Properties of each reactant.

Id	Name	SBO
s_0231	3-ketosphinganine	
s_1212	NADPH	

Modifiers

Table 86: Properties of each modifier.

Id	Name	SBO
e_0092	TSC10	0000460
s_0231	3-ketosphinganine	
s_1212	NADPH	
s_1207	NADP(+)	
s_1445	sphinganine	

Products

Table 87: Properties of each product.

Id	Name	SBO
s_1207	NADP(+)	
s_1445	sphinganine	

Kinetic Law

Derived unit contains undeclared units

$$v_{21} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0231}] \cdot [\text{s\_1212}] - \frac{[\text{s\_1207}] \cdot [\text{s\_1445}]}{\text{Keq}} \right)}{\text{Km0231} \cdot \text{Km1212}}}{\left(1 + \frac{[\text{s\_0231}]}{\text{Km0231}}\right) \cdot \left(1 + \frac{[\text{s\_1212}]}{\text{Km1212}}\right) + \left(1 + \frac{[\text{s\_1207}]}{\text{Km1207}}\right) \cdot \left(1 + \frac{[\text{s\_1445}]}{\text{Km1445}}\right) - 1} \tag{43}$$

Table 88: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.22290041668838 \cdot 10^{-5}$	dimensionless	☑
Vmax		0000324	$3.11206058336746 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0231		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1212		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1207		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1445		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.22 Reaction r_0060

This is a reversible reaction of one reactant forming one product influenced by three modifiers.

Name 3-isopropylmalate dehydratase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0165} \xrightleftharpoons{\text{e\_0328, s\_0165, s\_0009}} \text{s\_0009} \tag{44}$$

Reactant

Table 89: Properties of each reactant.

Id	Name	SBO
s_0165	2-isopropylmaleic acid	

Modifiers

Table 90: Properties of each modifier.

Id	Name	SBO
e_0328	LEU1	0000460
s_0165	2-isopropylmaleic acid	
s_0009	(2R,3S)-3-isopropylmalate	

Product

Table 91: Properties of each product.

Id	Name	SBO
s_0009	(2R,3S)-3-isopropylmalate	

Kinetic Law

Derived unit contains undeclared units

$$v_{22} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0165}] - \frac{[\text{s\_0009}]}{\text{Keq}} \right)}{\text{Km0165}}}{1 + \frac{[\text{s\_0165}]}{\text{Km0165}} + 1 + \frac{[\text{s\_0009}]}{\text{Km0009}} - 1} \tag{45}$$

Table 92: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.013	dimensionless	☑
Vmax		0000324	0.076	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0165		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0009		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.23 Reaction r_0061

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name 3-isopropylmalate dehydrogenase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0009} + \text{NAD} \underset{\longleftarrow}{\overset{\text{e\_0101, s\_0009, NAD, s\_0010, NADH}}{\rightleftharpoons}} \text{s\_0010} + \text{NADH} \tag{46}$$

Reactants

Table 93: Properties of each reactant.

Id	Name	SBO
s_0009	(2R,3S)-3-isopropylmalate	
NAD	NAD	

Modifiers

Table 94: Properties of each modifier.

Id	Name	SBO
e_0101	LEU2	0000460
s_0009	(2R,3S)-3-isopropylmalate	
NAD	NAD	
s_0010	(2S)-2-isopropyl-3-oxosuccinate	
NADH	NADH	

Products

Table 95: Properties of each product.

Id	Name	SBO
s_0010	(2S)-2-isopropyl-3-oxosuccinate	
NADH	NADH	

Kinetic Law

Derived unit contains undeclared units

$$v_{23} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0009}] \cdot [\mathrm{NAD}] - \frac{[\mathrm{s\_0010}] \cdot [\mathrm{NADH}]}{\mathrm{Keq}} \right)}{\mathrm{Km0009} \cdot \mathrm{KmNAD}}}{\left(1 + \frac{[\mathrm{s\_0009}]}{\mathrm{Km0009}}\right) \cdot \left(1 + \frac{[\mathrm{NAD}]}{\mathrm{KmNAD}}\right) + \left(1 + \frac{[\mathrm{s\_0010}]}{\mathrm{Km0010}}\right) \cdot \left(1 + \frac{[\mathrm{NADH}]}{\mathrm{KmNADH}}\right) - 1} \tag{47}$$

Table 96: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.013	dimensionless	☑
Vmax		0000324	0.178	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	0.115	dimensionless	☑
Km0009		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmNAD		0000322	1.503	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0010		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmNADH		0000323	0.087	$\mathrm{mmol \cdot l^{-1}}$	☑

6.24 Reaction r_0065

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name 3-phosphoshikimate 1-carboxyvinyltransferase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0261} + \text{PEP} \xrightleftharpoons{\text{e\_0182, s\_0261, PEP, s\_0324, PHO}} \text{s\_0324} + \text{PHO} \tag{48}$$

Reactants

Table 97: Properties of each reactant.

Id	Name	SBO
s_0261	3-phosphoshikimic acid	
PEP	phosphoenolpyruvate	

Modifiers

Table 98: Properties of each modifier.

Id	Name	SBO
e_0182	ARO1	0000460
s_0261	3-phosphoshikimic acid	
PEP	phosphoenolpyruvate	
s_0324	5-O-(1-carboxyvinyl)-3-phosphoshikimic acid	
PHO	phosphate	

Products

Table 99: Properties of each product.

Id	Name	SBO
s_0324	5-O-(1-carboxyvinyl)-3-phosphoshikimic acid	
PHO	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{24} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0261}] \cdot [\text{PEP}] - \frac{[\text{s\_0324}] \cdot [\text{PHO}]}{\text{Keq}} \right)}{\text{Km0261} \cdot \text{KmPEP}}}{\left(1 + \frac{[\text{s\_0261}]}{\text{Km0261}}\right) \cdot \left(1 + \frac{[\text{PEP}]}{\text{KmPEP}}\right) + \left(1 + \frac{[\text{s\_0324}]}{\text{Km0324}}\right) \cdot \left(1 + \frac{[\text{PHO}]}{\text{KmPHO}}\right) - 1} \tag{49}$$

Table 100: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.011	dimensionless	☑
Vmax		0000324	0.159	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	3.163	dimensionless	☑
Km0261		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmPEP		0000322	0.063	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0324		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmPHO		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.25 Reaction r_0079

This is a reversible reaction of three reactants forming four products influenced by eight modifiers.

Name 5'-phosphoribosylformyl glycinamidine synthetase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0301} + \text{ATP} + \text{s\_0999} \xrightleftharpoons{\text{e\_0368, s\_0301, ATP, s\_0999, s\_0302, ADP, s\_0991, PHO}} \text{s\_0302} + \text{ADP} + \text{s\_0991} + \text{PHO} \tag{50}$$

Reactants

Table 101: Properties of each reactant.

Id	Name	SBO
s_0301	5'-phosphoribosyl-N-formylglycineamide	
ATP	ATP	
s_0999	L-glutamine	

Modifiers

Table 102: Properties of each modifier.

Id	Name	SBO
e_0368	ADE6	0000460
s_0301	5'-phosphoribosyl-N-formylglycineamide	
ATP	ATP	
s_0999	L-glutamine	
s_0302	5'-phosphoribosyl-N-formylglycineamidine	
ADP	ADP	
s_0991	L-glutamate	
PHO	phosphate	

Products

Table 103: Properties of each product.

Id	Name	SBO
s_0302	5'-phosphoribosyl-N-formylglycineamidine	
ADP	ADP	
s_0991	L-glutamate	
PHO	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{25} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0301}] \cdot [\mathrm{ATP}] \cdot [\mathrm{s\_0999}] - \frac{[\mathrm{s\_0302}] \cdot [\mathrm{ADP}] \cdot [\mathrm{s\_0991}] \cdot [\mathrm{PHO}]}{\mathrm{Keq}} \right)}{\mathrm{Km0301} \cdot \mathrm{KmATP} \cdot \mathrm{Km0999}}}{\left(1 + \frac{[\mathrm{s\_0301}]}{\mathrm{Km0301}}\right) \cdot \left(1 + \frac{[\mathrm{ATP}]}{\mathrm{KmATP}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0999}]}{\mathrm{Km0999}}\right) + \left(1 + \frac{[\mathrm{s\_0302}]}{\mathrm{Km0302}}\right) \cdot \left(1 + \frac{[\mathrm{ADP}]}{\mathrm{KmADP}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0991}]}{\mathrm{Km0991}}\right) \cdot \left(1 + \frac{[\mathrm{PHO}]}{\mathrm{KmPHO}}\right) -} \quad (51)$$

Table 104: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.004	dimensionless	☑
Vmax		0000324	0.196	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	0.102	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0301		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmATP		0000322	2.525	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0999		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0302		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

Id	Name	SBO	Value	Unit	Constant
KmADP		0000323	1.282	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0991		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
KmPHO		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.26 Reaction r_0080

This is a reversible reaction of two reactants forming two products influenced by six modifiers.

Name 5,10-methylenetetrahydrofolate reductase (NADPH)

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0306} + \mathrm{s\_1212} \xrightleftharpoons{\mathrm{e\_0340},\ \mathrm{e\_0903},\ \mathrm{s\_0306},\ \mathrm{s\_1212},\ \mathrm{s\_0322},\ \mathrm{s\_1207}} \mathrm{s\_0322} + \mathrm{s\_1207} \qquad (52)$$

Reactants

Table 105: Properties of each reactant.

Id	Name	SBO
s_0306	5,10-methylenetetrahydrofolate	
s_1212	NADPH	

Modifiers

Table 106: Properties of each modifier.

Id	Name	SBO
e_0340	MET13	0000460
e_0903	MET12	0000460
s_0306	5,10-methylenetetrahydrofolate	
s_1212	NADPH	
s_0322	5-methyltetrahydrofolate	
s_1207	NADP(+)	

Products

Table 107: Properties of each product.

Id	Name	SBO
s_0322	5-methyltetrahydrofolate	
s_1207	NADP(+)	

Kinetic Law

Derived unit contains undeclared units

$$v_{26} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0306}] \cdot [\text{s\_1212}] - \frac{[\text{s\_0322}] \cdot [\text{s\_1207}]}{\text{Keq}} \right)}{\text{Km0306} \cdot \text{Km1212}}}{\left(1 + \frac{[\text{s\_0306}]}{\text{Km0306}}\right) \cdot \left(1 + \frac{[\text{s\_1212}]}{\text{Km1212}}\right) + \left(1 + \frac{[\text{s\_0322}]}{\text{Km0322}}\right) \cdot \left(1 + \frac{[\text{s\_1207}]}{\text{Km1207}}\right) - 1} \tag{53}$$

Table 108: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.003	dimensionless	☑
Vmax		0000324	0.040	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0306		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1212		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0322		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1207		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.27 Reaction r_0091

This is a reversible reaction of one reactant forming one product influenced by four modifiers.

Name 6-phosphogluconolactonase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0335} \xrightleftharpoons{\text{e\_0453, e\_0404, s\_0335, s\_0340}} \text{s\_0340} \tag{54}$$

Reactant

Table 109: Properties of each reactant.

Id	Name	SBO
s_0335	6-O-phosphono-D-glucono-1,5-lactone	

Modifiers

Table 110: Properties of each modifier.

Id	Name	SBO
e_0453	SOL3	0000460
e_0404	SOL4	0000460
s_0335	6-O-phosphono-D-glucono-1,5-lactone	
s_0340	6-phospho-D-gluconate	

Product

Table 111: Properties of each product.

Id	Name	SBO
s_0340	6-phospho-D-gluconate	

Kinetic Law

Derived unit contains undeclared units

$$v_{27} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0335}] - \frac{[\text{s\_0340}]}{\text{Keq}} \right)}{\text{Km0335}}}{1 + \frac{[\text{s\_0335}]}{\text{Km0335}} + 1 + \frac{[\text{s\_0340}]}{\text{Km0340}} - 1} \tag{55}$$

Table 112: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.058	dimensionless	☑
Vmax		0000324	0.348	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0335		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0340		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.28 Reaction r_0096

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name acetohydroxy acid isomeroreductase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0146} + \text{s\_1212} \xrightleftharpoons{\text{e\_0685, s\_0146, s\_1212, s\_0016, s\_1207}} \text{s\_0016} + \text{s\_1207} \qquad (56)$$

Reactants

Table 113: Properties of each reactant.

Id	Name	SBO
s_0146	2-acetyllactic acid	
s_1212	NADPH	

Modifiers

Table 114: Properties of each modifier.

Id	Name	SBO
e_0685	ILV5	0000460
s_0146	2-acetyllactic acid	
s_1212	NADPH	
s_0016	(R)-2,3-dihydroxy-3-methylbutanoate	
s_1207	NADP(+)	

Products

Table 115: Properties of each product.

Id	Name	SBO
s_0016	(R)-2,3-dihydroxy-3-methylbutanoate	
s_1207	NADP(+)	

Kinetic Law

Derived unit contains undeclared units

$$v_{28} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0146}] \cdot [\text{s\_1212}] - \frac{[\text{s\_0016}] \cdot [\text{s\_1207}]}{\text{Keq}} \right)}{\text{Km0146} \cdot \text{Km1212}}}{\left(1 + \frac{[\text{s\_0146}]}{\text{Km0146}}\right) \cdot \left(1 + \frac{[\text{s\_1212}]}{\text{Km1212}}\right) + \left(1 + \frac{[\text{s\_0016}]}{\text{Km0016}}\right) \cdot \left(1 + \frac{[\text{s\_1207}]}{\text{Km1207}}\right) - 1} \tag{57}$$

Table 116: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.024	dimensionless	☑
Vmax		0000324	0.338	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0146		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1212		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0016		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1207		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.29 Reaction r_0097

This is a reversible reaction of one reactant forming two products influenced by five modifiers.

Name acetolactate synthase

SBO:0000176 biochemical reaction

Reaction equation

$$2\,\text{PYR} \xrightleftharpoons{\text{e\_0734, e\_0100, PYR, s\_0146, CO2}} \text{s\_0146} + \text{CO2} \tag{58}$$

Reactant

Table 117: Properties of each reactant.

Id	Name	SBO
PYR	pyruvate	

Modifiers

Table 118: Properties of each modifier.

Id	Name	SBO
e_0734	ILV2	0000460
e_0100	ILV6	0000460

Id	Name	SBO
PYR	pyruvate	
s_0146	2-acetyllactic acid	
CO2	carbon dioxide	

Products

Table 119: Properties of each product.

Id	Name	SBO
s_0146	2-acetyllactic acid	
CO2	carbon dioxide	

Kinetic Law

Derived unit contains undeclared units

$$v_{29} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{PYR}]^2 - \frac{[\text{s\_0146}] \cdot [\text{CO2}]}{\text{Keq}} \right)}{\text{KmPYR}^2}}{\left(1 + \frac{[\text{PYR}]}{\text{KmPYR}}\right)^2 + \left(1 + \frac{[\text{s\_0146}]}{\text{Km0146}}\right) \cdot \left(1 + \frac{[\text{CO2}]}{\text{KmCO2}}\right) - 1} \tag{59}$$

Table 120: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.024	dimensionless	☑
Vmax		0000324	0.338	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.061	dimensionless	☑
KmPYR		0000322	1.815	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0146		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmCO2		0000323	1.000	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.30 Reaction r_0103

This is a reversible reaction of one reactant forming two products influenced by four modifiers.

Name acetyl-CoA C-acetyltransferase

SBO:0000176 biochemical reaction

Reaction equation

$$2\,\text{s\_0373} \xrightleftharpoons{\text{e\_0904, s\_0373, s\_0367, s\_0529}} \text{s\_0367} + \text{s\_0529} \tag{60}$$

Reactant

Table 121: Properties of each reactant.

Id	Name	SBO
s_0373	acetyl-CoA	

Modifiers

Table 122: Properties of each modifier.

Id	Name	SBO
e_0904	ERG10	0000460
s_0373	acetyl-CoA	
s_0367	acetoacetyl-CoA	
s_0529	coenzyme A	

Products

Table 123: Properties of each product.

Id	Name	SBO
s_0367	acetoacetyl-CoA	
s_0529	coenzyme A	

Kinetic Law

Derived unit contains undeclared units

$$v_{30} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0373}]^2 - \frac{[\text{s\_0367}] \cdot [\text{s\_0529}]}{\text{Keq}} \right)}{\text{Km0373}^2}}{\left(1 + \frac{[\text{s\_0373}]}{\text{Km0373}}\right)^2 + \left(1 + \frac{[\text{s\_0367}]}{\text{Km0367}}\right) \cdot \left(1 + \frac{[\text{s\_0529}]}{\text{Km0529}}\right) - 1} \tag{61}$$

Table 124: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.002	dimensionless	☑
Vmax		0000324	0.025	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0373		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0367		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0529		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.31 Reaction r_0108

This is a reversible reaction of three reactants forming three products influenced by eight modifiers.

Name acetyl-Coa carboxylase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0373} + \mathrm{ATP} + \mathrm{s\_0445} \xrightleftharpoons{\text{e\_0744, e\_0808, s\_0373, ATP, s\_0445, ADP, s\_1101, PHO}} \mathrm{ADP} + \mathrm{s\_1101} + \mathrm{PHO} \quad (62)$$

Reactants

Table 125: Properties of each reactant.

Id	Name	SBO
s_0373	acetyl-CoA	
ATP	ATP	
s_0445	bicarbonate	

Modifiers

Table 126: Properties of each modifier.

Id	Name	SBO
e_0744	HFA1	0000460
e_0808	ACC1	0000460
s_0373	acetyl-CoA	
ATP	ATP	

Id	Name	SBO
s_0445	bicarbonate	
ADP	ADP	
s_1101	malonyl-CoA	
PHO	phosphate	

Products

Table 127: Properties of each product.

Id	Name	SBO
ADP	ADP	
s_1101	malonyl-CoA	
PHO	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{31} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0373}] \cdot [\text{ATP}] \cdot [\text{s\_0445}] - \frac{[\text{ADP}] \cdot [\text{s\_1101}] \cdot [\text{PHO}]}{\text{Keq}} \right)}{\text{Km0373} \cdot \text{KmATP} \cdot \text{Km0445}}}{\left(1 + \frac{[\text{s\_0373}]}{\text{Km0373}}\right) \cdot \left(1 + \frac{[\text{ATP}]}{\text{KmATP}}\right) \cdot \left(1 + \frac{[\text{s\_0445}]}{\text{Km0445}}\right) + \left(1 + \frac{[\text{ADP}]}{\text{KmADP}}\right) \cdot \left(1 + \frac{[\text{s\_1101}]}{\text{Km1101}}\right) \cdot \left(1 + \frac{[\text{PHO}]}{\text{KmPHO}}\right) - 1} \tag{63}$$

Table 128: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.007	dimensionless	☑
Vmax		0000324	0.203	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	1.015	dimensionless	☑
Km0373		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmATP		0000322	2.525	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0445		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmADP		0000323	1.282	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1101		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmPHO		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.32 Reaction r_0110

This is a reversible reaction of two reactants forming one product influenced by four modifiers.

Name acetyl-CoA hydrolase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0362} + \text{s\_0529} \xrightleftharpoons{\text{e\_0022, s\_0362, s\_0529, s\_0373}} \text{s\_0373} \tag{64}$$

Reactants

Table 129: Properties of each reactant.

Id	Name	SBO
s_0362	acetate	
s_0529	coenzyme A	

Modifiers

Table 130: Properties of each modifier.

Id	Name	SBO
e_0022	ACH1	0000460
s_0362	acetate	
s_0529	coenzyme A	
s_0373	acetyl-CoA	

Product

Table 131: Properties of each product.

Id	Name	SBO
s_0373	acetyl-CoA	

Kinetic Law

Derived unit contains undeclared units

$$v_{32} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0362}] \cdot [\text{s\_0529}] - \frac{[\text{s\_0373}]}{\text{Keq}} \right)}{\text{Km0362} \cdot \text{Km0529}}}{\left(1 + \frac{[\text{s\_0362}]}{\text{Km0362}}\right) \cdot \left(1 + \frac{[\text{s\_0529}]}{\text{Km0529}}\right) + 1 + \frac{[\text{s\_0373}]}{\text{Km0373}} - 1} \tag{65}$$

Table 132: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.122	dimensionless	☑
Vmax		0000324	1.218	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Keq		0000281	20.000	$\mathrm{mmol}^{-1} \cdot \mathrm{l}$	☑
Km0362		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0529		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0373		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.33 Reaction r_0115

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name acetylglutamate kinase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{ATP} + \mathrm{s\_1192} \xrightleftharpoons{\text{e\_0290, ATP, s\_1192, ADP, s\_1191}} \mathrm{ADP} + \mathrm{s\_1191} \tag{66}$$

Reactants

Table 133: Properties of each reactant.

Id	Name	SBO
ATP	ATP	
s_1192	N-acetyl-L-glutamate	

Modifiers

Table 134: Properties of each modifier.

Id	Name	SBO
e_0290	ARG5,6	0000460
ATP	ATP	
s_1192	N-acetyl-L-glutamate	
ADP	ADP	
s_1191	N-acetyl-L-gamma-glutamyl phosphate	

Products

Table 135: Properties of each product.

Id	Name	SBO
ADP	ADP	
s_1191	N-acetyl-L-gamma-glutamyl phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{33} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{ATP}] \cdot [\text{s\_1192}] - \frac{[\text{ADP}] \cdot [\text{s\_1191}]}{\text{Keq}} \right)}{\text{KmATP} \cdot \text{Km1192}}}{\left(1 + \frac{[\text{ATP}]}{\text{KmATP}}\right) \cdot \left(1 + \frac{[\text{s\_1192}]}{\text{Km1192}}\right) + \left(1 + \frac{[\text{ADP}]}{\text{KmADP}}\right) \cdot \left(1 + \frac{[\text{s\_1191}]}{\text{Km1191}}\right) - 1} \tag{67}$$

Table 136: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.007	dimensionless	☑
Vmax		0000324	0.097	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	1.015	dimensionless	☑
KmATP		0000322	2.525	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1192		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmADP		0000323	1.282	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1191		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.34 Reaction r_0118

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name acteylornithine transaminase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0145} + \text{s\_0991} \xrightleftharpoons{\text{e\_0840, s\_0145, s\_0991, s\_0180, s\_1182}} \text{s\_0180} + \text{s\_1182} \tag{68}$$

Reactants

Table 137: Properties of each reactant.

Id	Name	SBO
s_0145	2-acetamido-5-oxopentanoate	
s_0991	L-glutamate	

Modifiers

Table 138: Properties of each modifier.

Id	Name	SBO
e_0840	ARG8	0000460
s_0145	2-acetamido-5-oxopentanoate	
s_0991	L-glutamate	
s_0180	2-oxoglutarate	
s_1182	N(2)-acetyl-L-ornithine	

Products

Table 139: Properties of each product.

Id	Name	SBO
s_0180	2-oxoglutarate	
s_1182	N(2)-acetyl-L-ornithine	

Kinetic Law

Derived unit contains undeclared units

$$v_{34} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0145}] \cdot [\mathrm{s\_0991}] - \frac{[\mathrm{s\_0180}] \cdot [\mathrm{s\_1182}]}{\mathrm{Keq}} \right)}{\mathrm{Km0145} \cdot \mathrm{Km0991}}}{\left(1 + \frac{[\mathrm{s\_0145}]}{\mathrm{Km0145}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0991}]}{\mathrm{Km0991}}\right) + \left(1 + \frac{[\mathrm{s\_0180}]}{\mathrm{Km0180}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1182}]}{\mathrm{Km1182}}\right) - 1} \tag{69}$$

Table 140: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.007	dimensionless	☑
Vmax		0000324	0.097	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0145		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

Id	Name	SBO	Value	Unit	Constant
Km0991		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0180		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1182		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.35 Reaction r_0142

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name adenosine kinase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0386} + \mathrm{ATP} \xrightleftharpoons{\mathrm{e\_0541},\ \mathrm{s\_0386},\ \mathrm{ATP},\ \mathrm{ADP},\ \mathrm{AMP}} \mathrm{ADP} + \mathrm{AMP} \tag{70}$$

Reactants

Table 141: Properties of each reactant.

Id	Name	SBO
s_0386	adenosine	
ATP	ATP	

Modifiers

Table 142: Properties of each modifier.

Id	Name	SBO
e_0541	ADO1	0000460
s_0386	adenosine	
ATP	ATP	
ADP	ADP	
AMP	AMP	

Products

Table 143: Properties of each product.

Id	Name	SBO
ADP	ADP	
AMP	AMP	

Kinetic Law

Derived unit contains undeclared units

$$v_{35} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0386}] \cdot [\text{ATP}] - \frac{[\text{ADP}] \cdot [\text{AMP}]}{\text{Keq}} \right)}{\text{Km0386} \cdot \text{KmATP}}}{\left(1 + \frac{[\text{s\_0386}]}{\text{Km0386}}\right) \cdot \left(1 + \frac{[\text{ATP}]}{\text{KmATP}}\right) + \left(1 + \frac{[\text{ADP}]}{\text{KmADP}}\right) \cdot \left(1 + \frac{[\text{AMP}]}{\text{KmAMP}}\right) - 1} \tag{71}$$

Table 144: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$6.61479376058174 \cdot 10^{-4}$	dimensionless	☑
Vmax		0000324	0.009	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.974	dimensionless	☑
Km0386		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmATP		0000322	2.525	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmADP		0000323	1.282	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmAMP		0000323	0.293	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.36 Reaction r_0144

This is a reversible reaction of one reactant forming two products influenced by four modifiers.

Name adenosylhomocysteinase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_1413} \xrightleftharpoons{\text{e\_0280, s\_1413, s\_0386, s\_1012}} \text{s\_0386} + \text{s\_1012} \tag{72}$$

Reactant

Table 145: Properties of each reactant.

Id	Name	SBO
s_1413	S-adenosyl-L-homocysteine	

Modifiers

Table 146: Properties of each modifier.

Id	Name	SBO
e_0280	SAH1	0000460
s_1413	S-adenosyl-L-homocysteine	
s_0386	adenosine	
s_1012	L-homocysteine	

Products

Table 147: Properties of each product.

Id	Name	SBO
s_0386	adenosine	
s_1012	L-homocysteine	

Kinetic Law

Derived unit contains undeclared units

$$v_{36} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_1413}] - \frac{[\text{s\_0386}] \cdot [\text{s\_1012}]}{\text{Keq}} \right)}{\text{Km1413}}}{1 + \frac{[\text{s\_1413}]}{\text{Km1413}} + \left(1 + \frac{[\text{s\_0386}]}{\text{Km0386}}\right) \cdot \left(1 + \frac{[\text{s\_1012}]}{\text{Km1012}}\right) - 1} \tag{73}$$

Table 148: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$6.6147934932568 \cdot 10^{-4}$	dimensionless	☑
Vmax		0000324	0.007	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.200	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1413		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0386		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1012		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.37 Reaction AK

This is a reversible reaction of one reactant forming two products influenced by five modifiers.

Name adenylate kinase

SBO:0000176 biochemical reaction

Reaction equation

$$2\,\mathrm{ADP} \xrightleftharpoons{\text{e\_0194, e\_0303, ADP, AMP, ATP}} \mathrm{AMP} + \mathrm{ATP} \tag{74}$$

Reactant

Table 149: Properties of each reactant.

Id	Name	SBO
ADP	ADP	

Modifiers

Table 150: Properties of each modifier.

Id	Name	SBO
e_0194	ADK1	0000460
e_0303	ADK2	0000460
ADP	ADP	
AMP	AMP	
ATP	ATP	

Products

Table 151: Properties of each product.

Id	Name	SBO
AMP	AMP	
ATP	ATP	

Kinetic Law

Derived unit $0.0010\,\mathrm{mol}\cdot\mathrm{s}^{-1}$

$$v_{37} = \text{vol}\,(\text{cell}) \cdot \text{k} \cdot \left([\text{ADP}] \cdot [\text{ADP}] - \frac{[\text{AMP}] \cdot [\text{ATP}]}{\text{Keq}} \right) \tag{75}$$

Table 152: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
k			0.750	$\text{mmol}^{-1} \cdot 1 \cdot \text{s}^{-1}$	☑
Keq			0.450	dimensionless	☑
FLUX_VALUE			$7.17842452147011 \cdot 10^{-12}$	dimensionless	☑

6.38 Reaction r_0150

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name adenylate kinase (GTP)

SBO:0000176 biochemical reaction

Reaction equation

$$\text{AMP} + \text{s\_0785} \xrightleftharpoons{\text{e\_0303, AMP, s\_0785, ADP, s\_0739}} \text{ADP} + \text{s\_0739} \tag{76}$$

Reactants

Table 153: Properties of each reactant.

Id	Name	SBO
AMP	AMP	
s_0785	GTP	

Modifiers

Table 154: Properties of each modifier.

Id	Name	SBO
e_0303	ADK2	0000460
AMP	AMP	
s_0785	GTP	
ADP	ADP	
s_0739	GDP	

Products

Table 155: Properties of each product.

Id	Name	SBO
ADP	ADP	
s_0739	GDP	

Kinetic Law

Derived unit contains undeclared units

$$v_{38} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{AMP}] \cdot [\text{s\_0785}] - \frac{[\text{ADP}] \cdot [\text{s\_0739}]}{\text{Keq}} \right)}{\text{KmAMP} \cdot \text{Km0785}}}{\left(1 + \frac{[\text{AMP}]}{\text{KmAMP}}\right) \cdot \left(1 + \frac{[\text{s\_0785}]}{\text{Km0785}}\right) + \left(1 + \frac{[\text{ADP}]}{\text{KmADP}}\right) \cdot \left(1 + \frac{[\text{s\_0739}]}{\text{Km0739}}\right) - 1} \tag{77}$$

Table 156: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.189	dimensionless	☑
Vmax		0000324	2.653	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	8.754	dimensionless	☑
KmAMP		0000322	0.293	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0785		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmADP		0000323	1.282	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0739		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.39 Reaction r_0151

This is a reversible reaction of one reactant forming two products influenced by four modifiers.

Name adenylosuccinate lyase (AICAR)

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0299} \xrightleftharpoons{\text{e\_0686, s\_0299, s\_0403, s\_0725}} \text{s\_0403} + \text{s\_0725} \tag{78}$$

Reactant

Table 157: Properties of each reactant.

Id	Name	SBO
s_0299	5'-phosphoribosyl-4-(N-succinocarboxamide)-5-aminoimidazole	

Modifiers

Table 158: Properties of each modifier.

Id	Name	SBO
e_0686	ADE13	0000460
s_0299	5'-phosphoribosyl-4-(N-succinocarboxamide)-5-aminoimidazole	
s_0403	AICAR	
s_0725	fumarate	

Products

Table 159: Properties of each product.

Id	Name	SBO
s_0403	AICAR	
s_0725	fumarate	

Kinetic Law

Derived unit contains undeclared units

$$v_{39} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0299}] - \frac{[\text{s\_0403}] \cdot [\text{s\_0725}]}{\text{Keq}} \right)}{\text{Km0299}}}{1 + \frac{[\text{s\_0299}]}{\text{Km0299}} + \left(1 + \frac{[\text{s\_0403}]}{\text{Km0403}}\right) \cdot \left(1 + \frac{[\text{s\_0725}]}{\text{Km0725}}\right) - 1} \tag{79}$$

Table 160: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.004	dimensionless	☑
Vmax		0000324	0.043	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.200	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0299		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0403		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0725		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.40 Reaction r_0152

This is a reversible reaction of one reactant forming two products influenced by four modifiers.

Name adenylosuccinate lyase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0393} \xrightleftharpoons{\text{e\_0686, s\_0393, AMP, s\_0725}} \text{AMP} + \text{s\_0725} \tag{80}$$

Reactant

Table 161: Properties of each reactant.

Id	Name	SBO
s_0393	adenylo-succinate	

Modifiers

Table 162: Properties of each modifier.

Id	Name	SBO
e_0686	ADE13	0000460
s_0393	adenylo-succinate	
AMP	AMP	
s_0725	fumarate	

Products

Table 163: Properties of each product.

Id	Name	SBO
AMP	AMP	
s_0725	fumarate	

Kinetic Law

Derived unit contains undeclared units

$$v_{40} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0393}] - \frac{[\mathrm{AMP}] \cdot [\mathrm{s\_0725}]}{\mathrm{Keq}} \right)}{\mathrm{Km0393}}}{1 + \frac{[\mathrm{s\_0393}]}{\mathrm{Km0393}} + \left(1 + \frac{[\mathrm{AMP}]}{\mathrm{KmAMP}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0725}]}{\mathrm{Km0725}}\right) - 1} \tag{81}$$

Table 164: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.005	dimensionless	☑
Vmax		0000324	0.050	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	0.586	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0393		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmAMP		0000323	0.293	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0725		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.41 Reaction r_0153

This is a reversible reaction of three reactants forming three products influenced by seven modifiers.

Name adenylosuccinate synthase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0785} + \mathrm{s\_0849} + \mathrm{s\_0973} \xrightleftharpoons{\mathrm{e\_0791,\ s\_0785,\ s\_0849,\ s\_0973,\ s\_0393,\ s\_0739,\ PHO}} \mathrm{s\_0393} + \mathrm{s\_0739} + \mathrm{PHO} \tag{82}$$

Reactants

Table 165: Properties of each reactant.

Id	Name	SBO
s_0785	GTP	
s_0849	IMP	
s_0973	L-aspartate	

Modifiers

Table 166: Properties of each modifier.

Id	Name	SBO
e_0791	ADE12	0000460
s_0785	GTP	
s_0849	IMP	
s_0973	L-aspartate	
s_0393	adenylo-succinate	
s_0739	GDP	
PHO	phosphate	

Products

Table 167: Properties of each product.

Id	Name	SBO
s_0393	adenylo-succinate	
s_0739	GDP	
PHO	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{41} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0785}] \cdot [\text{s\_0849}] \cdot [\text{s\_0973}] - \frac{[\text{s\_0393}] \cdot [\text{s\_0739}] \cdot [\text{PHO}]}{\text{Keq}} \right)}{\text{Km0785} \cdot \text{Km0849} \cdot \text{Km0973}}}{\left(1 + \frac{[\text{s\_0785}]}{\text{Km0785}}\right) \cdot \left(1 + \frac{[\text{s\_0849}]}{\text{Km0849}}\right) \cdot \left(1 + \frac{[\text{s\_0973}]}{\text{Km0973}}\right) + \left(1 + \frac{[\text{s\_0393}]}{\text{Km0393}}\right) \cdot \left(1 + \frac{[\text{s\_0739}]}{\text{Km0739}}\right) \cdot \left(1 + \frac{[\text{PHO}]}{\text{KmPHO}}\right) - 1} \tag{83}$$

Table 168: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.005	dimensionless	☑
Vmax		0000324	0.149	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0785		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0849		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0973		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0393		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0739		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmPHO		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.42 Reaction r_0154

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name adenylyl-sulfate kinase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0298} + \text{ATP} \xrightleftharpoons{\text{e\_0556, s\_0298, ATP, s\_0201, ADP}} \text{s\_0201} + \text{ADP} \tag{84}$$

Reactants

Table 169: Properties of each reactant.

Id	Name	SBO
s_0298	5'-adenylyl sulfate	
ATP	ATP	

Modifiers

Table 170: Properties of each modifier.

Id	Name	SBO
e_0556	MET14	0000460
s_0298	5'-adenylyl sulfate	
ATP	ATP	
s_0201	3'-phospho-5'-adenylyl sulfate	
ADP	ADP	

Products

Table 171: Properties of each product.

Id	Name	SBO
s_0201	3'-phospho-5'-adenylyl sulfate	
ADP	ADP	

Kinetic Law

Derived unit contains undeclared units

$$v_{42} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0298}] \cdot [\text{ATP}] - \frac{[\text{s\_0201}] \cdot [\text{ADP}]}{\text{Keq}} \right)}{\text{Km0298} \cdot \text{KmATP}}}{\left(1 + \frac{[\text{s\_0298}]}{\text{Km0298}}\right) \cdot \left(1 + \frac{[\text{ATP}]}{\text{KmATP}}\right) + \left(1 + \frac{[\text{s\_0201}]}{\text{Km0201}}\right) \cdot \left(1 + \frac{[\text{ADP}]}{\text{KmADP}}\right) - 1} \tag{85}$$

Table 172: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.002	dimensionless	☑
Vmax		0000324	0.034	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	1.015	dimensionless	☑
Km0298		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmATP		0000322	2.525	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0201		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmADP		0000323	1.282	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.43 Reaction r_0156

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name alanine glyoxylate aminotransferase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0779} + \text{s\_0955} \xrightleftharpoons{\text{e\_0313, s\_0779, s\_0955, s\_1003, PYR}} \text{s\_1003} + \text{PYR} \tag{86}$$

Reactants

Table 173: Properties of each reactant.

Id	Name	SBO
s_0779	glyoxylate	
s_0955	L-alanine	

Modifiers

Table 174: Properties of each modifier.

Id	Name	SBO
e_0313	AGX1	0000460

Id	Name	SBO
s_0779	glyoxylate	
s_0955	L-alanine	
s_1003	L-glycine	
PYR	pyruvate	

Products

Table 175: Properties of each product.

Id	Name	SBO
s_1003	L-glycine	
PYR	pyruvate	

Kinetic Law

Derived unit contains undeclared units

$$v_{43} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0779}] \cdot [\text{s\_0955}] - \frac{[\text{s\_1003}] \cdot [\text{PYR}]}{\text{Keq}} \right)}{\text{Km0779} \cdot \text{Km0955}}}{\left(1 + \frac{[\text{s\_0779}]}{\text{Km0779}}\right) \cdot \left(1 + \frac{[\text{s\_0955}]}{\text{Km0955}}\right) + \left(1 + \frac{[\text{s\_1003}]}{\text{Km1003}}\right) \cdot \left(1 + \frac{[\text{PYR}]}{\text{KmPYR}}\right) - 1} \tag{87}$$

Table 176: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.033	dimensionless	☑
Vmax		0000324	0.459	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	36.306	dimensionless	☑
Km0779		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0955		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1003		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmPYR		0000323	1.815	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.44 Reaction r_0157

This is a reversible reaction of three reactants forming three products influenced by seven modifiers.

Name alanyl-tRNA synthetase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{ATP} + \mathrm{s\_0955} + \mathrm{s\_1582} \xrightleftharpoons{\mathrm{e\_0894,\ ATP,\ s\_0955,\ s\_1582,\ s\_0404,\ AMP,\ s\_0633}} \mathrm{s\_0404} + \mathrm{AMP} + \mathrm{s\_0633} \quad (88)$$

Reactants

Table 177: Properties of each reactant.

Id	Name	SBO
ATP	ATP	
s_0955	L-alanine	
s_1582	tRNA(Ala)	

Modifiers

Table 178: Properties of each modifier.

Id	Name	SBO
e_0894	ALA1	0000460
ATP	ATP	
s_0955	L-alanine	
s_1582	tRNA(Ala)	
s_0404	Ala-tRNA(Ala)	
AMP	AMP	
s_0633	diphosphate	

Products

Table 179: Properties of each product.

Id	Name	SBO
s_0404	Ala-tRNA(Ala)	
AMP	AMP	
s_0633	diphosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{44} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{ATP}] \cdot [\text{s\_0955}] \cdot [\text{s\_1582}] - \frac{[\text{s\_0404}] \cdot [\text{AMP}] \cdot [\text{s\_0633}]}{\text{Keq}} \right)}{\text{KmATP} \cdot \text{Km0955} \cdot \text{Km1582}}}{\left(1 + \frac{[\text{ATP}]}{\text{KmATP}}\right) \cdot \left(1 + \frac{[\text{s\_0955}]}{\text{Km0955}}\right) \cdot \left(1 + \frac{[\text{s\_1582}]}{\text{Km1582}}\right) + \left(1 + \frac{[\text{s\_0404}]}{\text{Km0404}}\right) \cdot \left(1 + \frac{[\text{AMP}]}{\text{KmAMP}}\right) \cdot \left(1 + \frac{[\text{s\_0633}]}{\text{Km0633}}\right) - 1} \tag{89}$$

Table 180: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.020	dimensionless	☑
Vmax		0000324	0.592	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.232	dimensionless	☑
KmATP		0000322	2.525	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0955		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1582		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0404		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmAMP		0000323	0.293	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0633		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.45 Reaction ADH

This is a reversible reaction of two reactants forming two products influenced by eight modifiers.

Name mitochondrial alcohol dehydrogenase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{AcAld} + \text{NADH} \xrightleftharpoons{\text{e\_0730, e\_0356, e\_0069, e\_0834, AcAld, NADH, EtOH, NAD}} \text{EtOH} + \text{NAD} \tag{90}$$

Reactants

Table 181: Properties of each reactant.

Id	Name	SBO
AcAld	acetaldehyde	
NADH	NADH	

Modifiers

Table 182: Properties of each modifier.

Id	Name	SBO
e_0730	ADH3	0000460
e_0356	ADH4	0000460
e_0069	ADH5	0000460
e_0834	ADH1	0000460
AcAld	acetaldehyde	
NADH	NADH	
EtOH	ethanol	
NAD	NAD	

Products

Table 183: Properties of each product.

Id	Name	SBO
EtOH	ethanol	
NAD	NAD	

Kinetic Law

Derived unit contains undeclared units

$$v_{45} = \mathrm{vol}\,(\mathrm{cell}) \cdot \frac{\mathrm{Vmax} \cdot \left(\frac{[\mathrm{AcAld}] \cdot [\mathrm{NADH}]}{\mathrm{Kacald} \cdot \mathrm{Kinadh}} - \frac{[\mathrm{EtOH}] \cdot [\mathrm{NAD}]}{\mathrm{Kacald} \cdot \mathrm{Kinadh} \cdot \mathrm{Keq}} \right)}{1 + \frac{[\mathrm{NADH}]}{\mathrm{Kinadh}} + \frac{[\mathrm{AcAld}] \cdot \mathrm{Knadh}}{\mathrm{Kinadh} \cdot \mathrm{Kacald}} + \frac{[\mathrm{EtOH}] \cdot \mathrm{Knad}}{\mathrm{Kinad} \cdot \mathrm{Ketoh}} + \frac{[\mathrm{NAD}]}{\mathrm{Kinad}} + \frac{[\mathrm{AcAld}] \cdot [\mathrm{NADH}]}{\mathrm{Kinadh} \cdot \mathrm{Kacald}} + \frac{[\mathrm{NADH}] \cdot [\mathrm{EtOH}] \cdot \mathrm{Knad}}{\mathrm{Kinadh} \cdot \mathrm{Kinad} \cdot \mathrm{Ketoh}} + \frac{[\mathrm{AcAld}] \cdot [\mathrm{NAD}] \cdot \mathrm{Knadh}}{\mathrm{Kinadh} \cdot \mathrm{Kinad} \cdot \mathrm{Kacald}} + \frac{[\mathrm{EtOH}]}{\mathrm{Ketoh}}} \tag{91}$$

Table 184: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
Vmax			111.335	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Ketoh			17.000	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Kinad			0.920	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Keq			14492.754	dimensionless	☑
Knad			0.170	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Knadh			0.110	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Kinadh			0.031	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Kacald			1.110	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Kiacald			1.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

Id	Name	SBO	Value	Unit	Constant
Kietoh			90.000	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
FLUX_VALUE			2.173	dimensionless	☑

6.46 Reaction r_0173

This is a reversible reaction of two reactants forming two products influenced by seven modifiers.

Name aldehyde dehydrogenase (acetaldehyde, NADP)

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{AcAld} + \mathrm{s\_1207} \xrightleftharpoons{\mathrm{e\_0911},\ \mathrm{e\_0898},\ \mathrm{e\_0293},\ \mathrm{AcAld},\ \mathrm{s\_1207},\ \mathrm{s\_0362},\ \mathrm{s\_1212}} \mathrm{s\_0362} + \mathrm{s\_1212} \tag{92}$$

Reactants

Table 185: Properties of each reactant.

Id	Name	SBO
AcAld	acetaldehyde	
s_1207	NADP(+)	

Modifiers

Table 186: Properties of each modifier.

Id	Name	SBO
e_0911	ALD6	0000460
e_0898	ALD4	0000460
e_0293	ALD5	0000460
AcAld	acetaldehyde	
s_1207	NADP(+)	
s_0362	acetate	
s_1212	NADPH	

Products

Table 187: Properties of each product.

Id	Name	SBO
s_0362	acetate	
s_1212	NADPH	

Kinetic Law

Derived unit contains undeclared units

$$v_{46} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{AcAld}] \cdot [\text{s\_1207}] - \frac{[\text{s\_0362}] \cdot [\text{s\_1212}]}{\text{Keq}} \right)}{\text{KmAcAld} \cdot \text{Km1207}}}{\left(1 + \frac{[\text{AcAld}]}{\text{KmAcAld}}\right) \cdot \left(1 + \frac{[\text{s\_1207}]}{\text{Km1207}}\right) + \left(1 + \frac{[\text{s\_0362}]}{\text{Km0362}}\right) \cdot \left(1 + \frac{[\text{s\_1212}]}{\text{Km1212}}\right) - 1} \tag{93}$$

Table 188: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.086	dimensionless	☑
Vmax		0000324	1.207	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	1.123	dimensionless	☑
KmAcAld		0000322	0.178	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1207		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0362		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1212		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.47 Reaction r_0174

This is a reversible reaction of two reactants forming two products influenced by six modifiers.

Name aldehyde dehydrogenase (acetylaldehyde, NAD)

SBO:0000176 biochemical reaction

Reaction equation

$$\text{AcAld} + \text{NAD} \xrightleftharpoons{\text{e\_0898, e\_0740, AcAld, NAD, s\_0362, NADH}} \text{s\_0362} + \text{NADH} \tag{94}$$

Reactants

Table 189: Properties of each reactant.

Id	Name	SBO
AcAld	acetaldehyde	
NAD	NAD	

Modifiers

Table 190: Properties of each modifier.

Id	Name	SBO
e_0898	ALD4	0000460
e_0740	ALD2	0000460
AcAld	acetaldehyde	
NAD	NAD	
s_0362	acetate	
NADH	NADH	

Products

Table 191: Properties of each product.

Id	Name	SBO
s_0362	acetate	
NADH	NADH	

Kinetic Law

Derived unit contains undeclared units

$$v_{47} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{AcAld}] \cdot [\mathrm{NAD}] - \frac{[\mathrm{s\_0362}] \cdot [\mathrm{NADH}]}{\mathrm{Keq}} \right)}{\mathrm{KmAcAld} \cdot \mathrm{KmNAD}}}{\left(1 + \frac{[\mathrm{AcAld}]}{\mathrm{KmAcAld}}\right) \cdot \left(1 + \frac{[\mathrm{NAD}]}{\mathrm{KmNAD}}\right) + \left(1 + \frac{[\mathrm{s\_0362}]}{\mathrm{Km0362}}\right) \cdot \left(1 + \frac{[\mathrm{NADH}]}{\mathrm{KmNADH}}\right) - 1} \tag{95}$$

Table 192: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.029	dimensionless	☑
Vmax		0000324	0.408	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	0.065	dimensionless	☑

Id	Name	SBO	Value	Unit	Constant
KmAcAld		0000322	0.178	$\mathrm{mmol \cdot l^{-1}}$	☑
KmNAD		0000322	1.503	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0362		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmNADH		0000323	0.087	$\mathrm{mmol \cdot l^{-1}}$	☑

6.48 Reaction r_0195

This is a reversible reaction of two reactants forming two products influenced by eight modifiers.

Name alpha,alpha-trehalose-phosphate synthase (UDP-forming)

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{G6P} + \mathrm{s\_1543} \xrightleftharpoons{\mathrm{e\_0711,\ e\_0065,\ e\_0179,\ e\_0753,\ G6P,\ s\_1543,\ s\_0409,\ s\_1538}} \mathrm{s\_0409} + \mathrm{s\_1538} \tag{96}$$

Reactants

Table 193: Properties of each reactant.

Id	Name	SBO
G6P	D-glucose 6-phosphate	
s_1543	UDP-D-glucose	

Modifiers

Table 194: Properties of each modifier.

Id	Name	SBO
e_0711	TSL1	0000460
e_0065	TPS1	0000460
e_0179	TPS2	0000460
e_0753	TPS3	0000460
G6P	D-glucose 6-phosphate	
s_1543	UDP-D-glucose	
s_0409	alpha,alpha-trehalose 6-phosphate	
s_1538	UDP	

Products

Table 195: Properties of each product.

Id	Name	SBO
s_0409	alpha,alpha-trehalose 6-phosphate	
s_1538	UDP	

Kinetic Law

Derived unit contains undeclared units

$$v_{48} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{G6P}] \cdot [\text{s\_1543}] - \frac{[\text{s\_0409}] \cdot [\text{s\_1538}]}{\text{Keq}} \right)}{\text{KmG6P} \cdot \text{Km1543}}}{\left(1 + \frac{[\text{G6P}]}{\text{KmG6P}}\right) \cdot \left(1 + \frac{[\text{s\_1543}]}{\text{Km1543}}\right) + \left(1 + \frac{[\text{s\_0409}]}{\text{Km0409}}\right) \cdot \left(1 + \frac{[\text{s\_1538}]}{\text{Km1538}}\right) - 1} \tag{97}$$

Table 196: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.001	dimensionless	☑
Vmax		0000324	0.014	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.075	dimensionless	☑
KmG6P		0000322	2.675	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1543		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0409		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1538		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.49 Reaction r_0202

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name anthranilate phosphoribosyltransferase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0427} + \text{s\_1386} \xrightleftharpoons{\text{e\_0219, s\_0427, s\_1386, s\_0633, s\_1187}} \text{s\_0633} + \text{s\_1187} \tag{98}$$

Reactants

Table 197: Properties of each reactant.

Id	Name	SBO
s_0427	anthranilate	
s_1386	PRPP	

Modifiers

Table 198: Properties of each modifier.

Id	Name	SBO
e_0219	TRP4	0000460
s_0427	anthranilate	
s_1386	PRPP	
s_0633	diphosphate	
s_1187	N-(5-phospho-beta-D-ribosyl)anthranilate	

Products

Table 199: Properties of each product.

Id	Name	SBO
s_0633	diphosphate	
s_1187	N-(5-phospho-beta-D-ribosyl)anthranilate	

Kinetic Law

Derived unit contains undeclared units

$$v_{49} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0427}] \cdot [\text{s\_1386}] - \frac{[\text{s\_0633}] \cdot [\text{s\_1187}]}{\text{Keq}} \right)}{\text{Km0427} \cdot \text{Km1386}}}{\left(1 + \frac{[\text{s\_0427}]}{\text{Km0427}}\right) \cdot \left(1 + \frac{[\text{s\_1386}]}{\text{Km1386}}\right) + \left(1 + \frac{[\text{s\_0633}]}{\text{Km0633}}\right) \cdot \left(1 + \frac{[\text{s\_1187}]}{\text{Km1187}}\right) - 1} \tag{99}$$

Table 200: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.001	dimensionless	☑
Vmax		0000324	0.017	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0427		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

Id	Name	SBO	Value	Unit	Constant
Km1386		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0633		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1187		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.50 Reaction r_0203

This is a reversible reaction of two reactants forming three products influenced by seven modifiers.

Name anthranilate synthase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0515} + \mathrm{s\_0999} \xrightleftharpoons{\mathrm{e\_0297},\ \mathrm{e\_0591},\ \mathrm{s\_0515},\ \mathrm{s\_0999},\ \mathrm{s\_0427},\ \mathrm{s\_0991},\ \mathrm{PYR}} \mathrm{s\_0427} + \mathrm{s\_0991} + \mathrm{PYR} \quad (100)$$

Reactants

Table 201: Properties of each reactant.

Id	Name	SBO
s_0515	chorismate	
s_0999	L-glutamine	

Modifiers

Table 202: Properties of each modifier.

Id	Name	SBO
e_0297	TRP2	0000460
e_0591	TRP3	0000460
s_0515	chorismate	
s_0999	L-glutamine	
s_0427	anthranilate	
s_0991	L-glutamate	
PYR	pyruvate	

Products

Table 203: Properties of each product.

Id	Name	SBO
s_0427	anthranilate	
s_0991	L-glutamate	
PYR	pyruvate	

Kinetic Law

Derived unit contains undeclared units

$$v_{50} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0515}] \cdot [\text{s\_0999}] - \frac{[\text{s\_0427}] \cdot [\text{s\_0991}] \cdot [\text{PYR}]}{\text{Keq}} \right)}{\text{Km0515} \cdot \text{Km0999}}}{\left(1 + \frac{[\text{s\_0515}]}{\text{Km0515}}\right) \cdot \left(1 + \frac{[\text{s\_0999}]}{\text{Km0999}}\right) + \left(1 + \frac{[\text{s\_0427}]}{\text{Km0427}}\right) \cdot \left(1 + \frac{[\text{s\_0991}]}{\text{Km0991}}\right) \cdot \left(1 + \frac{[\text{PYR}]}{\text{KmPYR}}\right) - 1} \tag{101}$$

Table 204: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.001	dimensionless	☑
Vmax		0000324	0.027	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	3.631	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0515		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0999		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0427		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0991		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmPYR		0000323	1.815	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.51 Reaction r_0207

This is a reversible reaction of one reactant forming two products influenced by four modifiers.

Name argininosuccinate lyase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0015} \xrightleftharpoons{\text{e\_0426, s\_0015, s\_0725, s\_0965}} \text{s\_0725} + \text{s\_0965} \tag{102}$$

Reactant

Table 205: Properties of each reactant.

Id	Name	SBO
s_0015	(N(omega)-L-arginino)succinic acid	

Modifiers

Table 206: Properties of each modifier.

Id	Name	SBO
e_0426	ARG4	0000460
s_0015	(N(omega)-L-arginino)succinic acid	
s_0725	fumarate	
s_0965	L-arginine	

Products

Table 207: Properties of each product.

Id	Name	SBO
s_0725	fumarate	
s_0965	L-arginine	

Kinetic Law

Derived unit contains undeclared units

$$v_{51} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0015}] - \frac{[\text{s\_0725}] \cdot [\text{s\_0965}]}{\text{Keq}} \right)}{\text{Km0015}}}{1 + \frac{[\text{s\_0015}]}{\text{Km0015}} + \left(1 + \frac{[\text{s\_0725}]}{\text{Km0725}}\right) \cdot \left(1 + \frac{[\text{s\_0965}]}{\text{Km0965}}\right) - 1} \tag{103}$$

Table 208: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.007	dimensionless	☑
Vmax		0000324	0.069	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.200	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0015		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0725		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0965		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.52 Reaction r_0208

This is a reversible reaction of three reactants forming three products influenced by seven modifiers.

Name argininosuccinate synthase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{ATP} + \mathrm{s\_0973} + \mathrm{s\_0979} \xrightleftharpoons{\text{e\_0826, ATP, s\_0973, s\_0979, s\_0015, AMP, s\_0633}} \mathrm{s\_0015} + \mathrm{AMP} + \mathrm{s\_0633} \quad (104)$$

Reactants

Table 209: Properties of each reactant.

Id	Name	SBO
ATP	ATP	
s_0973	L-aspartate	
s_0979	L-citrulline	

Modifiers

Table 210: Properties of each modifier.

Id	Name	SBO
e_0826	ARG1	0000460
ATP	ATP	
s_0973	L-aspartate	
s_0979	L-citrulline	
s_0015	(N(omega)-L-arginino)succinic acid	
AMP	AMP	
s_0633	diphosphate	

Products

Table 211: Properties of each product.

Id	Name	SBO
s_0015	(N(omega)-L-arginino)succinic acid	

Id	Name	SBO
AMP	AMP	
s_0633	diphosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{52} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{ATP}] \cdot [\text{s\_0973}] \cdot [\text{s\_0979}] - \frac{[\text{s\_0015}] \cdot [\text{AMP}] \cdot [\text{s\_0633}]}{\text{Keq}} \right)}{\text{KmATP} \cdot \text{Km0973} \cdot \text{Km0979}}}{\left(1 + \frac{[\text{ATP}]}{\text{KmATP}}\right) \cdot \left(1 + \frac{[\text{s\_0973}]}{\text{Km0973}}\right) \cdot \left(1 + \frac{[\text{s\_0979}]}{\text{Km0979}}\right) + \left(1 + \frac{[\text{s\_0015}]}{\text{Km0015}}\right) \cdot \left(1 + \frac{[\text{AMP}]}{\text{KmAMP}}\right) \cdot \left(1 + \frac{[\text{s\_0633}]}{\text{Km0633}}\right) - 1} \tag{105}$$

Table 212: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.007	dimensionless	☑
Vmax		0000324	0.207	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.232	dimensionless	☑
KmATP		0000322	2.525	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0973		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0979		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0015		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmAMP		0000323	0.293	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0633		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.53 Reaction r_0209

This is a reversible reaction of three reactants forming three products influenced by seven modifiers.

Name arginyl-tRNA synthetase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{ATP} + \text{s\_0965} + \text{s\_1583} \xrightleftharpoons{\text{e\_0214, ATP, s\_0965, s\_1583, AMP, s\_0428, s\_0633}} \text{AMP} + \text{s\_0428} + \text{s\_0633} \tag{106}$$

Reactants

Table 213: Properties of each reactant.

Id	Name	SBO
ATP	ATP	
s_0965	L-arginine	
s_1583	tRNA(Arg)	

Modifiers

Table 214: Properties of each modifier.

Id	Name	SBO
e_0214	YDR341C	0000460
ATP	ATP	
s_0965	L-arginine	
s_1583	tRNA(Arg)	
AMP	AMP	
s_0428	Arg-tRNA(Arg)	
s_0633	diphosphate	

Products

Table 215: Properties of each product.

Id	Name	SBO
AMP	AMP	
s_0428	Arg-tRNA(Arg)	
s_0633	diphosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{53} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{ATP}] \cdot [\text{s\_0965}] \cdot [\text{s\_1583}] - \frac{[\text{AMP}] \cdot [\text{s\_0428}] \cdot [\text{s\_0633}]}{\text{Keq}} \right)}{\text{KmATP} \cdot \text{Km0965} \cdot \text{Km1583}}}{\left(1 + \frac{[\text{ATP}]}{\text{KmATP}}\right) \cdot \left(1 + \frac{[\text{s\_0965}]}{\text{Km0965}}\right) \cdot \left(1 + \frac{[\text{s\_1583}]}{\text{Km1583}}\right) + \left(1 + \frac{[\text{AMP}]}{\text{KmAMP}}\right) \cdot \left(1 + \frac{[\text{s\_0428}]}{\text{Km0428}}\right) \cdot \left(1 + \frac{[\text{s\_0633}]}{\text{Km0633}}\right) - 1} \tag{107}$$

Table 216: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.007	dimensionless	☑
Vmax		0000324	0.207	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	0.232	dimensionless	☑
KmATP		0000322	2.525	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0965		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1583		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmAMP		0000323	0.293	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0428		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0633		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.54 Reaction r_0211

This is a reversible reaction of three reactants forming four products influenced by nine modifiers.

Name asparagine synthase (glutamine-hydrolysing)

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{ATP} + \mathrm{s\_0973} + \mathrm{s\_0999} \xrightleftharpoons{\text{e\_0970, e\_0376, ATP, s\_0973, s\_0999, AMP, s\_0633, s\_0969, s\_0991}} \mathrm{AMP} + \mathrm{s\_0633} + \mathrm{s\_09} \quad (108)$$

Reactants

Table 217: Properties of each reactant.

Id	Name	SBO
ATP	ATP	
s_0973	L-aspartate	
s_0999	L-glutamine	

Modifiers

Table 218: Properties of each modifier.

Id	Name	SBO
e_0970	ASN1	0000460

Id	Name	SBO
e_0376	ASN2	0000460
ATP	ATP	
s_0973	L-aspartate	
s_0999	L-glutamine	
AMP	AMP	
s_0633	diphosphate	
s_0969	L-asparagine	
s_0991	L-glutamate	

Products

Table 219: Properties of each product.

Id	Name	SBO
AMP	AMP	
s_0633	diphosphate	
s_0969	L-asparagine	
s_0991	L-glutamate	

Kinetic Law

Derived unit contains undeclared units

$$v_{54} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{ATP}] \cdot [\mathrm{s\_0973}] \cdot [\mathrm{s\_0999}] - \frac{[\mathrm{AMP}] \cdot [\mathrm{s\_0633}] \cdot [\mathrm{s\_0969}] \cdot [\mathrm{s\_0991}]}{\mathrm{Keq}} \right)}{\mathrm{KmATP} \cdot \mathrm{Km0973} \cdot \mathrm{Km0999}}}{\left(1 + \frac{[\mathrm{ATP}]}{\mathrm{KmATP}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0973}]}{\mathrm{Km0973}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0999}]}{\mathrm{Km0999}}\right) + \left(1 + \frac{[\mathrm{AMP}]}{\mathrm{KmAMP}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0633}]}{\mathrm{Km0633}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0969}]}{\mathrm{Km0969}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0991}]}{\mathrm{Km0991}}\right) -} \quad (109)$$

Table 220: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.004	dimensionless	☑
Vmax		0000324	0.201	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	0.023	$\mathrm{mmol \cdot l^{-1}}$	☑
KmATP		0000322	2.525	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0973		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0999		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmAMP		0000323	0.293	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0633		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0969		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0991		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.55 Reaction r_0212

This is a reversible reaction of three reactants forming three products influenced by seven modifiers.

Name Asparaginyl-tRNA synthetase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{ATP} + \mathrm{s\_0969} + \mathrm{s\_1585} \xrightleftharpoons{\text{e\_0427, ATP, s\_0969, s\_1585, AMP, s\_0430, s\_0633}} \mathrm{AMP} + \mathrm{s\_0430} + \mathrm{s\_0633} \quad (110)$$

Reactants

Table 221: Properties of each reactant.

Id	Name	SBO
ATP	ATP	
s_0969	L-asparagine	
s_1585	tRNA(Asn)	

Modifiers

Table 222: Properties of each modifier.

Id	Name	SBO
e_0427	DED81	0000460
ATP	ATP	
s_0969	L-asparagine	
s_1585	tRNA(Asn)	
AMP	AMP	
s_0430	Asn-tRNA(Asn)	
s_0633	diphosphate	

Products

Table 223: Properties of each product.

Id	Name	SBO
AMP	AMP	

Id	Name	SBO
s_0430	Asn-tRNA(Asn)	
s_0633	diphosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{55} = \frac{\frac{\text{vol(cell)}\cdot\text{Vmax}\cdot\left([\text{ATP}]\cdot[\text{s\_0969}]\cdot[\text{s\_1585}]-\frac{[\text{AMP}]\cdot[\text{s\_0430}]\cdot[\text{s\_0633}]}{\text{Keq}}\right)}{\text{KmATP}\cdot\text{Km0969}\cdot\text{Km1585}}}{\left(1+\frac{[\text{ATP}]}{\text{KmATP}}\right)\cdot\left(1+\frac{[\text{s\_0969}]}{\text{Km0969}}\right)\cdot\left(1+\frac{[\text{s\_1585}]}{\text{Km1585}}\right)+\left(1+\frac{[\text{AMP}]}{\text{KmAMP}}\right)\cdot\left(1+\frac{[\text{s\_0430}]}{\text{Km0430}}\right)\cdot\left(1+\frac{[\text{s\_0633}]}{\text{Km0633}}\right)-1} \quad (111)$$

Table 224: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.004	dimensionless	☑
Vmax		0000324	0.131	$\text{mmol}\cdot\text{l}^{-1}\cdot\text{s}^{-1}$	☑
Keq		0000281	0.232	dimensionless	☑
KmATP		0000322	2.525	$\text{mmol}\cdot\text{l}^{-1}$	☑
Km0969		0000322	0.100	$\text{mmol}\cdot\text{l}^{-1}$	☑
Km1585		0000322	0.100	$\text{mmol}\cdot\text{l}^{-1}$	☑
KmAMP		0000323	0.293	$\text{mmol}\cdot\text{l}^{-1}$	☑
Km0430		0000323	0.100	$\text{mmol}\cdot\text{l}^{-1}$	☑
Km0633		0000323	0.100	$\text{mmol}\cdot\text{l}^{-1}$	☑

6.56 Reaction r_0214

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name aspartate carbamoyltransferase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0455} + \text{s\_0973} \xrightleftharpoons{\text{e\_0508, s\_0455, s\_0973, s\_1194, PHO}} \text{s\_1194} + \text{PHO} \quad (112)$$

Reactants

Table 225: Properties of each reactant.

Id	Name	SBO
s_0455	carbamoyl phosphate	
s_0973	L-aspartate	

Modifiers

Table 226: Properties of each modifier.

Id	Name	SBO
e_0508	URA2	0000460
s_0455	carbamoyl phosphate	
s_0973	L-aspartate	
s_1194	N-carbamoyl-L-aspartate	
PHO	phosphate	

Products

Table 227: Properties of each product.

Id	Name	SBO
s_1194	N-carbamoyl-L-aspartate	
PHO	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{56} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0455}] \cdot [\mathrm{s\_0973}] - \frac{[\mathrm{s\_1194}] \cdot [\mathrm{PHO}]}{\mathrm{Keq}} \right)}{\mathrm{Km0455} \cdot \mathrm{Km0973}}}{\left(1 + \frac{[\mathrm{s\_0455}]}{\mathrm{Km0455}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0973}]}{\mathrm{Km0973}}\right) + \left(1 + \frac{[\mathrm{s\_1194}]}{\mathrm{Km1194}}\right) \cdot \left(1 + \frac{[\mathrm{PHO}]}{\mathrm{KmPHO}}\right) - 1} \tag{113}$$

Table 228: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.005	dimensionless	☑
Vmax		0000324	0.067	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0455		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

Id	Name	SBO	Value	Unit	Constant
Km0973		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1194		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
KmPHO		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.57 Reaction r_0215

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name aspartate kinase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{ATP} + \mathrm{s\_0973} \xrightleftharpoons{\mathrm{e\_0281,\ ATP,\ s\_0973,\ s\_0295,\ ADP}} \mathrm{s\_0295} + \mathrm{ADP} \tag{114}$$

Reactants

Table 229: Properties of each reactant.

Id	Name	SBO
ATP	ATP	
s_0973	L-aspartate	

Modifiers

Table 230: Properties of each modifier.

Id	Name	SBO
e_0281	HOM3	0000460
ATP	ATP	
s_0973	L-aspartate	
s_0295	4-phospho-L-aspartate	
ADP	ADP	

Products

Table 231: Properties of each product.

Id	Name	SBO
s_0295	4-phospho-L-aspartate	
ADP	ADP	

Kinetic Law

Derived unit contains undeclared units

$$v_{57} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{ATP}] \cdot [\text{s\_0973}] - \frac{[\text{s\_0295}] \cdot [\text{ADP}]}{\text{Keq}} \right)}{\text{KmATP} \cdot \text{Km0973}}}{\left(1 + \frac{[\text{ATP}]}{\text{KmATP}}\right) \cdot \left(1 + \frac{[\text{s\_0973}]}{\text{Km0973}}\right) + \left(1 + \frac{[\text{s\_0295}]}{\text{Km0295}}\right) \cdot \left(1 + \frac{[\text{ADP}]}{\text{KmADP}}\right) - 1} \tag{115}$$

Table 232: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.036	dimensionless	☑
Vmax		0000324	0.502	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	1.015	dimensionless	☑
KmATP		0000322	2.525	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0973		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0295		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmADP		0000323	1.282	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.58 Reaction r_0216

This is a reversible reaction of two reactants forming two products influenced by six modifiers.

Name aspartate transaminase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0991} + \text{s\_1271} \xrightleftharpoons{\text{e\_0629, e\_0574, s\_0991, s\_1271, s\_0180, s\_0973}} \text{s\_0180} + \text{s\_0973} \tag{116}$$

Reactants

Table 233: Properties of each reactant.

Id	Name	SBO
s_0991	L-glutamate	
s_1271	oxaloacetate	

Modifiers

Table 234: Properties of each modifier.

Id	Name	SBO
e_0629	AAT2	0000460
e_0574	AAT1	0000460
s_0991	L-glutamate	
s_1271	oxaloacetate	
s_0180	2-oxoglutarate	
s_0973	L-aspartate	

Products

Table 235: Properties of each product.

Id	Name	SBO
s_0180	2-oxoglutarate	
s_0973	L-aspartate	

Kinetic Law

Derived unit contains undeclared units

$$v_{58} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0991}] \cdot [\mathrm{s\_1271}] - \frac{[\mathrm{s\_0180}] \cdot [\mathrm{s\_0973}]}{\mathrm{Keq}} \right)}{\mathrm{Km0991} \cdot \mathrm{Km1271}}}{\left(1 + \frac{[\mathrm{s\_0991}]}{\mathrm{Km0991}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1271}]}{\mathrm{Km1271}}\right) + \left(1 + \frac{[\mathrm{s\_0180}]}{\mathrm{Km0180}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0973}]}{\mathrm{Km0973}}\right) - 1} \tag{117}$$

Table 236: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.074	dimensionless	☑
Vmax		0000324	1.035	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	2.000	dimensionless	☑

Id	Name	SBO	Value	Unit	Constant
Km0991		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1271		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0180		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0973		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.59 Reaction r_0219

This is a reversible reaction of two reactants forming three products influenced by six modifiers.

Name aspartate-semialdehyde dehydrogenase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0295} + \mathrm{s\_1212} \xrightleftharpoons{\mathrm{e\_0186},\ \mathrm{s\_0295},\ \mathrm{s\_1212},\ \mathrm{s\_0978},\ \mathrm{s\_1207},\ \mathrm{PHO}} \mathrm{s\_0978} + \mathrm{s\_1207} + \mathrm{PHO} \tag{118}$$

Reactants

Table 237: Properties of each reactant.

Id	Name	SBO
s_0295	4-phospho-L-aspartate	
s_1212	NADPH	

Modifiers

Table 238: Properties of each modifier.

Id	Name	SBO
e_0186	HOM2	0000460
s_0295	4-phospho-L-aspartate	
s_1212	NADPH	
s_0978	L-aspartate 4-semialdehyde	
s_1207	NADP(+)	
PHO	phosphate	

Products

Table 239: Properties of each product.

Id	Name	SBO
s_0978	L-aspartate 4-semialdehyde	
s_1207	NADP(+)	
PHO	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{59} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0295}] \cdot [\text{s\_1212}] - \frac{[\text{s\_0978}] \cdot [\text{s\_1207}] \cdot [\text{PHO}]}{\text{Keq}} \right)}{\text{Km0295} \cdot \text{Km1212}}}{\left(1 + \frac{[\text{s\_0295}]}{\text{Km0295}}\right) \cdot \left(1 + \frac{[\text{s\_1212}]}{\text{Km1212}}\right) + \left(1 + \frac{[\text{s\_0978}]}{\text{Km0978}}\right) \cdot \left(1 + \frac{[\text{s\_1207}]}{\text{Km1207}}\right) \cdot \left(1 + \frac{[\text{PHO}]}{\text{KmPHO}}\right) - 1} \tag{119}$$

Table 240: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.036	dimensionless	☑
Vmax		0000324	0.790	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.200	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0295		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1212		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0978		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1207		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmPHO		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.60 Reaction r_0220

This is a reversible reaction of three reactants forming three products influenced by seven modifiers.

Name Aspartyl-tRNA synthetase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{ATP} + \text{s\_0973} + \text{s\_1587} \xrightleftharpoons{\text{e\_0615, ATP, s\_0973, s\_1587, AMP, s\_0432, s\_0633}} \text{AMP} + \text{s\_0432} + \text{s\_0633} \tag{120}$$

Reactants

Table 241: Properties of each reactant.

Id	Name	SBO
ATP	ATP	
s_0973	L-aspartate	
s_1587	tRNA(Asp)	

Modifiers

Table 242: Properties of each modifier.

Id	Name	SBO
e_0615	DPS1	0000460
ATP	ATP	
s_0973	L-aspartate	
s_1587	tRNA(Asp)	
AMP	AMP	
s_0432	Asp-tRNA(Asp)	
s_0633	diphosphate	

Products

Table 243: Properties of each product.

Id	Name	SBO
AMP	AMP	
s_0432	Asp-tRNA(Asp)	
s_0633	diphosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{60} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{ATP}] \cdot [\mathrm{s\_0973}] \cdot [\mathrm{s\_1587}] - \frac{[\mathrm{AMP}] \cdot [\mathrm{s\_0432}] \cdot [\mathrm{s\_0633}]}{\mathrm{Keq}} \right)}{\mathrm{KmATP} \cdot \mathrm{Km0973} \cdot \mathrm{Km1587}}}{\left(1 + \frac{[\mathrm{ATP}]}{\mathrm{KmATP}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0973}]}{\mathrm{Km0973}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1587}]}{\mathrm{Km1587}}\right) + \left(1 + \frac{[\mathrm{AMP}]}{\mathrm{KmAMP}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0432}]}{\mathrm{Km0432}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0633}]}{\mathrm{Km0633}}\right) - 1} \tag{121}$$

Table 244: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.013	dimensionless	☑
Vmax		0000324	0.384	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	0.232	dimensionless	☑
KmATP		0000322	2.525	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0973		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1587		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmAMP		0000323	0.293	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0432		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0633		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.61 Reaction r_0225

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name ATP phosphoribosyltransferase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{ATP} + \mathrm{s\_1386} \xrightleftharpoons{\mathrm{e\_0283,\ ATP,\ s\_1386,\ s\_0326,\ s\_0633}} \mathrm{s\_0326} + \mathrm{s\_0633} \qquad (122)$$

Reactants

Table 245: Properties of each reactant.

Id	Name	SBO
ATP	ATP	
s_1386	PRPP	

Modifiers

Table 246: Properties of each modifier.

Id	Name	SBO
e_0283	HIS1	0000460
ATP	ATP	
s_1386	PRPP	
s_0326	5-phosphoribosyl-ATP	

Id	Name	SBO
s_0633	diphosphate	

Products

Table 247: Properties of each product.

Id	Name	SBO
s_0326	5-phosphoribosyl-ATP	
s_0633	diphosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{61} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{ATP}] \cdot [\text{s\_1386}] - \frac{[\text{s\_0326}] \cdot [\text{s\_0633}]}{\text{Keq}} \right)}{\text{KmATP} \cdot \text{Km1386}}}{\left(1 + \frac{[\text{ATP}]}{\text{KmATP}}\right) \cdot \left(1 + \frac{[\text{s\_1386}]}{\text{Km1386}}\right) + \left(1 + \frac{[\text{s\_0326}]}{\text{Km0326}}\right) \cdot \left(1 + \frac{[\text{s\_0633}]}{\text{Km0633}}\right) - 1} \tag{123}$$

Table 248: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.003	dimensionless	☑
Vmax		0000324	0.040	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.079	dimensionless	☑
KmATP		0000322	2.525	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1386		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0326		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0633		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.62 Reaction r_0226

This is a reversible reaction of two reactants forming one product influenced by 19 modifiers.

Name ATP synthase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{ADP} + \mathrm{PHO} \xrightleftharpoons{\text{e\_0950, e\_0944, e\_0005, e\_0033, e\_0207, e\_0003, e\_0671, e\_0002, e\_0051, e\_0223, e\_0709, e\_0213, e\_0}} \quad (124)$$

Reactants

Table 249: Properties of each reactant.

Id	Name	SBO
ADP	ADP	
PHO	phosphate	

Modifiers

Table 250: Properties of each modifier.

Id	Name	SBO
e_0950	ATP20	0000460
e_0944	ATP15	0000460
e_0005	OLI1	0000460
e_0033	ATP1	0000460
e_0207	ATP5	0000460
e_0003	ATP6	0000460
e_0671	ATP14	0000460
e_0002	ATP8	0000460
e_0051	ATP3	0000460
e_0223	ATP17	0000460
e_0709	ATP18	0000460
e_0213	TIM11	0000460
e_0544	ATP2	0000460
e_0559	ATP7	0000460
e_0127	ATP16	0000460
e_0913	ATP4	0000460
ADP	ADP	
PHO	phosphate	
ATP	ATP	

Product

Table 251: Properties of each product.

Id	Name	SBO
ATP	ATP	

Kinetic Law

Derived unit contains undeclared units

$$v_{62} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{ADP}] \cdot [\text{PHO}] - \frac{[\text{ATP}]}{\text{Keq}} \right)}{\text{KmADP} \cdot \text{KmPHO}}}{\left(1 + \frac{[\text{ADP}]}{\text{KmADP}}\right) \cdot \left(1 + \frac{[\text{PHO}]}{\text{KmPHO}}\right) + 1 + \frac{[\text{ATP}]}{\text{KmATP}} - 1} \tag{125}$$

Table 252: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			3.292	dimensionless	☑
Vmax		0000324	32.921	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	39.394	$\text{mmol}^{-1} \cdot \text{l}$	☑
KmADP		0000322	1.282	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmPHO		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmATP		0000323	2.525	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.63 Reaction ATPase

This is a reversible reaction of one reactant forming two products influenced by 31 modifiers.

Name ATPase, cytosolic

SBO:0000176 biochemical reaction

Reaction equation

$$\text{ATP} \xrightleftharpoons{\text{e\_0727, e\_0569, e\_0432, e\_0263, e\_0956, e\_0155, e\_0892, e\_0362, e\_0251, e\_0695, e\_0935, e\_0066, e\_0429, e\_}} \tag{126}$$

Reactant

Table 253: Properties of each reactant.

Id	Name	SBO
ATP	ATP	

Modifiers

Table 254: Properties of each modifier.

Id	Name	SBO
e_0727	STV1	0000460
e_0569	VMA5	0000460
e_0432	VMA10	0000460
e_0263	VMA8	0000460
e_0956	VMA13	0000460
e_0155	VMA1	0000460
e_0892	VMA4	0000460
e_0362	VMA7	0000460
e_0251	VMA3	0000460
e_0695	VMA6	0000460
e_0935	VMA11	0000460
e_0066	VMA2	0000460
e_0429	VMA16	0000460
e_0183	YCF1	0000460
e_0621	YBT1	0000460
e_0569	VMA5	0000460
e_0432	VMA10	0000460
e_0263	VMA8	0000460
e_0956	VMA13	0000460
e_0155	VMA1	0000460
e_0892	VMA4	0000460
e_0362	VMA7	0000460
e_0251	VMA3	0000460
e_0695	VMA6	0000460
e_0884	VPH1	0000460
e_0935	VMA11	0000460
e_0066	VMA2	0000460
e_0429	VMA16	0000460
e_0588	PXA2	0000460
e_0924	PXA1	0000460
ATP	ATP	

Products

Table 255: Properties of each product.

Id	Name	SBO
ADP	ADP	
PHO	phosphate	

Kinetic Law

Derived unit $s^{-1} \cdot mmol$

$$v_{63} = \text{vol}(\text{cell}) \cdot k \cdot [\text{ATP}] \tag{127}$$

Table 256: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
k			0.658	s^{-1}	☑
FLUX_VALUE			1.662	dimensionless	☑

6.64 Reaction r_0231

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name C-14 sterol reductase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0262} + \text{s\_1212} \xrightleftharpoons{\text{e\_0800, s\_0262, s\_1212, s\_0122, s\_1207}} \text{s\_0122} + \text{s\_1207} \tag{128}$$

Reactants

Table 257: Properties of each reactant.

Id	Name	SBO
s_0262	4,4-dimethyl-5alpha-cholesta-8,14,24-trien-3beta-ol	
s_1212	NADPH	

Modifiers

Table 258: Properties of each modifier.

Id	Name	SBO
e_0800	ERG24	0000460
s_0262	4,4-dimethyl-5alpha-cholesta-8,14,24-trien-3beta-ol	
s_1212	NADPH	
s_0122	14-demethyllanosterol	
s_1207	NADP(+)	

Products

Table 259: Properties of each product.

Id	Name	SBO
s_0122	14-demethyllanosterol	
s_1207	NADP(+)	

Kinetic Law

Derived unit contains undeclared units

$$v_{64} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0262}] \cdot [\mathrm{s\_1212}] - \frac{[\mathrm{s\_0122}] \cdot [\mathrm{s\_1207}]}{\mathrm{Keq}} \right)}{\mathrm{Km0262} \cdot \mathrm{Km1212}}}{\left(1 + \frac{[\mathrm{s\_0262}]}{\mathrm{Km0262}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1212}]}{\mathrm{Km1212}}\right) + \left(1 + \frac{[\mathrm{s\_0122}]}{\mathrm{Km0122}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1207}]}{\mathrm{Km1207}}\right) - 1} \tag{129}$$

Table 260: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.93102373430305 \cdot 10^{-4}$	dimensionless	☑
Vmax		0000324	0.004	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0262		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1212		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0122		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1207		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.65 Reaction r_0234

This is a reversible reaction of two reactants forming three products influenced by six modifiers.

Name C-3 sterol dehydrogenase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_1207} + \text{s\_1578} \xrightleftharpoons{\text{e\_0326, s\_1207, s\_1578, CO2, s\_1212, s\_1579}} \text{CO2} + \text{s\_1212} + \text{s\_1579} \tag{130}$$

Reactants

Table 261: Properties of each reactant.

Id	Name	SBO
s_1207	NADP(+)	
s_1578	zymosterol intermediate 1c	

Modifiers

Table 262: Properties of each modifier.

Id	Name	SBO
e_0326	ERG26	0000460
s_1207	NADP(+)	
s_1578	zymosterol intermediate 1c	
CO2	carbon dioxide	
s_1212	NADPH	
s_1579	zymosterol intermediate 2	

Products

Table 263: Properties of each product.

Id	Name	SBO
CO2	carbon dioxide	
s_1212	NADPH	
s_1579	zymosterol intermediate 2	

Kinetic Law

Derived unit contains undeclared units

$$v_{65} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_1207}] \cdot [\text{s\_1578}] - \frac{[\text{CO2}] \cdot [\text{s\_1212}] \cdot [\text{s\_1579}]}{\text{Keq}} \right)}{\text{Km1207} \cdot \text{Km1578}}}{\left(1 + \frac{[\text{s\_1207}]}{\text{Km1207}}\right) \cdot \left(1 + \frac{[\text{s\_1578}]}{\text{Km1578}}\right) + \left(1 + \frac{[\text{CO2}]}{\text{KmCO2}}\right) \cdot \left(1 + \frac{[\text{s\_1212}]}{\text{Km1212}}\right) \cdot \left(1 + \frac{[\text{s\_1579}]}{\text{Km1579}}\right) - 1} \tag{131}$$

Table 264: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.90694961726454 \cdot 10^{-4}$	dimensionless	☑
Vmax		0000324	0.006	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1207		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1578		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmCO2		0000323	1.000	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1212		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1579		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.66 Reaction r_0235

This is a reversible reaction of two reactants forming three products influenced by six modifiers.

Name C-3 sterol dehydrogenase (4-methylzymosterol)

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0297} + \text{NAD} \xrightleftharpoons{\text{e\_0326, s\_0297, NAD, s\_0209, CO2, NADH}} \text{s\_0209} + \text{CO2} + \text{NADH} \tag{132}$$

Reactants

Table 265: Properties of each reactant.

Id	Name	SBO
s_0297	4beta-methylzymosterol-4alpha-carboxylic acid	
NAD	NAD	

Modifiers

Table 266: Properties of each modifier.

Id	Name	SBO
e_0326	ERG26	0000460
s_0297	4beta-methylzymosterol-4alpha-carboxylic acid	
NAD	NAD	
s_0209	3-dehydro-4-methylzymosterol	
CO2	carbon dioxide	
NADH	NADH	

Products

Table 267: Properties of each product.

Id	Name	SBO
s_0209	3-dehydro-4-methylzymosterol	
CO2	carbon dioxide	
NADH	NADH	

Kinetic Law

Derived unit contains undeclared units

$$v_{66} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0297}] \cdot [\text{NAD}] - \frac{[\text{s\_0209}] \cdot [\text{CO2}] \cdot [\text{NADH}]}{\text{Keq}} \right)}{\text{Km0297} \cdot \text{KmNAD}}}{\left(1 + \frac{[\text{s\_0297}]}{\text{Km0297}}\right) \cdot \left(1 + \frac{[\text{NAD}]}{\text{KmNAD}}\right) + \left(1 + \frac{[\text{s\_0209}]}{\text{Km0209}}\right) \cdot \left(1 + \frac{[\text{CO2}]}{\text{KmCO2}}\right) \cdot \left(1 + \frac{[\text{NADH}]}{\text{KmNADH}}\right) - 1} \tag{133}$$

Table 268: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.90694961726454 \cdot 10^{-4}$	dimensionless	☑
Vmax		0000324	0.006	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.115	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0297		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmNAD		0000322	1.503	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0209		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmCO2		0000323	1.000	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmNADH		0000323	0.087	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.67 Reaction r_0236

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name C-3 sterol keto reductase (4-methylzymosterol)

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0209} + \text{s\_1212} \xrightleftharpoons{\text{e\_0644, s\_0209, s\_1212, s\_0296, s\_1207}} \text{s\_0296} + \text{s\_1207} \qquad (134)$$

Reactants

Table 269: Properties of each reactant.

Id	Name	SBO
s_0209	3-dehydro-4-methylzymosterol	
s_1212	NADPH	

Modifiers

Table 270: Properties of each modifier.

Id	Name	SBO
e_0644	ERG27	0000460
s_0209	3-dehydro-4-methylzymosterol	
s_1212	NADPH	
s_0296	4alpha-methylzymosterol	
s_1207	NADP(+)	

Products

Table 271: Properties of each product.

Id	Name	SBO
s_0296	4alpha-methylzymosterol	
s_1207	NADP(+)	

Kinetic Law

Derived unit contains undeclared units

$$v_{67} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0209}] \cdot [\text{s\_1212}] - \frac{[\text{s\_0296}] \cdot [\text{s\_1207}]}{\text{Keq}} \right)}{\text{Km0209} \cdot \text{Km1212}}}{\left(1 + \frac{[\text{s\_0209}]}{\text{Km0209}}\right) \cdot \left(1 + \frac{[\text{s\_1212}]}{\text{Km1212}}\right) + \left(1 + \frac{[\text{s\_0296}]}{\text{Km0296}}\right) \cdot \left(1 + \frac{[\text{s\_1207}]}{\text{Km1207}}\right) - 1} \tag{135}$$

Table 272: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.90694961726454 \cdot 10^{-4}$	dimensionless	☑
Vmax		0000324	0.004	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0209		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1212		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0296		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1207		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.68 Reaction r_0237

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name C-3 sterol keto reductase (zymosterol)

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_1212} + \text{s\_1579} \xrightleftharpoons{\text{e\_0644, s\_1212, s\_1579, s\_1207, s\_1569}} \text{s\_1207} + \text{s\_1569} \tag{136}$$

Reactants

Table 273: Properties of each reactant.

Id	Name	SBO
s_1212	NADPH	
s_1579	zymosterol intermediate 2	

Modifiers

Table 274: Properties of each modifier.

Id	Name	SBO
e_0644	ERG27	0000460

Id	Name	SBO
s_1212	NADPH	
s_1579	zymosterol intermediate 2	
s_1207	NADP(+)	
s_1569	zymosterol	

Products

Table 275: Properties of each product.

Id	Name	SBO
s_1207	NADP(+)	
s_1569	zymosterol	

Kinetic Law

Derived unit contains undeclared units

$$v_{68} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_1212}] \cdot [\mathrm{s\_1579}] - \frac{[\mathrm{s\_1207}] \cdot [\mathrm{s\_1569}]}{\mathrm{Keq}} \right)}{\mathrm{Km1212} \cdot \mathrm{Km1579}}}{\left(1 + \frac{[\mathrm{s\_1212}]}{\mathrm{Km1212}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1579}]}{\mathrm{Km1579}}\right) + \left(1 + \frac{[\mathrm{s\_1207}]}{\mathrm{Km1207}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1569}]}{\mathrm{Km1569}}\right) - 1} \tag{137}$$

Table 276: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.90694961726454 \cdot 10^{-4}$	dimensionless	☑
Vmax		0000324	0.004	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km1212		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1579		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1207		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1569		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.69 Reaction r_0238

This is a reversible reaction of three reactants forming two products influenced by six modifiers.

Name C-4 methyl sterol oxidase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0296} + \text{s\_1212} + \text{s\_1275} \xrightleftharpoons{\text{e\_0367, s\_0296, s\_1212, s\_1275, s\_1207, s\_1576}} \text{s\_1207} + \text{s\_1576} \quad (138)$$

Reactants

Table 277: Properties of each reactant.

Id	Name	SBO
s_0296	4alpha-methylzymosterol	
s_1212	NADPH	
s_1275	oxygen	

Modifiers

Table 278: Properties of each modifier.

Id	Name	SBO
e_0367	ERG25	0000460
s_0296	4alpha-methylzymosterol	
s_1212	NADPH	
s_1275	oxygen	
s_1207	NADP(+)	
s_1576	zymosterol intermediate 1a	

Products

Table 279: Properties of each product.

Id	Name	SBO
s_1207	NADP(+)	
s_1576	zymosterol intermediate 1a	

Kinetic Law

Derived unit contains undeclared units

$$v_{69} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0296}] \cdot [\text{s\_1212}] \cdot [\text{s\_1275}] - \frac{[\text{s\_1207}] \cdot [\text{s\_1576}]}{\text{Keq}} \right)}{\text{Km0296} \cdot \text{Km1212} \cdot \text{Km1275}}}{\left(1 + \frac{[\text{s\_0296}]}{\text{Km0296}}\right) \cdot \left(1 + \frac{[\text{s\_1212}]}{\text{Km1212}}\right) \cdot \left(1 + \frac{[\text{s\_1275}]}{\text{Km1275}}\right) + \left(1 + \frac{[\text{s\_1207}]}{\text{Km1207}}\right) \cdot \left(1 + \frac{[\text{s\_1576}]}{\text{Km1576}}\right) - 1} \tag{139}$$

Table 280: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.90694961726454 \cdot 10^{-4}$	dimensionless	☑
Vmax		0000324	0.006	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	20.000	$\text{mmol}^{-1} \cdot \text{l}$	☑
Km0296		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1212		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1275		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1207		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1576		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.70 Reaction r_0239

This is a reversible reaction of three reactants forming two products influenced by six modifiers.

Name C-4 methyl sterol oxidase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_1212} + \text{s\_1275} + \text{s\_1576} \xrightleftharpoons{\text{e\_0367, s\_1212, s\_1275, s\_1576, s\_1207, s\_1577}} \text{s\_1207} + \text{s\_1577} \tag{140}$$

Reactants

Table 281: Properties of each reactant.

Id	Name	SBO
s_1212	NADPH	
s_1275	oxygen	
s_1576	zymosterol intermediate 1a	

Modifiers

Table 282: Properties of each modifier.

Id	Name	SBO
e_0367	ERG25	0000460
s_1212	NADPH	
s_1275	oxygen	
s_1576	zymosterol intermediate 1a	
s_1207	NADP(+)	
s_1577	zymosterol intermediate 1b	

Products

Table 283: Properties of each product.

Id	Name	SBO
s_1207	NADP(+)	
s_1577	zymosterol intermediate 1b	

Kinetic Law

Derived unit contains undeclared units

$$v_{70} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_1212}] \cdot [\text{s\_1275}] \cdot [\text{s\_1576}] - \frac{[\text{s\_1207}] \cdot [\text{s\_1577}]}{\text{Keq}} \right)}{\text{Km1212} \cdot \text{Km1275} \cdot \text{Km1576}}}{\left(1 + \frac{[\text{s\_1212}]}{\text{Km1212}}\right) \cdot \left(1 + \frac{[\text{s\_1275}]}{\text{Km1275}}\right) \cdot \left(1 + \frac{[\text{s\_1576}]}{\text{Km1576}}\right) + \left(1 + \frac{[\text{s\_1207}]}{\text{Km1207}}\right) \cdot \left(1 + \frac{[\text{s\_1577}]}{\text{Km1577}}\right) - 1} \tag{141}$$

Table 284: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.90694961726454 \cdot 10^{-4}$	dimensionless	☑
Vmax		0000324	0.006	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	20.000	$\text{mmol}^{-1} \cdot \text{l}$	☑
Km1212		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1275		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1576		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1207		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1577		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.71 Reaction r_0240

This is a reversible reaction of three reactants forming two products influenced by six modifiers.

Name C-4 methyl sterol oxidase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_1212} + \text{s\_1275} + \text{s\_1577} \xrightleftharpoons{\text{e\_0367, s\_1212, s\_1275, s\_1577, s\_1207, s\_1578}} \text{s\_1207} + \text{s\_1578} \tag{142}$$

Reactants

Table 285: Properties of each reactant.

Id	Name	SBO
s_1212	NADPH	
s_1275	oxygen	
s_1577	zymosterol intermediate 1b	

Modifiers

Table 286: Properties of each modifier.

Id	Name	SBO
e_0367	ERG25	0000460
s_1212	NADPH	
s_1275	oxygen	
s_1577	zymosterol intermediate 1b	
s_1207	NADP(+)	
s_1578	zymosterol intermediate 1c	

Products

Table 287: Properties of each product.

Id	Name	SBO
s_1207	NADP(+)	
s_1578	zymosterol intermediate 1c	

Kinetic Law

Derived unit contains undeclared units

$$v_{71} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_1212}] \cdot [\text{s\_1275}] \cdot [\text{s\_1577}] - \frac{[\text{s\_1207}] \cdot [\text{s\_1578}]}{\text{Keq}} \right)}{\text{Km1212} \cdot \text{Km1275} \cdot \text{Km1577}}}{\left(1 + \frac{[\text{s\_1212}]}{\text{Km1212}}\right) \cdot \left(1 + \frac{[\text{s\_1275}]}{\text{Km1275}}\right) \cdot \left(1 + \frac{[\text{s\_1577}]}{\text{Km1577}}\right) + \left(1 + \frac{[\text{s\_1207}]}{\text{Km1207}}\right) \cdot \left(1 + \frac{[\text{s\_1578}]}{\text{Km1578}}\right) - 1} \tag{143}$$

Table 288: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.90694961726454 \cdot 10^{-4}$	dimensionless	☑
Vmax		0000324	0.006	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	20.000	$\text{mmol}^{-1} \cdot \text{l}$	☑
Km1212		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1275		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1577		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1207		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1578		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.72 Reaction r_0241

This is a reversible reaction of three reactants forming two products influenced by six modifiers.

Name C-4 sterol methyl oxidase (4,4-dimethylzymosterol)

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0122} + 3\,\text{s\_1212} + 3\,\text{s\_1275} \xrightleftharpoons{\text{e\_0367, s\_0122, s\_1212, s\_1275, s\_0297, s\_1207}} \text{s\_0297} + 3\,\text{s\_1207} \tag{144}$$

Reactants

Table 289: Properties of each reactant.

Id	Name	SBO
s_0122	14-demethyllanosterol	
s_1212	NADPH	
s_1275	oxygen	

Modifiers

Table 290: Properties of each modifier.

Id	Name	SBO
e_0367	ERG25	0000460
s_0122	14-demethyllanosterol	
s_1212	NADPH	
s_1275	oxygen	
s_0297	4beta-methylzymosterol-4alpha-carboxylic acid	
s_1207	NADP(+)	

Products

Table 291: Properties of each product.

Id	Name	SBO
s_0297	4beta-methylzymosterol-4alpha-carboxylic acid	
s_1207	NADP(+)	

Kinetic Law

Derived unit contains undeclared units

$$v_{72} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0122}] \cdot [\mathrm{s\_1212}]^3 \cdot [\mathrm{s\_1275}]^3 - \frac{[\mathrm{s\_0297}] \cdot [\mathrm{s\_1207}]^3}{\mathrm{Keq}} \right)}{\mathrm{Km0122} \cdot \mathrm{Km1212}^3 \cdot \mathrm{Km1275}^3}}{\left(1 + \frac{[\mathrm{s\_0122}]}{\mathrm{Km0122}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1212}]}{\mathrm{Km1212}}\right)^3 \cdot \left(1 + \frac{[\mathrm{s\_1275}]}{\mathrm{Km1275}}\right)^3 + \left(1 + \frac{[\mathrm{s\_0297}]}{\mathrm{Km0297}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1207}]}{\mathrm{Km1207}}\right)^3 - 1} \tag{145}$$

Table 292: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.90694961726454 \cdot 10^{-4}$	dimensionless	☑
Vmax		0000324	0.083	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Keq		0000281	2000.000	$\mathrm{mmol}^{-3} \cdot \mathrm{l}^{3}$	☑
Km0122		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1212		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1275		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0297		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1207		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.73 Reaction r_0243

This is a reversible reaction of one reactant forming one product influenced by three modifiers.

Name C-8 sterol isomerase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0700} \xrightleftharpoons{\text{e\_0742, s\_0700, s\_0657}} \text{s\_0657} \tag{146}$$

Reactant

Table 293: Properties of each reactant.

Id	Name	SBO
s_0700	fecosterol	

Modifiers

Table 294: Properties of each modifier.

Id	Name	SBO
e_0742	ERG2	0000460
s_0700	fecosterol	
s_0657	episterol	

Product

Table 295: Properties of each product.

Id	Name	SBO
s_0657	episterol	

Kinetic Law

Derived unit contains undeclared units

$$v_{73} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0700}] - \frac{[\text{s\_0657}]}{\text{Keq}} \right)}{\text{Km0700}}}{1 + \frac{[\text{s\_0700}]}{\text{Km0700}} + 1 + \frac{[\text{s\_0657}]}{\text{Km0657}} - 1} \tag{147}$$

Table 296: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$4.12702283642471 \cdot 10^{-6}$	dimensionless	☑
Vmax		0000324	$2.47621370185965 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0700		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0657		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.74 Reaction r_0244

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name C-s24 sterol reductase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0662} + \text{s\_1212} \xrightleftharpoons{\text{e\_0329, s\_0662, s\_1212, s\_0666, s\_1207}} \text{s\_0666} + \text{s\_1207} \qquad (148)$$

Reactants

Table 297: Properties of each reactant.

Id	Name	SBO
s_0662	ergosta-5,7,22,24(28)-tetraen-3beta-ol	
s_1212	NADPH	

Modifiers

Table 298: Properties of each modifier.

Id	Name	SBO
e_0329	ERG4	0000460
s_0662	ergosta-5,7,22,24(28)-tetraen-3beta-ol	
s_1212	NADPH	
s_0666	ergosterol	
s_1207	NADP(+)	

Products

Table 299: Properties of each product.

Id	Name	SBO
s_0666	ergosterol	
s_1207	NADP(+)	

Kinetic Law

Derived unit contains undeclared units

$$v_{74} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0662}] \cdot [\text{s\_1212}] - \frac{[\text{s\_0666}] \cdot [\text{s\_1207}]}{\text{Keq}} \right)}{\text{Km0662} \cdot \text{Km1212}}}{\left(1 + \frac{[\text{s\_0662}]}{\text{Km0662}}\right) \cdot \left(1 + \frac{[\text{s\_1212}]}{\text{Km1212}}\right) + \left(1 + \frac{[\text{s\_0666}]}{\text{Km0666}}\right) \cdot \left(1 + \frac{[\text{s\_1207}]}{\text{Km1207}}\right) - 1} \quad (149)$$

Table 300: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.7564863865831 \cdot 10^{-4}$	dimensionless	☑
Vmax		0000324	0.004	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0662		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1212		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0666		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1207		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.75 Reaction r_0250

This is a reversible reaction of three reactants forming four products influenced by ten modifiers.

Name carbamoyl-phosphate synthase (glutamine-hydrolysing)

SBO:0000176 biochemical reaction

Reaction equation

$$2\,\text{ATP} + \text{s\_0445} + \text{s\_0999} \xrightleftharpoons{\text{e\_0508, e\_0542, e\_0888, ATP, s\_0445, s\_0999, ADP, s\_0455, s\_0991, PHO}} 2\,\text{ADP} + \text{s\_045} \quad (150)$$

Reactants

Table 301: Properties of each reactant.

Id	Name	SBO
ATP	ATP	
s_0445	bicarbonate	
s_0999	L-glutamine	

Modifiers

Table 302: Properties of each modifier.

Id	Name	SBO
e_0508	URA2	0000460
e_0542	CPA2	0000460
e_0888	CPA1	0000460
ATP	ATP	
s_0445	bicarbonate	
s_0999	L-glutamine	
ADP	ADP	
s_0455	carbamoyl phosphate	
s_0991	L-glutamate	
PHO	phosphate	

Products

Table 303: Properties of each product.

Id	Name	SBO
ADP	ADP	
s_0455	carbamoyl phosphate	
s_0991	L-glutamate	
PHO	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{75} = \frac{\dfrac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{ATP}]^2 \cdot [\mathrm{s\_0445}] \cdot [\mathrm{s\_0999}] - \frac{[\mathrm{ADP}]^2 \cdot [\mathrm{s\_0455}] \cdot [\mathrm{s\_0991}] \cdot [\mathrm{PHO}]}{\mathrm{Keq}} \right)}{\mathrm{KmATP}^2 \cdot \mathrm{Km0445} \cdot \mathrm{Km0999}}}{\left(1 + \frac{[\mathrm{ATP}]}{\mathrm{KmATP}}\right)^2 \cdot \left(1 + \frac{[\mathrm{s\_0445}]}{\mathrm{Km0445}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0999}]}{\mathrm{Km0999}}\right) + \left(1 + \frac{[\mathrm{ADP}]}{\mathrm{KmADP}}\right)^2 \cdot \left(1 + \frac{[\mathrm{s\_0455}]}{\mathrm{Km0455}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0991}]}{\mathrm{Km0991}}\right) \cdot \left(1 + \frac{[\mathrm{PHO}]}{\mathrm{KmPHO}}\right)} \quad (151)$$

Table 304: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.012	dimensionless	☑
Vmax		0000324	1.096	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	0.052	$\mathrm{mmol \cdot l^{-1}}$	☑
KmATP		0000322	2.525	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0445		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0999		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmADP		0000323	1.282	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0455		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0991		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmPHO		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.76 Reaction r_0257

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name CDP-diacylglycerol synthase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0539} + \mathrm{s\_1331} \xrightleftharpoons{\mathrm{e\_0045,\ s\_0539,\ s\_1331,\ s\_0471,\ s\_0633}} \mathrm{s\_0471} + \mathrm{s\_0633} \qquad (152)$$

Reactants

Table 305: Properties of each reactant.

Id	Name	SBO
s_0539	CTP	
s_1331	phosphatidate	

Modifiers

Table 306: Properties of each modifier.

Id	Name	SBO
e_0045	CDS1	0000460
s_0539	CTP	
s_1331	phosphatidate	

Id	Name	SBO
s_0471	CDP-diacylglycerol	
s_0633	diphosphate	

Products

Table 307: Properties of each product.

Id	Name	SBO
s_0471	CDP-diacylglycerol	
s_0633	diphosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{76} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0539}] \cdot [\text{s\_1331}] - \frac{[\text{s\_0471}] \cdot [\text{s\_0633}]}{\text{Keq}} \right)}{\text{Km0539} \cdot \text{Km1331}}}{\left(1 + \frac{[\text{s\_0539}]}{\text{Km0539}}\right) \cdot \left(1 + \frac{[\text{s\_1331}]}{\text{Km1331}}\right) + \left(1 + \frac{[\text{s\_0471}]}{\text{Km0471}}\right) \cdot \left(1 + \frac{[\text{s\_0633}]}{\text{Km0633}}\right) - 1} \tag{153}$$

Table 308: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.60820701144352 \cdot 10^{-4}$	dimensionless	☑
Vmax		0000324	0.004	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0539		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1331		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0471		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0633		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.77 Reaction r_0264

This is a reversible reaction of two reactants forming two products influenced by seven modifiers.

Name ceramide-1 synthase (26C)

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0816} + \text{s\_1445} \xrightleftharpoons{\text{e\_0558, e\_0417, e\_0762, s\_0816, s\_1445, s\_0478, s\_0529}} \text{s\_0478} + \text{s\_0529} \tag{154}$$

Reactants

Table 309: Properties of each reactant.

Id	Name	SBO
s_0816	hexacosanoyl-CoA	
s_1445	sphinganine	

Modifiers

Table 310: Properties of each modifier.

Id	Name	SBO
e_0558	LAC1	0000460
e_0417	LAG1	0000460
e_0762	LIP1	0000460
s_0816	hexacosanoyl-CoA	
s_1445	sphinganine	
s_0478	ceramide-1 (C26)	
s_0529	coenzyme A	

Products

Table 311: Properties of each product.

Id	Name	SBO
s_0478	ceramide-1 (C26)	
s_0529	coenzyme A	

Kinetic Law

Derived unit contains undeclared units

$$v_{77} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0816}] \cdot [\text{s\_1445}] - \frac{[\text{s\_0478}] \cdot [\text{s\_0529}]}{\text{Keq}} \right)}{\text{Km0816} \cdot \text{Km1445}}}{\left(1 + \frac{[\text{s\_0816}]}{\text{Km0816}}\right) \cdot \left(1 + \frac{[\text{s\_1445}]}{\text{Km1445}}\right) + \left(1 + \frac{[\text{s\_0478}]}{\text{Km0478}}\right) \cdot \left(1 + \frac{[\text{s\_0529}]}{\text{Km0529}}\right) - 1} \tag{155}$$

Table 312: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.22290012145366 \cdot 10^{-5}$	dimensionless	☑
Vmax		0000324	$3.11206017003025 \cdot 10^{-4}$	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0816		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1445		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0478		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0529		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.78 Reaction r_0278

This is a reversible reaction of one reactant forming one product influenced by three modifiers.

Name chorismate mutase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0515} \xrightleftharpoons{\mathrm{e\_0959},\ \mathrm{s\_0515},\ \mathrm{s\_1377}} \mathrm{s\_1377} \tag{156}$$

Reactant

Table 313: Properties of each reactant.

Id	Name	SBO
s_0515	chorismate	

Modifiers

Table 314: Properties of each modifier.

Id	Name	SBO
e_0959	ARO7	0000460
s_0515	chorismate	
s_1377	prephenate	

Product

Table 315: Properties of each product.

Id	Name	SBO
s_1377	prephenate	

Kinetic Law

Derived unit contains undeclared units

$$v_{78} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0515}] - \frac{[\text{s\_1377}]}{\text{Keq}} \right)}{\text{Km0515}}}{1 + \frac{[\text{s\_0515}]}{\text{Km0515}} + 1 + \frac{[\text{s\_1377}]}{\text{Km1377}} - 1} \tag{157}$$

Table 316: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.010	dimensionless	☑
Vmax		0000324	0.061	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0515		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1377		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.79 Reaction r_0279

This is a reversible reaction of one reactant forming two products influenced by four modifiers.

Name chorismate synthase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0324} \xrightleftharpoons{\text{e\_0342, s\_0324, s\_0515, PHO}} \text{s\_0515} + \text{PHO} \tag{158}$$

Reactant

Table 317: Properties of each reactant.

Id	Name	SBO
s_0324	5-O-(1-carboxyvinyl)-3-phosphoshikimic acid	

Modifiers

Table 318: Properties of each modifier.

Id	Name	SBO
e_0342	ARO2	0000460
s_0324	5-O-(1-carboxyvinyl)-3-phosphoshikimic acid	
s_0515	chorismate	
PHO	phosphate	

Products

Table 319: Properties of each product.

Id	Name	SBO
s_0515	chorismate	
PHO	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{79} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0324}] - \frac{[\mathrm{s\_0515}] \cdot [\mathrm{PHO}]}{\mathrm{Keq}} \right)}{\mathrm{Km0324}}}{1 + \frac{[\mathrm{s\_0324}]}{\mathrm{Km0324}} + \left(1 + \frac{[\mathrm{s\_0515}]}{\mathrm{Km0515}}\right) \cdot \left(1 + \frac{[\mathrm{PHO}]}{\mathrm{KmPHO}}\right) - 1} \tag{159}$$

Table 320: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.011	dimensionless	☑
Vmax		0000324	0.114	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	0.200	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0324		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0515		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmPHO		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.80 Reaction r_0280

This is a reversible reaction of one reactant forming one product influenced by three modifiers.

Name cis-aconitate(3-) to isocitrate

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0516} \xrightleftharpoons{\text{e\_0675, s\_0516, s\_0940}} \text{s\_0940} \tag{160}$$

Reactant

Table 321: Properties of each reactant.

Id	Name	SBO
s_0516	cis-aconitate	

Modifiers

Table 322: Properties of each modifier.

Id	Name	SBO
e_0675	ACO1	0000460
s_0516	cis-aconitate	
s_0940	isocitrate	

Product

Table 323: Properties of each product.

Id	Name	SBO
s_0940	isocitrate	

Kinetic Law

Derived unit contains undeclared units

$$v_{80} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0516}] - \frac{[\text{s\_0940}]}{\text{Keq}} \right)}{\text{Km0516}}}{1 + \frac{[\text{s\_0516}]}{\text{Km0516}} + 1 + \frac{[\text{s\_0940}]}{\text{Km0940}} - 1} \tag{161}$$

Table 324: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.077	dimensionless	☑
Vmax		0000324	0.460	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0516		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0940		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.81 Reaction r_0300

This is a reversible reaction of two reactants forming two products influenced by seven modifiers.

Name citrate synthase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0373} + \mathrm{s\_1271} \xrightleftharpoons{\mathrm{e\_0947,\ e\_0805,\ e\_0111,\ s\_0373,\ s\_1271,\ s\_0522,\ s\_0529}} \mathrm{s\_0522} + \mathrm{s\_0529} \tag{162}$$

Reactants

Table 325: Properties of each reactant.

Id	Name	SBO
s_0373	acetyl-CoA	
s_1271	oxaloacetate	

Modifiers

Table 326: Properties of each modifier.

Id	Name	SBO
e_0947	CIT3	0000460
e_0805	CIT1	0000460
e_0111	CIT2	0000460
s_0373	acetyl-CoA	
s_1271	oxaloacetate	
s_0522	citrate	
s_0529	coenzyme A	

Products

Table 327: Properties of each product.

Id	Name	SBO
s_0522	citrate	
s_0529	coenzyme A	

Kinetic Law

Derived unit contains undeclared units

$$v_{81} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0373}] \cdot [\text{s\_1271}] - \frac{[\text{s\_0522}] \cdot [\text{s\_0529}]}{\text{Keq}} \right)}{\text{Km0373} \cdot \text{Km1271}}}{\left(1 + \frac{[\text{s\_0373}]}{\text{Km0373}}\right) \cdot \left(1 + \frac{[\text{s\_1271}]}{\text{Km1271}}\right) + \left(1 + \frac{[\text{s\_0522}]}{\text{Km0522}}\right) \cdot \left(1 + \frac{[\text{s\_0529}]}{\text{Km0529}}\right) - 1} \tag{163}$$

Table 328: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.077	dimensionless	☑
Vmax		0000324	1.073	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0373		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1271		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0522		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0529		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.82 Reaction r_0302

This is a reversible reaction of one reactant forming one product influenced by three modifiers.

Name citrate to cis-aconitate(3-)

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0522} \xrightleftharpoons{\text{e\_0675, s\_0522, s\_0516}} \text{s\_0516} \tag{164}$$

Reactant

Table 329: Properties of each reactant.

Id	Name	SBO
s_0522	citrate	

Modifiers

Table 330: Properties of each modifier.

Id	Name	SBO
e_0675	ACO1	0000460
s_0522	citrate	
s_0516	cis-aconitate	

Product

Table 331: Properties of each product.

Id	Name	SBO
s_0516	cis-aconitate	

Kinetic Law

Derived unit contains undeclared units

$$v_{82} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0522}] - \frac{[\text{s\_0516}]}{\text{Keq}} \right)}{\text{Km0522}}}{1 + \frac{[\text{s\_0522}]}{\text{Km0522}} + 1 + \frac{[\text{s\_0516}]}{\text{Km0516}} - 1} \tag{165}$$

Table 332: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.077	dimensionless	☑
Vmax		0000324	0.460	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0522		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0516		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.83 Reaction r_0307

This is a reversible reaction of three reactants forming three products influenced by eight modifiers.

Name CTP synthase (NH3)

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0419} + \text{ATP} + \text{s\_1559} \xrightleftharpoons{\text{e\_0540, e\_0026, s\_0419, ATP, s\_1559, ADP, s\_0539, PHO}} \text{ADP} + \text{s\_0539} + \text{PHO} \quad (166)$$

Reactants

Table 333: Properties of each reactant.

Id	Name	SBO
s_0419	ammonium	
ATP	ATP	
s_1559	UTP	

Modifiers

Table 334: Properties of each modifier.

Id	Name	SBO
e_0540	URA8	0000460
e_0026	URA7	0000460
s_0419	ammonium	
ATP	ATP	
s_1559	UTP	
ADP	ADP	
s_0539	CTP	
PHO	phosphate	

Products

Table 335: Properties of each product.

Id	Name	SBO
ADP	ADP	
s_0539	CTP	
PHO	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{83} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0419}] \cdot [\text{ATP}] \cdot [\text{s\_1559}] - \frac{[\text{ADP}] \cdot [\text{s\_0539}] \cdot [\text{PHO}]}{\text{Keq}} \right)}{\text{Km0419} \cdot \text{KmATP} \cdot \text{Km1559}}}{\left(1 + \frac{[\text{s\_0419}]}{\text{Km0419}}\right) \cdot \left(1 + \frac{[\text{ATP}]}{\text{KmATP}}\right) \cdot \left(1 + \frac{[\text{s\_1559}]}{\text{Km1559}}\right) + \left(1 + \frac{[\text{ADP}]}{\text{KmADP}}\right) \cdot \left(1 + \frac{[\text{s\_0539}]}{\text{Km0539}}\right) \cdot \left(1 + \frac{[\text{PHO}]}{\text{KmPHO}}\right) - 1} \tag{167}$$

Table 336: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.002	dimensionless	☑
Vmax		0000324	0.061	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	1.015	dimensionless	☑
Km0419		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmATP		0000322	2.525	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1559		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmADP		0000323	1.282	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0539		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmPHO		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.84 Reaction r_0309

This is a reversible reaction of two reactants forming one product influenced by four modifiers.

Name cystathionine beta-synthase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_1012} + \text{s\_1039} \xrightleftharpoons{\text{e\_0380, s\_1012, s\_1039, s\_0980}} \text{s\_0980} \tag{168}$$

Reactants

Table 337: Properties of each reactant.

Id	Name	SBO
s_1012	L-homocysteine	
s_1039	L-serine	

Modifiers

Table 338: Properties of each modifier.

Id	Name	SBO
e_0380	CYS4	0000460
s_1012	L-homocysteine	
s_1039	L-serine	
s_0980	L-cystathionine	

Product

Table 339: Properties of each product.

Id	Name	SBO
s_0980	L-cystathionine	

Kinetic Law

Derived unit contains undeclared units

$$v_{84} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_1012}] \cdot [\text{s\_1039}] - \frac{[\text{s\_0980}]}{\text{Keq}} \right)}{\text{Km1012} \cdot \text{Km1039}}}{\left(1 + \frac{[\text{s\_1012}]}{\text{Km1012}}\right) \cdot \left(1 + \frac{[\text{s\_1039}]}{\text{Km1039}}\right) + 1 + \frac{[\text{s\_0980}]}{\text{Km0980}} - 1} \tag{169}$$

Table 340: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.83730618430864 \cdot 10^{-4}$	dimensionless	☑
Vmax		0000324	0.003	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	20.000	$\text{mmol}^{-1} \cdot \text{l}$	☑
Km1012		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1039		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0980		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.85 Reaction r_0310

This is a reversible reaction of one reactant forming three products influenced by five modifiers.

Name cystathionine g-lyase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0980} \xrightleftharpoons{\text{e\_0008, s\_0980, s\_0178, s\_0419, s\_0981}} \text{s\_0178} + \text{s\_0419} + \text{s\_0981} \tag{170}$$

Reactant

Table 341: Properties of each reactant.

Id	Name	SBO
s_0980	L-cystathionine	

Modifiers

Table 342: Properties of each modifier.

Id	Name	SBO
e_0008	CYS3	0000460
s_0980	L-cystathionine	
s_0178	2-oxobutanoate	
s_0419	ammonium	
s_0981	L-cysteine	

Products

Table 343: Properties of each product.

Id	Name	SBO
s_0178	2-oxobutanoate	
s_0419	ammonium	
s_0981	L-cysteine	

Kinetic Law

Derived unit contains undeclared units

$$v_{85} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0980}] - \frac{[\text{s\_0178}] \cdot [\text{s\_0419}] \cdot [\text{s\_0981}]}{\text{Keq}} \right)}{\text{Km0980}}}{1 + \frac{[\text{s\_0980}]}{\text{Km0980}} + \left(1 + \frac{[\text{s\_0178}]}{\text{Km0178}}\right) \cdot \left(1 + \frac{[\text{s\_0419}]}{\text{Km0419}}\right) \cdot \left(1 + \frac{[\text{s\_0981}]}{\text{Km0981}}\right) - 1} \tag{171}$$

Table 344: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.004	dimensionless	☑
Vmax		0000324	0.077	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.020	$\text{mmol}^2 \cdot \text{l}^{-2}$	☑
Km0980		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0178		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0419		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0981		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.86 Reaction r_0311

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name cystathionine gamma-synthase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0981} + \text{s\_1233} \xrightleftharpoons{\text{e\_0545, s\_0981, s\_1233, s\_0362, s\_0980}} \text{s\_0362} + \text{s\_0980} \tag{172}$$

Reactants

Table 345: Properties of each reactant.

Id	Name	SBO
s_0981	L-cysteine	
s_1233	O-acetyl-L-homoserine	

Modifiers

Table 346: Properties of each modifier.

Id	Name	SBO
e_0545	STR2	0000460

Id	Name	SBO
s_0981	L-cysteine	
s_1233	O-acetyl-L-homoserine	
s_0362	acetate	
s_0980	L-cystathionine	

Products

Table 347: Properties of each product.

Id	Name	SBO
s_0362	acetate	
s_0980	L-cystathionine	

Kinetic Law

Derived unit contains undeclared units

$$v_{86} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0981}] \cdot [\mathrm{s\_1233}] - \frac{[\mathrm{s\_0362}] \cdot [\mathrm{s\_0980}]}{\mathrm{Keq}} \right)}{\mathrm{Km0981} \cdot \mathrm{Km1233}}}{\left(1 + \frac{[\mathrm{s\_0981}]}{\mathrm{Km0981}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1233}]}{\mathrm{Km1233}}\right) + \left(1 + \frac{[\mathrm{s\_0362}]}{\mathrm{Km0362}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0980}]}{\mathrm{Km0980}}\right) - 1} \tag{173}$$

Table 348: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.004	dimensionless	☑
Vmax		0000324	0.056	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0981		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1233		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0362		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0980		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.87 Reaction r_0313

This is a reversible reaction of three reactants forming three products influenced by seven modifiers.

Name cysteinyl-tRNA synthetase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{ATP} + \mathrm{s\_0981} + \mathrm{s\_1589} \xrightleftharpoons{\mathrm{e\_0793},\ \mathrm{ATP},\ \mathrm{s\_0981},\ \mathrm{s\_1589},\ \mathrm{AMP},\ \mathrm{s\_0542},\ \mathrm{s\_0633}} \mathrm{AMP} + \mathrm{s\_0542} + \mathrm{s\_0633} \quad (174)$$

Reactants

Table 349: Properties of each reactant.

Id	Name	SBO
ATP	ATP	
s_0981	L-cysteine	
s_1589	tRNA(Cys)	

Modifiers

Table 350: Properties of each modifier.

Id	Name	SBO
e_0793	YNL247W	0000460
ATP	ATP	
s_0981	L-cysteine	
s_1589	tRNA(Cys)	
AMP	AMP	
s_0542	Cys-tRNA(Cys)	
s_0633	diphosphate	

Products

Table 351: Properties of each product.

Id	Name	SBO
AMP	AMP	
s_0542	Cys-tRNA(Cys)	
s_0633	diphosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{87} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{ATP}] \cdot [\text{s\_0981}] \cdot [\text{s\_1589}] - \frac{[\text{AMP}] \cdot [\text{s\_0542}] \cdot [\text{s\_0633}]}{\text{Keq}} \right)}{\text{KmATP} \cdot \text{Km0981} \cdot \text{Km1589}}}{\left(1 + \frac{[\text{ATP}]}{\text{KmATP}}\right) \cdot \left(1 + \frac{[\text{s\_0981}]}{\text{Km0981}}\right) \cdot \left(1 + \frac{[\text{s\_1589}]}{\text{Km1589}}\right) + \left(1 + \frac{[\text{AMP}]}{\text{KmAMP}}\right) \cdot \left(1 + \frac{[\text{s\_0542}]}{\text{Km0542}}\right) \cdot \left(1 + \frac{[\text{s\_0633}]}{\text{Km0633}}\right) - 1} \tag{175}$$

Table 352: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.83730663529172 \cdot 10^{-4}$	dimensionless	☑
Vmax		0000324	0.009	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.232	dimensionless	☑
KmATP		0000322	2.525	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0981		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1589		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmAMP		0000323	0.293	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0542		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0633		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.88 Reaction r_0317

This is a reversible reaction of three reactants forming three products influenced by eight modifiers.

Name cytochrome P450 lanosterol 14-alpha-demethylase (NADP)

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_1059} + 3\,\text{s\_1212} + 3\,\text{s\_1275} \xrightleftharpoons{\text{e\_0434, e\_0424, s\_1059, s\_1212, s\_1275, s\_0262, s\_0722, s\_1207}} \text{s\_0262} + \text{s\_0722} + 3\,\text{s} \tag{176}$$

Reactants

Table 353: Properties of each reactant.

Id	Name	SBO
s_1059	lanosterol	
s_1212	NADPH	
s_1275	oxygen	

Modifiers

Table 354: Properties of each modifier.

Id	Name	SBO
e_0434	NCP1	0000460
e_0424	ERG11	0000460
s_1059	lanosterol	
s_1212	NADPH	
s_1275	oxygen	
s_0262	4,4-dimethyl-5alpha-cholesta-8,14,24-trien-3beta-ol	
s_0722	formate	
s_1207	NADP(+)	

Products

Table 355: Properties of each product.

Id	Name	SBO
s_0262	4,4-dimethyl-5alpha-cholesta-8,14,24-trien-3beta-ol	
s_0722	formate	
s_1207	NADP(+)	

Kinetic Law

Derived unit contains undeclared units

$$v_{88} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_1059}] \cdot [\mathrm{s\_1212}]^3 \cdot [\mathrm{s\_1275}]^3 - \frac{[\mathrm{s\_0262}] \cdot [\mathrm{s\_0722}] \cdot [\mathrm{s\_1207}]^3}{\mathrm{Keq}} \right)}{\mathrm{Km1059} \cdot \mathrm{Km1212}^3 \cdot \mathrm{Km1275}^3}}{\left(1 + \frac{[\mathrm{s\_1059}]}{\mathrm{Km1059}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1212}]}{\mathrm{Km1212}}\right)^3 \cdot \left(1 + \frac{[\mathrm{s\_1275}]}{\mathrm{Km1275}}\right)^3 + \left(1 + \frac{[\mathrm{s\_0262}]}{\mathrm{Km0262}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0722}]}{\mathrm{Km0722}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1207}]}{\mathrm{Km1207}}\right)^3 - 1} \quad (177)$$

Table 356: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.93102373430305 \cdot 10^{-4}$	dimensionless	☑
Vmax		0000324	0.093	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Keq		0000281	200.000	$\mathrm{mmol}^{-2} \cdot \mathrm{l}^{2}$	☑
Km1059		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1212		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

Id	Name	SBO	Value	Unit	Constant
Km1275		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0262		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0722		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1207		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.89 Reaction r_0326

This is a reversible reaction of one reactant forming two products influenced by four modifiers.

Name dCMP deaminase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0589} \xrightleftharpoons{\mathrm{e\_0452,\ s\_0589,\ s\_0419,\ s\_0654}} \mathrm{s\_0419} + \mathrm{s\_0654} \tag{178}$$

Reactant

Table 357: Properties of each reactant.

Id	Name	SBO
s_0589	dCMP	

Modifiers

Table 358: Properties of each modifier.

Id	Name	SBO
e_0452	DCD1	0000460
s_0589	dCMP	
s_0419	ammonium	
s_0654	dUMP	

Products

Table 359: Properties of each product.

Id	Name	SBO
s_0419	ammonium	

Id	Name	SBO
s_0654	dUMP	

Kinetic Law

Derived unit contains undeclared units

$$v_{89} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0589}] - \frac{[\mathrm{s\_0419}] \cdot [\mathrm{s\_0654}]}{\mathrm{Keq}} \right)}{\mathrm{Km0589}}}{1 + \frac{[\mathrm{s\_0589}]}{\mathrm{Km0589}} + \left(1 + \frac{[\mathrm{s\_0419}]}{\mathrm{Km0419}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0654}]}{\mathrm{Km0654}}\right) - 1} \tag{179}$$

Table 360: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.44213152998562 \cdot 10^{-6}$	dimensionless	☑
Vmax		0000324	$1.44213152998124 \cdot 10^{-5}$	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Keq		0000281	0.200	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0589		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0419		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0654		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.90 Reaction r_0330

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name deoxyguanylate kinase (dGMP:ATP)

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{ADP} + \mathrm{s\_0613} \xrightleftharpoons{\mathrm{e\_0234,\ ADP,\ s\_0613,\ ATP,\ s\_0615}} \mathrm{ATP} + \mathrm{s\_0615} \tag{180}$$

Reactants

Table 361: Properties of each reactant.

Id	Name	SBO
ADP	ADP	
s_0613	dGDP	

Modifiers

Table 362: Properties of each modifier.

Id	Name	SBO
e_0234	GUK1	0000460
ADP	ADP	
s_0613	dGDP	
ATP	ATP	
s_0615	dGMP	

Products

Table 363: Properties of each product.

Id	Name	SBO
ATP	ATP	
s_0615	dGMP	

Kinetic Law

Derived unit contains undeclared units

$$v_{90} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{ADP}] \cdot [\text{s\_0613}] - \frac{[\text{ATP}] \cdot [\text{s\_0615}]}{\text{Keq}} \right)}{\text{KmADP} \cdot \text{Km0613}}}{\left(1 + \frac{[\text{ADP}]}{\text{KmADP}}\right) \cdot \left(1 + \frac{[\text{s\_0613}]}{\text{Km0613}}\right) + \left(1 + \frac{[\text{ATP}]}{\text{KmATP}}\right) \cdot \left(1 + \frac{[\text{s\_0615}]}{\text{Km0615}}\right) - 1} \tag{181}$$

Table 364: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.03174788678278 \cdot 10^{-4}$	dimensionless	☑
Vmax		0000324	0.001	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	3.939	dimensionless	☑
KmADP		0000322	1.282	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0613		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmATP		0000323	2.525	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0615		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.91 Reaction r_0336

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name diacylglycerol acyltransferase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0529} + \text{s\_1524} \xrightleftharpoons{\text{e\_0883, s\_0529, s\_1524, s\_0380, s\_0619}} \text{s\_0380} + \text{s\_0619} \qquad (182)$$

Reactants

Table 365: Properties of each reactant.

Id	Name	SBO
s_0529	coenzyme A	
s_1524	triglyceride	

Modifiers

Table 366: Properties of each modifier.

Id	Name	SBO
e_0883	DGA1	0000460
s_0529	coenzyme A	
s_1524	triglyceride	
s_0380	acyl-CoA	
s_0619	diglyceride	

Products

Table 367: Properties of each product.

Id	Name	SBO
s_0380	acyl-CoA	
s_0619	diglyceride	

Kinetic Law

Derived unit contains undeclared units

$$v_{91} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0529}] \cdot [\text{s\_1524}] - \frac{[\text{s\_0380}] \cdot [\text{s\_0619}]}{\text{Keq}} \right)}{\text{Km0529} \cdot \text{Km1524}}}{\left(1 + \frac{[\text{s\_0529}]}{\text{Km0529}}\right) \cdot \left(1 + \frac{[\text{s\_1524}]}{\text{Km1524}}\right) + \left(1 + \frac{[\text{s\_0380}]}{\text{Km0380}}\right) \cdot \left(1 + \frac{[\text{s\_0619}]}{\text{Km0619}}\right) - 1} \tag{183}$$

Table 368: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$5.44332973675324 \cdot 10^{-4}$	dimensionless	☑
Vmax		0000324	0.008	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0529		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1524		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0380		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0619		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.92 Reaction r_0337

This is a reversible reaction of one reactant forming two products influenced by four modifiers.

Name diacylglycerol pyrophosphate phosphatase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_1331} \xrightleftharpoons{\text{e\_0203, s\_1331, s\_0619, PHO}} \text{s\_0619} + \text{PHO} \tag{184}$$

Reactant

Table 369: Properties of each reactant.

Id	Name	SBO
s_1331	phosphatidate	

Modifiers

Table 370: Properties of each modifier.

Id	Name	SBO
e_0203	DPP1	0000460
s_1331	phosphatidate	

Id	Name	SBO
s_0619	diglyceride	
PHO	phosphate	

Products

Table 371: Properties of each product.

Id	Name	SBO
s_0619	diglyceride	
PHO	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{92} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_1331}] - \frac{[\text{s\_0619}] \cdot [\text{PHO}]}{\text{Keq}} \right)}{\text{Km1331}}}{1 + \frac{[\text{s\_1331}]}{\text{Km1331}} + \left(1 + \frac{[\text{s\_0619}]}{\text{Km0619}}\right) \cdot \left(1 + \frac{[\text{PHO}]}{\text{KmPHO}}\right) - 1} \tag{185}$$

Table 372: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.13457877977285 \cdot 10^{-5}$	dimensionless	☑
Vmax		0000324	$1.1345787797757 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.200	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1331		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0619		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmPHO		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.93 Reaction r_0344

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name dihydrofolate reductase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0625} + \text{s\_1212} \xrightleftharpoons{\text{e\_0880, s\_0625, s\_1212, s\_1207, s\_1487}} \text{s\_1207} + \text{s\_1487} \tag{186}$$

Reactants

Table 373: Properties of each reactant.

Id	Name	SBO
s_0625	dihydrofolic acid	
s_1212	NADPH	

Modifiers

Table 374: Properties of each modifier.

Id	Name	SBO
e_0880	DFR1	0000460
s_0625	dihydrofolic acid	
s_1212	NADPH	
s_1207	NADP(+)	
s_1487	THF	

Products

Table 375: Properties of each product.

Id	Name	SBO
s_1207	NADP(+)	
s_1487	THF	

Kinetic Law

Derived unit contains undeclared units

$$v_{93} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0625}] \cdot [\mathrm{s\_1212}] - \frac{[\mathrm{s\_1207}] \cdot [\mathrm{s\_1487}]}{\mathrm{Keq}} \right)}{\mathrm{Km0625} \cdot \mathrm{Km1212}}}{\left(1 + \frac{[\mathrm{s\_0625}]}{\mathrm{Km0625}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1212}]}{\mathrm{Km1212}}\right) + \left(1 + \frac{[\mathrm{s\_1207}]}{\mathrm{Km1207}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1487}]}{\mathrm{Km1487}}\right) - 1} \tag{187}$$

Table 376: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.54762180106816 \cdot 10^{-4}$	dimensionless	☑
Vmax		0000324	0.002	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑

Id	Name	SBO	Value	Unit	Constant
Keq		0000281	2.000	dimensionless	☑
Km0625		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1212		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1207		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1487		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.94 Reaction r_0349

This is a reversible reaction of one reactant forming one product influenced by three modifiers.

Name dihydroorotase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_1194} \xrightleftharpoons{\mathrm{e\_0692,\ s\_1194,\ s\_0061}} \mathrm{s\_0061} \tag{188}$$

Reactant

Table 377: Properties of each reactant.

Id	Name	SBO
s_1194	N-carbamoyl-L-aspartate	

Modifiers

Table 378: Properties of each modifier.

Id	Name	SBO
e_0692	URA4	0000460
s_1194	N-carbamoyl-L-aspartate	
s_0061	(S)-dihydroorotate	

Product

Table 379: Properties of each product.

Id	Name	SBO
s_0061	(S)-dihydroorotate	

Kinetic Law

Derived unit contains undeclared units

$$v_{94} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_1194}] - \frac{[\mathrm{s\_0061}]}{\mathrm{Keq}} \right)}{\mathrm{Km1194}}}{1 + \frac{[\mathrm{s\_1194}]}{\mathrm{Km1194}} + 1 + \frac{[\mathrm{s\_0061}]}{\mathrm{Km0061}} - 1} \tag{189}$$

Table 380: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.005	dimensionless	☑
Vmax		0000324	0.029	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	2.000	dimensionless	☑
Km1194		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0061		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.95 Reaction r_0352

This is a reversible reaction of one reactant forming one product influenced by three modifiers.

Name dihydroxy-acid dehydratase (2,3-dihydroxy-3-methylbutanoate)

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0016} \xrightleftharpoons{\mathrm{e\_0528,\ s\_0016,\ s\_0232}} \mathrm{s\_0232} \tag{190}$$

Reactant

Table 381: Properties of each reactant.

Id	Name	SBO
s_0016	(R)-2,3-dihydroxy-3-methylbutanoate	

Modifiers

Table 382: Properties of each modifier.

Id	Name	SBO
e_0528	ILV3	0000460

Id	Name	SBO
s_0016	(R)-2,3-dihydroxy-3-methylbutanoate	
s_0232	3-methyl-2-oxobutanoate	

Product

Table 383: Properties of each product.

Id	Name	SBO
s_0232	3-methyl-2-oxobutanoate	

Kinetic Law

Derived unit contains undeclared units

$$v_{95} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0016}] - \frac{[\text{s\_0232}]}{\text{Keq}} \right)}{\text{Km0016}}}{1 + \frac{[\text{s\_0016}]}{\text{Km0016}} + 1 + \frac{[\text{s\_0232}]}{\text{Km0232}} - 1} \tag{191}$$

Table 384: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.024	dimensionless	☑
Vmax		0000324	0.145	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0016		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0232		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.96 Reaction r_0353

This is a reversible reaction of one reactant forming one product influenced by three modifiers.

Name dihydroxy-acid dehydratase (2,3-dihydroxy-3-methylpentanoate)

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0008} \xrightleftharpoons{\text{e\_0528, s\_0008, s\_0056}} \text{s\_0056} \tag{192}$$

Reactant

Table 385: Properties of each reactant.

Id	Name	SBO
s_0008	(2R,3R)-2,3-dihydroxy-3-methylpentanoate	

Modifiers

Table 386: Properties of each modifier.

Id	Name	SBO
e_0528	ILV3	0000460
s_0008	(2R,3R)-2,3-dihydroxy-3-methylpentanoate	
s_0056	(S)-3-methyl-2-oxopentanoate	

Product

Table 387: Properties of each product.

Id	Name	SBO
s_0056	(S)-3-methyl-2-oxopentanoate	

Kinetic Law

Derived unit contains undeclared units

$$v_{96} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0008}] - \frac{[\mathrm{s\_0056}]}{\mathrm{Keq}} \right)}{\mathrm{Km0008}}}{1 + \frac{[\mathrm{s\_0008}]}{\mathrm{Km0008}} + 1 + \frac{[\mathrm{s\_0056}]}{\mathrm{Km0056}} - 1} \tag{193}$$

Table 388: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.008	dimensionless	☑
Vmax		0000324	0.050	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0008		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0056		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.97 Reaction r_0355

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name dimethylallyltranstransferase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0943} + \text{s\_1376} \xrightleftharpoons{\text{e\_0515, s\_0943, s\_1376, s\_0633, s\_0745}} \text{s\_0633} + \text{s\_0745} \tag{194}$$

Reactants

Table 389: Properties of each reactant.

Id	Name	SBO
s_0943	isopentenyl diphosphate	
s_1376	prenyl diphosphate	

Modifiers

Table 390: Properties of each modifier.

Id	Name	SBO
e_0515	ERG20	0000460
s_0943	isopentenyl diphosphate	
s_1376	prenyl diphosphate	
s_0633	diphosphate	
s_0745	geranyl diphosphate	

Products

Table 391: Properties of each product.

Id	Name	SBO
s_0633	diphosphate	
s_0745	geranyl diphosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{97} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0943}] \cdot [\text{s\_1376}] - \frac{[\text{s\_0633}] \cdot [\text{s\_0745}]}{\text{Keq}} \right)}{\text{Km0943} \cdot \text{Km1376}}}{\left(1 + \frac{[\text{s\_0943}]}{\text{Km0943}}\right) \cdot \left(1 + \frac{[\text{s\_1376}]}{\text{Km1376}}\right) + \left(1 + \frac{[\text{s\_0633}]}{\text{Km0633}}\right) \cdot \left(1 + \frac{[\text{s\_0745}]}{\text{Km0745}}\right) - 1} \tag{195}$$

Table 392: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$5.88956076077212 \cdot 10^{-4}$	dimensionless	☑
Vmax		0000324	0.008	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0943		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1376		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0633		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0745		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.98 Reaction r_0361

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name dolichyl-phosphate D-mannosyltransferase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0645} + \text{s\_0743} \xrightleftharpoons{\text{e\_0976, s\_0645, s\_0743, s\_0644, s\_0739}} \text{s\_0644} + \text{s\_0739} \tag{196}$$

Reactants

Table 393: Properties of each reactant.

Id	Name	SBO
s_0645	dolichyl phosphate	
s_0743	GDP-alpha-D-mannose	

Modifiers

Table 394: Properties of each modifier.

Id	Name	SBO
e_0976	DPM1	0000460

Id	Name	SBO
s_0645	dolichyl phosphate	
s_0743	GDP-alpha-D-mannose	
s_0644	dolichyl D-mannosyl phosphate	
s_0739	GDP	

Products

Table 395: Properties of each product.

Id	Name	SBO
s_0644	dolichyl D-mannosyl phosphate	
s_0739	GDP	

Kinetic Law

Derived unit contains undeclared units

$$v_{98} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0645}] \cdot [\mathrm{s\_0743}] - \frac{[\mathrm{s\_0644}] \cdot [\mathrm{s\_0739}]}{\mathrm{Keq}} \right)}{\mathrm{Km0645} \cdot \mathrm{Km0743}}}{\left(1 + \frac{[\mathrm{s\_0645}]}{\mathrm{Km0645}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0743}]}{\mathrm{Km0743}}\right) + \left(1 + \frac{[\mathrm{s\_0644}]}{\mathrm{Km0644}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0739}]}{\mathrm{Km0739}}\right) - 1} \tag{197}$$

Table 396: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.035	dimensionless	☑
Vmax		0000324	0.486	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0645		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0743		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0644		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0739		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.99 Reaction r_0362

This is a reversible reaction of one reactant forming two products influenced by eight modifiers.

Name dolichyl-phosphate-mannose–protein mannosyltransferase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0644} \xrightleftharpoons{\text{e\_0141, e\_0549, e\_0010, e\_0890, e\_0142, s\_0644, s\_0645, s\_1107}} \text{s\_0645} + \text{s\_1107} \tag{198}$$

Reactant

Table 397: Properties of each reactant.

Id	Name	SBO
s_0644	dolichyl D-mannosyl phosphate	

Modifiers

Table 398: Properties of each modifier.

Id	Name	SBO
e_0141	PMT5	0000460
e_0549	PMT4	0000460
e_0010	PMT2	0000460
e_0890	PMT3	0000460
e_0142	PMT1	0000460
s_0644	dolichyl D-mannosyl phosphate	
s_0645	dolichyl phosphate	
s_1107	mannan	

Products

Table 399: Properties of each product.

Id	Name	SBO
s_0645	dolichyl phosphate	
s_1107	mannan	

Kinetic Law

Derived unit contains undeclared units

$$v_{99} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0644}] - \frac{[\text{s\_0645}] \cdot [\text{s\_1107}]}{\text{Keq}} \right)}{\text{Km0644}}}{1 + \frac{[\text{s\_0644}]}{\text{Km0644}} + \left(1 + \frac{[\text{s\_0645}]}{\text{Km0645}}\right) \cdot \left(1 + \frac{[\text{s\_1107}]}{\text{Km1107}}\right) - 1} \tag{199}$$

Table 400: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.035	dimensionless	☑
Vmax		0000324	0.347	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Keq		0000281	0.200	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0644		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0645		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1107		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.100 Reaction r_0364

This is a reversible reaction of one reactant forming two products influenced by four modifiers.

Name dUTP diphosphatase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0656} \xrightleftharpoons{\mathrm{e\_0089},\ \mathrm{s\_0656},\ \mathrm{s\_0633},\ \mathrm{s\_0654}} \mathrm{s\_0633} + \mathrm{s\_0654} \tag{200}$$

Reactant

Table 401: Properties of each reactant.

Id	Name	SBO
s_0656	dUTP	

Modifiers

Table 402: Properties of each modifier.

Id	Name	SBO
e_0089	DUT1	0000460
s_0656	dUTP	
s_0633	diphosphate	
s_0654	dUMP	

Products

Table 403: Properties of each product.

Id	Name	SBO
s_0633	diphosphate	
s_0654	dUMP	

Kinetic Law

Derived unit contains undeclared units

$$v_{100} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0656}] - \frac{[\text{s\_0633}] \cdot [\text{s\_0654}]}{\text{Keq}} \right)}{\text{Km0656}}}{1 + \frac{[\text{s\_0656}]}{\text{Km0656}} + \left(1 + \frac{[\text{s\_0633}]}{\text{Km0633}}\right) \cdot \left(1 + \frac{[\text{s\_0654}]}{\text{Km0654}}\right) - 1} \tag{201}$$

Table 404: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.53320048576619 \cdot 10^{-4}$	dimensionless	☑
Vmax		0000324	0.002	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.200	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0656		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0633		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0654		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.101 Reaction ENO

This is a reversible reaction of one reactant forming one product influenced by four modifiers.

Name enolase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{P2G} \xrightleftharpoons{\text{e\_0405, e\_0454, P2G, PEP}} \text{PEP} \tag{202}$$

Reactant

Table 405: Properties of each reactant.

Id	Name	SBO
P2G	2-phospho-D-glyceric acid	

Id	Name	SBO

Modifiers

Table 406: Properties of each modifier.

Id	Name	SBO
e_0405	ENO1	0000460
e_0454	ENO2	0000460
P2G	2-phospho-D-glyceric acid	
PEP	phosphoenolpyruvate	

Product

Table 407: Properties of each product.

Id	Name	SBO
PEP	phosphoenolpyruvate	

Kinetic Law

Derived unit contains undeclared units

$$v_{101} = \mathrm{vol}\,(\mathrm{cell}) \cdot \frac{\mathrm{Vmax} \cdot \left(\frac{[\mathrm{P2G}]}{\mathrm{Kp2g}} - \frac{[\mathrm{PEP}]}{\mathrm{Kp2g} \cdot \mathrm{Keq}} \right)}{1 + \frac{[\mathrm{P2G}]}{\mathrm{Kp2g}} + \frac{[\mathrm{PEP}]}{\mathrm{Kpep}}} \tag{203}$$

Table 408: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
Vmax			3.360	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Kp2g			0.040	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Keq			6.700	dimensionless	☑
Kpep			0.500	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
FLUX_VALUE			2.300	dimensionless	☑

6.102 Reaction r_0386

This is a reversible reaction of three reactants forming four products influenced by eleven modifiers.

Name fatty acid synthase (n-C12:0)

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0595} + \mathrm{s\_1101} + 2\,\mathrm{s\_1212} \xrightleftharpoons{\mathrm{e\_0808,\ e\_0365,\ e\_0586,\ e\_0934,\ s\_0595,\ s\_1101,\ s\_1212,\ CO2,\ s\_0529,\ s\_1065,\ s\_1207}} \tag{204}$$

Reactants

Table 409: Properties of each reactant.

Id	Name	SBO
s_0595	decanoate	
s_1101	malonyl-CoA	
s_1212	NADPH	

Modifiers

Table 410: Properties of each modifier.

Id	Name	SBO
e_0808	ACC1	0000460
e_0365	ACB1	0000460
e_0586	FAS1	0000460
e_0934	FAS2	0000460
s_0595	decanoate	
s_1101	malonyl-CoA	
s_1212	NADPH	
CO2	carbon dioxide	
s_0529	coenzyme A	
s_1065	laurate	
s_1207	NADP(+)	

Products

Table 411: Properties of each product.

Id	Name	SBO
CO2	carbon dioxide	

Id	Name	SBO
s_0529	coenzyme A	
s_1065	laurate	
s_1207	NADP(+)	

Kinetic Law

Derived unit contains undeclared units

$$v_{102} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0595}] \cdot [\mathrm{s\_1101}] \cdot [\mathrm{s\_1212}]^2 - \frac{[\mathrm{CO2}] \cdot [\mathrm{s\_0529}] \cdot [\mathrm{s\_1065}] \cdot [\mathrm{s\_1207}]^2}{\mathrm{Keq}} \right)}{\mathrm{Km0595} \cdot \mathrm{Km1101} \cdot \mathrm{Km1212}^2}}{\left(1 + \frac{[\mathrm{s\_0595}]}{\mathrm{Km0595}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1101}]}{\mathrm{Km1101}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1212}]}{\mathrm{Km1212}}\right)^2 + \left(1 + \frac{[\mathrm{CO2}]}{\mathrm{KmCO2}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0529}]}{\mathrm{Km0529}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1065}]}{\mathrm{Km1065}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1207}]}{\mathrm{Km1207}}\right)^2} \quad (205)$$

Table 412: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.11145361985654 \cdot 10^{-5}$	dimensionless	☑
Vmax		0000324	0.001	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Keq		0000281	2.000	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0595		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1101		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1212		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
KmCO2		0000323	1.000	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0529		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1065		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1207		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.103 Reaction r_0387

This is a reversible reaction of three reactants forming four products influenced by eleven modifiers.

Name fatty acid synthase (n-C14:0)

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_1065} + \mathrm{s\_1101} + 2\,\mathrm{s\_1212} \xrightleftharpoons{\mathrm{e\_0808,\ e\_0365,\ e\_0586,\ e\_0934,\ s\_1065,\ s\_1101,\ s\_1212,\ CO2,\ s\_0529,\ s\_1161,\ s\_1207}} \quad (206)$$

Reactants

Table 413: Properties of each reactant.

Id	Name	SBO
s_1065	laurate	
s_1101	malonyl-CoA	
s_1212	NADPH	

Modifiers

Table 414: Properties of each modifier.

Id	Name	SBO
e_0808	ACC1	0000460
e_0365	ACB1	0000460
e_0586	FAS1	0000460
e_0934	FAS2	0000460
s_1065	laurate	
s_1101	malonyl-CoA	
s_1212	NADPH	
CO2	carbon dioxide	
s_0529	coenzyme A	
s_1161	myristate	
s_1207	NADP(+)	

Products

Table 415: Properties of each product.

Id	Name	SBO
CO2	carbon dioxide	
s_0529	coenzyme A	
s_1161	myristate	
s_1207	NADP(+)	

Kinetic Law

Derived unit contains undeclared units

$$v_{103} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_1065}] \cdot [\text{s\_1101}] \cdot [\text{s\_1212}]^2 - \frac{[\text{CO2}] \cdot [\text{s\_0529}] \cdot [\text{s\_1161}] \cdot [\text{s\_1207}]^2}{\text{Keq}} \right)}{\text{Km1065} \cdot \text{Km1101} \cdot \text{Km1212}^2}}{\left(1 + \frac{[\text{s\_1065}]}{\text{Km1065}}\right) \cdot \left(1 + \frac{[\text{s\_1101}]}{\text{Km1101}}\right) \cdot \left(1 + \frac{[\text{s\_1212}]}{\text{Km1212}}\right)^2 + \left(1 + \frac{[\text{CO2}]}{\text{KmCO2}}\right) \cdot \left(1 + \frac{[\text{s\_0529}]}{\text{Km0529}}\right) \cdot \left(1 + \frac{[\text{s\_1161}]}{\text{Km1161}}\right) \cdot \left(1 + \frac{[\text{s\_1207}]}{\text{Km1207}}\right)^2} \quad (207)$$

Table 416: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.11144810306745 \cdot 10^{-5}$	dimensionless	☑
Vmax		0000324	0.001	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1065		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1101		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1212		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmCO2		0000323	1.000	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0529		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1161		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1207		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.104 Reaction r_0389

This is a reversible reaction of three reactants forming four products influenced by eleven modifiers.

Name fatty acid synthase (n-C16:0)

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_1101} + \text{s\_1161} + 2\,\text{s\_1212} \xrightleftharpoons{\text{e\_0808, e\_0365, e\_0586, e\_0934, s\_1101, s\_1161, s\_1212, CO2, s\_0529, s\_1207, s\_1286}} \quad (208)$$

Reactants

Table 417: Properties of each reactant.

Id	Name	SBO
s_1101	malonyl-CoA	
s_1161	myristate	
s_1212	NADPH	

Modifiers

Table 418: Properties of each modifier.

Id	Name	SBO
e_0808	ACC1	0000460
e_0365	ACB1	0000460
e_0586	FAS1	0000460
e_0934	FAS2	0000460
s_1101	malonyl-CoA	
s_1161	myristate	
s_1212	NADPH	
CO2	carbon dioxide	
s_0529	coenzyme A	
s_1207	NADP(+)	
s_1286	palmitate	

Products

Table 419: Properties of each product.

Id	Name	SBO
CO2	carbon dioxide	
s_0529	coenzyme A	
s_1207	NADP(+)	
s_1286	palmitate	

Kinetic Law

Derived unit contains undeclared units

$$v_{104} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_1101}] \cdot [\mathrm{s\_1161}] \cdot [\mathrm{s\_1212}]^2 - \frac{[\mathrm{CO2}] \cdot [\mathrm{s\_0529}] \cdot [\mathrm{s\_1207}]^2 \cdot [\mathrm{s\_1286}]}{\mathrm{Keq}} \right)}{\mathrm{Km1101} \cdot \mathrm{Km1161} \cdot \mathrm{Km1212}^2}}{\left(1 + \frac{[\mathrm{s\_1101}]}{\mathrm{Km1101}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1161}]}{\mathrm{Km1161}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1212}]}{\mathrm{Km1212}}\right)^2 + \left(1 + \frac{[\mathrm{CO2}]}{\mathrm{KmCO2}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0529}]}{\mathrm{Km0529}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1207}]}{\mathrm{Km1207}}\right)^2 \cdot \left(1 + \frac{[\mathrm{s\_1286}]}{\mathrm{Km1286}}\right)} \quad (209)$$

Table 420: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.11144810306745 \cdot 10^{-5}$	dimensionless	☑

Id	Name	SBO	Value	Unit	Constant
Vmax		0000324	0.001	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Keq		0000281	2.000	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1101		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1161		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1212		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
KmCO2		0000323	1.000	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0529		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1207		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1286		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.105 Reaction r_0391

This is a reversible reaction of three reactants forming four products influenced by eleven modifiers.

Name fatty acid synthase (n-C18:0)

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_1101} + 2\,\mathrm{s\_1212} + \mathrm{s\_1286} \xrightleftharpoons{\mathrm{e\_0808},\ \mathrm{e\_0365},\ \mathrm{e\_0586},\ \mathrm{e\_0934},\ \mathrm{s\_1101},\ \mathrm{s\_1212},\ \mathrm{s\_1286},\ \mathrm{CO2},\ \mathrm{s\_0529},\ \mathrm{s\_1207},\ \mathrm{s\_1449}} \quad (210)$$

Reactants

Table 421: Properties of each reactant.

Id	Name	SBO
s_1101	malonyl-CoA	
s_1212	NADPH	
s_1286	palmitate	

Modifiers

Table 422: Properties of each modifier.

Id	Name	SBO
e_0808	ACC1	0000460
e_0365	ACB1	0000460
e_0586	FAS1	0000460

Id	Name	SBO
e_0934	FAS2	0000460
s_1101	malonyl-CoA	
s_1212	NADPH	
s_1286	palmitate	
CO2	carbon dioxide	
s_0529	coenzyme A	
s_1207	NADP(+)	
s_1449	stearate	

Products

Table 423: Properties of each product.

Id	Name	SBO
CO2	carbon dioxide	
s_0529	coenzyme A	
s_1207	NADP(+)	
s_1449	stearate	

Kinetic Law

Derived unit contains undeclared units

$$v_{105} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_1101}] \cdot [\mathrm{s\_1212}]^2 \cdot [\mathrm{s\_1286}] - \frac{[\mathrm{CO2}] \cdot [\mathrm{s\_0529}] \cdot [\mathrm{s\_1207}]^2 \cdot [\mathrm{s\_1449}]}{\mathrm{Keq}} \right)}{\mathrm{Km1101} \cdot \mathrm{Km1212}^2 \cdot \mathrm{Km1286}}}{\left(1 + \frac{[\mathrm{s\_1101}]}{\mathrm{Km1101}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1212}]}{\mathrm{Km1212}}\right)^2 \cdot \left(1 + \frac{[\mathrm{s\_1286}]}{\mathrm{Km1286}}\right) + \left(1 + \frac{[\mathrm{CO2}]}{\mathrm{KmCO2}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0529}]}{\mathrm{Km0529}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1207}]}{\mathrm{Km1207}}\right)^2 \cdot \left(1 + \frac{[\mathrm{s\_1449}]}{\mathrm{Km1449}}\right)} \quad (211)$$

Table 424: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.111448103067\,45 \cdot 10^{-5}$	dimensionless	☑
Vmax		0000324	0.001	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Keq		0000281	2.000	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1101		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1212		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1286		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
KmCO2		0000323	1.000	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0529		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

Id	Name	SBO	Value	Unit	Constant
Km1207		0000323	0.100	$\mathrm{mmol}\cdot\mathrm{l}^{-1}$	☑
Km1449		0000323	0.100	$\mathrm{mmol}\cdot\mathrm{l}^{-1}$	☑

6.106 Reaction r_0393

This is a reversible reaction of three reactants forming four products influenced by ten modifiers.

Name fatty acid synthase (n-C24:0), lumped reaction

SBO:0000176 biochemical reaction

Reaction equation

$$3\,\mathrm{s\_1101} + 6\,\mathrm{s\_1212} + \mathrm{s\_1449} \xrightleftharpoons{\mathrm{e\_0128},\ \mathrm{e\_0117},\ \mathrm{e\_0687},\ \mathrm{s\_1101},\ \mathrm{s\_1212},\ \mathrm{s\_1449},\ \mathrm{CO2},\ \mathrm{s\_0529},\ \mathrm{s\_1084},\ \mathrm{s\_1207}} 3\,\mathrm{CO2} \tag{212}$$

Reactants

Table 425: Properties of each reactant.

Id	Name	SBO
s_1101	malonyl-CoA	
s_1212	NADPH	
s_1449	stearate	

Modifiers

Table 426: Properties of each modifier.

Id	Name	SBO
e_0128	TSC13	0000460
e_0117	FEN1	0000460
e_0687	SUR4	0000460
s_1101	malonyl-CoA	
s_1212	NADPH	
s_1449	stearate	
CO2	carbon dioxide	
s_0529	coenzyme A	
s_1084	lignoceric acid	
s_1207	NADP(+)	

Products

Table 427: Properties of each product.

Id	Name	SBO
CO2	carbon dioxide	
s_0529	coenzyme A	
s_1084	lignoceric acid	
s_1207	NADP(+)	

Kinetic Law

Derived unit contains undeclared units

$$v_{106} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_1101}]^3 \cdot [\text{s\_1212}]^6 \cdot [\text{s\_1449}] - \frac{[\text{CO2}]^3 \cdot [\text{s\_0529}]^3 \cdot [\text{s\_1084}] \cdot [\text{s\_1207}]^6}{\text{Keq}} \right)}{\text{Km1101}^3 \cdot \text{Km1212}^6 \cdot \text{Km1449}}}{\left(1 + \frac{[\text{s\_1101}]}{\text{Km1101}}\right)^3 \cdot \left(1 + \frac{[\text{s\_1212}]}{\text{Km1212}}\right)^6 \cdot \left(1 + \frac{[\text{s\_1449}]}{\text{Km1449}}\right) + \left(1 + \frac{[\text{CO2}]}{\text{KmCO2}}\right)^3 \cdot \left(1 + \frac{[\text{s\_0529}]}{\text{Km0529}}\right)^3 \cdot \left(1 + \frac{[\text{s\_1084}]}{\text{Km1084}}\right) \cdot \left(1 + \frac{[\text{s\_1207}]}{\text{Km1207}}\right)} \quad (213)$$

Table 428: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.22290048783841 \cdot 10^{-5}$	dimensionless	☑
Vmax		0000324	0.410	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	$\text{mmol}^3 \cdot \text{l}^{-3}$	☑
Km1101		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1212		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1449		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmCO2		0000323	1.000	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0529		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1084		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1207		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.107 Reaction r_0394

This is a reversible reaction of three reactants forming four products influenced by ten modifiers.

Name fatty acid synthase (n-C26:0)

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_1084} + \mathrm{s\_1101} + 2\,\mathrm{s\_1212} \xrightleftharpoons{\mathrm{e\_0128,\ e\_0117,\ e\_0687,\ s\_1084,\ s\_1101,\ s\_1212,\ CO2,\ s\_0505,\ s\_0529,\ s\_1207}} \mathrm{CO2} + \mathrm{s} \quad (214)$$

Reactants

Table 429: Properties of each reactant.

Id	Name	SBO
s_1084	lignoceric acid	
s_1101	malonyl-CoA	
s_1212	NADPH	

Modifiers

Table 430: Properties of each modifier.

Id	Name	SBO
e_0128	TSC13	0000460
e_0117	FEN1	0000460
e_0687	SUR4	0000460
s_1084	lignoceric acid	
s_1101	malonyl-CoA	
s_1212	NADPH	
CO2	carbon dioxide	
s_0505	cerotate	
s_0529	coenzyme A	
s_1207	NADP(+)	

Products

Table 431: Properties of each product.

Id	Name	SBO
CO2	carbon dioxide	
s_0505	cerotate	
s_0529	coenzyme A	
s_1207	NADP(+)	

Kinetic Law

Derived unit contains undeclared units

$$v_{107} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_1084}] \cdot [\text{s\_1101}] \cdot [\text{s\_1212}]^2 - \frac{[\text{CO2}] \cdot [\text{s\_0505}] \cdot [\text{s\_0529}] \cdot [\text{s\_1207}]^2}{\text{Keq}} \right)}{\text{Km1084} \cdot \text{Km1101} \cdot \text{Km1212}^2}}{\left(1 + \frac{[\text{s\_1084}]}{\text{Km1084}}\right) \cdot \left(1 + \frac{[\text{s\_1101}]}{\text{Km1101}}\right) \cdot \left(1 + \frac{[\text{s\_1212}]}{\text{Km1212}}\right)^2 + \left(1 + \frac{[\text{CO2}]}{\text{KmCO2}}\right) \cdot \left(1 + \frac{[\text{s\_0505}]}{\text{Km0505}}\right) \cdot \left(1 + \frac{[\text{s\_0529}]}{\text{Km0529}}\right) \cdot \left(1 + \frac{[\text{s\_1207}]}{\text{Km1207}}\right)^2} \quad (215)$$

Table 432: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.22290070597961 \cdot 10^{-5}$	dimensionless	☑
Vmax		0000324	0.002	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1084		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1101		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1212		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmCO2		0000323	1.000	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0505		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0529		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1207		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.108 Reaction r_0397

This is a reversible reaction of three reactants forming four products influenced by eleven modifiers.

Name fatty acyl-CoA synthase (n-C10:0CoA)

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_1101} + 2\,\text{s\_1212} + \text{s\_1255} \xrightleftharpoons{\text{e\_0808, e\_0365, e\_0586, e\_0934, s\_1101, s\_1212, s\_1255, CO2, s\_0529, s\_0602, s\_1207}} \quad (216)$$

Reactants

Table 433: Properties of each reactant.

Id	Name	SBO
s_1101	malonyl-CoA	
s_1212	NADPH	
s_1255	octanoyl-CoA	

Modifiers

Table 434: Properties of each modifier.

Id	Name	SBO
e_0808	ACC1	0000460
e_0365	ACB1	0000460
e_0586	FAS1	0000460
e_0934	FAS2	0000460
s_1101	malonyl-CoA	
s_1212	NADPH	
s_1255	octanoyl-CoA	
CO2	carbon dioxide	
s_0529	coenzyme A	
s_0602	decanoyl-CoA	
s_1207	NADP(+)	

Products

Table 435: Properties of each product.

Id	Name	SBO
CO2	carbon dioxide	
s_0529	coenzyme A	
s_0602	decanoyl-CoA	
s_1207	NADP(+)	

Kinetic Law

Derived unit contains undeclared units

$$v_{108} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_1101}] \cdot [\text{s\_1212}]^2 \cdot [\text{s\_1255}] - \frac{[\text{CO2}] \cdot [\text{s\_0529}] \cdot [\text{s\_0602}] \cdot [\text{s\_1207}]^2}{\text{Keq}} \right)}{\text{Km1101} \cdot \text{Km1212}^2 \cdot \text{Km1255}}}{\left(1 + \frac{[\text{s\_1101}]}{\text{Km1101}}\right) \cdot \left(1 + \frac{[\text{s\_1212}]}{\text{Km1212}}\right)^2 \cdot \left(1 + \frac{[\text{s\_1255}]}{\text{Km1255}}\right) + \left(1 + \frac{[\text{CO2}]}{\text{KmCO2}}\right) \cdot \left(1 + \frac{[\text{s\_0529}]}{\text{Km0529}}\right) \cdot \left(1 + \frac{[\text{s\_0602}]}{\text{Km0602}}\right) \cdot \left(1 + \frac{[\text{s\_1207}]}{\text{Km1207}}\right)^2} \quad (217)$$

Table 436: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.002	dimensionless	☑
Vmax		0000324	0.153	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1101		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1212		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1255		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmCO2		0000323	1.000	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0529		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0602		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1207		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.109 Reaction r_0398

This is a reversible reaction of three reactants forming four products influenced by eleven modifiers.

Name fatty acyl-CoA synthase (n-C8:0CoA), lumped reaction

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0373} + 3\,\text{s\_1101} + 6\,\text{s\_1212} \xrightleftharpoons{\text{e\_0808, e\_0365, e\_0586, e\_0934, s\_0373, s\_1101, s\_1212, CO2, s\_0529, s\_1207, s\_125}} \quad (218)$$

Reactants

Table 437: Properties of each reactant.

Id	Name	SBO
s_0373	acetyl-CoA	
s_1101	malonyl-CoA	
s_1212	NADPH	

Modifiers

Table 438: Properties of each modifier.

Id	Name	SBO
e_0808	ACC1	0000460
e_0365	ACB1	0000460
e_0586	FAS1	0000460
e_0934	FAS2	0000460
s_0373	acetyl-CoA	
s_1101	malonyl-CoA	
s_1212	NADPH	
CO2	carbon dioxide	
s_0529	coenzyme A	
s_1207	NADP(+)	
s_1255	octanoyl-CoA	

Products

Table 439: Properties of each product.

Id	Name	SBO
CO2	carbon dioxide	
s_0529	coenzyme A	
s_1207	NADP(+)	
s_1255	octanoyl-CoA	

Kinetic Law

Derived unit contains undeclared units

$$v_{109} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0373}] \cdot [\mathrm{s\_1101}]^3 \cdot [\mathrm{s\_1212}]^6 - \frac{[\mathrm{CO2}]^3 \cdot [\mathrm{s\_0529}]^3 \cdot [\mathrm{s\_1207}]^6 \cdot [\mathrm{s\_1255}]}{\mathrm{Keq}} \right)}{\mathrm{Km0373} \cdot \mathrm{Km1101}^3 \cdot \mathrm{Km1212}^6}}{\left(1 + \frac{[\mathrm{s\_0373}]}{\mathrm{Km0373}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1101}]}{\mathrm{Km1101}}\right)^3 \cdot \left(1 + \frac{[\mathrm{s\_1212}]}{\mathrm{Km1212}}\right)^6 + \left(1 + \frac{[\mathrm{CO2}]}{\mathrm{KmCO2}}\right)^3 \cdot \left(1 + \frac{[\mathrm{s\_0529}]}{\mathrm{Km0529}}\right)^3 \cdot \left(1 + \frac{[\mathrm{s\_1207}]}{\mathrm{Km1207}}\right)^6 \cdot \left(1 + \frac{[\mathrm{s\_125}}{\mathrm{Km12}}\right.} \quad (219)$$

Table 440: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.002	dimensionless	☑

Id	Name	SBO	Value	Unit	Constant
Vmax		0000324	30.094	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Keq		0000281	2.000	$\mathrm{mmol}^{3} \cdot \mathrm{l}^{-3}$	☑
Km0373		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1101		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1212		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
KmCO2		0000323	1.000	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0529		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1207		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1255		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.110 Reaction r_0399

This is a reversible reaction of three reactants forming three products influenced by seven modifiers.

Name fatty-acid–CoA ligase (decanoate)

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{AMP} + \mathrm{s\_0602} + \mathrm{s\_0633} \xrightleftharpoons{\text{e\_0273, AMP, s\_0602, s\_0633, ATP, s\_0529, s\_0595}} \mathrm{ATP} + \mathrm{s\_0529} + \mathrm{s\_0595} \tag{220}$$

Reactants

Table 441: Properties of each reactant.

Id	Name	SBO
AMP	AMP	
s_0602	decanoyl-CoA	
s_0633	diphosphate	

Modifiers

Table 442: Properties of each modifier.

Id	Name	SBO
e_0273	FAA2	0000460
AMP	AMP	
s_0602	decanoyl-CoA	

Id	Name	SBO
s_0633	diphosphate	
ATP	ATP	
s_0529	coenzyme A	
s_0595	decanoate	

Products

Table 443: Properties of each product.

Id	Name	SBO
ATP	ATP	
s_0529	coenzyme A	
s_0595	decanoate	

Kinetic Law

Derived unit contains undeclared units

$$v_{110} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{AMP}] \cdot [\mathrm{s\_0602}] \cdot [\mathrm{s\_0633}] - \frac{[\mathrm{ATP}] \cdot [\mathrm{s\_0529}] \cdot [\mathrm{s\_0595}]}{\mathrm{Keq}} \right)}{\mathrm{KmAMP} \cdot \mathrm{Km0602} \cdot \mathrm{Km0633}}}{\left(1 + \frac{[\mathrm{AMP}]}{\mathrm{KmAMP}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0602}]}{\mathrm{Km0602}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0633}]}{\mathrm{Km0633}}\right) + \left(1 + \frac{[\mathrm{ATP}]}{\mathrm{KmATP}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0529}]}{\mathrm{Km0529}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0595}]}{\mathrm{Km0595}}\right) - 1} \tag{221}$$

Table 444: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.002	dimensionless	☑
Vmax		0000324	0.048	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Keq		0000281	17.243	dimensionless	☑
KmAMP		0000322	0.293	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0602		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0633		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
KmATP		0000323	2.525	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0529		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0595		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.111 Reaction r_0400

This is a reversible reaction of three reactants forming three products influenced by seven modifiers.

Name fatty-acid–CoA ligase (dodecanoate)

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{ATP} + \mathrm{s\_0529} + \mathrm{s\_1065} \xrightleftharpoons{\text{e\_0273, ATP, s\_0529, s\_1065, AMP, s\_0633, s\_1073}} \mathrm{AMP} + \mathrm{s\_0633} + \mathrm{s\_1073} \quad (222)$$

Reactants

Table 445: Properties of each reactant.

Id	Name	SBO
ATP	ATP	
s_0529	coenzyme A	
s_1065	laurate	

Modifiers

Table 446: Properties of each modifier.

Id	Name	SBO
e_0273	FAA2	0000460
ATP	ATP	
s_0529	coenzyme A	
s_1065	laurate	
AMP	AMP	
s_0633	diphosphate	
s_1073	lauroyl-CoA	

Products

Table 447: Properties of each product.

Id	Name	SBO
AMP	AMP	

Id	Name	SBO
s_0633	diphosphate	
s_1073	lauroyl-CoA	

Kinetic Law

Derived unit contains undeclared units

$$v_{111} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{ATP}] \cdot [\text{s\_0529}] \cdot [\text{s\_1065}] - \frac{[\text{AMP}] \cdot [\text{s\_0633}] \cdot [\text{s\_1073}]}{\text{Keq}} \right)}{\text{KmATP} \cdot \text{Km0529} \cdot \text{Km1065}}}{\left(1 + \frac{[\text{ATP}]}{\text{KmATP}}\right) \cdot \left(1 + \frac{[\text{s\_0529}]}{\text{Km0529}}\right) \cdot \left(1 + \frac{[\text{s\_1065}]}{\text{Km1065}}\right) + \left(1 + \frac{[\text{AMP}]}{\text{KmAMP}}\right) \cdot \left(1 + \frac{[\text{s\_0633}]}{\text{Km0633}}\right) \cdot \left(1 + \frac{[\text{s\_1073}]}{\text{Km1073}}\right) - 1} \tag{223}$$

Table 448: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$3.40095790139533 \cdot 10^{-11}$	dimensionless	☑
Vmax		0000324	$1.02028737041523 \cdot 10^{-9}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.232	dimensionless	☑
KmATP		0000322	2.525	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0529		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1065		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmAMP		0000323	0.293	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0633		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1073		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.112 Reaction r_0406

This is a reversible reaction of three reactants forming three products influenced by seven modifiers.

Name fatty-acid–CoA ligase (n-C26:0)

SBO:0000176 biochemical reaction

Reaction equation

$$\text{ATP} + \text{s\_0505} + \text{s\_0529} \xrightleftharpoons{\text{e\_0053, ATP, s\_0505, s\_0529, AMP, s\_0633, s\_0816}} \text{AMP} + \text{s\_0633} + \text{s\_0816} \tag{224}$$

Reactants

Table 449: Properties of each reactant.

Id	Name	SBO
ATP	ATP	
s_0505	cerotate	
s_0529	coenzyme A	

Modifiers

Table 450: Properties of each modifier.

Id	Name	SBO
e_0053	FAT1	0000460
ATP	ATP	
s_0505	cerotate	
s_0529	coenzyme A	
AMP	AMP	
s_0633	diphosphate	
s_0816	hexacosanoyl-CoA	

Products

Table 451: Properties of each product.

Id	Name	SBO
AMP	AMP	
s_0633	diphosphate	
s_0816	hexacosanoyl-CoA	

Kinetic Law

Derived unit contains undeclared units

$$v_{112} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{ATP}] \cdot [\mathrm{s\_0505}] \cdot [\mathrm{s\_0529}] - \frac{[\mathrm{AMP}] \cdot [\mathrm{s\_0633}] \cdot [\mathrm{s\_0816}]}{\mathrm{Keq}} \right)}{\mathrm{KmATP} \cdot \mathrm{Km0505} \cdot \mathrm{Km0529}}}{\left(1 + \frac{[\mathrm{ATP}]}{\mathrm{KmATP}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0505}]}{\mathrm{Km0505}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0529}]}{\mathrm{Km0529}}\right) + \left(1 + \frac{[\mathrm{AMP}]}{\mathrm{KmAMP}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0633}]}{\mathrm{Km0633}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0816}]}{\mathrm{Km0816}}\right) - 1} \tag{225}$$

Table 452: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.22290070597961 \cdot 10^{-5}$	dimensionless	☑
Vmax		0000324	$6.66870211793481 \cdot 10^{-4}$	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Keq		0000281	0.232	dimensionless	☑
KmATP		0000322	2.525	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0505		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0529		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
KmAMP		0000323	0.293	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0633		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0816		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.113 Reaction r_0407

This is a reversible reaction of three reactants forming three products influenced by nine modifiers.

Name fatty-acid–CoA ligase (octadecanoate)

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{AMP} + \mathrm{s\_0633} + \mathrm{s\_1454} \xrightleftharpoons{\mathrm{e\_0750},\ \mathrm{e\_0889},\ \mathrm{e\_0462},\ \mathrm{AMP},\ \mathrm{s\_0633},\ \mathrm{s\_1454},\ \mathrm{ATP},\ \mathrm{s\_0529},\ \mathrm{s\_1449}} \mathrm{ATP} + \mathrm{s\_0529} + \mathrm{s\_14} \tag{226}$$

Reactants

Table 453: Properties of each reactant.

Id	Name	SBO
AMP	AMP	
s_0633	diphosphate	
s_1454	stearoyl-CoA	

Modifiers

Table 454: Properties of each modifier.

Id	Name	SBO
e_0750	FAA4	0000460

Id	Name	SBO
e_0889	FAA1	0000460
e_0462	FAA3	0000460
AMP	AMP	
s_0633	diphosphate	
s_1454	stearoyl-CoA	
ATP	ATP	
s_0529	coenzyme A	
s_1449	stearate	

Products

Table 455: Properties of each product.

Id	Name	SBO
ATP	ATP	
s_0529	coenzyme A	
s_1449	stearate	

Kinetic Law

Derived unit contains undeclared units

$$v_{113} = \frac{\frac{\text{vol(cell)}\cdot\text{Vmax}\cdot\left([\text{AMP}]\cdot[\text{s\_0633}]\cdot[\text{s\_1454}]-\frac{[\text{ATP}]\cdot[\text{s\_0529}]\cdot[\text{s\_1449}]}{\text{Keq}}\right)}{\text{KmAMP}\cdot\text{Km0633}\cdot\text{Km1454}}}{\left(1+\frac{[\text{AMP}]}{\text{KmAMP}}\right)\cdot\left(1+\frac{[\text{s\_0633}]}{\text{Km0633}}\right)\cdot\left(1+\frac{[\text{s\_1454}]}{\text{Km1454}}\right)+\left(1+\frac{[\text{ATP}]}{\text{KmATP}}\right)\cdot\left(1+\frac{[\text{s\_0529}]}{\text{Km0529}}\right)\cdot\left(1+\frac{[\text{s\_1449}]}{\text{Km1449}}\right)-1} \quad (227)$$

Table 456: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.11145238477096\cdot10^{-5}$	dimensionless	☑
Vmax		0000324	$3.33435715430091\cdot10^{-4}$	$\text{mmol}\cdot\text{l}^{-1}\cdot\text{s}^{-1}$	☑
Keq		0000281	17.243	dimensionless	☑
KmAMP		0000322	0.293	$\text{mmol}\cdot\text{l}^{-1}$	☑
Km0633		0000322	0.100	$\text{mmol}\cdot\text{l}^{-1}$	☑
Km1454		0000322	0.100	$\text{mmol}\cdot\text{l}^{-1}$	☑
KmATP		0000323	2.525	$\text{mmol}\cdot\text{l}^{-1}$	☑
Km0529		0000323	0.100	$\text{mmol}\cdot\text{l}^{-1}$	☑
Km1449		0000323	0.100	$\text{mmol}\cdot\text{l}^{-1}$	☑

6.114 Reaction r_0432

This is a reversible reaction of three reactants forming four products influenced by eleven modifiers.

Name fatty-acyl-CoA synthase (n-C12:0CoA)

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0602} + \mathrm{s\_1101} + 2\,\mathrm{s\_1212} \xrightleftharpoons{\mathrm{e\_0808},\ \mathrm{e\_0365},\ \mathrm{e\_0586},\ \mathrm{e\_0934},\ \mathrm{s\_0602},\ \mathrm{s\_1101},\ \mathrm{s\_1212},\ \mathrm{CO2},\ \mathrm{s\_0529},\ \mathrm{s\_1073},\ \mathrm{s\_1207}} \quad (228)$$

Reactants

Table 457: Properties of each reactant.

Id	Name	SBO
s_0602	decanoyl-CoA	
s_1101	malonyl-CoA	
s_1212	NADPH	

Modifiers

Table 458: Properties of each modifier.

Id	Name	SBO
e_0808	ACC1	0000460
e_0365	ACB1	0000460
e_0586	FAS1	0000460
e_0934	FAS2	0000460
s_0602	decanoyl-CoA	
s_1101	malonyl-CoA	
s_1212	NADPH	
CO2	carbon dioxide	
s_0529	coenzyme A	
s_1073	lauroyl-CoA	
s_1207	NADP(+)	

Products

Table 459: Properties of each product.

Id	Name	SBO
CO2	carbon dioxide	
s_0529	coenzyme A	
s_1073	lauroyl-CoA	
s_1207	NADP(+)	

Kinetic Law

Derived unit contains undeclared units

$$v_{114} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0602}] \cdot [\mathrm{s\_1101}] \cdot [\mathrm{s\_1212}]^2 - \frac{[\mathrm{CO2}] \cdot [\mathrm{s\_0529}] \cdot [\mathrm{s\_1073}] \cdot [\mathrm{s\_1207}]^2}{\mathrm{Keq}} \right)}{\mathrm{Km0602} \cdot \mathrm{Km1101} \cdot \mathrm{Km1212}^2}}{\left(1 + \frac{[\mathrm{s\_0602}]}{\mathrm{Km0602}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1101}]}{\mathrm{Km1101}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1212}]}{\mathrm{Km1212}}\right)^2 + \left(1 + \frac{[\mathrm{CO2}]}{\mathrm{KmCO2}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0529}]}{\mathrm{Km0529}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1073}]}{\mathrm{Km1073}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1207}]}{\mathrm{Km1207}}\right)^2} \quad (229)$$

Table 460: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$3.33434646922878 \cdot 10^{-5}$	dimensionless	☑
Vmax		0000324	0.003	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Keq		0000281	2.000	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0602		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1101		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1212		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
KmCO2		0000323	1.000	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0529		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1073		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1207		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.115 Reaction r_0433

This is a reversible reaction of three reactants forming four products influenced by eleven modifiers.

Name fatty-acyl-CoA synthase (n-C14:0CoA)

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_1073} + \mathrm{s\_1101} + 2\,\mathrm{s\_1212} \xrightleftharpoons{\mathrm{e\_0808},\ \mathrm{e\_0365},\ \mathrm{e\_0586},\ \mathrm{e\_0934},\ \mathrm{s\_1073},\ \mathrm{s\_1101},\ \mathrm{s\_1212},\ \mathrm{CO2},\ \mathrm{s\_0529},\ \mathrm{s\_1176},\ \mathrm{s\_1207}} \tag{230}$$

Reactants

Table 461: Properties of each reactant.

Id	Name	SBO
s_1073	lauroyl-CoA	
s_1101	malonyl-CoA	
s_1212	NADPH	

Modifiers

Table 462: Properties of each modifier.

Id	Name	SBO
e_0808	ACC1	0000460
e_0365	ACB1	0000460
e_0586	FAS1	0000460
e_0934	FAS2	0000460
s_1073	lauroyl-CoA	
s_1101	malonyl-CoA	
s_1212	NADPH	
CO2	carbon dioxide	
s_0529	coenzyme A	
s_1176	myristoyl-CoA	
s_1207	NADP(+)	

Products

Table 463: Properties of each product.

Id	Name	SBO
CO2	carbon dioxide	
s_0529	coenzyme A	
s_1176	myristoyl-CoA	
s_1207	NADP(+)	

Kinetic Law

Derived unit contains undeclared units

$$v_{115} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_1073}] \cdot [\text{s\_1101}] \cdot [\text{s\_1212}]^2 - \frac{[\text{CO2}] \cdot [\text{s\_0529}] \cdot [\text{s\_1176}] \cdot [\text{s\_1207}]^2}{\text{Keq}} \right)}{\text{Km1073} \cdot \text{Km1101} \cdot \text{Km1212}^2}}{\left(1 + \frac{[\text{s\_1073}]}{\text{Km1073}}\right) \cdot \left(1 + \frac{[\text{s\_1101}]}{\text{Km1101}}\right) \cdot \left(1 + \frac{[\text{s\_1212}]}{\text{Km1212}}\right)^2 + \left(1 + \frac{[\text{CO2}]}{\text{KmCO2}}\right) \cdot \left(1 + \frac{[\text{s\_0529}]}{\text{Km0529}}\right) \cdot \left(1 + \frac{[\text{s\_1176}]}{\text{Km1176}}\right) \cdot \left(1 + \frac{[\text{s\_1207}]}{\text{Km1207}}\right)^2} \quad (231)$$

Table 464: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$3.33435576399053 \cdot 10^{-5}$	dimensionless	☑
Vmax		0000324	0.003	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1073		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1101		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1212		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmCO2		0000323	1.000	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0529		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1176		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1207		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.116 Reaction r_0434

This is a reversible reaction of three reactants forming four products influenced by eleven modifiers.

Name fatty-acyl-CoA synthase (n-C16:0CoA)

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_1101} + \text{s\_1176} + 2\,\text{s\_1212} \xrightleftharpoons{\text{e\_0808, e\_0365, e\_0586, e\_0934, s\_1101, s\_1176, s\_1212, CO2, s\_0529, s\_1207, s\_1302}} \quad (232)$$

Reactants

Table 465: Properties of each reactant.

Id	Name	SBO
s_1101	malonyl-CoA	
s_1176	myristoyl-CoA	
s_1212	NADPH	

Modifiers

Table 466: Properties of each modifier.

Id	Name	SBO
e_0808	ACC1	0000460
e_0365	ACB1	0000460
e_0586	FAS1	0000460
e_0934	FAS2	0000460
s_1101	malonyl-CoA	
s_1176	myristoyl-CoA	
s_1212	NADPH	
CO2	carbon dioxide	
s_0529	coenzyme A	
s_1207	NADP(+)	
s_1302	palmitoyl-CoA	

Products

Table 467: Properties of each product.

Id	Name	SBO
CO2	carbon dioxide	
s_0529	coenzyme A	
s_1207	NADP(+)	
s_1302	palmitoyl-CoA	

Kinetic Law

Derived unit contains undeclared units

$$v_{116} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_1101}] \cdot [\mathrm{s\_1176}] \cdot [\mathrm{s\_1212}]^2 - \frac{[\mathrm{CO2}] \cdot [\mathrm{s\_0529}] \cdot [\mathrm{s\_1207}]^2 \cdot [\mathrm{s\_1302}]}{\mathrm{Keq}} \right)}{\mathrm{Km1101} \cdot \mathrm{Km1176} \cdot \mathrm{Km1212}^2}}{\left(1 + \frac{[\mathrm{s\_1101}]}{\mathrm{Km1101}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1176}]}{\mathrm{Km1176}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1212}]}{\mathrm{Km1212}}\right)^2 + \left(1 + \frac{[\mathrm{CO2}]}{\mathrm{KmCO2}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0529}]}{\mathrm{Km0529}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1207}]}{\mathrm{Km1207}}\right)^2 \cdot \left(1 + \frac{[\mathrm{s\_1302}]}{\mathrm{Km1302}}\right)} \quad (233)$$

Table 468: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$3.33435576399053 \cdot 10^{-5}$	dimensionless	☑
Vmax		0000324	0.003	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Keq		0000281	2.000	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1101		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1176		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1212		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
KmCO2		0000323	1.000	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0529		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1207		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1302		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.117 Reaction r_0435

This is a reversible reaction of three reactants forming four products influenced by eleven modifiers.

Name fatty-acyl-CoA synthase (n-C18:0CoA)

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_1101} + 2\,\mathrm{s\_1212} + \mathrm{s\_1302} \xrightleftharpoons{\mathrm{e\_0808,\ e\_0365,\ e\_0586,\ e\_0934,\ s\_1101,\ s\_1212,\ s\_1302,\ CO2,\ s\_0529,\ s\_1207,\ s\_1454}} \quad (234)$$

Reactants

Table 469: Properties of each reactant.

Id	Name	SBO
s_1101	malonyl-CoA	
s_1212	NADPH	
s_1302	palmitoyl-CoA	

Modifiers

Table 470: Properties of each modifier.

Id	Name	SBO
e_0808	ACC1	0000460
e_0365	ACB1	0000460
e_0586	FAS1	0000460
e_0934	FAS2	0000460
s_1101	malonyl-CoA	
s_1212	NADPH	
s_1302	palmitoyl-CoA	
C02	carbon dioxide	
s_0529	coenzyme A	
s_1207	NADP(+)	
s_1454	stearoyl-CoA	

Products

Table 471: Properties of each product.

Id	Name	SBO
C02	carbon dioxide	
s_0529	coenzyme A	
s_1207	NADP(+)	
s_1454	stearoyl-CoA	

Kinetic Law

Derived unit contains undeclared units

$$v_{117} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_1101}] \cdot [\mathrm{s\_1212}]^2 \cdot [\mathrm{s\_1302}] - \frac{[\mathrm{CO2}] \cdot [\mathrm{s\_0529}] \cdot [\mathrm{s\_1207}]^2 \cdot [\mathrm{s\_1454}]}{\mathrm{Keq}} \right)}{\mathrm{Km1101} \cdot \mathrm{Km1212}^2 \cdot \mathrm{Km1302}}}{\left(1 + \frac{[\mathrm{s\_1101}]}{\mathrm{Km1101}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1212}]}{\mathrm{Km1212}}\right)^2 \cdot \left(1 + \frac{[\mathrm{s\_1302}]}{\mathrm{Km1302}}\right) + \left(1 + \frac{[\mathrm{CO2}]}{\mathrm{KmCO2}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0529}]}{\mathrm{Km0529}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1207}]}{\mathrm{Km1207}}\right)^2 \cdot \left(1 + \frac{[\mathrm{s\_1454}]}{\mathrm{Km1454}}\right)} \quad (235)$$

Table 472: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.11145238477096 \cdot 10^{-5}$	dimensionless	☑

Id	Name	SBO	Value	Unit	Constant
Vmax		0000324	0.001	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Keq		0000281	2.000	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1101		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1212		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1302		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
KmCO2		0000323	1.000	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0529		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1207		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1454		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.118 Reaction r_0438

This is a reversible reaction of two reactants forming one product influenced by 17 modifiers.

Name ferrocytochrome-c:oxygen oxidoreductase

SBO:0000176 biochemical reaction

Reaction equation

$$4\,\mathrm{s\_0710} + \mathrm{s\_1275} \xrightleftharpoons{\mathrm{e\_0632},\ \mathrm{e\_0007},\ \mathrm{e\_0774},\ \mathrm{e\_0436},\ \mathrm{e\_0136},\ \mathrm{e\_0001},\ \mathrm{e\_0347},\ \mathrm{e\_0255},\ \mathrm{e\_0752},\ \mathrm{e\_0690},\ \mathrm{e\_0006},\ \mathrm{e\_053}} \tag{236}$$

Reactants

Table 473: Properties of each reactant.

Id	Name	SBO
s_0710	ferrocytochrome c	
s_1275	oxygen	

Modifiers

Table 474: Properties of each modifier.

Id	Name	SBO
e_0632	COX12	0000460
e_0007	COX3	0000460
e_0774	COX5A	0000460
e_0436	COX6	0000460
e_0136	COX9	0000460

Id	Name	SBO
e_0001	COX1	0000460
e_0347	COX13	0000460
e_0255	CYC7	0000460
e_0752	COX7	0000460
e_0690	COX8	0000460
e_0006	COX2	0000460
e_0531	CYC1	0000460
e_0346	COX4	0000460
e_0475	COX5B	0000460
s_0710	ferrocytochrome c	
s_1275	oxygen	
s_0709	ferricytochrome c	

Product

Table 475: Properties of each product.

Id	Name	SBO
s_0709	ferricytochrome c	

Kinetic Law

Derived unit contains undeclared units

$$v_{118} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0710}]^4 \cdot [\text{s\_1275}] - \frac{[\text{s\_0709}]^4}{\text{Keq}} \right)}{\text{Km0710}^4 \cdot \text{Km1275}}}{\left(1 + \frac{[\text{s\_0710}]}{\text{Km0710}}\right)^4 \cdot \left(1 + \frac{[\text{s\_1275}]}{\text{Km1275}}\right) + \left(1 + \frac{[\text{s\_0709}]}{\text{Km0709}}\right)^4 - 1} \tag{237}$$

Table 476: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.116	dimensionless	☑
Vmax		0000324	10.912	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	20.000	$\text{mmol}^{-1} \cdot \text{l}$	☑
Km0710		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1275		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0709		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.119 Reaction r_0439

This is a reversible reaction of two reactants forming two products influenced by 16 modifiers.

Name ferrocytochrome-c:oxygen oxidoreductase

SBO:0000176 biochemical reaction

Reaction equation

$$2\,\mathrm{s\_0709} + \mathrm{s\_1535} \xrightleftharpoons{\mathrm{e\_0514},\ \mathrm{e\_0978},\ \mathrm{e\_0422},\ \mathrm{e\_0250},\ \mathrm{e\_0004},\ \mathrm{e\_0243},\ \mathrm{e\_0389},\ \mathrm{e\_0255},\ \mathrm{e\_0848},\ \mathrm{e\_0028},\ \mathrm{e\_0531},\ \mathrm{e\_032}} \quad (238)$$

Reactants

Table 477: Properties of each reactant.

Id	Name	SBO
s_0709	ferricytochrome c	
s_1535	ubiquinol-6	

Modifiers

Table 478: Properties of each modifier.

Id	Name	SBO
e_0514	QCR8	0000460
e_0978	QCR2	0000460
e_0422	QCR10	0000460
e_0250	RIP1	0000460
e_0004	COB	0000460
e_0243	QCR7	0000460
e_0389	QCR9	0000460
e_0255	CYC7	0000460
e_0848	CYT1	0000460
e_0028	COR1	0000460
e_0531	CYC1	0000460
e_0322	QCR6	0000460
s_0709	ferricytochrome c	
s_1535	ubiquinol-6	
s_0710	ferrocytochrome c	
s_1537	ubiquinone-6	

Products

Table 479: Properties of each product.

Id	Name	SBO
s_0710	ferrocytochrome c	
s_1537	ubiquinone-6	

Kinetic Law

Derived unit contains undeclared units

$$v_{119} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0709}]^2 \cdot [\text{s\_1535}] - \frac{[\text{s\_0710}]^2 \cdot [\text{s\_1537}]}{\text{Keq}} \right)}{\text{Km0709}^2 \cdot \text{Km1535}}}{\left(1 + \frac{[\text{s\_0709}]}{\text{Km0709}}\right)^2 \cdot \left(1 + \frac{[\text{s\_1535}]}{\text{Km1535}}\right) + \left(1 + \frac{[\text{s\_0710}]}{\text{Km0710}}\right)^2 \cdot \left(1 + \frac{[\text{s\_1537}]}{\text{Km1537}}\right) - 1} \quad (239)$$

Table 480: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.016	dimensionless	☑
Vmax		0000324	0.492	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0709		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1535		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0710		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1537		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.120 Reaction r_0446

This is a reversible reaction of three reactants forming three products influenced by eight modifiers.

Name formate-tetrahydrofolate ligase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{ATP} + \text{s\_0722} + \text{s\_1487} \xrightleftharpoons{\text{e\_0396, e\_0057, ATP, s\_0722, s\_1487, s\_0120, ADP, PHO}} \text{s\_0120} + \text{ADP} + \text{PHO} \quad (240)$$

Reactants

Table 481: Properties of each reactant.

Id	Name	SBO
ATP	ATP	
s_0722	formate	
s_1487	THF	

Modifiers

Table 482: Properties of each modifier.

Id	Name	SBO
e_0396	ADE3	0000460
e_0057	MIS1	0000460
ATP	ATP	
s_0722	formate	
s_1487	THF	
s_0120	10-formyl-THF	
ADP	ADP	
PHO	phosphate	

Products

Table 483: Properties of each product.

Id	Name	SBO
s_0120	10-formyl-THF	
ADP	ADP	
PHO	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{120} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{ATP}] \cdot [\mathrm{s\_0722}] \cdot [\mathrm{s\_1487}] - \frac{[\mathrm{s\_0120}] \cdot [\mathrm{ADP}] \cdot [\mathrm{PHO}]}{\mathrm{Keq}} \right)}{\mathrm{KmATP} \cdot \mathrm{Km0722} \cdot \mathrm{Km1487}}}{\left(1 + \frac{[\mathrm{ATP}]}{\mathrm{KmATP}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0722}]}{\mathrm{Km0722}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1487}]}{\mathrm{Km1487}}\right) + \left(1 + \frac{[\mathrm{s\_0120}]}{\mathrm{Km0120}}\right) \cdot \left(1 + \frac{[\mathrm{ADP}]}{\mathrm{KmADP}}\right) \cdot \left(1 + \frac{[\mathrm{PHO}]}{\mathrm{KmPHO}}\right) - 1} \tag{241}$$

Table 484: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$4.20781143195575 \cdot 10^{-4}$	dimensionless	☑
Vmax		0000324	0.013	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Keq		0000281	1.015	dimensionless	☑
KmATP		0000322	2.525	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0722		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1487		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0120		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
KmADP		0000323	1.282	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
KmPHO		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.121 Reaction FBA

This is a reversible reaction of one reactant forming two products influenced by four modifiers.

Name fructose-bisphosphate aldolase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{F16bP} \xrightleftharpoons{\text{e\_0567, F16bP, DHAP, GAP}} \mathrm{DHAP} + \mathrm{GAP} \tag{242}$$

Reactant

Table 485: Properties of each reactant.

Id	Name	SBO
F16bP	D-fructose 1,6-bisphosphate	

Modifiers

Table 486: Properties of each modifier.

Id	Name	SBO
e_0567	FBA1	0000460
F16bP	D-fructose 1,6-bisphosphate	
DHAP	dihydroxyacetone phosphate	
GAP	glyceraldehyde 3-phosphate	

Products

Table 487: Properties of each product.

Id	Name	SBO
DHAP	dihydroxyacetone phosphate	
GAP	glyceraldehyde 3-phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{121} = \mathrm{vol}\,(\mathrm{cell}) \cdot \frac{\mathrm{Vmax} \cdot \left(\frac{[\mathrm{F16bP}]}{\mathrm{Kf16bp}} - \frac{[\mathrm{DHAP}] \cdot [\mathrm{GAP}]}{\mathrm{Kf16bp} \cdot \mathrm{Keq}} \right)}{1 + \frac{[\mathrm{F16bP}]}{\mathrm{Kf16bp}} + \frac{[\mathrm{DHAP}]}{\mathrm{Kdhap}} + \frac{[\mathrm{GAP}]}{\mathrm{Kgap}} + \frac{[\mathrm{F16bP}] \cdot [\mathrm{GAP}]}{\mathrm{Kf16bp} \cdot \mathrm{Kigap}} + \frac{[\mathrm{DHAP}] \cdot [\mathrm{GAP}]}{\mathrm{Kdhap} \cdot \mathrm{Kgap}}} \tag{243}$$

Table 488: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
Vmax			1.578	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Kf16bp			0.300	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Keq			0.069	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Kdhap			2.000	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Kgap			2.400	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Kigap			10.000	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
FLUX_VALUE			1.309	dimensionless	☑

6.122 Reaction r_0451

This is a reversible reaction of one reactant forming one product influenced by three modifiers.

Name fumarase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0725} \xrightleftharpoons{\mathrm{e\_0940},\ \mathrm{s\_0725},\ \mathrm{s\_0066}} \mathrm{s\_0066} \tag{244}$$

Reactant

Table 489: Properties of each reactant.

Id	Name	SBO
s_0725	fumarate	

Modifiers

Table 490: Properties of each modifier.

Id	Name	SBO
e_0940	FUM1	0000460
s_0725	fumarate	
s_0066	(S)-malate	

Product

Table 491: Properties of each product.

Id	Name	SBO
s_0066	(S)-malate	

Kinetic Law

Derived unit contains undeclared units

$$v_{122} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0725}] - \frac{[\mathrm{s\_0066}]}{\mathrm{Keq}} \right)}{\mathrm{Km0725}}}{1 + \frac{[\mathrm{s\_0725}]}{\mathrm{Km0725}} + 1 + \frac{[\mathrm{s\_0066}]}{\mathrm{Km0066}} - 1} \tag{245}$$

Table 492: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.033	dimensionless	☑
Vmax		0000324	0.195	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0725		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0066		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.123 Reaction r_0462

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name geranyltranstransferase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0745} + \text{s\_0943} \xrightleftharpoons{\text{e\_0515, s\_0745, s\_0943, s\_0190, s\_0633}} \text{s\_0190} + \text{s\_0633} \tag{246}$$

Reactants

Table 493: Properties of each reactant.

Id	Name	SBO
s_0745	geranyl diphosphate	
s_0943	isopentenyl diphosphate	

Modifiers

Table 494: Properties of each modifier.

Id	Name	SBO
e_0515	ERG20	0000460
s_0745	geranyl diphosphate	
s_0943	isopentenyl diphosphate	
s_0190	farnesyl diphosphate	
s_0633	diphosphate	

Products

Table 495: Properties of each product.

Id	Name	SBO
s_0190	farnesyl diphosphate	
s_0633	diphosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{123} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0745}] \cdot [\text{s\_0943}] - \frac{[\text{s\_0190}] \cdot [\text{s\_0633}]}{\text{Keq}} \right)}{\text{Km0745} \cdot \text{Km0943}}}{\left(1 + \frac{[\text{s\_0745}]}{\text{Km0745}}\right) \cdot \left(1 + \frac{[\text{s\_0943}]}{\text{Km0943}}\right) + \left(1 + \frac{[\text{s\_0190}]}{\text{Km0190}}\right) \cdot \left(1 + \frac{[\text{s\_0633}]}{\text{Km0633}}\right) - 1} \tag{247}$$

Table 496: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$5.88956076077212 \cdot 10^{-4}$	dimensionless	☑
Vmax		0000324	0.008	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0745		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0943		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0190		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0633		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.124 Reaction r_0466

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name glucose 6-phosphate dehydrogenase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{G6P} + \text{s\_1207} \xrightleftharpoons{\text{e\_0792, G6P, s\_1207, s\_0335, s\_1212}} \text{s\_0335} + \text{s\_1212} \tag{248}$$

Reactants

Table 497: Properties of each reactant.

Id	Name	SBO
G6P	D-glucose 6-phosphate	
s_1207	NADP(+)	

Modifiers

Table 498: Properties of each modifier.

Id	Name	SBO
e_0792	ZWF1	0000460

Id	Name	SBO
G6P	D-glucose 6-phosphate	
s_1207	NADP(+)	
s_0335	6-O-phosphono-D-glucono-1,5-lactone	
s_1212	NADPH	

Products

Table 499: Properties of each product.

Id	Name	SBO
s_0335	6-O-phosphono-D-glucono-1,5-lactone	
s_1212	NADPH	

Kinetic Law

Derived unit contains undeclared units

$$v_{124} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{G6P}] \cdot [\mathrm{s\_1207}] - \frac{[\mathrm{s\_0335}] \cdot [\mathrm{s\_1212}]}{\mathrm{Keq}} \right)}{\mathrm{KmG6P} \cdot \mathrm{Km1207}}}{\left(1 + \frac{[\mathrm{G6P}]}{\mathrm{KmG6P}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1207}]}{\mathrm{Km1207}}\right) + \left(1 + \frac{[\mathrm{s\_0335}]}{\mathrm{Km0335}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1212}]}{\mathrm{Km1212}}\right) - 1} \tag{249}$$

Table 500: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.058	dimensionless	☑
Vmax		0000324	0.813	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	0.075	dimensionless	☑
KmG6P		0000322	2.675	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1207		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0335		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1212		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.125 Reaction PGI

This is a reversible reaction of one reactant forming one product influenced by three modifiers.

Name glucose-6-phosphate isomerase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{G6P} \xrightleftharpoons{\text{e\_0079, G6P, F6P}} \mathrm{F6P} \tag{250}$$

Reactant

Table 501: Properties of each reactant.

Id	Name	SBO
G6P	D-glucose 6-phosphate	

Modifiers

Table 502: Properties of each modifier.

Id	Name	SBO
e_0079	PGI1	0000460
G6P	D-glucose 6-phosphate	
F6P	D-fructose 6-phosphate	

Product

Table 503: Properties of each product.

Id	Name	SBO
F6P	D-fructose 6-phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{125} = \mathrm{vol}\,(\mathrm{cell}) \cdot \frac{\mathrm{Vmax} \cdot \left(\frac{[\mathrm{G6P}]}{\mathrm{Kg6p}} - \frac{[\mathrm{F6P}]}{\mathrm{Kg6p} \cdot \mathrm{Keq}} \right)}{1 + \frac{[\mathrm{G6P}]}{\mathrm{Kg6p}} + \frac{[\mathrm{F6P}]}{\mathrm{Kf6p}}} \tag{251}$$

Table 504: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
Vmax			17.600	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Kg6p			1.400	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

Id	Name	SBO	Value	Unit	Constant
Keq			0.290	dimensionless	☑
Kf6p			0.300	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
FLUX_VALUE			1.309	dimensionless	☑

6.126 Reaction r_0470

This is a reversible reaction of three reactants forming two products influenced by six modifiers.

Name glutamate dehydrogenase (NAD)

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0180} + \mathrm{s\_0419} + \mathrm{NADH} \xrightleftharpoons{\mathrm{e\_0160},\ \mathrm{s\_0180},\ \mathrm{s\_0419},\ \mathrm{NADH},\ \mathrm{s\_0991},\ \mathrm{NAD}} \mathrm{s\_0991} + \mathrm{NAD} \tag{252}$$

Reactants

Table 505: Properties of each reactant.

Id	Name	SBO
s_0180	2-oxoglutarate	
s_0419	ammonium	
NADH	NADH	

Modifiers

Table 506: Properties of each modifier.

Id	Name	SBO
e_0160	GDH2	0000460
s_0180	2-oxoglutarate	
s_0419	ammonium	
NADH	NADH	
s_0991	L-glutamate	
NAD	NAD	

Products

Table 507: Properties of each product.

Id	Name	SBO
s_0991	L-glutamate	
NAD	NAD	

Kinetic Law

Derived unit contains undeclared units

$$v_{126} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0180}] \cdot [\text{s\_0419}] \cdot [\text{NADH}] - \frac{[\text{s\_0991}] \cdot [\text{NAD}]}{\text{Keq}} \right)}{\text{Km0180} \cdot \text{Km0419} \cdot \text{KmNADH}}}{\left(1 + \frac{[\text{s\_0180}]}{\text{Km0180}}\right) \cdot \left(1 + \frac{[\text{s\_0419}]}{\text{Km0419}}\right) \cdot \left(1 + \frac{[\text{NADH}]}{\text{KmNADH}}\right) + \left(1 + \frac{[\text{s\_0991}]}{\text{Km0991}}\right) \cdot \left(1 + \frac{[\text{NAD}]}{\text{KmNAD}}\right) - 1} \tag{253}$$

Table 508: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.235	dimensionless	☑
Vmax		0000324	5.168	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	346.741	$\text{mmol}^{-1} \cdot \text{l}$	☑
Km0180		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0419		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmNADH		0000322	0.087	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0991		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmNAD		0000323	1.503	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.127 Reaction r_0476

This is a reversible reaction of three reactants forming three products influenced by seven modifiers.

Name glutamine synthetase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0419} + \text{ATP} + \text{s\_0991} \xrightleftharpoons{\text{e\_0955, s\_0419, ATP, s\_0991, ADP, s\_0999, PHO}} \text{ADP} + \text{s\_0999} + \text{PHO} \tag{254}$$

Reactants

Table 509: Properties of each reactant.

Id	Name	SBO
s_0419	ammonium	
ATP	ATP	
s_0991	L-glutamate	

Modifiers

Table 510: Properties of each modifier.

Id	Name	SBO
e_0955	GLN1	0000460
s_0419	ammonium	
ATP	ATP	
s_0991	L-glutamate	
ADP	ADP	
s_0999	L-glutamine	
PHO	phosphate	

Products

Table 511: Properties of each product.

Id	Name	SBO
ADP	ADP	
s_0999	L-glutamine	
PHO	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{127} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0419}] \cdot [\text{ATP}] \cdot [\text{s\_0991}] - \frac{[\text{ADP}] \cdot [\text{s\_0999}] \cdot [\text{PHO}]}{\text{Keq}} \right)}{\text{Km0419} \cdot \text{KmATP} \cdot \text{Km0991}}}{\left(1 + \frac{[\text{s\_0419}]}{\text{Km0419}}\right) \cdot \left(1 + \frac{[\text{ATP}]}{\text{KmATP}}\right) \cdot \left(1 + \frac{[\text{s\_0991}]}{\text{Km0991}}\right) + \left(1 + \frac{[\text{ADP}]}{\text{KmADP}}\right) \cdot \left(1 + \frac{[\text{s\_0999}]}{\text{Km0999}}\right) \cdot \left(1 + \frac{[\text{PHO}]}{\text{KmPHO}}\right) - 1} \tag{255}$$

Table 512: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.035	dimensionless	☑
Vmax		0000324	1.058	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	1.015	dimensionless	☑
Km0419		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmATP		0000322	2.525	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0991		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmADP		0000323	1.282	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0999		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmPHO		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.128 Reaction r_0478

This is a reversible reaction of three reactants forming three products influenced by seven modifiers.

Name glutaminyl-tRNA synthetase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{ATP} + \mathrm{s\_0999} + \mathrm{s\_1590} \xrightleftharpoons{\text{e\_0867, ATP, s\_0999, s\_1590, AMP, s\_0633, s\_0747}} \mathrm{AMP} + \mathrm{s\_0633} + \mathrm{s\_0747} \quad (256)$$

Reactants

Table 513: Properties of each reactant.

Id	Name	SBO
ATP	ATP	
s_0999	L-glutamine	
s_1590	tRNA(Gln)	

Modifiers

Table 514: Properties of each modifier.

Id	Name	SBO
e_0867	GLN4	0000460

Id	Name	SBO
ATP	ATP	
s_0999	L-glutamine	
s_1590	tRNA(Gln)	
AMP	AMP	
s_0633	diphosphate	
s_0747	Gln-tRNA(Gln)	

Products

Table 515: Properties of each product.

Id	Name	SBO
AMP	AMP	
s_0633	diphosphate	
s_0747	Gln-tRNA(Gln)	

Kinetic Law

Derived unit contains undeclared units

$$v_{128} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{ATP}] \cdot [\mathrm{s\_0999}] \cdot [\mathrm{s\_1590}] - \frac{[\mathrm{AMP}] \cdot [\mathrm{s\_0633}] \cdot [\mathrm{s\_0747}]}{\mathrm{Keq}} \right)}{\mathrm{KmATP} \cdot \mathrm{Km0999} \cdot \mathrm{Km1590}}}{\left(1 + \frac{[\mathrm{ATP}]}{\mathrm{KmATP}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0999}]}{\mathrm{Km0999}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1590}]}{\mathrm{Km1590}}\right) + \left(1 + \frac{[\mathrm{AMP}]}{\mathrm{KmAMP}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0633}]}{\mathrm{Km0633}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0747}]}{\mathrm{Km0747}}\right) - 1} \tag{257}$$

Table 516: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.005	dimensionless	☑
Vmax		0000324	0.136	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	0.232	dimensionless	☑
KmATP		0000322	2.525	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0999		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1590		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmAMP		0000323	0.293	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0633		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0747		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.129 Reaction r_0479

This is a reversible reaction of three reactants forming three products influenced by seven modifiers.

Name glutamyl-tRNA synthetase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{ATP} + \mathrm{s\_0991} + \mathrm{s\_1591} \xrightleftharpoons{\text{e\_0353, ATP, s\_0991, s\_1591, AMP, s\_0633, s\_0748}} \mathrm{AMP} + \mathrm{s\_0633} + \mathrm{s\_0748} \quad (258)$$

Reactants

Table 517: Properties of each reactant.

Id	Name	SBO
ATP	ATP	
s_0991	L-glutamate	
s_1591	tRNA(Glu)	

Modifiers

Table 518: Properties of each modifier.

Id	Name	SBO
e_0353	GUS1	0000460
ATP	ATP	
s_0991	L-glutamate	
s_1591	tRNA(Glu)	
AMP	AMP	
s_0633	diphosphate	
s_0748	Glu-tRNA(Glu)	

Products

Table 519: Properties of each product.

Id	Name	SBO
AMP	AMP	

Id	Name	SBO
s_0633	diphosphate	
s_0748	Glu-tRNA(Glu)	

Kinetic Law

Derived unit contains undeclared units

$$v_{129} = \frac{\frac{\text{vol(cell)}\cdot\text{Vmax}\cdot\left([\text{ATP}]\cdot[\text{s\_0991}]\cdot[\text{s\_1591}]-\frac{[\text{AMP}]\cdot[\text{s\_0633}]\cdot[\text{s\_0748}]}{\text{Keq}}\right)}{\text{KmATP}\cdot\text{Km0991}\cdot\text{Km1591}}}{\left(1+\frac{[\text{ATP}]}{\text{KmATP}}\right)\cdot\left(1+\frac{[\text{s\_0991}]}{\text{Km0991}}\right)\cdot\left(1+\frac{[\text{s\_1591}]}{\text{Km1591}}\right)+\left(1+\frac{[\text{AMP}]}{\text{KmAMP}}\right)\cdot\left(1+\frac{[\text{s\_0633}]}{\text{Km0633}}\right)\cdot\left(1+\frac{[\text{s\_0748}]}{\text{Km0748}}\right)-1} \tag{259}$$

Table 520: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.013	dimensionless	☑
Vmax		0000324	0.389	$\text{mmol}\cdot\text{l}^{-1}\cdot\text{s}^{-1}$	☑
Keq		0000281	0.232	dimensionless	☑
KmATP		0000322	2.525	$\text{mmol}\cdot\text{l}^{-1}$	☑
Km0991		0000322	0.100	$\text{mmol}\cdot\text{l}^{-1}$	☑
Km1591		0000322	0.100	$\text{mmol}\cdot\text{l}^{-1}$	☑
KmAMP		0000323	0.293	$\text{mmol}\cdot\text{l}^{-1}$	☑
Km0633		0000323	0.100	$\text{mmol}\cdot\text{l}^{-1}$	☑
Km0748		0000323	0.100	$\text{mmol}\cdot\text{l}^{-1}$	☑

6.130 Reaction TDH

This is a reversible reaction of three reactants forming two products influenced by eight modifiers.

Name glyceraldehyde-3-phosphate dehydrogenase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{GAP}+\text{NAD}+\text{PHO} \xrightleftharpoons{\text{e\_0392, e\_0495, e\_0525, GAP, NAD, PHO, BPG, NADH}} \text{BPG}+\text{NADH} \tag{260}$$

Reactants

Table 521: Properties of each reactant.

Id	Name	SBO
GAP	glyceraldehyde 3-phosphate	
NAD	NAD	
PHO	phosphate	

Modifiers

Table 522: Properties of each modifier.

Id	Name	SBO
e_0392	TDH3	0000460
e_0495	TDH1	0000460
e_0525	TDH2	0000460
GAP	glyceraldehyde 3-phosphate	
NAD	NAD	
PHO	phosphate	
BPG	1,3-bisphospho-D-glycerate	
NADH	NADH	

Products

Table 523: Properties of each product.

Id	Name	SBO
BPG	1,3-bisphospho-D-glycerate	
NADH	NADH	

Kinetic Law

Derived unit contains undeclared units

$$v_{130} = \frac{\frac{\text{vol(cell)}\cdot\text{Vmax}}{\text{Kgap}\cdot\text{Knad}\cdot\text{Kpho}} \cdot \left([\text{GAP}]\cdot[\text{NAD}]\cdot[\text{PHO}] - \frac{[\text{BPG}]\cdot[\text{NADH}]}{\text{Keq}}\right)}{\left(1+\frac{[\text{PHO}]}{\text{Kpho}}\right)\cdot\left(1+\frac{[\text{GAP}]}{\text{Kgap}}+\frac{[\text{BPG}]}{\text{Kbpg}}\right)\cdot\left(1+\frac{[\text{NAD}]}{\text{Knad}}+\frac{[\text{NADH}]}{\text{Knadh}}\right)} \tag{261}$$

Table 524: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
Vmax			19.219	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Kgap			0.210	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Knad			0.090	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Kbpg			0.010	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Knadh			0.060	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Keq			0.053	dimensionless	☑
Kpho			10^{-4}	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
FLUX_VALUE			2.300	dimensionless	☑

6.131 Reaction r_0489

This is a reversible reaction of one reactant forming two products influenced by five modifiers.

Name glycerol-3-phosphatase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0767} \xrightleftharpoons{\mathrm{e\_0466,\ e\_0288,\ s\_0767,\ GLY,\ PHO}} \mathrm{GLY} + \mathrm{PHO} \tag{262}$$

Reactant

Table 525: Properties of each reactant.

Id	Name	SBO
s_0767	glycerol 3-phosphate	

Modifiers

Table 526: Properties of each modifier.

Id	Name	SBO
e_0466	RHR2	0000460
e_0288	HOR2	0000460
s_0767	glycerol 3-phosphate	
GLY	glycerol	
PHO	phosphate	

Products

Table 527: Properties of each product.

Id	Name	SBO
GLY	glycerol	
PHO	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{131} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0767}] - \frac{[\text{GLY}] \cdot [\text{PHO}]}{\text{Keq}} \right)}{\text{Km0767}}}{1 + \frac{[\text{s\_0767}]}{\text{Km0767}} + \left(1 + \frac{[\text{GLY}]}{\text{KmGLY}}\right) \cdot \left(1 + \frac{[\text{PHO}]}{\text{KmPHO}}\right) - 1} \tag{263}$$

Table 528: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.093	dimensionless	☑
Vmax		0000324	0.931	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.300	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0767		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmGLY		0000323	0.150	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmPHO		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.132 Reaction r_0491

This is a reversible reaction of two reactants forming two products influenced by six modifiers.

Name glycerol-3-phosphate dehydrogenase (NAD)

SBO:0000176 biochemical reaction

Reaction equation

$$\text{DHAP} + \text{NADH} \xrightleftharpoons{\text{e\_0129, e\_0827, DHAP, NADH, s\_0767, NAD}} \text{s\_0767} + \text{NAD} \tag{264}$$

Reactants

Table 529: Properties of each reactant.

Id	Name	SBO
DHAP	dihydroxyacetone phosphate	
NADH	NADH	

Modifiers

Table 530: Properties of each modifier.

Id	Name	SBO
e_0129	GPD1	0000460
e_0827	GPD2	0000460
DHAP	dihydroxyacetone phosphate	
NADH	NADH	
s_0767	glycerol 3-phosphate	
NAD	NAD	

Products

Table 531: Properties of each product.

Id	Name	SBO
s_0767	glycerol 3-phosphate	
NAD	NAD	

Kinetic Law

Derived unit contains undeclared units

$$v_{132} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{DHAP}] \cdot [\mathrm{NADH}] - \frac{[\mathrm{s\_0767}] \cdot [\mathrm{NAD}]}{\mathrm{Keq}} \right)}{\mathrm{KmDHAP} \cdot \mathrm{KmNADH}}}{\left(1 + \frac{[\mathrm{DHAP}]}{\mathrm{KmDHAP}}\right) \cdot \left(1 + \frac{[\mathrm{NADH}]}{\mathrm{KmNADH}}\right) + \left(1 + \frac{[\mathrm{s\_0767}]}{\mathrm{Km0767}}\right) \cdot \left(1 + \frac{[\mathrm{NAD}]}{\mathrm{KmNAD}}\right) - 1} \tag{265}$$

Table 532: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.093	dimensionless	☑
Vmax		0000324	1.307	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	3.453	dimensionless	☑

Id	Name	SBO	Value	Unit	Constant
KmDHAP		0000322	1.004	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
KmNADH		0000322	0.087	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0767		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
KmNAD		0000323	1.503	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.133 Reaction r_0495

This is a reversible reaction of two reactants forming two products influenced by six modifiers.

Name glycerol-3-phosphate/dihydroxyacetone phosphate acyltransferase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0380} + \mathrm{s\_0767} \xrightleftharpoons{\mathrm{e\_0020},\ \mathrm{e\_0607},\ \mathrm{s\_0380},\ \mathrm{s\_0767},\ \mathrm{s\_0082},\ \mathrm{s\_0529}} \mathrm{s\_0082} + \mathrm{s\_0529} \qquad (266)$$

Reactants

Table 533: Properties of each reactant.

Id	Name	SBO
s_0380	acyl-CoA	
s_0767	glycerol 3-phosphate	

Modifiers

Table 534: Properties of each modifier.

Id	Name	SBO
e_0020	SCT1	0000460
e_0607	GPT2	0000460
s_0380	acyl-CoA	
s_0767	glycerol 3-phosphate	
s_0082	1-acyl-sn-glycerol 3-phosphate	
s_0529	coenzyme A	

Products

Table 535: Properties of each product.

Id	Name	SBO
s_0082	1-acyl-sn-glycerol 3-phosphate	
s_0529	coenzyme A	

Kinetic Law

Derived unit contains undeclared units

$$v_{133} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0380}] \cdot [\text{s\_0767}] - \frac{[\text{s\_0082}] \cdot [\text{s\_0529}]}{\text{Keq}} \right)}{\text{Km0380} \cdot \text{Km0767}}}{\left(1 + \frac{[\text{s\_0380}]}{\text{Km0380}}\right) \cdot \left(1 + \frac{[\text{s\_0767}]}{\text{Km0767}}\right) + \left(1 + \frac{[\text{s\_0082}]}{\text{Km0082}}\right) \cdot \left(1 + \frac{[\text{s\_0529}]}{\text{Km0529}}\right) - 1} \quad (267)$$

Table 536: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.72166486160745 \cdot 10^{-4}$	dimensionless	☑
Vmax		0000324	0.004	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0380		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0767		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0082		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0529		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.134 Reaction r_0499

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name glycinamide ribotide transformylase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0120} + \text{s\_0325} \xrightleftharpoons{\text{e\_0231, s\_0120, s\_0325, s\_0301, s\_1487}} \text{s\_0301} + \text{s\_1487} \quad (268)$$

Reactants

Table 537: Properties of each reactant.

Id	Name	SBO
s_0120	10-formyl-THF	
s_0325	5-phospho-ribosyl-glycineamide	

Modifiers

Table 538: Properties of each modifier.

Id	Name	SBO
e_0231	ADE8	0000460
s_0120	10-formyl-THF	
s_0325	5-phospho-ribosyl-glycineamide	
s_0301	5'-phosphoribosyl-N-formylglycineamide	
s_1487	THF	

Products

Table 539: Properties of each product.

Id	Name	SBO
s_0301	5'-phosphoribosyl-N-formylglycineamide	
s_1487	THF	

Kinetic Law

Derived unit contains undeclared units

$$v_{134} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0120}] \cdot [\mathrm{s\_0325}] - \frac{[\mathrm{s\_0301}] \cdot [\mathrm{s\_1487}]}{\mathrm{Keq}} \right)}{\mathrm{Km0120} \cdot \mathrm{Km0325}}}{\left(1 + \frac{[\mathrm{s\_0120}]}{\mathrm{Km0120}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0325}]}{\mathrm{Km0325}}\right) + \left(1 + \frac{[\mathrm{s\_0301}]}{\mathrm{Km0301}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1487}]}{\mathrm{Km1487}}\right) - 1} \tag{269}$$

Table 540: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.004	dimensionless	☑
Vmax		0000324	0.060	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0120		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

Id	Name	SBO	Value	Unit	Constant
Km0325		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0301		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1487		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.135 Reaction r_0501

This is a reversible reaction of three reactants forming four products influenced by eleven modifiers.

Name glycine cleavage system

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_1003} + \mathrm{NAD} + \mathrm{s\_1487} \xrightleftharpoons{\mathrm{e\_0741,\ e\_0012,\ e\_0167,\ e\_0311,\ s\_1003,\ NAD,\ s\_1487,\ s\_0306,\ s\_0419,\ CO2,\ NADH}} \mathrm{s\_03} \tag{270}$$

Reactants

Table 541: Properties of each reactant.

Id	Name	SBO
s_1003	L-glycine	
NAD	NAD	
s_1487	THF	

Modifiers

Table 542: Properties of each modifier.

Id	Name	SBO
e_0741	GCV2	0000460
e_0012	GCV3	0000460
e_0167	GCV1	0000460
e_0311	LPD1	0000460
s_1003	L-glycine	
NAD	NAD	
s_1487	THF	
s_0306	5,10-methylenetetrahydrofolate	
s_0419	ammonium	

Id	Name	SBO
CO2	carbon dioxide	
NADH	NADH	

Products

Table 543: Properties of each product.

Id	Name	SBO
s_0306	5,10-methylenetetrahydrofolate	
s_0419	ammonium	
CO2	carbon dioxide	
NADH	NADH	

Kinetic Law

Derived unit contains undeclared units

$$v_{135} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_1003}] \cdot [\mathrm{NAD}] \cdot [\mathrm{s\_1487}] - \frac{[\mathrm{s\_0306}] \cdot [\mathrm{s\_0419}] \cdot [\mathrm{CO2}] \cdot [\mathrm{NADH}]}{\mathrm{Keq}} \right)}{\mathrm{Km1003} \cdot \mathrm{KmNAD} \cdot \mathrm{Km1487}}}{\left(1 + \frac{[\mathrm{s\_1003}]}{\mathrm{Km1003}}\right) \cdot \left(1 + \frac{[\mathrm{NAD}]}{\mathrm{KmNAD}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1487}]}{\mathrm{Km1487}}\right) + \left(1 + \frac{[\mathrm{s\_0306}]}{\mathrm{Km0306}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0419}]}{\mathrm{Km0419}}\right) \cdot \left(1 + \frac{[\mathrm{CO2}]}{\mathrm{KmCO2}}\right) \cdot \left(1 + \frac{[\mathrm{NADH}]}{\mathrm{KmNADH}}\right)} \quad (271)$$

Table 544: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.024	dimensionless	☑
Vmax		0000324	1.086	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	0.115	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1003		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmNAD		0000322	1.503	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1487		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0306		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0419		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmCO2		0000323	1.000	$\mathrm{mmol \cdot l^{-1}}$	☑
KmNADH		0000323	0.087	$\mathrm{mmol \cdot l^{-1}}$	☑

6.136 Reaction r_0502

This is a reversible reaction of two reactants forming two products influenced by six modifiers.

Name glycine hydroxymethyltransferase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0306} + \text{s\_1003} \xrightleftharpoons{\text{e\_0638, e\_0091, s\_0306, s\_1003, s\_1039, s\_1487}} \text{s\_1039} + \text{s\_1487} \qquad (272)$$

Reactants

Table 545: Properties of each reactant.

Id	Name	SBO
s_0306	5,10-methylenetetrahydrofolate	
s_1003	L-glycine	

Modifiers

Table 546: Properties of each modifier.

Id	Name	SBO
e_0638	SHM2	0000460
e_0091	SHM1	0000460
s_0306	5,10-methylenetetrahydrofolate	
s_1003	L-glycine	
s_1039	L-serine	
s_1487	THF	

Products

Table 547: Properties of each product.

Id	Name	SBO
s_1039	L-serine	
s_1487	THF	

Kinetic Law

Derived unit contains undeclared units

$$v_{136} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0306}] \cdot [\text{s\_1003}] - \frac{[\text{s\_1039}] \cdot [\text{s\_1487}]}{\text{Keq}} \right)}{\text{Km0306} \cdot \text{Km1003}}}{\left(1 + \frac{[\text{s\_0306}]}{\text{Km0306}}\right) \cdot \left(1 + \frac{[\text{s\_1003}]}{\text{Km1003}}\right) + \left(1 + \frac{[\text{s\_1039}]}{\text{Km1039}}\right) \cdot \left(1 + \frac{[\text{s\_1487}]}{\text{Km1487}}\right) - 1} \tag{273}$$

Table 548: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.010	dimensionless	☑
Vmax		0000324	0.135	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0306		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1003		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1039		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1487		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.137 Reaction r_0510

This is a reversible reaction of one reactant forming two products influenced by seven modifiers.

Name glycogen (starch) synthase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_1543} \xrightleftharpoons{\text{e\_0667, e\_0510, e\_0317, e\_0603, s\_1543, s\_0773, s\_1538}} \text{s\_0773} + \text{s\_1538} \tag{274}$$

Reactant

Table 549: Properties of each reactant.

Id	Name	SBO
s_1543	UDP-D-glucose	

Modifiers

Table 550: Properties of each modifier.

Id	Name	SBO
e_0667	GSY2	0000460
e_0510	GLG2	0000460

Id	Name	SBO
e_0317	GSY1	0000460
e_0603	GLG1	0000460
s_1543	UDP-D-glucose	
s_0773	glycogen	
s_1538	UDP	

Products

Table 551: Properties of each product.

Id	Name	SBO
s_0773	glycogen	
s_1538	UDP	

Kinetic Law

Derived unit contains undeclared units

$$v_{137} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_1543}] - \frac{[\text{s\_0773}] \cdot [\text{s\_1538}]}{\text{Keq}} \right)}{\text{Km1543}}}{1 + \frac{[\text{s\_1543}]}{\text{Km1543}} + \left(1 + \frac{[\text{s\_0773}]}{\text{Km0773}}\right) \cdot \left(1 + \frac{[\text{s\_1538}]}{\text{Km1538}}\right) - 1} \tag{275}$$

Table 552: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.022	dimensionless	☑
Vmax		0000324	0.223	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.200	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1543		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0773		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1538		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.138 Reaction r_0512

This is a reversible reaction of three reactants forming three products influenced by eight modifiers.

Name glycyl-tRNA synthetase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{ATP} + \mathrm{s\_1003} + \mathrm{s\_1593} \xrightleftharpoons{\mathrm{e\_0064},\ \mathrm{e\_0963},\ \mathrm{ATP},\ \mathrm{s\_1003},\ \mathrm{s\_1593},\ \mathrm{AMP},\ \mathrm{s\_0633},\ \mathrm{s\_0757}} \mathrm{AMP} + \mathrm{s\_0633} + \mathrm{s\_0757} \quad (276)$$

Reactants

Table 553: Properties of each reactant.

Id	Name	SBO
ATP	ATP	
s_1003	L-glycine	
s_1593	tRNA(Gly)	

Modifiers

Table 554: Properties of each modifier.

Id	Name	SBO
e_0064	GRS1	0000460
e_0963	GRS2	0000460
ATP	ATP	
s_1003	L-glycine	
s_1593	tRNA(Gly)	
AMP	AMP	
s_0633	diphosphate	
s_0757	Gly-tRNA(Gly)	

Products

Table 555: Properties of each product.

Id	Name	SBO
AMP	AMP	
s_0633	diphosphate	
s_0757	Gly-tRNA(Gly)	

Kinetic Law

Derived unit contains undeclared units

$$v_{138} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{ATP}] \cdot [\text{s\_1003}] \cdot [\text{s\_1593}] - \frac{[\text{AMP}] \cdot [\text{s\_0633}] \cdot [\text{s\_0757}]}{\text{Keq}} \right)}{\text{KmATP} \cdot \text{Km1003} \cdot \text{Km1593}}}{\left(1 + \frac{[\text{ATP}]}{\text{KmATP}}\right) \cdot \left(1 + \frac{[\text{s\_1003}]}{\text{Km1003}}\right) \cdot \left(1 + \frac{[\text{s\_1593}]}{\text{Km1593}}\right) + \left(1 + \frac{[\text{AMP}]}{\text{KmAMP}}\right) \cdot \left(1 + \frac{[\text{s\_0633}]}{\text{Km0633}}\right) \cdot \left(1 + \frac{[\text{s\_0757}]}{\text{Km0757}}\right) - 1} \tag{277}$$

Table 556: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.012	dimensionless	☑
Vmax		0000324	0.375	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.232	dimensionless	☑
KmATP		0000322	2.525	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1003		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1593		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmAMP		0000323	0.293	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0633		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0757		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.139 Reaction r_0514

This is a reversible reaction of three reactants forming four products influenced by eight modifiers.

Name GMP synthase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{ATP} + \text{s\_0999} + \text{s\_1565} \xrightleftharpoons{\text{e\_0746, ATP, s\_0999, s\_1565, AMP, s\_0633, s\_0782, s\_0991}} \text{AMP} + \text{s\_0633} + \text{s\_0782} + \text{s\_0} \tag{278}$$

Reactants

Table 557: Properties of each reactant.

Id	Name	SBO
ATP	ATP	
s_0999	L-glutamine	
s_1565	xanthosine-5-phosphate	

Modifiers

Table 558: Properties of each modifier.

Id	Name	SBO
e_0746	GUA1	0000460
ATP	ATP	
s_0999	L-glutamine	
s_1565	xanthosine-5-phosphate	
AMP	AMP	
s_0633	diphosphate	
s_0782	GMP	
s_0991	L-glutamate	

Products

Table 559: Properties of each product.

Id	Name	SBO
AMP	AMP	
s_0633	diphosphate	
s_0782	GMP	
s_0991	L-glutamate	

Kinetic Law

Derived unit contains undeclared units

$$v_{139} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{ATP}] \cdot [\mathrm{s\_0999}] \cdot [\mathrm{s\_1565}] - \frac{[\mathrm{AMP}] \cdot [\mathrm{s\_0633}] \cdot [\mathrm{s\_0782}] \cdot [\mathrm{s\_0991}]}{\mathrm{Keq}} \right)}{\mathrm{KmATP} \cdot \mathrm{Km0999} \cdot \mathrm{Km1565}}}{\left(1 + \frac{[\mathrm{ATP}]}{\mathrm{KmATP}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0999}]}{\mathrm{Km0999}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1565}]}{\mathrm{Km1565}}\right) + \left(1 + \frac{[\mathrm{AMP}]}{\mathrm{KmAMP}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0633}]}{\mathrm{Km0633}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0782}]}{\mathrm{Km0782}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0991}]}{\mathrm{Km0991}}\right) -} \quad (279)$$

Table 560: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.002	dimensionless	☑
Vmax		0000324	0.098	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	0.023	$\mathrm{mmol \cdot l^{-1}}$	☑
KmATP		0000322	2.525	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0999		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

Id	Name	SBO	Value	Unit	Constant
Km1565		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmAMP		0000323	0.293	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0633		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0782		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0991		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.140 Reaction r_0525

This is a reversible reaction of one reactant forming three products influenced by five modifiers.

Name GTP cyclohydrolase II

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0785} \xrightleftharpoons{\mathrm{e\_0025,\ s\_0785,\ s\_0141,\ s\_0633,\ s\_0722}} \mathrm{s\_0141} + \mathrm{s\_0633} + \mathrm{s\_0722} \qquad (280)$$

Reactant

Table 561: Properties of each reactant.

Id	Name	SBO
s_0785	GTP	

Modifiers

Table 562: Properties of each modifier.

Id	Name	SBO
e_0025	RIB1	0000460
s_0785	GTP	
s_0141	2,5-diamino-4-hydroxy-6-(5-phosphoribosylamino)pyrimidine	
s_0633	diphosphate	
s_0722	formate	

Products

Table 563: Properties of each product.

Id	Name	SBO
s_0141	2,5-diamino-4-hydroxy-6-(5-phosphoribosylamino)pyrimidine	
s_0633	diphosphate	
s_0722	formate	

Kinetic Law

Derived unit contains undeclared units

$$v_{140} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0785}] - \frac{[\text{s\_0141}] \cdot [\text{s\_0633}] \cdot [\text{s\_0722}]}{\text{Keq}} \right)}{\text{Km0785}}}{1 + \frac{[\text{s\_0785}]}{\text{Km0785}} + \left(1 + \frac{[\text{s\_0141}]}{\text{Km0141}}\right) \cdot \left(1 + \frac{[\text{s\_0633}]}{\text{Km0633}}\right) \cdot \left(1 + \frac{[\text{s\_0722}]}{\text{Km0722}}\right) - 1} \quad (281)$$

Table 564: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$4.25595995293758 \cdot 10^{-5}$	dimensionless	☑
Vmax		0000324	$7.66072791528529 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.020	$\text{mmol}^2 \cdot \text{l}^{-2}$	☑
Km0785		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0141		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0633		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0722		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.141 Reaction r_0528

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name guanylate kinase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{ATP} + \text{s\_0782} \xrightleftharpoons{\text{e\_0234, ATP, s\_0782, ADP, s\_0739}} \text{ADP} + \text{s\_0739} \quad (282)$$

Reactants

Table 565: Properties of each reactant.

Id	Name	SBO
ATP	ATP	
s_0782	GMP	

Modifiers

Table 566: Properties of each modifier.

Id	Name	SBO
e_0234	GUK1	0000460
ATP	ATP	
s_0782	GMP	
ADP	ADP	
s_0739	GDP	

Products

Table 567: Properties of each product.

Id	Name	SBO
ADP	ADP	
s_0739	GDP	

Kinetic Law

Derived unit contains undeclared units

$$v_{141} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{ATP}] \cdot [\mathrm{s\_0782}] - \frac{[\mathrm{ADP}] \cdot [\mathrm{s\_0739}]}{\mathrm{Keq}} \right)}{\mathrm{KmATP} \cdot \mathrm{Km0782}}}{\left(1 + \frac{[\mathrm{ATP}]}{\mathrm{KmATP}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0782}]}{\mathrm{Km0782}}\right) + \left(1 + \frac{[\mathrm{ADP}]}{\mathrm{KmADP}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0739}]}{\mathrm{Km0739}}\right) - 1} \tag{283}$$

Table 568: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$7.2867193132727 \cdot 10^{-5}$	dimensionless	☑
Vmax		0000324	0.001	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Keq		0000281	1.015	dimensionless	☑
KmATP		0000322	2.525	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

Id	Name	SBO	Value	Unit	Constant
Km0782		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
KmADP		0000323	1.282	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0739		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.142 Reaction r_0529

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name guanylate kinase (GMP:dATP)

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0586} + \mathrm{s\_0782} \xrightleftharpoons{\mathrm{e\_0234},\ \mathrm{s\_0586},\ \mathrm{s\_0782},\ \mathrm{s\_0582},\ \mathrm{s\_0739}} \mathrm{s\_0582} + \mathrm{s\_0739} \qquad (284)$$

Reactants

Table 569: Properties of each reactant.

Id	Name	SBO
s_0586	dATP	
s_0782	GMP	

Modifiers

Table 570: Properties of each modifier.

Id	Name	SBO
e_0234	GUK1	0000460
s_0586	dATP	
s_0782	GMP	
s_0582	dADP	
s_0739	GDP	

Products

Table 571: Properties of each product.

Id	Name	SBO
s_0582	dADP	
s_0739	GDP	

Kinetic Law

Derived unit contains undeclared units

$$v_{142} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0586}] \cdot [\text{s\_0782}] - \frac{[\text{s\_0582}] \cdot [\text{s\_0739}]}{\text{Keq}} \right)}{\text{Km0586} \cdot \text{Km0782}}}{\left(1 + \frac{[\text{s\_0586}]}{\text{Km0586}}\right) \cdot \left(1 + \frac{[\text{s\_0782}]}{\text{Km0782}}\right) + \left(1 + \frac{[\text{s\_0582}]}{\text{Km0582}}\right) \cdot \left(1 + \frac{[\text{s\_0739}]}{\text{Km0739}}\right) - 1} \tag{285}$$

Table 572: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$7.28671814146884 \cdot 10^{-5}$	dimensionless	☑
Vmax		0000324	0.001	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0586		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0782		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0582		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0739		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.143 Reaction HXK

This is a reversible reaction of two reactants forming two products influenced by seven modifiers.

Name hexokinase (D-glucose:ATP)

SBO:0000176 biochemical reaction

Reaction equation

$$\text{ATP} + \text{GLC} \xrightleftharpoons{\text{e\_0106, e\_0325, e\_0355, GLC, ATP, G6P, ADP}} \text{ADP} + \text{G6P} \tag{286}$$

Reactants

Table 573: Properties of each reactant.

Id	Name	SBO
ATP	ATP	
GLC	D-glucose	

Modifiers

Table 574: Properties of each modifier.

Id	Name	SBO
e_0106	GLK1	0000460
e_0325	HXK1	0000460
e_0355	HXK2	0000460
GLC	D-glucose	
ATP	ATP	
G6P	D-glucose 6-phosphate	
ADP	ADP	

Products

Table 575: Properties of each product.

Id	Name	SBO
ADP	ADP	
G6P	D-glucose 6-phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{143} = \mathrm{vol}\,(\mathrm{cell}) \cdot \frac{\mathrm{Vmax} \cdot \left(\frac{[\mathrm{GLC}] \cdot [\mathrm{ATP}]}{\mathrm{Kglc} \cdot \mathrm{Katp}} - \frac{[\mathrm{G6P}] \cdot [\mathrm{ADP}]}{\mathrm{Kglc} \cdot \mathrm{Katp} \cdot \mathrm{Keq}} \right)}{\left(1 + \frac{[\mathrm{GLC}]}{\mathrm{Kglc}} + \frac{[\mathrm{G6P}]}{\mathrm{Kg6p}} \right) \cdot \left(1 + \frac{[\mathrm{ATP}]}{\mathrm{Katp}} + \frac{[\mathrm{ADP}]}{\mathrm{Kadp}} \right)} \tag{287}$$

Table 576: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
Vmax			3.945	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Kglc			0.080	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

Id	Name	SBO	Value	Unit	Constant
Katp			0.150	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Keq			2000.000	dimensionless	☑
Kg6p			30.000	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Kadp			0.230	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
FLUX_VALUE			1.489	dimensionless	☑

6.144 Reaction r_0536

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name histidinol dehydrogenase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_1010} + 2\,\mathrm{NAD} \xrightleftharpoons{\mathrm{e\_0103,\ s\_1010,\ NAD,\ s\_1006,\ NADH}} \mathrm{s\_1006} + 2\,\mathrm{NADH} \tag{288}$$

Reactants

Table 577: Properties of each reactant.

Id	Name	SBO
s_1010	L-histidinol	
NAD	NAD	

Modifiers

Table 578: Properties of each modifier.

Id	Name	SBO
e_0103	HIS4	0000460
s_1010	L-histidinol	
NAD	NAD	
s_1006	L-histidine	
NADH	NADH	

Products

Table 579: Properties of each product.

Id	Name	SBO
s_1006	L-histidine	
NADH	NADH	

Kinetic Law

Derived unit contains undeclared units

$$v_{144} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_1010}] \cdot [\text{NAD}]^2 - \frac{[\text{s\_1006}] \cdot [\text{NADH}]^2}{\text{Keq}} \right)}{\text{Km1010} \cdot \text{KmNAD}^2}}{\left(1 + \frac{[\text{s\_1010}]}{\text{Km1010}}\right) \cdot \left(1 + \frac{[\text{NAD}]}{\text{KmNAD}}\right)^2 + \left(1 + \frac{[\text{s\_1006}]}{\text{Km1006}}\right) \cdot \left(1 + \frac{[\text{NADH}]}{\text{KmNADH}}\right)^2 - 1} \quad (289)$$

Table 580: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.003	dimensionless	☑
Vmax		0000324	0.086	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.007	dimensionless	☑
Km1010		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmNAD		0000322	1.503	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1006		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmNADH		0000323	0.087	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.145 Reaction r_0537

This is a reversible reaction of one reactant forming two products influenced by four modifiers.

Name histidinol-phosphatase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_1011} \xrightleftharpoons{\text{e\_0320, s\_1011, s\_1010, PHO}} \text{s\_1010} + \text{PHO} \quad (290)$$

Reactant

Table 581: Properties of each reactant.

Id	Name	SBO
s_1011	L-histidinol phosphate	

Modifiers

Table 582: Properties of each modifier.

Id	Name	SBO
e_0320	HIS2	0000460
s_1011	L-histidinol phosphate	
s_1010	L-histidinol	
PHO	phosphate	

Products

Table 583: Properties of each product.

Id	Name	SBO
s_1010	L-histidinol	
PHO	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{145} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_1011}] - \frac{[\text{s\_1010}] \cdot [\text{PHO}]}{\text{Keq}} \right)}{\text{Km1011}}}{1 + \frac{[\text{s\_1011}]}{\text{Km1011}} + \left(1 + \frac{[\text{s\_1010}]}{\text{Km1010}}\right) \cdot \left(1 + \frac{[\text{PHO}]}{\text{KmPHO}}\right) - 1} \tag{291}$$

Table 584: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.003	dimensionless	☑
Vmax		0000324	0.029	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.200	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1011		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1010		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmPHO		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.146 Reaction r_0538

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name histidinol-phosphate transaminase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0207} + \text{s\_0991} \xrightleftharpoons{\text{e\_0476, s\_0207, s\_0991, s\_0180, s\_1011}} \text{s\_0180} + \text{s\_1011} \tag{292}$$

Reactants

Table 585: Properties of each reactant.

Id	Name	SBO
s_0207	3-(imidazol-4-yl)-2-oxopropyl dihydrogen phosphate	
s_0991	L-glutamate	

Modifiers

Table 586: Properties of each modifier.

Id	Name	SBO
e_0476	HIS5	0000460
s_0207	3-(imidazol-4-yl)-2-oxopropyl dihydrogen phosphate	
s_0991	L-glutamate	
s_0180	2-oxoglutarate	
s_1011	L-histidinol phosphate	

Products

Table 587: Properties of each product.

Id	Name	SBO
s_0180	2-oxoglutarate	
s_1011	L-histidinol phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{146} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0207}] \cdot [\text{s\_0991}] - \frac{[\text{s\_0180}] \cdot [\text{s\_1011}]}{\text{Keq}} \right)}{\text{Km0207} \cdot \text{Km0991}}}{\left(1 + \frac{[\text{s\_0207}]}{\text{Km0207}}\right) \cdot \left(1 + \frac{[\text{s\_0991}]}{\text{Km0991}}\right) + \left(1 + \frac{[\text{s\_0180}]}{\text{Km0180}}\right) \cdot \left(1 + \frac{[\text{s\_1011}]}{\text{Km1011}}\right) - 1} \tag{293}$$

Table 588: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.003	dimensionless	☑
Vmax		0000324	0.040	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0207		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0991		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0180		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1011		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.147 Reaction r_0539

This is a reversible reaction of three reactants forming three products influenced by seven modifiers.

Name histidyl-tRNA synthetase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{ATP} + \text{s\_1006} + \text{s\_1594} \xrightleftharpoons{\text{e\_0953, ATP, s\_1006, s\_1594, AMP, s\_0633, s\_0832}} \text{AMP} + \text{s\_0633} + \text{s\_0832} \tag{294}$$

Reactants

Table 589: Properties of each reactant.

Id	Name	SBO
ATP	ATP	
s_1006	L-histidine	
s_1594	tRNA(His)	

Modifiers

Table 590: Properties of each modifier.

Id	Name	SBO
e_0953	HTS1	0000460
ATP	ATP	
s_1006	L-histidine	
s_1594	tRNA(His)	
AMP	AMP	
s_0633	diphosphate	
s_0832	His-tRNA(His)	

Products

Table 591: Properties of each product.

Id	Name	SBO
AMP	AMP	
s_0633	diphosphate	
s_0832	His-tRNA(His)	

Kinetic Law

Derived unit contains undeclared units

$$v_{147} = \frac{\frac{\text{vol(cell)}\cdot\text{Vmax}\cdot\left([\text{ATP}]\cdot[\text{s\_1006}]\cdot[\text{s\_1594}]-\frac{[\text{AMP}]\cdot[\text{s\_0633}]\cdot[\text{s\_0832}]}{\text{Keq}}\right)}{\text{KmATP}\cdot\text{Km1006}\cdot\text{Km1594}}}{\left(1+\frac{[\text{ATP}]}{\text{KmATP}}\right)\cdot\left(1+\frac{[\text{s\_1006}]}{\text{Km1006}}\right)\cdot\left(1+\frac{[\text{s\_1594}]}{\text{Km1594}}\right)+\left(1+\frac{[\text{AMP}]}{\text{KmAMP}}\right)\cdot\left(1+\frac{[\text{s\_0633}]}{\text{Km0633}}\right)\cdot\left(1+\frac{[\text{s\_0832}]}{\text{Km0832}}\right)-1} \quad (295)$$

Table 592: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.003	dimensionless	☑
Vmax		0000324	0.086	$\text{mmol}\cdot\text{l}^{-1}\cdot\text{s}^{-1}$	☑
Keq		0000281	0.232	dimensionless	☑
KmATP		0000322	2.525	$\text{mmol}\cdot\text{l}^{-1}$	☑
Km1006		0000322	0.100	$\text{mmol}\cdot\text{l}^{-1}$	☑
Km1594		0000322	0.100	$\text{mmol}\cdot\text{l}^{-1}$	☑
KmAMP		0000323	0.293	$\text{mmol}\cdot\text{l}^{-1}$	☑
Km0633		0000323	0.100	$\text{mmol}\cdot\text{l}^{-1}$	☑
Km0832		0000323	0.100	$\text{mmol}\cdot\text{l}^{-1}$	☑

6.148 Reaction r_0542

This is a reversible reaction of one reactant forming one product influenced by three modifiers.

Name homoacontinate hydratase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0454} \xrightleftharpoons{\text{e\_0196, s\_0454, s\_0836}} \text{s\_0836} \tag{296}$$

Reactant

Table 593: Properties of each reactant.

Id	Name	SBO
s_0454	but-1-ene-1,2,4-tricarboxylic acid	

Modifiers

Table 594: Properties of each modifier.

Id	Name	SBO
e_0196	LYS4	0000460
s_0454	but-1-ene-1,2,4-tricarboxylic acid	
s_0836	homoisocitrate	

Product

Table 595: Properties of each product.

Id	Name	SBO
s_0836	homoisocitrate	

Kinetic Law

Derived unit contains undeclared units

$$v_{148} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0454}] - \frac{[\text{s\_0836}]}{\text{Keq}} \right)}{\text{Km0454}}}{1 + \frac{[\text{s\_0454}]}{\text{Km0454}} + 1 + \frac{[\text{s\_0836}]}{\text{Km0836}} - 1} \tag{297}$$

Table 596: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.012	dimensionless	☑
Vmax		0000324	0.074	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0454		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0836		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.149 Reaction r_0543

This is a reversible reaction of two reactants forming two products influenced by six modifiers.

Name homocitrate synthase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0180} + \mathrm{s\_0373} \xrightleftharpoons{\mathrm{e\_0154,\ e\_0146,\ s\_0180,\ s\_0373,\ s\_0529,\ s\_0835}} \mathrm{s\_0529} + \mathrm{s\_0835} \qquad (298)$$

Reactants

Table 597: Properties of each reactant.

Id	Name	SBO
s_0180	2-oxoglutarate	
s_0373	acetyl-CoA	

Modifiers

Table 598: Properties of each modifier.

Id	Name	SBO
e_0154	LYS20	0000460
e_0146	LYS21	0000460
s_0180	2-oxoglutarate	
s_0373	acetyl-CoA	
s_0529	coenzyme A	
s_0835	homocitrate	

Products

Table 599: Properties of each product.

Id	Name	SBO
s_0529	coenzyme A	
s_0835	homocitrate	

Kinetic Law

Derived unit contains undeclared units

$$v_{149} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0180}] \cdot [\text{s\_0373}] - \frac{[\text{s\_0529}] \cdot [\text{s\_0835}]}{\text{Keq}} \right)}{\text{Km0180} \cdot \text{Km0373}}}{\left(1 + \frac{[\text{s\_0180}]}{\text{Km0180}}\right) \cdot \left(1 + \frac{[\text{s\_0373}]}{\text{Km0373}}\right) + \left(1 + \frac{[\text{s\_0529}]}{\text{Km0529}}\right) \cdot \left(1 + \frac{[\text{s\_0835}]}{\text{Km0835}}\right) - 1} \tag{299}$$

Table 600: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.012	dimensionless	☑
Vmax		0000324	0.172	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0180		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0373		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0529		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0835		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.150 Reaction r_0545

This is a reversible reaction of two reactants forming three products influenced by six modifiers.

Name homoisocitrate dehydrogenase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0836} + \text{NAD} \xrightleftharpoons{\text{e\_0472, s\_0836, NAD, s\_0176, NADH, CO2}} \text{s\_0176} + \text{NADH} + \text{CO2} \tag{300}$$

Reactants

Table 601: Properties of each reactant.

Id	Name	SBO
s_0836	homoisocitrate	
NAD	NAD	

Modifiers

Table 602: Properties of each modifier.

Id	Name	SBO
e_0472	LYS12	0000460
s_0836	homoisocitrate	
NAD	NAD	
s_0176	2-oxoadipic acid	
NADH	NADH	
CO2	carbon dioxide	

Products

Table 603: Properties of each product.

Id	Name	SBO
s_0176	2-oxoadipic acid	
NADH	NADH	
CO2	carbon dioxide	

Kinetic Law

Derived unit contains undeclared units

$$v_{150} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0836}] \cdot [\mathrm{NAD}] - \frac{[\mathrm{s\_0176}] \cdot [\mathrm{NADH}] \cdot [\mathrm{CO2}]}{\mathrm{Keq}} \right)}{\mathrm{Km0836} \cdot \mathrm{KmNAD}}}{\left(1 + \frac{[\mathrm{s\_0836}]}{\mathrm{Km0836}}\right) \cdot \left(1 + \frac{[\mathrm{NAD}]}{\mathrm{KmNAD}}\right) + \left(1 + \frac{[\mathrm{s\_0176}]}{\mathrm{Km0176}}\right) \cdot \left(1 + \frac{[\mathrm{NADH}]}{\mathrm{KmNADH}}\right) \cdot \left(1 + \frac{[\mathrm{CO2}]}{\mathrm{KmCO2}}\right) - 1} \tag{301}$$

Table 604: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.012	dimensionless	☑

Id	Name	SBO	Value	Unit	Constant
Vmax		0000324	0.271	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	0.115	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0836		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmNAD		0000322	1.503	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0176		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmNADH		0000323	0.087	$\mathrm{mmol \cdot l^{-1}}$	☑
KmCO2		0000323	1.000	$\mathrm{mmol \cdot l^{-1}}$	☑

6.151 Reaction r_0547

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name homoserine dehydrogenase (NADP)

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0978} + \mathrm{s\_1212} \xrightleftharpoons{\mathrm{e\_0548,\ s\_0978,\ s\_1212,\ s\_1014,\ s\_1207}} \mathrm{s\_1014} + \mathrm{s\_1207} \qquad (302)$$

Reactants

Table 605: Properties of each reactant.

Id	Name	SBO
s_0978	L-aspartate 4-semialdehyde	
s_1212	NADPH	

Modifiers

Table 606: Properties of each modifier.

Id	Name	SBO
e_0548	HOM6	0000460
s_0978	L-aspartate 4-semialdehyde	
s_1212	NADPH	
s_1014	L-homoserine	
s_1207	NADP(+)	

Products

Table 607: Properties of each product.

Id	Name	SBO
s_1014	L-homoserine	
s_1207	NADP(+)	

Kinetic Law

Derived unit contains undeclared units

$$v_{151} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0978}] \cdot [\text{s\_1212}] - \frac{[\text{s\_1014}] \cdot [\text{s\_1207}]}{\text{Keq}} \right)}{\text{Km0978} \cdot \text{Km1212}}}{\left(1 + \frac{[\text{s\_0978}]}{\text{Km0978}}\right) \cdot \left(1 + \frac{[\text{s\_1212}]}{\text{Km1212}}\right) + \left(1 + \frac{[\text{s\_1014}]}{\text{Km1014}}\right) \cdot \left(1 + \frac{[\text{s\_1207}]}{\text{Km1207}}\right) - 1} \tag{303}$$

Table 608: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.036	dimensionless	☑
Vmax		0000324	0.502	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0978		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1212		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1014		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1207		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.152 Reaction r_0548

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name homoserine kinase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{ATP} + \text{s\_1014} \xrightleftharpoons{\text{e\_0428, ATP, s\_1014, ADP, s\_1238}} \text{ADP} + \text{s\_1238} \tag{304}$$

Reactants

Table 609: Properties of each reactant.

Id	Name	SBO
ATP	ATP	
s_1014	L-homoserine	

Modifiers

Table 610: Properties of each modifier.

Id	Name	SBO
e_0428	THR1	0000460
ATP	ATP	
s_1014	L-homoserine	
ADP	ADP	
s_1238	O-phospho-L-homoserine	

Products

Table 611: Properties of each product.

Id	Name	SBO
ADP	ADP	
s_1238	O-phospho-L-homoserine	

Kinetic Law

Derived unit contains undeclared units

$$v_{152} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{ATP}] \cdot [\mathrm{s\_1014}] - \frac{[\mathrm{ADP}] \cdot [\mathrm{s\_1238}]}{\mathrm{Keq}} \right)}{\mathrm{KmATP} \cdot \mathrm{Km1014}}}{\left(1 + \frac{[\mathrm{ATP}]}{\mathrm{KmATP}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1014}]}{\mathrm{Km1014}}\right) + \left(1 + \frac{[\mathrm{ADP}]}{\mathrm{KmADP}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1238}]}{\mathrm{Km1238}}\right) - 1} \tag{305}$$

Table 612: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.029	dimensionless	☑
Vmax		0000324	0.412	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	1.015	dimensionless	☑
KmATP		0000322	2.525	$\mathrm{mmol \cdot l^{-1}}$	☑

Id	Name	SBO	Value	Unit	Constant
Km1014		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmADP		0000323	1.282	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1238		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.153 Reaction r_0549

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name homoserine O-trans-acetylase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0373} + \mathrm{s\_1014} \xrightleftharpoons{\mathrm{e\_0799,\ s\_0373,\ s\_1014,\ s\_0529,\ s\_1233}} \mathrm{s\_0529} + \mathrm{s\_1233} \tag{306}$$

Reactants

Table 613: Properties of each reactant.

Id	Name	SBO
s_0373	acetyl-CoA	
s_1014	L-homoserine	

Modifiers

Table 614: Properties of each modifier.

Id	Name	SBO
e_0799	MET2	0000460
s_0373	acetyl-CoA	
s_1014	L-homoserine	
s_0529	coenzyme A	
s_1233	O-acetyl-L-homoserine	

Products

Table 615: Properties of each product.

Id	Name	SBO
s_0529	coenzyme A	
s_1233	O-acetyl-L-homoserine	

Kinetic Law

Derived unit contains undeclared units

$$v_{153} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0373}] \cdot [\text{s\_1014}] - \frac{[\text{s\_0529}] \cdot [\text{s\_1233}]}{\text{Keq}} \right)}{\text{Km0373} \cdot \text{Km1014}}}{\left(1 + \frac{[\text{s\_0373}]}{\text{Km0373}}\right) \cdot \left(1 + \frac{[\text{s\_1014}]}{\text{Km1014}}\right) + \left(1 + \frac{[\text{s\_0529}]}{\text{Km0529}}\right) \cdot \left(1 + \frac{[\text{s\_1233}]}{\text{Km1233}}\right) - 1} \tag{307}$$

Table 616: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.006	dimensionless	☑
Vmax		0000324	0.090	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0373		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1014		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0529		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1233		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.154 Reaction r_0553

This is a reversible reaction of one reactant forming two products influenced by five modifiers.

Name hydroxyacylglutathione hydrolase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0033} \xrightleftharpoons{\text{e\_0202, e\_0846, s\_0033, s\_0025, s\_0750}} \text{s\_0025} + \text{s\_0750} \tag{308}$$

Reactant

Table 617: Properties of each reactant.

Id	Name	SBO
s_0033	(R)-S-lactoylglutathione	

Modifiers

Table 618: Properties of each modifier.

Id	Name	SBO
e_0202	GLO2	0000460
e_0846	GLO4	0000460
s_0033	(R)-S-lactoylglutathione	
s_0025	(R)-lactate	
s_0750	glutathione	

Products

Table 619: Properties of each product.

Id	Name	SBO
s_0025	(R)-lactate	
s_0750	glutathione	

Kinetic Law

Derived unit contains undeclared units

$$v_{154} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0033}] - \frac{[\mathrm{s\_0025}] \cdot [\mathrm{s\_0750}]}{\mathrm{Keq}} \right)}{\mathrm{Km0033}}}{1 + \frac{[\mathrm{s\_0033}]}{\mathrm{Km0033}} + \left(1 + \frac{[\mathrm{s\_0025}]}{\mathrm{Km0025}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0750}]}{\mathrm{Km0750}}\right) - 1} \tag{309}$$

Table 620: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.165	dimensionless	☑
Vmax		0000324	1.647	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	0.200	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0033		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0025		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0750		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.155 Reaction r_0558

This is a reversible reaction of two reactants forming three products influenced by seven modifiers.

Name hydroxymethylglutaryl CoA reductase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0218} + 2\,\mathrm{s\_1212} \xrightleftharpoons{\mathrm{e\_0697},\ \mathrm{e\_0708},\ \mathrm{s\_0218},\ \mathrm{s\_1212},\ \mathrm{s\_0028},\ \mathrm{s\_0529},\ \mathrm{s\_1207}} \mathrm{s\_0028} + \mathrm{s\_0529} + 2\,\mathrm{s\_1207} \tag{310}$$

Reactants

Table 621: Properties of each reactant.

Id	Name	SBO
s_0218	3-hydroxy-3-methylglutaryl-CoA	
s_1212	NADPH	

Modifiers

Table 622: Properties of each modifier.

Id	Name	SBO
e_0697	HMG2	0000460
e_0708	HMG1	0000460
s_0218	3-hydroxy-3-methylglutaryl-CoA	
s_1212	NADPH	
s_0028	(R)-mevalonate	
s_0529	coenzyme A	
s_1207	NADP(+)	

Products

Table 623: Properties of each product.

Id	Name	SBO
s_0028	(R)-mevalonate	
s_0529	coenzyme A	

Id	Name	SBO
s_1207	NADP(+)	

Kinetic Law

Derived unit contains undeclared units

$$v_{155} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0218}] \cdot [\text{s\_1212}]^2 - \frac{[\text{s\_0028}] \cdot [\text{s\_0529}] \cdot [\text{s\_1207}]^2}{\text{Keq}} \right)}{\text{Km0218} \cdot \text{Km1212}^2}}{\left(1 + \frac{[\text{s\_0218}]}{\text{Km0218}}\right) \cdot \left(1 + \frac{[\text{s\_1212}]}{\text{Km1212}}\right)^2 + \left(1 + \frac{[\text{s\_0028}]}{\text{Km0028}}\right) \cdot \left(1 + \frac{[\text{s\_0529}]}{\text{Km0529}}\right) \cdot \left(1 + \frac{[\text{s\_1207}]}{\text{Km1207}}\right)^2 - 1} \tag{311}$$

Table 624: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.002	dimensionless	☑
Vmax		0000324	0.081	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.200	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0218		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1212		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0028		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0529		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1207		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.156 Reaction r_0559

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name hydroxymethylglutaryl CoA synthase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0367} + \text{s\_0373} \xrightleftharpoons{\text{e\_0716, s\_0367, s\_0373, s\_0218, s\_0529}} \text{s\_0218} + \text{s\_0529} \tag{312}$$

Reactants

Table 625: Properties of each reactant.

Id	Name	SBO
s_0367	acetoacetyl-CoA	
s_0373	acetyl-CoA	

Modifiers

Table 626: Properties of each modifier.

Id	Name	SBO
e_0716	ERG13	0000460
s_0367	acetoacetyl-CoA	
s_0373	acetyl-CoA	
s_0218	3-hydroxy-3-methylglutaryl-CoA	
s_0529	coenzyme A	

Products

Table 627: Properties of each product.

Id	Name	SBO
s_0218	3-hydroxy-3-methylglutaryl-CoA	
s_0529	coenzyme A	

Kinetic Law

Derived unit contains undeclared units

$$v_{156} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0367}] \cdot [\mathrm{s\_0373}] - \frac{[\mathrm{s\_0218}] \cdot [\mathrm{s\_0529}]}{\mathrm{Keq}} \right)}{\mathrm{Km0367} \cdot \mathrm{Km0373}}}{\left(1 + \frac{[\mathrm{s\_0367}]}{\mathrm{Km0367}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0373}]}{\mathrm{Km0373}}\right) + \left(1 + \frac{[\mathrm{s\_0218}]}{\mathrm{Km0218}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0529}]}{\mathrm{Km0529}}\right) - 1} \tag{313}$$

Table 628: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.002	dimensionless	☑
Vmax		0000324	0.025	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0367		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

Id	Name	SBO	Value	Unit	Constant
Km0373		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0218		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0529		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.157 Reaction r_0563

This is a reversible reaction of two reactants forming three products influenced by six modifiers.

Name Imidazole-glycerol-3-phosphate synthase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0312} + \mathrm{s\_0999} \xrightleftharpoons{\mathrm{e\_0087},\ \mathrm{s\_0312},\ \mathrm{s\_0999},\ \mathrm{s\_0403},\ \mathrm{s\_0550},\ \mathrm{s\_0991}} \mathrm{s\_0403} + \mathrm{s\_0550} + \mathrm{s\_0991} \tag{314}$$

Reactants

Table 629: Properties of each reactant.

Id	Name
s_0312	5-[(5-phospho-1-deoxy-D-ribulos-1-ylamino)methylideneamino]-1-(5-phospho-D-ribosyl)imidazole-4-c
s_0999	L-glutamine

Modifiers

Table 630: Properties of each modifier.

Id	Name
e_0087	HIS7
s_0312	5-[(5-phospho-1-deoxy-D-ribulos-1-ylamino)methylideneamino]-1-(5-phospho-D-ribosyl)imidazole-4-c
s_0999	L-glutamine
s_0403	AICAR
s_0550	D-erythro-1-(imidazol-4-yl)glycerol 3-phosphate
s_0991	L-glutamate

Products

Table 631: Properties of each product.

Id	Name	SBO
s_0403	AICAR	
s_0550	D-erythro-1-(imidazol-4-yl)glycerol 3-phosphate	
s_0991	L-glutamate	

Kinetic Law

Derived unit contains undeclared units

$$v_{157} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0312}] \cdot [\mathrm{s\_0999}] - \frac{[\mathrm{s\_0403}] \cdot [\mathrm{s\_0550}] \cdot [\mathrm{s\_0991}]}{\mathrm{Keq}} \right)}{\mathrm{Km0312} \cdot \mathrm{Km0999}}}{\left(1 + \frac{[\mathrm{s\_0312}]}{\mathrm{Km0312}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0999}]}{\mathrm{Km0999}}\right) + \left(1 + \frac{[\mathrm{s\_0403}]}{\mathrm{Km0403}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0550}]}{\mathrm{Km0550}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0991}]}{\mathrm{Km0991}}\right) - 1} \tag{315}$$

Table 632: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.003	dimensionless	☑
Vmax		0000324	0.063	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	0.200	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0312		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0999		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0403		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0550		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0991		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.158 Reaction r_0564

This is a reversible reaction of one reactant forming one product influenced by three modifiers.

Name imidazoleglycerol-phosphate dehydratase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0550} \xrightleftharpoons{\mathrm{e\_0875,\ s\_0550,\ s\_0207}} \mathrm{s\_0207} \tag{316}$$

Reactant

Table 633: Properties of each reactant.

Id	Name	SBO
s_0550	D-erythro-1-(imidazol-4-yl)glycerol 3-phosphate	

Modifiers

Table 634: Properties of each modifier.

Id	Name	SBO
e_0875	HIS3	0000460
s_0550	D-erythro-1-(imidazol-4-yl)glycerol 3-phosphate	
s_0207	3-(imidazol-4-yl)-2-oxopropyl dihydrogen phosphate	

Product

Table 635: Properties of each product.

Id	Name	SBO
s_0207	3-(imidazol-4-yl)-2-oxopropyl dihydrogen phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{158} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0550}] - \frac{[\mathrm{s\_0207}]}{\mathrm{Keq}} \right)}{\mathrm{Km0550}}}{1 + \frac{[\mathrm{s\_0550}]}{\mathrm{Km0550}} + 1 + \frac{[\mathrm{s\_0207}]}{\mathrm{Km0207}} - 1} \tag{317}$$

Table 636: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.003	dimensionless	☑
Vmax		0000324	0.017	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0550		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0207		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.159 Reaction r_0565

This is a reversible reaction of two reactants forming two products influenced by seven modifiers.

Name IMP dehydrogenase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0849} + \text{NAD} \xrightleftharpoons{\text{e\_0705, e\_0458, e\_0693, s\_0849, NAD, NADH, s\_1565}} \text{NADH} + \text{s\_1565} \tag{318}$$

Reactants

Table 637: Properties of each reactant.

Id	Name	SBO
s_0849	IMP	
NAD	NAD	

Modifiers

Table 638: Properties of each modifier.

Id	Name	SBO
e_0705	IMD4	0000460
e_0458	IMD2	0000460
e_0693	IMD3	0000460
s_0849	IMP	
NAD	NAD	
NADH	NADH	
s_1565	xanthosine-5-phosphate	

Products

Table 639: Properties of each product.

Id	Name	SBO
NADH	NADH	
s_1565	xanthosine-5-phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{159} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0849}] \cdot [\mathrm{NAD}] - \frac{[\mathrm{NADH}] \cdot [\mathrm{s\_1565}]}{\mathrm{Keq}} \right)}{\mathrm{Km0849} \cdot \mathrm{KmNAD}}}{\left(1 + \frac{[\mathrm{s\_0849}]}{\mathrm{Km0849}}\right) \cdot \left(1 + \frac{[\mathrm{NAD}]}{\mathrm{KmNAD}}\right) + \left(1 + \frac{[\mathrm{NADH}]}{\mathrm{KmNADH}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1565}]}{\mathrm{Km1565}}\right) - 1} \tag{319}$$

Table 640: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.002	dimensionless	☑
Vmax		0000324	0.030	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	0.115	dimensionless	☑
Km0849		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmNAD		0000322	1.503	$\mathrm{mmol \cdot l^{-1}}$	☑
KmNADH		0000323	0.087	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1565		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.160 Reaction r_0566

This is a reversible reaction of one reactant forming two products influenced by four modifiers.

Name indole-3-glycerol-phosphate synthase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0076} \xrightleftharpoons{\mathrm{e\_0591,\ s\_0076,\ s\_0086,\ CO2}} \mathrm{s\_0086} + \mathrm{CO2} \tag{320}$$

Reactant

Table 641: Properties of each reactant.

Id	Name	SBO
s_0076	1-(2-carboxyphenylamino)-1-deoxy-D-ribulose 5-phosphate	

Modifiers

Table 642: Properties of each modifier.

Id	Name	SBO
e_0591	TRP3	0000460
s_0076	1-(2-carboxyphenylamino)-1-deoxy-D-ribulose 5-phosphate	
s_0086	1-C-(indol-3-yl)glycerol 3-phosphate	
CO2	carbon dioxide	

Products

Table 643: Properties of each product.

Id	Name	SBO
s_0086	1-C-(indol-3-yl)glycerol 3-phosphate	
CO2	carbon dioxide	

Kinetic Law

Derived unit contains undeclared units

$$v_{160} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0076}] - \frac{[\mathrm{s\_0086}] \cdot [\mathrm{CO2}]}{\mathrm{Keq}} \right)}{\mathrm{Km0076}}}{1 + \frac{[\mathrm{s\_0076}]}{\mathrm{Km0076}} + \left(1 + \frac{[\mathrm{s\_0086}]}{\mathrm{Km0086}}\right) \cdot \left(1 + \frac{[\mathrm{CO2}]}{\mathrm{KmCO2}}\right) - 1} \tag{321}$$

Table 644: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.001	dimensionless	☑
Vmax		0000324	0.012	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	2.000	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0076		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0086		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmCO2		0000323	1.000	$\mathrm{mmol \cdot l^{-1}}$	☑

6.161 Reaction r_0568

This is a reversible reaction of one reactant forming one product influenced by four modifiers.

Name inorganic diphosphatase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0633} \xrightleftharpoons{\text{e\_0038, e\_0754, s\_0633, PHO}} 2\,\text{PHO} \tag{322}$$

Reactant

Table 645: Properties of each reactant.

Id	Name	SBO
s_0633	diphosphate	

Modifiers

Table 646: Properties of each modifier.

Id	Name	SBO
e_0038	IPP1	0000460
e_0754	PPA2	0000460
s_0633	diphosphate	
PHO	phosphate	

Product

Table 647: Properties of each product.

Id	Name	SBO
PHO	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{161} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0633}] - \frac{[\text{PHO}]^2}{\text{Keq}} \right)}{\text{Km0633}}}{1 + \frac{[\text{s\_0633}]}{\text{Km0633}} + \left(1 + \frac{[\text{PHO}]}{\text{KmPHO}}\right)^2 - 1} \tag{323}$$

Table 648: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.345	dimensionless	☑
Vmax		0000324	3.447	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Keq		0000281	0.200	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0633		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
KmPHO		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.162 Reaction r_0570

This is a reversible reaction of one reactant forming one product influenced by four modifiers.

Name inosine monophosphate cyclohydrolase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_1365} \xrightleftharpoons{\mathrm{e\_0631,\ e\_0736,\ s\_1365,\ s\_0849}} \mathrm{s\_0849} \tag{324}$$

Reactant

Table 649: Properties of each reactant.

Id	Name	SBO
s_1365	phosphoribosyl-formamido-carboxamide	

Modifiers

Table 650: Properties of each modifier.

Id	Name	SBO
e_0631	ADE16	0000460
e_0736	ADE17	0000460
s_1365	phosphoribosyl-formamido-carboxamide	
s_0849	IMP	

Product

Table 651: Properties of each product.

Id	Name	SBO
s_0849	IMP	

Kinetic Law

Derived unit contains undeclared units

$$v_{162} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_1365}] - \frac{[\text{s\_0849}]}{\text{Keq}} \right)}{\text{Km1365}}}{1 + \frac{[\text{s\_1365}]}{\text{Km1365}} + 1 + \frac{[\text{s\_0849}]}{\text{Km0849}} - 1} \tag{325}$$

Table 652: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.007	dimensionless	☑
Vmax		0000324	0.043	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km1365		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0849		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.163 Reaction r_0591

This is a reversible reaction of two reactants forming two products influenced by six modifiers.

Name IPC synthase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0089} + \text{s\_0478} \xrightleftharpoons{\text{e\_0557, e\_0220, s\_0089, s\_0478, s\_0619, s\_0897}} \text{s\_0619} + \text{s\_0897} \tag{326}$$

Reactants

Table 653: Properties of each reactant.

Id	Name	SBO
s_0089	1-phosphatidyl-1D-myo-inositol	
s_0478	ceramide-1 (C26)	

Modifiers

Table 654: Properties of each modifier.

Id	Name	SBO
e_0557	AUR1	0000460
e_0220	KEI1	0000460
s_0089	1-phosphatidyl-1D-myo-inositol	
s_0478	ceramide-1 (C26)	
s_0619	diglyceride	
s_0897	inositol-P-ceramide A (C26)	

Products

Table 655: Properties of each product.

Id	Name	SBO
s_0619	diglyceride	
s_0897	inositol-P-ceramide A (C26)	

Kinetic Law

Derived unit contains undeclared units

$$v_{163} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0089}] \cdot [\mathrm{s\_0478}] - \frac{[\mathrm{s\_0619}] \cdot [\mathrm{s\_0897}]}{\mathrm{Keq}} \right)}{\mathrm{Km0089} \cdot \mathrm{Km0478}}}{\left(1 + \frac{[\mathrm{s\_0089}]}{\mathrm{Km0089}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0478}]}{\mathrm{Km0478}}\right) + \left(1 + \frac{[\mathrm{s\_0619}]}{\mathrm{Km0619}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0897}]}{\mathrm{Km0897}}\right) - 1} \tag{327}$$

Table 656: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.22289676445616 \cdot 10^{-5}$	dimensionless	☑
Vmax		0000324	$3.11205547023725 \cdot 10^{-4}$	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0089		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0478		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0619		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0897		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.164 Reaction r_0658

This is a reversible reaction of two reactants forming three products influenced by seven modifiers.

Name isocitrate dehydrogenase (NAD+)

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0940} + \text{NAD} \xrightleftharpoons{\text{e\_0862, e\_0771, s\_0940, NAD, s\_0180, CO2, NADH}} \text{s\_0180} + \text{CO2} + \text{NADH} \quad (328)$$

Reactants

Table 657: Properties of each reactant.

Id	Name	SBO
s_0940	isocitrate	
NAD	NAD	

Modifiers

Table 658: Properties of each modifier.

Id	Name	SBO
e_0862	IDH2	0000460
e_0771	IDH1	0000460
s_0940	isocitrate	
NAD	NAD	
s_0180	2-oxoglutarate	
CO2	carbon dioxide	
NADH	NADH	

Products

Table 659: Properties of each product.

Id	Name	SBO
s_0180	2-oxoglutarate	
CO2	carbon dioxide	

Id	Name	SBO
NADH	NADH	

Kinetic Law

Derived unit contains undeclared units

$$v_{164} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0940}] \cdot [\mathrm{NAD}] - \frac{[\mathrm{s\_0180}] \cdot [\mathrm{CO2}] \cdot [\mathrm{NADH}]}{\mathrm{Keq}} \right)}{\mathrm{Km0940} \cdot \mathrm{KmNAD}}}{\left(1 + \frac{[\mathrm{s\_0940}]}{\mathrm{Km0940}}\right) \cdot \left(1 + \frac{[\mathrm{NAD}]}{\mathrm{KmNAD}}\right) + \left(1 + \frac{[\mathrm{s\_0180}]}{\mathrm{Km0180}}\right) \cdot \left(1 + \frac{[\mathrm{CO2}]}{\mathrm{KmCO2}}\right) \cdot \left(1 + \frac{[\mathrm{NADH}]}{\mathrm{KmNADH}}\right) - 1} \tag{329}$$

Table 660: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.022	dimensionless	☑
Vmax		0000324	0.482	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	0.115	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0940		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmNAD		0000322	1.503	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0180		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmCO2		0000323	1.000	$\mathrm{mmol \cdot l^{-1}}$	☑
KmNADH		0000323	0.087	$\mathrm{mmol \cdot l^{-1}}$	☑

6.165 Reaction r_0661

This is a reversible reaction of two reactants forming three products influenced by seven modifiers.

Name isocitrate dehydrogenase (NADP+), peroxisomal

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0940} + \mathrm{s\_1207} \xrightleftharpoons{\mathrm{e\_0769,\ e\_0135,\ s\_0940,\ s\_1207,\ s\_0180,\ CO2,\ s\_1212}} \mathrm{s\_0180} + \mathrm{CO2} + \mathrm{s\_1212} \tag{330}$$

Reactants

Table 661: Properties of each reactant.

Id	Name	SBO
s_0940	isocitrate	
s_1207	NADP(+)	

Modifiers

Table 662: Properties of each modifier.

Id	Name	SBO
e_0769	IDP3	0000460
e_0135	IDP1	0000460
s_0940	isocitrate	
s_1207	NADP(+)	
s_0180	2-oxoglutarate	
CO2	carbon dioxide	
s_1212	NADPH	

Products

Table 663: Properties of each product.

Id	Name	SBO
s_0180	2-oxoglutarate	
CO2	carbon dioxide	
s_1212	NADPH	

Kinetic Law

Derived unit contains undeclared units

$$v_{165} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0940}] \cdot [\mathrm{s\_1207}] - \frac{[\mathrm{s\_0180}] \cdot [\mathrm{CO2}] \cdot [\mathrm{s\_1212}]}{\mathrm{Keq}} \right)}{\mathrm{Km0940} \cdot \mathrm{Km1207}}}{\left(1 + \frac{[\mathrm{s\_0940}]}{\mathrm{Km0940}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1207}]}{\mathrm{Km1207}}\right) + \left(1 + \frac{[\mathrm{s\_0180}]}{\mathrm{Km0180}}\right) \cdot \left(1 + \frac{[\mathrm{CO2}]}{\mathrm{KmCO2}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1212}]}{\mathrm{Km1212}}\right) - 1} \tag{331}$$

Table 664: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.022	dimensionless	☑
Vmax		0000324	0.482	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	2.000	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0940		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1207		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0180		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmCO2		0000323	1.000	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1212		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.166 Reaction r_0662

This is a reversible reaction of one reactant forming two products influenced by four modifiers.

Name isocitrate lyase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0940} \xrightleftharpoons{\mathrm{e\_0289,\ s\_0940,\ s\_0779,\ s\_1458}} \mathrm{s\_0779} + \mathrm{s\_1458} \tag{332}$$

Reactant

Table 665: Properties of each reactant.

Id	Name	SBO
s_0940	isocitrate	

Modifiers

Table 666: Properties of each modifier.

Id	Name	SBO
e_0289	ICL1	0000460
s_0940	isocitrate	
s_0779	glyoxylate	
s_1458	succinate	

Products

Table 667: Properties of each product.

Id	Name	SBO
s_0779	glyoxylate	
s_1458	succinate	

Kinetic Law

Derived unit contains undeclared units

$$v_{166} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0940}] - \frac{[\mathrm{s\_0779}] \cdot [\mathrm{s\_1458}]}{\mathrm{Keq}} \right)}{\mathrm{Km0940}}}{1 + \frac{[\mathrm{s\_0940}]}{\mathrm{Km0940}} + \left(1 + \frac{[\mathrm{s\_0779}]}{\mathrm{Km0779}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1458}]}{\mathrm{Km1458}}\right) - 1} \tag{333}$$

Table 668: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.033	dimensionless	☑
Vmax		0000324	0.328	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	0.200	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0940		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0779		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1458		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.167 Reaction r_0663

This is a reversible reaction of two reactants forming two products influenced by six modifiers.

Name isoleucine transaminase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0056} + \mathrm{s\_0991} \xrightleftharpoons{\mathrm{e\_0550,\ e\_0457,\ s\_0056,\ s\_0991,\ s\_0180,\ s\_1016}} \mathrm{s\_0180} + \mathrm{s\_1016} \tag{334}$$

Reactants

Table 669: Properties of each reactant.

Id	Name	SBO
s_0056	(S)-3-methyl-2-oxopentanoate	
s_0991	L-glutamate	

Modifiers

Table 670: Properties of each modifier.

Id	Name	SBO
e_0550	BAT2	0000460
e_0457	BAT1	0000460
s_0056	(S)-3-methyl-2-oxopentanoate	
s_0991	L-glutamate	
s_0180	2-oxoglutarate	
s_1016	L-isoleucine	

Products

Table 671: Properties of each product.

Id	Name	SBO
s_0180	2-oxoglutarate	
s_1016	L-isoleucine	

Kinetic Law

Derived unit contains undeclared units

$$v_{167} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0056}] \cdot [\text{s\_0991}] - \frac{[\text{s\_0180}] \cdot [\text{s\_1016}]}{\text{Keq}} \right)}{\text{Km0056} \cdot \text{Km0991}}}{\left(1 + \frac{[\text{s\_0056}]}{\text{Km0056}}\right) \cdot \left(1 + \frac{[\text{s\_0991}]}{\text{Km0991}}\right) + \left(1 + \frac{[\text{s\_0180}]}{\text{Km0180}}\right) \cdot \left(1 + \frac{[\text{s\_1016}]}{\text{Km1016}}\right) - 1} \tag{335}$$

Table 672: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.008	dimensionless	☑
Vmax		0000324	0.116	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑

Id	Name	SBO	Value	Unit	Constant
Km0056		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0991		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0180		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1016		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.168 Reaction r_0665

This is a reversible reaction of three reactants forming three products influenced by seven modifiers.

Name isoleucyl-tRNA synthetase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{ATP} + \mathrm{s\_1016} + \mathrm{s\_1596} \xrightleftharpoons{\text{e\_0031, ATP, s\_1016, s\_1596, AMP, s\_0633, s\_0847}} \mathrm{AMP} + \mathrm{s\_0633} + \mathrm{s\_0847} \quad (336)$$

Reactants

Table 673: Properties of each reactant.

Id	Name	SBO
ATP	ATP	
s_1016	L-isoleucine	
s_1596	tRNA(Ile)	

Modifiers

Table 674: Properties of each modifier.

Id	Name	SBO
e_0031	ILS1	0000460
ATP	ATP	
s_1016	L-isoleucine	
s_1596	tRNA(Ile)	
AMP	AMP	
s_0633	diphosphate	
s_0847	Ile-tRNA(Ile)	

Products

Table 675: Properties of each product.

Id	Name	SBO
AMP	AMP	
s_0633	diphosphate	
s_0847	Ile-tRNA(Ile)	

Kinetic Law

Derived unit contains undeclared units

$$v_{168} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{ATP}] \cdot [\text{s\_1016}] \cdot [\text{s\_1596}] - \frac{[\text{AMP}] \cdot [\text{s\_0633}] \cdot [\text{s\_0847}]}{\text{Keq}} \right)}{\text{KmATP} \cdot \text{Km1016} \cdot \text{Km1596}}}{\left(1 + \frac{[\text{ATP}]}{\text{KmATP}}\right) \cdot \left(1 + \frac{[\text{s\_1016}]}{\text{Km1016}}\right) \cdot \left(1 + \frac{[\text{s\_1596}]}{\text{Km1596}}\right) + \left(1 + \frac{[\text{AMP}]}{\text{KmAMP}}\right) \cdot \left(1 + \frac{[\text{s\_0633}]}{\text{Km0633}}\right) \cdot \left(1 + \frac{[\text{s\_0847}]}{\text{Km0847}}\right) - 1} \tag{337}$$

Table 676: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.008	dimensionless	☑
Vmax		0000324	0.249	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.232	dimensionless	☑
KmATP		0000322	2.525	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1016		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1596		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmAMP		0000323	0.293	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0633		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0847		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.169 Reaction r_0667

This is a reversible reaction of one reactant forming one product influenced by three modifiers.

Name isopentenyl-diphosphate D-isomerase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0943} \xrightleftharpoons{\text{e\_0922, s\_0943, s\_1376}} \text{s\_1376} \tag{338}$$

Reactant

Table 677: Properties of each reactant.

Id	Name	SBO
s_0943	isopentenyl diphosphate	

Modifiers

Table 678: Properties of each modifier.

Id	Name	SBO
e_0922	IDI1	0000460
s_0943	isopentenyl diphosphate	
s_1376	prenyl diphosphate	

Product

Table 679: Properties of each product.

Id	Name	SBO
s_1376	prenyl diphosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{169} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0943}] - \frac{[\mathrm{s\_1376}]}{\mathrm{Keq}} \right)}{\mathrm{Km0943}}}{1 + \frac{[\mathrm{s\_0943}]}{\mathrm{Km0943}} + 1 + \frac{[\mathrm{s\_1376}]}{\mathrm{Km1376}} - 1} \tag{339}$$

Table 680: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$5.88956076077212 \cdot 10^{-4}$	dimensionless	☑
Vmax		0000324	0.004	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0943		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1376		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.170 Reaction r_0669

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name ketol-acid reductoisomerase (2-aceto-2-hydroxybutanoate)

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0039} + \text{s\_1212} \xrightleftharpoons{\text{e\_0685, s\_0039, s\_1212, s\_0008, s\_1207}} \text{s\_0008} + \text{s\_1207} \tag{340}$$

Reactants

Table 681: Properties of each reactant.

Id	Name	SBO
s_0039	(S)-2-acetyl-2-hydroxybutanoate	
s_1212	NADPH	

Modifiers

Table 682: Properties of each modifier.

Id	Name	SBO
e_0685	ILV5	0000460
s_0039	(S)-2-acetyl-2-hydroxybutanoate	
s_1212	NADPH	
s_0008	(2R,3R)-2,3-dihydroxy-3-methylpentanoate	
s_1207	NADP(+)	

Products

Table 683: Properties of each product.

Id	Name	SBO
s_0008	(2R,3R)-2,3-dihydroxy-3-methylpentanoate	
s_1207	NADP(+)	

Kinetic Law

Derived unit contains undeclared units

$$v_{170} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0039}] \cdot [\text{s\_1212}] - \frac{[\text{s\_0008}] \cdot [\text{s\_1207}]}{\text{Keq}} \right)}{\text{Km0039} \cdot \text{Km1212}}}{\left(1 + \frac{[\text{s\_0039}]}{\text{Km0039}}\right) \cdot \left(1 + \frac{[\text{s\_1212}]}{\text{Km1212}}\right) + \left(1 + \frac{[\text{s\_0008}]}{\text{Km0008}}\right) \cdot \left(1 + \frac{[\text{s\_1207}]}{\text{Km1207}}\right) - 1} \tag{341}$$

Table 684: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.008	dimensionless	☑
Vmax		0000324	0.116	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0039		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1212		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0008		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1207		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.171 Reaction r_0674

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name L-alanine transaminase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0991} + \text{PYR} \xrightleftharpoons{\text{e\_0642, s\_0991, PYR, s\_0180, s\_0955}} \text{s\_0180} + \text{s\_0955} \tag{342}$$

Reactants

Table 685: Properties of each reactant.

Id	Name	SBO
s_0991	L-glutamate	
PYR	pyruvate	

Modifiers

Table 686: Properties of each modifier.

Id	Name	SBO
e_0642	ALT1	0000460

Id	Name	SBO
s_0991	L-glutamate	
PYR	pyruvate	
s_0180	2-oxoglutarate	
s_0955	L-alanine	

Products

Table 687: Properties of each product.

Id	Name	SBO
s_0180	2-oxoglutarate	
s_0955	L-alanine	

Kinetic Law

Derived unit contains undeclared units

$$v_{171} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0991}] \cdot [\text{PYR}] - \frac{[\text{s\_0180}] \cdot [\text{s\_0955}]}{\text{Keq}} \right)}{\text{Km0991} \cdot \text{KmPYR}}}{\left(1 + \frac{[\text{s\_0991}]}{\text{Km0991}}\right) \cdot \left(1 + \frac{[\text{PYR}]}{\text{KmPYR}}\right) + \left(1 + \frac{[\text{s\_0180}]}{\text{Km0180}}\right) \cdot \left(1 + \frac{[\text{s\_0955}]}{\text{Km0955}}\right) - 1} \tag{343}$$

Table 688: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.053	dimensionless	☑
Vmax		0000324	0.736	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.110	dimensionless	☑
Km0991		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmPYR		0000322	1.815	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0180		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0955		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.172 Reaction r_0678

This is a reversible reaction of two reactants forming two products influenced by six modifiers.

Name L-aminoadipate-semialdehyde dehydrogenase (NADPH)

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0953} + \text{s\_1212} \xrightleftharpoons{\text{e\_0062, e\_0343, s\_0953, s\_1212, s\_0959, s\_1207}} \text{s\_0959} + \text{s\_1207} \qquad (344)$$

Reactants

Table 689: Properties of each reactant.

Id	Name	SBO
s_0953	L-2-aminoadipate	
s_1212	NADPH	

Modifiers

Table 690: Properties of each modifier.

Id	Name	SBO
e_0062	LYS2	0000460
e_0343	LYS5	0000460
s_0953	L-2-aminoadipate	
s_1212	NADPH	
s_0959	L-allysine	
s_1207	NADP(+)	

Products

Table 691: Properties of each product.

Id	Name	SBO
s_0959	L-allysine	
s_1207	NADP(+)	

Kinetic Law

Derived unit contains undeclared units

$$v_{172} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0953}] \cdot [\text{s\_1212}] - \frac{[\text{s\_0959}] \cdot [\text{s\_1207}]}{\text{Keq}} \right)}{\text{Km0953} \cdot \text{Km1212}}}{\left(1 + \frac{[\text{s\_0953}]}{\text{Km0953}}\right) \cdot \left(1 + \frac{[\text{s\_1212}]}{\text{Km1212}}\right) + \left(1 + \frac{[\text{s\_0959}]}{\text{Km0959}}\right) \cdot \left(1 + \frac{[\text{s\_1207}]}{\text{Km1207}}\right) - 1} \qquad (345)$$

Table 692: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.012	dimensionless	☑
Vmax		0000324	0.172	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0953		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1212		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0959		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1207		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.173 Reaction r_0688

This is a reversible reaction of two reactants forming two products influenced by six modifiers.

Name L-lactaldehyde:NADP+ 1-oxidoreductase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_1151} + \mathrm{s\_1212} \xrightleftharpoons{\mathrm{e\_0842,\ e\_0447,\ s\_1151,\ s\_1212,\ s\_0062,\ s\_1207}} \mathrm{s\_0062} + \mathrm{s\_1207} \qquad (346)$$

Reactants

Table 693: Properties of each reactant.

Id	Name	SBO
s_1151	methylglyoxal	
s_1212	NADPH	

Modifiers

Table 694: Properties of each modifier.

Id	Name	SBO
e_0842	GRE2	0000460
e_0447	GRE3	0000460
s_1151	methylglyoxal	
s_1212	NADPH	
s_0062	(S)-lactaldehyde	
s_1207	NADP(+)	

Products

Table 695: Properties of each product.

Id	Name	SBO
s_0062	(S)-lactaldehyde	
s_1207	NADP(+)	

Kinetic Law

Derived unit contains undeclared units

$$v_{173} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_1151}] \cdot [\text{s\_1212}] - \frac{[\text{s\_0062}] \cdot [\text{s\_1207}]}{\text{Keq}} \right)}{\text{Km1151} \cdot \text{Km1212}}}{\left(1 + \frac{[\text{s\_1151}]}{\text{Km1151}}\right) \cdot \left(1 + \frac{[\text{s\_1212}]}{\text{Km1212}}\right) + \left(1 + \frac{[\text{s\_0062}]}{\text{Km0062}}\right) \cdot \left(1 + \frac{[\text{s\_1207}]}{\text{Km1207}}\right) - 1} \tag{347}$$

Table 696: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.051	dimensionless	☑
Vmax		0000324	0.715	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km1151		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1212		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0062		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1207		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.174 Reaction r_0692

This is a reversible reaction of one reactant forming two products influenced by five modifiers.

Name L-threonine deaminase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_1045} \xrightleftharpoons{\text{e\_0109, e\_0295, s\_1045, s\_0178, s\_0419}} \text{s\_0178} + \text{s\_0419} \tag{348}$$

Reactant

Table 697: Properties of each reactant.

Id	Name	SBO
s_1045	L-threonine	

Modifiers

Table 698: Properties of each modifier.

Id	Name	SBO
e_0109	CHA1	0000460
e_0295	ILV1	0000460
s_1045	L-threonine	
s_0178	2-oxobutanoate	
s_0419	ammonium	

Products

Table 699: Properties of each product.

Id	Name	SBO
s_0178	2-oxobutanoate	
s_0419	ammonium	

Kinetic Law

Derived unit contains undeclared units

$$v_{174} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_1045}] - \frac{[\mathrm{s\_0178}] \cdot [\mathrm{s\_0419}]}{\mathrm{Keq}} \right)}{\mathrm{Km1045}}}{1 + \frac{[\mathrm{s\_1045}]}{\mathrm{Km1045}} + \left(1 + \frac{[\mathrm{s\_0178}]}{\mathrm{Km0178}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0419}]}{\mathrm{Km0419}}\right) - 1} \tag{349}$$

Table 700: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.004	dimensionless	☑
Vmax		0000324	0.040	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	0.200	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1045		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0178		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0419		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.175 Reaction r_0696

This is a reversible reaction of two reactants forming two products influenced by four modifiers.

Name lactaldehyde dehydrogenase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0062} + \text{NAD} \xrightleftharpoons{\text{s\_0062, NAD, s\_0063, NADH}} \text{s\_0063} + \text{NADH} \tag{350}$$

Reactants

Table 701: Properties of each reactant.

Id	Name	SBO
s_0062	(S)-lactaldehyde	
NAD	NAD	

Modifiers

Table 702: Properties of each modifier.

Id	Name	SBO
s_0062	(S)-lactaldehyde	
NAD	NAD	
s_0063	(S)-lactate	
NADH	NADH	

Products

Table 703: Properties of each product.

Id	Name	SBO
s_0063	(S)-lactate	
NADH	NADH	

Kinetic Law

Derived unit contains undeclared units

$$v_{175} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0062}] \cdot [\text{NAD}] - \frac{[\text{s\_0063}] \cdot [\text{NADH}]}{\text{Keq}} \right)}{\text{Km0062} \cdot \text{KmNAD}}}{\left(1 + \frac{[\text{s\_0062}]}{\text{Km0062}}\right) \cdot \left(1 + \frac{[\text{NAD}]}{\text{KmNAD}}\right) + \left(1 + \frac{[\text{s\_0063}]}{\text{Km0063}}\right) \cdot \left(1 + \frac{[\text{NADH}]}{\text{KmNADH}}\right) - 1} \tag{351}$$

Table 704: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.051	dimensionless	☑
Vmax		0000324	0.715	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.115	dimensionless	☑
Km0062		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmNAD		0000322	1.503	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0063		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmNADH		0000323	0.087	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.176 Reaction r_0697

This is a reversible reaction of two reactants forming one product influenced by four modifiers.

Name lactoylglutathione lyase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0750} + \text{s\_1151} \xrightleftharpoons{\text{e\_0698, s\_0750, s\_1151, s\_0033}} \text{s\_0033} \tag{352}$$

Reactants

Table 705: Properties of each reactant.

Id	Name	SBO
s_0750	glutathione	
s_1151	methylglyoxal	

Modifiers

Table 706: Properties of each modifier.

Id	Name	SBO
e_0698	GLO1	0000460

Id	Name	SBO
s_0750	glutathione	
s_1151	methylglyoxal	
s_0033	(R)-S-lactoylglutathione	

Product

Table 707: Properties of each product.

Id	Name	SBO
s_0033	(R)-S-lactoylglutathione	

Kinetic Law

Derived unit contains undeclared units

$$v_{176} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0750}] \cdot [\text{s\_1151}] - \frac{[\text{s\_0033}]}{\text{Keq}} \right)}{\text{Km0750} \cdot \text{Km1151}}}{\left(1 + \frac{[\text{s\_0750}]}{\text{Km0750}}\right) \cdot \left(1 + \frac{[\text{s\_1151}]}{\text{Km1151}}\right) + 1 + \frac{[\text{s\_0033}]}{\text{Km0033}} - 1} \tag{353}$$

Table 708: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.165	dimensionless	☑
Vmax		0000324	1.647	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	20.000	$\text{mmol}^{-1} \cdot \text{l}$	☑
Km0750		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1151		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0033		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.177 Reaction r_0698

This is a reversible reaction of one reactant forming one product influenced by three modifiers.

Name lanosterol synthase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0037} \xrightleftharpoons{\text{e\_0440, s\_0037, s\_1059}} \text{s\_1059} \tag{354}$$

Reactant

Table 709: Properties of each reactant.

Id	Name	SBO
s_0037	(S)-2,3-epoxysqualene	

Modifiers

Table 710: Properties of each modifier.

Id	Name	SBO
e_0440	ERG7	0000460
s_0037	(S)-2,3-epoxysqualene	
s_1059	lanosterol	

Product

Table 711: Properties of each product.

Id	Name	SBO
s_1059	lanosterol	

Kinetic Law

Derived unit contains undeclared units

$$v_{177} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0037}] - \frac{[\mathrm{s\_1059}]}{\mathrm{Keq}} \right)}{\mathrm{Km0037}}}{1 + \frac{[\mathrm{s\_0037}]}{\mathrm{Km0037}} + 1 + \frac{[\mathrm{s\_1059}]}{\mathrm{Km1059}} - 1} \tag{355}$$

Table 712: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.94478036673883 \cdot 10^{-4}$	dimensionless	☑
Vmax		0000324	0.002	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0037		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1059		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.178 Reaction r_0699

This is a reversible reaction of two reactants forming two products influenced by six modifiers.

Name leucine transaminase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0291} + \text{s\_0991} \xrightleftharpoons{\text{e\_0550, e\_0457, s\_0291, s\_0991, s\_0180, s\_1021}} \text{s\_0180} + \text{s\_1021} \qquad (356)$$

Reactants

Table 713: Properties of each reactant.

Id	Name	SBO
s_0291	4-methyl-2-oxopentanoate	
s_0991	L-glutamate	

Modifiers

Table 714: Properties of each modifier.

Id	Name	SBO
e_0550	BAT2	0000460
e_0457	BAT1	0000460
s_0291	4-methyl-2-oxopentanoate	
s_0991	L-glutamate	
s_0180	2-oxoglutarate	
s_1021	L-leucine	

Products

Table 715: Properties of each product.

Id	Name	SBO
s_0180	2-oxoglutarate	
s_1021	L-leucine	

Kinetic Law

Derived unit contains undeclared units

$$v_{178} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0291}] \cdot [\text{s\_0991}] - \frac{[\text{s\_0180}] \cdot [\text{s\_1021}]}{\text{Keq}} \right)}{\text{Km0291} \cdot \text{Km0991}}}{\left(1 + \frac{[\text{s\_0291}]}{\text{Km0291}}\right) \cdot \left(1 + \frac{[\text{s\_0991}]}{\text{Km0991}}\right) + \left(1 + \frac{[\text{s\_0180}]}{\text{Km0180}}\right) \cdot \left(1 + \frac{[\text{s\_1021}]}{\text{Km1021}}\right) - 1} \tag{357}$$

Table 716: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.013	dimensionless	☑
Vmax		0000324	0.178	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0291		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0991		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0180		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1021		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.179 Reaction r_0701

This is a reversible reaction of three reactants forming three products influenced by seven modifiers.

Name leucyl-tRNA synthetase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{ATP} + \text{s\_1021} + \text{s\_1598} \xrightleftharpoons{\text{e\_0926, ATP, s\_1021, s\_1598, AMP, s\_0633, s\_1077}} \text{AMP} + \text{s\_0633} + \text{s\_1077} \tag{358}$$

Reactants

Table 717: Properties of each reactant.

Id	Name	SBO
ATP	ATP	
s_1021	L-leucine	
s_1598	tRNA(Leu)	

Modifiers

Table 718: Properties of each modifier.

Id	Name	SBO
e_0926	CDC60	0000460
ATP	ATP	
s_1021	L-leucine	
s_1598	tRNA(Leu)	
AMP	AMP	
s_0633	diphosphate	
s_1077	Leu-tRNA(Leu)	

Products

Table 719: Properties of each product.

Id	Name	SBO
AMP	AMP	
s_0633	diphosphate	
s_1077	Leu-tRNA(Leu)	

Kinetic Law

Derived unit contains undeclared units

$$v_{179} = \frac{\frac{\text{vol(cell)}\cdot\text{Vmax}\cdot\left([\text{ATP}]\cdot[\text{s\_1021}]\cdot[\text{s\_1598}]-\frac{[\text{AMP}]\cdot[\text{s\_0633}]\cdot[\text{s\_1077}]}{\text{Keq}}\right)}{\text{KmATP}\cdot\text{Km1021}\cdot\text{Km1598}}}{\left(1+\frac{[\text{ATP}]}{\text{KmATP}}\right)\cdot\left(1+\frac{[\text{s\_1021}]}{\text{Km1021}}\right)\cdot\left(1+\frac{[\text{s\_1598}]}{\text{Km1598}}\right)+\left(1+\frac{[\text{AMP}]}{\text{KmAMP}}\right)\cdot\left(1+\frac{[\text{s\_0633}]}{\text{Km0633}}\right)\cdot\left(1+\frac{[\text{s\_1077}]}{\text{Km1077}}\right)-1} \tag{359}$$

Table 720: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.013	dimensionless	☑
Vmax		0000324	0.382	$\text{mmol}\cdot\text{l}^{-1}\cdot\text{s}^{-1}$	☑
Keq		0000281	0.232	dimensionless	☑
KmATP		0000322	2.525	$\text{mmol}\cdot\text{l}^{-1}$	☑
Km1021		0000322	0.100	$\text{mmol}\cdot\text{l}^{-1}$	☑
Km1598		0000322	0.100	$\text{mmol}\cdot\text{l}^{-1}$	☑
KmAMP		0000323	0.293	$\text{mmol}\cdot\text{l}^{-1}$	☑

Id	Name	SBO	Value	Unit	Constant
Km0633		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1077		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.180 Reaction r_0711

This is a reversible reaction of three reactants forming three products influenced by seven modifiers.

Name lysyl-tRNA synthetase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{ATP} + \mathrm{s\_1025} + \mathrm{s\_1600} \xrightleftharpoons{\text{e\_0171, ATP, s\_1025, s\_1600, AMP, s\_0633, s\_1099}} \mathrm{AMP} + \mathrm{s\_0633} + \mathrm{s\_1099} \quad (360)$$

Reactants

Table 721: Properties of each reactant.

Id	Name	SBO
ATP	ATP	
s_1025	L-lysine	
s_1600	tRNA(Lys)	

Modifiers

Table 722: Properties of each modifier.

Id	Name	SBO
e_0171	KRS1	0000460
ATP	ATP	
s_1025	L-lysine	
s_1600	tRNA(Lys)	
AMP	AMP	
s_0633	diphosphate	
s_1099	Lys-tRNA(Lys)	

Products

Table 723: Properties of each product.

Id	Name	SBO
AMP	AMP	
s_0633	diphosphate	
s_1099	Lys-tRNA(Lys)	

Kinetic Law

Derived unit contains undeclared units

$$v_{180} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{ATP}] \cdot [\mathrm{s\_1025}] \cdot [\mathrm{s\_1600}] - \frac{[\mathrm{AMP}] \cdot [\mathrm{s\_0633}] \cdot [\mathrm{s\_1099}]}{\mathrm{Keq}} \right)}{\mathrm{KmATP} \cdot \mathrm{Km1025} \cdot \mathrm{Km1600}}}{\left(1 + \frac{[\mathrm{ATP}]}{\mathrm{KmATP}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1025}]}{\mathrm{Km1025}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1600}]}{\mathrm{Km1600}}\right) + \left(1 + \frac{[\mathrm{AMP}]}{\mathrm{KmAMP}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0633}]}{\mathrm{Km0633}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1099}]}{\mathrm{Km1099}}\right) - 1} \tag{361}$$

Table 724: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.012	dimensionless	☑
Vmax		0000324	0.369	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	0.232	dimensionless	☑
KmATP		0000322	2.525	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1025		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1600		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmAMP		0000323	0.293	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0633		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1099		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.181 Reaction r_0713

This is a reversible reaction of two reactants forming two products influenced by seven modifiers.

Name malate dehydrogenase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0066} + \mathrm{NAD} \xrightleftharpoons{\mathrm{e\_0571,\ e\_0838,\ e\_0137,\ s\_0066,\ NAD,\ NADH,\ s\_1271}} \mathrm{NADH} + \mathrm{s\_1271} \tag{362}$$

Reactants

Table 725: Properties of each reactant.

Id	Name	SBO
s_0066	(S)-malate	
NAD	NAD	

Modifiers

Table 726: Properties of each modifier.

Id	Name	SBO
e_0571	MDH1	0000460
e_0838	MDH2	0000460
e_0137	MDH3	0000460
s_0066	(S)-malate	
NAD	NAD	
NADH	NADH	
s_1271	oxaloacetate	

Products

Table 727: Properties of each product.

Id	Name	SBO
NADH	NADH	
s_1271	oxaloacetate	

Kinetic Law

Derived unit contains undeclared units

$$v_{181} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0066}] \cdot [\mathrm{NAD}] - \frac{[\mathrm{NADH}] \cdot [\mathrm{s\_1271}]}{\mathrm{Keq}} \right)}{\mathrm{Km0066} \cdot \mathrm{KmNAD}}}{\left(1 + \frac{[\mathrm{s\_0066}]}{\mathrm{Km0066}}\right) \cdot \left(1 + \frac{[\mathrm{NAD}]}{\mathrm{KmNAD}}\right) + \left(1 + \frac{[\mathrm{NADH}]}{\mathrm{KmNADH}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1271}]}{\mathrm{Km1271}}\right) - 1} \tag{363}$$

Table 728: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.033	dimensionless	☑
Vmax		0000324	0.456	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	0.115	dimensionless	☑
Km0066		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmNAD		0000322	1.503	$\mathrm{mmol \cdot l^{-1}}$	☑
KmNADH		0000323	0.087	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1271		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.182 Reaction r_0722

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name mannose-1-phosphate guanylyltransferase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0573} + \mathrm{s\_0785} \xrightleftharpoons{\mathrm{e\_0134,\ s\_0573,\ s\_0785,\ s\_0633,\ s\_0743}} \mathrm{s\_0633} + \mathrm{s\_0743} \tag{364}$$

Reactants

Table 729: Properties of each reactant.

Id	Name	SBO
s_0573	D-mannose 1-phosphate	
s_0785	GTP	

Modifiers

Table 730: Properties of each modifier.

Id	Name	SBO
e_0134	PSA1	0000460
s_0573	D-mannose 1-phosphate	
s_0785	GTP	
s_0633	diphosphate	
s_0743	GDP-alpha-D-mannose	

Products

Table 731: Properties of each product.

Id	Name	SBO
s_0633	diphosphate	
s_0743	GDP-alpha-D-mannose	

Kinetic Law

Derived unit contains undeclared units

$$v_{182} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0573}] \cdot [\text{s\_0785}] - \frac{[\text{s\_0633}] \cdot [\text{s\_0743}]}{\text{Keq}} \right)}{\text{Km0573} \cdot \text{Km0785}}}{\left(1 + \frac{[\text{s\_0573}]}{\text{Km0573}}\right) \cdot \left(1 + \frac{[\text{s\_0785}]}{\text{Km0785}}\right) + \left(1 + \frac{[\text{s\_0633}]}{\text{Km0633}}\right) \cdot \left(1 + \frac{[\text{s\_0743}]}{\text{Km0743}}\right) - 1} \tag{365}$$

Table 732: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.035	dimensionless	☑
Vmax		0000324	0.486	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0573		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0785		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0633		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0743		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.183 Reaction r_0723

This is a reversible reaction of one reactant forming one product influenced by three modifiers.

Name mannose-6-phosphate isomerase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{F6P} \xrightleftharpoons{\text{e\_0269, F6P, s\_0574}} \text{s\_0574} \tag{366}$$

Reactant

Table 733: Properties of each reactant.

Id	Name	SBO
F6P	D-fructose 6-phosphate	

Modifiers

Table 734: Properties of each modifier.

Id	Name	SBO
e_0269	PMI40	0000460
F6P	D-fructose 6-phosphate	
s_0574	D-mannose 6-phosphate	

Product

Table 735: Properties of each product.

Id	Name	SBO
s_0574	D-mannose 6-phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{183} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{F6P}] - \frac{[\text{s\_0574}]}{\text{Keq}} \right)}{\text{KmF6P}}}{1 + \frac{[\text{F6P}]}{\text{KmF6P}} + 1 + \frac{[\text{s\_0574}]}{\text{Km0574}} - 1} \tag{367}$$

Table 736: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.035	dimensionless	☑
Vmax		0000324	0.208	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.320	dimensionless	☑
KmF6P		0000322	0.625	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0574		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.184 Reaction r_0724

This is a reversible reaction of one reactant forming one product influenced by four modifiers.

Name methenyltetrahydrifikate cyclohydrolase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0304} \xrightleftharpoons{\text{e\_0057, e\_0396, s\_0304, s\_0120}} \text{s\_0120} \tag{368}$$

Reactant

Table 737: Properties of each reactant.

Id	Name	SBO
s_0304	5,10-methenyl-THF	

Modifiers

Table 738: Properties of each modifier.

Id	Name	SBO
e_0057	MIS1	0000460
e_0396	ADE3	0000460
s_0304	5,10-methenyl-THF	
s_0120	10-formyl-THF	

Product

Table 739: Properties of each product.

Id	Name	SBO
s_0120	10-formyl-THF	

Kinetic Law

Derived unit contains undeclared units

$$v_{184} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0304}] - \frac{[\text{s\_0120}]}{\text{Keq}} \right)}{\text{Km0304}}}{1 + \frac{[\text{s\_0304}]}{\text{Km0304}} + 1 + \frac{[\text{s\_0120}]}{\text{Km0120}} - 1} \tag{369}$$

Table 740: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.011	dimensionless	☑
Vmax		0000324	0.066	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0304		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0120		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.185 Reaction r_0726

This is a reversible reaction of two reactants forming three products influenced by seven modifiers.

Name methionine adenosyltransferase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{ATP} + \mathrm{s\_1029} \xrightleftharpoons{\mathrm{e\_0239,\ e\_0658,\ ATP,\ s\_1029,\ s\_0633,\ PHO,\ s\_1416}} \mathrm{s\_0633} + \mathrm{PHO} + \mathrm{s\_1416} \tag{370}$$

Reactants

Table 741: Properties of each reactant.

Id	Name	SBO
ATP	ATP	
s_1029	L-methionine	

Modifiers

Table 742: Properties of each modifier.

Id	Name	SBO
e_0239	SAM2	0000460
e_0658	SAM1	0000460
ATP	ATP	
s_1029	L-methionine	
s_0633	diphosphate	
PHO	phosphate	

Id	Name	SBO
s_1416	S-adenosyl-L-methionine	

Products

Table 743: Properties of each product.

Id	Name	SBO
s_0633	diphosphate	
PHO	phosphate	
s_1416	S-adenosyl-L-methionine	

Kinetic Law

Derived unit contains undeclared units

$$v_{185} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{ATP}] \cdot [\text{s\_1029}] - \frac{[\text{s\_0633}] \cdot [\text{PHO}] \cdot [\text{s\_1416}]}{\text{Keq}} \right)}{\text{KmATP} \cdot \text{Km1029}}}{\left(1 + \frac{[\text{ATP}]}{\text{KmATP}}\right) \cdot \left(1 + \frac{[\text{s\_1029}]}{\text{Km1029}}\right) + \left(1 + \frac{[\text{s\_0633}]}{\text{Km0633}}\right) \cdot \left(1 + \frac{[\text{PHO}]}{\text{KmPHO}}\right) \cdot \left(1 + \frac{[\text{s\_1416}]}{\text{Km1416}}\right) - 1} \tag{371}$$

Table 744: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$6.61479358800954 \cdot 10^{-4}$	dimensionless	☑
Vmax		0000324	0.015	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.008	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmATP		0000322	2.525	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1029		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0633		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmPHO		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1416		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.186 Reaction r_0727

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name methionine synthase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0322} + \text{s\_1012} \xrightleftharpoons{\text{e\_0298, s\_0322, s\_1012, s\_1029, s\_1487}} \text{s\_1029} + \text{s\_1487} \tag{372}$$

Reactants

Table 745: Properties of each reactant.

Id	Name	SBO
s_0322	5-methyltetrahydrofolate	
s_1012	L-homocysteine	

Modifiers

Table 746: Properties of each modifier.

Id	Name	SBO
e_0298	MET6	0000460
s_0322	5-methyltetrahydrofolate	
s_1012	L-homocysteine	
s_1029	L-methionine	
s_1487	THF	

Products

Table 747: Properties of each product.

Id	Name	SBO
s_1029	L-methionine	
s_1487	THF	

Kinetic Law

Derived unit contains undeclared units

$$v_{186} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0322}] \cdot [\text{s\_1012}] - \frac{[\text{s\_1029}] \cdot [\text{s\_1487}]}{\text{Keq}} \right)}{\text{Km0322} \cdot \text{Km1012}}}{\left(1 + \frac{[\text{s\_0322}]}{\text{Km0322}}\right) \cdot \left(1 + \frac{[\text{s\_1012}]}{\text{Km1012}}\right) + \left(1 + \frac{[\text{s\_1029}]}{\text{Km1029}}\right) \cdot \left(1 + \frac{[\text{s\_1487}]}{\text{Km1487}}\right) - 1} \tag{373}$$

Table 748: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.003	dimensionless	☑
Vmax		0000324	0.040	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0322		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1012		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1029		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1487		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.187 Reaction r_0729

This is a reversible reaction of three reactants forming three products influenced by seven modifiers.

Name methionyl-tRNA synthetase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{ATP} + \mathrm{s\_1029} + \mathrm{s\_1602} \xrightleftharpoons{\text{e\_0409, ATP, s\_1029, s\_1602, AMP, s\_0633, s\_1148}} \mathrm{AMP} + \mathrm{s\_0633} + \mathrm{s\_1148} \quad (374)$$

Reactants

Table 749: Properties of each reactant.

Id	Name	SBO
ATP	ATP	
s_1029	L-methionine	
s_1602	tRNA(Met)	

Modifiers

Table 750: Properties of each modifier.

Id	Name	SBO
e_0409	MES1	0000460
ATP	ATP	
s_1029	L-methionine	

Id	Name	SBO
s_1602	tRNA(Met)	
AMP	AMP	
s_0633	diphosphate	
s_1148	Met-tRNA(Met)	

Products

Table 751: Properties of each product.

Id	Name	SBO
AMP	AMP	
s_0633	diphosphate	
s_1148	Met-tRNA(Met)	

Kinetic Law

Derived unit contains undeclared units

$$v_{187} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{ATP}] \cdot [\mathrm{s\_1029}] \cdot [\mathrm{s\_1602}] - \frac{[\mathrm{AMP}] \cdot [\mathrm{s\_0633}] \cdot [\mathrm{s\_1148}]}{\mathrm{Keq}} \right)}{\mathrm{KmATP} \cdot \mathrm{Km1029} \cdot \mathrm{Km1602}}}{\left(1 + \frac{[\mathrm{ATP}]}{\mathrm{KmATP}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1029}]}{\mathrm{Km1029}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1602}]}{\mathrm{Km1602}}\right) + \left(1 + \frac{[\mathrm{AMP}]}{\mathrm{KmAMP}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0633}]}{\mathrm{Km0633}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1148}]}{\mathrm{Km1148}}\right) - 1} \tag{375}$$

Table 752: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.002	dimensionless	☑
Vmax		0000324	0.065	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	0.232	dimensionless	☑
KmATP		0000322	2.525	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1029		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1602		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmAMP		0000323	0.293	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0633		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1148		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.188 Reaction r_0731

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name methylenetetrahydrofolate dehydrogenase (NAD)

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0304} + \text{NADH} \xrightleftharpoons{\text{e\_0610, s\_0304, NADH, s\_0306, NAD}} \text{s\_0306} + \text{NAD} \tag{376}$$

Reactants

Table 753: Properties of each reactant.

Id	Name	SBO
s_0304	5,10-methenyl-THF	
NADH	NADH	

Modifiers

Table 754: Properties of each modifier.

Id	Name	SBO
e_0610	MTD1	0000460
s_0304	5,10-methenyl-THF	
NADH	NADH	
s_0306	5,10-methylenetetrahydrofolate	
NAD	NAD	

Products

Table 755: Properties of each product.

Id	Name	SBO
s_0306	5,10-methylenetetrahydrofolate	
NAD	NAD	

Kinetic Law

Derived unit contains undeclared units

$$v_{188} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0304}] \cdot [\text{NADH}] - \frac{[\text{s\_0306}] \cdot [\text{NAD}]}{\text{Keq}} \right)}{\text{Km0304} \cdot \text{KmNADH}}}{\left(1 + \frac{[\text{s\_0304}]}{\text{Km0304}}\right) \cdot \left(1 + \frac{[\text{NADH}]}{\text{KmNADH}}\right) + \left(1 + \frac{[\text{s\_0306}]}{\text{Km0306}}\right) \cdot \left(1 + \frac{[\text{NAD}]}{\text{KmNAD}}\right) - 1} \tag{377}$$

Table 756: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$7.08627601042622 \cdot 10^{-12}$	dimensionless	☑
Vmax		0000324	$9.92078641462824 \cdot 10^{-11}$	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Keq		0000281	34.674	dimensionless	☑
Km0304		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
KmNADH		0000322	0.087	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0306		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
KmNAD		0000323	1.503	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.189 Reaction r_0732

This is a reversible reaction of two reactants forming two products influenced by six modifiers.

Name methylenetetrahydrofolate dehydrogenase (NADP)

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0306} + \mathrm{s\_1207} \xrightleftharpoons{\mathrm{e\_0396},\ \mathrm{e\_0057},\ \mathrm{s\_0306},\ \mathrm{s\_1207},\ \mathrm{s\_0304},\ \mathrm{s\_1212}} \mathrm{s\_0304} + \mathrm{s\_1212} \qquad (378)$$

Reactants

Table 757: Properties of each reactant.

Id	Name	SBO
s_0306	5,10-methylenetetrahydrofolate	
s_1207	NADP(+)	

Modifiers

Table 758: Properties of each modifier.

Id	Name	SBO
e_0396	ADE3	0000460
e_0057	MIS1	0000460
s_0306	5,10-methylenetetrahydrofolate	
s_1207	NADP(+)	
s_0304	5,10-methenyl-THF	
s_1212	NADPH	

Products

Table 759: Properties of each product.

Id	Name	SBO
s_0304	5,10-methenyl-THF	
s_1212	NADPH	

Kinetic Law

Derived unit contains undeclared units

$$v_{189} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0306}] \cdot [\text{s\_1207}] - \frac{[\text{s\_0304}] \cdot [\text{s\_1212}]}{\text{Keq}} \right)}{\text{Km0306} \cdot \text{Km1207}}}{\left(1 + \frac{[\text{s\_0306}]}{\text{Km0306}}\right) \cdot \left(1 + \frac{[\text{s\_1207}]}{\text{Km1207}}\right) + \left(1 + \frac{[\text{s\_0304}]}{\text{Km0304}}\right) \cdot \left(1 + \frac{[\text{s\_1212}]}{\text{Km1212}}\right) - 1} \tag{379}$$

Table 760: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.011	dimensionless	☑
Vmax		0000324	0.153	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0306		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1207		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0304		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1212		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.190 Reaction r_0735

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name mevalonate kinase (atp)

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0028} + \text{ATP} \xrightleftharpoons{\text{e\_0745, s\_0028, ATP, s\_0019, ADP}} \text{s\_0019} + \text{ADP} \tag{380}$$

Reactants

Table 761: Properties of each reactant.

Id	Name	SBO
s_0028	(R)-mevalonate	
ATP	ATP	

Modifiers

Table 762: Properties of each modifier.

Id	Name	SBO
e_0745	ERG12	0000460
s_0028	(R)-mevalonate	
ATP	ATP	
s_0019	(R)-5-phosphomevalonic acid	
ADP	ADP	

Products

Table 763: Properties of each product.

Id	Name	SBO
s_0019	(R)-5-phosphomevalonic acid	
ADP	ADP	

Kinetic Law

Derived unit contains undeclared units

$$v_{190} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0028}] \cdot [\text{ATP}] - \frac{[\text{s\_0019}] \cdot [\text{ADP}]}{\text{Keq}} \right)}{\text{Km0028} \cdot \text{KmATP}}}{\left(1 + \frac{[\text{s\_0028}]}{\text{Km0028}}\right) \cdot \left(1 + \frac{[\text{ATP}]}{\text{KmATP}}\right) + \left(1 + \frac{[\text{s\_0019}]}{\text{Km0019}}\right) \cdot \left(1 + \frac{[\text{ADP}]}{\text{KmADP}}\right) - 1} \tag{381}$$

Table 764: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.44184282113713 \cdot 10^{-6}$	dimensionless	☑
Vmax		0000324	$2.01857994959905 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	1.015	dimensionless	☑
Km0028		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

Id	Name	SBO	Value	Unit	Constant
KmATP		0000322	2.525	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0019		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
KmADP		0000323	1.282	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.191 Reaction r_0736

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name mevalonate kinase (ctp)

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0028} + \mathrm{s\_0539} \xrightleftharpoons{\mathrm{e\_0745},\ \mathrm{s\_0028},\ \mathrm{s\_0539},\ \mathrm{s\_0019},\ \mathrm{s\_0467}} \mathrm{s\_0019} + \mathrm{s\_0467} \qquad (382)$$

Reactants

Table 765: Properties of each reactant.

Id	Name	SBO
s_0028	(R)-mevalonate	
s_0539	CTP	

Modifiers

Table 766: Properties of each modifier.

Id	Name	SBO
e_0745	ERG12	0000460
s_0028	(R)-mevalonate	
s_0539	CTP	
s_0019	(R)-5-phosphomevalonic acid	
s_0467	CDP	

Products

Table 767: Properties of each product.

Id	Name	SBO
s_0019	(R)-5-phosphomevalonic acid	
s_0467	CDP	

Kinetic Law

Derived unit contains undeclared units

$$v_{191} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0028}] \cdot [\text{s\_0539}] - \frac{[\text{s\_0019}] \cdot [\text{s\_0467}]}{\text{Keq}} \right)}{\text{Km0028} \cdot \text{Km0539}}}{\left(1 + \frac{[\text{s\_0028}]}{\text{Km0028}}\right) \cdot \left(1 + \frac{[\text{s\_0539}]}{\text{Km0539}}\right) + \left(1 + \frac{[\text{s\_0019}]}{\text{Km0019}}\right) \cdot \left(1 + \frac{[\text{s\_0467}]}{\text{Km0467}}\right) - 1} \tag{383}$$

Table 768: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.002	dimensionless	☑
Vmax		0000324	0.025	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0028		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0539		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0019		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0467		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.192 Reaction r_0739

This is a reversible reaction of two reactants forming four products influenced by seven modifiers.

Name mevalonate pyrophoshate decarboxylase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0018} + \text{ATP} \xrightleftharpoons{\text{e\_0812, s\_0018, ATP, ADP, CO2, s\_0943, PHO}} \text{ADP} + \text{CO2} + \text{s\_0943} + \text{PHO} \tag{384}$$

Reactants

Table 769: Properties of each reactant.

Id	Name	SBO
s_0018	(R)-5-diphosphomevalonic acid	
ATP	ATP	

Modifiers

Table 770: Properties of each modifier.

Id	Name	SBO
e_0812	MVD1	0000460
s_0018	(R)-5-diphosphomevalonic acid	
ATP	ATP	
ADP	ADP	
CO2	carbon dioxide	
s_0943	isopentenyl diphosphate	
PHO	phosphate	

Products

Table 771: Properties of each product.

Id	Name	SBO
ADP	ADP	
CO2	carbon dioxide	
s_0943	isopentenyl diphosphate	
PHO	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{192} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0018}] \cdot [\mathrm{ATP}] - \frac{[\mathrm{ADP}] \cdot [\mathrm{CO2}] \cdot [\mathrm{s\_0943}] \cdot [\mathrm{PHO}]}{\mathrm{Keq}} \right)}{\mathrm{Km0018} \cdot \mathrm{KmATP}}}{\left(1 + \frac{[\mathrm{s\_0018}]}{\mathrm{Km0018}}\right) \cdot \left(1 + \frac{[\mathrm{ATP}]}{\mathrm{KmATP}}\right) + \left(1 + \frac{[\mathrm{ADP}]}{\mathrm{KmADP}}\right) \cdot \left(1 + \frac{[\mathrm{CO2}]}{\mathrm{KmCO2}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0943}]}{\mathrm{Km0943}}\right) \cdot \left(1 + \frac{[\mathrm{PHO}]}{\mathrm{KmPHO}}\right) - 1} \tag{385}$$

Table 772: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.002	dimensionless	☑
Vmax		0000324	0.067	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	0.102	$\mathrm{mmol^2 \cdot l^{-2}}$	☑
Km0018		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmATP		0000322	2.525	$\mathrm{mmol \cdot l^{-1}}$	☑
KmADP		0000323	1.282	$\mathrm{mmol \cdot l^{-1}}$	☑
KmCO2		0000323	1.000	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0943		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmPHO		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.193 Reaction r_0757

This is a reversible reaction of one reactant forming two products influenced by five modifiers.

Name myo-inositol 1-phosphatase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0126} \xrightleftharpoons{\mathrm{e\_0204,\ e\_0435,\ s\_0126,\ s\_1153,\ PHO}} \mathrm{s\_1153} + \mathrm{PHO} \tag{386}$$

Reactant

Table 773: Properties of each reactant.

Id	Name	SBO
s_0126	1D-myo-inositol 1-phosphate	

Modifiers

Table 774: Properties of each modifier.

Id	Name	SBO
e_0204	INM2	0000460
e_0435	INM1	0000460
s_0126	1D-myo-inositol 1-phosphate	
s_1153	myo-inositol	
PHO	phosphate	

Products

Table 775: Properties of each product.

Id	Name	SBO
s_1153	myo-inositol	
PHO	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{193} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0126}] - \frac{[\text{s\_1153}] \cdot [\text{PHO}]}{\text{Keq}} \right)}{\text{Km0126}}}{1 + \frac{[\text{s\_0126}]}{\text{Km0126}} + \left(1 + \frac{[\text{s\_1153}]}{\text{Km1153}}\right) \cdot \left(1 + \frac{[\text{PHO}]}{\text{KmPHO}}\right) - 1} \tag{387}$$

Table 776: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$9.028139427404 \cdot 10^{-5}$	dimensionless	☑
Vmax		0000324	$9.028139427408 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.200	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0126		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1153		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmPHO		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.194 Reaction r_0758

This is a reversible reaction of one reactant forming one product influenced by three modifiers.

Name myo-inositol-1-phosphate synthase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{G6P} \xrightleftharpoons{\text{e\_0512, G6P, s\_0126}} \text{s\_0126} \tag{388}$$

Reactant

Table 777: Properties of each reactant.

Id	Name	SBO
G6P	D-glucose 6-phosphate	

Modifiers

Table 778: Properties of each modifier.

Id	Name	SBO
e_0512	INO1	0000460
G6P	D-glucose 6-phosphate	
s_0126	1D-myo-inositol 1-phosphate	

Product

Table 779: Properties of each product.

Id	Name	SBO
s_0126	1D-myo-inositol 1-phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{194} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{G6P}] - \frac{[\text{s\_0126}]}{\text{Keq}} \right)}{\text{KmG6P}}}{1 + \frac{[\text{G6P}]}{\text{KmG6P}} + 1 + \frac{[\text{s\_0126}]}{\text{Km0126}} - 1} \tag{389}$$

Table 780: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$9.02813775553284 \cdot 10^{-5}$	dimensionless	☑
Vmax		0000324	$5.4168826533146 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.075	dimensionless	☑
KmG6P		0000322	2.675	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0126		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.195 Reaction r_0759

This is a reversible reaction of two reactants forming three products influenced by six modifiers.

Name N-acetyl-g-glutamyl-phosphate reductase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_1191} + \text{s\_1212} \xrightleftharpoons{\text{e\_0290, s\_1191, s\_1212, s\_0145, s\_1207, PHO}} \text{s\_0145} + \text{s\_1207} + \text{PHO} \tag{390}$$

Reactants

Table 781: Properties of each reactant.

Id	Name	SBO
s_1191	N-acetyl-L-gamma-glutamyl phosphate	
s_1212	NADPH	

Modifiers

Table 782: Properties of each modifier.

Id	Name	SBO
e_0290	ARG5,6	0000460
s_1191	N-acetyl-L-gamma-glutamyl phosphate	
s_1212	NADPH	
s_0145	2-acetamido-5-oxopentanoate	
s_1207	NADP(+)	
PHO	phosphate	

Products

Table 783: Properties of each product.

Id	Name	SBO
s_0145	2-acetamido-5-oxopentanoate	
s_1207	NADP(+)	
PHO	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{195} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_1191}] \cdot [\mathrm{s\_1212}] - \frac{[\mathrm{s\_0145}] \cdot [\mathrm{s\_1207}] \cdot [\mathrm{PHO}]}{\mathrm{Keq}} \right)}{\mathrm{Km1191} \cdot \mathrm{Km1212}}}{\left(1 + \frac{[\mathrm{s\_1191}]}{\mathrm{Km1191}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1212}]}{\mathrm{Km1212}}\right) + \left(1 + \frac{[\mathrm{s\_0145}]}{\mathrm{Km0145}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1207}]}{\mathrm{Km1207}}\right) \cdot \left(1 + \frac{[\mathrm{PHO}]}{\mathrm{KmPHO}}\right) - 1} \tag{391}$$

Table 784: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.007	dimensionless	☑
Vmax		0000324	0.152	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	0.200	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1191		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1212		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0145		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1207		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmPHO		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.196 Reaction r_0792

This is a reversible reaction of one reactant forming two products influenced by four modifiers.

Name nucleoside diphosphatase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0467} \xrightleftharpoons{\mathrm{e\_0271,\ s\_0467,\ s\_0526,\ PHO}} \mathrm{s\_0526} + \mathrm{PHO} \tag{392}$$

Reactant

Table 785: Properties of each reactant.

Id	Name	SBO
s_0467	CDP	

Modifiers

Table 786: Properties of each modifier.

Id	Name	SBO
e_0271	YND1	0000460
s_0467	CDP	
s_0526	CMP	
PHO	phosphate	

Products

Table 787: Properties of each product.

Id	Name	SBO
s_0526	CMP	
PHO	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{196} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0467}] - \frac{[\text{s\_0526}] \cdot [\text{PHO}]}{\text{Keq}} \right)}{\text{Km0467}}}{1 + \frac{[\text{s\_0467}]}{\text{Km0467}} + \left(1 + \frac{[\text{s\_0526}]}{\text{Km0526}}\right) \cdot \left(1 + \frac{[\text{PHO}]}{\text{KmPHO}}\right) - 1} \tag{393}$$

Table 788: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.002	dimensionless	☑
Vmax		0000324	0.017	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.200	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0467		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0526		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmPHO		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.197 Reaction r_0800

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name nucleoside diphosphate kinase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{ATP} + \mathrm{s\_0739} \xrightleftharpoons{\mathrm{e\_0568,\ ATP,\ s\_0739,\ ADP,\ s\_0785}} \mathrm{ADP} + \mathrm{s\_0785} \tag{394}$$

Reactants

Table 789: Properties of each reactant.

Id	Name	SBO
ATP	ATP	
s_0739	GDP	

Modifiers

Table 790: Properties of each modifier.

Id	Name	SBO
e_0568	YNK1	0000460
ATP	ATP	
s_0739	GDP	
ADP	ADP	
s_0785	GTP	

Products

Table 791: Properties of each product.

Id	Name	SBO
ADP	ADP	
s_0785	GTP	

Kinetic Law

Derived unit contains undeclared units

$$v_{197} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{ATP}] \cdot [\mathrm{s\_0739}] - \frac{[\mathrm{ADP}] \cdot [\mathrm{s\_0785}]}{\mathrm{Keq}} \right)}{\mathrm{KmATP} \cdot \mathrm{Km0739}}}{\left(1 + \frac{[\mathrm{ATP}]}{\mathrm{KmATP}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0739}]}{\mathrm{Km0739}}\right) + \left(1 + \frac{[\mathrm{ADP}]}{\mathrm{KmADP}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0785}]}{\mathrm{Km0785}}\right) - 1} \tag{395}$$

Table 792: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.229	dimensionless	☑
Vmax		0000324	3.209	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Keq		0000281	1.015	dimensionless	☑
KmATP		0000322	2.525	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0739		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
KmADP		0000323	1.282	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0785		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.198 Reaction r_0811

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name nucleoside-diphosphate kinase (ATP:UDP)

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{ATP} + \mathrm{s\_1538} \xrightleftharpoons{\mathrm{e\_0568},\ \mathrm{ATP},\ \mathrm{s\_1538},\ \mathrm{ADP},\ \mathrm{s\_1559}} \mathrm{ADP} + \mathrm{s\_1559} \tag{396}$$

Reactants

Table 793: Properties of each reactant.

Id	Name	SBO
ATP	ATP	
s_1538	UDP	

Modifiers

Table 794: Properties of each modifier.

Id	Name	SBO
e_0568	YNK1	0000460
ATP	ATP	
s_1538	UDP	
ADP	ADP	
s_1559	UTP	

Products

Table 795: Properties of each product.

Id	Name	SBO
ADP	ADP	
s_1559	UTP	

Kinetic Law

Derived unit contains undeclared units

$$v_{198} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{ATP}] \cdot [\text{s\_1538}] - \frac{[\text{ADP}] \cdot [\text{s\_1559}]}{\text{Keq}} \right)}{\text{KmATP} \cdot \text{Km1538}}}{\left(1 + \frac{[\text{ATP}]}{\text{KmATP}}\right) \cdot \left(1 + \frac{[\text{s\_1538}]}{\text{Km1538}}\right) + \left(1 + \frac{[\text{ADP}]}{\text{KmADP}}\right) \cdot \left(1 + \frac{[\text{s\_1559}]}{\text{Km1559}}\right) - 1} \tag{397}$$

Table 796: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.123	dimensionless	☑
Vmax		0000324	1.723	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	1.015	dimensionless	☑
KmATP		0000322	2.525	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1538		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmADP		0000323	1.282	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1559		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.199 Reaction r_0813

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name O-acetylhomoserine (thiol)-lyase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0841} + \text{s\_1233} \xrightleftharpoons{\text{e\_0674, s\_0841, s\_1233, s\_0362, s\_1012}} \text{s\_0362} + \text{s\_1012} \tag{398}$$

Reactants

Table 797: Properties of each reactant.

Id	Name	SBO
s_0841	hydrogen sulfide	
s_1233	O-acetyl-L-homoserine	

Modifiers

Table 798: Properties of each modifier.

Id	Name	SBO
e_0674	MET17	0000460
s_0841	hydrogen sulfide	
s_1233	O-acetyl-L-homoserine	
s_0362	acetate	
s_1012	L-homocysteine	

Products

Table 799: Properties of each product.

Id	Name	SBO
s_0362	acetate	
s_1012	L-homocysteine	

Kinetic Law

Derived unit contains undeclared units

$$v_{199} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0841}] \cdot [\mathrm{s\_1233}] - \frac{[\mathrm{s\_0362}] \cdot [\mathrm{s\_1012}]}{\mathrm{Keq}} \right)}{\mathrm{Km0841} \cdot \mathrm{Km1233}}}{\left(1 + \frac{[\mathrm{s\_0841}]}{\mathrm{Km0841}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1233}]}{\mathrm{Km1233}}\right) + \left(1 + \frac{[\mathrm{s\_0362}]}{\mathrm{Km0362}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1012}]}{\mathrm{Km1012}}\right) - 1} \tag{399}$$

Table 800: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.002	dimensionless	☑
Vmax		0000324	0.034	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0841		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

Id	Name	SBO	Value	Unit	Constant
Km1233		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0362		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1012		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.200 Reaction r_0816

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name ornithine carbamoyltransferase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0455} + \mathrm{s\_1266} \xrightleftharpoons{\mathrm{e\_0499},\ \mathrm{s\_0455},\ \mathrm{s\_1266},\ \mathrm{s\_0979},\ \mathrm{PHO}} \mathrm{s\_0979} + \mathrm{PHO} \qquad (400)$$

Reactants

Table 801: Properties of each reactant.

Id	Name	SBO
s_0455	carbamoyl phosphate	
s_1266	ornithine	

Modifiers

Table 802: Properties of each modifier.

Id	Name	SBO
e_0499	ARG3	0000460
s_0455	carbamoyl phosphate	
s_1266	ornithine	
s_0979	L-citrulline	
PHO	phosphate	

Products

Table 803: Properties of each product.

Id	Name	SBO
s_0979	L-citrulline	
PHO	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{200} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0455}] \cdot [\text{s\_1266}] - \frac{[\text{s\_0979}] \cdot [\text{PHO}]}{\text{Keq}} \right)}{\text{Km0455} \cdot \text{Km1266}}}{\left(1 + \frac{[\text{s\_0455}]}{\text{Km0455}}\right) \cdot \left(1 + \frac{[\text{s\_1266}]}{\text{Km1266}}\right) + \left(1 + \frac{[\text{s\_0979}]}{\text{Km0979}}\right) \cdot \left(1 + \frac{[\text{PHO}]}{\text{KmPHO}}\right) - 1} \tag{401}$$

Table 804: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.007	dimensionless	☑
Vmax		0000324	0.097	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0455		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1266		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0979		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmPHO		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.201 Reaction r_0818

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name ornithine transacetylase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0991} + \text{s\_1182} \xrightleftharpoons{\text{e\_0729, s\_0991, s\_1182, s\_1192, s\_1266}} \text{s\_1192} + \text{s\_1266} \tag{402}$$

Reactants

Table 805: Properties of each reactant.

Id	Name	SBO
s_0991	L-glutamate	
s_1182	N(2)-acetyl-L-ornithine	

Modifiers

Table 806: Properties of each modifier.

Id	Name	SBO
e_0729	ARG7	0000460
s_0991	L-glutamate	
s_1182	N(2)-acetyl-L-ornithine	
s_1192	N-acetyl-L-glutamate	
s_1266	ornithine	

Products

Table 807: Properties of each product.

Id	Name	SBO
s_1192	N-acetyl-L-glutamate	
s_1266	ornithine	

Kinetic Law

Derived unit contains undeclared units

$$v_{201} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0991}] \cdot [\mathrm{s\_1182}] - \frac{[\mathrm{s\_1192}] \cdot [\mathrm{s\_1266}]}{\mathrm{Keq}} \right)}{\mathrm{Km0991} \cdot \mathrm{Km1182}}}{\left(1 + \frac{[\mathrm{s\_0991}]}{\mathrm{Km0991}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1182}]}{\mathrm{Km1182}}\right) + \left(1 + \frac{[\mathrm{s\_1192}]}{\mathrm{Km1192}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1266}]}{\mathrm{Km1266}}\right) - 1} \tag{403}$$

Table 808: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.007	dimensionless	☑
Vmax		0000324	0.097	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0991		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

Id	Name	SBO	Value	Unit	Constant
Km1182		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1192		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1266		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.202 Reaction r_0820

This is a reversible reaction of two reactants forming two products influenced by six modifiers.

Name orotate phosphoribosyltransferase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_1269} + \mathrm{s\_1386} \xrightleftharpoons{\mathrm{e\_0755},\ \mathrm{e\_0712},\ \mathrm{s\_1269},\ \mathrm{s\_1386},\ \mathrm{s\_0633},\ \mathrm{s\_1270}} \mathrm{s\_0633} + \mathrm{s\_1270} \qquad (404)$$

Reactants

Table 809: Properties of each reactant.

Id	Name	SBO
s_1269	orotate	
s_1386	PRPP	

Modifiers

Table 810: Properties of each modifier.

Id	Name	SBO
e_0755	URA10	0000460
e_0712	URA5	0000460
s_1269	orotate	
s_1386	PRPP	
s_0633	diphosphate	
s_1270	orotidine 5'-(dihydrogen phosphate)	

Products

Table 811: Properties of each product.

Id	Name	SBO
s_0633	diphosphate	
s_1270	orotidine 5'-(dihydrogen phosphate)	

Kinetic Law

Derived unit contains undeclared units

$$v_{202} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_1269}] \cdot [\text{s\_1386}] - \frac{[\text{s\_0633}] \cdot [\text{s\_1270}]}{\text{Keq}} \right)}{\text{Km1269} \cdot \text{Km1386}}}{\left(1 + \frac{[\text{s\_1269}]}{\text{Km1269}}\right) \cdot \left(1 + \frac{[\text{s\_1386}]}{\text{Km1386}}\right) + \left(1 + \frac{[\text{s\_0633}]}{\text{Km0633}}\right) \cdot \left(1 + \frac{[\text{s\_1270}]}{\text{Km1270}}\right) - 1} \tag{405}$$

Table 812: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.005	dimensionless	☑
Vmax		0000324	0.067	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km1269		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1386		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0633		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1270		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.203 Reaction r_0821

This is a reversible reaction of one reactant forming two products influenced by four modifiers.

Name orotidine-5'-phosphate decarboxylase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_1270} \xrightleftharpoons{\text{e\_0249, s\_1270, CO2, s\_1545}} \text{CO2} + \text{s\_1545} \tag{406}$$

Reactant

Table 813: Properties of each reactant.

Id	Name	SBO
s_1270	orotidine 5'-(dihydrogen phosphate)	

Modifiers

Table 814: Properties of each modifier.

Id	Name	SBO
e_0249	URA3	0000460
s_1270	orotidine 5'-(dihydrogen phosphate)	
CO2	carbon dioxide	
s_1545	UMP	

Products

Table 815: Properties of each product.

Id	Name	SBO
CO2	carbon dioxide	
s_1545	UMP	

Kinetic Law

Derived unit contains undeclared units

$$v_{203} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_1270}] - \frac{[\mathrm{CO2}] \cdot [\mathrm{s\_1545}]}{\mathrm{Keq}} \right)}{\mathrm{Km1270}}}{1 + \frac{[\mathrm{s\_1270}]}{\mathrm{Km1270}} + \left(1 + \frac{[\mathrm{CO2}]}{\mathrm{KmCO2}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1545}]}{\mathrm{Km1545}}\right) - 1} \tag{407}$$

Table 816: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.005	dimensionless	☑
Vmax		0000324	0.048	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	2.000	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1270		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmCO2		0000323	1.000	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1545		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.204 Reaction r_0851

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name phenylalanine transaminase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0951} + \text{s\_0991} \xrightleftharpoons{\text{e\_0348, s\_0951, s\_0991, s\_0180, s\_1032}} \text{s\_0180} + \text{s\_1032} \qquad (408)$$

Reactants

Table 817: Properties of each reactant.

Id	Name	SBO
s_0951	keto-phenylpyruvate	
s_0991	L-glutamate	

Modifiers

Table 818: Properties of each modifier.

Id	Name	SBO
e_0348	ARO8	0000460
s_0951	keto-phenylpyruvate	
s_0991	L-glutamate	
s_0180	2-oxoglutarate	
s_1032	L-phenylalanine	

Products

Table 819: Properties of each product.

Id	Name	SBO
s_0180	2-oxoglutarate	
s_1032	L-phenylalanine	

Kinetic Law

Derived unit contains undeclared units

$$v_{204} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0951}] \cdot [\text{s\_0991}] - \frac{[\text{s\_0180}] \cdot [\text{s\_1032}]}{\text{Keq}} \right)}{\text{Km0951} \cdot \text{Km0991}}}{\left(1 + \frac{[\text{s\_0951}]}{\text{Km0951}}\right) \cdot \left(1 + \frac{[\text{s\_0991}]}{\text{Km0991}}\right) + \left(1 + \frac{[\text{s\_0180}]}{\text{Km0180}}\right) \cdot \left(1 + \frac{[\text{s\_1032}]}{\text{Km1032}}\right) - 1} \tag{409}$$

Table 820: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.006	dimensionless	☑
Vmax		0000324	0.081	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0951		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0991		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0180		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1032		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.205 Reaction r_0852

This is a reversible reaction of three reactants forming three products influenced by eight modifiers.

Name phenylalanyl-tRNA synthetase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{ATP} + \text{s\_1032} + \text{s\_1604} \xrightleftharpoons{\text{e\_0639, e\_0312, ATP, s\_1032, s\_1604, AMP, s\_0633, s\_1314}} \text{AMP} + \text{s\_0633} + \text{s\_1314} \tag{410}$$

Reactants

Table 821: Properties of each reactant.

Id	Name	SBO
ATP	ATP	
s_1032	L-phenylalanine	
s_1604	tRNA(Phe)	

Modifiers

Table 822: Properties of each modifier.

Id	Name	SBO
e_0639	FRS1	0000460
e_0312	FRS2	0000460
ATP	ATP	
s_1032	L-phenylalanine	
s_1604	tRNA(Phe)	
AMP	AMP	
s_0633	diphosphate	
s_1314	Phe-tRNA(Phe)	

Products

Table 823: Properties of each product.

Id	Name	SBO
AMP	AMP	
s_0633	diphosphate	
s_1314	Phe-tRNA(Phe)	

Kinetic Law

Derived unit contains undeclared units

$$v_{205} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{ATP}] \cdot [\text{s\_1032}] \cdot [\text{s\_1604}] - \frac{[\text{AMP}] \cdot [\text{s\_0633}] \cdot [\text{s\_1314}]}{\text{Keq}} \right)}{\text{KmATP} \cdot \text{Km1032} \cdot \text{Km1604}}}{\left(1 + \frac{[\text{ATP}]}{\text{KmATP}}\right) \cdot \left(1 + \frac{[\text{s\_1032}]}{\text{Km1032}}\right) \cdot \left(1 + \frac{[\text{s\_1604}]}{\text{Km1604}}\right) + \left(1 + \frac{[\text{AMP}]}{\text{KmAMP}}\right) \cdot \left(1 + \frac{[\text{s\_0633}]}{\text{Km0633}}\right) \cdot \left(1 + \frac{[\text{s\_1314}]}{\text{Km1314}}\right) - 1} \tag{411}$$

Table 824: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.006	dimensionless	☑
Vmax		0000324	0.173	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.232	dimensionless	☑
KmATP		0000322	2.525	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1032		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1604		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmAMP		0000323	0.293	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0633		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1314		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.206 Reaction r_0855

This is a reversible reaction of two reactants forming three products influenced by six modifiers.

Name phopshoribosylaminoimidazole synthetase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0302} + \text{ATP} \xrightleftharpoons{\text{e\_0352, s\_0302, ATP, s\_0300, ADP, PHO}} \text{s\_0300} + \text{ADP} + \text{PHO} \qquad (412)$$

Reactants

Table 825: Properties of each reactant.

Id	Name	SBO
s_0302	5'-phosphoribosyl-N-formylglycineamidine	
ATP	ATP	

Modifiers

Table 826: Properties of each modifier.

Id	Name	SBO
e_0352	ADE5,7	0000460
s_0302	5'-phosphoribosyl-N-formylglycineamidine	
ATP	ATP	
s_0300	5'-phosphoribosyl-5-aminoimidazole	
ADP	ADP	
PHO	phosphate	

Products

Table 827: Properties of each product.

Id	Name	SBO
s_0300	5'-phosphoribosyl-5-aminoimidazole	
ADP	ADP	
PHO	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{206} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0302}] \cdot [\text{ATP}] - \frac{[\text{s\_0300}] \cdot [\text{ADP}] \cdot [\text{PHO}]}{\text{Keq}} \right)}{\text{Km0302} \cdot \text{KmATP}}}{\left(1 + \frac{[\text{s\_0302}]}{\text{Km0302}}\right) \cdot \left(1 + \frac{[\text{ATP}]}{\text{KmATP}}\right) + \left(1 + \frac{[\text{s\_0300}]}{\text{Km0300}}\right) \cdot \left(1 + \frac{[\text{ADP}]}{\text{KmADP}}\right) \cdot \left(1 + \frac{[\text{PHO}]}{\text{KmPHO}}\right) - 1} \tag{413}$$

Table 828: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.004	dimensionless	☑
Vmax		0000324	0.094	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.102	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0302		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmATP		0000322	2.525	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0300		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmADP		0000323	1.282	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmPHO		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.207 Reaction r_0858

This is a reversible reaction of two reactants forming two products influenced by six modifiers.

Name phosphatidylethanolamine methyltransferase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_1351} + \text{s\_1416} \xrightleftharpoons{\text{e\_0536, e\_0381, s\_1351, s\_1416, s\_1343, s\_1413}} \text{s\_1343} + \text{s\_1413} \tag{414}$$

Reactants

Table 829: Properties of each reactant.

Id	Name	SBO
s_1351	phosphatidylethanolamine	
s_1416	S-adenosyl-L-methionine	

Modifiers

Table 830: Properties of each modifier.

Id	Name	SBO
e_0536	OPI3	0000460
e_0381	CHO2	0000460
s_1351	phosphatidylethanolamine	
s_1416	S-adenosyl-L-methionine	
s_1343	phosphatidyl-N-methylethanolamine	
s_1413	S-adenosyl-L-homocysteine	

Products

Table 831: Properties of each product.

Id	Name	SBO
s_1343	phosphatidyl-N-methylethanolamine	
s_1413	S-adenosyl-L-homocysteine	

Kinetic Law

Derived unit contains undeclared units

$$v_{207} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_1351}] \cdot [\mathrm{s\_1416}] - \frac{[\mathrm{s\_1343}] \cdot [\mathrm{s\_1413}]}{\mathrm{Keq}} \right)}{\mathrm{Km1351} \cdot \mathrm{Km1416}}}{\left(1 + \frac{[\mathrm{s\_1351}]}{\mathrm{Km1351}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1416}]}{\mathrm{Km1416}}\right) + \left(1 + \frac{[\mathrm{s\_1343}]}{\mathrm{Km1343}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1413}]}{\mathrm{Km1413}}\right) - 1} \tag{415}$$

Table 832: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.23809739802672 \cdot 10^{-4}$	dimensionless	☑
Vmax		0000324	0.002	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km1351		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1416		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1343		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1413		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.208 Reaction r_0874

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name phosphatidylinositol synthase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0471} + \text{s\_1153} \xrightleftharpoons{\text{e\_0964, s\_0471, s\_1153, s\_0089, s\_0526}} \text{s\_0089} + \text{s\_0526} \tag{416}$$

Reactants

Table 833: Properties of each reactant.

Id	Name	SBO
s_0471	CDP-diacylglycerol	
s_1153	myo-inositol	

Modifiers

Table 834: Properties of each modifier.

Id	Name	SBO
e_0964	PIS1	0000460
s_0471	CDP-diacylglycerol	
s_1153	myo-inositol	
s_0089	1-phosphatidyl-1D-myo-inositol	
s_0526	CMP	

Products

Table 835: Properties of each product.

Id	Name	SBO
s_0089	1-phosphatidyl-1D-myo-inositol	
s_0526	CMP	

Kinetic Law

Derived unit contains undeclared units

$$v_{208} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0471}] \cdot [\text{s\_1153}] - \frac{[\text{s\_0089}] \cdot [\text{s\_0526}]}{\text{Keq}} \right)}{\text{Km0471} \cdot \text{Km1153}}}{\left(1 + \frac{[\text{s\_0471}]}{\text{Km0471}}\right) \cdot \left(1 + \frac{[\text{s\_1153}]}{\text{Km1153}}\right) + \left(1 + \frac{[\text{s\_0089}]}{\text{Km0089}}\right) \cdot \left(1 + \frac{[\text{s\_0526}]}{\text{Km0526}}\right) - 1} \tag{417}$$

Table 836: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$9.028139427404 \cdot 10^{-5}$	dimensionless	☑
Vmax		0000324	0.001	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0471		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1153		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0089		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0526		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.209 Reaction r_0877

This is a reversible reaction of one reactant forming two products influenced by five modifiers.

Name phosphatidylserine decarboxylase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_1337} \xrightleftharpoons{\text{e\_0788, e\_0382, s\_1337, CO2, s\_1351}} \text{CO2} + \text{s\_1351} \tag{418}$$

Reactant

Table 837: Properties of each reactant.

Id	Name	SBO
s_1337	phosphatidyl-L-serine	

Modifiers

Table 838: Properties of each modifier.

Id	Name	SBO
e_0788	PSD1	0000460
e_0382	PSD2	0000460

Id	Name	SBO
s_1337	phosphatidyl-L-serine	
CO2	carbon dioxide	
s_1351	phosphatidylethanolamine	

Products

Table 839: Properties of each product.

Id	Name	SBO
CO2	carbon dioxide	
s_1351	phosphatidylethanolamine	

Kinetic Law

Derived unit contains undeclared units

$$v_{209} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_1337}] - \frac{[\mathrm{CO2}] \cdot [\mathrm{s\_1351}]}{\mathrm{Keq}} \right)}{\mathrm{Km1337}}}{1 + \frac{[\mathrm{s\_1337}]}{\mathrm{Km1337}} + \left(1 + \frac{[\mathrm{CO2}]}{\mathrm{KmCO2}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1351}]}{\mathrm{Km1351}}\right) - 1} \tag{419}$$

Table 840: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.53773416789459 \cdot 10^{-4}$	dimensionless	☑
Vmax		0000324	0.002	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Keq		0000281	2.000	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1337		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
KmCO2		0000323	1.000	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1351		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.210 Reaction r_0880

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name phosphatidylserine synthase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0471} + \text{s\_1039} \xrightleftharpoons{\text{e\_0278, s\_0471, s\_1039, s\_0526, s\_1337}} \text{s\_0526} + \text{s\_1337} \tag{420}$$

Reactants

Table 841: Properties of each reactant.

Id	Name	SBO
s_0471	CDP-diacylglycerol	
s_1039	L-serine	

Modifiers

Table 842: Properties of each modifier.

Id	Name	SBO
e_0278	CHO1	0000460
s_0471	CDP-diacylglycerol	
s_1039	L-serine	
s_0526	CMP	
s_1337	phosphatidyl-L-serine	

Products

Table 843: Properties of each product.

Id	Name	SBO
s_0526	CMP	
s_1337	phosphatidyl-L-serine	

Kinetic Law

Derived unit contains undeclared units

$$v_{210} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0471}] \cdot [\text{s\_1039}] - \frac{[\text{s\_0526}] \cdot [\text{s\_1337}]}{\text{Keq}} \right)}{\text{Km0471} \cdot \text{Km1039}}}{\left(1 + \frac{[\text{s\_0471}]}{\text{Km0471}}\right) \cdot \left(1 + \frac{[\text{s\_1039}]}{\text{Km1039}}\right) + \left(1 + \frac{[\text{s\_0526}]}{\text{Km0526}}\right) \cdot \left(1 + \frac{[\text{s\_1337}]}{\text{Km1337}}\right) - 1} \tag{421}$$

Table 844: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.70539319634365 \cdot 10^{-4}$	dimensionless	☑
Vmax		0000324	0.002	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0471		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1039		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0526		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1337		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.211 Reaction r_0883

This is a reversible reaction of two reactants forming three products influenced by eight modifiers.

Name phosphoadenylyl-sulfate reductase (thioredoxin)

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0201} + \mathrm{s\_1616} \xrightleftharpoons{\mathrm{e\_0633},\ \mathrm{e\_0975},\ \mathrm{e\_0398},\ \mathrm{s\_0201},\ \mathrm{s\_1616},\ \mathrm{s\_0390},\ \mathrm{s\_1469},\ \mathrm{s\_1620}} \mathrm{s\_0390} + \mathrm{s\_1469} + \mathrm{s\_1620} \tag{422}$$

Reactants

Table 845: Properties of each reactant.

Id	Name	SBO
s_0201	3'-phospho-5'-adenylyl sulfate	
s_1616	TRX1	

Modifiers

Table 846: Properties of each modifier.

Id	Name	SBO
e_0633	TRX1	0000460
e_0975	MET16	0000460
e_0398	TRX2	0000460
s_0201	3'-phospho-5'-adenylyl sulfate	

Id	Name	SBO
s_1616	TRX1	
s_0390	adenosine 3',5'-bismonophosphate	
s_1469	sulphite	
s_1620	TRX1 disulphide	

Products

Table 847: Properties of each product.

Id	Name	SBO
s_0390	adenosine 3',5'-bismonophosphate	
s_1469	sulphite	
s_1620	TRX1 disulphide	

Kinetic Law

Derived unit contains undeclared units

$$v_{211} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0201}] \cdot [\mathrm{s\_1616}] - \frac{[\mathrm{s\_0390}] \cdot [\mathrm{s\_1469}] \cdot [\mathrm{s\_1620}]}{\mathrm{Keq}} \right)}{\mathrm{Km0201} \cdot \mathrm{Km1616}}}{\left(1 + \frac{[\mathrm{s\_0201}]}{\mathrm{Km0201}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1616}]}{\mathrm{Km1616}}\right) + \left(1 + \frac{[\mathrm{s\_0390}]}{\mathrm{Km0390}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1469}]}{\mathrm{Km1469}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1620}]}{\mathrm{Km1620}}\right) - 1} \tag{423}$$

Table 848: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.002	dimensionless	☑
Vmax		0000324	0.054	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	0.200	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0201		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1616		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0390		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1469		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1620		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.212 Reaction r_0884

This is a reversible reaction of two reactants forming three products influenced by six modifiers.

Name phosphoenolpyruvate carboxykinase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{ATP} + \mathrm{s\_1271} \xrightleftharpoons{\text{e\_0612, ATP, s\_1271, ADP, CO2, PEP}} \mathrm{ADP} + \mathrm{CO2} + \mathrm{PEP} \tag{424}$$

Reactants

Table 849: Properties of each reactant.

Id	Name	SBO
ATP	ATP	
s_1271	oxaloacetate	

Modifiers

Table 850: Properties of each modifier.

Id	Name	SBO
e_0612	PCK1	0000460
ATP	ATP	
s_1271	oxaloacetate	
ADP	ADP	
CO2	carbon dioxide	
PEP	phosphoenolpyruvate	

Products

Table 851: Properties of each product.

Id	Name	SBO
ADP	ADP	
CO2	carbon dioxide	
PEP	phosphoenolpyruvate	

Kinetic Law

Derived unit contains undeclared units

$$v_{212} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{ATP}] \cdot [\text{s\_1271}] - \frac{[\text{ADP}] \cdot [\text{CO2}] \cdot [\text{PEP}]}{\text{Keq}} \right)}{\text{KmATP} \cdot \text{Km1271}}}{\left(1 + \frac{[\text{ATP}]}{\text{KmATP}}\right) \cdot \left(1 + \frac{[\text{s\_1271}]}{\text{Km1271}}\right) + \left(1 + \frac{[\text{ADP}]}{\text{KmADP}}\right) \cdot \left(1 + \frac{[\text{CO2}]}{\text{KmCO2}}\right) \cdot \left(1 + \frac{[\text{PEP}]}{\text{KmPEP}}\right) - 1} \tag{425}$$

Table 852: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.023	dimensionless	☑
Vmax		0000324	0.500	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.642	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmATP		0000322	2.525	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1271		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmADP		0000323	1.282	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmCO2		0000323	1.000	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmPEP		0000323	0.063	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.213 Reaction PFK

This is a reversible reaction of two reactants forming two products influenced by nine modifiers.

Name phosphofructokinase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{ATP} + \text{F6P} \xrightleftharpoons{\text{e\_0401, e\_0743, AMP, F26bP, F6P, ATP, AMP, F26bP, F16bP}} \text{ADP} + \text{F16bP} \tag{426}$$

Reactants

Table 853: Properties of each reactant.

Id	Name	SBO
ATP	ATP	
F6P	D-fructose 6-phosphate	

Modifiers

Table 854: Properties of each modifier.

Id	Name	SBO
e_0401	PFK1	0000460
e_0743	PFK2	0000460
AMP	AMP	
F26bP	beta-D-fructose 2,6-bisphosphate	
F6P	D-fructose 6-phosphate	
ATP	ATP	
AMP	AMP	
F26bP	beta-D-fructose 2,6-bisphosphate	
F16bP	D-fructose 1,6-bisphosphate	

Products

Table 855: Properties of each product.

Id	Name	SBO
ADP	ADP	
F16bP	D-fructose 1,6-bisphosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{213} = \mathrm{vol}\,(\mathrm{cell}) \cdot \mathrm{Vmax} \cdot \frac{\mathrm{gR} \cdot \frac{[\mathrm{F6P}]}{\mathrm{Kf6p}} \cdot \frac{[\mathrm{ATP}]}{\mathrm{Katp}} \cdot \left(1 + \frac{[\mathrm{F6P}]}{\mathrm{Kf6p}} + \frac{[\mathrm{ATP}]}{\mathrm{Katp}} + \frac{\frac{\mathrm{gR}\cdot[\mathrm{F6P}]}{\mathrm{Kf6p}}\cdot[\mathrm{ATP}]}{\mathrm{Katp}}\right)}{\left(1 + \frac{[\mathrm{F6P}]}{\mathrm{Kf6p}} + \frac{[\mathrm{ATP}]}{\mathrm{Katp}} + \frac{\frac{\mathrm{gR}\cdot[\mathrm{F6P}]}{\mathrm{Kf6p}}\cdot[\mathrm{ATP}]}{\mathrm{Katp}}\right)^2 + \mathrm{L0} \cdot \left(\frac{1+\frac{\mathrm{Ciatp}\cdot[\mathrm{ATP}]}{\mathrm{Kiatp}}}{1+\frac{[\mathrm{ATP}]}{\mathrm{Kiatp}}}\right)^2 \cdot \left(\frac{1+\frac{\mathrm{Camp}\cdot[\mathrm{AMP}]}{\mathrm{Kamp}}}{1+\frac{[\mathrm{AMP}]}{\mathrm{Kamp}}}\right)^2 \cdot \left(\frac{1+\frac{\mathrm{Cf26}\cdot[\mathrm{F26bP}]}{\mathrm{Kf26}}+\frac{\mathrm{Cf16}\cdot[\mathrm{F16bP}]}{\mathrm{Kf16}}}{1+\frac{[\mathrm{F26bP}]}{\mathrm{Kf26}}+\frac{[\mathrm{F16bP}]}{\mathrm{Kf16}}}\right)^2 \cdot \left(1 + \frac{\mathrm{Cat}}{}\right.} \tag{427}$$

Table 856: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
Vmax			1.833	$\mathrm{mmol}\cdot\mathrm{l}^{-1}\cdot\mathrm{s}^{-1}$	☑
gR			5.120	dimensionless	☑
Kf6p			0.100	$\mathrm{mmol}\cdot\mathrm{l}^{-1}$	☑
Katp			0.710	$\mathrm{mmol}\cdot\mathrm{l}^{-1}$	☑
L0			0.660	dimensionless	☑
Ciatp			100.000	dimensionless	☑
Kiatp			0.650	$\mathrm{mmol}\cdot\mathrm{l}^{-1}$	☑

Id	Name	SBO	Value	Unit	Constant
Camp			0.085	dimensionless	☑
Kamp			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Cf26			0.017	dimensionless	☑
Kf26			$6.82 \cdot 10^{-4}$	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Cf16			0.397	dimensionless	☑
Kf16			0.111	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Catp			3.000	dimensionless	☑
FLUX_VALUE			1.309	dimensionless	☑

6.214 Reaction r_0888

This is a reversible reaction of one reactant forming one product influenced by five modifiers.

Name phosphoglucomutase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{G6P} \xrightleftharpoons{\text{e\_0576, e\_0757, e\_0733, G6P, s\_0567}} \mathrm{s\_0567} \tag{428}$$

Reactant

Table 857: Properties of each reactant.

Id	Name	SBO
G6P	D-glucose 6-phosphate	

Modifiers

Table 858: Properties of each modifier.

Id	Name	SBO
e_0576	PGM1	0000460
e_0757	PGM3	0000460
e_0733	PGM2	0000460
G6P	D-glucose 6-phosphate	
s_0567	D-glucose 1-phosphate	

Product

Table 859: Properties of each product.

Id	Name	SBO
s_0567	D-glucose 1-phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{214} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{G6P}] - \frac{[\text{s\_0567}]}{\text{Keq}} \right)}{\text{KmG6P}}}{1 + \frac{[\text{G6P}]}{\text{KmG6P}} + 1 + \frac{[\text{s\_0567}]}{\text{Km0567}} - 1} \tag{429}$$

Table 860: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.121	dimensionless	☑
Vmax		0000324	0.725	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.075	dimensionless	☑
KmG6P		0000322	2.675	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0567		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.215 Reaction r_0889

This is a reversible reaction of two reactants forming three products influenced by seven modifiers.

Name phosphogluconate dehydrogenase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0340} + \text{s\_1207} \xrightleftharpoons{\text{e\_0455, e\_0407, s\_0340, s\_1207, CO2, s\_0577, s\_1212}} \text{CO2} + \text{s\_0577} + \text{s\_1212} \tag{430}$$

Reactants

Table 861: Properties of each reactant.

Id	Name	SBO
s_0340	6-phospho-D-gluconate	

Id	Name	SBO
s_1207	NADP(+)	

Modifiers

Table 862: Properties of each modifier.

Id	Name	SBO
e_0455	GND1	0000460
e_0407	GND2	0000460
s_0340	6-phospho-D-gluconate	
s_1207	NADP(+)	
CO2	carbon dioxide	
s_0577	D-ribulose 5-phosphate	
s_1212	NADPH	

Products

Table 863: Properties of each product.

Id	Name	SBO
CO2	carbon dioxide	
s_0577	D-ribulose 5-phosphate	
s_1212	NADPH	

Kinetic Law

Derived unit contains undeclared units

$$v_{215} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0340}] \cdot [\text{s\_1207}] - \frac{[\text{CO2}] \cdot [\text{s\_0577}] \cdot [\text{s\_1212}]}{\text{Keq}} \right)}{\text{Km0340} \cdot \text{Km1207}}}{\left(1 + \frac{[\text{s\_0340}]}{\text{Km0340}}\right) \cdot \left(1 + \frac{[\text{s\_1207}]}{\text{Km1207}}\right) + \left(1 + \frac{[\text{CO2}]}{\text{KmCO2}}\right) \cdot \left(1 + \frac{[\text{s\_0577}]}{\text{Km0577}}\right) \cdot \left(1 + \frac{[\text{s\_1212}]}{\text{Km1212}}\right) - 1} \tag{431}$$

Table 864: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.058	dimensionless	☑
Vmax		0000324	1.277	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	$\text{mmol} \cdot \text{l}^{-1}$	☑

Id	Name	SBO	Value	Unit	Constant
Km0340		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1207		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
KmCO2		0000323	1.000	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0577		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1212		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.216 Reaction PGK

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name phosphoglycerate kinase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{BPG} + \mathrm{ADP} \xrightleftharpoons{\text{e\_0113, BPG, ADP, P3G, ATP}} \mathrm{P3G} + \mathrm{ATP} \tag{432}$$

Reactants

Table 865: Properties of each reactant.

Id	Name	SBO
BPG	1,3-bisphospho-D-glycerate	
ADP	ADP	

Modifiers

Table 866: Properties of each modifier.

Id	Name	SBO
e_0113	PGK1	0000460
BPG	1,3-bisphospho-D-glycerate	
ADP	ADP	
P3G	3-phosphoglycerate	
ATP	ATP	

Products

Table 867: Properties of each product.

Id	Name	SBO
P3G	3-phosphoglycerate	
ATP	ATP	

Kinetic Law

Derived unit contains undeclared units

$$v_{216} = \mathrm{vol}\,(\mathrm{cell}) \cdot \frac{\mathrm{Vmax} \cdot \left(\frac{[\mathrm{BPG}] \cdot [\mathrm{ADP}]}{\mathrm{Kbpg} \cdot \mathrm{Kadp}} - \frac{[\mathrm{P3G}] \cdot [\mathrm{ATP}]}{\mathrm{Kbpg} \cdot \mathrm{Kadp} \cdot \mathrm{Keq}} \right)}{\left(1 + \frac{[\mathrm{BPG}]}{\mathrm{Kbpg}} + \frac{[\mathrm{P3G}]}{\mathrm{Kp3g}} \right) \cdot \left(1 + \frac{[\mathrm{ADP}]}{\mathrm{Kadp}} + \frac{[\mathrm{ATP}]}{\mathrm{Katp}} \right)} \tag{433}$$

Table 868: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
Vmax			259.220	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Keq			3200.000	dimensionless	☑
Kp3g			0.530	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Katp			0.300	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Kbpg			0.003	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Kadp			0.200	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
FLUX_VALUE			2.300	dimensionless	☑

6.217 Reaction GPM

This is a reversible reaction of one reactant forming one product influenced by three modifiers.

Name phosphoglycerate mutase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{P3G} \xrightleftharpoons{\text{e\_0582, P3G, P2G}} \mathrm{P2G} \tag{434}$$

Reactant

Table 869: Properties of each reactant.

Id	Name	SBO
P3G	3-phosphoglycerate	

Modifiers

Table 870: Properties of each modifier.

Id	Name	SBO
e_0582	GPM1	0000460
P3G	3-phosphoglycerate	
P2G	2-phospho-D-glyceric acid	

Product

Table 871: Properties of each product.

Id	Name	SBO
P2G	2-phospho-D-glyceric acid	

Kinetic Law

Derived unit contains undeclared units

$$v_{217} = \mathrm{vol}\,(\mathrm{cell}) \cdot \frac{\mathrm{Vmax} \cdot \left(\frac{[\mathrm{P3G}]}{\mathrm{Kp3g}} - \frac{[\mathrm{P2G}]}{\mathrm{Kp3g} \cdot \mathrm{Keq}} \right)}{1 + \frac{[\mathrm{P3G}]}{\mathrm{Kp3g}} + \frac{[\mathrm{P2G}]}{\mathrm{Kp2g}}} \tag{435}$$

Table 872: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
Vmax			43.083	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Kp3g			1.200	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Keq			0.190	dimensionless	☑
Kp2g			0.080	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
FLUX_VALUE			2.300	dimensionless	☑

6.218 Reaction r_0900

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name phospholipid methyltransferase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_1342} + \text{s\_1416} \xrightleftharpoons{\text{e\_0536, s\_1342, s\_1416, s\_1346, s\_1413}} \text{s\_1346} + \text{s\_1413} \tag{436}$$

Reactants

Table 873: Properties of each reactant.

Id	Name	SBO
s_1342	phosphatidyl-N,N-dimethylethanolamine	
s_1416	S-adenosyl-L-methionine	

Modifiers

Table 874: Properties of each modifier.

Id	Name	SBO
e_0536	OPI3	0000460
s_1342	phosphatidyl-N,N-dimethylethanolamine	
s_1416	S-adenosyl-L-methionine	
s_1346	phosphatidylcholine	
s_1413	S-adenosyl-L-homocysteine	

Products

Table 875: Properties of each product.

Id	Name	SBO
s_1346	phosphatidylcholine	
s_1413	S-adenosyl-L-homocysteine	

Kinetic Law

Derived unit contains undeclared units

$$v_{218} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_1342}] \cdot [\text{s\_1416}] - \frac{[\text{s\_1346}] \cdot [\text{s\_1413}]}{\text{Keq}} \right)}{\text{Km1342} \cdot \text{Km1416}}}{\left(1 + \frac{[\text{s\_1342}]}{\text{Km1342}}\right) \cdot \left(1 + \frac{[\text{s\_1416}]}{\text{Km1416}}\right) + \left(1 + \frac{[\text{s\_1346}]}{\text{Km1346}}\right) \cdot \left(1 + \frac{[\text{s\_1413}]}{\text{Km1413}}\right) - 1} \tag{437}$$

Table 876: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.23809739802672 \cdot 10^{-4}$	dimensionless	☑
Vmax		0000324	0.002	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km1342		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1416		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1346		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1413		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.219 Reaction r_0901

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name phospholipid methyltransferase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_1343} + \text{s\_1416} \xrightleftharpoons{\text{e\_0536, s\_1343, s\_1416, s\_1342, s\_1413}} \text{s\_1342} + \text{s\_1413} \tag{438}$$

Reactants

Table 877: Properties of each reactant.

Id	Name	SBO
s_1343	phosphatidyl-N-methylethanolamine	
s_1416	S-adenosyl-L-methionine	

Modifiers

Table 878: Properties of each modifier.

Id	Name	SBO
e_0536	OPI3	0000460

Id	Name	SBO
s_1343	phosphatidyl-N-methylethanolamine	
s_1416	S-adenosyl-L-methionine	
s_1342	phosphatidyl-N,N-dimethylethanolamine	
s_1413	S-adenosyl-L-homocysteine	

Products

Table 879: Properties of each product.

Id	Name	SBO
s_1342	phosphatidyl-N,N-dimethylethanolamine	
s_1413	S-adenosyl-L-homocysteine	

Kinetic Law

Derived unit contains undeclared units

$$v_{219} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_1343}] \cdot [\text{s\_1416}] - \frac{[\text{s\_1342}] \cdot [\text{s\_1413}]}{\text{Keq}} \right)}{\text{Km1343} \cdot \text{Km1416}}}{\left(1 + \frac{[\text{s\_1343}]}{\text{Km1343}}\right) \cdot \left(1 + \frac{[\text{s\_1416}]}{\text{Km1416}}\right) + \left(1 + \frac{[\text{s\_1342}]}{\text{Km1342}}\right) \cdot \left(1 + \frac{[\text{s\_1413}]}{\text{Km1413}}\right) - 1} \tag{439}$$

Table 880: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.23809739802672 \cdot 10^{-4}$	dimensionless	☑
Vmax		0000324	0.002	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km1343		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1416		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1342		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1413		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.220 Reaction r_0902

This is a reversible reaction of one reactant forming one product influenced by three modifiers.

Name phosphomannomutase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0574} \xrightleftharpoons{\text{e\_0314, s\_0574, s\_0573}} \text{s\_0573} \tag{440}$$

Reactant

Table 881: Properties of each reactant.

Id	Name	SBO
s_0574	D-mannose 6-phosphate	

Modifiers

Table 882: Properties of each modifier.

Id	Name	SBO
e_0314	SEC53	0000460
s_0574	D-mannose 6-phosphate	
s_0573	D-mannose 1-phosphate	

Product

Table 883: Properties of each product.

Id	Name	SBO
s_0573	D-mannose 1-phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{220} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0574}] - \frac{[\text{s\_0573}]}{\text{Keq}} \right)}{\text{Km0574}}}{1 + \frac{[\text{s\_0574}]}{\text{Km0574}} + 1 + \frac{[\text{s\_0573}]}{\text{Km0573}} - 1} \tag{441}$$

Table 884: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.035	dimensionless	☑
Vmax		0000324	0.208	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑

Id	Name	SBO	Value	Unit	Constant
Keq		0000281	2.000	dimensionless	☑
Km0574		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0573		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.221 Reaction r_0904

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name phosphomevalonate kinase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0019} + \mathrm{ATP} \xrightleftharpoons{\mathrm{e\_0747},\ \mathrm{s\_0019},\ \mathrm{ATP},\ \mathrm{s\_0018},\ \mathrm{ADP}} \mathrm{s\_0018} + \mathrm{ADP} \tag{442}$$

Reactants

Table 885: Properties of each reactant.

Id	Name	SBO
s_0019	(R)-5-phosphomevalonic acid	
ATP	ATP	

Modifiers

Table 886: Properties of each modifier.

Id	Name	SBO
e_0747	ERG8	0000460
s_0019	(R)-5-phosphomevalonic acid	
ATP	ATP	
s_0018	(R)-5-diphosphomevalonic acid	
ADP	ADP	

Products

Table 887: Properties of each product.

Id	Name	SBO
s_0018	(R)-5-diphosphomevalonic acid	
ADP	ADP	

Kinetic Law

Derived unit contains undeclared units

$$v_{221} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0019}] \cdot [\text{ATP}] - \frac{[\text{s\_0018}] \cdot [\text{ADP}]}{\text{Keq}} \right)}{\text{Km0019} \cdot \text{KmATP}}}{\left(1 + \frac{[\text{s\_0019}]}{\text{Km0019}}\right) \cdot \left(1 + \frac{[\text{ATP}]}{\text{KmATP}}\right) + \left(1 + \frac{[\text{s\_0018}]}{\text{Km0018}}\right) \cdot \left(1 + \frac{[\text{ADP}]}{\text{KmADP}}\right) - 1} \quad (443)$$

Table 888: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.002	dimensionless	☑
Vmax		0000324	0.025	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	1.015	dimensionless	☑
Km0019		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmATP		0000322	2.525	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0018		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmADP		0000323	1.282	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.222 Reaction r_0908

This is a reversible reaction of three reactants forming three products influenced by seven modifiers.

Name phosphoribosyl amino imidazolesuccinocarbozamide synthetase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{ATP} + \text{s\_0973} + \text{s\_1364} \xrightleftharpoons{\text{e\_0017, ATP, s\_0973, s\_1364, s\_0299, ADP, PHO}} \text{s\_0299} + \text{ADP} + \text{PHO} \quad (444)$$

Reactants

Table 889: Properties of each reactant.

Id	Name	SBO
ATP	ATP	
s_0973	L-aspartate	
s_1364	phosphoribosyl-carboxy-aminoimidazole	

Modifiers

Table 890: Properties of each modifier.

Id	Name	SBO
e_0017	ADE1	0000460
ATP	ATP	
s_0973	L-aspartate	
s_1364	phosphoribosyl-carboxy-aminoimidazole	
s_0299	5'-phosphoribosyl-4-(N-succinocarboxamide)-5-aminoimidazole	
ADP	ADP	
PHO	phosphate	

Products

Table 891: Properties of each product.

Id	Name	SBO
s_0299	5'-phosphoribosyl-4-(N-succinocarboxamide)-5-aminoimidazole	
ADP	ADP	
PHO	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{222} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{ATP}] \cdot [\mathrm{s\_0973}] \cdot [\mathrm{s\_1364}] - \frac{[\mathrm{s\_0299}] \cdot [\mathrm{ADP}] \cdot [\mathrm{PHO}]}{\mathrm{Keq}} \right)}{\mathrm{KmATP} \cdot \mathrm{Km0973} \cdot \mathrm{Km1364}}}{\left(1 + \frac{[\mathrm{ATP}]}{\mathrm{KmATP}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0973}]}{\mathrm{Km0973}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1364}]}{\mathrm{Km1364}}\right) + \left(1 + \frac{[\mathrm{s\_0299}]}{\mathrm{Km0299}}\right) \cdot \left(1 + \frac{[\mathrm{ADP}]}{\mathrm{KmADP}}\right) \cdot \left(1 + \frac{[\mathrm{PHO}]}{\mathrm{KmPHO}}\right) - 1} \tag{445}$$

Table 892: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.004	dimensionless	☑
Vmax		0000324	0.128	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	1.015	dimensionless	☑
KmATP		0000322	2.525	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0973		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1364		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0299		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmADP		0000323	1.282	$\mathrm{mmol \cdot l^{-1}}$	☑
KmPHO		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.223 Reaction r_0909

This is a reversible reaction of one reactant forming one product influenced by three modifiers.

Name phosphoribosyl-AMP cyclohydrolase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0078} \xrightleftharpoons{\mathrm{e\_0103,\ s\_0078,\ s\_0077}} \mathrm{s\_0077} \tag{446}$$

Reactant

Table 893: Properties of each reactant.

Id	Name	SBO
s_0078	1-(5-phosphoribosyl)-5'-AMP	

Modifiers

Table 894: Properties of each modifier.

Id	Name
e_0103	HIS4
s_0078	1-(5-phosphoribosyl)-5'-AMP
s_0077	1-(5-phospho-D-ribosyl)-5-[(5-phospho-D-ribosylamino)methylideneamino]imidazole-4-carboxamide

Product

Table 895: Properties of each product.

Id	Name
s_0077	1-(5-phospho-D-ribosyl)-5-[(5-phospho-D-ribosylamino)methylideneamino]imidazole-4-carboxamide

Kinetic Law

Derived unit contains undeclared units

$$v_{223} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0078}] - \frac{[\text{s\_0077}]}{\text{Keq}} \right)}{\text{Km0078}}}{1 + \frac{[\text{s\_0078}]}{\text{Km0078}} + 1 + \frac{[\text{s\_0077}]}{\text{Km0077}} - 1} \tag{447}$$

Table 896: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.003	dimensionless	☑
Vmax		0000324	0.017	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0078		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0077		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.224 Reaction r_0910

This is a reversible reaction of one reactant forming two products influenced by four modifiers.

Name phosphoribosyl-ATP pyrophosphatase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0326} \xrightleftharpoons{\text{e\_0103, s\_0326, s\_0078, s\_0633}} \text{s\_0078} + \text{s\_0633} \tag{448}$$

Reactant

Table 897: Properties of each reactant.

Id	Name	SBO
s_0326	5-phosphoribosyl-ATP	

Modifiers

Table 898: Properties of each modifier.

Id	Name	SBO
e_0103	HIS4	0000460
s_0326	5-phosphoribosyl-ATP	
s_0078	1-(5-phosphoribosyl)-5'-AMP	
s_0633	diphosphate	

Products

Table 899: Properties of each product.

Id	Name	SBO
s_0078	1-(5-phosphoribosyl)-5'-AMP	
s_0633	diphosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{224} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0326}] - \frac{[\mathrm{s\_0078}] \cdot [\mathrm{s\_0633}]}{\mathrm{Keq}} \right)}{\mathrm{Km0326}}}{1 + \frac{[\mathrm{s\_0326}]}{\mathrm{Km0326}} + \left(1 + \frac{[\mathrm{s\_0078}]}{\mathrm{Km0078}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0633}]}{\mathrm{Km0633}}\right) - 1} \tag{449}$$

Table 900: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.003	dimensionless	☑
Vmax		0000324	0.029	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	0.200	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0326		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0078		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0633		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.225 Reaction r_0911

This is a reversible reaction of three reactants forming three products influenced by seven modifiers.

Name phosphoribosylaminoimidazole-carboxylase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0300} + \text{CO2} + \text{ATP} \xrightleftharpoons{\text{e\_0860, s\_0300, CO2, ATP, s\_1364, ADP, PHO}} \text{s\_1364} + \text{ADP} + \text{PHO} \quad (450)$$

Reactants

Table 901: Properties of each reactant.

Id	Name	SBO
s_0300	5'-phosphoribosyl-5-aminoimidazole	
CO2	carbon dioxide	
ATP	ATP	

Modifiers

Table 902: Properties of each modifier.

Id	Name	SBO
e_0860	ADE2	0000460
s_0300	5'-phosphoribosyl-5-aminoimidazole	
CO2	carbon dioxide	
ATP	ATP	
s_1364	phosphoribosyl-carboxy-aminoimidazole	
ADP	ADP	
PHO	phosphate	

Products

Table 903: Properties of each product.

Id	Name	SBO
s_1364	phosphoribosyl-carboxy-aminoimidazole	
ADP	ADP	
PHO	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{225} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0300}] \cdot [\text{CO2}] \cdot [\text{ATP}] - \frac{[\text{s\_1364}] \cdot [\text{ADP}] \cdot [\text{PHO}]}{\text{Keq}} \right)}{\text{Km0300} \cdot \text{KmCO2} \cdot \text{KmATP}}}{\left(1 + \frac{[\text{s\_0300}]}{\text{Km0300}}\right) \cdot \left(1 + \frac{[\text{CO2}]}{\text{KmCO2}}\right) \cdot \left(1 + \frac{[\text{ATP}]}{\text{KmATP}}\right) + \left(1 + \frac{[\text{s\_1364}]}{\text{Km1364}}\right) \cdot \left(1 + \frac{[\text{ADP}]}{\text{KmADP}}\right) \cdot \left(1 + \frac{[\text{PHO}]}{\text{KmPHO}}\right) - 1} \quad (451)$$

Table 904: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.004	dimensionless	☑
Vmax		0000324	0.128	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.102	dimensionless	☑
Km0300		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmCO2		0000322	1.000	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmATP		0000322	2.525	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1364		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmADP		0000323	1.282	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmPHO		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.226 Reaction r_0912

This is a reversible reaction of two reactants forming two products influenced by six modifiers.

Name phosphoribosylaminoimidazolecarboxamide formyltransferase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0120} + \text{s\_0403} \xrightleftharpoons{\text{e\_0631, e\_0736, s\_0120, s\_0403, s\_1365, s\_1487}} \text{s\_1365} + \text{s\_1487} \quad (452)$$

Reactants

Table 905: Properties of each reactant.

Id	Name	SBO
s_0120	10-formyl-THF	
s_0403	AICAR	

Modifiers

Table 906: Properties of each modifier.

Id	Name	SBO
e_0631	ADE16	0000460
e_0736	ADE17	0000460
s_0120	10-formyl-THF	
s_0403	AICAR	
s_1365	phosphoribosyl-formamido-carboxamide	
s_1487	THF	

Products

Table 907: Properties of each product.

Id	Name	SBO
s_1365	phosphoribosyl-formamido-carboxamide	
s_1487	THF	

Kinetic Law

Derived unit contains undeclared units

$$v_{226} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0120}] \cdot [\mathrm{s\_0403}] - \frac{[\mathrm{s\_1365}] \cdot [\mathrm{s\_1487}]}{\mathrm{Keq}} \right)}{\mathrm{Km0120} \cdot \mathrm{Km0403}}}{\left(1 + \frac{[\mathrm{s\_0120}]}{\mathrm{Km0120}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0403}]}{\mathrm{Km0403}}\right) + \left(1 + \frac{[\mathrm{s\_1365}]}{\mathrm{Km1365}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1487}]}{\mathrm{Km1487}}\right) - 1} \tag{453}$$

Table 908: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.007	dimensionless	☑
Vmax		0000324	0.099	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0120		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0403		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1365		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1487		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.227 Reaction r_0913

This is a reversible reaction of one reactant forming one product influenced by three modifiers.

Name phosphoribosylanthranilate isomerase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_1187} \xrightleftharpoons{\text{e\_0165, s\_1187, s\_0076}} \text{s\_0076} \tag{454}$$

Reactant

Table 909: Properties of each reactant.

Id	Name	SBO
s_1187	N-(5-phospho-beta-D-ribosyl)anthranilate	

Modifiers

Table 910: Properties of each modifier.

Id	Name	SBO
e_0165	TRP1	0000460
s_1187	N-(5-phospho-beta-D-ribosyl)anthranilate	
s_0076	1-(2-carboxyphenylamino)-1-deoxy-D-ribulose 5-phosphate	

Product

Table 911: Properties of each product.

Id	Name	SBO
s_0076	1-(2-carboxyphenylamino)-1-deoxy-D-ribulose 5-phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{227} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_1187}] - \frac{[\text{s\_0076}]}{\text{Keq}} \right)}{\text{Km1187}}}{1 + \frac{[\text{s\_1187}]}{\text{Km1187}} + 1 + \frac{[\text{s\_0076}]}{\text{Km0076}} - 1} \tag{455}$$

Table 912: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.001	dimensionless	☑
Vmax		0000324	0.007	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	2.000	dimensionless	☑
Km1187		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0076		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.228 Reaction r_0914

This is a reversible reaction of three reactants forming three products influenced by seven modifiers.

Name phosphoribosylglycinamidine synthetase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0327} + \mathrm{ATP} + \mathrm{s\_1003} \xrightleftharpoons{\mathrm{e\_0352,\ s\_0327,\ ATP,\ s\_1003,\ s\_0325,\ ADP,\ PHO}} \mathrm{s\_0325} + \mathrm{ADP} + \mathrm{PHO} \quad (456)$$

Reactants

Table 913: Properties of each reactant.

Id	Name	SBO
s_0327	5-phosphoribosylamine	
ATP	ATP	
s_1003	L-glycine	

Modifiers

Table 914: Properties of each modifier.

Id	Name	SBO
e_0352	ADE5,7	0000460
s_0327	5-phosphoribosylamine	
ATP	ATP	
s_1003	L-glycine	
s_0325	5-phospho-ribosyl-glycineamide	

Id	Name	SBO
ADP	ADP	
PHO	phosphate	

Products

Table 915: Properties of each product.

Id	Name	SBO
s_0325	5-phospho-ribosyl-glycineamide	
ADP	ADP	
PHO	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{228} = \frac{\frac{\text{vol(cell)}\cdot\text{Vmax}\cdot\left([\text{s\_0327}]\cdot[\text{ATP}]\cdot[\text{s\_1003}]-\frac{[\text{s\_0325}]\cdot[\text{ADP}]\cdot[\text{PHO}]}{\text{Keq}}\right)}{\text{Km0327}\cdot\text{KmATP}\cdot\text{Km1003}}}{\left(1+\frac{[\text{s\_0327}]}{\text{Km0327}}\right)\cdot\left(1+\frac{[\text{ATP}]}{\text{KmATP}}\right)\cdot\left(1+\frac{[\text{s\_1003}]}{\text{Km1003}}\right)+\left(1+\frac{[\text{s\_0325}]}{\text{Km0325}}\right)\cdot\left(1+\frac{[\text{ADP}]}{\text{KmADP}}\right)\cdot\left(1+\frac{[\text{PHO}]}{\text{KmPHO}}\right)-1} \quad (457)$$

Table 916: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.004	dimensionless	☑
Vmax		0000324	0.128	$\text{mmol}\cdot\text{l}^{-1}\cdot\text{s}^{-1}$	☑
Keq		0000281	1.015	dimensionless	☑
Km0327		0000322	0.100	$\text{mmol}\cdot\text{l}^{-1}$	☑
KmATP		0000322	2.525	$\text{mmol}\cdot\text{l}^{-1}$	☑
Km1003		0000322	0.100	$\text{mmol}\cdot\text{l}^{-1}$	☑
Km0325		0000323	0.100	$\text{mmol}\cdot\text{l}^{-1}$	☑
KmADP		0000323	1.282	$\text{mmol}\cdot\text{l}^{-1}$	☑
KmPHO		0000323	0.100	$\text{mmol}\cdot\text{l}^{-1}$	☑

6.229 Reaction r_0915

This is a reversible reaction of two reactants forming three products influenced by six modifiers.

Name phosphoribosylpyrophosphate amidotransferase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0999} + \text{s\_1386} \xrightleftharpoons{\text{e\_0763, s\_0999, s\_1386, s\_0327, s\_0633, s\_0991}} \text{s\_0327} + \text{s\_0633} + \text{s\_0991} \quad (458)$$

Reactants

Table 917: Properties of each reactant.

Id	Name	SBO
s_0999	L-glutamine	
s_1386	PRPP	

Modifiers

Table 918: Properties of each modifier.

Id	Name	SBO
e_0763	ADE4	0000460
s_0999	L-glutamine	
s_1386	PRPP	
s_0327	5-phosphoribosylamine	
s_0633	diphosphate	
s_0991	L-glutamate	

Products

Table 919: Properties of each product.

Id	Name	SBO
s_0327	5-phosphoribosylamine	
s_0633	diphosphate	
s_0991	L-glutamate	

Kinetic Law

Derived unit contains undeclared units

$$v_{229} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0999}] \cdot [\mathrm{s\_1386}] - \frac{[\mathrm{s\_0327}] \cdot [\mathrm{s\_0633}] \cdot [\mathrm{s\_0991}]}{\mathrm{Keq}} \right)}{\mathrm{Km0999} \cdot \mathrm{Km1386}}}{\left(1 + \frac{[\mathrm{s\_0999}]}{\mathrm{Km0999}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1386}]}{\mathrm{Km1386}}\right) + \left(1 + \frac{[\mathrm{s\_0327}]}{\mathrm{Km0327}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0633}]}{\mathrm{Km0633}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0991}]}{\mathrm{Km0991}}\right) - 1} \tag{459}$$

Table 920: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.004	dimensionless	☑
Vmax		0000324	0.094	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	0.200	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0999		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1386		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0327		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0633		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0991		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.230 Reaction r_0916

This is a reversible reaction of two reactants forming two products influenced by nine modifiers.

Name phosphoribosylpyrophosphate synthetase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{ATP} + \mathrm{s\_1408} \xrightleftharpoons{\mathrm{e\_0030,\ e\_0299,\ e\_0418,\ e\_0585,\ e\_0829,\ ATP,\ s\_1408,\ AMP,\ s\_1386}} \mathrm{AMP} + \mathrm{s\_1386} \tag{460}$$

Reactants

Table 921: Properties of each reactant.

Id	Name	SBO
ATP	ATP	
s_1408	ribose-5-phosphate	

Modifiers

Table 922: Properties of each modifier.

Id	Name	SBO
e_0030	PRS4	0000460
e_0299	PRS2	0000460
e_0418	PRS3	0000460
e_0585	PRS1	0000460
e_0829	PRS5	0000460
ATP	ATP	
s_1408	ribose-5-phosphate	
AMP	AMP	
s_1386	PRPP	

Products

Table 923: Properties of each product.

Id	Name	SBO
AMP	AMP	
s_1386	PRPP	

Kinetic Law

Derived unit contains undeclared units

$$v_{230} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{ATP}] \cdot [\text{s\_1408}] - \frac{[\text{AMP}] \cdot [\text{s\_1386}]}{\text{Keq}} \right)}{\text{KmATP} \cdot \text{Km1408}}}{\left(1 + \frac{[\text{ATP}]}{\text{KmATP}}\right) \cdot \left(1 + \frac{[\text{s\_1408}]}{\text{Km1408}}\right) + \left(1 + \frac{[\text{AMP}]}{\text{KmAMP}}\right) \cdot \left(1 + \frac{[\text{s\_1386}]}{\text{Km1386}}\right) - 1} \tag{461}$$

Table 924: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.013	dimensionless	☑
Vmax		0000324	0.183	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.232	dimensionless	☑
KmATP		0000322	2.525	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1408		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmAMP		0000323	0.293	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1386		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.231 Reaction r_0938

This is a reversible reaction of one reactant forming two products influenced by four modifiers.

Name prephenate dehydratase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_1377} \xrightleftharpoons{\text{e\_0802, s\_1377, CO2, s\_0951}} \text{CO2} + \text{s\_0951} \tag{462}$$

Reactant

Table 925: Properties of each reactant.

Id	Name	SBO
s_1377	prephenate	

Modifiers

Table 926: Properties of each modifier.

Id	Name	SBO
e_0802	PHA2	0000460
s_1377	prephenate	
CO2	carbon dioxide	
s_0951	keto-phenylpyruvate	

Products

Table 927: Properties of each product.

Id	Name	SBO
CO2	carbon dioxide	
s_0951	keto-phenylpyruvate	

Kinetic Law

Derived unit contains undeclared units

$$v_{231} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_1377}] - \frac{[\text{CO2}] \cdot [\text{s\_0951}]}{\text{Keq}} \right)}{\text{Km1377}}}{1 + \frac{[\text{s\_1377}]}{\text{Km1377}} + \left(1 + \frac{[\text{CO2}]}{\text{KmCO2}}\right) \cdot \left(1 + \frac{[\text{s\_0951}]}{\text{Km0951}}\right) - 1} \tag{463}$$

Table 928: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.006	dimensionless	☑
Vmax		0000324	0.058	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1377		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmCO2		0000323	1.000	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0951		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.232 Reaction r_0939

This is a reversible reaction of two reactants forming three products influenced by six modifiers.

Name prephenate dehydrogenase (NADP)

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_1207} + \text{s\_1377} \xrightleftharpoons{\text{e\_0074, s\_1207, s\_1377, s\_0204, CO2, s\_1212}} \text{s\_0204} + \text{CO2} + \text{s\_1212} \tag{464}$$

Reactants

Table 929: Properties of each reactant.

Id	Name	SBO
s_1207	NADP(+)	
s_1377	prephenate	

Modifiers

Table 930: Properties of each modifier.

Id	Name	SBO
e_0074	TYR1	0000460

Id	Name	SBO
s_1207	NADP(+)	
s_1377	prephenate	
s_0204	3-(4-hydroxyphenyl)pyruvate	
CO2	carbon dioxide	
s_1212	NADPH	

Products

Table 931: Properties of each product.

Id	Name	SBO
s_0204	3-(4-hydroxyphenyl)pyruvate	
CO2	carbon dioxide	
s_1212	NADPH	

Kinetic Law

Derived unit contains undeclared units

$$v_{232} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_1207}] \cdot [\text{s\_1377}] - \frac{[\text{s\_0204}] \cdot [\text{CO2}] \cdot [\text{s\_1212}]}{\text{Keq}} \right)}{\text{Km1207} \cdot \text{Km1377}}}{\left(1 + \frac{[\text{s\_1207}]}{\text{Km1207}}\right) \cdot \left(1 + \frac{[\text{s\_1377}]}{\text{Km1377}}\right) + \left(1 + \frac{[\text{s\_0204}]}{\text{Km0204}}\right) \cdot \left(1 + \frac{[\text{CO2}]}{\text{KmCO2}}\right) \cdot \left(1 + \frac{[\text{s\_1212}]}{\text{Km1212}}\right) - 1} \tag{465}$$

Table 932: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.004	dimensionless	☑
Vmax		0000324	0.096	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1207		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1377		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0204		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmCO2		0000323	1.000	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1212		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.233 Reaction r_0941

This is a reversible reaction of three reactants forming three products influenced by seven modifiers.

Name prolyl-tRNA synthetase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{ATP} + \mathrm{s\_1035} + \mathrm{s\_1606} \xrightleftharpoons{\text{e\_0296, ATP, s\_1035, s\_1606, AMP, s\_0633, s\_1379}} \mathrm{AMP} + \mathrm{s\_0633} + \mathrm{s\_1379} \quad (466)$$

Reactants

Table 933: Properties of each reactant.

Id	Name	SBO
ATP	ATP	
s_1035	L-proline	
s_1606	tRNA(Pro)	

Modifiers

Table 934: Properties of each modifier.

Id	Name	SBO
e_0296	AIM10	0000460
ATP	ATP	
s_1035	L-proline	
s_1606	tRNA(Pro)	
AMP	AMP	
s_0633	diphosphate	
s_1379	Pro-tRNA(Pro)	

Products

Table 935: Properties of each product.

Id	Name	SBO
AMP	AMP	

Id	Name	SBO
s_0633	diphosphate	
s_1379	Pro-tRNA(Pro)	

Kinetic Law

Derived unit contains undeclared units

$$v_{233} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{ATP}] \cdot [\mathrm{s\_1035}] \cdot [\mathrm{s\_1606}] - \frac{[\mathrm{AMP}] \cdot [\mathrm{s\_0633}] \cdot [\mathrm{s\_1379}]}{\mathrm{Keq}} \right)}{\mathrm{KmATP} \cdot \mathrm{Km1035} \cdot \mathrm{Km1606}}}{\left(1 + \frac{[\mathrm{ATP}]}{\mathrm{KmATP}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1035}]}{\mathrm{Km1035}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1606}]}{\mathrm{Km1606}}\right) + \left(1 + \frac{[\mathrm{AMP}]}{\mathrm{KmAMP}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0633}]}{\mathrm{Km0633}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1379}]}{\mathrm{Km1379}}\right) - 1} \tag{467}$$

Table 936: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.007	dimensionless	☑
Vmax		0000324	0.212	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	0.232	dimensionless	☑
KmATP		0000322	2.525	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1035		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1606		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmAMP		0000323	0.293	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0633		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1379		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.234 Reaction r_0957

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name pyrroline-5-carboxylate reductase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0118} + \mathrm{s\_1212} \xrightleftharpoons{\mathrm{e\_0276,\ s\_0118,\ s\_1212,\ s\_1035,\ s\_1207}} \mathrm{s\_1035} + \mathrm{s\_1207} \tag{468}$$

Reactants

Table 937: Properties of each reactant.

Id	Name	SBO
s_0118	1-pyrroline-5-carboxylate	
s_1212	NADPH	

Modifiers

Table 938: Properties of each modifier.

Id	Name	SBO
e_0276	PRO3	0000460
s_0118	1-pyrroline-5-carboxylate	
s_1212	NADPH	
s_1035	L-proline	
s_1207	NADP(+)	

Products

Table 939: Properties of each product.

Id	Name	SBO
s_1035	L-proline	
s_1207	NADP(+)	

Kinetic Law

Derived unit contains undeclared units

$$v_{234} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0118}] \cdot [\mathrm{s\_1212}] - \frac{[\mathrm{s\_1035}] \cdot [\mathrm{s\_1207}]}{\mathrm{Keq}} \right)}{\mathrm{Km0118} \cdot \mathrm{Km1212}}}{\left(1 + \frac{[\mathrm{s\_0118}]}{\mathrm{Km0118}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1212}]}{\mathrm{Km1212}}\right) + \left(1 + \frac{[\mathrm{s\_1035}]}{\mathrm{Km1035}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1207}]}{\mathrm{Km1207}}\right) - 1} \tag{469}$$

Table 940: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.007	dimensionless	☑
Vmax		0000324	0.099	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0118		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

Id	Name	SBO	Value	Unit	Constant
Km1212		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1035		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1207		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.235 Reaction r_0958

This is a reversible reaction of three reactants forming three products influenced by eight modifiers.

Name pyruvate carboxylase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{ATP} + \mathrm{s\_0445} + \mathrm{PYR} \xrightleftharpoons{\mathrm{e\_0334,\ e\_0084,\ ATP,\ s\_0445,\ PYR,\ ADP,\ s\_1271,\ PHO}} \mathrm{ADP} + \mathrm{s\_1271} + \mathrm{PHO} \quad (470)$$

Reactants

Table 941: Properties of each reactant.

Id	Name	SBO
ATP	ATP	
s_0445	bicarbonate	
PYR	pyruvate	

Modifiers

Table 942: Properties of each modifier.

Id	Name	SBO
e_0334	PYC1	0000460
e_0084	PYC2	0000460
ATP	ATP	
s_0445	bicarbonate	
PYR	pyruvate	
ADP	ADP	
s_1271	oxaloacetate	
PHO	phosphate	

Products

Table 943: Properties of each product.

Id	Name	SBO
ADP	ADP	
s_1271	oxaloacetate	
PHO	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{235} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{ATP}] \cdot [\text{s\_0445}] \cdot [\text{PYR}] - \frac{[\text{ADP}] \cdot [\text{s\_1271}] \cdot [\text{PHO}]}{\text{Keq}} \right)}{\text{KmATP} \cdot \text{Km0445} \cdot \text{KmPYR}}}{\left(1 + \frac{[\text{ATP}]}{\text{KmATP}}\right) \cdot \left(1 + \frac{[\text{s\_0445}]}{\text{Km0445}}\right) \cdot \left(1 + \frac{[\text{PYR}]}{\text{KmPYR}}\right) + \left(1 + \frac{[\text{ADP}]}{\text{KmADP}}\right) \cdot \left(1 + \frac{[\text{s\_1271}]}{\text{Km1271}}\right) \cdot \left(1 + \frac{[\text{PHO}]}{\text{KmPHO}}\right) - 1} \tag{471}$$

Table 944: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.141	dimensionless	☑
Vmax		0000324	4.222	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.056	dimensionless	☑
KmATP		0000322	2.525	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0445		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmPYR		0000322	1.815	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmADP		0000323	1.282	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1271		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmPHO		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.236 Reaction PDC

This is a reversible reaction of one reactant forming two products influenced by four modifiers.

Name pyruvate decarboxylase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{PYR} \xrightleftharpoons{\text{e\_0370, e\_0636, e\_0647, PYR}} \text{AcAld} + \text{CO2} \tag{472}$$

Reactant

Table 945: Properties of each reactant.

Id	Name	SBO
PYR	pyruvate	

Modifiers

Table 946: Properties of each modifier.

Id	Name	SBO
e_0370	PDC6	0000460
e_0636	PDC1	0000460
e_0647	PDC5	0000460
PYR	pyruvate	

Products

Table 947: Properties of each product.

Id	Name	SBO
AcAld	acetaldehyde	
CO2	carbon dioxide	

Kinetic Law

Derived unit contains undeclared units

$$v_{236} = \mathrm{vol}\,(\mathrm{cell}) \cdot \frac{\mathrm{Vmax} \cdot \left(\frac{[\mathrm{PYR}]}{\mathrm{Kpyr}}\right)^{\mathrm{nH}}}{1 + \left(\frac{[\mathrm{PYR}]}{\mathrm{Kpyr}}\right)^{\mathrm{nH}}} \tag{473}$$

Table 948: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
Vmax			14.297	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Kpyr			4.330	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
nH			1.900	dimensionless	☑
FLUX_VALUE			2.300	dimensionless	☑

6.237 Reaction PYK

This is a reversible reaction of two reactants forming two products influenced by six modifiers.

Name pyruvate kinase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{ADP} + \mathrm{PEP} \xrightleftharpoons{\text{e\_0011, e\_0895, PEP, ADP, PYR, ATP}} \mathrm{ATP} + \mathrm{PYR} \tag{474}$$

Reactants

Table 949: Properties of each reactant.

Id	Name	SBO
ADP	ADP	
PEP	phosphoenolpyruvate	

Modifiers

Table 950: Properties of each modifier.

Id	Name	SBO
e_0011	CDC19	0000460
e_0895	PYK2	0000460
PEP	phosphoenolpyruvate	
ADP	ADP	
PYR	pyruvate	
ATP	ATP	

Products

Table 951: Properties of each product.

Id	Name	SBO
ATP	ATP	
PYR	pyruvate	

Kinetic Law

Derived unit contains undeclared units

$$v_{237} = \mathrm{vol}\,(\mathrm{cell}) \cdot \frac{\mathrm{Vmax} \cdot \left(\frac{[\mathrm{PEP}] \cdot [\mathrm{ADP}]}{\mathrm{Kpep} \cdot \mathrm{Kadp}} - \frac{[\mathrm{PYR}] \cdot [\mathrm{ATP}]}{\mathrm{Kpep} \cdot \mathrm{Kadp} \cdot \mathrm{Keq}} \right)}{\left(1 + \frac{[\mathrm{PEP}]}{\mathrm{Kpep}} + \frac{[\mathrm{PYR}]}{\mathrm{Kpyr}} \right) \cdot \left(1 + \frac{[\mathrm{ADP}]}{\mathrm{Kadp}} + \frac{[\mathrm{ATP}]}{\mathrm{Katp}} \right)} \tag{475}$$

Table 952: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
Vmax			16.667	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Kpep			0.140	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Kadp			0.530	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Keq			6500.000	dimensionless	☑
Kpyr			21.000	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Katp			1.500	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
FLUX_VALUE			2.300	dimensionless	☑

6.238 Reaction r_0967

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name riboflavin synthase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0158} + \mathrm{s\_0314} \xrightleftharpoons{\mathrm{e\_0841,\ s\_0158,\ s\_0314,\ s\_0328,\ PHO}} \mathrm{s\_0328} + \mathrm{PHO} \tag{476}$$

Reactants

Table 953: Properties of each reactant.

Id	Name	SBO
s_0158	2-hydroxy-3-oxobutyl phosphate	
s_0314	5-amino-6-(D-ribitylamino)uracil	

Modifiers

Table 954: Properties of each modifier.

Id	Name	SBO
e_0841	RIB4	0000460
s_0158	2-hydroxy-3-oxobutyl phosphate	
s_0314	5-amino-6-(D-ribitylamino)uracil	
s_0328	6,7-dimethyl-8-(1-D-ribityl)lumazine	
PHO	phosphate	

Products

Table 955: Properties of each product.

Id	Name	SBO
s_0328	6,7-dimethyl-8-(1-D-ribityl)lumazine	
PHO	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{238} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0158}] \cdot [\text{s\_0314}] - \frac{[\text{s\_0328}] \cdot [\text{PHO}]}{\text{Keq}} \right)}{\text{Km0158} \cdot \text{Km0314}}}{\left(1 + \frac{[\text{s\_0158}]}{\text{Km0158}}\right) \cdot \left(1 + \frac{[\text{s\_0314}]}{\text{Km0314}}\right) + \left(1 + \frac{[\text{s\_0328}]}{\text{Km0328}}\right) \cdot \left(1 + \frac{[\text{PHO}]}{\text{KmPHO}}\right) - 1} \quad (477)$$

Table 956: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$8.51191990587516 \cdot 10^{-5}$	dimensionless	☑
Vmax		0000324	0.001	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0158		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0314		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0328		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmPHO		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.239 Reaction r_0968

This is a reversible reaction of one reactant forming two products influenced by four modifiers.

Name riboflavin synthase

SBO:0000176 biochemical reaction

Reaction equation

$$2\,\mathrm{s\_0328} \xrightleftharpoons{\mathrm{e\_0090},\ \mathrm{s\_0328},\ \mathrm{s\_0314},\ \mathrm{s\_1405}} \mathrm{s\_0314} + \mathrm{s\_1405} \tag{478}$$

Reactant

Table 957: Properties of each reactant.

Id	Name	SBO
s_0328	6,7-dimethyl-8-(1-D-ribityl)lumazine	

Modifiers

Table 958: Properties of each modifier.

Id	Name	SBO
e_0090	RIB5	0000460
s_0328	6,7-dimethyl-8-(1-D-ribityl)lumazine	
s_0314	5-amino-6-(D-ribitylamino)uracil	
s_1405	riboflavin	

Products

Table 959: Properties of each product.

Id	Name	SBO
s_0314	5-amino-6-(D-ribitylamino)uracil	
s_1405	riboflavin	

Kinetic Law

Derived unit contains undeclared units

$$v_{239} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0328}]^2 - \frac{[\mathrm{s\_0314}] \cdot [\mathrm{s\_1405}]}{\mathrm{Keq}} \right)}{\mathrm{Km0328}^2}}{\left(1 + \frac{[\mathrm{s\_0328}]}{\mathrm{Km0328}}\right)^2 + \left(1 + \frac{[\mathrm{s\_0314}]}{\mathrm{Km0314}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1405}]}{\mathrm{Km1405}}\right) - 1} \tag{479}$$

Table 960: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$4.25595995293758 \cdot 10^{-5}$	dimensionless	☑
Vmax		0000324	$5.95834393411522 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0328		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0314		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1405		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.240 Reaction r_0970

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name ribonucleoside-triphosphate reductase (ATP)

SBO:0000176 biochemical reaction

Reaction equation

$$\text{ATP} + \text{s\_1616} \xrightleftharpoons{\text{e\_0398, ATP, s\_1616, s\_0586, s\_1620}} \text{s\_0586} + \text{s\_1620} \qquad (480)$$

Reactants

Table 961: Properties of each reactant.

Id	Name	SBO
ATP	ATP	
s_1616	TRX1	

Modifiers

Table 962: Properties of each modifier.

Id	Name	SBO
e_0398	TRX2	0000460
ATP	ATP	
s_1616	TRX1	
s_0586	dATP	
s_1620	TRX1 disulphide	

Products

Table 963: Properties of each product.

Id	Name	SBO
s_0586	dATP	
s_1620	TRX1 disulphide	

Kinetic Law

Derived unit contains undeclared units

$$v_{240} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{ATP}] \cdot [\text{s\_1616}] - \frac{[\text{s\_0586}] \cdot [\text{s\_1620}]}{\text{Keq}} \right)}{\text{KmATP} \cdot \text{Km1616}}}{\left(1 + \frac{[\text{ATP}]}{\text{KmATP}}\right) \cdot \left(1 + \frac{[\text{s\_1616}]}{\text{Km1616}}\right) + \left(1 + \frac{[\text{s\_0586}]}{\text{Km0586}}\right) \cdot \left(1 + \frac{[\text{s\_1620}]}{\text{Km1620}}\right) - 1} \tag{481}$$

Table 964: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$7.28671814146884 \cdot 10^{-5}$	dimensionless	☑
Vmax		0000324	0.001	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.079	dimensionless	☑
KmATP		0000322	2.525	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1616		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0586		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1620		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.241 Reaction r_0973

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name ribonucleoside-triphosphate reductase (UTP)

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_1559} + \text{s\_1616} \xrightleftharpoons{\text{e\_0398, s\_1559, s\_1616, s\_0656, s\_1620}} \text{s\_0656} + \text{s\_1620} \tag{482}$$

Reactants

Table 965: Properties of each reactant.

Id	Name	SBO
s_1559	UTP	
s_1616	TRX1	

Modifiers

Table 966: Properties of each modifier.

Id	Name	SBO
e_0398	TRX2	0000460
s_1559	UTP	
s_1616	TRX1	
s_0656	dUTP	
s_1620	TRX1 disulphide	

Products

Table 967: Properties of each product.

Id	Name	SBO
s_0656	dUTP	
s_1620	TRX1 disulphide	

Kinetic Law

Derived unit contains undeclared units

$$v_{241} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_1559}] \cdot [\mathrm{s\_1616}] - \frac{[\mathrm{s\_0656}] \cdot [\mathrm{s\_1620}]}{\mathrm{Keq}} \right)}{\mathrm{Km1559} \cdot \mathrm{Km1616}}}{\left(1 + \frac{[\mathrm{s\_1559}]}{\mathrm{Km1559}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1616}]}{\mathrm{Km1616}}\right) + \left(1 + \frac{[\mathrm{s\_0656}]}{\mathrm{Km0656}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1620}]}{\mathrm{Km1620}}\right) - 1} \tag{483}$$

Table 968: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.53320048576619 \cdot 10^{-4}$	dimensionless	☑
Vmax		0000324	0.002	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km1559		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

Id	Name	SBO	Value	Unit	Constant
Km1616		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0656		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1620		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.242 Reaction r_0974

This is a reversible reaction of two reactants forming two products influenced by eight modifiers.

Name ribonucleotide reductase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{ADP} + \mathrm{s\_1616} \xrightleftharpoons{\mathrm{e\_0467},\ \mathrm{e\_0492},\ \mathrm{e\_0387},\ \mathrm{e\_0291},\ \mathrm{ADP},\ \mathrm{s\_1616},\ \mathrm{s\_0582},\ \mathrm{s\_1620}} \mathrm{s\_0582} + \mathrm{s\_1620} \quad (484)$$

Reactants

Table 969: Properties of each reactant.

Id	Name	SBO
ADP	ADP	
s_1616	TRX1	

Modifiers

Table 970: Properties of each modifier.

Id	Name	SBO
e_0467	RNR3	0000460
e_0492	RNR2	0000460
e_0387	RNR4	0000460
e_0291	RNR1	0000460
ADP	ADP	
s_1616	TRX1	
s_0582	dADP	
s_1620	TRX1 disulphide	

Products

Table 971: Properties of each product.

Id	Name	SBO
s_0582	dADP	
s_1620	TRX1 disulphide	

Kinetic Law

Derived unit contains undeclared units

$$v_{242} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{ADP}] \cdot [\text{s\_1616}] - \frac{[\text{s\_0582}] \cdot [\text{s\_1620}]}{\text{Keq}} \right)}{\text{KmADP} \cdot \text{Km1616}}}{\left(1 + \frac{[\text{ADP}]}{\text{KmADP}}\right) \cdot \left(1 + \frac{[\text{s\_1616}]}{\text{Km1616}}\right) + \left(1 + \frac{[\text{s\_0582}]}{\text{Km0582}}\right) \cdot \left(1 + \frac{[\text{s\_1620}]}{\text{Km1620}}\right) - 1} \quad (485)$$

Table 972: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$8.18949921570746 \cdot 10^{-5}$	dimensionless	☑
Vmax		0000324	0.001	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.156	dimensionless	☑
KmADP		0000322	1.282	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1616		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0582		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1620		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.243 Reaction r_0976

This is a reversible reaction of two reactants forming two products influenced by eight modifiers.

Name ribonucleotide reductase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0467} + \text{s\_1616} \xrightleftharpoons{\text{e\_0467, e\_0492, e\_0387, e\_0291, s\_0467, s\_1616, s\_0587, s\_1620}} \text{s\_0587} + \text{s\_1620} \quad (486)$$

Reactants

Table 973: Properties of each reactant.

Id	Name	SBO
s_0467	CDP	
s_1616	TRX1	

Modifiers

Table 974: Properties of each modifier.

Id	Name	SBO
e_0467	RNR3	0000460
e_0492	RNR2	0000460
e_0387	RNR4	0000460
e_0291	RNR1	0000460
s_0467	CDP	
s_1616	TRX1	
s_0587	dCDP	
s_1620	TRX1 disulphide	

Products

Table 975: Properties of each product.

Id	Name	SBO
s_0587	dCDP	
s_1620	TRX1 disulphide	

Kinetic Law

Derived unit contains undeclared units

$$v_{243} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0467}] \cdot [\mathrm{s\_1616}] - \frac{[\mathrm{s\_0587}] \cdot [\mathrm{s\_1620}]}{\mathrm{Keq}} \right)}{\mathrm{Km0467} \cdot \mathrm{Km1616}}}{\left(1 + \frac{[\mathrm{s\_0467}]}{\mathrm{Km0467}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1616}]}{\mathrm{Km1616}}\right) + \left(1 + \frac{[\mathrm{s\_0587}]}{\mathrm{Km0587}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1620}]}{\mathrm{Km1620}}\right) - 1} \tag{487}$$

Table 976: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.04616655671391 \cdot 10^{-4}$	dimensionless	☑

Id	Name	SBO	Value	Unit	Constant
Vmax		0000324	0.001	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0467		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1616		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0587		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1620		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.244 Reaction r_0978

This is a reversible reaction of two reactants forming two products influenced by eight modifiers.

Name ribonucleotide reductase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0739} + \mathrm{s\_1616} \xrightleftharpoons{\mathrm{e\_0467,\ e\_0492,\ e\_0387,\ e\_0291,\ s\_0739,\ s\_1616,\ s\_0613,\ s\_1620}} \mathrm{s\_0613} + \mathrm{s\_1620} \quad (488)$$

Reactants

Table 977: Properties of each reactant.

Id	Name	SBO
s_0739	GDP	
s_1616	TRX1	

Modifiers

Table 978: Properties of each modifier.

Id	Name	SBO
e_0467	RNR3	0000460
e_0492	RNR2	0000460
e_0387	RNR4	0000460
e_0291	RNR1	0000460
s_0739	GDP	
s_1616	TRX1	
s_0613	dGDP	
s_1620	TRX1 disulphide	

Products

Table 979: Properties of each product.

Id	Name	SBO
s_0613	dGDP	
s_1620	TRX1 disulphide	

Kinetic Law

Derived unit contains undeclared units

$$v_{244} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0739}] \cdot [\text{s\_1616}] - \frac{[\text{s\_0613}] \cdot [\text{s\_1620}]}{\text{Keq}} \right)}{\text{Km0739} \cdot \text{Km1616}}}{\left(1 + \frac{[\text{s\_0739}]}{\text{Km0739}}\right) \cdot \left(1 + \frac{[\text{s\_1616}]}{\text{Km1616}}\right) + \left(1 + \frac{[\text{s\_0613}]}{\text{Km0613}}\right) \cdot \left(1 + \frac{[\text{s\_1620}]}{\text{Km1620}}\right) - 1} \tag{489}$$

Table 980: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.03174784204643 \cdot 10^{-4}$	dimensionless	☑
Vmax		0000324	0.001	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0739		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1616		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0613		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1620		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.245 Reaction r_0982

This is a reversible reaction of one reactant forming one product influenced by three modifiers.

Name ribose-5-phosphate isomerase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0577} \xrightleftharpoons{\text{e\_0852, s\_0577, s\_1408}} \text{s\_1408} \tag{490}$$

Reactant

Table 981: Properties of each reactant.

Id	Name	SBO
s_0577	D-ribulose 5-phosphate	

Modifiers

Table 982: Properties of each modifier.

Id	Name	SBO
e_0852	RKI1	0000460
s_0577	D-ribulose 5-phosphate	
s_1408	ribose-5-phosphate	

Product

Table 983: Properties of each product.

Id	Name	SBO
s_1408	ribose-5-phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{245} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0577}] - \frac{[\mathrm{s\_1408}]}{\mathrm{Keq}} \right)}{\mathrm{Km0577}}}{1 + \frac{[\mathrm{s\_0577}]}{\mathrm{Km0577}} + 1 + \frac{[\mathrm{s\_1408}]}{\mathrm{Km1408}} - 1} \tag{491}$$

Table 984: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.032	dimensionless	☑
Vmax		0000324	0.191	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0577		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1408		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.246 Reaction r_0984

This is a reversible reaction of one reactant forming one product influenced by three modifiers.

Name ribulose 5-phosphate 3-epimerase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0577} \xrightleftharpoons{\text{e\_0506, s\_0577, s\_0581}} \text{s\_0581} \tag{492}$$

Reactant

Table 985: Properties of each reactant.

Id	Name	SBO
s_0577	D-ribulose 5-phosphate	

Modifiers

Table 986: Properties of each modifier.

Id	Name	SBO
e_0506	RPE1	0000460
s_0577	D-ribulose 5-phosphate	
s_0581	D-xylulose 5-phosphate	

Product

Table 987: Properties of each product.

Id	Name	SBO
s_0581	D-xylulose 5-phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{246} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0577}] - \frac{[\text{s\_0581}]}{\text{Keq}} \right)}{\text{Km0577}}}{1 + \frac{[\text{s\_0577}]}{\text{Km0577}} + 1 + \frac{[\text{s\_0581}]}{\text{Km0581}} - 1} \tag{493}$$

Table 988: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.026	dimensionless	☑
Vmax		0000324	0.157	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0577		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0581		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.247 Reaction r_0986

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name S-adenosyl-methionine delta-24-sterol-c-methyltransferase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_1416} + \mathrm{s\_1569} \xrightleftharpoons{\mathrm{e\_0699,\ s\_1416,\ s\_1569,\ s\_0700,\ s\_1413}} \mathrm{s\_0700} + \mathrm{s\_1413} \tag{494}$$

Reactants

Table 989: Properties of each reactant.

Id	Name	SBO
s_1416	S-adenosyl-L-methionine	
s_1569	zymosterol	

Modifiers

Table 990: Properties of each modifier.

Id	Name	SBO
e_0699	ERG6	0000460
s_1416	S-adenosyl-L-methionine	
s_1569	zymosterol	
s_0700	fecosterol	
s_1413	S-adenosyl-L-homocysteine	

Products

Table 991: Properties of each product.

Id	Name	SBO
s_0700	fecosterol	
s_1413	S-adenosyl-L-homocysteine	

Kinetic Law

Derived unit contains undeclared units

$$v_{247} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_1416}] \cdot [\text{s\_1569}] - \frac{[\text{s\_0700}] \cdot [\text{s\_1413}]}{\text{Keq}} \right)}{\text{Km1416} \cdot \text{Km1569}}}{\left(1 + \frac{[\text{s\_1416}]}{\text{Km1416}}\right) \cdot \left(1 + \frac{[\text{s\_1569}]}{\text{Km1569}}\right) + \left(1 + \frac{[\text{s\_0700}]}{\text{Km0700}}\right) \cdot \left(1 + \frac{[\text{s\_1413}]}{\text{Km1413}}\right) - 1} \tag{495}$$

Table 992: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$9.0277971522068 \cdot 10^{-6}$	dimensionless	☑
Vmax		0000324	$1.2638916013079 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km1416		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1569		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0700		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1413		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.248 Reaction r_0988

This is a reversible reaction of two reactants forming three products influenced by six modifiers.

Name saccharopine dehydrogenase (NAD, L-lysine forming)

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_1038} + \text{NAD} \xrightleftharpoons{\text{e\_0489, s\_1038, NAD, s\_0180, s\_1025, NADH}} \text{s\_0180} + \text{s\_1025} + \text{NADH} \tag{496}$$

Reactants

Table 993: Properties of each reactant.

Id	Name	SBO
s_1038	L-saccharopine	
NAD	NAD	

Modifiers

Table 994: Properties of each modifier.

Id	Name	SBO
e_0489	LYS1	0000460
s_1038	L-saccharopine	
NAD	NAD	
s_0180	2-oxoglutarate	
s_1025	L-lysine	
NADH	NADH	

Products

Table 995: Properties of each product.

Id	Name	SBO
s_0180	2-oxoglutarate	
s_1025	L-lysine	
NADH	NADH	

Kinetic Law

Derived unit contains undeclared units

$$v_{248} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_1038}] \cdot [\mathrm{NAD}] - \frac{[\mathrm{s\_0180}] \cdot [\mathrm{s\_1025}] \cdot [\mathrm{NADH}]}{\mathrm{Keq}} \right)}{\mathrm{Km1038} \cdot \mathrm{KmNAD}}}{\left(1 + \frac{[\mathrm{s\_1038}]}{\mathrm{Km1038}}\right) \cdot \left(1 + \frac{[\mathrm{NAD}]}{\mathrm{KmNAD}}\right) + \left(1 + \frac{[\mathrm{s\_0180}]}{\mathrm{Km0180}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1025}]}{\mathrm{Km1025}}\right) \cdot \left(1 + \frac{[\mathrm{NADH}]}{\mathrm{KmNADH}}\right) - 1} \tag{497}$$

Table 996: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.012	dimensionless	☑

Id	Name	SBO	Value	Unit	Constant
Vmax		0000324	0.271	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	0.012	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1038		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmNAD		0000322	1.503	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0180		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1025		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmNADH		0000323	0.087	$\mathrm{mmol \cdot l^{-1}}$	☑

6.249 Reaction r_0989

This is a reversible reaction of three reactants forming two products influenced by six modifiers.

Name saccharopine dehydrogenase (NADP, L-glutamate forming)

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0959} + \mathrm{s\_0991} + \mathrm{s\_1212} \xrightleftharpoons{\mathrm{e\_0813,\ s\_0959,\ s\_0991,\ s\_1212,\ s\_1038,\ s\_1207}} \mathrm{s\_1038} + \mathrm{s\_1207} \tag{498}$$

Reactants

Table 997: Properties of each reactant.

Id	Name	SBO
s_0959	L-allysine	
s_0991	L-glutamate	
s_1212	NADPH	

Modifiers

Table 998: Properties of each modifier.

Id	Name	SBO
e_0813	LYS9	0000460
s_0959	L-allysine	
s_0991	L-glutamate	
s_1212	NADPH	
s_1038	L-saccharopine	
s_1207	NADP(+)	

Products

Table 999: Properties of each product.

Id	Name	SBO
s_1038	L-saccharopine	
s_1207	NADP(+)	

Kinetic Law

Derived unit contains undeclared units

$$v_{249} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0959}] \cdot [\text{s\_0991}] \cdot [\text{s\_1212}] - \frac{[\text{s\_1038}] \cdot [\text{s\_1207}]}{\text{Keq}} \right)}{\text{Km0959} \cdot \text{Km0991} \cdot \text{Km1212}}}{\left(1 + \frac{[\text{s\_0959}]}{\text{Km0959}}\right) \cdot \left(1 + \frac{[\text{s\_0991}]}{\text{Km0991}}\right) \cdot \left(1 + \frac{[\text{s\_1212}]}{\text{Km1212}}\right) + \left(1 + \frac{[\text{s\_1038}]}{\text{Km1038}}\right) \cdot \left(1 + \frac{[\text{s\_1207}]}{\text{Km1207}}\right) - 1} \tag{499}$$

Table 1000: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.012	dimensionless	☑
Vmax		0000324	0.271	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	20.000	$\text{mmol}^{-1} \cdot \text{l}$	☑
Km0959		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0991		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1212		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1038		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1207		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.250 Reaction r_0990

This is a reversible reaction of two reactants forming one product influenced by four modifiers.

Name sedoheptulose 1,7-bisphosphate D-glyceraldehyde-3-phosphate-lyase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0551} + \text{DHAP} \xrightleftharpoons{\text{e\_0567, s\_0551, DHAP, s\_1426}} \text{s\_1426} \tag{500}$$

Reactants

Table 1001: Properties of each reactant.

Id	Name	SBO
s_0551	D-erythrose 4-phosphate	
DHAP	dihydroxyacetone phosphate	

Modifiers

Table 1002: Properties of each modifier.

Id	Name	SBO
e_0567	FBA1	0000460
s_0551	D-erythrose 4-phosphate	
DHAP	dihydroxyacetone phosphate	
s_1426	sedoheptulose 1,7-bisphosphate	

Product

Table 1003: Properties of each product.

Id	Name	SBO
s_1426	sedoheptulose 1,7-bisphosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{250} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0551}] \cdot [\text{DHAP}] - \frac{[\text{s\_1426}]}{\text{Keq}} \right)}{\text{Km0551} \cdot \text{KmDHAP}}}{\left(1 + \frac{[\text{s\_0551}]}{\text{Km0551}}\right) \cdot \left(1 + \frac{[\text{DHAP}]}{\text{KmDHAP}}\right) + 1 + \frac{[\text{s\_1426}]}{\text{Km1426}} - 1} \tag{501}$$

Table 1004: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.009	dimensionless	☑
Vmax		0000324	0.086	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	1.992	$\text{mmol}^{-1} \cdot \text{l}$	☑
Km0551		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

Id	Name	SBO	Value	Unit	Constant
KmDHAP		0000322	1.004	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1426		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.251 Reaction r_0993

This is a reversible reaction of two reactants forming three products influenced by eight modifiers.

Name serine palmitotransferase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_1039} + \mathrm{s\_1302} \xrightleftharpoons{\mathrm{e\_0054,\ e\_0177,\ e\_0761,\ s\_1039,\ s\_1302,\ s\_0231,\ CO2,\ s\_0529}} \mathrm{s\_0231} + \mathrm{CO2} + \mathrm{s\_0529} \quad (502)$$

Reactants

Table 1005: Properties of each reactant.

Id	Name	SBO
s_1039	L-serine	
s_1302	palmitoyl-CoA	

Modifiers

Table 1006: Properties of each modifier.

Id	Name	SBO
e_0054	TSC3	0000460
e_0177	LCB2	0000460
e_0761	LCB1	0000460
s_1039	L-serine	
s_1302	palmitoyl-CoA	
s_0231	3-ketosphinganine	
CO2	carbon dioxide	
s_0529	coenzyme A	

Products

Table 1007: Properties of each product.

Id	Name	SBO
s_0231	3-ketosphinganine	
CO2	carbon dioxide	
s_0529	coenzyme A	

Kinetic Law

Derived unit contains undeclared units

$$v_{251} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_1039}] \cdot [\mathrm{s\_1302}] - \frac{[\mathrm{s\_0231}] \cdot [\mathrm{CO2}] \cdot [\mathrm{s\_0529}]}{\mathrm{Keq}} \right)}{\mathrm{Km1039} \cdot \mathrm{Km1302}}}{\left(1 + \frac{[\mathrm{s\_1039}]}{\mathrm{Km1039}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1302}]}{\mathrm{Km1302}}\right) + \left(1 + \frac{[\mathrm{s\_0231}]}{\mathrm{Km0231}}\right) \cdot \left(1 + \frac{[\mathrm{CO2}]}{\mathrm{KmCO2}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0529}]}{\mathrm{Km0529}}\right) - 1} \tag{503}$$

Table 1008: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.22290041668838 \cdot 10^{-5}$	dimensionless	☑
Vmax		0000324	$4.89038091671887 \cdot 10^{-4}$	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Keq		0000281	2.000	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1039		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1302		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0231		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
KmCO2		0000323	1.000	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0529		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.252 Reaction r_0995

This is a reversible reaction of three reactants forming three products influenced by eight modifiers.

Name seryl-tRNA synthetase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{ATP} + \mathrm{s\_1039} + \mathrm{s\_1607} \xrightleftharpoons{\mathrm{e\_0168,\ e\_0425,\ ATP,\ s\_1039,\ s\_1607,\ AMP,\ s\_0633,\ s\_1428}} \mathrm{AMP} + \mathrm{s\_0633} + \mathrm{s\_1428} \tag{504}$$

Reactants

Table 1009: Properties of each reactant.

Id	Name	SBO
ATP	ATP	
s_1039	L-serine	
s_1607	tRNA(Ser)	

Modifiers

Table 1010: Properties of each modifier.

Id	Name	SBO
e_0168	SES1	0000460
e_0425	DIA4	0000460
ATP	ATP	
s_1039	L-serine	
s_1607	tRNA(Ser)	
AMP	AMP	
s_0633	diphosphate	
s_1428	Ser-tRNA(Ser)	

Products

Table 1011: Properties of each product.

Id	Name	SBO
AMP	AMP	
s_0633	diphosphate	
s_1428	Ser-tRNA(Ser)	

Kinetic Law

Derived unit contains undeclared units

$$v_{252} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{ATP}] \cdot [\mathrm{s\_1039}] \cdot [\mathrm{s\_1607}] - \frac{[\mathrm{AMP}] \cdot [\mathrm{s\_0633}] \cdot [\mathrm{s\_1428}]}{\mathrm{Keq}} \right)}{\mathrm{KmATP} \cdot \mathrm{Km1039} \cdot \mathrm{Km1607}}}{\left(1 + \frac{[\mathrm{ATP}]}{\mathrm{KmATP}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1039}]}{\mathrm{Km1039}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1607}]}{\mathrm{Km1607}}\right) + \left(1 + \frac{[\mathrm{AMP}]}{\mathrm{KmAMP}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0633}]}{\mathrm{Km0633}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1428}]}{\mathrm{Km1428}}\right) - 1} \tag{505}$$

Table 1012: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.008	dimensionless	☑
Vmax		0000324	0.239	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	0.232	dimensionless	☑
KmATP		0000322	2.525	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1039		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1607		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmAMP		0000323	0.293	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0633		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1428		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.253 Reaction r_0996

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name shikimate dehydrogenase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0211} + \mathrm{s\_1212} \xrightleftharpoons{\mathrm{e\_0182,\ s\_0211,\ s\_1212,\ s\_1207,\ s\_1429}} \mathrm{s\_1207} + \mathrm{s\_1429} \tag{506}$$

Reactants

Table 1013: Properties of each reactant.

Id	Name	SBO
s_0211	3-dehydroshikimate	
s_1212	NADPH	

Modifiers

Table 1014: Properties of each modifier.

Id	Name	SBO
e_0182	ARO1	0000460
s_0211	3-dehydroshikimate	
s_1212	NADPH	
s_1207	NADP(+)	

Id	Name	SBO
s_1429	shikimate	

Products

Table 1015: Properties of each product.

Id	Name	SBO
s_1207	NADP(+)	
s_1429	shikimate	

Kinetic Law

Derived unit contains undeclared units

$$v_{253} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0211}] \cdot [\text{s\_1212}] - \frac{[\text{s\_1207}] \cdot [\text{s\_1429}]}{\text{Keq}} \right)}{\text{Km0211} \cdot \text{Km1212}}}{\left(1 + \frac{[\text{s\_0211}]}{\text{Km0211}}\right) \cdot \left(1 + \frac{[\text{s\_1212}]}{\text{Km1212}}\right) + \left(1 + \frac{[\text{s\_1207}]}{\text{Km1207}}\right) \cdot \left(1 + \frac{[\text{s\_1429}]}{\text{Km1429}}\right) - 1} \tag{507}$$

Table 1016: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.011	dimensionless	☑
Vmax		0000324	0.159	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0211		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1212		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1207		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1429		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.254 Reaction r_0997

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name shikimate kinase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{ATP} + \text{s\_1429} \xrightleftharpoons{\text{e\_0182, ATP, s\_1429, s\_0261, ADP}} \text{s\_0261} + \text{ADP} \tag{508}$$

Reactants

Table 1017: Properties of each reactant.

Id	Name	SBO
ATP	ATP	
s_1429	shikimate	

Modifiers

Table 1018: Properties of each modifier.

Id	Name	SBO
e_0182	ARO1	0000460
ATP	ATP	
s_1429	shikimate	
s_0261	3-phosphoshikimic acid	
ADP	ADP	

Products

Table 1019: Properties of each product.

Id	Name	SBO
s_0261	3-phosphoshikimic acid	
ADP	ADP	

Kinetic Law

Derived unit contains undeclared units

$$v_{254} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{ATP}] \cdot [\mathrm{s\_1429}] - \frac{[\mathrm{s\_0261}] \cdot [\mathrm{ADP}]}{\mathrm{Keq}} \right)}{\mathrm{KmATP} \cdot \mathrm{Km1429}}}{\left(1 + \frac{[\mathrm{ATP}]}{\mathrm{KmATP}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1429}]}{\mathrm{Km1429}}\right) + \left(1 + \frac{[\mathrm{s\_0261}]}{\mathrm{Km0261}}\right) \cdot \left(1 + \frac{[\mathrm{ADP}]}{\mathrm{KmADP}}\right) - 1} \tag{509}$$

Table 1020: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.011	dimensionless	☑
Vmax		0000324	0.159	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑

Id	Name	SBO	Value	Unit	Constant
Keq		0000281	1.015	dimensionless	☑
KmATP		0000322	2.525	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1429		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0261		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
KmADP		0000323	1.282	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.255 Reaction r_1010

This is a reversible reaction of three reactants forming two products influenced by six modifiers.

Name squalene epoxidase (NAD)

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{NADH} + \mathrm{s\_1275} + \mathrm{s\_1447} \xrightleftharpoons{\text{e\_0385, NADH, s\_1275, s\_1447, s\_0037, NAD}} \mathrm{s\_0037} + \mathrm{NAD} \tag{510}$$

Reactants

Table 1021: Properties of each reactant.

Id	Name	SBO
NADH	NADH	
s_1275	oxygen	
s_1447	squalene	

Modifiers

Table 1022: Properties of each modifier.

Id	Name	SBO
e_0385	ERG1	0000460
NADH	NADH	
s_1275	oxygen	
s_1447	squalene	
s_0037	(S)-2,3-epoxysqualene	
NAD	NAD	

Products

Table 1023: Properties of each product.

Id	Name	SBO
s_0037	(S)-2,3-epoxysqualene	
NAD	NAD	

Kinetic Law

Derived unit contains undeclared units

$$v_{255} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{NADH}] \cdot [\text{s\_1275}] \cdot [\text{s\_1447}] - \frac{[\text{s\_0037}] \cdot [\text{NAD}]}{\text{Keq}} \right)}{\text{KmNADH} \cdot \text{Km1275} \cdot \text{Km1447}}}{\left(1 + \frac{[\text{NADH}]}{\text{KmNADH}}\right) \cdot \left(1 + \frac{[\text{s\_1275}]}{\text{Km1275}}\right) \cdot \left(1 + \frac{[\text{s\_1447}]}{\text{Km1447}}\right) + \left(1 + \frac{[\text{s\_0037}]}{\text{Km0037}}\right) \cdot \left(1 + \frac{[\text{NAD}]}{\text{KmNAD}}\right) - 1} \tag{511}$$

Table 1024: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.94478038038606 \cdot 10^{-4}$	dimensionless	☑
Vmax		0000324	0.006	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	346.741	$\text{mmol}^{-1} \cdot \text{l}$	☑
KmNADH		0000322	0.087	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1275		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1447		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0037		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmNAD		0000323	1.503	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.256 Reaction r_1012

This is a reversible reaction of two reactants forming three products influenced by six modifiers.

Name squalene synthase

SBO:0000176 biochemical reaction

Reaction equation

$$2\,\text{s\_0190} + \text{s\_1212} \xrightleftharpoons{\text{e\_0456, s\_0190, s\_1212, s\_0633, s\_1207, s\_1447}} 2\,\text{s\_0633} + \text{s\_1207} + \text{s\_1447} \tag{512}$$

Reactants

Table 1025: Properties of each reactant.

Id	Name	SBO
s_0190	farnesyl diphosphate	
s_1212	NADPH	

Modifiers

Table 1026: Properties of each modifier.

Id	Name	SBO
e_0456	ERG9	0000460
s_0190	farnesyl diphosphate	
s_1212	NADPH	
s_0633	diphosphate	
s_1207	NADP(+)	
s_1447	squalene	

Products

Table 1027: Properties of each product.

Id	Name	SBO
s_0633	diphosphate	
s_1207	NADP(+)	
s_1447	squalene	

Kinetic Law

Derived unit contains undeclared units

$$v_{256} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0190}]^2 \cdot [\mathrm{s\_1212}] - \frac{[\mathrm{s\_0633}]^2 \cdot [\mathrm{s\_1207}] \cdot [\mathrm{s\_1447}]}{\mathrm{Keq}} \right)}{\mathrm{Km0190}^2 \cdot \mathrm{Km1212}}}{\left(1 + \frac{[\mathrm{s\_0190}]}{\mathrm{Km0190}}\right)^2 \cdot \left(1 + \frac{[\mathrm{s\_1212}]}{\mathrm{Km1212}}\right) + \left(1 + \frac{[\mathrm{s\_0633}]}{\mathrm{Km0633}}\right)^2 \cdot \left(1 + \frac{[\mathrm{s\_1207}]}{\mathrm{Km1207}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1447}]}{\mathrm{Km1447}}\right) - 1} \tag{513}$$

Table 1028: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.94478038038606 \cdot 10^{-4}$	dimensionless	☑
Vmax		0000324	0.014	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Keq		0000281	0.200	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0190		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1212		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0633		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1207		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1447		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.257 Reaction r_1014

This is a reversible reaction of two reactants forming one product influenced by five modifiers.

Name steryl ester hydrolase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0666} + 1 \cdot 8\,\mathrm{s\_0595} \xrightleftharpoons{\mathrm{e\_0578},\ \mathrm{e\_0613},\ \mathrm{s\_0666},\ \mathrm{s\_0595},\ \mathrm{s\_0672}} \mathrm{s\_0672} \qquad (514)$$

Reactants

Table 1029: Properties of each reactant.

Id	Name	SBO
s_0666	ergosterol	
s_0595	decanoate	

Modifiers

Table 1030: Properties of each modifier.

Id	Name	SBO
e_0578	TGL1	0000460
e_0613	YEH1	0000460
s_0666	ergosterol	
s_0595	decanoate	
s_0672	ergosterol ester	

Product

Table 1031: Properties of each product.

Id	Name	SBO
s_0672	ergosterol ester	

Kinetic Law

Derived unit contains undeclared units

$$v_{257} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0666}] \cdot [\text{s\_0595}] - \frac{[\text{s\_0672}]}{\text{Keq}} \right)}{\text{Km0666} \cdot \text{Km0595}}}{\left(1 + \frac{[\text{s\_0666}]}{\text{Km0666}}\right) \cdot \left(1 + \frac{[\text{s\_0595}]}{\text{Km0595}}\right) + 1 + \frac{[\text{s\_0672}]}{\text{Km0672}} - 1} \tag{515}$$

Table 1032: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$3.49074696876419 \cdot 10^{-5}$	dimensionless	☑
Vmax		0000324	$3.49074696876838 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	20.000	$\text{mmol}^{-1} \cdot \text{l}$	☑
Km0666		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0595		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0672		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.258 Reaction r_1021

This is a reversible reaction of two reactants forming two products influenced by nine modifiers.

Name succinate dehydrogenase (ubiquinone-6)

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_1458} + \text{s\_1537} \xrightleftharpoons{\text{e\_0579, e\_0188, e\_0494, e\_0619, e\_0581, s\_1458, s\_1537, s\_0725, s\_1535}} \text{s\_0725} + \text{s\_1535} \tag{516}$$

Reactants

Table 1033: Properties of each reactant.

Id	Name	SBO
s_1458	succinate	
s_1537	ubiquinone-6	

Modifiers

Table 1034: Properties of each modifier.

Id	Name	SBO
e_0579	SDH3	0000460
e_0188	SDH4	0000460
e_0494	YJL045W	0000460
e_0619	SDH2	0000460
e_0581	SDH1	0000460
s_1458	succinate	
s_1537	ubiquinone-6	
s_0725	fumarate	
s_1535	ubiquinol-6	

Products

Table 1035: Properties of each product.

Id	Name	SBO
s_0725	fumarate	
s_1535	ubiquinol-6	

Kinetic Law

Derived unit contains undeclared units

$$v_{258} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_1458}] \cdot [\mathrm{s\_1537}] - \frac{[\mathrm{s\_0725}] \cdot [\mathrm{s\_1535}]}{\mathrm{Keq}} \right)}{\mathrm{Km1458} \cdot \mathrm{Km1537}}}{\left(1 + \frac{[\mathrm{s\_1458}]}{\mathrm{Km1458}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1537}]}{\mathrm{Km1537}}\right) + \left(1 + \frac{[\mathrm{s\_0725}]}{\mathrm{Km0725}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1535}]}{\mathrm{Km1535}}\right) - 1} \tag{517}$$

Table 1036: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.016	dimensionless	☑
Vmax		0000324	0.230	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	2.000	dimensionless	☑
Km1458		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1537		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0725		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1535		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.259 Reaction r_1026

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name sulfate adenylyltransferase (ADP)

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{ADP} + \mathrm{s\_1467} \xrightleftharpoons{\text{e\_0107, ADP, s\_1467, s\_0298, PHO}} \mathrm{s\_0298} + \mathrm{PHO} \tag{518}$$

Reactants

Table 1037: Properties of each reactant.

Id	Name	SBO
ADP	ADP	
s_1467	sulphate	

Modifiers

Table 1038: Properties of each modifier.

Id	Name	SBO
e_0107	APA1	0000460
ADP	ADP	
s_1467	sulphate	
s_0298	5'-adenylyl sulfate	
PHO	phosphate	

Products

Table 1039: Properties of each product.

Id	Name	SBO
s_0298	5'-adenylyl sulfate	
PHO	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{259} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{ADP}] \cdot [\text{s\_1467}] - \frac{[\text{s\_0298}] \cdot [\text{PHO}]}{\text{Keq}} \right)}{\text{KmADP} \cdot \text{Km1467}}}{\left(1 + \frac{[\text{ADP}]}{\text{KmADP}}\right) \cdot \left(1 + \frac{[\text{s\_1467}]}{\text{Km1467}}\right) + \left(1 + \frac{[\text{s\_0298}]}{\text{Km0298}}\right) \cdot \left(1 + \frac{[\text{PHO}]}{\text{KmPHO}}\right) - 1} \tag{519}$$

Table 1040: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.002	dimensionless	☑
Vmax		0000324	0.034	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.156	dimensionless	☑
KmADP		0000322	1.282	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1467		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0298		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmPHO		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.260 Reaction r_1027

This is a reversible reaction of two reactants forming two products influenced by six modifiers.

Name sulfite reductase (NADPH2)

SBO:0000176 biochemical reaction

Reaction equation

$$3\,\text{s\_1212} + \text{s\_1469} \xrightleftharpoons{\text{e\_0547, e\_0321, s\_1212, s\_1469, s\_0841, s\_1207}} \text{s\_0841} + 3\,\text{s\_1207} \tag{520}$$

Reactants

Table 1041: Properties of each reactant.

Id	Name	SBO
s_1212	NADPH	
s_1469	sulphite	

Modifiers

Table 1042: Properties of each modifier.

Id	Name	SBO
e_0547	MET5	0000460
e_0321	MET10	0000460
s_1212	NADPH	
s_1469	sulphite	
s_0841	hydrogen sulfide	
s_1207	NADP(+)	

Products

Table 1043: Properties of each product.

Id	Name	SBO
s_0841	hydrogen sulfide	
s_1207	NADP(+)	

Kinetic Law

Derived unit contains undeclared units

$$v_{260} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_1212}]^3 \cdot [\text{s\_1469}] - \frac{[\text{s\_0841}] \cdot [\text{s\_1207}]^3}{\text{Keq}} \right)}{\text{Km1212}^3 \cdot \text{Km1469}}}{\left(1 + \frac{[\text{s\_1212}]}{\text{Km1212}}\right)^3 \cdot \left(1 + \frac{[\text{s\_1469}]}{\text{Km1469}}\right) + \left(1 + \frac{[\text{s\_0841}]}{\text{Km0841}}\right) \cdot \left(1 + \frac{[\text{s\_1207}]}{\text{Km1207}}\right)^3 - 1} \quad (521)$$

Table 1044: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.002	dimensionless	☑
Vmax		0000324	0.153	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑

Id	Name	SBO	Value	Unit	Constant
Km1212		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1469		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0841		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1207		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.261 Reaction r_1038

This is a reversible reaction of two reactants forming two products influenced by ten modifiers.

Name thioredoxin reductase (NADPH)

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_1212} + \mathrm{s\_1620} \xrightleftharpoons{\mathrm{e\_0633},\ \mathrm{e\_0218},\ \mathrm{e\_0398},\ \mathrm{e\_0448},\ \mathrm{e\_0915},\ \mathrm{e\_0124},\ \mathrm{s\_1212},\ \mathrm{s\_1620},\ \mathrm{s\_1207},\ \mathrm{s\_1616}} \mathrm{s\_1207} + \mathrm{s\_1616} \tag{522}$$

Reactants

Table 1045: Properties of each reactant.

Id	Name	SBO
s_1212	NADPH	
s_1620	TRX1 disulphide	

Modifiers

Table 1046: Properties of each modifier.

Id	Name	SBO
e_0633	TRX1	0000460
e_0218	TRR1	0000460
e_0398	TRX2	0000460
e_0448	TRR2	0000460
e_0915	GLR1	0000460
e_0124	TRX3	0000460
s_1212	NADPH	
s_1620	TRX1 disulphide	
s_1207	NADP(+)	
s_1616	TRX1	

Products

Table 1047: Properties of each product.

Id	Name	SBO
s_1207	NADP(+)	
s_1616	TRX1	

Kinetic Law

Derived unit contains undeclared units

$$v_{261} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_1212}] \cdot [\text{s\_1620}] - \frac{[\text{s\_1207}] \cdot [\text{s\_1616}]}{\text{Keq}} \right)}{\text{Km1212} \cdot \text{Km1620}}}{\left(1 + \frac{[\text{s\_1212}]}{\text{Km1212}}\right) \cdot \left(1 + \frac{[\text{s\_1620}]}{\text{Km1620}}\right) + \left(1 + \frac{[\text{s\_1207}]}{\text{Km1207}}\right) \cdot \left(1 + \frac{[\text{s\_1616}]}{\text{Km1616}}\right) - 1} \tag{523}$$

Table 1048: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.003	dimensionless	☑
Vmax		0000324	0.042	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km1212		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1620		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1207		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1616		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.262 Reaction r_1040

This is a reversible reaction of one reactant forming two products influenced by four modifiers.

Name threonine aldolase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_1045} \xrightleftharpoons{\text{e\_0260, s\_1045, AcAld, s\_1003}} \text{AcAld} + \text{s\_1003} \tag{524}$$

Reactant

Table 1049: Properties of each reactant.

Id	Name	SBO
s_1045	L-threonine	

Modifiers

Table 1050: Properties of each modifier.

Id	Name	SBO
e_0260	GLY1	0000460
s_1045	L-threonine	
AcAld	acetaldehyde	
s_1003	L-glycine	

Products

Table 1051: Properties of each product.

Id	Name	SBO
AcAld	acetaldehyde	
s_1003	L-glycine	

Kinetic Law

Derived unit contains undeclared units

$$v_{262} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_1045}] - \frac{[\text{AcAld}] \cdot [\text{s\_1003}]}{\text{Keq}} \right)}{\text{Km1045}}}{1 + \frac{[\text{s\_1045}]}{\text{Km1045}} + \left(1 + \frac{[\text{AcAld}]}{\text{KmAcAld}}\right) \cdot \left(1 + \frac{[\text{s\_1003}]}{\text{Km1003}}\right) - 1} \tag{525}$$

Table 1052: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.017	dimensionless	☑
Vmax		0000324	0.172	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.356	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1045		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmAcAld		0000323	0.178	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1003		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.263 Reaction r_1041

This is a reversible reaction of one reactant forming two products influenced by four modifiers.

Name threonine synthase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_1238} \xrightleftharpoons{\text{e\_0122, s\_1238, s\_1045, PHO}} \text{s\_1045} + \text{PHO} \tag{526}$$

Reactant

Table 1053: Properties of each reactant.

Id	Name	SBO
s_1238	O-phospho-L-homoserine	

Modifiers

Table 1054: Properties of each modifier.

Id	Name	SBO
e_0122	THR4	0000460
s_1238	O-phospho-L-homoserine	
s_1045	L-threonine	
PHO	phosphate	

Products

Table 1055: Properties of each product.

Id	Name	SBO
s_1045	L-threonine	
PHO	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{263} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_1238}] - \frac{[\text{s\_1045}] \cdot [\text{PHO}]}{\text{Keq}} \right)}{\text{Km1238}}}{1 + \frac{[\text{s\_1238}]}{\text{Km1238}} + \left(1 + \frac{[\text{s\_1045}]}{\text{Km1045}}\right) \cdot \left(1 + \frac{[\text{PHO}]}{\text{KmPHO}}\right) - 1} \tag{527}$$

Table 1056: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.029	dimensionless	☑
Vmax		0000324	0.294	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.200	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1238		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1045		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmPHO		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.264 Reaction r_1042

This is a reversible reaction of three reactants forming three products influenced by seven modifiers.

Name threonyl-tRNA synthetase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{ATP} + \text{s\_1045} + \text{s\_1608} \xrightleftharpoons{\text{e\_0470, ATP, s\_1045, s\_1608, AMP, s\_0633, s\_1491}} \text{AMP} + \text{s\_0633} + \text{s\_1491} \tag{528}$$

Reactants

Table 1057: Properties of each reactant.

Id	Name	SBO
ATP	ATP	
s_1045	L-threonine	
s_1608	tRNA(Thr)	

Modifiers

Table 1058: Properties of each modifier.

Id	Name	SBO
e_0470	THS1	0000460
ATP	ATP	
s_1045	L-threonine	
s_1608	tRNA(Thr)	
AMP	AMP	
s_0633	diphosphate	
s_1491	Thr-tRNA(Thr)	

Products

Table 1059: Properties of each product.

Id	Name	SBO
AMP	AMP	
s_0633	diphosphate	
s_1491	Thr-tRNA(Thr)	

Kinetic Law

Derived unit contains undeclared units

$$v_{264} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{ATP}] \cdot [\mathrm{s\_1045}] \cdot [\mathrm{s\_1608}] - \frac{[\mathrm{AMP}] \cdot [\mathrm{s\_0633}] \cdot [\mathrm{s\_1491}]}{\mathrm{Keq}} \right)}{\mathrm{KmATP} \cdot \mathrm{Km1045} \cdot \mathrm{Km1608}}}{\left(1 + \frac{[\mathrm{ATP}]}{\mathrm{KmATP}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1045}]}{\mathrm{Km1045}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1608}]}{\mathrm{Km1608}}\right) + \left(1 + \frac{[\mathrm{AMP}]}{\mathrm{KmAMP}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0633}]}{\mathrm{Km0633}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1491}]}{\mathrm{Km1491}}\right) - 1} \tag{529}$$

Table 1060: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.008	dimensionless	☑
Vmax		0000324	0.247	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	0.232	dimensionless	☑
KmATP		0000322	2.525	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1045		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1608		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmAMP		0000323	0.293	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0633		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1491		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.265 Reaction r_1045

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name thymidylate synthase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0306} + \text{s\_0654} \xrightleftharpoons{\text{e\_0850, s\_0306, s\_0654, s\_0625, s\_0649}} \text{s\_0625} + \text{s\_0649} \tag{530}$$

Reactants

Table 1061: Properties of each reactant.

Id	Name	SBO
s_0306	5,10-methylenetetrahydrofolate	
s_0654	dUMP	

Modifiers

Table 1062: Properties of each modifier.

Id	Name	SBO
e_0850	CDC21	0000460
s_0306	5,10-methylenetetrahydrofolate	
s_0654	dUMP	
s_0625	dihydrofolic acid	
s_0649	dTMP	

Products

Table 1063: Properties of each product.

Id	Name	SBO
s_0625	dihydrofolic acid	
s_0649	dTMP	

Kinetic Law

Derived unit contains undeclared units

$$v_{265} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0306}] \cdot [\text{s\_0654}] - \frac{[\text{s\_0625}] \cdot [\text{s\_0649}]}{\text{Keq}} \right)}{\text{Km0306} \cdot \text{Km0654}}}{\left(1 + \frac{[\text{s\_0306}]}{\text{Km0306}}\right) \cdot \left(1 + \frac{[\text{s\_0654}]}{\text{Km0654}}\right) + \left(1 + \frac{[\text{s\_0625}]}{\text{Km0625}}\right) \cdot \left(1 + \frac{[\text{s\_0649}]}{\text{Km0649}}\right) - 1} \tag{531}$$

Table 1064: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.54762180106604 \cdot 10^{-4}$	dimensionless	☑
Vmax		0000324	0.002	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0306		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0654		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0625		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0649		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.266 Reaction r_1048

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name transaldolase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{GAP} + \text{s\_1427} \xrightleftharpoons{\text{e\_0684, GAP, s\_1427, s\_0551, F6P}} \text{s\_0551} + \text{F6P} \tag{532}$$

Reactants

Table 1065: Properties of each reactant.

Id	Name	SBO
GAP	glyceraldehyde 3-phosphate	
s_1427	sedoheptulose 7-phosphate	

Modifiers

Table 1066: Properties of each modifier.

Id	Name	SBO
e_0684	TAL1	0000460

Id	Name	SBO
GAP	glyceraldehyde 3-phosphate	
s_1427	sedoheptulose 7-phosphate	
s_0551	D-erythrose 4-phosphate	
F6P	D-fructose 6-phosphate	

Products

Table 1067: Properties of each product.

Id	Name	SBO
s_0551	D-erythrose 4-phosphate	
F6P	D-fructose 6-phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{266} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{GAP}] \cdot [\mathrm{s\_1427}] - \frac{[\mathrm{s\_0551}] \cdot [\mathrm{F6P}]}{\mathrm{Keq}} \right)}{\mathrm{KmGAP} \cdot \mathrm{Km1427}}}{\left(1 + \frac{[\mathrm{GAP}]}{\mathrm{KmGAP}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1427}]}{\mathrm{Km1427}}\right) + \left(1 + \frac{[\mathrm{s\_0551}]}{\mathrm{Km0551}}\right) \cdot \left(1 + \frac{[\mathrm{F6P}]}{\mathrm{KmF6P}}\right) - 1} \tag{533}$$

Table 1068: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.027	dimensionless	☑
Vmax		0000324	0.383	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Keq		0000281	27.666	dimensionless	☑
KmGAP		0000322	0.045	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1427		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0551		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
KmF6P		0000323	0.625	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.267 Reaction r_1049

This is a reversible reaction of two reactants forming two products influenced by six modifiers.

Name transketolase 1

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0581} + \text{s\_1408} \xrightleftharpoons{\text{e\_0063, e\_0962, s\_0581, s\_1408, GAP, s\_1427}} \text{GAP} + \text{s\_1427} \tag{534}$$

Reactants

Table 1069: Properties of each reactant.

Id	Name	SBO
s_0581	D-xylulose 5-phosphate	
s_1408	ribose-5-phosphate	

Modifiers

Table 1070: Properties of each modifier.

Id	Name	SBO
e_0063	TKL2	0000460
e_0962	TKL1	0000460
s_0581	D-xylulose 5-phosphate	
s_1408	ribose-5-phosphate	
GAP	glyceraldehyde 3-phosphate	
s_1427	sedoheptulose 7-phosphate	

Products

Table 1071: Properties of each product.

Id	Name	SBO
GAP	glyceraldehyde 3-phosphate	
s_1427	sedoheptulose 7-phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{267} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0581}] \cdot [\text{s\_1408}] - \frac{[\text{GAP}] \cdot [\text{s\_1427}]}{\text{Keq}} \right)}{\text{Km0581} \cdot \text{Km1408}}}{\left(1 + \frac{[\text{s\_0581}]}{\text{Km0581}}\right) \cdot \left(1 + \frac{[\text{s\_1408}]}{\text{Km1408}}\right) + \left(1 + \frac{[\text{GAP}]}{\text{KmGAP}}\right) \cdot \left(1 + \frac{[\text{s\_1427}]}{\text{Km1427}}\right) - 1} \tag{535}$$

Table 1072: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.019	dimensionless	☑
Vmax		0000324	0.262	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	0.904	dimensionless	☑
Km0581		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1408		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmGAP		0000323	0.045	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1427		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.268 Reaction r_1050

This is a reversible reaction of two reactants forming two products influenced by six modifiers.

Name transketolase 2

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0551} + \mathrm{s\_0581} \xrightleftharpoons{\mathrm{e\_0063,\ e\_0962,\ s\_0551,\ s\_0581,\ F6P,\ GAP}} \mathrm{F6P} + \mathrm{GAP} \qquad (536)$$

Reactants

Table 1073: Properties of each reactant.

Id	Name	SBO
s_0551	D-erythrose 4-phosphate	
s_0581	D-xylulose 5-phosphate	

Modifiers

Table 1074: Properties of each modifier.

Id	Name	SBO
e_0063	TKL2	0000460
e_0962	TKL1	0000460
s_0551	D-erythrose 4-phosphate	
s_0581	D-xylulose 5-phosphate	
F6P	D-fructose 6-phosphate	
GAP	glyceraldehyde 3-phosphate	

Products

Table 1075: Properties of each product.

Id	Name	SBO
F6P	D-fructose 6-phosphate	
GAP	glyceraldehyde 3-phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{268} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0551}] \cdot [\text{s\_0581}] - \frac{[\text{F6P}] \cdot [\text{GAP}]}{\text{Keq}} \right)}{\text{Km0551} \cdot \text{Km0581}}}{\left(1 + \frac{[\text{s\_0551}]}{\text{Km0551}}\right) \cdot \left(1 + \frac{[\text{s\_0581}]}{\text{Km0581}}\right) + \left(1 + \frac{[\text{F6P}]}{\text{KmF6P}}\right) \cdot \left(1 + \frac{[\text{GAP}]}{\text{KmGAP}}\right) - 1} \tag{537}$$

Table 1076: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.007	dimensionless	☑
Vmax		0000324	0.103	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	5.647	dimensionless	☑
Km0551		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0581		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmF6P		0000323	0.625	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmGAP		0000323	0.045	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.269 Reaction r_1051

This is a reversible reaction of one reactant forming two products influenced by seven modifiers.

Name trehalose-phosphatase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0409} \xrightleftharpoons{\text{e\_0711, e\_0065, e\_0179, e\_0753, s\_0409, PHO, s\_1520}} \text{PHO} + \text{s\_1520} \tag{538}$$

Reactant

Table 1077: Properties of each reactant.

Id	Name	SBO
s_0409	alpha,alpha-trehalose 6-phosphate	

Modifiers

Table 1078: Properties of each modifier.

Id	Name	SBO
e_0711	TSL1	0000460
e_0065	TPS1	0000460
e_0179	TPS2	0000460
e_0753	TPS3	0000460
s_0409	alpha,alpha-trehalose 6-phosphate	
PHO	phosphate	
s_1520	trehalose	

Products

Table 1079: Properties of each product.

Id	Name	SBO
PHO	phosphate	
s_1520	trehalose	

Kinetic Law

Derived unit contains undeclared units

$$v_{269} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0409}] - \frac{[\mathrm{PHO}] \cdot [\mathrm{s\_1520}]}{\mathrm{Keq}} \right)}{\mathrm{Km0409}}}{1 + \frac{[\mathrm{s\_0409}]}{\mathrm{Km0409}} + \left(1 + \frac{[\mathrm{PHO}]}{\mathrm{KmPHO}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1520}]}{\mathrm{Km1520}}\right) - 1} \tag{539}$$

Table 1080: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.001	dimensionless	☑
Vmax		0000324	0.010	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	0.200	$\mathrm{mmol \cdot l^{-1}}$	☑

Id	Name	SBO	Value	Unit	Constant
Km0409		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
KmPHO		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1520		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.270 Reaction r_1052

This is a reversible reaction of two reactants forming one product influenced by seven modifiers.

Name triacylglycerol lipase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0619} + 2 \cdot 6\,\mathrm{s\_0595} \xrightleftharpoons{\mathrm{e\_0176,\ e\_0611,\ e\_0765,\ e\_0851,\ s\_0619,\ s\_0595,\ s\_1524}} \mathrm{s\_1524} \quad (540)$$

Reactants

Table 1081: Properties of each reactant.

Id	Name	SBO
s_0619	diglyceride	
s_0595	decanoate	

Modifiers

Table 1082: Properties of each modifier.

Id	Name	SBO
e_0176	TGL2	0000460
e_0611	TGL4	0000460
e_0765	TGL3	0000460
e_0851	TGL5	0000460
s_0619	diglyceride	
s_0595	decanoate	
s_1524	triglyceride	

Product

Table 1083: Properties of each product.

Id	Name	SBO
s_1524	triglyceride	

Kinetic Law

Derived unit contains undeclared units

$$v_{270} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0619}] \cdot [\text{s\_0595}] - \frac{[\text{s\_1524}]}{\text{Keq}} \right)}{\text{Km0619} \cdot \text{Km0595}}}{\left(1 + \frac{[\text{s\_0619}]}{\text{Km0619}}\right) \cdot \left(1 + \frac{[\text{s\_0595}]}{\text{Km0595}}\right) + 1 + \frac{[\text{s\_1524}]}{\text{Km1524}} - 1} \tag{541}$$

Table 1084: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$5.77907768859609 \cdot 10^{-4}$	dimensionless	☑
Vmax		0000324	0.006	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	20.000	$\text{mmol}^{-1} \cdot \text{l}$	☑
Km0619		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0595		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1524		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.271 Reaction TPI

This is a reversible reaction of one reactant forming one product influenced by three modifiers.

Name triose-phosphate isomerase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{DHAP} \xrightleftharpoons{\text{e\_0175, DHAP, GAP}} \text{GAP} \tag{542}$$

Reactant

Table 1085: Properties of each reactant.

Id	Name	SBO
DHAP	dihydroxyacetone phosphate	

Modifiers

Table 1086: Properties of each modifier.

Id	Name	SBO
e_0175	TPI1	0000460
DHAP	dihydroxyacetone phosphate	
GAP	glyceraldehyde 3-phosphate	

Product

Table 1087: Properties of each product.

Id	Name	SBO
GAP	glyceraldehyde 3-phosphate	

Kinetic Law

Derived unit $\mathrm{s}^{-1} \cdot \mathrm{mmol}$

$$v_{271} = \mathrm{vol}\,(\mathrm{cell}) \cdot \mathrm{k} \cdot \left([\mathrm{DHAP}] - \frac{[\mathrm{GAP}]}{\mathrm{Keq}} \right) \tag{543}$$

Table 1088: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
k			7500.000	s^{-1}	☑
Keq			0.045	dimensionless	☑
FLUX_VALUE			0.991	dimensionless	☑

6.272 Reaction r_1055

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name tryptophan synthase (indoleglycerol phosphate)

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0086} + \mathrm{s\_1039} \rightleftharpoons^{\mathrm{e\_0330,\ s\_0086,\ s\_1039,\ GAP,\ s\_1048}} \mathrm{GAP} + \mathrm{s\_1048} \tag{544}$$

Reactants

Table 1089: Properties of each reactant.

Id	Name	SBO
s_0086	1-C-(indol-3-yl)glycerol 3-phosphate	
s_1039	L-serine	

Modifiers

Table 1090: Properties of each modifier.

Id	Name	SBO
e_0330	TRP5	0000460
s_0086	1-C-(indol-3-yl)glycerol 3-phosphate	
s_1039	L-serine	
GAP	glyceraldehyde 3-phosphate	
s_1048	L-tryptophan	

Products

Table 1091: Properties of each product.

Id	Name	SBO
GAP	glyceraldehyde 3-phosphate	
s_1048	L-tryptophan	

Kinetic Law

Derived unit contains undeclared units

$$v_{272} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0086}] \cdot [\mathrm{s\_1039}] - \frac{[\mathrm{GAP}] \cdot [\mathrm{s\_1048}]}{\mathrm{Keq}} \right)}{\mathrm{Km0086} \cdot \mathrm{Km1039}}}{\left(1 + \frac{[\mathrm{s\_0086}]}{\mathrm{Km0086}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1039}]}{\mathrm{Km1039}}\right) + \left(1 + \frac{[\mathrm{GAP}]}{\mathrm{KmGAP}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1048}]}{\mathrm{Km1048}}\right) - 1} \tag{545}$$

Table 1092: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.001	dimensionless	☑
Vmax		0000324	0.017	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑

Id	Name	SBO	Value	Unit	Constant
Keq		0000281	0.904	dimensionless	☑
Km0086		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1039		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
KmGAP		0000323	0.045	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1048		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.273 Reaction r_1057

This is a reversible reaction of three reactants forming three products influenced by seven modifiers.

Name tryptophanyl-tRNA synthetase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{ATP} + \mathrm{s\_1048} + \mathrm{s\_1610} \xrightleftharpoons{\text{e\_0836, ATP, s\_1048, s\_1610, AMP, s\_0633, s\_1527}} \mathrm{AMP} + \mathrm{s\_0633} + \mathrm{s\_1527} \quad (546)$$

Reactants

Table 1093: Properties of each reactant.

Id	Name	SBO
ATP	ATP	
s_1048	L-tryptophan	
s_1610	tRNA(Trp)	

Modifiers

Table 1094: Properties of each modifier.

Id	Name	SBO
e_0836	WRS1	0000460
ATP	ATP	
s_1048	L-tryptophan	
s_1610	tRNA(Trp)	
AMP	AMP	
s_0633	diphosphate	
s_1527	Trp-tRNA(Trp)	

Products

Table 1095: Properties of each product.

Id	Name	SBO
AMP	AMP	
s_0633	diphosphate	
s_1527	Trp-tRNA(Trp)	

Kinetic Law

Derived unit contains undeclared units

$$v_{273} = \frac{\frac{\text{vol(cell)}\cdot\text{Vmax}\cdot\left([\text{ATP}]\cdot[\text{s\_1048}]\cdot[\text{s\_1610}]-\frac{[\text{AMP}]\cdot[\text{s\_0633}]\cdot[\text{s\_1527}]}{\text{Keq}}\right)}{\text{KmATP}\cdot\text{Km1048}\cdot\text{Km1610}}}{\left(1+\frac{[\text{ATP}]}{\text{KmATP}}\right)\cdot\left(1+\frac{[\text{s\_1048}]}{\text{Km1048}}\right)\cdot\left(1+\frac{[\text{s\_1610}]}{\text{Km1610}}\right)+\left(1+\frac{[\text{AMP}]}{\text{KmAMP}}\right)\cdot\left(1+\frac{[\text{s\_0633}]}{\text{Km0633}}\right)\cdot\left(1+\frac{[\text{s\_1527}]}{\text{Km1527}}\right)-1} \quad (547)$$

Table 1096: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.001	dimensionless	☑
Vmax		0000324	0.037	$\text{mmol}\cdot\text{l}^{-1}\cdot\text{s}^{-1}$	☑
Keq		0000281	0.232	dimensionless	☑
KmATP		0000322	2.525	$\text{mmol}\cdot\text{l}^{-1}$	☑
Km1048		0000322	0.100	$\text{mmol}\cdot\text{l}^{-1}$	☑
Km1610		0000322	0.100	$\text{mmol}\cdot\text{l}^{-1}$	☑
KmAMP		0000323	0.293	$\text{mmol}\cdot\text{l}^{-1}$	☑
Km0633		0000323	0.100	$\text{mmol}\cdot\text{l}^{-1}$	☑
Km1527		0000323	0.100	$\text{mmol}\cdot\text{l}^{-1}$	☑

6.274 Reaction r_1063

This is a reversible reaction of two reactants forming two products influenced by six modifiers.

Name tyrosine transaminase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0204} + \text{s\_0991} \xrightleftharpoons{\text{e\_0348, e\_0629, s\_0204, s\_0991, s\_0180, s\_1051}} \text{s\_0180} + \text{s\_1051} \quad (548)$$

Reactants

Table 1097: Properties of each reactant.

Id	Name	SBO
s_0204	3-(4-hydroxyphenyl)pyruvate	
s_0991	L-glutamate	

Modifiers

Table 1098: Properties of each modifier.

Id	Name	SBO
e_0348	ARO8	0000460
e_0629	AAT2	0000460
s_0204	3-(4-hydroxyphenyl)pyruvate	
s_0991	L-glutamate	
s_0180	2-oxoglutarate	
s_1051	L-tyrosine	

Products

Table 1099: Properties of each product.

Id	Name	SBO
s_0180	2-oxoglutarate	
s_1051	L-tyrosine	

Kinetic Law

Derived unit contains undeclared units

$$v_{274} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0204}] \cdot [\mathrm{s\_0991}] - \frac{[\mathrm{s\_0180}] \cdot [\mathrm{s\_1051}]}{\mathrm{Keq}} \right)}{\mathrm{Km0204} \cdot \mathrm{Km0991}}}{\left(1 + \frac{[\mathrm{s\_0204}]}{\mathrm{Km0204}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0991}]}{\mathrm{Km0991}}\right) + \left(1 + \frac{[\mathrm{s\_0180}]}{\mathrm{Km0180}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1051}]}{\mathrm{Km1051}}\right) - 1} \tag{549}$$

Table 1100: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.004	dimensionless	☑

Id	Name	SBO	Value	Unit	Constant
Vmax		0000324	0.061	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0204		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0991		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0180		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1051		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.275 Reaction r_1066

This is a reversible reaction of three reactants forming three products influenced by seven modifiers.

Name tyrosyl-tRNA synthetase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{ATP} + \mathrm{s\_1051} + \mathrm{s\_1612} \xrightleftharpoons{\mathrm{e\_0390,\ ATP,\ s\_1051,\ s\_1612,\ AMP,\ s\_0633,\ s\_1533}} \mathrm{AMP} + \mathrm{s\_0633} + \mathrm{s\_1533} \quad (550)$$

Reactants

Table 1101: Properties of each reactant.

Id	Name	SBO
ATP	ATP	
s_1051	L-tyrosine	
s_1612	tRNA(Tyr)	

Modifiers

Table 1102: Properties of each modifier.

Id	Name	SBO
e_0390	TYS1	0000460
ATP	ATP	
s_1051	L-tyrosine	
s_1612	tRNA(Tyr)	
AMP	AMP	
s_0633	diphosphate	

Id	Name	SBO
s_1533	Tyr-tRNA(Tyr)	

Products

Table 1103: Properties of each product.

Id	Name	SBO
AMP	AMP	
s_0633	diphosphate	
s_1533	Tyr-tRNA(Tyr)	

Kinetic Law

Derived unit contains undeclared units

$$v_{275} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{ATP}] \cdot [\mathrm{s\_1051}] \cdot [\mathrm{s\_1612}] - \frac{[\mathrm{AMP}] \cdot [\mathrm{s\_0633}] \cdot [\mathrm{s\_1533}]}{\mathrm{Keq}} \right)}{\mathrm{KmATP} \cdot \mathrm{Km1051} \cdot \mathrm{Km1612}}}{\left(1 + \frac{[\mathrm{ATP}]}{\mathrm{KmATP}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1051}]}{\mathrm{Km1051}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1612}]}{\mathrm{Km1612}}\right) + \left(1 + \frac{[\mathrm{AMP}]}{\mathrm{KmAMP}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0633}]}{\mathrm{Km0633}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1533}]}{\mathrm{Km1533}}\right) - 1} \tag{551}$$

Table 1104: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.004	dimensionless	☑
Vmax		0000324	0.132	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	0.232	dimensionless	☑
KmATP		0000322	2.525	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1051		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1612		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmAMP		0000323	0.293	$\mathrm{mmol \cdot l^{-1}}$	☑
Km0633		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1533		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.276 Reaction r_1072

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name UMP kinase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{ATP} + \mathrm{s\_1545} \xrightleftharpoons{\mathrm{e\_0561},\ \mathrm{ATP},\ \mathrm{s\_1545},\ \mathrm{ADP},\ \mathrm{s\_1538}} \mathrm{ADP} + \mathrm{s\_1538} \tag{552}$$

Reactants

Table 1105: Properties of each reactant.

Id	Name	SBO
ATP	ATP	
s_1545	UMP	

Modifiers

Table 1106: Properties of each modifier.

Id	Name	SBO
e_0561	URA6	0000460
ATP	ATP	
s_1545	UMP	
ADP	ADP	
s_1538	UDP	

Products

Table 1107: Properties of each product.

Id	Name	SBO
ADP	ADP	
s_1538	UDP	

Kinetic Law

Derived unit contains undeclared units

$$v_{276} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{ATP}] \cdot [\mathrm{s\_1545}] - \frac{[\mathrm{ADP}] \cdot [\mathrm{s\_1538}]}{\mathrm{Keq}} \right)}{\mathrm{KmATP} \cdot \mathrm{Km1545}}}{\left(1 + \frac{[\mathrm{ATP}]}{\mathrm{KmATP}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1545}]}{\mathrm{Km1545}}\right) + \left(1 + \frac{[\mathrm{ADP}]}{\mathrm{KmADP}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1538}]}{\mathrm{Km1538}}\right) - 1} \tag{553}$$

Table 1108: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.002	dimensionless	☑
Vmax		0000324	0.031	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	1.015	dimensionless	☑
KmATP		0000322	2.525	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1545		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmADP		0000323	1.282	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1538		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.277 Reaction r_1084

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name UTP-glucose-1-phosphate uridylyltransferase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0567} + \mathrm{s\_1559} \xrightleftharpoons{\mathrm{e\_0565,\ s\_0567,\ s\_1559,\ s\_0633,\ s\_1543}} \mathrm{s\_0633} + \mathrm{s\_1543} \tag{554}$$

Reactants

Table 1109: Properties of each reactant.

Id	Name	SBO
s_0567	D-glucose 1-phosphate	
s_1559	UTP	

Modifiers

Table 1110: Properties of each modifier.

Id	Name	SBO
e_0565	UGP1	0000460
s_0567	D-glucose 1-phosphate	
s_1559	UTP	
s_0633	diphosphate	
s_1543	UDP-D-glucose	

Products

Table 1111: Properties of each product.

Id	Name	SBO
s_0633	diphosphate	
s_1543	UDP-D-glucose	

Kinetic Law

Derived unit contains undeclared units

$$v_{277} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0567}] \cdot [\text{s\_1559}] - \frac{[\text{s\_0633}] \cdot [\text{s\_1543}]}{\text{Keq}} \right)}{\text{Km0567} \cdot \text{Km1559}}}{\left(1 + \frac{[\text{s\_0567}]}{\text{Km0567}}\right) \cdot \left(1 + \frac{[\text{s\_1559}]}{\text{Km1559}}\right) + \left(1 + \frac{[\text{s\_0633}]}{\text{Km0633}}\right) \cdot \left(1 + \frac{[\text{s\_1543}]}{\text{Km1543}}\right) - 1} \tag{555}$$

Table 1112: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.121	dimensionless	☑
Vmax		0000324	1.692	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	2.000	dimensionless	☑
Km0567		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1559		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0633		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1543		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.278 Reaction r_1087

This is a reversible reaction of two reactants forming two products influenced by six modifiers.

Name valine transaminase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0232} + \text{s\_0991} \xrightleftharpoons{\text{e\_0550, e\_0457, s\_0232, s\_0991, s\_0180, s\_1056}} \text{s\_0180} + \text{s\_1056} \tag{556}$$

Reactants

Table 1113: Properties of each reactant.

Id	Name	SBO
s_0232	3-methyl-2-oxobutanoate	
s_0991	L-glutamate	

Modifiers

Table 1114: Properties of each modifier.

Id	Name	SBO
e_0550	BAT2	0000460
e_0457	BAT1	0000460
s_0232	3-methyl-2-oxobutanoate	
s_0991	L-glutamate	
s_0180	2-oxoglutarate	
s_1056	L-valine	

Products

Table 1115: Properties of each product.

Id	Name	SBO
s_0180	2-oxoglutarate	
s_1056	L-valine	

Kinetic Law

Derived unit contains undeclared units

$$v_{278} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_0232}] \cdot [\mathrm{s\_0991}] - \frac{[\mathrm{s\_0180}] \cdot [\mathrm{s\_1056}]}{\mathrm{Keq}} \right)}{\mathrm{Km0232} \cdot \mathrm{Km0991}}}{\left(1 + \frac{[\mathrm{s\_0232}]}{\mathrm{Km0232}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0991}]}{\mathrm{Km0991}}\right) + \left(1 + \frac{[\mathrm{s\_0180}]}{\mathrm{Km0180}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1056}]}{\mathrm{Km1056}}\right) - 1} \tag{557}$$

Table 1116: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.011	dimensionless	☑
Vmax		0000324	0.159	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	2.000	dimensionless	☑

Id	Name	SBO	Value	Unit	Constant
Km0232		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0991		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0180		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1056		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.279 Reaction r_1089

This is a reversible reaction of three reactants forming three products influenced by seven modifiers.

Name valyl-tRNA synthetase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{ATP} + \mathrm{s\_1056} + \mathrm{s\_1614} \xrightleftharpoons{\text{e\_0372, ATP, s\_1056, s\_1614, AMP, s\_0633, s\_1561}} \mathrm{AMP} + \mathrm{s\_0633} + \mathrm{s\_1561} \quad (558)$$

Reactants

Table 1117: Properties of each reactant.

Id	Name	SBO
ATP	ATP	
s_1056	L-valine	
s_1614	tRNA(Val)	

Modifiers

Table 1118: Properties of each modifier.

Id	Name	SBO
e_0372	VAS1	0000460
ATP	ATP	
s_1056	L-valine	
s_1614	tRNA(Val)	
AMP	AMP	
s_0633	diphosphate	
s_1561	Val-tRNA(Val)	

Products

Table 1119: Properties of each product.

Id	Name	SBO
AMP	AMP	
s_0633	diphosphate	
s_1561	Val-tRNA(Val)	

Kinetic Law

Derived unit contains undeclared units

$$v_{279} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{ATP}] \cdot [\text{s\_1056}] \cdot [\text{s\_1614}] - \frac{[\text{AMP}] \cdot [\text{s\_0633}] \cdot [\text{s\_1561}]}{\text{Keq}} \right)}{\text{KmATP} \cdot \text{Km1056} \cdot \text{Km1614}}}{\left(1 + \frac{[\text{ATP}]}{\text{KmATP}}\right) \cdot \left(1 + \frac{[\text{s\_1056}]}{\text{Km1056}}\right) \cdot \left(1 + \frac{[\text{s\_1614}]}{\text{Km1614}}\right) + \left(1 + \frac{[\text{AMP}]}{\text{KmAMP}}\right) \cdot \left(1 + \frac{[\text{s\_0633}]}{\text{Km0633}}\right) \cdot \left(1 + \frac{[\text{s\_1561}]}{\text{Km1561}}\right) - 1} \tag{559}$$

Table 1120: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.011	dimensionless	☑
Vmax		0000324	0.341	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.232	dimensionless	☑
KmATP		0000322	2.525	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1056		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1614		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmAMP		0000323	0.293	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0633		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1561		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.280 Reaction r_1115

This is a reversible reaction of one reactant forming one product influenced by two modifiers.

Name ammonia transport

SBO:0000185 transport reaction

Reaction equation

$$\text{s\_0420} \xrightleftharpoons{\text{s\_0420, s\_0419}} \text{s\_0419} \tag{560}$$

Reactant

Table 1121: Properties of each reactant.

Id	Name	SBO
s_0420	ammonium	

Modifiers

Table 1122: Properties of each modifier.

Id	Name	SBO
s_0420	ammonium	
s_0419	ammonium	

Product

Table 1123: Properties of each product.

Id	Name	SBO
s_0419	ammonium	

Kinetic Law

Derived unit contains undeclared units

$$v_{280} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot (\text{[s\_0420]} - \text{[s\_0419]})}{\text{Km0420}}}{1 + \frac{\text{[s\_0420]}}{\text{Km0420}} + 1 + \frac{\text{[s\_0419]}}{\text{Km0419}} - 1} \tag{561}$$

Table 1124: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.240	dimensionless	☑
Vmax		0000324	0.801	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Km0420		0000322	1.000	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0419		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.281 Reaction HXT

This is a reversible reaction of one reactant forming one product influenced by two modifiers.

Name glucose transport

SBO:0000185 transport reaction

Reaction equation

$$\mathrm{GLCx} \xrightleftharpoons{\mathrm{GLCx,\ GLC}} \mathrm{GLC} \tag{562}$$

Reactant

Table 1125: Properties of each reactant.

Id	Name	SBO
GLCx	D-glucose	

Modifiers

Table 1126: Properties of each modifier.

Id	Name	SBO
GLCx	D-glucose	
GLC	D-glucose	

Product

Table 1127: Properties of each product.

Id	Name	SBO
GLC	D-glucose	

Kinetic Law

Derived unit contains undeclared units

$$v_{281} = \mathrm{vol}\,(\mathrm{cell}) \cdot \frac{\frac{\mathrm{Vmax} \cdot (\mathrm{[GLCx]} - \mathrm{[GLC]})}{\mathrm{Kglc}}}{1 + \frac{\mathrm{[GLCx]}}{\mathrm{Kglc}} + \frac{\mathrm{[GLC]}}{\mathrm{Kglc}} + \frac{\frac{\mathrm{Ki} \cdot \mathrm{[GLCx]}}{\mathrm{Kglc}} \cdot \mathrm{[GLC]}}{\mathrm{Kglc}}} \tag{563}$$

Table 1128: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
Vmax			1.621	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Kglc			1.192	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Ki			0.910	dimensionless	☑
FLUX_VALUE			1.489	dimensionless	☑

6.282 Reaction r_1172

This is an irreversible reaction of one reactant forming one product influenced by one modifier.

Name glycerol transport via channel

SBO:0000185 transport reaction

Reaction equation

$$\mathrm{GLY} \xrightarrow{\mathrm{GLY}} \mathrm{s\_0766} \tag{564}$$

Reactant

Table 1129: Properties of each reactant.

Id	Name	SBO
GLY	glycerol	

Modifier

Table 1130: Properties of each modifier.

Id	Name	SBO
GLY	glycerol	

Product

Table 1131: Properties of each product.

Id	Name	SBO
s_0766	glycerol	

Kinetic Law

Derived unit contains undeclared units

$$v_{282} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot [\text{GLY}]}{\text{KmGLY}}}{1 + \frac{[\text{GLY}]}{\text{KmGLY}}} \tag{565}$$

Table 1132: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.093	dimensionless	☑
Vmax		0000324	0.186	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
KmGLY		0000322	0.150	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.283 Reaction r_1244

This is a reversible reaction of one reactant forming one product influenced by two modifiers.

Name phosphate transport

SBO:0000185 transport reaction

Reaction equation

$$\text{s\_1324} \overset{\text{s\_1324, PHO}}{\rightleftharpoons} \text{PHO} \tag{566}$$

Reactant

Table 1133: Properties of each reactant.

Id	Name	SBO
s_1324	phosphate	

Modifiers

Table 1134: Properties of each modifier.

Id	Name	SBO
s_1324	phosphate	
PHO	phosphate	

Product

Table 1135: Properties of each product.

Id	Name	SBO
PHO	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{283} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot (\text{[s\_1324]} - \text{[PHO]})}{\text{Km1324}}}{1 + \frac{\text{[s\_1324]}}{\text{Km1324}} + 1 + \frac{\text{[PHO]}}{\text{KmPHO}} - 1} \tag{567}$$

Table 1136: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.034	dimensionless	☑
Vmax		0000324	0.113	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Km1324		0000322	1.000	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmPHO		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.284 Reaction r_1266

This is a reversible reaction of one reactant forming one product influenced by two modifiers.

Name sulfate uniport

SBO:0000185 transport reaction

Reaction equation

$$\text{s\_1468} \xrightleftharpoons{\text{s\_1468, s\_1467}} \text{s\_1467} \tag{568}$$

Reactant

Table 1137: Properties of each reactant.

Id	Name	SBO
s_1468	sulphate	

Modifiers

Table 1138: Properties of each modifier.

Id	Name	SBO
s_1468	sulphate	
s_1467	sulphate	

Product

Table 1139: Properties of each product.

Id	Name	SBO
s_1467	sulphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{284} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot ([\text{s\_1468}] - [\text{s\_1467}])}{\text{Km1468}}}{1 + \frac{[\text{s\_1468}]}{\text{Km1468}} + 1 + \frac{[\text{s\_1467}]}{\text{Km1467}} - 1} \tag{569}$$

Table 1140: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.003	dimensionless	☑
Vmax		0000324	0.011	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Km1468		0000322	1.000	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1467		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.285 Reaction r_1633

This is an irreversible reaction of one reactant forming one product influenced by one modifier.

Name acetaldehyde transport

SBO:0000185 transport reaction

Reaction equation

$$\text{AcAld} \xrightarrow{\text{AcAld}} \text{s\_0360} \tag{570}$$

Reactant

Table 1141: Properties of each reactant.

Id	Name	SBO
AcAld	acetaldehyde	

Modifier

Table 1142: Properties of each modifier.

Id	Name	SBO
AcAld	acetaldehyde	

Product

Table 1143: Properties of each product.

Id	Name	SBO
s_0360	acetaldehyde	

Kinetic Law

Derived unit contains undeclared units

$$v_{285} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot [\text{AcAld}]}{\text{KmAcAld}}}{1 + \frac{[\text{AcAld}]}{\text{KmAcAld}}} \tag{571}$$

Table 1144: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.029	dimensionless	☑
Vmax		0000324	0.058	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
KmAcAld		0000322	0.178	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.286 Reaction r_1664

This is a reversible reaction of one reactant forming one product influenced by two modifiers.

Name bicarbonate formation

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{CO2} \underset{\text{CO2, s\_0445}}{\rightleftharpoons} \mathrm{s\_0445} \tag{572}$$

Reactant

Table 1145: Properties of each reactant.

Id	Name	SBO
CO2	carbon dioxide	

Modifiers

Table 1146: Properties of each modifier.

Id	Name	SBO
CO2	carbon dioxide	
s_0445	bicarbonate	

Product

Table 1147: Properties of each product.

Id	Name	SBO
s_0445	bicarbonate	

Kinetic Law

Derived unit contains undeclared units

$$v_{286} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{CO2}] - \frac{[\mathrm{s\_0445}]}{\mathrm{Keq}} \right)}{\mathrm{KmCO2}}}{1 + \frac{[\mathrm{CO2}]}{\mathrm{KmCO2}} + 1 + \frac{[\mathrm{s\_0445}]}{\mathrm{Km0445}} - 1} \tag{573}$$

Table 1148: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.159	dimensionless	☑

Id	Name	SBO	Value	Unit	Constant
Vmax		0000324	0.955	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Keq		0000281	0.200	dimensionless	☑
KmCO2		0000322	1.000	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0445		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.287 Reaction r_1682

This is a reversible reaction of three reactants forming two products influenced by five modifiers.

Name cholestenol delta-isomerase, lumped reaction

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_1275} + \mathrm{s\_1416} + \mathrm{s\_1569} \xrightleftharpoons{\mathrm{s\_1275},\ \mathrm{s\_1416},\ \mathrm{s\_1569},\ \mathrm{s\_0662},\ \mathrm{s\_1413}} \mathrm{s\_0662} + \mathrm{s\_1413} \qquad (574)$$

Reactants

Table 1149: Properties of each reactant.

Id	Name	SBO
s_1275	oxygen	
s_1416	S-adenosyl-L-methionine	
s_1569	zymosterol	

Modifiers

Table 1150: Properties of each modifier.

Id	Name	SBO
s_1275	oxygen	
s_1416	S-adenosyl-L-methionine	
s_1569	zymosterol	
s_0662	ergosta-5,7,22,24(28)-tetraen-3beta-ol	
s_1413	S-adenosyl-L-homocysteine	

Products

Table 1151: Properties of each product.

Id	Name	SBO
s_0662	ergosta-5,7,22,24(28)-tetraen-3beta-ol	
s_1413	S-adenosyl-L-homocysteine	

Kinetic Law

Derived unit contains undeclared units

$$v_{287} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_1275}] \cdot [\mathrm{s\_1416}] \cdot [\mathrm{s\_1569}] - \frac{[\mathrm{s\_0662}] \cdot [\mathrm{s\_1413}]}{\mathrm{Keq}} \right)}{\mathrm{Km1275} \cdot \mathrm{Km1416} \cdot \mathrm{Km1569}}}{\left(1 + \frac{[\mathrm{s\_1275}]}{\mathrm{Km1275}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1416}]}{\mathrm{Km1416}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1569}]}{\mathrm{Km1569}}\right) + \left(1 + \frac{[\mathrm{s\_0662}]}{\mathrm{Km0662}}\right) \cdot \left(1 + \frac{[\mathrm{s\_1413}]}{\mathrm{Km1413}}\right) - 1} \tag{575}$$

Table 1152: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.81022322927489 \cdot 10^{-4}$	dimensionless	☑
Vmax		0000324	0.006	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Keq		0000281	20.000	$\mathrm{mmol}^{-1} \cdot \mathrm{l}$	☑
Km1275		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1416		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1569		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0662		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1413		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.288 Reaction r_1697

This is an irreversible reaction of one reactant forming one product influenced by one modifier.

Name CO2 transport

SBO:0000185 transport reaction

Reaction equation

$$\mathrm{CO2} \xrightarrow{\mathrm{CO2}} \mathrm{s\_0458} \tag{576}$$

Reactant

Table 1153: Properties of each reactant.

Id	Name	SBO
CO2	carbon dioxide	

Modifier

Table 1154: Properties of each modifier.

Id	Name	SBO
CO2	carbon dioxide	

Product

Table 1155: Properties of each product.

Id	Name	SBO
s_0458	carbon dioxide	

Kinetic Law

Derived unit contains undeclared units

$$v_{288} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot [\text{CO2}]}{\text{KmCO2}}}{1 + \frac{[\text{CO2}]}{\text{KmCO2}}} \tag{577}$$

Table 1156: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			2.368	dimensionless	☑
Vmax		0000324	4.735	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
KmCO2		0000322	1.000	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.289 Reaction r_1704

This is a reversible reaction of two reactants forming two products influenced by four modifiers.

Name cytidylate kinase (dCMP)

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{ADP} + \mathrm{s\_0587} \xrightleftharpoons{\mathrm{ADP,\ s\_0587,\ ATP,\ s\_0589}} \mathrm{ATP} + \mathrm{s\_0589} \tag{578}$$

Reactants

Table 1157: Properties of each reactant.

Id	Name	SBO
ADP	ADP	
s_0587	dCDP	

Modifiers

Table 1158: Properties of each modifier.

Id	Name	SBO
ADP	ADP	
s_0587	dCDP	
ATP	ATP	
s_0589	dCMP	

Products

Table 1159: Properties of each product.

Id	Name	SBO
ATP	ATP	
s_0589	dCMP	

Kinetic Law

Derived unit contains undeclared units

$$v_{289} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{ADP}] \cdot [\mathrm{s\_0587}] - \frac{[\mathrm{ATP}] \cdot [\mathrm{s\_0589}]}{\mathrm{Keq}} \right)}{\mathrm{KmADP} \cdot \mathrm{Km0587}}}{\left(1 + \frac{[\mathrm{ADP}]}{\mathrm{KmADP}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0587}]}{\mathrm{Km0587}}\right) + \left(1 + \frac{[\mathrm{ATP}]}{\mathrm{KmATP}}\right) \cdot \left(1 + \frac{[\mathrm{s\_0589}]}{\mathrm{Km0589}}\right) - 1} \tag{579}$$

Table 1160: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.04616918267866 \cdot 10^{-4}$	dimensionless	☑
Vmax		0000324	0.001	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Keq		0000281	3.939	dimensionless	☑
KmADP		0000322	1.282	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0587		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
KmATP		0000323	2.525	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km0589		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

6.290 Reaction r_1729

This is a reversible reaction of two reactants forming two products influenced by four modifiers.

Name deoxyadenylate kinase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{ADP} + \mathrm{s\_0582} \xrightleftharpoons{\mathrm{ADP,\ s\_0582,\ ATP,\ s\_0584}} \mathrm{ATP} + \mathrm{s\_0584} \qquad (580)$$

Reactants

Table 1161: Properties of each reactant.

Id	Name	SBO
ADP	ADP	
s_0582	dADP	

Modifiers

Table 1162: Properties of each modifier.

Id	Name	SBO
ADP	ADP	
s_0582	dADP	
ATP	ATP	
s_0584	dAMP	

Products

Table 1163: Properties of each product.

Id	Name	SBO
ATP	ATP	
s_0584	dAMP	

Kinetic Law

Derived unit contains undeclared units

$$v_{290} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{ADP}] \cdot [\text{s\_0582}] - \frac{[\text{ATP}] \cdot [\text{s\_0584}]}{\text{Keq}} \right)}{\text{KmADP} \cdot \text{Km0582}}}{\left(1 + \frac{[\text{ADP}]}{\text{KmADP}}\right) \cdot \left(1 + \frac{[\text{s\_0582}]}{\text{Km0582}}\right) + \left(1 + \frac{[\text{ATP}]}{\text{KmATP}}\right) \cdot \left(1 + \frac{[\text{s\_0584}]}{\text{Km0584}}\right) - 1} \tag{581}$$

Table 1164: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.54762173571763 \cdot 10^{-4}$	dimensionless	☑
Vmax		0000324	0.002	$\text{mmol} \cdot 1^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	3.939	dimensionless	☑
KmADP		0000322	1.282	$\text{mmol} \cdot 1^{-1}$	☑
Km0582		0000322	0.100	$\text{mmol} \cdot 1^{-1}$	☑
KmATP		0000323	2.525	$\text{mmol} \cdot 1^{-1}$	☑
Km0584		0000323	0.100	$\text{mmol} \cdot 1^{-1}$	☑

6.291 Reaction r_1762

This is an irreversible reaction of one reactant forming one product influenced by one modifier.

Name ethanol transport

SBO:0000185 transport reaction

Reaction equation

$$\text{EtOH} \xrightarrow{\text{EtOH}} \text{s\_0681} \tag{582}$$

Reactant

Table 1165: Properties of each reactant.

Id	Name	SBO
EtOH	ethanol	

Modifier

Table 1166: Properties of each modifier.

Id	Name	SBO
EtOH	ethanol	

Product

Table 1167: Properties of each product.

Id	Name	SBO
s_0681	ethanol	

Kinetic Law

Derived unit contains undeclared units

$$v_{291} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot [\text{EtOH}]}{\text{KmEtOH}}}{1 + \frac{[\text{EtOH}]}{\text{KmEtOH}}} \tag{583}$$

Table 1168: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			2.173	dimensionless	☑
Vmax		0000324	4.346	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
KmEtOH		0000322	50.000	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.292 Reaction r_1936

This is a reversible reaction of one reactant forming two products influenced by three modifiers.

Name methylglyoxal synthase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{DHAP} \xrightleftharpoons{\mathrm{DHAP},\ \mathrm{s\_1151},\ \mathrm{PHO}} \mathrm{s\_1151} + \mathrm{PHO} \tag{584}$$

Reactant

Table 1169: Properties of each reactant.

Id	Name	SBO
DHAP	dihydroxyacetone phosphate	

Modifiers

Table 1170: Properties of each modifier.

Id	Name	SBO
DHAP	dihydroxyacetone phosphate	
s_1151	methylglyoxal	
PHO	phosphate	

Products

Table 1171: Properties of each product.

Id	Name	SBO
s_1151	methylglyoxal	
PHO	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{292} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{DHAP}] - \frac{[\mathrm{s\_1151}] \cdot [\mathrm{PHO}]}{\mathrm{Keq}} \right)}{\mathrm{KmDHAP}}}{1 + \frac{[\mathrm{DHAP}]}{\mathrm{KmDHAP}} + \left(1 + \frac{[\mathrm{s\_1151}]}{\mathrm{Km1151}}\right) \cdot \left(1 + \frac{[\mathrm{PHO}]}{\mathrm{KmPHO}}\right) - 1} \tag{585}$$

Table 1172: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.216	dimensionless	☑

Id	Name	SBO	Value	Unit	Constant
Vmax		0000324	2.158	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	0.020	$\mathrm{mmol \cdot l^{-1}}$	☑
KmDHAP		0000322	1.004	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1151		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmPHO		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.293 Reaction r_1979

This is a reversible reaction of one reactant forming one product influenced by two modifiers.

Name O2 transport

SBO:0000185 transport reaction

Reaction equation

$$\mathrm{s\_1277} \xrightleftharpoons{\mathrm{s\_1277,\ s\_1275}} \mathrm{s\_1275} \tag{586}$$

Reactant

Table 1173: Properties of each reactant.

Id	Name	SBO
s_1277	oxygen	

Modifiers

Table 1174: Properties of each modifier.

Id	Name	SBO
s_1277	oxygen	
s_1275	oxygen	

Product

Table 1175: Properties of each product.

Id	Name	SBO
s_1275	oxygen	

Kinetic Law

Derived unit contains undeclared units

$$v_{293} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot (\text{[s\_1277]} - \text{[s\_1275]})}{\text{Km1277}}}{1 + \frac{\text{[s\_1277]}}{\text{Km1277}} + 1 + \frac{\text{[s\_1275]}}{\text{Km1275}} - 1} \tag{587}$$

Table 1176: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.119	dimensionless	☑
Vmax		0000324	0.398	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Km1277		0000322	1.000	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km1275		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.294 Reaction r_2030

This is a reversible reaction of one reactant forming two products influenced by three modifiers.

Name pyrimidine phosphatase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0313} \xrightleftharpoons{\text{s\_0313, s\_0314, PHO}} \text{s\_0314} + \text{PHO} \tag{588}$$

Reactant

Table 1177: Properties of each reactant.

Id	Name	SBO
s_0313	5-amino-6-(5-phosphoribitylamino)uracil	

Modifiers

Table 1178: Properties of each modifier.

Id	Name	SBO
s_0313	5-amino-6-(5-phosphoribitylamino)uracil	
s_0314	5-amino-6-(D-ribitylamino)uracil	

Id	Name	SBO
PHO	phosphate	

Products

Table 1179: Properties of each product.

Id	Name	SBO
s_0314	5-amino-6-(D-ribitylamino)uracil	
PHO	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{294} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0313}] - \frac{[\text{s\_0314}] \cdot [\text{PHO}]}{\text{Keq}} \right)}{\text{Km0313}}}{1 + \frac{[\text{s\_0313}]}{\text{Km0313}} + \left(1 + \frac{[\text{s\_0314}]}{\text{Km0314}}\right) \cdot \left(1 + \frac{[\text{PHO}]}{\text{KmPHO}}\right) - 1} \tag{589}$$

Table 1180: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$4.25595995293758 \cdot 10^{-5}$	dimensionless	☑
Vmax		0000324	$4.25595995293516 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Keq		0000281	0.200	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0313		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
Km0314		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑
KmPHO		0000323	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.295 Reaction r_2057

This is an irreversible reaction of one reactant forming one product influenced by one modifier.

Name succinate transport

SBO:0000185 transport reaction

Reaction equation

$$\text{s\_1458} \xrightarrow{\text{s\_1458}} \text{s\_1459} \tag{590}$$

Reactant

Table 1181: Properties of each reactant.

Id	Name	SBO
s_1458	succinate	

Modifier

Table 1182: Properties of each modifier.

Id	Name	SBO
s_1458	succinate	

Product

Table 1183: Properties of each product.

Id	Name	SBO
s_1459	succinate	

Kinetic Law

Derived unit contains undeclared units

$$v_{295} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot [\text{s\_1458}]}{\text{Km1458}}}{1 + \frac{[\text{s\_1458}]}{\text{Km1458}}} \tag{591}$$

Table 1184: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.016	dimensionless	☑
Vmax		0000324	0.033	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
Km1458		0000322	0.100	$\text{mmol} \cdot \text{l}^{-1}$	☑

6.296 Reaction r_2111

This is an irreversible reaction of 51 reactants forming 22 products influenced by 51 modifiers.

Name growth

SBO:0000176 biochemical reaction

Reaction equation

$$1 \cdot 1348\,\mathrm{s\_0002} + 0 \cdot 046\,\mathrm{AMP} + 59 \cdot 276\,\mathrm{ATP} + 0 \cdot 0447\,\mathrm{s\_0526} + 0 \cdot 0036\,\mathrm{s\_0584} + 0 \cdot 0024\,\mathrm{s\_0589} + 0 \cdot 0024\,\mathrm{s\_0615} + 0 \cdot$$
(592)

Reactants

Table 1185: Properties of each reactant.

Id	Name	SBO
s_0002	(1->3)-beta-D-glucan	
AMP	AMP	
ATP	ATP	
s_0526	CMP	
s_0584	dAMP	
s_0589	dCMP	
s_0615	dGMP	
s_0649	dTMP	
s_0773	glycogen	
s_0782	GMP	
s_1107	mannan	
s_1405	riboflavin	
s_1467	sulphate	
s_1520	trehalose	
s_1545	UMP	
s_0004	(1->6)-beta-D-glucan	
s_0404	Ala-tRNA(Ala)	
s_0428	Arg-tRNA(Arg)	
s_0430	Asn-tRNA(Asn)	
s_0432	Asp-tRNA(Asp)	
s_0542	Cys-tRNA(Cys)	
s_0747	Gln-tRNA(Gln)	
s_0748	Glu-tRNA(Glu)	
s_0757	Gly-tRNA(Gly)	
s_0832	His-tRNA(His)	
s_0847	Ile-tRNA(Ile)	
s_1077	Leu-tRNA(Leu)	
s_1099	Lys-tRNA(Lys)	
s_1148	Met-tRNA(Met)	
s_1314	Phe-tRNA(Phe)	
s_1379	Pro-tRNA(Pro)	

Id	Name	SBO
s_1337	phosphatidyl-L-serine	
s_0089	1-phosphatidyl-1D-myo-inositol	
s_1428	Ser-tRNA(Ser)	
s_1491	Thr-tRNA(Thr)	
s_1527	Trp-tRNA(Trp)	
s_1533	Tyr-tRNA(Tyr)	
s_1561	Val-tRNA(Val)	
s_0122	14-demethyllanosterol	
s_0897	inositol-P-ceramide A (C26)	
s_0657	episterol	
s_0662	ergosta-5,7,22,24(28)-tetraen-3beta-ol	
s_0666	ergosterol	
s_0672	ergosterol ester	
s_0595	decanoate	
s_0700	fecosterol	
s_1059	lanosterol	
s_1346	phosphatidylcholine	
s_1351	phosphatidylethanolamine	
s_1524	triglyceride	
s_1569	zymosterol	

Modifiers

Table 1186: Properties of each modifier.

Id	Name	SBO
s_0002	(1->3)-beta-D-glucan	
AMP	AMP	
ATP	ATP	
s_0526	CMP	
s_0584	dAMP	
s_0589	dCMP	
s_0615	dGMP	
s_0649	dTMP	
s_0773	glycogen	
s_0782	GMP	
s_1107	mannan	
s_1405	riboflavin	
s_1467	sulphate	
s_1520	trehalose	
s_1545	UMP	

Id	Name	SBO
s_0004	(1->6)-beta-D-glucan	
s_0404	Ala-tRNA(Ala)	
s_0428	Arg-tRNA(Arg)	
s_0430	Asn-tRNA(Asn)	
s_0432	Asp-tRNA(Asp)	
s_0542	Cys-tRNA(Cys)	
s_0747	Gln-tRNA(Gln)	
s_0748	Glu-tRNA(Glu)	
s_0757	Gly-tRNA(Gly)	
s_0832	His-tRNA(His)	
s_0847	Ile-tRNA(Ile)	
s_1077	Leu-tRNA(Leu)	
s_1099	Lys-tRNA(Lys)	
s_1148	Met-tRNA(Met)	
s_1314	Phe-tRNA(Phe)	
s_1379	Pro-tRNA(Pro)	
s_1337	phosphatidyl-L-serine	
s_0089	1-phosphatidyl-1D-myo-inositol	
s_1428	Ser-tRNA(Ser)	
s_1491	Thr-tRNA(Thr)	
s_1527	Trp-tRNA(Trp)	
s_1533	Tyr-tRNA(Tyr)	
s_1561	Val-tRNA(Val)	
s_0122	14-demethyllanosterol	
s_0897	inositol-P-ceramide A (C26)	
s_0657	episterol	
s_0662	ergosta-5,7,22,24(28)-tetraen-3beta-ol	
s_0666	ergosterol	
s_0672	ergosterol ester	
s_0595	decanoate	
s_0700	fecosterol	
s_1059	lanosterol	
s_1346	phosphatidylcholine	
s_1351	phosphatidylethanolamine	
s_1524	triglyceride	
s_1569	zymosterol	

Products

Table 1187: Properties of each product.

Id	Name	SBO
ADP	ADP	
PHO	phosphate	
s_1582	tRNA(Ala)	
s_1583	tRNA(Arg)	
s_1585	tRNA(Asn)	
s_1587	tRNA(Asp)	
s_1589	tRNA(Cys)	
s_1590	tRNA(Gln)	
s_1591	tRNA(Glu)	
s_1593	tRNA(Gly)	
s_1594	tRNA(His)	
s_1596	tRNA(Ile)	
s_1598	tRNA(Leu)	
s_1600	tRNA(Lys)	
s_1602	tRNA(Met)	
s_1604	tRNA(Phe)	
s_1606	tRNA(Pro)	
s_1607	tRNA(Ser)	
s_1608	tRNA(Thr)	
s_1610	tRNA(Trp)	
s_1612	tRNA(Tyr)	
s_1614	tRNA(Val)	

Kinetic Law

Derived unit contains undeclared units

$$v_{296} = \mathrm{vol}\,(\mathrm{cell}) \tag{593}$$
$$\cdot \max\left(\mathrm{v0}\cdot\left(1+\mathrm{ep0002}\cdot\left(\frac{[\mathrm{s\_0002}]}{\mathrm{ic0002}}\right)+\mathrm{epAMP}\cdot\left(\frac{[\mathrm{AMP}]}{\mathrm{icAMP}}\right)+\mathrm{epATP}\cdot\left(\frac{[\mathrm{ATP}]}{\mathrm{icATP}}\right)\right.\right.$$
$$+\mathrm{ep0526}\cdot\left(\frac{[\mathrm{s\_0526}]}{\mathrm{ic0526}}\right)+\mathrm{ep0584}\cdot\left(\frac{[\mathrm{s\_0584}]}{\mathrm{ic0584}}\right)+\mathrm{ep0589}\cdot\left(\frac{[\mathrm{s\_0589}]}{\mathrm{ic0589}}\right)+\mathrm{ep0615}$$
$$\cdot\left(\frac{[\mathrm{s\_0615}]}{\mathrm{ic0615}}\right)+\mathrm{ep0649}\cdot\left(\frac{[\mathrm{s\_0649}]}{\mathrm{ic0649}}\right)+\mathrm{ep0773}\cdot\left(\frac{[\mathrm{s\_0773}]}{\mathrm{ic0773}}\right)+\mathrm{ep0782}\cdot\left(\frac{[\mathrm{s\_0782}]}{\mathrm{ic0782}}\right)$$
$$+\mathrm{ep1107}\cdot\left(\frac{[\mathrm{s\_1107}]}{\mathrm{ic1107}}\right)+\mathrm{ep1405}\cdot\left(\frac{[\mathrm{s\_1405}]}{\mathrm{ic1405}}\right)+\mathrm{ep1467}\cdot\left(\frac{[\mathrm{s\_1467}]}{\mathrm{ic1467}}\right)+\mathrm{ep1520}$$
$$\cdot\left(\frac{[\mathrm{s\_1520}]}{\mathrm{ic1520}}\right)+\mathrm{ep1545}\cdot\left(\frac{[\mathrm{s\_1545}]}{\mathrm{ic1545}}\right)+\mathrm{ep0004}\cdot\left(\frac{[\mathrm{s\_0004}]}{\mathrm{ic0004}}\right)+\mathrm{ep0404}\cdot\left(\frac{[\mathrm{s\_0404}]}{\mathrm{ic0404}}\right)$$
$$+\mathrm{ep0428}\cdot\left(\frac{[\mathrm{s\_0428}]}{\mathrm{ic0428}}\right)+\mathrm{ep0430}\cdot\left(\frac{[\mathrm{s\_0430}]}{\mathrm{ic0430}}\right)+\mathrm{ep0432}\cdot\left(\frac{[\mathrm{s\_0432}]}{\mathrm{ic0432}}\right)+\mathrm{ep0542}$$
$$\cdot\left(\frac{[\mathrm{s\_0542}]}{\mathrm{ic0542}}\right)+\mathrm{ep0747}\cdot\left(\frac{[\mathrm{s\_0747}]}{\mathrm{ic0747}}\right)+\mathrm{ep0748}\cdot\left(\frac{[\mathrm{s\_0748}]}{\mathrm{ic0748}}\right)+\mathrm{ep0757}\cdot\left(\frac{[\mathrm{s\_0757}]}{\mathrm{ic0757}}\right)$$
$$+\mathrm{ep0832}\cdot\left(\frac{[\mathrm{s\_0832}]}{\mathrm{ic0832}}\right)+\mathrm{ep0847}\cdot\left(\frac{[\mathrm{s\_0847}]}{\mathrm{ic0847}}\right)+\mathrm{ep1077}\cdot\left(\frac{[\mathrm{s\_1077}]}{\mathrm{ic1077}}\right)+\mathrm{ep1099}$$
$$\cdot\left(\frac{[\mathrm{s\_1099}]}{\mathrm{ic1099}}\right)+\mathrm{ep1148}\cdot\left(\frac{[\mathrm{s\_1148}]}{\mathrm{ic1148}}\right)+\mathrm{ep1314}\cdot\left(\frac{[\mathrm{s\_1314}]}{\mathrm{ic1314}}\right)+\mathrm{ep1379}\cdot\left(\frac{[\mathrm{s\_1379}]}{\mathrm{ic1379}}\right)$$
$$+\mathrm{ep1337}\cdot\left(\frac{[\mathrm{s\_1337}]}{\mathrm{ic1337}}\right)+\mathrm{ep0089}\cdot\left(\frac{[\mathrm{s\_0089}]}{\mathrm{ic0089}}\right)+\mathrm{ep1428}\cdot\left(\frac{[\mathrm{s\_1428}]}{\mathrm{ic1428}}\right)+\mathrm{ep1491}$$
$$\cdot\left(\frac{[\mathrm{s\_1491}]}{\mathrm{ic1491}}\right)+\mathrm{ep1527}\cdot\left(\frac{[\mathrm{s\_1527}]}{\mathrm{ic1527}}\right)+\mathrm{ep1533}\cdot\left(\frac{[\mathrm{s\_1533}]}{\mathrm{ic1533}}\right)+\mathrm{ep1561}\cdot\left(\frac{[\mathrm{s\_1561}]}{\mathrm{ic1561}}\right)$$
$$+\mathrm{ep0122}\cdot\left(\frac{[\mathrm{s\_0122}]}{\mathrm{ic0122}}\right)+\mathrm{ep0897}\cdot\left(\frac{[\mathrm{s\_0897}]}{\mathrm{ic0897}}\right)+\mathrm{ep0657}\cdot\left(\frac{[\mathrm{s\_0657}]}{\mathrm{ic0657}}\right)+\mathrm{ep0662}\cdot\left(\frac{[\mathrm{s\_0662}]}{\mathrm{ic0662}}\right)$$
$$+\mathrm{ep0666}\cdot\left(\frac{[\mathrm{s\_0666}]}{\mathrm{ic0666}}\right)+\mathrm{ep0672}\cdot\left(\frac{[\mathrm{s\_0672}]}{\mathrm{ic0672}}\right)+\mathrm{ep0595}\cdot\left(\frac{[\mathrm{s\_0595}]}{\mathrm{ic0595}}\right)+\mathrm{ep0700}\cdot\left(\frac{[\mathrm{s\_0700}]}{\mathrm{ic0700}}\right)$$
$$+\mathrm{ep1059}\cdot\left(\frac{[\mathrm{s\_1059}]}{\mathrm{ic1059}}\right)+\mathrm{ep1346}\cdot\left(\frac{[\mathrm{s\_1346}]}{\mathrm{ic1346}}\right)+\mathrm{ep1351}\cdot\left(\frac{[\mathrm{s\_1351}]}{\mathrm{ic1351}}\right)+\mathrm{ep1524}\cdot\left(\frac{[\mathrm{s\_1524}]}{\mathrm{ic1524}}\right)$$
$$\left.\left.+\,\mathrm{ep1569}\cdot\left(\frac{[\mathrm{s\_1569}]}{\mathrm{ic1569}}\right)\right),\mathrm{zero\_flux}\right)$$

$$\max(\mathrm{x},\mathrm{y}) = \frac{\mathrm{x}+\mathrm{y}+|\mathrm{x}-\mathrm{y}|}{2} \tag{594}$$

$$\max(\mathrm{x},\mathrm{y}) = \frac{\mathrm{x}+\mathrm{y}+|\mathrm{x}-\mathrm{y}|}{2} \tag{595}$$

Table 1188: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.043	dimensionless	☑
zero_flux			0.000	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
v0			0.043	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
ic0002			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep0002			1.135	dimensionless	☑
icAMP			0.293	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
epAMP			0.046	dimensionless	☑
icATP			2.525	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
epATP			59.276	dimensionless	☑
ic0526			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep0526			0.045	dimensionless	☑
ic0584			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep0584			0.004	dimensionless	☑
ic0589			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep0589			0.002	dimensionless	☑
ic0615			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep0615			0.002	dimensionless	☑
ic0649			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep0649			0.004	dimensionless	☑
ic0773			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep0773			0.519	dimensionless	☑
ic0782			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep0782			0.046	dimensionless	☑
ic1107			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep1107			0.808	dimensionless	☑
ic1405			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep1405			$9.9 \cdot 10^{-4}$	dimensionless	☑
ic1467			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep1467			0.020	dimensionless	☑
ic1520			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep1520			0.023	dimensionless	☑
ic1545			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep1545			0.060	dimensionless	☑
ic0004			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep0004			1.135	dimensionless	☑
ic0404			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep0404			0.459	dimensionless	☑
ic0428			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep0428			0.161	dimensionless	☑
ic0430			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

Id	Name	SBO	Value	Unit	Constant
ep0430			0.102	dimensionless	☑
ic0432			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep0432			0.298	dimensionless	☑
ic0542			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep0542			0.007	dimensionless	☑
ic0747			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep0747			0.105	dimensionless	☑
ic0748			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep0748			0.302	dimensionless	☑
ic0757			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep0757			0.290	dimensionless	☑
ic0832			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep0832			0.066	dimensionless	☑
ic0847			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep0847			0.193	dimensionless	☑
ic1077			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep1077			0.296	dimensionless	☑
ic1099			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep1099			0.286	dimensionless	☑
ic1148			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep1148			0.051	dimensionless	☑
ic1314			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep1314			0.134	dimensionless	☑
ic1379			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep1379			0.165	dimensionless	☑
ic1337			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep1337			$3.9 \cdot 10^{-4}$	dimensionless	☑
ic0089			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep0089			0.002	dimensionless	☑
ic1428			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep1428			0.185	dimensionless	☑
ic1491			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep1491			0.191	dimensionless	☑
ic1527			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep1527			0.028	dimensionless	☑
ic1533			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep1533			0.102	dimensionless	☑
ic1561			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep1561			0.265	dimensionless	☑
ic0122			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep0122			$5.6 \cdot 10^{-5}$	dimensionless	☑
ic0897			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

Id	Name	SBO	Value	Unit	Constant
ep0897			$5.1708 \cdot 10^{-4}$	dimensionless	☑
ic0657			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep0657			$9.6 \cdot 10^{-5}$	dimensionless	☑
ic0662			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep0662			$1.25 \cdot 10^{-4}$	dimensionless	☑
ic0666			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep0666			0.006	dimensionless	☑
ic0672			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep0672			$8.12 \cdot 10^{-4}$	dimensionless	☑
ic0595			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep0595			$5.35599999999999 \cdot 10^{-4}$	dimensionless	☑
ic0700			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep0700			$1.14 \cdot 10^{-4}$	dimensionless	☑
ic1059			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep1059			$3.2 \cdot 10^{-5}$	dimensionless	☑
ic1346			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep1346			0.003	dimensionless	☑
ic1351			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep1351			$6.97 \cdot 10^{-4}$	dimensionless	☑
ic1524			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep1524			$7.81 \cdot 10^{-4}$	dimensionless	☑
ic1569			0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
ep1569			$1.5 \cdot 10^{-5}$	dimensionless	☑

6.297 Reaction r_2126

This is a reversible reaction of one reactant forming two products influenced by four modifiers.

Name sedoheptulose bisphosphatase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_1426} \xrightleftharpoons{\mathrm{e\_0601,\ s\_1426,\ s\_1427,\ PHO}} \mathrm{s\_1427} + \mathrm{PHO} \tag{596}$$

Reactant

Table 1189: Properties of each reactant.

Id	Name	SBO
s_1426	sedoheptulose 1,7-bisphosphate	

Modifiers

Table 1190: Properties of each modifier.

Id	Name	SBO
e_0601	SHB17	0000460
s_1426	sedoheptulose 1,7-bisphosphate	
s_1427	sedoheptulose 7-phosphate	
PHO	phosphate	

Products

Table 1191: Properties of each product.

Id	Name	SBO
s_1427	sedoheptulose 7-phosphate	
PHO	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{297} = \frac{\frac{\mathrm{vol(cell)} \cdot \mathrm{Vmax} \cdot \left([\mathrm{s\_1426}] - \frac{[\mathrm{s\_1427}] \cdot [\mathrm{PHO}]}{\mathrm{Keq}} \right)}{\mathrm{Km1426}}}{1 + \frac{[\mathrm{s\_1426}]}{\mathrm{Km1426}} + \left(1 + \frac{[\mathrm{s\_1427}]}{\mathrm{Km1427}}\right) \cdot \left(1 + \frac{[\mathrm{PHO}]}{\mathrm{KmPHO}}\right) - 1} \tag{597}$$

Table 1192: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.009	dimensionless	☑
Vmax		0000324	0.086	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
Keq		0000281	0.200	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1426		0000322	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
Km1427		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑
KmPHO		0000323	0.100	$\mathrm{mmol \cdot l^{-1}}$	☑

6.298 Reaction r_2127

This is a reversible reaction of two reactants forming two products influenced by five modifiers.

Name dihydroorotate dehydrogenase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0061} + \text{NAD} \xrightleftharpoons{\text{e\_0594, s\_0061, NAD, s\_1269, NADH}} \text{s\_1269} + \text{NADH} \tag{598}$$

Reactants

Table 1193: Properties of each reactant.

Id	Name	SBO
s_0061	(S)-dihydroorotate	
NAD	NAD	

Modifiers

Table 1194: Properties of each modifier.

Id	Name	SBO
e_0594	URA1	0000460
s_0061	(S)-dihydroorotate	
NAD	NAD	
s_1269	orotate	
NADH	NADH	

Products

Table 1195: Properties of each product.

Id	Name	SBO
s_1269	orotate	
NADH	NADH	

Kinetic Law

Derived unit contains undeclared units

$$v_{298} = \frac{\frac{\text{vol(cell)} \cdot \text{Vmax} \cdot \left([\text{s\_0061}] \cdot [\text{NAD}] - \frac{[\text{s\_1269}] \cdot [\text{NADH}]}{\text{Keq}} \right)}{\text{Km0061} \cdot \text{KmNAD}}}{\left(1 + \frac{[\text{s\_0061}]}{\text{Km0061}}\right) \cdot \left(1 + \frac{[\text{NAD}]}{\text{KmNAD}}\right) + \left(1 + \frac{[\text{s\_1269}]}{\text{Km1269}}\right) \cdot \left(1 + \frac{[\text{NADH}]}{\text{KmNADH}}\right) - 1} \tag{599}$$

Table 1196: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.005	dimensionless	☑
Vmax		0000324	0.067	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
Keq		0000281	0.115	dimensionless	☑
Km0061		0000322	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
KmNAD		0000322	1.503	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
Km1269		0000323	0.100	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑
KmNADH		0000323	0.087	$\mathrm{mmol} \cdot \mathrm{l}^{-1}$	☑

7 Derived Rate Equations

When interpreted as an ordinary differential equation framework, this model implies the following set of equations for the rates of change of each species.

7.1 Species s_0002

Name (1->3)-beta-D-glucan

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_2111 and as a product in r_0005 and as a modifier in r_0005, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0002} = v_3 - 1.1348 v_{296} \tag{600}$$

7.2 Species s_0004

Name (1->6)-beta-D-glucan

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_2111 and as a product in r_0006 and as a modifier in r_0006, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0004} = v_4 - 1.1348 v_{296} \tag{601}$$

7.3 Species s_0008

Name (2R,3R)-2,3-dihydroxy-3-methylpentanoate

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0353 and as a product in r_0669 and as a modifier in r_0353, r_0669).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0008} = v_{170} - v_{96} \tag{602}$$

7.4 Species s_0009

Name (2R,3S)-3-isopropylmalate

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0061 and as a product in r_0060 and as a modifier in r_0060, r_0061).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0009} = v_{22} - v_{23} \tag{603}$$

7.5 Species s_0010

Name (2S)-2-isopropyl-3-oxosuccinate

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0029 and as a product in r_0061 and as a modifier in r_0029, r_0061).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0010} = v_{23} - v_{16} \tag{604}$$

7.6 Species s_0015

Name (N(omega)-L-arginino)succinic acid

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0207 and as a product in r_0208 and as a modifier in r_0207, r_0208).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0015} = v_{52} - v_{51} \tag{605}$$

7.7 Species s_0016

Name (R)-2,3-dihydroxy-3-methylbutanoate

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0352 and as a product in r_0096 and as a modifier in r_0096, r_0352).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0016} = v_{28} - v_{95} \tag{606}$$

7.8 Species s_0018

Name (R)-5-diphosphomevalonic acid

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0739 and as a product in r_0904 and as a modifier in r_0739, r_0904).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0018} = v_{221} - v_{192} \tag{607}$$

7.9 Species s_0019

Name (R)-5-phosphomevalonic acid

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in six reactions (as a reactant in r_0904 and as a product in r_0735, r_0736 and as a modifier in r_0735, r_0736, r_0904).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0019} = v_{190} + v_{191} - v_{221} \tag{608}$$

7.10 Species s_0025

Name (R)-lactate

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0001 and as a product in r_0553 and as a modifier in r_0001, r_0553).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0025} = v_{154} - v_{1} \tag{609}$$

7.11 Species s_0028

Name (R)-mevalonate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in six reactions (as a reactant in r_0735, r_0736 and as a product in r_0558 and as a modifier in r_0558, r_0735, r_0736).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0028} = v_{155} - v_{190} - v_{191} \tag{610}$$

7.12 Species s_0033

Name (R)-S-lactoylglutathione

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0553 and as a product in r_0697 and as a modifier in r_0553, r_0697).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0033} = v_{176} - v_{154} \tag{611}$$

7.13 Species s_0037

Name (S)-2,3-epoxysqualene

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0698 and as a product in r_1010 and as a modifier in r_0698, r_1010).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0037} = v_{255} - v_{177} \tag{612}$$

7.14 Species s_0039

Name (S)-2-acetyl-2-hydroxybutanoate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0669 and as a product in r_0016 and as a modifier in r_0016, r_0669).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0039} = v_{10} - v_{170} \tag{613}$$

7.15 Species s_0056

Name (S)-3-methyl-2-oxopentanoate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0663 and as a product in r_0353 and as a modifier in r_0353, r_0663).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0056} = v_{96} - v_{167} \tag{614}$$

7.16 Species s_0061

Name (S)-dihydroorotate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_2127 and as a product in r_0349 and as a modifier in r_0349, r_2127).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0061} = v_{94} - v_{298} \tag{615}$$

7.17 Species s_0062

Name (S)-lactaldehyde

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0696 and as a product in r_0688 and as a modifier in r_0688, r_0696).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0062} = v_{173} - v_{175} \tag{616}$$

7.18 Species s_0063

Name (S)-lactate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0004 and as a product in r_0696 and as a modifier in r_0004, r_0696).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0063} = v_{175} - v_{2} \tag{617}$$

7.19 Species s_0066

Name (S)-malate

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0713 and as a product in r_0451 and as a modifier in r_0451, r_0713).

$$\frac{\text{d}}{\text{d}t}\text{s\_0066} = v_{122} - v_{181} \tag{618}$$

7.20 Species BPG

Name 1,3-bisphospho-D-glycerate

SBO:0000247 simple chemical

Initial concentration $7.36873499865602 \cdot 10^{-4}\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in PGK and as a product in TDH and as a modifier in TDH, PGK).

$$\frac{\text{d}}{\text{d}t}\text{BPG} = v_{130} - v_{216} \tag{619}$$

7.21 Species s_0076

Name 1-(2-carboxyphenylamino)-1-deoxy-D-ribulose 5-phosphate

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0566 and as a product in r_0913 and as a modifier in r_0566, r_0913).

$$\frac{\text{d}}{\text{d}t}\text{s\_0076} = v_{227} - v_{160} \tag{620}$$

7.22 Species s_0077

Name 1-(5-phospho-D-ribosyl)-5-[(5-phospho-D-ribosylamino)methylideneamino]imidazole-4-carboxamide

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0007 and as a product in r_0909 and as a modifier in r_0007, r_0909).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0077} = v_{223} - v_5 \tag{621}$$

7.23 Species s_0078

Name 1-(5-phosphoribosyl)-5'-AMP

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0909 and as a product in r_0910 and as a modifier in r_0909, r_0910).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0078} = v_{224} - v_{223} \tag{622}$$

7.24 Species s_0082

Name 1-acyl-sn-glycerol 3-phosphate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0008 and as a product in r_0495 and as a modifier in r_0008, r_0495).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0082} = v_{133} - v_6 \tag{623}$$

7.25 Species s_0086

Name 1-C-(indol-3-yl)glycerol 3-phosphate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_1055 and as a product in r_0566 and as a modifier in r_0566, r_1055).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0086} = v_{160} - v_{272} \tag{624}$$

7.26 Species s_0089

Name 1-phosphatidyl-1D-myo-inositol

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in six reactions (as a reactant in r_0591, r_2111 and as a product in r_0874 and as a modifier in r_0591, r_0874, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0089} = v_{208} - v_{163} - 0.001583 v_{296} \tag{625}$$

7.27 Species s_0118

Name 1-pyrroline-5-carboxylate

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0957 and as a product in r_0012 and as a modifier in r_0012, r_0957).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0118} = v_{7} - v_{234} \tag{626}$$

7.28 Species s_0120

Name 10-formyl-THF

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in eight reactions (as a reactant in r_0499, r_0912 and as a product in r_0446, r_0724 and as a modifier in r_0446, r_0499, r_0724, r_0912).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0120} = v_{120} + v_{184} - v_{134} - v_{226} \tag{627}$$

7.29 Species s_0122

Name 14-demethyllanosterol

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in six reactions (as a reactant in r_0241, r_2111 and as a product in r_0231 and as a modifier in r_0231, r_0241, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0122} = v_{64} - v_{72} - 5.6 \cdot 10^{-5} v_{296} \tag{628}$$

7.30 Species s_0126

Name 1D-myo-inositol 1-phosphate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0757 and as a product in r_0758 and as a modifier in r_0757, r_0758).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0126} = v_{194} - v_{193} \tag{629}$$

7.31 Species s_0141

Name 2,5-diamino-4-hydroxy-6-(5-phosphoribosylamino)pyrimidine

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0015 and as a product in r_0525 and as a modifier in r_0015, r_0525).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0141} = v_{140} - v_{9} \tag{630}$$

7.32 Species s_0142

Name 2,5-diamino-6-(5-phosphono)ribitylamino-4(3H)-pyrimidinone

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0014 and as a product in r_0015 and as a modifier in r_0014, r_0015).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0142} = v_{9} - v_{8} \tag{631}$$

7.33 Species s_0145

Name 2-acetamido-5-oxopentanoate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0118 and as a product in r_0759 and as a modifier in r_0118, r_0759).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0145} = v_{195} - v_{34} \tag{632}$$

7.34 Species s_0146

Name 2-acetyllactic acid

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0096 and as a product in r_0097 and as a modifier in r_0096, r_0097).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0146} = v_{29} - v_{28} \tag{633}$$

7.35 Species s_0158

Name 2-hydroxy-3-oxobutyl phosphate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0967 and as a product in r_0038 and as a modifier in r_0038, r_0967).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0158} = v_{18} - v_{238} \tag{634}$$

7.36 Species s_0162

Name 2-isopropylmalate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0023 and as a product in r_0024 and as a modifier in r_0023, r_0024).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0162} = v_{14} - v_{13} \tag{635}$$

7.37 Species s_0165

Name 2-isopropylmaleic acid

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0060 and as a product in r_0023 and as a modifier in r_0023, r_0060).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0165} = v_{13} - v_{22} \tag{636}$$

7.38 Species s_0176

Name 2-oxoadipic acid

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0018 and as a product in r_0545 and as a modifier in r_0018, r_0545).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0176} = v_{150} - v_{11} \tag{637}$$

7.39 Species s_0178

Name 2-oxobutanoate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in six reactions (as a reactant in r_0016 and as a product in r_0310, r_0692 and as a modifier in r_0016, r_0310, r_0692).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0178} = v_{85} + v_{174} - v_{10} \tag{638}$$

7.40 Species s_0180

Name 2-oxoglutarate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in 30 reactions (as a reactant in r_0470, r_0543 and as a product in r_0018, r_0118, r_0216, r_0538, r_0658, r_0661, r_0663, r_0674, r_0699, r_0851, r_0988, r_1063, r_1087 and as a modifier in r_0018, r_0118, r_0216, r_0470, r_0538, r_0543, r_0658, r_0661, r_0663, r_0674, r_0699, r_0851, r_0988, r_1063, r_1087).

$$\begin{aligned}\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0180} = {} & v_{11} + v_{34} + v_{58} + v_{146} + v_{164} + v_{165} + v_{167} + v_{171} \\ & + v_{178} + v_{204} + v_{248} + v_{274} + v_{278} - v_{126} - v_{149}\end{aligned} \tag{639}$$

7.41 Species P2G

Name 2-phospho-D-glyceric acid

SBO:0000247 simple chemical

Initial concentration $0.127695817386632\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in ENO and as a product in GPM and as a modifier in ENO, GPM).

$$\frac{\text{d}}{\text{d}t}\text{P2G} = v_{217} - v_{101} \tag{640}$$

7.42 Species s_0190

Name farnesyl diphosphate

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_1012 and as a product in r_0462 and as a modifier in r_0462, r_1012).

$$\frac{\text{d}}{\text{d}t}\text{s\_0190} = v_{123} - 2v_{256} \tag{641}$$

7.43 Species s_0201

Name 3'-phospho-5'-adenylyl sulfate

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0883 and as a product in r_0154 and as a modifier in r_0154, r_0883).

$$\frac{\text{d}}{\text{d}t}\text{s\_0201} = v_{42} - v_{211} \tag{642}$$

7.44 Species s_0204

Name 3-(4-hydroxyphenyl)pyruvate

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_1063 and as a product in r_0939 and as a modifier in r_0939, r_1063).

$$\frac{\text{d}}{\text{d}t}\text{s\_0204} = v_{232} - v_{274} \tag{643}$$

7.45 Species s_0207

Name 3-(imidazol-4-yl)-2-oxopropyl dihydrogen phosphate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0538 and as a product in r_0564 and as a modifier in r_0538, r_0564).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0207} = v_{158} - v_{146} \tag{644}$$

7.46 Species s_0209

Name 3-dehydro-4-methylzymosterol

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0236 and as a product in r_0235 and as a modifier in r_0235, r_0236).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0209} = v_{66} - v_{67} \tag{645}$$

7.47 Species s_0210

Name 3-dehydroquinate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0039 and as a product in r_0040 and as a modifier in r_0039, r_0040).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0210} = v_{20} - v_{19} \tag{646}$$

7.48 Species s_0211

Name 3-dehydroshikimate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0996 and as a product in r_0039 and as a modifier in r_0039, r_0996).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0211} = v_{19} - v_{253} \tag{647}$$

7.49 Species s_0218

Name 3-hydroxy-3-methylglutaryl-CoA

SBO:0000247 simple chemical

Initial concentration 0.1 mmol · l^{-1}

This species takes part in four reactions (as a reactant in r_0558 and as a product in r_0559 and as a modifier in r_0558, r_0559).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0218} = v_{156} - v_{155} \tag{648}$$

7.50 Species s_0231

Name 3-ketosphinganine

SBO:0000247 simple chemical

Initial concentration 0.1 mmol · l^{-1}

This species takes part in four reactions (as a reactant in r_0041 and as a product in r_0993 and as a modifier in r_0041, r_0993).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0231} = v_{251} - v_{21} \tag{649}$$

7.51 Species s_0232

Name 3-methyl-2-oxobutanoate

SBO:0000247 simple chemical

Initial concentration 0.1 mmol · l^{-1}

This species takes part in six reactions (as a reactant in r_0024, r_1087 and as a product in r_0352 and as a modifier in r_0024, r_0352, r_1087).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0232} = v_{95} - v_{14} - v_{278} \tag{650}$$

7.52 Species P3G

Name 3-phosphoglycerate

SBO:0000247 simple chemical

Initial concentration 0.885688538360659 mmol · l^{-1}

This species takes part in four reactions (as a reactant in GPM and as a product in PGK and as a modifier in PGK, GPM).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{P3G} = v_{216} - v_{217} \tag{651}$$

7.53 Species s_0261

Name 3-phosphoshikimic acid

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0065 and as a product in r_0997 and as a modifier in r_0065, r_0997).

$$\frac{\text{d}}{\text{d}t}\text{s\_0261} = v_{254} - v_{24} \tag{652}$$

7.54 Species s_0262

Name 4,4-dimethyl-5alpha-cholesta-8,14,24-trien-3beta-ol

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0231 and as a product in r_0317 and as a modifier in r_0231, r_0317).

$$\frac{\text{d}}{\text{d}t}\text{s\_0262} = v_{88} - v_{64} \tag{653}$$

7.55 Species s_0291

Name 4-methyl-2-oxopentanoate

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0699 and as a product in r_0029 and as a modifier in r_0029, r_0699).

$$\frac{\text{d}}{\text{d}t}\text{s\_0291} = v_{16} - v_{178} \tag{654}$$

7.56 Species s_0295

Name 4-phospho-L-aspartate

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0219 and as a product in r_0215 and as a modifier in r_0215, r_0219).

$$\frac{\text{d}}{\text{d}t}\text{s\_0295} = v_{57} - v_{59} \tag{655}$$

7.57 Species s_0296

Name 4alpha-methylzymosterol

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0238 and as a product in r_0236 and as a modifier in r_0236, r_0238).

$$\frac{\text{d}}{\text{d}t}\text{s\_0296} = v_{67} - v_{69} \tag{656}$$

7.58 Species s_0297

Name 4beta-methylzymosterol-4alpha-carboxylic acid

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0235 and as a product in r_0241 and as a modifier in r_0235, r_0241).

$$\frac{\text{d}}{\text{d}t}\text{s\_0297} = v_{72} - v_{66} \tag{657}$$

7.59 Species s_0298

Name 5'-adenylyl sulfate

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0154 and as a product in r_1026 and as a modifier in r_0154, r_1026).

$$\frac{\text{d}}{\text{d}t}\text{s\_0298} = v_{259} - v_{42} \tag{658}$$

7.60 Species s_0299

Name 5'-phosphoribosyl-4-(N-succinocarboxamide)-5-aminoimidazole

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0151 and as a product in r_0908 and as a modifier in r_0151, r_0908).

$$\frac{\text{d}}{\text{d}t}\text{s\_0299} = v_{222} - v_{39} \tag{659}$$

7.61 Species s_0300

Name 5'-phosphoribosyl-5-aminoimidazole

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0911 and as a product in r_0855 and as a modifier in r_0855, r_0911).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0300} = v_{206} - v_{225} \tag{660}$$

7.62 Species s_0301

Name 5'-phosphoribosyl-N-formylglycineamide

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0079 and as a product in r_0499 and as a modifier in r_0079, r_0499).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0301} = v_{134} - v_{25} \tag{661}$$

7.63 Species s_0302

Name 5'-phosphoribosyl-N-formylglycineamidine

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0855 and as a product in r_0079 and as a modifier in r_0079, r_0855).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0302} = v_{25} - v_{206} \tag{662}$$

7.64 Species s_0304

Name 5,10-methenyl-THF

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in six reactions (as a reactant in r_0724, r_0731 and as a product in r_0732 and as a modifier in r_0724, r_0731, r_0732).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0304} = v_{189} - v_{184} - v_{188} \tag{663}$$

7.65 Species s_0306

Name 5,10-methylenetetrahydrofolate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in twelve reactions (as a reactant in r_0080, r_0502, r_0732, r_1045 and as a product in r_0501, r_0731 and as a modifier in r_0080, r_0501, r_0502, r_0731, r_0732, r_1045).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0306} = v_{135} + v_{188} - v_{26} - v_{136} - v_{189} - v_{265} \tag{664}$$

7.66 Species s_0312

Name 5-[(5-phospho-1-deoxy-D-ribulos-1-ylamino)methylideneamino]-1-(5-phospho-D-ribosyl)imidazole-4-carboxamide

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0563 and as a product in r_0007 and as a modifier in r_0007, r_0563).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0312} = v_{5} - v_{157} \tag{665}$$

7.67 Species s_0313

Name 5-amino-6-(5-phosphoribitylamino)uracil

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_2030 and as a product in r_0014 and as a modifier in r_0014, r_2030).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0313} = v_{8} - v_{294} \tag{666}$$

7.68 Species s_0314

Name 5-amino-6-(D-ribitylamino)uracil

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in six reactions (as a reactant in r_0967 and as a product in r_0968, r_2030 and as a modifier in r_0967, r_0968, r_2030).

$$\frac{\text{d}}{\text{d}t}\text{s\_0314} = v_{239} + v_{294} - v_{238} \tag{667}$$

7.69 Species s_0322

Name 5-methyltetrahydrofolate

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0727 and as a product in r_0080 and as a modifier in r_0080, r_0727).

$$\frac{\text{d}}{\text{d}t}\text{s\_0322} = v_{26} - v_{186} \tag{668}$$

7.70 Species s_0324

Name 5-O-(1-carboxyvinyl)-3-phosphoshikimic acid

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0279 and as a product in r_0065 and as a modifier in r_0065, r_0279).

$$\frac{\text{d}}{\text{d}t}\text{s\_0324} = v_{24} - v_{79} \tag{669}$$

7.71 Species s_0325

Name 5-phospho-ribosyl-glycineamide

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0499 and as a product in r_0914 and as a modifier in r_0499, r_0914).

$$\frac{\text{d}}{\text{d}t}\text{s\_0325} = v_{228} - v_{134} \tag{670}$$

7.72 Species s_0326

Name 5-phosphoribosyl-ATP

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0910 and as a product in r_0225 and as a modifier in r_0225, r_0910).

$$\frac{\text{d}}{\text{d}t}\text{s\_0326} = v_{61} - v_{224} \tag{671}$$

7.73 Species s_0327

Name 5-phosphoribosylamine

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0914 and as a product in r_0915 and as a modifier in r_0914, r_0915).

$$\frac{\text{d}}{\text{d}t}\text{s\_0327} = v_{229} - v_{228} \tag{672}$$

7.74 Species s_0328

Name 6,7-dimethyl-8-(1-D-ribityl)lumazine

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0968 and as a product in r_0967 and as a modifier in r_0967, r_0968).

$$\frac{\text{d}}{\text{d}t}\text{s\_0328} = v_{238} - 2v_{239} \tag{673}$$

7.75 Species s_0335

Name 6-O-phosphono-D-glucono-1,5-lactone

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0091 and as a product in r_0466 and as a modifier in r_0091, r_0466).

$$\frac{\text{d}}{\text{d}t}\text{s\_0335} = v_{124} - v_{27} \tag{674}$$

7.76 Species s_0340

Name 6-phospho-D-gluconate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0889 and as a product in r_0091 and as a modifier in r_0091, r_0889).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0340} = v_{27} - v_{215} \tag{675}$$

7.77 Species s_0349

Name 7-phospho-2-dehydro-3-deoxy-D-arabino-heptonic acid

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0040 and as a product in r_0020 and as a modifier in r_0020, r_0040).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0349} = v_{12} - v_{20} \tag{676}$$

7.78 Species AcAld

Name acetaldehyde

SBO:0000247 simple chemical

Initial concentration $0.178140579850657\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in eleven reactions (as a reactant in ADH, r_0173, r_0174, r_1633 and as a product in PDC, r_1040 and as a modifier in ADH, r_0173, r_0174, r_1040, r_1633).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{AcAld} = v_{236} + v_{262} - v_{45} - v_{46} - v_{47} - v_{285} \tag{677}$$

7.79 Species s_0360

Name acetaldehyde

SBO:0000247 simple chemical

Initial concentration $0\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a product in r_1633), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0360} = 0 \tag{678}$$

7.80 Species s_0362

Name acetate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in ten reactions (as a reactant in r_0110 and as a product in r_0173, r_0174, r_0311, r_0813 and as a modifier in r_0110, r_0173, r_0174, r_0311, r_0813).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0362} = v_{46} + v_{47} + v_{86} + v_{199} - v_{32} \tag{679}$$

7.81 Species s_0367

Name acetoacetyl-CoA

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0559 and as a product in r_0103 and as a modifier in r_0103, r_0559).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0367} = v_{30} - v_{156} \tag{680}$$

7.82 Species s_0373

Name acetyl-CoA

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in 18 reactions (as a reactant in r_0024, r_0103, r_0108, r_0300, r_0398, r_0543, r_0549, r_0559 and as a product in r_0110 and as a modifier in r_0024, r_0103, r_0108, r_0110, r_0300, r_0398, r_0543, r_0549, r_0559).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0373} = v_{32} - v_{14} - 2v_{30} - v_{31} - v_{81} - v_{109} - v_{149} - v_{153} - v_{156} \tag{681}$$

7.83 Species s_0380

Name acyl-CoA

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in six reactions (as a reactant in r_0008, r_0495 and as a product in r_0336 and as a modifier in r_0008, r_0336, r_0495).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0380} = v_{91} - v_6 - v_{133} \tag{682}$$

7.84 Species s_0386

Name adenosine

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0142 and as a product in r_0144 and as a modifier in r_0142, r_0144).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0386} = v_{36} - v_{35} \tag{683}$$

7.85 Species s_0390

Name adenosine 3',5'-bismonophosphate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0032 and as a product in r_0883 and as a modifier in r_0032, r_0883).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0390} = v_{211} - v_{17} \tag{684}$$

7.86 Species s_0393

Name adenylo-succinate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0152 and as a product in r_0153 and as a modifier in r_0152, r_0153).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0393} = v_{41} - v_{40} \tag{685}$$

7.87 Species ADP

Name ADP

SBO:0000247 simple chemical

Initial concentration $1.28198768168719\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in 75 reactions (as a reactant in AK, r_0226, r_0330, PGK, PYK, r_0974, r_1026, r_1704, r_1729 and as a product in r_0079, r_0108, r_0115, r_0142, r_0150, r_0154, r_0215, ATPase, r_0250, r_0307, r_0446, r_0476, r_0528, HXK, r_0548, r_0735, r_0739, r_0800, r_0811, r_0855, r_0884, PFK, r_0904, r_0908, r_0911, r_0914, r_0958, r_0997, r_1072, r_2111 and as a modifier in r_0079, r_0108, r_0115, r_0142, AK, r_0150, r_0154, r_0215, r_0226, r_0250, r_0307, r_0330, r_0446, r_0476, r_0528, HXK, r_0548, r_0735, r_0739, r_0800, r_0811, r_0855, r_0884, PGK, r_0904, r_0908, r_0911, r_0914, r_0958, PYK, r_0974, r_0997, r_1026, r_1072, r_1704, r_1729).

$$\begin{aligned}\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{ADP} = {} & v_{25} + v_{31} + v_{33} + v_{35} + v_{38} + v_{42} + v_{57} + v_{63} + 2v_{75} + v_{83} + v_{120} + v_{127} + v_{141} + v_{143} \\ & + v_{152} + v_{190} + v_{192} + v_{197} + v_{198} + v_{206} + v_{212} + v_{213} + v_{221} + v_{222} + v_{225} + v_{228} + v_{235} \\ & + v_{254} + v_{276} + 59.276v_{296} - 2v_{37} - v_{62} - v_{90} - v_{216} - v_{237} - v_{242} - v_{259} - v_{289} - v_{290}\end{aligned} \tag{686}$$

7.88 Species s_0403

Name AICAR

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in six reactions (as a reactant in r_0912 and as a product in r_0151, r_0563 and as a modifier in r_0151, r_0563, r_0912).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0403} = v_{39} + v_{157} - v_{226} \tag{687}$$

7.89 Species s_0404

Name Ala-tRNA(Ala)

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_2111 and as a product in r_0157 and as a modifier in r_0157, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0404} = v_{44} - 0.4588v_{296} \tag{688}$$

7.90 Species s_0409

Name alpha,alpha-trehalose 6-phosphate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_1051 and as a product in r_0195 and as a modifier in r_0195, r_1051).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0409} = v_{48} - v_{269} \tag{689}$$

7.91 Species s_0419

Name ammonium

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in 18 reactions (as a reactant in r_0307, r_0470, r_0476 and as a product in r_0014, r_0310, r_0326, r_0501, r_0692, r_1115 and as a modifier in r_0014, r_0307, r_0310, r_0326, r_0470, r_0476, r_0501, r_0692, r_1115).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0419} = v_8 + v_{85} + v_{89} + v_{135} + v_{174} + v_{280} - v_{83} - v_{126} - v_{127} \tag{690}$$

7.92 Species s_0420

Name ammonium

SBO:0000247 simple chemical

Initial concentration $1\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in two reactions (as a reactant in r_1115 and as a modifier in r_1115), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0420} = 0 \tag{691}$$

7.93 Species AMP

Name AMP

SBO:0000247 simple chemical

Initial concentration $0.292884853320091\ \text{mmol}\cdot\text{l}^{-1}$

This species takes part in 70 reactions (as a reactant in r_0150, r_0399, r_0407, r_2111 and as a product in r_0032, r_0142, AK, r_0152, r_0157, r_0208, r_0209, r_0211, r_0212, r_0220, r_0313, r_0400, r_0406, r_0478, r_0479, r_0512, r_0514, r_0539, r_0665, r_0701, r_0711, r_0729, r_0852, r_0916, r_0941, r_0995, r_1042, r_1057, r_1066, r_1089 and as a modifier in r_0032, r_0142, AK, r_0150, r_0152, r_0157, r_0208, r_0209, r_0211, r_0212, r_0220, r_0313, r_0399, r_0400, r_0406, r_0407, r_0478, r_0479, r_0512, r_0514, r_0539, r_0665, r_0701, r_0711, r_0729, r_0852, PFK, PFK, r_0916, r_0941, r_0995, r_1042, r_1057, r_1066, r_1089, r_2111).

$$\begin{aligned}\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{AMP} = {} & v_{17} + v_{35} + v_{37} + v_{40} + v_{44} + v_{52} + v_{53} + v_{54} + v_{55} + v_{60} + v_{87} + v_{111} + v_{112} \\ & + v_{128} + v_{129} + v_{138} + v_{139} + v_{147} + v_{168} + v_{179} + v_{180} + v_{187} + v_{205} + v_{230} \\ & + v_{233} + v_{252} + v_{264} + v_{273} + v_{275} + v_{279} - v_{38} - v_{110} - v_{113} - 0.046v_{296}\end{aligned} \tag{692}$$

7.94 Species s_0427

Name anthranilate

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol}\cdot\text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0202 and as a product in r_0203 and as a modifier in r_0202, r_0203).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0427} = v_{50} - v_{49} \tag{693}$$

7.95 Species s_0428

Name Arg-tRNA(Arg)

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol}\cdot\text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_2111 and as a product in r_0209 and as a modifier in r_0209, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0428} = v_{53} - 0.1607v_{296} \tag{694}$$

7.96 Species s_0430

Name Asn-tRNA(Asn)

SBO:0000247 simple chemical

Initial concentration 0.1 mmol · l^{-1}

This species takes part in four reactions (as a reactant in r_2111 and as a product in r_0212 and as a modifier in r_0212, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0430} = v_{55} - 0.1017 v_{296} \tag{695}$$

7.97 Species s_0432

Name Asp-tRNA(Asp)

SBO:0000247 simple chemical

Initial concentration 0.1 mmol · l^{-1}

This species takes part in four reactions (as a reactant in r_2111 and as a product in r_0220 and as a modifier in r_0220, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0432} = v_{60} - 0.2975 v_{296} \tag{696}$$

7.98 Species ATP

Name ATP

SBO:0000247 simple chemical

Initial concentration 2.52512746499271 mmol · l^{-1}

This species takes part in 134 reactions (as a reactant in r_0079, r_0108, r_0115, r_0142, r_0154, r_0157, r_0208, r_0209, r_0211, r_0212, r_0215, r_0220, r_0225, ATPase, r_0250, r_0307, r_0313, r_0400, r_0406, r_0446, r_0476, r_0478, r_0479, r_0512, r_0514, r_0528, HXK, r_0539, r_0548, r_0665, r_0701, r_0711, r_0726, r_0729, r_0735, r_0739, r_0800, r_0811, r_0852, r_0855, r_0884, PFK, r_0904, r_0908, r_0911, r_0914, r_0916, r_0941, r_0958, r_0970, r_0995, r_0997, r_1042, r_1057, r_1066, r_1072, r_1089, r_2111 and as a product in AK, r_0226, r_0330, r_0399, r_0407, PGK, PYK, r_1704, r_1729 and as a modifier in r_0079, r_0108, r_0115, r_0142, AK, r_0154, r_0157, r_0208, r_0209, r_0211, r_0212, r_0215, r_0220, r_0225, r_0226, ATPase, r_0250, r_0307, r_0313, r_0330, r_0399, r_0400, r_0406, r_0407, r_0446, r_0476, r_0478, r_0479, r_0512, r_0514, r_0528, HXK, r_0539, r_0548, r_0665, r_0701, r_0711, r_0726, r_0729, r_0735, r_0739, r_0800, r_0811, r_0852, r_0855, r_0884, PFK, PGK, r_0904, r_0908, r_0911, r_0914, r_0916, r_0941, r_0958, PYK, r_0970, r_0995, r_0997, r_1042, r_1057, r_1066, r_1072, r_1089, r_1704, r_1729, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{ATP} = v_{37} + v_{62} + v_{90} + v_{110} + v_{113} + v_{216} + v_{237} + v_{289} + v_{290} - v_{25} - v_{31} - v_{33} - v_{35} - v_{42} - v_{44} - v_{52} - v_{53} - v_{54} - v_{55} - v_{57} - v_{60} - v_{61} - v_{63} - 2v_{75} - v_{83} - v_{87} - v_{111} - v_{112} - v_{120} - v_{127} - v_{128} - v_{129} - v_{138} - v_{139} - v_{141} - v_{143} - v_{147} - v_{152} - v_{168} - v_{179} - v_{180} - v_{185} - v_{187} - v_{190} - v_{192} - v_{197} - v_{198} - v_{205} - v_{206} - v_{212} - v_{213} - v_{221} - v_{222} - v_{225} - v_{228} - v_{230} - v_{233} - v_{235} - v_{240} - v_{252} - v_{254} - v_{264} - v_{273} - v_{275} - v_{276} - v_{279} - 59.276v_{296} \tag{697}$$

7.99 Species s_0445

Name bicarbonate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in eight reactions (as a reactant in r_0108, r_0250, r_0958 and as a product in r_1664 and as a modifier in r_0108, r_0250, r_0958, r_1664).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0445} = v_{286} - v_{31} - v_{75} - v_{235} \tag{698}$$

7.100 Species s_0454

Name but-1-ene-1,2,4-tricarboxylic acid

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0542 and as a product in r_0027 and as a modifier in r_0027, r_0542).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0454} = v_{15} - v_{148} \tag{699}$$

7.101 Species s_0455

Name carbamoyl phosphate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in six reactions (as a reactant in r_0214, r_0816 and as a product in r_0250 and as a modifier in r_0214, r_0250, r_0816).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0455} = v_{75} - v_{56} - v_{200} \tag{700}$$

7.102 Species C02

Name carbon dioxide

SBO:0000247 simple chemical

Initial concentration $1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in 67 reactions (as a reactant in r_0911, r_1664, r_1697 and as a product in r_0016, r_0029, r_0097, r_0234, r_0235, r_0386, r_0387, r_0389, r_0391, r_0393, r_0394, r_0397, r_0398, r_0432, r_0433, r_0434, r_0435, r_0501, r_0545, r_0566, r_0658, r_0661, r_0739, r_0821, r_0877, r_0884, r_0889, r_0938, r_0939, PDC, r_0993 and as a modifier in r_0016, r_0029, r_0097, r_0234, r_0235, r_0386, r_0387, r_0389, r_0391, r_0393, r_0394, r_0397, r_0398, r_0432, r_0433, r_0434, r_0435, r_0501, r_0545, r_0566, r_0658, r_0661, r_0739, r_0821, r_0877, r_0884, r_0889, r_0911, r_0938, r_0939, r_0993, r_1664, r_1697).

$$\begin{aligned}\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{CO2} = {} & v_{10} + v_{16} + v_{29} + v_{65} + v_{66} + v_{102} + v_{103} + v_{104} + v_{105} + 3v_{106} + v_{107} + v_{108} \\ & + 3v_{109} + v_{114} + v_{115} + v_{116} + v_{117} + v_{135} + v_{150} + v_{160} + v_{164} + v_{165} + v_{192} \\ & + v_{203} + v_{209} + v_{212} + v_{215} + v_{231} + v_{232} + v_{236} + v_{251} - v_{225} - v_{286} - v_{288}\end{aligned} \tag{701}$$

7.103 Species s_0458

Name carbon dioxide

SBO:0000247 simple chemical

Initial concentration $0\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a product in r_1697), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0458} = 0 \tag{702}$$

7.104 Species s_0467

Name CDP

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in six reactions (as a reactant in r_0792, r_0976 and as a product in r_0736 and as a modifier in r_0736, r_0792, r_0976).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0467} = v_{191} - v_{196} - v_{243} \tag{703}$$

7.105 Species s_0471

Name CDP-diacylglycerol

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in six reactions (as a reactant in r_0874, r_0880 and as a product in r_0257 and as a modifier in r_0257, r_0874, r_0880).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0471} = v_{76} - v_{208} - v_{210} \tag{704}$$

7.106 Species s_0478

Name ceramide-1 (C26)

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0591 and as a product in r_0264 and as a modifier in r_0264, r_0591).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0478} = v_{77} - v_{163} \tag{705}$$

7.107 Species s_0505

Name cerotate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0406 and as a product in r_0394 and as a modifier in r_0394, r_0406).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0505} = v_{107} - v_{112} \tag{706}$$

7.108 Species s_0515

Name chorismate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in six reactions (as a reactant in r_0203, r_0278 and as a product in r_0279 and as a modifier in r_0203, r_0278, r_0279).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0515} = v_{79} - v_{50} - v_{78} \tag{707}$$

7.109 Species s_0516

Name cis-aconitate

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0280 and as a product in r_0302 and as a modifier in r_0280, r_0302).

$$\frac{\text{d}}{\text{d}t}\text{s\_0516} = v_{82} - v_{80} \tag{708}$$

7.110 Species s_0522

Name citrate

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0302 and as a product in r_0300 and as a modifier in r_0300, r_0302).

$$\frac{\text{d}}{\text{d}t}\text{s\_0522} = v_{81} - v_{82} \tag{709}$$

7.111 Species s_0526

Name CMP

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in eight reactions (as a reactant in r_2111 and as a product in r_0792, r_0874, r_0880 and as a modifier in r_0792, r_0874, r_0880, r_2111).

$$\frac{\text{d}}{\text{d}t}\text{s\_0526} = v_{196} + v_{208} + v_{210} - 0.0447 v_{296} \tag{710}$$

7.112 Species s_0529

Name coenzyme A

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in 58 reactions (as a reactant in r_0110, r_0336, r_0400, r_0406 and as a product in r_0008, r_0024, r_0103, r_0264, r_0300, r_0386, r_0387, r_0389, r_0391, r_0393, r_0394, r_0397, r_0398, r_0399, r_0407, r_0432, r_0433, r_0434, r_0435, r_0495, r_0543, r_0549, r_0558, r_0559, r_0993 and as a modifier in r_0008, r_0024, r_0103, r_0110, r_0264, r_0300, r_0336, r_0386, r_0387, r_0389, r_0391, r_0393, r_0394, r_0397, r_0398, r_0399, r_0400, r_0406, r_0407, r_0432, r_0433, r_0434, r_0435, r_0495, r_0543, r_0549, r_0558, r_0559, r_0993).

$$\begin{aligned}\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0529} = {} & v_6 + v_{14} + v_{30} + v_{77} + v_{81} + v_{102} + v_{103} + v_{104} + v_{105} + 3v_{106} \\ & + v_{107} + v_{108} + 3v_{109} + v_{110} + v_{113} + v_{114} + v_{115} + v_{116} + v_{117} \\ & + v_{133} + v_{149} + v_{153} + v_{155} + v_{156} + v_{251} - v_{32} - v_{91} - v_{111} - v_{112}\end{aligned} \tag{711}$$

7.113 Species s_0539

Name CTP

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in six reactions (as a reactant in r_0257, r_0736 and as a product in r_0307 and as a modifier in r_0257, r_0307, r_0736).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0539} = v_{83} - v_{76} - v_{191} \tag{712}$$

7.114 Species s_0542

Name Cys-tRNA(Cys)

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_2111 and as a product in r_0313 and as a modifier in r_0313, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0542} = v_{87} - 0.0066v_{296} \tag{713}$$

7.115 Species s_0550

Name D-erythro-1-(imidazol-4-yl)glycerol 3-phosphate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0564 and as a product in r_0563 and as a modifier in r_0563, r_0564).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0550} = v_{157} - v_{158} \tag{714}$$

7.116 Species s_0551

Name D-erythrose 4-phosphate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in eight reactions (as a reactant in r_0020, r_0990, r_1050 and as a product in r_1048 and as a modifier in r_0020, r_0990, r_1048, r_1050).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0551} = v_{266} - v_{12} - v_{250} - v_{268} \tag{715}$$

7.117 Species F16bP

Name D-fructose 1,6-bisphosphate

SBO:0000247 simple chemical

Initial concentration $6.22132076069411\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in FBA and as a product in PFK and as a modifier in FBA, PFK).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{F16bP} = v_{213} - v_{121} \tag{716}$$

7.118 Species F6P

Name D-fructose 6-phosphate

SBO:0000247 simple chemical

Initial concentration $0.624976405532373\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in ten reactions (as a reactant in r_0723, PFK and as a product in PGI, r_1048, r_1050 and as a modifier in PGI, r_0723, PFK, r_1048, r_1050).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{F6P} = v_{125} + v_{266} + v_{268} - v_{183} - v_{213} \tag{717}$$

7.119 Species GLC

Name D-glucose

SBO:0000247 simple chemical

Initial concentration 0.097652231064563 mmol · l^{-1}

This species takes part in four reactions (as a reactant in HXK and as a product in HXT and as a modifier in HXK, HXT).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{GLC} = v_{281} - v_{143} \tag{718}$$

7.120 Species GLCx

Name D-glucose

SBO:0000247 simple chemical

Initial concentration 100 mmol · l^{-1}

This species takes part in two reactions (as a reactant in HXT and as a modifier in HXT), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{GLCx} = 0 \tag{719}$$

7.121 Species s_0567

Name D-glucose 1-phosphate

SBO:0000247 simple chemical

Initial concentration 0.1 mmol · l^{-1}

This species takes part in four reactions (as a reactant in r_1084 and as a product in r_0888 and as a modifier in r_0888, r_1084).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0567} = v_{214} - v_{277} \tag{720}$$

7.122 Species G6P

Name D-glucose 6-phosphate

SBO:0000247 simple chemical

Initial concentration 2.67504014044787 mmol · l^{-1}

This species takes part in twelve reactions (as a reactant in r_0195, r_0466, PGI, r_0758, r_0888 and as a product in HXK and as a modifier in r_0195, r_0466, PGI, HXK, r_0758, r_0888).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{G6P} = v_{143} - v_{48} - v_{124} - v_{125} - v_{194} - v_{214} \tag{721}$$

7.123 Species s_0573

Name D-mannose 1-phosphate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0722 and as a product in r_0902 and as a modifier in r_0722, r_0902).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0573} = v_{220} - v_{182} \tag{722}$$

7.124 Species s_0574

Name D-mannose 6-phosphate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0902 and as a product in r_0723 and as a modifier in r_0723, r_0902).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0574} = v_{183} - v_{220} \tag{723}$$

7.125 Species s_0577

Name D-ribulose 5-phosphate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in eight reactions (as a reactant in r_0038, r_0982, r_0984 and as a product in r_0889 and as a modifier in r_0038, r_0889, r_0982, r_0984).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0577} = v_{215} - v_{18} - v_{245} - v_{246} \tag{724}$$

7.126 Species s_0581

Name D-xylulose 5-phosphate

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in six reactions (as a reactant in r_1049, r_1050 and as a product in r_0984 and as a modifier in r_0984, r_1049, r_1050).

$$\frac{\text{d}}{\text{d}t}\text{s\_0581} = v_{246} - v_{267} - v_{268} \tag{725}$$

7.127 Species s_0582

Name dADP

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in six reactions (as a reactant in r_1729 and as a product in r_0529, r_0974 and as a modifier in r_0529, r_0974, r_1729).

$$\frac{\text{d}}{\text{d}t}\text{s\_0582} = v_{142} + v_{242} - v_{290} \tag{726}$$

7.128 Species s_0584

Name dAMP

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_2111 and as a product in r_1729 and as a modifier in r_1729, r_2111).

$$\frac{\text{d}}{\text{d}t}\text{s\_0584} = v_{290} - 0.0036 v_{296} \tag{727}$$

7.129 Species s_0586

Name dATP

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0529 and as a product in r_0970 and as a modifier in r_0529, r_0970).

$$\frac{\text{d}}{\text{d}t}\text{s\_0586} = v_{240} - v_{142} \tag{728}$$

7.130 Species s_0587

Name dCDP

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_1704 and as a product in r_0976 and as a modifier in r_0976, r_1704).

$$\frac{\text{d}}{\text{d}t}\text{s\_0587} = v_{243} - v_{289} \tag{729}$$

7.131 Species s_0589

Name dCMP

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in six reactions (as a reactant in r_0326, r_2111 and as a product in r_1704 and as a modifier in r_0326, r_1704, r_2111).

$$\frac{\text{d}}{\text{d}t}\text{s\_0589} = v_{289} - v_{89} - 0.0024 v_{296} \tag{730}$$

7.132 Species s_0595

Name decanoate

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in ten reactions (as a reactant in r_0386, r_1014, r_1052, r_2111 and as a product in r_0399 and as a modifier in r_0386, r_0399, r_1014, r_1052, r_2111).

$$\frac{\text{d}}{\text{d}t}\text{s\_0595} = v_{110} - v_{102} - 1.8 v_{257} - 2.6 v_{270} - 5.35599999999999 \cdot 10^{-4} v_{296} \tag{731}$$

7.133 Species s_0602

Name decanoyl-CoA

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in six reactions (as a reactant in r_0399, r_0432 and as a product in r_0397 and as a modifier in r_0397, r_0399, r_0432).

$$\frac{\text{d}}{\text{d}t}\text{s\_0602} = v_{108} - v_{110} - v_{114} \tag{732}$$

7.134 Species s_0613

Name dGDP

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0330 and as a product in r_0978 and as a modifier in r_0330, r_0978).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0613} = v_{244} - v_{90} \tag{733}$$

7.135 Species s_0615

Name dGMP

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_2111 and as a product in r_0330 and as a modifier in r_0330, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0615} = v_{90} - 0.0024 v_{296} \tag{734}$$

7.136 Species s_0619

Name diglyceride

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in eight reactions (as a reactant in r_1052 and as a product in r_0336, r_0337, r_0591 and as a modifier in r_0336, r_0337, r_0591, r_1052).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0619} = v_{91} + v_{92} + v_{163} - v_{270} \tag{735}$$

7.137 Species s_0625

Name dihydrofolic acid

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0344 and as a product in r_1045 and as a modifier in r_0344, r_1045).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0625} = v_{265} - v_{93} \tag{736}$$

7.138 Species DHAP

Name dihydroxyacetone phosphate

SBO:0000247 simple chemical

Initial concentration 1.00415254899644 mmol · l^{-1}

This species takes part in ten reactions (as a reactant in r_0491, r_0990, TPI, r_1936 and as a product in FBA and as a modifier in FBA, r_0491, r_0990, TPI, r_1936).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{DHAP} = v_{121} - v_{132} - v_{250} - v_{271} - v_{292} \tag{737}$$

7.139 Species s_0633

Name diphosphate

SBO:0000247 simple chemical

Initial concentration 0.1 mmol · l^{-1}

This species takes part in 84 reactions (as a reactant in r_0399, r_0407, r_0568 and as a product in r_0157, r_0202, r_0208, r_0209, r_0211, r_0212, r_0220, r_0225, r_0257, r_0313, r_0355, r_0364, r_0400, r_0406, r_0462, r_0478, r_0479, r_0512, r_0514, r_0525, r_0539, r_0665, r_0701, r_0711, r_0722, r_0726, r_0729, r_0820, r_0852, r_0910, r_0915, r_0941, r_0995, r_1012, r_1042, r_1057, r_1066, r_1084, r_1089 and as a modifier in r_0157, r_0202, r_0208, r_0209, r_0211, r_0212, r_0220, r_0225, r_0257, r_0313, r_0355, r_0364, r_0399, r_0400, r_0406, r_0407, r_0462, r_0478, r_0479, r_0512, r_0514, r_0525, r_0539, r_0568, r_0665, r_0701, r_0711, r_0722, r_0726, r_0729, r_0820, r_0852, r_0910, r_0915, r_0941, r_0995, r_1012, r_1042, r_1057, r_1066, r_1084, r_1089).

$$\begin{aligned}\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0633} = {} & v_{44} + v_{49} + v_{52} + v_{53} + v_{54} + v_{55} + v_{60} + v_{61} + v_{76} + v_{87} + v_{97} + v_{100} \\ & + v_{111} + v_{112} + v_{123} + v_{128} + v_{129} + v_{138} + v_{139} + v_{140} + v_{147} + v_{168} \\ & + v_{179} + v_{180} + v_{182} + v_{185} + v_{187} + v_{202} + v_{205} + v_{224} + v_{229} + v_{233} \\ & + v_{252} + 2v_{256} + v_{264} + v_{273} + v_{275} + v_{277} + v_{279} - v_{110} - v_{113} - v_{161}\end{aligned} \tag{738}$$

7.140 Species s_0644

Name dolichyl D-mannosyl phosphate

SBO:0000247 simple chemical

Initial concentration 0.1 mmol · l^{-1}

This species takes part in four reactions (as a reactant in r_0362 and as a product in r_0361 and as a modifier in r_0361, r_0362).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0644} = v_{98} - v_{99} \tag{739}$$

7.141 Species s_0645

Name dolichyl phosphate

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0361 and as a product in r_0362 and as a modifier in r_0361, r_0362).

$$\frac{\text{d}}{\text{d}t}\text{s\_0645} = v_{99} - v_{98} \tag{740}$$

7.142 Species s_0649

Name dTMP

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_2111 and as a product in r_1045 and as a modifier in r_1045, r_2111).

$$\frac{\text{d}}{\text{d}t}\text{s\_0649} = v_{265} - 0.0036 v_{296} \tag{741}$$

7.143 Species s_0654

Name dUMP

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in six reactions (as a reactant in r_1045 and as a product in r_0326, r_0364 and as a modifier in r_0326, r_0364, r_1045).

$$\frac{\text{d}}{\text{d}t}\text{s\_0654} = v_{89} + v_{100} - v_{265} \tag{742}$$

7.144 Species s_0656

Name dUTP

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0364 and as a product in r_0973 and as a modifier in r_0364, r_0973).

$$\frac{\text{d}}{\text{d}t}\text{s\_0656} = v_{241} - v_{100} \tag{743}$$

7.145 Species s_0657

Name episterol

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_2111 and as a product in r_0243 and as a modifier in r_0243, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0657} = v_{73} - 9.6 \cdot 10^{-5} v_{296} \tag{744}$$

7.146 Species s_0662

Name ergosta-5,7,22,24(28)-tetraen-3beta-ol

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in six reactions (as a reactant in r_0244, r_2111 and as a product in r_1682 and as a modifier in r_0244, r_1682, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0662} = v_{287} - v_{74} - 1.25 \cdot 10^{-4} v_{296} \tag{745}$$

7.147 Species s_0666

Name ergosterol

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in six reactions (as a reactant in r_1014, r_2111 and as a product in r_0244 and as a modifier in r_0244, r_1014, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0666} = v_{74} - v_{257} - 0.0056 v_{296} \tag{746}$$

7.148 Species s_0672

Name ergosterol ester

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_2111 and as a product in r_1014 and as a modifier in r_1014, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0672} = v_{257} - 8.12 \cdot 10^{-4} v_{296} \tag{747}$$

7.149 Species EtOH

Name ethanol

SBO:0000247 simple chemical

Initial concentration $50\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_1762 and as a product in ADH and as a modifier in ADH, r_1762).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{EtOH} = v_{45} - v_{291} \tag{748}$$

7.150 Species s_0681

Name ethanol

SBO:0000247 simple chemical

Initial concentration $0\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a product in r_1762), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0681} = 0 \tag{749}$$

7.151 Species s_0700

Name fecosterol

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in six reactions (as a reactant in r_0243, r_2111 and as a product in r_0986 and as a modifier in r_0243, r_0986, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0700} = v_{247} - v_{73} - 1.14 \cdot 10^{-4} v_{296} \tag{750}$$

7.152 Species s_0709

Name ferricytochrome c

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in eight reactions (as a reactant in r_0001, r_0004, r_0439 and as a product in r_0438 and as a modifier in r_0001, r_0004, r_0438, r_0439).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0709} = 4v_{118} - 2v_1 - 2v_2 - 2v_{119} \tag{751}$$

7.153 Species s_0710

Name ferrocytochrome c

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in eight reactions (as a reactant in r_0438 and as a product in r_0001, r_0004, r_0439 and as a modifier in r_0001, r_0004, r_0438, r_0439).

$$\frac{\text{d}}{\text{d}t}\text{s\_0710} = 2v_1 + 2v_2 + 2v_{119} - 4v_{118} \tag{752}$$

7.154 Species s_0722

Name formate

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in eight reactions (as a reactant in r_0446 and as a product in r_0038, r_0317, r_0525 and as a modifier in r_0038, r_0317, r_0446, r_0525).

$$\frac{\text{d}}{\text{d}t}\text{s\_0722} = v_{18} + v_{88} + v_{140} - v_{120} \tag{753}$$

7.155 Species s_0725

Name fumarate

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in ten reactions (as a reactant in r_0451 and as a product in r_0151, r_0152, r_0207, r_1021 and as a modifier in r_0151, r_0152, r_0207, r_0451, r_1021).

$$\frac{\text{d}}{\text{d}t}\text{s\_0725} = v_{39} + v_{40} + v_{51} + v_{258} - v_{122} \tag{754}$$

7.156 Species s_0739

Name GDP

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in 14 reactions (as a reactant in r_0800, r_0978 and as a product in r_0150, r_0153, r_0361, r_0528, r_0529 and as a modifier in r_0150, r_0153, r_0361, r_0528, r_0529, r_0800, r_0978).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0739} = v_{38} + v_{41} + v_{98} + v_{141} + v_{142} - v_{197} - v_{244} \tag{755}$$

7.157 Species s_0743

Name GDP-alpha-D-mannose

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0361 and as a product in r_0722 and as a modifier in r_0361, r_0722).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0743} = v_{182} - v_{98} \tag{756}$$

7.158 Species s_0745

Name geranyl diphosphate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0462 and as a product in r_0355 and as a modifier in r_0355, r_0462).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0745} = v_{97} - v_{123} \tag{757}$$

7.159 Species s_0747

Name Gln-tRNA(Gln)

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_2111 and as a product in r_0478 and as a modifier in r_0478, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0747} = v_{128} - 0.1054 v_{296} \tag{758}$$

7.160 Species s_0748

Name Glu-tRNA(Glu)

SBO:0000247 simple chemical

Initial concentration 0.1 mmol · l^{-1}

This species takes part in four reactions (as a reactant in r_2111 and as a product in r_0479 and as a modifier in r_0479, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0748} = v_{129} - 0.3018 v_{296} \tag{759}$$

7.161 Species s_0750

Name glutathione

SBO:0000247 simple chemical

Initial concentration 0.1 mmol · l^{-1}

This species takes part in four reactions (as a reactant in r_0697 and as a product in r_0553 and as a modifier in r_0553, r_0697).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0750} = v_{154} - v_{176} \tag{760}$$

7.162 Species s_0757

Name Gly-tRNA(Gly)

SBO:0000247 simple chemical

Initial concentration 0.1 mmol · l^{-1}

This species takes part in four reactions (as a reactant in r_2111 and as a product in r_0512 and as a modifier in r_0512, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0757} = v_{138} - 0.2904 v_{296} \tag{761}$$

7.163 Species GAP

Name glyceraldehyde 3-phosphate

SBO:0000247 simple chemical

Initial concentration 0.0451809175780963 mmol · l^{-1}

This species takes part in 14 reactions (as a reactant in TDH, r_1048 and as a product in FBA, r_1049, r_1050, TPI, r_1055 and as a modifier in FBA, TDH, r_1048, r_1049, r_1050, TPI, r_1055).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{GAP} = v_{121} + v_{267} + v_{268} + v_{271} + v_{272} - v_{130} - v_{266} \tag{762}$$

7.164 Species GLY

Name glycerol

SBO:0000247 simple chemical

Initial concentration $0.15\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_1172 and as a product in r_0489 and as a modifier in r_0489, r_1172).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{GLY} = v_{131} - v_{282} \tag{763}$$

7.165 Species s_0766

Name glycerol

SBO:0000247 simple chemical

Initial concentration $0\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a product in r_1172), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0766} = 0 \tag{764}$$

7.166 Species s_0767

Name glycerol 3-phosphate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in six reactions (as a reactant in r_0489, r_0495 and as a product in r_0491 and as a modifier in r_0489, r_0491, r_0495).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0767} = v_{132} - v_{131} - v_{133} \tag{765}$$

7.167 Species s_0773

Name glycogen

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_2111 and as a product in r_0510 and as a modifier in r_0510, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0773} = v_{137} - 0.5185 v_{296} \tag{766}$$

7.168 Species s_0779

Name glyoxylate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0156 and as a product in r_0662 and as a modifier in r_0156, r_0662).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0779} = v_{166} - v_{43} \tag{767}$$

7.169 Species s_0782

Name GMP

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in eight reactions (as a reactant in r_0528, r_0529, r_2111 and as a product in r_0514 and as a modifier in r_0514, r_0528, r_0529, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0782} = v_{139} - v_{141} - v_{142} - 0.046 v_{296} \tag{768}$$

7.170 Species s_0785

Name GTP

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in ten reactions (as a reactant in r_0150, r_0153, r_0525, r_0722 and as a product in r_0800 and as a modifier in r_0150, r_0153, r_0525, r_0722, r_0800).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0785} = v_{197} - v_{38} - v_{41} - v_{140} - v_{182} \tag{769}$$

7.171 Species s_0816

Name hexacosanoyl-CoA

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0264 and as a product in r_0406 and as a modifier in r_0264, r_0406).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0816} = v_{112} - v_{77} \tag{770}$$

7.172 Species s_0832

Name His-tRNA(His)

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_2111 and as a product in r_0539 and as a modifier in r_0539, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0832} = v_{147} - 0.0663 v_{296} \tag{771}$$

7.173 Species s_0835

Name homocitrate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0027 and as a product in r_0543 and as a modifier in r_0027, r_0543).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0835} = v_{149} - v_{15} \tag{772}$$

7.174 Species s_0836

Name homoisocitrate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0545 and as a product in r_0542 and as a modifier in r_0542, r_0545).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0836} = v_{148} - v_{150} \tag{773}$$

7.175 Species s_0841

Name hydrogen sulfide

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0813 and as a product in r_1027 and as a modifier in r_0813, r_1027).

$$\frac{\text{d}}{\text{d}t}\text{s\_0841} = v_{260} - v_{199} \tag{774}$$

7.176 Species s_0847

Name Ile-tRNA(Ile)

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_2111 and as a product in r_0665 and as a modifier in r_0665, r_2111).

$$\frac{\text{d}}{\text{d}t}\text{s\_0847} = v_{168} - 0.1927 v_{296} \tag{775}$$

7.177 Species s_0849

Name IMP

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in six reactions (as a reactant in r_0153, r_0565 and as a product in r_0570 and as a modifier in r_0153, r_0565, r_0570).

$$\frac{\text{d}}{\text{d}t}\text{s\_0849} = v_{162} - v_{41} - v_{159} \tag{776}$$

7.178 Species s_0897

Name inositol-P-ceramide A (C26)

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_2111 and as a product in r_0591 and as a modifier in r_0591, r_2111).

$$\frac{\text{d}}{\text{d}t}\text{s\_0897} = v_{163} - 5.1708 \cdot 10^{-4} v_{296} \tag{777}$$

7.179 Species s_0940

Name isocitrate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in eight reactions (as a reactant in r_0658, r_0661, r_0662 and as a product in r_0280 and as a modifier in r_0280, r_0658, r_0661, r_0662).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0940} = v_{80} - v_{164} - v_{165} - v_{166} \tag{778}$$

7.180 Species s_0943

Name isopentenyl diphosphate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in eight reactions (as a reactant in r_0355, r_0462, r_0667 and as a product in r_0739 and as a modifier in r_0355, r_0462, r_0667, r_0739).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0943} = v_{192} - v_{97} - v_{123} - v_{169} \tag{779}$$

7.181 Species s_0951

Name keto-phenylpyruvate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0851 and as a product in r_0938 and as a modifier in r_0851, r_0938).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0951} = v_{231} - v_{204} \tag{780}$$

7.182 Species s_0953

Name L-2-aminoadipate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0678 and as a product in r_0018 and as a modifier in r_0018, r_0678).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0953} = v_{11} - v_{172} \tag{781}$$

7.183 Species s_0955

Name L-alanine

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in six reactions (as a reactant in r_0156, r_0157 and as a product in r_0674 and as a modifier in r_0156, r_0157, r_0674).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0955} = v_{171} - v_{43} - v_{44} \tag{782}$$

7.184 Species s_0959

Name L-allysine

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0989 and as a product in r_0678 and as a modifier in r_0678, r_0989).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0959} = v_{172} - v_{249} \tag{783}$$

7.185 Species s_0965

Name L-arginine

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0209 and as a product in r_0207 and as a modifier in r_0207, r_0209).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0965} = v_{51} - v_{53} \tag{784}$$

7.186 Species s_0969

Name L-asparagine

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0212 and as a product in r_0211 and as a modifier in r_0211, r_0212).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0969} = v_{54} - v_{55} \tag{785}$$

7.187 Species s_0973

Name L-aspartate

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in 16 reactions (as a reactant in r_0153, r_0208, r_0211, r_0214, r_0215, r_0220, r_0908 and as a product in r_0216 and as a modifier in r_0153, r_0208, r_0211, r_0214, r_0215, r_0216, r_0220, r_0908).

$$\frac{\text{d}}{\text{d}t}\text{s\_0973} = v_{58} - v_{41} - v_{52} - v_{54} - v_{56} - v_{57} - v_{60} - v_{222} \tag{786}$$

7.188 Species s_0978

Name L-aspartate 4-semialdehyde

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0547 and as a product in r_0219 and as a modifier in r_0219, r_0547).

$$\frac{\text{d}}{\text{d}t}\text{s\_0978} = v_{59} - v_{151} \tag{787}$$

7.189 Species s_0979

Name L-citrulline

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0208 and as a product in r_0816 and as a modifier in r_0208, r_0816).

$$\frac{\text{d}}{\text{d}t}\text{s\_0979} = v_{200} - v_{52} \tag{788}$$

7.190 Species s_0980

Name L-cystathionine

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in six reactions (as a reactant in r_0310 and as a product in r_0309, r_0311 and as a modifier in r_0309, r_0310, r_0311).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0980} = v_{84} + v_{86} - v_{85} \tag{789}$$

7.191 Species s_0981

Name L-cysteine

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in six reactions (as a reactant in r_0311, r_0313 and as a product in r_0310 and as a modifier in r_0310, r_0311, r_0313).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0981} = v_{85} - v_{86} - v_{87} \tag{790}$$

7.192 Species s_0991

Name L-glutamate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in 46 reactions (as a reactant in r_0012, r_0018, r_0118, r_0216, r_0476, r_0479, r_0538, r_0663, r_0674, r_0699, r_0818, r_0851, r_0989, r_1063, r_1087 and as a product in r_0079, r_0203, r_0211, r_0250, r_0470, r_0514, r_0563, r_0915 and as a modifier in r_0012, r_0018, r_0079, r_0118, r_0203, r_0211, r_0216, r_0250, r_0470, r_0476, r_0479, r_0514, r_0538, r_0563, r_0663, r_0674, r_0699, r_0818, r_0851, r_0915, r_0989, r_1063, r_1087).

$$\begin{aligned}\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0991} = {} & v_{25} + v_{50} + v_{54} + v_{75} + v_{126} + v_{139} + v_{157} + v_{229} - v_{7} - v_{11} - v_{34} - v_{58} \\ & - v_{127} - v_{129} - v_{146} - v_{167} - v_{171} - v_{178} - v_{201} - v_{204} - v_{249} - v_{274} - v_{278}\end{aligned} \tag{791}$$

7.193 Species s_0999

Name L-glutamine

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in 18 reactions (as a reactant in r_0079, r_0203, r_0211, r_0250, r_0478, r_0514, r_0563, r_0915 and as a product in r_0476 and as a modifier in r_0079, r_0203, r_0211, r_0250, r_0476, r_0478, r_0514, r_0563, r_0915).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0999} = v_{127} - v_{25} - v_{50} - v_{54} - v_{75} - v_{128} - v_{139} - v_{157} - v_{229} \tag{792}$$

7.194 Species s_1003

Name L-glycine

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in twelve reactions (as a reactant in r_0501, r_0502, r_0512, r_0914 and as a product in r_0156, r_1040 and as a modifier in r_0156, r_0501, r_0502, r_0512, r_0914, r_1040).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1003} = v_{43} + v_{262} - v_{135} - v_{136} - v_{138} - v_{228} \tag{793}$$

7.195 Species s_1006

Name L-histidine

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0539 and as a product in r_0536 and as a modifier in r_0536, r_0539).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1006} = v_{144} - v_{147} \tag{794}$$

7.196 Species s_1010

Name L-histidinol

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0536 and as a product in r_0537 and as a modifier in r_0536, r_0537).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1010} = v_{145} - v_{144} \tag{795}$$

7.197 Species s_1011

Name L-histidinol phosphate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0537 and as a product in r_0538 and as a modifier in r_0537, r_0538).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1011} = v_{146} - v_{145} \tag{796}$$

7.198 Species s_1012

Name L-homocysteine

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in eight reactions (as a reactant in r_0309, r_0727 and as a product in r_0144, r_0813 and as a modifier in r_0144, r_0309, r_0727, r_0813).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1012} = v_{36} + v_{199} - v_{84} - v_{186} \tag{797}$$

7.199 Species s_1014

Name L-homoserine

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in six reactions (as a reactant in r_0548, r_0549 and as a product in r_0547 and as a modifier in r_0547, r_0548, r_0549).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1014} = v_{151} - v_{152} - v_{153} \tag{798}$$

7.200 Species s_1016

Name L-isoleucine

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0665 and as a product in r_0663 and as a modifier in r_0663, r_0665).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1016} = v_{167} - v_{168} \tag{799}$$

7.201 Species s_1021

Name L-leucine

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0701 and as a product in r_0699 and as a modifier in r_0699, r_0701).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1021} = v_{178} - v_{179} \tag{800}$$

7.202 Species s_1025

Name L-lysine

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0711 and as a product in r_0988 and as a modifier in r_0711, r_0988).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1025} = v_{248} - v_{180} \tag{801}$$

7.203 Species s_1029

Name L-methionine

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in six reactions (as a reactant in r_0726, r_0729 and as a product in r_0727 and as a modifier in r_0726, r_0727, r_0729).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1029} = v_{186} - v_{185} - v_{187} \tag{802}$$

7.204 Species s_1032

Name L-phenylalanine

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0852 and as a product in r_0851 and as a modifier in r_0851, r_0852).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1032} = v_{204} - v_{205} \tag{803}$$

7.205 Species s_1035

Name L-proline

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0941 and as a product in r_0957 and as a modifier in r_0941, r_0957).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1035} = v_{234} - v_{233} \tag{804}$$

7.206 Species s_1038

Name L-saccharopine

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0988 and as a product in r_0989 and as a modifier in r_0988, r_0989).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1038} = v_{249} - v_{248} \tag{805}$$

7.207 Species s_1039

Name L-serine

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in twelve reactions (as a reactant in r_0309, r_0880, r_0993, r_0995, r_1055 and as a product in r_0502 and as a modifier in r_0309, r_0502, r_0880, r_0993, r_0995, r_1055).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1039} = v_{136} - v_{84} - v_{210} - v_{251} - v_{252} - v_{272} \tag{806}$$

7.208 Species s_1045

Name L-threonine

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in eight reactions (as a reactant in r_0692, r_1040, r_1042 and as a product in r_1041 and as a modifier in r_0692, r_1040, r_1041, r_1042).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1045} = v_{263} - v_{174} - v_{262} - v_{264} \tag{807}$$

7.209 Species s_1048

Name L-tryptophan

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_1057 and as a product in r_1055 and as a modifier in r_1055, r_1057).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1048} = v_{272} - v_{273} \tag{808}$$

7.210 Species s_1051

Name L-tyrosine

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_1066 and as a product in r_1063 and as a modifier in r_1063, r_1066).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1051} = v_{274} - v_{275} \tag{809}$$

7.211 Species s_1056

Name L-valine

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_1089 and as a product in r_1087 and as a modifier in r_1087, r_1089).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1056} = v_{278} - v_{279} \tag{810}$$

7.212 Species s_1059

Name lanosterol

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in six reactions (as a reactant in r_0317, r_2111 and as a product in r_0698 and as a modifier in r_0317, r_0698, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1059} = v_{177} - v_{88} - 3.2\cdot 10^{-5} v_{296} \tag{811}$$

7.213 Species s_1065

Name laurate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in six reactions (as a reactant in r_0387, r_0400 and as a product in r_0386 and as a modifier in r_0386, r_0387, r_0400).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1065} = v_{102} - v_{103} - v_{111} \tag{812}$$

7.214 Species s_1073

Name lauroyl-CoA

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in six reactions (as a reactant in r_0433 and as a product in r_0400, r_0432 and as a modifier in r_0400, r_0432, r_0433).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1073} = v_{111} + v_{114} - v_{115} \tag{813}$$

7.215 Species s_1077

Name Leu-tRNA(Leu)

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_2111 and as a product in r_0701 and as a modifier in r_0701, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1077} = v_{179} - 0.2964 v_{296} \tag{814}$$

7.216 Species s_1084

Name lignoceric acid

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0394 and as a product in r_0393 and as a modifier in r_0393, r_0394).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1084} = v_{106} - v_{107} \tag{815}$$

7.217 Species s_1099

Name Lys-tRNA(Lys)

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_2111 and as a product in r_0711 and as a modifier in r_0711, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1099} = v_{180} - 0.2862 v_{296} \tag{816}$$

7.218 Species s_1101

Name malonyl-CoA

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in 26 reactions (as a reactant in r_0386, r_0387, r_0389, r_0391, r_0393, r_0394, r_0397, r_0398, r_0432, r_0433, r_0434, r_0435 and as a product in r_0108 and as a modifier in r_0108, r_0386, r_0387, r_0389, r_0391, r_0393, r_0394, r_0397, r_0398, r_0432, r_0433, r_0434, r_0435).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1101} = v_{31} - v_{102} - v_{103} - v_{104} - v_{105} - 3v_{106} - v_{107} - v_{108} - 3v_{109} - v_{114} - v_{115} - v_{116} - v_{117} \tag{817}$$

7.219 Species s_1107

Name mannan

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_2111 and as a product in r_0362 and as a modifier in r_0362, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1107} = v_{99} - 0.8079v_{296} \tag{818}$$

7.220 Species s_1148

Name Met-tRNA(Met)

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_2111 and as a product in r_0729 and as a modifier in r_0729, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1148} = v_{187} - 0.0507v_{296} \tag{819}$$

7.221 Species s_1151

Name methylglyoxal

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in six reactions (as a reactant in r_0688, r_0697 and as a product in r_1936 and as a modifier in r_0688, r_0697, r_1936).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1151} = v_{292} - v_{173} - v_{176} \tag{820}$$

7.222 Species s_1153

Name myo-inositol

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0874 and as a product in r_0757 and as a modifier in r_0757, r_0874).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1153} = v_{193} - v_{208} \tag{821}$$

7.223 Species s_1161

Name myristate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0389 and as a product in r_0387 and as a modifier in r_0387, r_0389).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1161} = v_{103} - v_{104} \tag{822}$$

7.224 Species s_1176

Name myristoyl-CoA

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0434 and as a product in r_0433 and as a modifier in r_0433, r_0434).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1176} = v_{115} - v_{116} \tag{823}$$

7.225 Species s_1182

Name N(2)-acetyl-L-ornithine

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0818 and as a product in r_0118 and as a modifier in r_0118, r_0818).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1182} = v_{34} - v_{201} \tag{824}$$

7.226 Species s_1187

Name N-(5-phospho-beta-D-ribosyl)anthranilate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0913 and as a product in r_0202 and as a modifier in r_0202, r_0913).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1187} = v_{49} - v_{227} \tag{825}$$

7.227 Species s_1191

Name N-acetyl-L-gamma-glutamyl phosphate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0759 and as a product in r_0115 and as a modifier in r_0115, r_0759).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1191} = v_{33} - v_{195} \tag{826}$$

7.228 Species s_1192

Name N-acetyl-L-glutamate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0115 and as a product in r_0818 and as a modifier in r_0115, r_0818).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1192} = v_{201} - v_{33} \tag{827}$$

7.229 Species s_1194

Name N-carbamoyl-L-aspartate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0349 and as a product in r_0214 and as a modifier in r_0214, r_0349).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1194} = v_{56} - v_{94} \tag{828}$$

7.230 Species NAD

Name NAD

SBO:0000247 simple chemical

Initial concentration 1.50329030201531 mmol · l^{-1}

This species takes part in 38 reactions (as a reactant in r_0061, r_0174, r_0235, TDH, r_0501, r_0536, r_0545, r_0565, r_0658, r_0696, r_0713, r_0988, r_2127 and as a product in r_0012, ADH, r_0470, r_0491, r_0731, r_1010 and as a modifier in r_0012, r_0061, ADH, r_0174, r_0235, r_0470, TDH, r_0491, r_0501, r_0536, r_0545, r_0565, r_0658, r_0696, r_0713, r_0731, r_0988, r_1010, r_2127).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{NAD} = v_7 + v_{45} + v_{126} + v_{132} + v_{188} + v_{255} - v_{23} - v_{47} - v_{66} - v_{130} - v_{135} - 2v_{144} - v_{150} - v_{159} - v_{164} - v_{175} - v_{181} - v_{248} - v_{298} \tag{829}$$

7.231 Species NADH

Name NADH

SBO:0000247 simple chemical

Initial concentration 0.0867096979846952 mmol · l^{-1}

This species takes part in 38 reactions (as a reactant in r_0012, ADH, r_0470, r_0491, r_0731, r_1010 and as a product in r_0061, r_0174, r_0235, TDH, r_0501, r_0536, r_0545, r_0565, r_0658, r_0696, r_0713, r_0988, r_2127 and as a modifier in r_0012, r_0061, ADH, r_0174, r_0235, r_0470, TDH, r_0491, r_0501, r_0536, r_0545, r_0565, r_0658, r_0696, r_0713, r_0731, r_0988, r_1010, r_2127).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{NADH} = v_{23} + v_{47} + v_{66} + v_{130} + v_{135} + 2v_{144} + v_{150} + v_{159} + v_{164} + v_{175} + v_{181} + v_{248} + v_{298} - v_7 - v_{45} - v_{126} - v_{132} - v_{188} - v_{255} \tag{830}$$

7.232 Species s_1207

Name NADP(+)

SBO:0000247 simple chemical

Initial concentration 0.1 mmol · l^{-1}

This species takes part in 92 reactions (as a reactant in r_0173, r_0234, r_0466, r_0661, r_0732, r_0889, r_0939 and as a product in r_0015, r_0041, r_0080, r_0096, r_0219, r_0231, r_0236, r_0237, r_0238, r_0239, r_0240, r_0241, r_0244, r_0317, r_0344, r_0386, r_0387, r_0389, r_0391, r_0393, r_0394, r_0397, r_0398, r_0432, r_0433, r_0434, r_0435, r_0547,

r_0558, r_0669, r_0678, r_0688, r_0759, r_0957, r_0989, r_0996, r_1012, r_1027, r_1038 and as a modifier in r_0015, r_0041, r_0080, r_0096, r_0173, r_0219, r_0231, r_0234, r_0236, r_0237, r_0238, r_0239, r_0240, r_0241, r_0244, r_0317, r_0344, r_0386, r_0387, r_0389, r_0391, r_0393, r_0394, r_0397, r_0398, r_0432, r_0433, r_0434, r_0435, r_0466, r_0547, r_0558, r_0661, r_0669, r_0678, r_0688, r_0732, r_0759, r_0889, r_0939, r_0957, r_0989, r_0996, r_1012, r_1027, r_1038).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1207} = v_9 + v_{21} + v_{26} + v_{28} + v_{59} + v_{64} + v_{67} + v_{68} + v_{69} + v_{70} + v_{71} + 3v_{72} + v_{74} + 3v_{88} + v_{93} + 2v_{102} + 2v_{103} + 2v_{104} + 2v_{105} + 6v_{106} + 2v_{107} + 2v_{108} + 6v_{109} + 2v_{114} + 2v_{115} + 2v_{116} + 2v_{117} + v_{151} + 2v_{155} + v_{170} + v_{172} + v_{173} + v_{195} + v_{234} + v_{249} + v_{253} + v_{256} + 3v_{260} + v_{261} - v_{46} - v_{65} - v_{124} - v_{165} - v_{189} - v_{215} - v_{232} \tag{831}$$

7.233 Species s_1212

Name NADPH

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in 92 reactions (as a reactant in r_0015, r_0041, r_0080, r_0096, r_0219, r_0231, r_0236, r_0237, r_0238, r_0239, r_0240, r_0241, r_0244, r_0317, r_0344, r_0386, r_0387, r_0389, r_0391, r_0393, r_0394, r_0397, r_0398, r_0432, r_0433, r_0434, r_0435, r_0547, r_0558, r_0669, r_0678, r_0688, r_0759, r_0957, r_0989, r_0996, r_1012, r_1027, r_1038 and as a product in r_0173, r_0234, r_0466, r_0661, r_0732, r_0889, r_0939 and as a modifier in r_0015, r_0041, r_0080, r_0096, r_0173, r_0219, r_0231, r_0234, r_0236, r_0237, r_0238, r_0239, r_0240, r_0241, r_0244, r_0317, r_0344, r_0386, r_0387, r_0389, r_0391, r_0393, r_0394, r_0397, r_0398, r_0432, r_0433, r_0434, r_0435, r_0466, r_0547, r_0558, r_0661, r_0669, r_0678, r_0688, r_0732, r_0759, r_0889, r_0939, r_0957, r_0989, r_0996, r_1012, r_1027, r_1038).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1212} = v_{46} + v_{65} + v_{124} + v_{165} + v_{189} + v_{215} + v_{232} - v_9 - v_{21} - v_{26} - v_{28} - v_{59} - v_{64} - v_{67} - v_{68} - v_{69} - v_{70} - v_{71} - 3v_{72} - v_{74} - 3v_{88} - v_{93} - 2v_{102} - 2v_{103} - 2v_{104} - 2v_{105} - 6v_{106} - 2v_{107} - 2v_{108} - 6v_{109} - 2v_{114} - 2v_{115} - 2v_{116} - 2v_{117} - v_{151} - 2v_{155} - v_{170} - v_{172} - v_{173} - v_{195} - v_{234} - v_{249} - v_{253} - v_{256} - 3v_{260} - v_{261} \tag{832}$$

7.234 Species s_1233

Name O-acetyl-L-homoserine

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in six reactions (as a reactant in r_0311, r_0813 and as a product in r_0549 and as a modifier in r_0311, r_0549, r_0813).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1233} = v_{153} - v_{86} - v_{199} \tag{833}$$

7.235 Species s_1238

Name O-phospho-L-homoserine

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_1041 and as a product in r_0548 and as a modifier in r_0548, r_1041).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1238} = v_{152} - v_{263} \tag{834}$$

7.236 Species s_1255

Name octanoyl-CoA

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0397 and as a product in r_0398 and as a modifier in r_0397, r_0398).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1255} = v_{109} - v_{108} \tag{835}$$

7.237 Species s_1266

Name ornithine

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0816 and as a product in r_0818 and as a modifier in r_0816, r_0818).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1266} = v_{201} - v_{200} \tag{836}$$

7.238 Species s_1269

Name orotate

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0820 and as a product in r_2127 and as a modifier in r_0820, r_2127).

$$\frac{\text{d}}{\text{d}t}\text{s\_1269} = v_{298} - v_{202} \tag{837}$$

7.239 Species s_1270

Name orotidine 5'-(dihydrogen phosphate)

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0821 and as a product in r_0820 and as a modifier in r_0820, r_0821).

$$\frac{\text{d}}{\text{d}t}\text{s\_1270} = v_{202} - v_{203} \tag{838}$$

7.240 Species s_1271

Name oxaloacetate

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in ten reactions (as a reactant in r_0216, r_0300, r_0884 and as a product in r_0713, r_0958 and as a modifier in r_0216, r_0300, r_0713, r_0884, r_0958).

$$\frac{\text{d}}{\text{d}t}\text{s\_1271} = v_{181} + v_{235} - v_{58} - v_{81} - v_{212} \tag{839}$$

7.241 Species s_1275

Name oxygen

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in 18 reactions (as a reactant in r_0238, r_0239, r_0240, r_0241, r_0317, r_0438, r_1010, r_1682 and as a product in r_1979 and as a modifier in r_0238, r_0239, r_0240, r_0241, r_0317, r_0438, r_1010, r_1682, r_1979).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1275} = v_{293} - v_{69} - v_{70} - v_{71} - 3v_{72} - 3v_{88} - v_{118} - v_{255} - v_{287} \tag{840}$$

7.242 Species s_1277

Name oxygen

SBO:0000247 simple chemical

Initial concentration $1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in two reactions (as a reactant in r_1979 and as a modifier in r_1979), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1277} = 0 \tag{841}$$

7.243 Species s_1286

Name palmitate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0391 and as a product in r_0389 and as a modifier in r_0389, r_0391).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1286} = v_{104} - v_{105} \tag{842}$$

7.244 Species s_1302

Name palmitoyl-CoA

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in six reactions (as a reactant in r_0435, r_0993 and as a product in r_0434 and as a modifier in r_0434, r_0435, r_0993).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1302} = v_{116} - v_{117} - v_{251} \tag{843}$$

7.245 Species s_1314

Name Phe-tRNA(Phe)

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_2111 and as a product in r_0852 and as a modifier in r_0852, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1314} = v_{205} - 0.1339 v_{296} \tag{844}$$

7.246 Species PHO

Name phosphate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in 80 reactions (as a reactant in r_0226, TDH and as a product in r_0020, r_0032, r_0040, r_0065, r_0079, r_0108, r_0153, r_0214, r_0219, ATPase, r_0250, r_0279, r_0307, r_0337, r_0446, r_0476, r_0489, r_0537, r_0568, r_0726, r_0739, r_0757, r_0759, r_0792, r_0816, r_0855, r_0908, r_0911, r_0914, r_0958, r_0967, r_1026, r_1041, r_1051, r_1244, r_1936, r_2030, r_2111, r_2126 and as a modifier in r_0020, r_0032, r_0040, r_0065, r_0079, r_0108, r_0153, r_0214, r_0219, r_0226, r_0250, r_0279, r_0307, r_0337, r_0446, r_0476, TDH, r_0489, r_0537, r_0568, r_0726, r_0739, r_0757, r_0759, r_0792, r_0816, r_0855, r_0908, r_0911, r_0914, r_0958, r_0967, r_1026, r_1041, r_1051, r_1244, r_1936, r_2030, r_2126).

$$\begin{aligned}\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{PHO} = {} & v_{12} + v_{17} + v_{20} + v_{24} + v_{25} + v_{31} + v_{41} + v_{56} + v_{59} + v_{63} + v_{75} + v_{79} + v_{83} + v_{92} + v_{120} + v_{127} \\ & + v_{131} + v_{145} + 2v_{161} + v_{185} + v_{192} + v_{193} + v_{195} + v_{196} + v_{200} + v_{206} + v_{222} + v_{225} + v_{228} \\ & + v_{235} + v_{238} + v_{259} + v_{263} + v_{269} + v_{283} + v_{292} + v_{294} + 58.70001 v_{296} + v_{297} - v_{62} - v_{130}\end{aligned} \tag{845}$$

7.247 Species s_1324

Name phosphate

SBO:0000247 simple chemical

Initial concentration $1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in two reactions (as a reactant in r_1244 and as a modifier in r_1244), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1324} = 0 \tag{846}$$

7.248 Species s_1331

Name phosphatidate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in six reactions (as a reactant in r_0257, r_0337 and as a product in r_0008 and as a modifier in r_0008, r_0257, r_0337).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1331} = v_{6} - v_{76} - v_{92} \tag{847}$$

7.249 Species s_1337

Name phosphatidyl-L-serine

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in six reactions (as a reactant in r_0877, r_2111 and as a product in r_0880 and as a modifier in r_0877, r_0880, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1337} = v_{210} - v_{209} - 3.9 \cdot 10^{-4} v_{296} \tag{848}$$

7.250 Species s_1342

Name phosphatidyl-N,N-dimethylethanolamine

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0900 and as a product in r_0901 and as a modifier in r_0900, r_0901).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1342} = v_{219} - v_{218} \tag{849}$$

7.251 Species s_1343

Name phosphatidyl-N-methylethanolamine

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0901 and as a product in r_0858 and as a modifier in r_0858, r_0901).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1343} = v_{207} - v_{219} \tag{850}$$

7.252 Species s_1346

Name phosphatidylcholine

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_2111 and as a product in r_0900 and as a modifier in r_0900, r_2111).

$$\frac{\text{d}}{\text{d}t}\text{s\_1346} = v_{218} - 0.00288 v_{296} \tag{851}$$

7.253 Species s_1351

Name phosphatidylethanolamine

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in six reactions (as a reactant in r_0858, r_2111 and as a product in r_0877 and as a modifier in r_0858, r_0877, r_2111).

$$\frac{\text{d}}{\text{d}t}\text{s\_1351} = v_{209} - v_{207} - 6.97 \cdot 10^{-4} v_{296} \tag{852}$$

7.254 Species PEP

Name phosphoenolpyruvate

SBO:0000247 simple chemical

Initial concentration $0.0632352144936527\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in ten reactions (as a reactant in r_0020, r_0065, PYK and as a product in ENO, r_0884 and as a modifier in r_0020, r_0065, ENO, r_0884, PYK).

$$\frac{\text{d}}{\text{d}t}\text{PEP} = v_{101} + v_{212} - v_{12} - v_{24} - v_{237} \tag{853}$$

7.255 Species s_1364

Name phosphoribosyl-carboxy-aminoimidazole

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0908 and as a product in r_0911 and as a modifier in r_0908, r_0911).

$$\frac{\text{d}}{\text{d}t}\text{s\_1364} = v_{225} - v_{222} \tag{854}$$

7.256 Species s_1365

Name phosphoribosyl-formamido-carboxamide

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0570 and as a product in r_0912 and as a modifier in r_0570, r_0912).

$$\frac{\text{d}}{\text{d}t}\text{s\_1365} = v_{226} - v_{162} \tag{855}$$

7.257 Species s_1376

Name prenyl diphosphate

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0355 and as a product in r_0667 and as a modifier in r_0355, r_0667).

$$\frac{\text{d}}{\text{d}t}\text{s\_1376} = v_{169} - v_{97} \tag{856}$$

7.258 Species s_1377

Name prephenate

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in six reactions (as a reactant in r_0938, r_0939 and as a product in r_0278 and as a modifier in r_0278, r_0938, r_0939).

$$\frac{\text{d}}{\text{d}t}\text{s\_1377} = v_{78} - v_{231} - v_{232} \tag{857}$$

7.259 Species s_1379

Name Pro-tRNA(Pro)

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_2111 and as a product in r_0941 and as a modifier in r_0941, r_2111).

$$\frac{\text{d}}{\text{d}t}\text{s\_1379} = v_{233} - 0.1647 v_{296} \tag{858}$$

7.260 Species s_1386

Name PRPP

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in ten reactions (as a reactant in r_0202, r_0225, r_0820, r_0915 and as a product in r_0916 and as a modifier in r_0202, r_0225, r_0820, r_0915, r_0916).

$$\frac{\text{d}}{\text{d}t}\text{s\_1386} = v_{230} - v_{49} - v_{61} - v_{202} - v_{229} \tag{859}$$

7.261 Species PYR

Name pyruvate

SBO:0000247 simple chemical

Initial concentration $1.81531251192736\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in 20 reactions (as a reactant in r_0016, r_0097, r_0674, r_0958, PDC and as a product in r_0001, r_0004, r_0156, r_0203, PYK and as a modifier in r_0001, r_0004, r_0016, r_0097, r_0156, r_0203, r_0674, r_0958, PDC, PYK).

$$\frac{\text{d}}{\text{d}t}\text{PYR} = v_1 + v_2 + v_{43} + v_{50} + v_{237} - v_{10} - 2v_{29} - v_{171} - v_{235} - v_{236} \tag{860}$$

7.262 Species s_1405

Name riboflavin

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_2111 and as a product in r_0968 and as a modifier in r_0968, r_2111).

$$\frac{\text{d}}{\text{d}t}\text{s\_1405} = v_{239} - 9.9 \cdot 10^{-4} v_{296} \tag{861}$$

7.263 Species s_1408

Name ribose-5-phosphate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in six reactions (as a reactant in r_0916, r_1049 and as a product in r_0982 and as a modifier in r_0916, r_0982, r_1049).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1408} = v_{245} - v_{230} - v_{267} \tag{862}$$

7.264 Species s_1413

Name S-adenosyl-L-homocysteine

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in twelve reactions (as a reactant in r_0144 and as a product in r_0858, r_0900, r_0901, r_0986, r_1682 and as a modifier in r_0144, r_0858, r_0900, r_0901, r_0986, r_1682).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1413} = v_{207} + v_{218} + v_{219} + v_{247} + v_{287} - v_{36} \tag{863}$$

7.265 Species s_1416

Name S-adenosyl-L-methionine

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in twelve reactions (as a reactant in r_0858, r_0900, r_0901, r_0986, r_1682 and as a product in r_0726 and as a modifier in r_0726, r_0858, r_0900, r_0901, r_0986, r_1682).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1416} = v_{185} - v_{207} - v_{218} - v_{219} - v_{247} - v_{287} \tag{864}$$

7.266 Species s_1426

Name sedoheptulose 1,7-bisphosphate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_2126 and as a product in r_0990 and as a modifier in r_0990, r_2126).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1426} = v_{250} - v_{297} \tag{865}$$

7.267 Species s_1427

Name sedoheptulose 7-phosphate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in six reactions (as a reactant in r_1048 and as a product in r_1049, r_2126 and as a modifier in r_1048, r_1049, r_2126).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1427} = v_{267} + v_{297} - v_{266} \tag{866}$$

7.268 Species s_1428

Name Ser-tRNA(Ser)

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_2111 and as a product in r_0995 and as a modifier in r_0995, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1428} = v_{252} - 0.1854 v_{296} \tag{867}$$

7.269 Species s_1429

Name shikimate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0997 and as a product in r_0996 and as a modifier in r_0996, r_0997).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1429} = v_{253} - v_{254} \tag{868}$$

7.270 Species s_1445

Name sphinganine

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0264 and as a product in r_0041 and as a modifier in r_0041, r_0264).

$$\frac{\text{d}}{\text{d}t}\text{s\_1445} = v_{21} - v_{77} \tag{869}$$

7.271 Species s_1447

Name squalene

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_1010 and as a product in r_1012 and as a modifier in r_1010, r_1012).

$$\frac{\text{d}}{\text{d}t}\text{s\_1447} = v_{256} - v_{255} \tag{870}$$

7.272 Species s_1449

Name stearate

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in six reactions (as a reactant in r_0393 and as a product in r_0391, r_0407 and as a modifier in r_0391, r_0393, r_0407).

$$\frac{\text{d}}{\text{d}t}\text{s\_1449} = v_{105} + v_{113} - v_{106} \tag{871}$$

7.273 Species s_1454

Name stearoyl-CoA

SBO:0000247 simple chemical

Initial concentration $0.1\ \text{mmol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0407 and as a product in r_0435 and as a modifier in r_0407, r_0435).

$$\frac{\text{d}}{\text{d}t}\text{s\_1454} = v_{117} - v_{113} \tag{872}$$

7.274 Species s_1458

Name succinate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in six reactions (as a reactant in r_1021, r_2057 and as a product in r_0662 and as a modifier in r_0662, r_1021, r_2057).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1458} = v_{166} - v_{258} - v_{295} \tag{873}$$

7.275 Species s_1459

Name succinate

SBO:0000247 simple chemical

Initial concentration $0\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a product in r_2057), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1459} = 0 \tag{874}$$

7.276 Species s_1467

Name sulphate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in six reactions (as a reactant in r_1026, r_2111 and as a product in r_1266 and as a modifier in r_1026, r_1266, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1467} = v_{284} - v_{259} - 0.02v_{296} \tag{875}$$

7.277 Species s_1468

Name sulphate

SBO:0000247 simple chemical

Initial concentration $1\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in two reactions (as a reactant in r_1266 and as a modifier in r_1266), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1468} = 0 \tag{876}$$

7.278 Species s_1469

Name sulphite

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_1027 and as a product in r_0883 and as a modifier in r_0883, r_1027).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1469} = v_{211} - v_{260} \tag{877}$$

7.279 Species s_1487

Name THF

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in 14 reactions (as a reactant in r_0446, r_0501 and as a product in r_0344, r_0499, r_0502, r_0727, r_0912 and as a modifier in r_0344, r_0446, r_0499, r_0501, r_0502, r_0727, r_0912).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1487} = v_{93} + v_{134} + v_{136} + v_{186} + v_{226} - v_{120} - v_{135} \tag{878}$$

7.280 Species s_1491

Name Thr-tRNA(Thr)

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_2111 and as a product in r_1042 and as a modifier in r_1042, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1491} = v_{264} - 0.1914 v_{296} \tag{879}$$

7.281 Species s_1520

Name trehalose

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_2111 and as a product in r_1051 and as a modifier in r_1051, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1520} = v_{269} - 0.0234 v_{296} \tag{880}$$

7.282 Species s_1524

Name triglyceride

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in six reactions (as a reactant in r_0336, r_2111 and as a product in r_1052 and as a modifier in r_0336, r_1052, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1524} = v_{270} - v_{91} - 7.81 \cdot 10^{-4} v_{296} \tag{881}$$

7.283 Species s_1527

Name Trp-tRNA(Trp)

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_2111 and as a product in r_1057 and as a modifier in r_1057, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1527} = v_{273} - 0.0284 v_{296} \tag{882}$$

7.284 Species s_1533

Name Tyr-tRNA(Tyr)

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_2111 and as a product in r_1066 and as a modifier in r_1066, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1533} = v_{275} - 0.102 v_{296} \tag{883}$$

7.285 Species s_1535

Name ubiquinol-6

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0439 and as a product in r_1021 and as a modifier in r_0439, r_1021).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1535} = v_{258} - v_{119} \tag{884}$$

7.286 Species s_1537

Name ubiquinone-6

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_1021 and as a product in r_0439 and as a modifier in r_0439, r_1021).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1537} = v_{119} - v_{258} \tag{885}$$

7.287 Species s_1538

Name UDP

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in twelve reactions (as a reactant in r_0811 and as a product in r_0005, r_0006, r_0195, r_0510, r_1072 and as a modifier in r_0005, r_0006, r_0195, r_0510, r_0811, r_1072).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1538} = v_3 + v_4 + v_{48} + v_{137} + v_{276} - v_{198} \tag{886}$$

7.288 Species s_1543

Name UDP-D-glucose

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in ten reactions (as a reactant in r_0005, r_0006, r_0195, r_0510 and as a product in r_1084 and as a modifier in r_0005, r_0006, r_0195, r_0510, r_1084).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1543} = v_{277} - v_3 - v_4 - v_{48} - v_{137} \tag{887}$$

7.289 Species s_1545

Name UMP

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in six reactions (as a reactant in r_1072, r_2111 and as a product in r_0821 and as a modifier in r_0821, r_1072, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1545} = v_{203} - v_{276} - 0.0599 v_{296} \tag{888}$$

7.290 Species s_1559

Name UTP

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in eight reactions (as a reactant in r_0307, r_0973, r_1084 and as a product in r_0811 and as a modifier in r_0307, r_0811, r_0973, r_1084).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1559} = v_{198} - v_{83} - v_{241} - v_{277} \tag{889}$$

7.291 Species s_1561

Name Val-tRNA(Val)

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_2111 and as a product in r_1089 and as a modifier in r_1089, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1561} = v_{279} - 0.2646 v_{296} \tag{890}$$

7.292 Species s_1565

Name xanthosine-5-phosphate

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0514 and as a product in r_0565 and as a modifier in r_0514, r_0565).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1565} = v_{159} - v_{139} \tag{891}$$

7.293 Species s_1569

Name zymosterol

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in eight reactions (as a reactant in r_0986, r_1682, r_2111 and as a product in r_0237 and as a modifier in r_0237, r_0986, r_1682, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1569} = v_{68} - v_{247} - v_{287} - 1.5\cdot 10^{-5} v_{296} \tag{892}$$

7.294 Species s_1576

Name zymosterol intermediate 1a

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0239 and as a product in r_0238 and as a modifier in r_0238, r_0239).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1576} = v_{69} - v_{70} \tag{893}$$

7.295 Species s_1577

Name zymosterol intermediate 1b

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0240 and as a product in r_0239 and as a modifier in r_0239, r_0240).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1577} = v_{70} - v_{71} \tag{894}$$

7.296 Species s_1578

Name zymosterol intermediate 1c

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0234 and as a product in r_0240 and as a modifier in r_0234, r_0240).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1578} = v_{71} - v_{65} \tag{895}$$

7.297 Species s_1579

Name zymosterol intermediate 2

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in r_0237 and as a product in r_0234 and as a modifier in r_0234, r_0237).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1579} = v_{65} - v_{68} \tag{896}$$

7.298 Species s_1582

Name tRNA(Ala)

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in three reactions (as a reactant in r_0157 and as a product in r_2111 and as a modifier in r_0157).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1582} = 0.4588 v_{296} - v_{44} \tag{897}$$

7.299 Species s_1583

Name tRNA(Arg)

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in three reactions (as a reactant in r_0209 and as a product in r_2111 and as a modifier in r_0209).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1583} = 0.1607 v_{296} - v_{53} \tag{898}$$

7.300 Species s_1585

Name tRNA(Asn)

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in three reactions (as a reactant in r_0212 and as a product in r_2111 and as a modifier in r_0212).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1585} = 0.1017 v_{296} - v_{55} \tag{899}$$

7.301 Species s_1587

Name tRNA(Asp)

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in three reactions (as a reactant in r_0220 and as a product in r_2111 and as a modifier in r_0220).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1587} = 0.2975 v_{296} - v_{60} \tag{900}$$

7.302 Species s_1589

Name tRNA(Cys)

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in three reactions (as a reactant in r_0313 and as a product in r_2111 and as a modifier in r_0313).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1589} = 0.0066 v_{296} - v_{87} \tag{901}$$

7.303 Species s_1590

Name tRNA(Gln)

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in three reactions (as a reactant in r_0478 and as a product in r_2111 and as a modifier in r_0478).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1590} = 0.1054 v_{296} - v_{128} \tag{902}$$

7.304 Species s_1591

Name tRNA(Glu)

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in three reactions (as a reactant in r_0479 and as a product in r_2111 and as a modifier in r_0479).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1591} = 0.3018 v_{296} - v_{129} \tag{903}$$

7.305 Species s_1593

Name tRNA(Gly)

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in three reactions (as a reactant in r_0512 and as a product in r_2111 and as a modifier in r_0512).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1593} = 0.2904 v_{296} - v_{138} \tag{904}$$

7.306 Species s_1594

Name tRNA(His)

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in three reactions (as a reactant in r_0539 and as a product in r_2111 and as a modifier in r_0539).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1594} = 0.0663 v_{296} - v_{147} \tag{905}$$

7.307 Species s_1596

Name tRNA(Ile)

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in three reactions (as a reactant in r_0665 and as a product in r_2111 and as a modifier in r_0665).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1596} = 0.1927 v_{296} - v_{168} \tag{906}$$

7.308 Species s_1598

Name tRNA(Leu)

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in three reactions (as a reactant in r_0701 and as a product in r_2111 and as a modifier in r_0701).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1598} = 0.2964 v_{296} - v_{179} \tag{907}$$

7.309 Species s_1600

Name tRNA(Lys)

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in three reactions (as a reactant in r_0711 and as a product in r_2111 and as a modifier in r_0711).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1600} = 0.2862 v_{296} - v_{180} \tag{908}$$

7.310 Species s_1602

Name tRNA(Met)

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in three reactions (as a reactant in r_0729 and as a product in r_2111 and as a modifier in r_0729).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1602} = 0.0507 v_{296} - v_{187} \tag{909}$$

7.311 Species s_1604

Name tRNA(Phe)

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in three reactions (as a reactant in r_0852 and as a product in r_2111 and as a modifier in r_0852).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1604} = 0.1339 v_{296} - v_{205} \tag{910}$$

7.312 Species s_1606

Name tRNA(Pro)

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in three reactions (as a reactant in r_0941 and as a product in r_2111 and as a modifier in r_0941).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1606} = 0.1647 v_{296} - v_{233} \tag{911}$$

7.313 Species s_1607

Name tRNA(Ser)

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in three reactions (as a reactant in r_0995 and as a product in r_2111 and as a modifier in r_0995).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1607} = 0.1854 v_{296} - v_{252} \tag{912}$$

7.314 Species s_1608

Name tRNA(Thr)

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in three reactions (as a reactant in r_1042 and as a product in r_2111 and as a modifier in r_1042).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1608} = 0.1914 v_{296} - v_{264} \tag{913}$$

7.315 Species s_1610

Name tRNA(Trp)

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in three reactions (as a reactant in r_1057 and as a product in r_2111 and as a modifier in r_1057).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1610} = 0.0284 v_{296} - v_{273} \tag{914}$$

7.316 Species s_1612

Name tRNA(Tyr)

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in three reactions (as a reactant in r_1066 and as a product in r_2111 and as a modifier in r_1066).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1612} = 0.102 v_{296} - v_{275} \tag{915}$$

7.317 Species s_1614

Name tRNA(Val)

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in three reactions (as a reactant in r_1089 and as a product in r_2111 and as a modifier in r_1089).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1614} = 0.2646 v_{296} - v_{279} \tag{916}$$

7.318 Species s_1616

Name TRX1

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in 14 reactions (as a reactant in r_0883, r_0970, r_0973, r_0974, r_0976, r_0978 and as a product in r_1038 and as a modifier in r_0883, r_0970, r_0973, r_0974, r_0976, r_0978, r_1038).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1616} = v_{261} - v_{211} - v_{240} - v_{241} - v_{242} - v_{243} - v_{244} \tag{917}$$

7.319 Species s_1620

Name TRX1 disulphide

SBO:0000247 simple chemical

Initial concentration $0.1\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in 14 reactions (as a reactant in r_1038 and as a product in r_0883, r_0970, r_0973, r_0974, r_0976, r_0978 and as a modifier in r_0883, r_0970, r_0973, r_0974, r_0976, r_0978, r_1038).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1620} = v_{211} + v_{240} + v_{241} + v_{242} + v_{243} + v_{244} - v_{261} \tag{918}$$

7.320 Species e_0001

Name COX1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0438), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0001} = 0 \tag{919}$$

7.321 Species e_0002

Name ATP8

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0226), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0002} = 0 \tag{920}$$

7.322 Species e_0003

Name ATP6

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0226), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0003} = 0 \tag{921}$$

7.323 Species e_0004

Name COB

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0439), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0004} = 0 \tag{922}$$

7.324 Species e_0005

Name OLI1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0226), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0005} = 0 \tag{923}$$

7.325 Species e_0006

Name COX2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0438), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0006} = 0 \tag{924}$$

7.326 Species e_0007

Name COX3

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0438), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0007} = 0 \tag{925}$$

7.327 Species e_0008

Name CYS3

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0310), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0008} = 0 \tag{926}$$

7.328 Species e_0010

Name PMT2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0362), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0010} = 0 \tag{927}$$

7.329 Species e_0011

Name CDC19

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in PYK), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0011} = 0 \tag{928}$$

7.330 Species e_0012

Name GCV3

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0501), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0012} = 0 \tag{929}$$

7.331 Species e_0017

Name ADE1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0908), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0017} = 0 \tag{930}$$

7.332 Species e_0020

Name SCT1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0495), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0020} = 0 \tag{931}$$

7.333 Species e_0022

Name ACH1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0110), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0022} = 0 \tag{932}$$

7.334 Species e_0025

Name RIB1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0525), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0025} = 0 \tag{933}$$

7.335 Species e_0026

Name URA7

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0307), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0026} = 0 \tag{934}$$

7.336 Species e_0028

Name COR1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0439), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0028} = 0 \tag{935}$$

7.337 Species e_0030

Name PRS4

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0916), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0030} = 0 \tag{936}$$

7.338 Species e_0031

Name ILS1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0665), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0031} = 0 \tag{937}$$

7.339 Species e_0033

Name ATP1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0226), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0033} = 0 \tag{938}$$

7.340 Species e_0038

Name IPP1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0568), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0038} = 0 \tag{939}$$

7.341 Species e_0045

Name CDS1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0257), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0045} = 0 \tag{940}$$

7.342 Species e_0051

Name ATP3

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0226), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0051} = 0 \tag{941}$$

7.343 Species e_0053

Name FAT1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0406), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0053} = 0 \tag{942}$$

7.344 Species e_0054

Name TSC3

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0993), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0054} = 0 \tag{943}$$

7.345 Species e_0057

Name MIS1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in three reactions (as a modifier in r_0446, r_0724, r_0732), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0057} = 0 \tag{944}$$

7.346 Species e_0062

Name LYS2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0678), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0062} = 0 \tag{945}$$

7.347 Species e_0063

Name TKL2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in r_1049, r_1050), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0063} = 0 \tag{946}$$

7.348 Species e_0064

Name GRS1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0512), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0064} = 0 \tag{947}$$

7.349 Species e_0065

Name TPS1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in r_0195, r_1051), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0065} = 0 \tag{948}$$

7.350 Species e_0066

Name VMA2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in ATPase, ATPase), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0066} = 0 \tag{949}$$

7.351 Species e_0069

Name ADH5

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in ADH), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0069} = 0 \tag{950}$$

7.352 Species e_0071

Name RIB7

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0015), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0071} = 0 \tag{951}$$

7.353 Species e_0074

Name TYR1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0939), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0074} = 0 \tag{952}$$

7.354 Species e_0079

Name PGI1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in PGI), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0079} = 0 \tag{953}$$

7.355 Species e_0084

Name PYC2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0958), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0084} = 0 \tag{954}$$

7.356 Species e_0087

Name HIS7

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0563), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0087} = 0 \tag{955}$$

7.357 Species e_0088

Name ARO4

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0020), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0088} = 0 \tag{956}$$

7.358 Species e_0089

Name DUT1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0364), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0089} = 0 \tag{957}$$

7.359 Species e_0090

Name RIB5

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0968), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0090} = 0 \tag{958}$$

7.360 Species e_0091

Name SHM1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0502), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0091} = 0 \tag{959}$$

7.361 Species e_0092

Name TSC10

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0041), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0092} = 0 \tag{960}$$

7.362 Species e_0100

Name ILV6

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in r_0016, r_0097), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0100} = 0 \tag{961}$$

7.363 Species e_0101

Name LEU2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0061), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0101} = 0 \tag{962}$$

7.364 Species e_0103

Name HIS4

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in three reactions (as a modifier in r_0536, r_0909, r_0910), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0103} = 0 \tag{963}$$

7.365 Species e_0106

Name GLK1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in HXK), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0106} = 0 \tag{964}$$

7.366 Species e_0107

Name APA1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_1026), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0107} = 0 \tag{965}$$

7.367 Species e_0109

Name CHA1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0692), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0109} = 0 \tag{966}$$

7.368 Species e_0111

Name CIT2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0300), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0111} = 0 \tag{967}$$

7.369 Species e_0113

Name PGK1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in PGK), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0113} = 0 \tag{968}$$

7.370 Species e_0117

Name FEN1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in three reactions (as a modifier in r_0008, r_0393, r_0394), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0117} = 0 \tag{969}$$

7.371 Species e_0122

Name THR4

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_1041), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0122} = 0 \tag{970}$$

7.372 Species e_0124

Name TRX3

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_1038), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0124} = 0 \tag{971}$$

7.373 Species e_0127

Name ATP16

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0226), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0127} = 0 \tag{972}$$

7.374 Species e_0128

Name TSC13

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in r_0393, r_0394), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0128} = 0 \tag{973}$$

7.375 Species e_0129

Name GPD1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0491), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0129} = 0 \tag{974}$$

7.376 Species e_0133

Name SLC1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0008), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0133} = 0 \tag{975}$$

7.377 Species e_0134

Name PSA1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0722), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0134} = 0 \tag{976}$$

7.378 Species e_0135

Name IDP1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0661), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0135} = 0 \tag{977}$$

7.379 Species e_0136

Name COX9

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0438), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0136} = 0 \tag{978}$$

7.380 Species e_0137

Name MDH3

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0713), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0137} = 0 \tag{979}$$

7.381 Species e_0141

Name PMT5

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0362), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0141} = 0 \tag{980}$$

7.382 Species e_0142

Name PMT1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0362), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0142} = 0 \tag{981}$$

7.383 Species e_0146

Name LYS21

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0543), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0146} = 0 \tag{982}$$

7.384 Species e_0151

Name DLD1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0001), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0151} = 0 \tag{983}$$

7.385 Species e_0152

Name DLD2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0001), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0152} = 0 \tag{984}$$

7.386 Species e_0154

Name LYS20

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0543), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0154} = 0 \tag{985}$$

7.387 Species e_0155

Name VMA1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in ATPase, ATPase), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0155} = 0 \tag{986}$$

7.388 Species e_0160

Name GDH2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0470), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0160} = 0 \tag{987}$$

7.389 Species e_0165

Name TRP1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0913), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0165} = 0 \tag{988}$$

7.390 Species e_0167

Name GCV1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0501), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0167} = 0 \tag{989}$$

7.391 Species e_0168

Name SES1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0995), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0168} = 0 \tag{990}$$

7.392 Species e_0169

Name ARO3

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0020), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0169} = 0 \tag{991}$$

7.393 Species e_0171

Name KRS1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0711), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0171} = 0 \tag{992}$$

7.394 Species e_0175

Name TPI1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in TPI), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0175} = 0 \tag{993}$$

7.395 Species e_0176

Name TGL2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_1052), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0176} = 0 \tag{994}$$

7.396 Species e_0177

Name LCB2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0993), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0177} = 0 \tag{995}$$

7.397 Species e_0179

Name TPS2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in r_0195, r_1051), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0179} = 0 \tag{996}$$

7.398 Species e_0182

Name ARO1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in five reactions (as a modifier in r_0039, r_0040, r_0065, r_0996, r_0997), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0182} = 0 \tag{997}$$

7.399 Species e_0183

Name YCF1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in ATPase), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0183} = 0 \tag{998}$$

7.400 Species e_0186

Name HOM2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0219), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0186} = 0 \tag{999}$$

7.401 Species e_0188

Name SDH4

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_1021), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0188} = 0 \tag{1000}$$

7.402 Species e_0194

Name ADK1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in AK), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0194} = 0 \tag{1001}$$

7.403 Species e_0196

Name LYS4

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in r_0027, r_0542), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0196} = 0 \tag{1002}$$

7.404 Species e_0202

Name GLO2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0553), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0202} = 0 \tag{1003}$$

7.405 Species e_0203

Name DPP1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0337), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0203} = 0 \tag{1004}$$

7.406 Species e_0204

Name INM2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0757), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0204} = 0 \tag{1005}$$

7.407 Species e_0207

Name ATP5

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0226), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0207} = 0 \tag{1006}$$

7.408 Species e_0213

Name TIM11

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0226), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0213} = 0 \tag{1007}$$

7.409 Species e_0214

Name YDR341C

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0209), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0214} = 0 \tag{1008}$$

7.410 Species e_0218

Name TRR1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_1038), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0218} = 0 \tag{1009}$$

7.411 Species e_0219

Name TRP4

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0202), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0219} = 0 \tag{1010}$$

7.412 Species e_0220

Name KEI1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0591), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0220} = 0 \tag{1011}$$

7.413 Species e_0223

Name ATP17

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0226), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0223} = 0 \tag{1012}$$

7.414 Species e_0231

Name ADE8

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0499), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0231} = 0 \tag{1013}$$

7.415 Species e_0234

Name GUK1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in three reactions (as a modifier in r_0330, r_0528, r_0529), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0234} = 0 \tag{1014}$$

7.416 Species e_0237

Name RIB3

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0038), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0237} = 0 \tag{1015}$$

7.417 Species e_0239

Name SAM2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0726), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0239} = 0 \tag{1016}$$

7.418 Species e_0243

Name QCR7

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0439), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0243} = 0 \tag{1017}$$

7.419 Species e_0249

Name URA3

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0821), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0249} = 0 \tag{1018}$$

7.420 Species e_0250

Name RIP1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0439), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0250} = 0 \tag{1019}$$

7.421 Species e_0251

Name VMA3

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in ATPase, ATPase), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0251} = 0 \tag{1020}$$

7.422 Species e_0255

Name CYC7

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in four reactions (as a modifier in r_0001, r_0004, r_0438, r_0439), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0255} = 0 \tag{1021}$$

7.423 Species e_0260

Name GLY1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_1040), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0260} = 0 \tag{1022}$$

7.424 Species e_0263

Name VMA8

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in ATPase, ATPase), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0263} = 0 \tag{1023}$$

7.425 Species e_0268

Name DLD3

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0001), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0268} = 0 \tag{1024}$$

7.426 Species e_0269

Name PMI40

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0723), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0269} = 0 \tag{1025}$$

7.427 Species e_0271

Name YND1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0792), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0271} = 0 \tag{1026}$$

7.428 Species e_0273

Name FAA2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in r_0399, r_0400), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0273} = 0 \tag{1027}$$

7.429 Species e_0276

Name PRO3

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0957), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0276} = 0 \tag{1028}$$

7.430 Species e_0278

Name CHO1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0880), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0278} = 0 \tag{1029}$$

7.431 Species e_0280

Name SAH1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0144), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0280} = 0 \tag{1030}$$

7.432 Species e_0281

Name HOM3

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0215), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0281} = 0 \tag{1031}$$

7.433 Species e_0283

Name HIS1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0225), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0283} = 0 \tag{1032}$$

7.434 Species e_0288

Name HOR2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0489), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0288} = 0 \tag{1033}$$

7.435 Species e_0289

Name ICL1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0662), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0289} = 0 \tag{1034}$$

7.436 Species e_0290

Name ARG5,6

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in r_0115, r_0759), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0290} = 0 \tag{1035}$$

7.437 Species e_0291

Name RNR1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in three reactions (as a modifier in r_0974, r_0976, r_0978), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0291} = 0 \tag{1036}$$

7.438 Species e_0293

Name ALD5

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0173), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0293} = 0 \tag{1037}$$

7.439 Species e_0295

Name ILV1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0692), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0295} = 0 \tag{1038}$$

7.440 Species e_0296

Name AIM10

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0941), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0296} = 0 \tag{1039}$$

7.441 Species e_0297

Name TRP2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0203), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0297} = 0 \tag{1040}$$

7.442 Species e_0298

Name MET6

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0727), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0298} = 0 \tag{1041}$$

7.443 Species e_0299

Name PRS2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0916), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0299} = 0 \tag{1042}$$

7.444 Species e_0303

Name ADK2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in AK, r_0150), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0303} = 0 \tag{1043}$$

7.445 Species e_0311

Name LPD1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0501), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0311} = 0 \tag{1044}$$

7.446 Species e_0312

Name FRS2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0852), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0312} = 0 \tag{1045}$$

7.447 Species e_0313

Name AGX1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0156), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0313} = 0 \tag{1046}$$

7.448 Species e_0314

Name SEC53

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0902), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0314} = 0 \tag{1047}$$

7.449 Species e_0317

Name GSY1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0510), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0317} = 0 \tag{1048}$$

7.450 Species e_0320

Name HIS2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0537), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0320} = 0 \tag{1049}$$

7.451 Species e_0321

Name MET10

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_1027), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0321} = 0 \tag{1050}$$

7.452 Species e_0322

Name QCR6

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0439), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0322} = 0 \tag{1051}$$

7.453 Species e_0325

Name HXK1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in HXK), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0325} = 0 \tag{1052}$$

7.454 Species e_0326

Name ERG26

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in r_0234, r_0235), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0326} = 0 \tag{1053}$$

7.455 Species e_0328

Name LEU1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in r_0023, r_0060), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0328} = 0 \tag{1054}$$

7.456 Species e_0329

Name ERG4

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0244), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0329} = 0 \tag{1055}$$

7.457 Species e_0330

Name TRP5

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_1055), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0330} = 0 \tag{1056}$$

7.458 Species e_0334

Name PYC1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0958), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0334} = 0 \tag{1057}$$

7.459 Species e_0340

Name MET13

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0080), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0340} = 0 \tag{1058}$$

7.460 Species e_0342

Name ARO2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0279), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0342} = 0 \tag{1059}$$

7.461 Species e_0343

Name LYS5

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0678), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0343} = 0 \tag{1060}$$

7.462 Species e_0346

Name COX4

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0438), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0346} = 0 \tag{1061}$$

7.463 Species e_0347

Name COX13

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0438), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0347} = 0 \tag{1062}$$

7.464 Species e_0348

Name ARO8

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in three reactions (as a modifier in r_0018, r_0851, r_1063), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0348} = 0 \tag{1063}$$

7.465 Species e_0352

Name ADE5,7

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in r_0855, r_0914), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0352} = 0 \tag{1064}$$

7.466 Species e_0353

Name GUS1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0479), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0353} = 0 \tag{1065}$$

7.467 Species e_0355

Name HXK2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in HXK), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0355} = 0 \tag{1066}$$

7.468 Species e_0356

Name ADH4

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in ADH), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0356} = 0 \tag{1067}$$

7.469 Species e_0362

Name VMA7

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in ATPase, ATPase), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0362} = 0 \tag{1068}$$

7.470 Species e_0364

Name GSC2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0005), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0364} = 0 \tag{1069}$$

7.471 Species e_0365

Name ACB1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in ten reactions (as a modifier in r_0386, r_0387, r_0389, r_0391, r_0397, r_0398, r_0432, r_0433, r_0434, r_0435), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0365} = 0 \tag{1070}$$

7.472 Species e_0367

Name ERG25

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a modifier in r_0238, r_0239, r_0240, r_0241), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0367} = 0 \tag{1071}$$

7.473 Species e_0368

Name ADE6

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0079), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0368} = 0 \tag{1072}$$

7.474 Species e_0370

Name PDC6

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in PDC), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0370} = 0 \tag{1073}$$

7.475 Species e_0372

Name VAS1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_1089), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0372} = 0 \tag{1074}$$

7.476 Species e_0376

Name ASN2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0211), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0376} = 0 \tag{1075}$$

7.477 Species e_0379

Name SKN1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0006), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0379} = 0 \tag{1076}$$

7.478 Species e_0380

Name CYS4

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0309), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0380} = 0 \tag{1077}$$

7.479 Species e_0381

Name CHO2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0858), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0381} = 0 \tag{1078}$$

7.480 Species e_0382

Name PSD2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0877), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0382} = 0 \tag{1079}$$

7.481 Species e_0385

Name ERG1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_1010), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0385} = 0 \tag{1080}$$

7.482 Species e_0387

Name RNR4

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in three reactions (as a modifier in r_0974, r_0976, r_0978), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0387} = 0 \tag{1081}$$

7.483 Species e_0389

Name QCR9

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0439), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0389} = 0 \tag{1082}$$

7.484 Species e_0390

Name TYS1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_1066), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0390} = 0 \tag{1083}$$

7.485 Species e_0392

Name TDH3

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in TDH), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0392} = 0 \tag{1084}$$

7.486 Species e_0396

Name ADE3

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in three reactions (as a modifier in r_0446, r_0724, r_0732), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0396} = 0 \tag{1085}$$

7.487 Species e_0398

Name TRX2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a modifier in r_0883, r_0970, r_0973, r_1038), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0398} = 0 \tag{1086}$$

7.488 Species e_0401

Name PFK1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in PFK), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0401} = 0 \tag{1087}$$

7.489 Species e_0404

Name SOL4

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0091), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0404} = 0 \tag{1088}$$

7.490 Species e_0405

Name ENO1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in ENO), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0405} = 0 \tag{1089}$$

7.491 Species e_0407

Name GND2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0889), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0407} = 0 \tag{1090}$$

7.492 Species e_0409

Name MES1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0729), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0409} = 0 \tag{1091}$$

7.493 Species e_0417

Name LAG1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0264), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0417} = 0 \tag{1092}$$

7.494 Species e_0418

Name PRS3

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0916), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0418} = 0 \tag{1093}$$

7.495 Species e_0422

Name QCR10

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0439), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0422} = 0 \tag{1094}$$

7.496 Species e_0424

Name ERG11

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0317), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0424} = 0 \tag{1095}$$

7.497 Species e_0425

Name DIA4

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0995), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0425} = 0 \tag{1096}$$

7.498 Species e_0426

Name ARG4

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0207), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0426} = 0 \tag{1097}$$

7.499 Species e_0427

Name DED81

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0212), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0427} = 0 \tag{1098}$$

7.500 Species e_0428

Name THR1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0548), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0428} = 0 \tag{1099}$$

7.501 Species e_0429

Name VMA16

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in ATPase, ATPase), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0429} = 0 \tag{1100}$$

7.502 Species e_0431

Name PUT2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0012), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0431} = 0 \tag{1101}$$

7.503 Species e_0432

Name VMA10

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in ATPase, ATPase), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0432} = 0 \tag{1102}$$

7.504 Species e_0434

Name NCP1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0317), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0434} = 0 \tag{1103}$$

7.505 Species e_0435

Name INM1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0757), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0435} = 0 \tag{1104}$$

7.506 Species e_0436

Name COX6

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0438), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0436} = 0 \tag{1105}$$

7.507 Species e_0440

Name ERG7

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0698), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0440} = 0 \tag{1106}$$

7.508 Species e_0447

Name GRE3

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0688), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0447} = 0 \tag{1107}$$

7.509 Species e_0448

Name TRR2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_1038), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0448} = 0 \tag{1108}$$

7.510 Species e_0452

Name DCD1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0326), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0452} = 0 \tag{1109}$$

7.511 Species e_0453

Name SOL3

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0091), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0453} = 0 \tag{1110}$$

7.512 Species e_0454

Name ENO2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in ENO), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0454} = 0 \tag{1111}$$

7.513 Species e_0455

Name GND1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0889), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0455} = 0 \tag{1112}$$

7.514 Species e_0456

Name ERG9

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_1012), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0456} = 0 \tag{1113}$$

7.515 Species e_0457

Name BAT1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in four reactions (as a modifier in r_0029, r_0663, r_0699, r_1087), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0457} = 0 \tag{1114}$$

7.516 Species e_0458

Name IMD2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0565), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0458} = 0 \tag{1115}$$

7.517 Species e_0462

Name FAA3

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0407), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0462} = 0 \tag{1116}$$

7.518 Species e_0465

Name HIS6

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0007), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0465} = 0 \tag{1117}$$

7.519 Species e_0466

Name RHR2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0489), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0466} = 0 \tag{1118}$$

7.520 Species e_0467

Name RNR3

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in three reactions (as a modifier in r_0974, r_0976, r_0978), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0467} = 0 \tag{1119}$$

7.521 Species e_0470

Name THS1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_1042), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0470} = 0 \tag{1120}$$

7.522 Species e_0472

Name LYS12

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0545), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0472} = 0 \tag{1121}$$

7.523 Species e_0475

Name COX5B

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0438), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0475} = 0 \tag{1122}$$

7.524 Species e_0476

Name HIS5

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0538), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0476} = 0 \tag{1123}$$

7.525 Species e_0489

Name LYS1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0988), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0489} = 0 \tag{1124}$$

7.526 Species e_0492

Name RNR2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in three reactions (as a modifier in r_0974, r_0976, r_0978), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0492} = 0 \tag{1125}$$

7.527 Species e_0494

Name YJL045W

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_1021), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0494} = 0 \tag{1126}$$

7.528 Species e_0495

Name TDH1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in TDH), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0495} = 0 \tag{1127}$$

7.529 Species e_0496

Name BNA3

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0018), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0496} = 0 \tag{1128}$$

7.530 Species e_0499

Name ARG3

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0816), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0499} = 0 \tag{1129}$$

7.531 Species e_0506

Name RPE1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0984), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0506} = 0 \tag{1130}$$

7.532 Species e_0508

Name URA2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in r_0214, r_0250), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0508} = 0 \tag{1131}$$

7.533 Species e_0510

Name GLG2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0510), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0510} = 0 \tag{1132}$$

7.534 Species e_0512

Name INO1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0758), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0512} = 0 \tag{1133}$$

7.535 Species e_0514

Name QCR8

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0439), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0514} = 0 \tag{1134}$$

7.536 Species e_0515

Name ERG20

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in r_0355, r_0462), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0515} = 0 \tag{1135}$$

7.537 Species e_0525

Name TDH2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in TDH), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0525} = 0 \tag{1136}$$

7.538 Species e_0528

Name ILV3

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in r_0352, r_0353), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0528} = 0 \tag{1137}$$

7.539 Species e_0531

Name CYC1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a modifier in r_0001, r_0004, r_0438, r_0439), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0531} = 0 \tag{1138}$$

7.540 Species e_0536

Name OPI3

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in three reactions (as a modifier in r_0858, r_0900, r_0901), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0536} = 0 \tag{1139}$$

7.541 Species e_0540

Name URA8

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0307), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0540} = 0 \tag{1140}$$

7.542 Species e_0541

Name ADO1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0142), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0541} = 0 \tag{1141}$$

7.543 Species e_0542

Name CPA2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0250), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0542} = 0 \tag{1142}$$

7.544 Species e_0544

Name ATP2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0226), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0544} = 0 \tag{1143}$$

7.545 Species e_0545

Name STR2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0311), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0545} = 0 \tag{1144}$$

7.546 Species e_0547

Name MET5

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_1027), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0547} = 0 \tag{1145}$$

7.547 Species e_0548

Name HOM6

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0547), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0548} = 0 \tag{1146}$$

7.548 Species e_0549

Name PMT4

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0362), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0549} = 0 \tag{1147}$$

7.549 Species e_0550

Name BAT2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in four reactions (as a modifier in r_0029, r_0663, r_0699, r_1087), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0550} = 0 \tag{1148}$$

7.550 Species e_0556

Name MET14

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0154), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0556} = 0 \tag{1149}$$

7.551 Species e_0557

Name AUR1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0591), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0557} = 0 \tag{1150}$$

7.552 Species e_0558

Name LAC1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0264), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0558} = 0 \tag{1151}$$

7.553 Species e_0559

Name ATP7

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0226), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0559} = 0 \tag{1152}$$

7.554 Species e_0561

Name URA6

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_1072), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0561} = 0 \tag{1153}$$

7.555 Species e_0565

Name UGP1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_1084), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0565} = 0 \tag{1154}$$

7.556 Species e_0567

Name FBA1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in FBA, r_0990), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0567} = 0 \tag{1155}$$

7.557 Species e_0568

Name YNK1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in r_0800, r_0811), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0568} = 0 \tag{1156}$$

7.558 Species e_0569

Name VMA5

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in ATPase, ATPase), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0569} = 0 \tag{1157}$$

7.559 Species e_0571

Name MDH1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0713), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0571} = 0 \tag{1158}$$

7.560 Species e_0574

Name AAT1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0216), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0574} = 0 \tag{1159}$$

7.561 Species e_0576

Name PGM1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0888), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0576} = 0 \tag{1160}$$

7.562 Species e_0578

Name TGL1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_1014), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0578} = 0 \tag{1161}$$

7.563 Species e_0579

Name SDH3

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_1021), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0579} = 0 \tag{1162}$$

7.564 Species e_0581

Name SDH1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_1021), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0581} = 0 \tag{1163}$$

7.565 Species e_0582

Name GPM1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in GPM), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0582} = 0 \tag{1164}$$

7.566 Species e_0585

Name PRS1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0916), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0585} = 0 \tag{1165}$$

7.567 Species e_0586

Name FAS1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in ten reactions (as a modifier in r_0386, r_0387, r_0389, r_0391, r_0397, r_0398, r_0432, r_0433, r_0434, r_0435), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0586} = 0 \tag{1166}$$

7.568 Species e_0588

Name PXA2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in ATPase), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0588} = 0 \tag{1167}$$

7.569 Species e_0591

Name TRP3

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in r_0203, r_0566), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0591} = 0 \tag{1168}$$

7.570 Species e_0594

Name URA1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_2127), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0594} = 0 \tag{1169}$$

7.571 Species e_0601

Name SHB17

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_2126), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0601} = 0 \tag{1170}$$

7.572 Species e_0603

Name GLG1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0510), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0603} = 0 \tag{1171}$$

7.573 Species e_0607

Name GPT2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0495), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0607} = 0 \tag{1172}$$

7.574 Species e_0610

Name MTD1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0731), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0610} = 0 \tag{1173}$$

7.575 Species e_0611

Name TGL4

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_1052), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0611} = 0 \tag{1174}$$

7.576 Species e_0612

Name PCK1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0884), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0612} = 0 \tag{1175}$$

7.577 Species e_0613

Name YEH1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_1014), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0613} = 0 \tag{1176}$$

7.578 Species e_0615

Name DPS1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0220), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0615} = 0 \tag{1177}$$

7.579 Species e_0619

Name SDH2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_1021), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0619} = 0 \tag{1178}$$

7.580 Species e_0621

Name YBT1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in ATPase), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0621} = 0 \tag{1179}$$

7.581 Species e_0629

Name AAT2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in r_0216, r_1063), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0629} = 0 \tag{1180}$$

7.582 Species e_0631

Name ADE16

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in r_0570, r_0912), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0631} = 0 \tag{1181}$$

7.583 Species e_0632

Name COX12

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0438), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0632} = 0 \tag{1182}$$

7.584 Species e_0633

Name TRX1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in r_0883, r_1038), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0633} = 0 \tag{1183}$$

7.585 Species e_0636

Name PDC1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in PDC), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0636} = 0 \tag{1184}$$

7.586 Species e_0638

Name SHM2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0502), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0638} = 0 \tag{1185}$$

7.587 Species e_0639

Name FRS1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0852), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0639} = 0 \tag{1186}$$

7.588 Species e_0642

Name ALT1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0674), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0642} = 0 \tag{1187}$$

7.589 Species e_0644

Name ERG27

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in r_0236, r_0237), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0644} = 0 \tag{1188}$$

7.590 Species e_0647

Name PDC5

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in PDC), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0647} = 0 \tag{1189}$$

7.591 Species e_0658

Name SAM1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0726), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0658} = 0 \tag{1190}$$

7.592 Species e_0667

Name GSY2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0510), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0667} = 0 \tag{1191}$$

7.593 Species e_0671

Name ATP14

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0226), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0671} = 0 \tag{1192}$$

7.594 Species e_0674

Name MET17

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0813), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0674} = 0 \tag{1193}$$

7.595 Species e_0675

Name ACO1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in r_0280, r_0302), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0675} = 0 \tag{1194}$$

7.596 Species e_0682

Name FKS1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0005), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0682} = 0 \tag{1195}$$

7.597 Species e_0684

Name TAL1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_1048), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0684} = 0 \tag{1196}$$

7.598 Species e_0685

Name ILV5

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in r_0096, r_0669), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0685} = 0 \tag{1197}$$

7.599 Species e_0686

Name ADE13

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in r_0151, r_0152), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0686} = 0 \tag{1198}$$

7.600 Species e_0687

Name SUR4

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in r_0393, r_0394), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0687} = 0 \tag{1199}$$

7.601 Species e_0690

Name COX8

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0438), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0690} = 0 \tag{1200}$$

7.602 Species e_0692

Name URA4

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0349), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0692} = 0 \tag{1201}$$

7.603 Species e_0693

Name IMD3

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0565), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0693} = 0 \tag{1202}$$

7.604 Species e_0695

Name VMA6

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in ATPase, ATPase), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0695} = 0 \tag{1203}$$

7.605 Species e_0697

Name HMG2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0558), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0697} = 0 \tag{1204}$$

7.606 Species e_0698

Name GLO1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0697), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0698} = 0 \tag{1205}$$

7.607 Species e_0699

Name ERG6

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0986), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0699} = 0 \tag{1206}$$

7.608 Species e_0704

Name CYB2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0004), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0704} = 0 \tag{1207}$$

7.609 Species e_0705

Name IMD4

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0565), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0705} = 0 \tag{1208}$$

7.610 Species e_0708

Name HMG1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0558), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0708} = 0 \tag{1209}$$

7.611 Species e_0709

Name ATP18

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0226), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0709} = 0 \tag{1210}$$

7.612 Species e_0711

Name TSL1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in r_0195, r_1051), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0711} = 0 \tag{1211}$$

7.613 Species e_0712

Name URA5

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0820), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0712} = 0 \tag{1212}$$

7.614 Species e_0716

Name ERG13

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0559), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0716} = 0 \tag{1213}$$

7.615 Species e_0727

Name STV1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in ATPase), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0727} = 0 \tag{1214}$$

7.616 Species e_0729

Name ARG7

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0818), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0729} = 0 \tag{1215}$$

7.617 Species e_0730

Name ADH3

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in ADH), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0730} = 0 \tag{1216}$$

7.618 Species e_0733

Name PGM2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0888), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0733} = 0 \tag{1217}$$

7.619 Species e_0734

Name ILV2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in r_0016, r_0097), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0734} = 0 \tag{1218}$$

7.620 Species e_0736

Name ADE17

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in r_0570, r_0912), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0736} = 0 \tag{1219}$$

7.621 Species e_0740

Name ALD2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0174), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0740} = 0 \tag{1220}$$

7.622 Species e_0741

Name GCV2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0501), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0741} = 0 \tag{1221}$$

7.623 Species e_0742

Name ERG2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0243), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0742} = 0 \tag{1222}$$

7.624 Species e_0743

Name PFK2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in PFK), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0743} = 0 \tag{1223}$$

7.625 Species e_0744

Name HFA1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0108), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0744} = 0 \tag{1224}$$

7.626 Species e_0745

Name ERG12

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in r_0735, r_0736), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0745} = 0 \tag{1225}$$

7.627 Species e_0746

Name GUA1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0514), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0746} = 0 \tag{1226}$$

7.628 Species e_0747

Name ERG8

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0904), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0747} = 0 \tag{1227}$$

7.629 Species e_0750

Name FAA4

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0407), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0750} = 0 \tag{1228}$$

7.630 Species e_0752

Name COX7

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0438), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0752} = 0 \tag{1229}$$

7.631 Species e_0753

Name TPS3

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in r_0195, r_1051), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0753} = 0 \tag{1230}$$

7.632 Species e_0754

Name PPA2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0568), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0754} = 0 \tag{1231}$$

7.633 Species e_0755

Name URA10

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0820), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0755} = 0 \tag{1232}$$

7.634 Species e_0757

Name PGM3

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0888), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0757} = 0 \tag{1233}$$

7.635 Species e_0761

Name LCB1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0993), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0761} = 0 \tag{1234}$$

7.636 Species e_0762

Name LIP1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0264), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0762} = 0 \tag{1235}$$

7.637 Species e_0763

Name ADE4

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0915), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0763} = 0 \tag{1236}$$

7.638 Species e_0765

Name TGL3

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_1052), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0765} = 0 \tag{1237}$$

7.639 Species e_0769

Name IDP3

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0661), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0769} = 0 \tag{1238}$$

7.640 Species e_0771

Name IDH1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0658), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0771} = 0 \tag{1239}$$

7.641 Species e_0774

Name COX5A

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0438), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0774} = 0 \tag{1240}$$

7.642 Species e_0778

Name LEU4

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0024), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0778} = 0 \tag{1241}$$

7.643 Species e_0788

Name PSD1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0877), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0788} = 0 \tag{1242}$$

7.644 Species e_0791

Name ADE12

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0153), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0791} = 0 \tag{1243}$$

7.645 Species e_0792

Name ZWF1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0466), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0792} = 0 \tag{1244}$$

7.646 Species e_0793

Name YNL247W

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0313), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0793} = 0 \tag{1245}$$

7.647 Species e_0799

Name MET2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0549), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0799} = 0 \tag{1246}$$

7.648 Species e_0800

Name ERG24

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0231), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0800} = 0 \tag{1247}$$

7.649 Species e_0802

Name PHA2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0938), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0802} = 0 \tag{1248}$$

7.650 Species e_0805

Name CIT1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0300), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0805} = 0 \tag{1249}$$

7.651 Species e_0808

Name ACC1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in eleven reactions (as a modifier in r_0108, r_0386, r_0387, r_0389, r_0391, r_0397, r_0398, r_0432, r_0433, r_0434, r_0435), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0808} = 0 \tag{1250}$$

7.652 Species e_0812

Name MVD1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0739), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0812} = 0 \tag{1251}$$

7.653 Species e_0813

Name LYS9

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0989), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0813} = 0 \tag{1252}$$

7.654 Species e_0826

Name ARG1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0208), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0826} = 0 \tag{1253}$$

7.655 Species e_0827

Name GPD2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0491), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0827} = 0 \tag{1254}$$

7.656 Species e_0829

Name PRS5

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0916), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0829} = 0 \tag{1255}$$

7.657 Species e_0830

Name MET22

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0032), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0830} = 0 \tag{1256}$$

7.658 Species e_0832

Name RIB2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0014), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0832} = 0 \tag{1257}$$

7.659 Species e_0834

Name ADH1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in ADH), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0834} = 0 \tag{1258}$$

7.660 Species e_0836

Name WRS1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_1057), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0836} = 0 \tag{1259}$$

7.661 Species e_0838

Name MDH2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0713), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0838} = 0 \tag{1260}$$

7.662 Species e_0840

Name ARG8

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0118), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0840} = 0 \tag{1261}$$

7.663 Species e_0841

Name RIB4

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0967), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0841} = 0 \tag{1262}$$

7.664 Species e_0842

Name GRE2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0688), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0842} = 0 \tag{1263}$$

7.665 Species e_0846

Name GLO4

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0553), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0846} = 0 \tag{1264}$$

7.666 Species e_0848

Name CYT1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0439), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0848} = 0 \tag{1265}$$

7.667 Species e_0850

Name CDC21

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_1045), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0850} = 0 \tag{1266}$$

7.668 Species e_0851

Name TGL5

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_1052), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0851} = 0 \tag{1267}$$

7.669 Species e_0852

Name RKI1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0982), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0852} = 0 \tag{1268}$$

7.670 Species e_0855

Name LEU9

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0024), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0855} = 0 \tag{1269}$$

7.671 Species e_0860

Name ADE2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0911), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0860} = 0 \tag{1270}$$

7.672 Species e_0862

Name IDH2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0658), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0862} = 0 \tag{1271}$$

7.673 Species e_0867

Name GLN4

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0478), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0867} = 0 \tag{1272}$$

7.674 Species e_0869

Name ALE1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0008), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0869} = 0 \tag{1273}$$

7.675 Species e_0875

Name HIS3

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0564), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0875} = 0 \tag{1274}$$

7.676 Species e_0880

Name DFR1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0344), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0880} = 0 \tag{1275}$$

7.677 Species e_0883

Name DGA1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0336), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0883} = 0 \tag{1276}$$

7.678 Species e_0884

Name VPH1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in ATPase), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0884} = 0 \tag{1277}$$

7.679 Species e_0888

Name CPA1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0250), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0888} = 0 \tag{1278}$$

7.680 Species e_0889

Name FAA1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0407), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0889} = 0 \tag{1279}$$

7.681 Species e_0890

Name PMT3

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0362), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0890} = 0 \tag{1280}$$

7.682 Species e_0892

Name VMA4

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in ATPase, ATPase), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0892} = 0 \tag{1281}$$

7.683 Species e_0894

Name ALA1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0157), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0894} = 0 \tag{1282}$$

7.684 Species e_0895

Name PYK2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in PYK), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0895} = 0 \tag{1283}$$

7.685 Species e_0898

Name ALD4

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in r_0173, r_0174), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0898} = 0 \tag{1284}$$

7.686 Species e_0903

Name MET12

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0080), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0903} = 0 \tag{1285}$$

7.687 Species e_0904

Name ERG10

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0103), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0904} = 0 \tag{1286}$$

7.688 Species e_0911

Name ALD6

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0173), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0911} = 0 \tag{1287}$$

7.689 Species e_0913

Name ATP4

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0226), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0913} = 0 \tag{1288}$$

7.690 Species e_0915

Name GLR1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_1038), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0915} = 0 \tag{1289}$$

7.691 Species e_0922

Name IDI1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0667), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0922} = 0 \tag{1290}$$

7.692 Species e_0924

Name PXA1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in ATPase), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0924} = 0 \tag{1291}$$

7.693 Species e_0926

Name CDC60

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0701), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0926} = 0 \tag{1292}$$

7.694 Species e_0934

Name FAS2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in ten reactions (as a modifier in r_0386, r_0387, r_0389, r_0391, r_0397, r_0398, r_0432, r_0433, r_0434, r_0435), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0934} = 0 \tag{1293}$$

7.695 Species e_0935

Name VMA11

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in ATPase, ATPase), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0935} = 0 \tag{1294}$$

7.696 Species e_0940

Name FUM1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0451), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0940} = 0 \tag{1295}$$

7.697 Species e_0944

Name ATP15

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0226), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0944} = 0 \tag{1296}$$

7.698 Species e_0947

Name CIT3

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0300), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0947} = 0 \tag{1297}$$

7.699 Species e_0950

Name ATP20

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0226), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0950} = 0 \tag{1298}$$

7.700 Species e_0953

Name HTS1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0539), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0953} = 0 \tag{1299}$$

7.701 Species e_0955

Name GLN1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0476), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0955} = 0 \tag{1300}$$

7.702 Species e_0956

Name VMA13

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in ATPase, ATPase), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0956} = 0 \tag{1301}$$

7.703 Species e_0959

Name ARO7

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0278), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0959} = 0 \tag{1302}$$

7.704 Species e_0962

Name TKL1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in r_1049, r_1050), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0962} = 0 \tag{1303}$$

7.705 Species e_0963

Name GRS2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0512), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0963} = 0 \tag{1304}$$

7.706 Species e_0964

Name PIS1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0874), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0964} = 0 \tag{1305}$$

7.707 Species e_0970

Name ASN1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0211), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0970} = 0 \tag{1306}$$

7.708 Species e_0973

Name KRE6

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0006), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0973} = 0 \tag{1307}$$

7.709 Species e_0975

Name MET16

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0883), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0975} = 0 \tag{1308}$$

7.710 Species e_0976

Name DPM1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0361), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0976} = 0 \tag{1309}$$

7.711 Species e_0978

Name QCR2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0439), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0978} = 0 \tag{1310}$$

7.712 Species e_0980

Name YER152C

SBO:0000252 polypeptide chain

Initial concentration $0.0010\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0018), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0980} = 0 \tag{1311}$$

7.713 Species F26bP

Name beta-D-fructose 2,6-bisphosphate

SBO:0000247 simple chemical

Initial concentration $0.02\ \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in two reactions (as a modifier in PFK, PFK).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{F26bP} = 0 \tag{1312}$$

A Glossary of Systems Biology Ontology Terms

SBO:0000176 biochemical reaction: An event involving one or more chemical entities that modifies the electrochemical structure of at least one of the participants.

SBO:0000185 transport reaction: Movement of a physical entity without modification of the structure of the entity

SBO:0000247 simple chemical: Simple, non-repetitive chemical entity

SBO:0000252 polypeptide chain: Naturally occurring macromolecule formed by the repetition of amino-acid residues linked by peptidic bonds. A polypeptide chain is synthesized by the ribosome. CHEBI:1654

SBO:0000281 equilibrium constant: Quantity characterizing a chemical equilibrium in a chemical reaction, which is a useful tool to determine the concentration of various reactants or products in a system where chemical equilibrium occurs

SBO:0000290 physical compartment: Specific location of space, that can be bounded or not. A physical compartment can have 1, 2 or 3 dimensions

SBO:0000322 Michaelis constant for substrate: Substrate concentration at which the velocity of product production by the forward activity of a reversible enzyme is half its maximum.

SBO:0000323 Michaelis constant for product: Product concentration at which the velocity of substrate production by the reverse activity of a reversible enzyme is half its maximum.

SBO:0000324 forward maximal velocity: Limiting maximal velocity of the forward reaction of a reversible enzyme, reached when the substrate is in large excess and all the enzyme is complexed.

SBO:0000460 enzymatic catalyst: A substance that accelerates the velocity of a chemical reaction without itself being consumed or transformed, by lowering the free energy of the transition state. The substance acting as a catalyst is an enzyme

SBML2LaTeX was developed by Andreas Dräger[a], Hannes Planatscher[a], Dieudonné M Wouamba[a], Adrian Schröder[a], Michael Hucka[b], Lukas Endler[c], Martin Golebiewski[d] and Andreas Zell[a]. Please see http://www.ra.cs.uni-tuebingen.de/software/SBML2LaTeX for more information.

[a]Center for Bioinformatics Tübingen (ZBIT), Germany
[b]California Institute of Technology, Beckman Institute BNMC, Pasadena, United States
[c]European Bioinformatics Institute, Wellcome Trust Genome Campus, Hinxton, United Kingdom
[d]EML Research gGmbH, Heidelberg, Germany