SBML Model Report

Model name: "Smallbone2013 - Yeast metabolic model with linlog rate law"

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 11:42 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	657
events	0	constraints	0
reactions	282	function definitions	1
global parameters	309	unit definitions	3
rules	0	initial assignments	0

2 Unit Definitions

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

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2.1 Unit `substance`

Name mmol

Definition mmol

2.2 Unit `mM`

Name mM

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

2.3 Unit `mM_per_s`

Name mM per s

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

2.4 Unit `volume`

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

Definition l

2.5 Unit `area`

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

Definition m^2

2.6 Unit `length`

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

Definition m

2.7 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 657 species. The boundary condition of 354 of these species is set to `true` so that these species' amount cannot be changed by any reaction. Section 8 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	$mmol \cdot l^{-1}$	⊟	⊟
s_0004	(1->6)-beta-D-glucan	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0008	(2R,3R)-2,3-dihydroxy-3-methylpentanoate	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0009	(2R,3S)-3-isopropylmalate	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0010	(2S)-2-isopropyl-3-oxosuccinate	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0015	(N(omega)-L-arginino)succinic acid	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0016	(R)-2,3-dihydroxy-3-methylbutanoate	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0018	(R)-5-diphosphomevalonic acid	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0019	(R)-5-phosphomevalonic acid	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0028	(R)-mevalonate	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0037	(S)-2,3-epoxysqualene	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0039	(S)-2-acetyl-2-hydroxybutanoate	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0056	(S)-3-methyl-2-oxopentanoate	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0061	(S)-dihydroorotate	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0066	(S)-malate	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0075	1,3-bisphospho-D-glycerate	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0076	1-(2-carboxyphenylamino)-1-deoxy-D-ribulose 5-phosphate	cell	$mmol \cdot l^{-1}$	⊟	⊟

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
s_0077	1-(5-phospho-D-ribosyl)-5-[(5-phospho-D-ribosylamino)methylideneamino]imidazole-4-carboxamide	cell	mmol·l^{-1}	⊟	⊟
s_0078	1-(5-phosphoribosyl)-5'-AMP	cell	mmol·l^{-1}	⊟	⊟
s_0082	1-acyl-sn-glycerol 3-phosphate	cell	mmol·l^{-1}	⊟	⊟
s_0086	1-C-(indol-3-yl)glycerol 3-phosphate	cell	mmol·l^{-1}	⊟	⊟
s_0089	1-phosphatidyl-1D-myo-inositol	cell	mmol·l^{-1}	⊟	⊟
s_0118	1-pyrroline-5-carboxylate	cell	mmol·l^{-1}	⊟	⊟
s_0120	10-formyl-THF	cell	mmol·l^{-1}	⊟	⊟
s_0122	14-demethyllanosterol	cell	mmol·l^{-1}	⊟	⊟
s_0126	1D-myo-inositol 1-phosphate	cell	mmol·l^{-1}	⊟	⊟
s_0141	2,5-diamino-4-hydroxy-6-(5-phosphoribosylamino)pyrimidine	cell	mmol·l^{-1}	⊟	⊟
s_0142	2,5-diamino-6-(5-phosphono)ribitylamino-4(3H)-pyrimidinone	cell	mmol·l^{-1}	⊟	⊟
s_0145	2-acetamido-5-oxopentanoate	cell	mmol·l^{-1}	⊟	⊟
s_0146	2-acetyllactic acid	cell	mmol·l^{-1}	⊟	⊟
s_0158	2-hydroxy-3-oxobutyl phosphate	cell	mmol·l^{-1}	⊟	⊟
s_0162	2-isopropylmalate	cell	mmol·l^{-1}	⊟	⊟
s_0165	2-isopropylmaleic acid	cell	mmol·l^{-1}	⊟	⊟
s_0176	2-oxoadipic acid	cell	mmol·l^{-1}	⊟	⊟
s_0178	2-oxobutanoate	cell	mmol·l^{-1}	⊟	⊟
s_0180	2-oxoglutarate	cell	mmol·l^{-1}	⊟	⊟
s_0188	2-phospho-D-glyceric acid	cell	mmol·l^{-1}	⊟	⊟
s_0190	farnesyl diphosphate	cell	mmol·l^{-1}	⊟	⊟

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
s_0201	3'-phospho-5'-adenylyl sulfate	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0204	3-(4-hydroxyphenyl)pyruvate	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0207	3-(imidazol-4-yl)-2-oxopropyl dihydrogen phosphate	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0209	3-dehydro-4-methylzymosterol	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0210	3-dehydroquinate	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0211	3-dehydroshikimate	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0218	3-hydroxy-3-methylglutaryl-CoA	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0231	3-ketosphinganine	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0232	3-methyl-2-oxobutanoate	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0258	3-phospho-hydroxypyruvate	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0259	3-phospho-serine	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0260	3-phosphoglycerate	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0261	3-phosphoshikimic acid	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0262	4,4-dimethyl-5alpha-cholesta-8,14,24-trien-3beta-ol	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0291	4-methyl-2-oxopentanoate	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0295	4-phospho-L-aspartate	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0296	4alpha-methylzymosterol	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0297	4beta-methylzymosterol-4alpha-carboxylic acid	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0298	5'-adenylyl sulfate	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0299	5'-phosphoribosyl-4-(N-succinocarboxamide)-5-aminoimidazole	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0300	5'-phosphoribosyl-5-aminoimidazole	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0301	5'-phosphoribosyl-N-formylglycineamide	cell	$mmol \cdot l^{-1}$	⊟	⊟

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_0349	7-phospho-2-dehydro-3-deoxy-D-arabino-heptonic acid	cell	$mmol \cdot l^{-1}$	⊟	⊟
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	$mmol \cdot l^{-1}$	⊟	⊟
s_0386	adenosine	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0390	adenosine 3',5'-bismonophosphate	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0393	adenylo-succinate	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0394	ADP	cell	$mmol \cdot l^{-1}$	⊟	⊟

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
s_0403	AICAR	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0404	Ala-tRNA(Ala)	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0409	alpha,alpha-trehalose 6-phosphate	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0419	ammonium	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0420	ammonium	extracellular	$mmol \cdot l^{-1}$	☑	☑
s_0423	AMP	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0427	anthranilate	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0428	Arg-tRNA(Arg)	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0430	Asn-tRNA(Asn)	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0432	Asp-tRNA(Asp)	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0434	ATP	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0445	bicarbonate	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0454	but-1-ene-1,2,4-tricarboxylic acid	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0455	carbamoyl phosphate	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0456	carbon dioxide	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0458	carbon dioxide	extracellular	$mmol \cdot l^{-1}$	☑	☑
s_0467	CDP	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0471	CDP-diacylglycerol	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0475	ceramide-1 (C24)	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0481	ceramide-2 (C24)	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0493	ceramide-3 (C24)	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0499	ceramide-4 (C24)	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0515	chorismate	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0516	cis-aconitate	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0522	citrate	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0526	CMP	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0529	coenzyme A	cell	$mmol \cdot l^{-1}$	⊟	⊟

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
s_0539	CTP	cell	mmol·l^{-1}	⊟	⊟
s_0542	Cys-tRNA(Cys)	cell	mmol·l^{-1}	⊟	⊟
s_0550	D-erythro-1-(imidazol-4-yl)glycerol 3-phosphate	cell	mmol·l^{-1}	⊟	⊟
s_0551	D-erythrose 4-phosphate	cell	mmol·l^{-1}	⊟	⊟
s_0555	D-fructose 1,6-bisphosphate	cell	mmol·l^{-1}	⊟	⊟
s_0557	D-fructose 6-phosphate	cell	mmol·l^{-1}	⊟	⊟
s_0563	D-glucose	cell	mmol·l^{-1}	⊟	⊟
s_0565	D-glucose	extracellular	mmol·l^{-1}	✔	✔
s_0567	D-glucose 1-phosphate	cell	mmol·l^{-1}	⊟	⊟
s_0568	D-glucose 6-phosphate	cell	mmol·l^{-1}	⊟	⊟
s_0573	D-mannose 1-phosphate	cell	mmol·l^{-1}	⊟	⊟
s_0574	D-mannose 6-phosphate	cell	mmol·l^{-1}	⊟	⊟
s_0577	D-ribulose 5-phosphate	cell	mmol·l^{-1}	⊟	⊟
s_0581	D-xylulose 5-phosphate	cell	mmol·l^{-1}	⊟	⊟
s_0582	dADP	cell	mmol·l^{-1}	⊟	⊟
s_0584	dAMP	cell	mmol·l^{-1}	⊟	⊟
s_0586	dATP	cell	mmol·l^{-1}	⊟	⊟
s_0587	dCDP	cell	mmol·l^{-1}	⊟	⊟
s_0589	dCMP	cell	mmol·l^{-1}	⊟	⊟
s_0595	decanoate	cell	mmol·l^{-1}	⊟	⊟
s_0602	decanoyl-CoA	cell	mmol·l^{-1}	⊟	⊟
s_0613	dGDP	cell	mmol·l^{-1}	⊟	⊟
s_0615	dGMP	cell	mmol·l^{-1}	⊟	⊟
s_0619	diglyceride	cell	mmol·l^{-1}	⊟	⊟
s_0625	dihydrofolic acid	cell	mmol·l^{-1}	⊟	⊟
s_0629	dihydroxyacetone phosphate	cell	mmol·l^{-1}	⊟	⊟

Id	Name	Compartment	Derived Unit	Constant	Boundary Condi- tion
s_0633	diphosphate	cell	mmol·l^{-1}	⊟	⊟
s_0644	dolichyl D-mannosyl phosphate	cell	mmol·l^{-1}	⊟	⊟
s_0645	dolichyl phosphate	cell	mmol·l^{-1}	⊟	⊟
s_0649	dTMP	cell	mmol·l^{-1}	⊟	⊟
s_0654	dUMP	cell	mmol·l^{-1}	⊟	⊟
s_0656	dUTP	cell	mmol·l^{-1}	⊟	⊟
s_0657	episterol	cell	mmol·l^{-1}	⊟	⊟
s_0662	ergosta-5,7,22,24(28)-tetraen-3beta-ol	cell	mmol·l^{-1}	⊟	⊟
s_0664	ergosta-5,7,24(28)-trien-3beta-ol	cell	mmol·l^{-1}	⊟	⊟
s_0666	ergosterol	cell	mmol·l^{-1}	⊟	⊟
s_0672	ergosterol ester	cell	mmol·l^{-1}	⊟	⊟
s_0700	fecosterol	cell	mmol·l^{-1}	⊟	⊟
s_0709	ferricytochrome c	cell	mmol·l^{-1}	⊟	⊟
s_0710	ferrocytochrome c	cell	mmol·l^{-1}	⊟	⊟
s_0722	formate	cell	mmol·l^{-1}	⊟	⊟
s_0723	formate	extracellular	mmol·l^{-1}	✓	✓
s_0725	fumarate	cell	mmol·l^{-1}	⊟	⊟
s_0739	GDP	cell	mmol·l^{-1}	⊟	⊟
s_0743	GDP-alpha-D-mannose	cell	mmol·l^{-1}	⊟	⊟
s_0745	geranyl diphosphate	cell	mmol·l^{-1}	⊟	⊟
s_0747	Gln-tRNA(Gln)	cell	mmol·l^{-1}	⊟	⊟
s_0748	Glu-tRNA(Glu)	cell	mmol·l^{-1}	⊟	⊟
s_0750	glutathione	cell	mmol·l^{-1}	⊟	⊟
s_0754	glutathione disulfide	cell	mmol·l^{-1}	⊟	⊟
s_0757	Gly-tRNA(Gly)	cell	mmol·l^{-1}	⊟	⊟
s_0764	glyceraldehyde 3-phosphate	cell	mmol·l^{-1}	⊟	⊟
s_0767	glycerol 3-phosphate	cell	mmol·l^{-1}	⊟	⊟

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
s_0773	glycogen	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0782	GMP	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0785	GTP	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0832	His-tRNA(His)	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0835	homocitrate	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0836	homoisocitrate	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0837	hydrogen peroxide	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0841	hydrogen sulfide	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0847	Ile-tRNA(Ile)	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0849	IMP	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0918	inositol-P-ceramide D (C24)	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0940	isocitrate	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0943	isopentenyl diphosphate	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0951	keto-phenylpyruvate	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0953	L-2-aminoadipate	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0955	L-alanine	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0959	L-allysine	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0965	L-arginine	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0969	L-asparagine	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0973	L-aspartate	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0978	L-aspartate 4-semialdehyde	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0979	L-citrulline	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0980	L-cystathionine	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0981	L-cysteine	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0991	L-glutamate	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_0999	L-glutamine	cell	$mmol \cdot l^{-1}$	⊟	⊟
s_1003	L-glycine	cell	$mmol \cdot l^{-1}$	⊟	⊟

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
s_1006	L-histidine	cell	$\mathrm{mmol \cdot l^{-1}}$	⊟	⊟
s_1010	L-histidinol	cell	$\mathrm{mmol \cdot l^{-1}}$	⊟	⊟
s_1011	L-histidinol phosphate	cell	$\mathrm{mmol \cdot l^{-1}}$	⊟	⊟
s_1012	L-homocysteine	cell	$\mathrm{mmol \cdot l^{-1}}$	⊟	⊟
s_1014	L-homoserine	cell	$\mathrm{mmol \cdot l^{-1}}$	⊟	⊟
s_1016	L-isoleucine	cell	$\mathrm{mmol \cdot l^{-1}}$	⊟	⊟
s_1021	L-leucine	cell	$\mathrm{mmol \cdot l^{-1}}$	⊟	⊟
s_1025	L-lysine	cell	$\mathrm{mmol \cdot l^{-1}}$	⊟	⊟
s_1029	L-methionine	cell	$\mathrm{mmol \cdot l^{-1}}$	⊟	⊟
s_1032	L-phenylalanine	cell	$\mathrm{mmol \cdot l^{-1}}$	⊟	⊟
s_1035	L-proline	cell	$\mathrm{mmol \cdot l^{-1}}$	⊟	⊟
s_1038	L-saccharopine	cell	$\mathrm{mmol \cdot l^{-1}}$	⊟	⊟
s_1039	L-serine	cell	$\mathrm{mmol \cdot l^{-1}}$	⊟	⊟
s_1045	L-threonine	cell	$\mathrm{mmol \cdot l^{-1}}$	⊟	⊟
s_1048	L-tryptophan	cell	$\mathrm{mmol \cdot l^{-1}}$	⊟	⊟
s_1051	L-tyrosine	cell	$\mathrm{mmol \cdot l^{-1}}$	⊟	⊟
s_1056	L-valine	cell	$\mathrm{mmol \cdot l^{-1}}$	⊟	⊟
s_1059	lanosterol	cell	$\mathrm{mmol \cdot l^{-1}}$	⊟	⊟
s_1065	laurate	cell	$\mathrm{mmol \cdot l^{-1}}$	⊟	⊟
s_1073	lauroyl-CoA	cell	$\mathrm{mmol \cdot l^{-1}}$	⊟	⊟
s_1077	Leu-tRNA(Leu)	cell	$\mathrm{mmol \cdot l^{-1}}$	⊟	⊟
s_1084	lignoceric acid	cell	$\mathrm{mmol \cdot l^{-1}}$	⊟	⊟
s_1099	Lys-tRNA(Lys)	cell	$\mathrm{mmol \cdot l^{-1}}$	⊟	⊟
s_1101	malonyl-CoA	cell	$\mathrm{mmol \cdot l^{-1}}$	⊟	⊟
s_1107	mannan	cell	$\mathrm{mmol \cdot l^{-1}}$	⊟	⊟
s_1148	Met-tRNA(Met)	cell	$\mathrm{mmol \cdot l^{-1}}$	⊟	⊟
s_1153	myo-inositol	cell	$\mathrm{mmol \cdot l^{-1}}$	⊟	⊟

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
s_1161	myristate	cell	mmol·l^{-1}	⊟	⊟
s_1176	myristoyl-CoA	cell	mmol·l^{-1}	⊟	⊟
s_1182	N(2)-acetyl-L-ornithine	cell	mmol·l^{-1}	⊟	⊟
s_1187	N-(5-phospho-beta-D-ribosyl)anthranilate	cell	mmol·l^{-1}	⊟	⊟
s_1191	N-acetyl-L-gamma-glutamyl phosphate	cell	mmol·l^{-1}	⊟	⊟
s_1192	N-acetyl-L-glutamate	cell	mmol·l^{-1}	⊟	⊟
s_1194	N-carbamoyl-L-aspartate	cell	mmol·l^{-1}	⊟	⊟
s_1198	NAD	cell	mmol·l^{-1}	⊟	⊟
s_1203	NADH	cell	mmol·l^{-1}	⊟	⊟
s_1207	NADP(+)	cell	mmol·l^{-1}	⊟	⊟
s_1212	NADPH	cell	mmol·l^{-1}	⊟	⊟
s_1233	O-acetyl-L-homoserine	cell	mmol·l^{-1}	⊟	⊟
s_1238	O-phospho-L-homoserine	cell	mmol·l^{-1}	⊟	⊟
s_1255	octanoyl-CoA	cell	mmol·l^{-1}	⊟	⊟
s_1266	ornithine	cell	mmol·l^{-1}	⊟	⊟
s_1269	orotate	cell	mmol·l^{-1}	⊟	⊟
s_1270	orotidine 5'-(dihydrogen phosphate)	cell	mmol·l^{-1}	⊟	⊟
s_1271	oxaloacetate	cell	mmol·l^{-1}	⊟	⊟
s_1275	oxygen	cell	mmol·l^{-1}	⊟	⊟
s_1277	oxygen	extracellular	mmol·l^{-1}	☑	☑
s_1286	palmitate	cell	mmol·l^{-1}	⊟	⊟
s_1302	palmitoyl-CoA	cell	mmol·l^{-1}	⊟	⊟
s_1314	Phe-tRNA(Phe)	cell	mmol·l^{-1}	⊟	⊟
s_1322	phosphate	cell	mmol·l^{-1}	⊟	⊟
s_1324	phosphate	extracellular	mmol·l^{-1}	☑	☑
s_1331	phosphatidate	cell	mmol·l^{-1}	⊟	⊟
s_1337	phosphatidyl-L-serine	cell	mmol·l^{-1}	⊟	⊟

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
s_1342	phosphatidyl-N,N-dimethylethanolamine	cell	mmol·l^{-1}	⊟	⊟
s_1343	phosphatidyl-N-methylethanolamine	cell	mmol·l^{-1}	⊟	⊟
s_1346	phosphatidylcholine	cell	mmol·l^{-1}	⊟	⊟
s_1351	phosphatidylethanolamine	cell	mmol·l^{-1}	⊟	⊟
s_1360	phosphoenolpyruvate	cell	mmol·l^{-1}	⊟	⊟
s_1364	phosphoribosyl-carboxy-aminoimidazole	cell	mmol·l^{-1}	⊟	⊟
s_1365	phosphoribosyl-formamido-carboxamide	cell	mmol·l^{-1}	⊟	⊟
s_1366	phytosphingosine	cell	mmol·l^{-1}	⊟	⊟
s_1376	prenyl diphosphate	cell	mmol·l^{-1}	⊟	⊟
s_1377	prephenate	cell	mmol·l^{-1}	⊟	⊟
s_1379	Pro-tRNA(Pro)	cell	mmol·l^{-1}	⊟	⊟
s_1386	PRPP	cell	mmol·l^{-1}	⊟	⊟
s_1399	pyruvate	cell	mmol·l^{-1}	⊟	⊟
s_1405	riboflavin	cell	mmol·l^{-1}	⊟	⊟
s_1408	ribose-5-phosphate	cell	mmol·l^{-1}	⊟	⊟
s_1413	S-adenosyl-L-homocysteine	cell	mmol·l^{-1}	⊟	⊟
s_1416	S-adenosyl-L-methionine	cell	mmol·l^{-1}	⊟	⊟
s_1427	sedoheptulose 7-phosphate	cell	mmol·l^{-1}	⊟	⊟
s_1428	Ser-tRNA(Ser)	cell	mmol·l^{-1}	⊟	⊟
s_1429	shikimate	cell	mmol·l^{-1}	⊟	⊟
s_1445	sphinganine	cell	mmol·l^{-1}	⊟	⊟
s_1447	squalene	cell	mmol·l^{-1}	⊟	⊟
s_1449	stearate	cell	mmol·l^{-1}	⊟	⊟
s_1454	stearoyl-CoA	cell	mmol·l^{-1}	⊟	⊟
s_1467	sulphate	cell	mmol·l^{-1}	⊟	⊟
s_1468	sulphate	extracellular	mmol·l^{-1}	☑	☑
s_1469	sulphite	cell	mmol·l^{-1}	⊟	⊟

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
s_1487	THF	cell	mmol·l^{-1}	⊟	⊟
s_1491	Thr-tRNA(Thr)	cell	mmol·l^{-1}	⊟	⊟
s_1520	trehalose	cell	mmol·l^{-1}	⊟	⊟
s_1524	triglyceride	cell	mmol·l^{-1}	⊟	⊟
s_1527	Trp-tRNA(Trp)	cell	mmol·l^{-1}	⊟	⊟
s_1533	Tyr-tRNA(Tyr)	cell	mmol·l^{-1}	⊟	⊟
s_1535	ubiquinol-6	cell	mmol·l^{-1}	⊟	⊟
s_1537	ubiquinone-6	cell	mmol·l^{-1}	⊟	⊟
s_1538	UDP	cell	mmol·l^{-1}	⊟	⊟
s_1543	UDP-D-glucose	cell	mmol·l^{-1}	⊟	⊟
s_1545	UMP	cell	mmol·l^{-1}	⊟	⊟
s_1559	UTP	cell	mmol·l^{-1}	⊟	⊟
s_1561	Val-tRNA(Val)	cell	mmol·l^{-1}	⊟	⊟
s_1565	xanthosine-5-phosphate	cell	mmol·l^{-1}	⊟	⊟
s_1569	zymosterol	cell	mmol·l^{-1}	⊟	⊟
s_1576	zymosterol intermediate 1a	cell	mmol·l^{-1}	⊟	⊟
s_1577	zymosterol intermediate 1b	cell	mmol·l^{-1}	⊟	⊟
s_1578	zymosterol intermediate 1c	cell	mmol·l^{-1}	⊟	⊟
s_1579	zymosterol intermediate 2	cell	mmol·l^{-1}	⊟	⊟
s_1582	tRNA(Ala)	cell	mmol·l^{-1}	⊟	⊟
s_1583	tRNA(Arg)	cell	mmol·l^{-1}	⊟	⊟
s_1585	tRNA(Asn)	cell	mmol·l^{-1}	⊟	⊟
s_1587	tRNA(Asp)	cell	mmol·l^{-1}	⊟	⊟
s_1589	tRNA(Cys)	cell	mmol·l^{-1}	⊟	⊟
s_1590	tRNA(Gln)	cell	mmol·l^{-1}	⊟	⊟
s_1591	tRNA(Glu)	cell	mmol·l^{-1}	⊟	⊟
s_1593	tRNA(Gly)	cell	mmol·l^{-1}	⊟	⊟

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
s_1594	tRNA(His)	cell	mmol·l^{-1}	⊟	⊟
s_1596	tRNA(Ile)	cell	mmol·l^{-1}	⊟	⊟
s_1598	tRNA(Leu)	cell	mmol·l^{-1}	⊟	⊟
s_1600	tRNA(Lys)	cell	mmol·l^{-1}	⊟	⊟
s_1602	tRNA(Met)	cell	mmol·l^{-1}	⊟	⊟
s_1604	tRNA(Phe)	cell	mmol·l^{-1}	⊟	⊟
s_1606	tRNA(Pro)	cell	mmol·l^{-1}	⊟	⊟
s_1607	tRNA(Ser)	cell	mmol·l^{-1}	⊟	⊟
s_1608	tRNA(Thr)	cell	mmol·l^{-1}	⊟	⊟
s_1610	tRNA(Trp)	cell	mmol·l^{-1}	⊟	⊟
s_1612	tRNA(Tyr)	cell	mmol·l^{-1}	⊟	⊟
s_1614	tRNA(Val)	cell	mmol·l^{-1}	⊟	⊟
s_1616	TRX1	cell	mmol·l^{-1}	⊟	⊟
s_1620	TRX1 disulphide	cell	mmol·l^{-1}	⊟	⊟
e_0001	COX1	cell	mmol·l^{-1}	☑	☑
e_0004	COB	cell	mmol·l^{-1}	☑	☑
e_0006	COX2	cell	mmol·l^{-1}	☑	☑
e_0007	COX3	cell	mmol·l^{-1}	☑	☑
e_0008	CYS3	cell	mmol·l^{-1}	☑	☑
e_0010	PMT2	cell	mmol·l^{-1}	☑	☑
e_0011	CDC19	cell	mmol·l^{-1}	☑	☑
e_0012	GCV3	cell	mmol·l^{-1}	☑	☑
e_0016	GDH3	cell	mmol·l^{-1}	☑	☑
e_0017	ADE1	cell	mmol·l^{-1}	☑	☑
e_0020	SCT1	cell	mmol·l^{-1}	☑	☑
e_0022	ACH1	cell	mmol·l^{-1}	☑	☑
e_0025	RIB1	cell	mmol·l^{-1}	☑	☑

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
e_0026	URA7	cell	$mmol \cdot l^{-1}$	☑	☑
e_0028	COR1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0029	PRX1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0030	PRS4	cell	$mmol \cdot l^{-1}$	☑	☑
e_0031	ILS1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0038	IPP1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0045	CDS1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0054	TSC3	cell	$mmol \cdot l^{-1}$	☑	☑
e_0057	MIS1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0062	LYS2	cell	$mmol \cdot l^{-1}$	☑	☑
e_0063	TKL2	cell	$mmol \cdot l^{-1}$	☑	☑
e_0064	GRS1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0065	TPS1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0071	RIB7	cell	$mmol \cdot l^{-1}$	☑	☑
e_0074	TYR1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0077	YPC1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0079	PGI1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0084	PYC2	cell	$mmol \cdot l^{-1}$	☑	☑
e_0085	PDB1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0086	GPX2	cell	$mmol \cdot l^{-1}$	☑	☑
e_0087	HIS7	cell	$mmol \cdot l^{-1}$	☑	☑
e_0088	ARO4	cell	$mmol \cdot l^{-1}$	☑	☑
e_0089	DUT1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0090	RIB5	cell	$mmol \cdot l^{-1}$	☑	☑
e_0091	SHM1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0092	TSC10	cell	$mmol \cdot l^{-1}$	☑	☑
e_0100	ILV6	cell	$mmol \cdot l^{-1}$	☑	☑

Id	Name	Compartment	Derived Unit	Constant	Boundary Condi- tion
e_0101	LEU2	cell	mmol$\cdot$l^{-1}	☑	☑
e_0103	HIS4	cell	mmol$\cdot$l^{-1}	☑	☑
e_0104	GRX1	cell	mmol$\cdot$l^{-1}	☑	☑
e_0106	GLK1	cell	mmol$\cdot$l^{-1}	☑	☑
e_0107	APA1	cell	mmol$\cdot$l^{-1}	☑	☑
e_0111	CIT2	cell	mmol$\cdot$l^{-1}	☑	☑
e_0113	PGK1	cell	mmol$\cdot$l^{-1}	☑	☑
e_0117	FEN1	cell	mmol$\cdot$l^{-1}	☑	☑
e_0122	THR4	cell	mmol$\cdot$l^{-1}	☑	☑
e_0124	TRX3	cell	mmol$\cdot$l^{-1}	☑	☑
e_0128	TSC13	cell	mmol$\cdot$l^{-1}	☑	☑
e_0129	GPD1	cell	mmol$\cdot$l^{-1}	☑	☑
e_0133	SLC1	cell	mmol$\cdot$l^{-1}	☑	☑
e_0134	PSA1	cell	mmol$\cdot$l^{-1}	☑	☑
e_0135	IDP1	cell	mmol$\cdot$l^{-1}	☑	☑
e_0136	COX9	cell	mmol$\cdot$l^{-1}	☑	☑
e_0137	MDH3	cell	mmol$\cdot$l^{-1}	☑	☑
e_0139	NDE2	cell	mmol$\cdot$l^{-1}	☑	☑
e_0141	PMT5	cell	mmol$\cdot$l^{-1}	☑	☑
e_0142	PMT1	cell	mmol$\cdot$l^{-1}	☑	☑
e_0146	LYS21	cell	mmol$\cdot$l^{-1}	☑	☑
e_0154	LYS20	cell	mmol$\cdot$l^{-1}	☑	☑
e_0160	GDH2	cell	mmol$\cdot$l^{-1}	☑	☑
e_0165	TRP1	cell	mmol$\cdot$l^{-1}	☑	☑
e_0167	GCV1	cell	mmol$\cdot$l^{-1}	☑	☑
e_0168	SES1	cell	mmol$\cdot$l^{-1}	☑	☑
e_0169	ARO3	cell	mmol$\cdot$l^{-1}	☑	☑

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
e_0171	KRS1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0175	TPI1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0176	TGL2	cell	$mmol \cdot l^{-1}$	☑	☑
e_0177	LCB2	cell	$mmol \cdot l^{-1}$	☑	☑
e_0179	TPS2	cell	$mmol \cdot l^{-1}$	☑	☑
e_0181	GRX3	cell	$mmol \cdot l^{-1}$	☑	☑
e_0182	ARO1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0186	HOM2	cell	$mmol \cdot l^{-1}$	☑	☑
e_0194	ADK1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0196	LYS4	cell	$mmol \cdot l^{-1}$	☑	☑
e_0203	DPP1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0204	INM2	cell	$mmol \cdot l^{-1}$	☑	☑
e_0206	SUR2	cell	$mmol \cdot l^{-1}$	☑	☑
e_0214	YDR341C	cell	$mmol \cdot l^{-1}$	☑	☑
e_0218	TRR1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0219	TRP4	cell	$mmol \cdot l^{-1}$	☑	☑
e_0220	KEI1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0231	ADE8	cell	$mmol \cdot l^{-1}$	☑	☑
e_0233	TSA2	cell	$mmol \cdot l^{-1}$	☑	☑
e_0234	GUK1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0237	RIB3	cell	$mmol \cdot l^{-1}$	☑	☑
e_0239	SAM2	cell	$mmol \cdot l^{-1}$	☑	☑
e_0242	GRX2	cell	$mmol \cdot l^{-1}$	☑	☑
e_0243	QCR7	cell	$mmol \cdot l^{-1}$	☑	☑
e_0249	URA3	cell	$mmol \cdot l^{-1}$	☑	☑
e_0250	RIP1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0255	CYC7	cell	$mmol \cdot l^{-1}$	☑	☑

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
e_0269	PMI40	cell	mmol·l^{-1}	☑	☑
e_0271	YND1	cell	mmol·l^{-1}	☑	☑
e_0273	FAA2	cell	mmol·l^{-1}	☑	☑
e_0276	PRO3	cell	mmol·l^{-1}	☑	☑
e_0278	CHO1	cell	mmol·l^{-1}	☑	☑
e_0280	SAH1	cell	mmol·l^{-1}	☑	☑
e_0281	HOM3	cell	mmol·l^{-1}	☑	☑
e_0283	HIS1	cell	mmol·l^{-1}	☑	☑
e_0290	ARG5,6	cell	mmol·l^{-1}	☑	☑
e_0291	RNR1	cell	mmol·l^{-1}	☑	☑
e_0294	SER3	cell	mmol·l^{-1}	☑	☑
e_0296	AIM10	cell	mmol·l^{-1}	☑	☑
e_0297	TRP2	cell	mmol·l^{-1}	☑	☑
e_0298	MET6	cell	mmol·l^{-1}	☑	☑
e_0299	PRS2	cell	mmol·l^{-1}	☑	☑
e_0303	ADK2	cell	mmol·l^{-1}	☑	☑
e_0304	GRX4	cell	mmol·l^{-1}	☑	☑
e_0306	PDA1	cell	mmol·l^{-1}	☑	☑
e_0311	LPD1	cell	mmol·l^{-1}	☑	☑
e_0312	FRS2	cell	mmol·l^{-1}	☑	☑
e_0314	SEC53	cell	mmol·l^{-1}	☑	☑
e_0317	GSY1	cell	mmol·l^{-1}	☑	☑
e_0320	HIS2	cell	mmol·l^{-1}	☑	☑
e_0321	MET10	cell	mmol·l^{-1}	☑	☑
e_0322	QCR6	cell	mmol·l^{-1}	☑	☑
e_0325	HXK1	cell	mmol·l^{-1}	☑	☑
e_0326	ERG26	cell	mmol·l^{-1}	☑	☑

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
e_0328	LEU1	cell	mmol·l^{-1}	☑	☑
e_0329	ERG4	cell	mmol·l^{-1}	☑	☑
e_0330	TRP5	cell	mmol·l^{-1}	☑	☑
e_0334	PYC1	cell	mmol·l^{-1}	☑	☑
e_0340	MET13	cell	mmol·l^{-1}	☑	☑
e_0342	ARO2	cell	mmol·l^{-1}	☑	☑
e_0343	LYS5	cell	mmol·l^{-1}	☑	☑
e_0346	COX4	cell	mmol·l^{-1}	☑	☑
e_0347	COX13	cell	mmol·l^{-1}	☑	☑
e_0348	ARO8	cell	mmol·l^{-1}	☑	☑
e_0352	ADE5,7	cell	mmol·l^{-1}	☑	☑
e_0353	GUS1	cell	mmol·l^{-1}	☑	☑
e_0355	HXK2	cell	mmol·l^{-1}	☑	☑
e_0364	GSC2	cell	mmol·l^{-1}	☑	☑
e_0365	ACB1	cell	mmol·l^{-1}	☑	☑
e_0367	ERG25	cell	mmol·l^{-1}	☑	☑
e_0368	ADE6	cell	mmol·l^{-1}	☑	☑
e_0372	VAS1	cell	mmol·l^{-1}	☑	☑
e_0376	ASN2	cell	mmol·l^{-1}	☑	☑
e_0379	SKN1	cell	mmol·l^{-1}	☑	☑
e_0380	CYS4	cell	mmol·l^{-1}	☑	☑
e_0381	CHO2	cell	mmol·l^{-1}	☑	☑
e_0382	PSD2	cell	mmol·l^{-1}	☑	☑
e_0385	ERG1	cell	mmol·l^{-1}	☑	☑
e_0387	RNR4	cell	mmol·l^{-1}	☑	☑
e_0389	QCR9	cell	mmol·l^{-1}	☑	☑
e_0390	TYS1	cell	mmol·l^{-1}	☑	☑

Id	Name	Compartment	Derived Unit	Constant	Boundary Condi- tion
e_0392	TDH3	cell	$\text{mmol} \cdot \text{l}^{-1}$	☑	☑
e_0393	PDX1	cell	$\text{mmol} \cdot \text{l}^{-1}$	☑	☑
e_0396	ADE3	cell	$\text{mmol} \cdot \text{l}^{-1}$	☑	☑
e_0397	SER2	cell	$\text{mmol} \cdot \text{l}^{-1}$	☑	☑
e_0398	TRX2	cell	$\text{mmol} \cdot \text{l}^{-1}$	☑	☑
e_0401	PFK1	cell	$\text{mmol} \cdot \text{l}^{-1}$	☑	☑
e_0405	ENO1	cell	$\text{mmol} \cdot \text{l}^{-1}$	☑	☑
e_0409	MES1	cell	$\text{mmol} \cdot \text{l}^{-1}$	☑	☑
e_0418	PRS3	cell	$\text{mmol} \cdot \text{l}^{-1}$	☑	☑
e_0422	QCR10	cell	$\text{mmol} \cdot \text{l}^{-1}$	☑	☑
e_0424	ERG11	cell	$\text{mmol} \cdot \text{l}^{-1}$	☑	☑
e_0425	DIA4	cell	$\text{mmol} \cdot \text{l}^{-1}$	☑	☑
e_0426	ARG4	cell	$\text{mmol} \cdot \text{l}^{-1}$	☑	☑
e_0427	DED81	cell	$\text{mmol} \cdot \text{l}^{-1}$	☑	☑
e_0428	THR1	cell	$\text{mmol} \cdot \text{l}^{-1}$	☑	☑
e_0431	PUT2	cell	$\text{mmol} \cdot \text{l}^{-1}$	☑	☑
e_0434	NCP1	cell	$\text{mmol} \cdot \text{l}^{-1}$	☑	☑
e_0435	INM1	cell	$\text{mmol} \cdot \text{l}^{-1}$	☑	☑
e_0436	COX6	cell	$\text{mmol} \cdot \text{l}^{-1}$	☑	☑
e_0440	ERG7	cell	$\text{mmol} \cdot \text{l}^{-1}$	☑	☑
e_0448	TRR2	cell	$\text{mmol} \cdot \text{l}^{-1}$	☑	☑
e_0452	DCD1	cell	$\text{mmol} \cdot \text{l}^{-1}$	☑	☑
e_0454	ENO2	cell	$\text{mmol} \cdot \text{l}^{-1}$	☑	☑
e_0456	ERG9	cell	$\text{mmol} \cdot \text{l}^{-1}$	☑	☑
e_0457	BAT1	cell	$\text{mmol} \cdot \text{l}^{-1}$	☑	☑
e_0458	IMD2	cell	$\text{mmol} \cdot \text{l}^{-1}$	☑	☑
e_0462	FAA3	cell	$\text{mmol} \cdot \text{l}^{-1}$	☑	☑

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
e_0463	DOT5	cell	mmol$\cdot$l^{-1}	☑	☑
e_0465	HIS6	cell	mmol$\cdot$l^{-1}	☑	☑
e_0467	RNR3	cell	mmol$\cdot$l^{-1}	☑	☑
e_0469	SER33	cell	mmol$\cdot$l^{-1}	☑	☑
e_0470	THS1	cell	mmol$\cdot$l^{-1}	☑	☑
e_0472	LYS12	cell	mmol$\cdot$l^{-1}	☑	☑
e_0475	COX5B	cell	mmol$\cdot$l^{-1}	☑	☑
e_0476	HIS5	cell	mmol$\cdot$l^{-1}	☑	☑
e_0489	LYS1	cell	mmol$\cdot$l^{-1}	☑	☑
e_0490	HYR1	cell	mmol$\cdot$l^{-1}	☑	☑
e_0492	RNR2	cell	mmol$\cdot$l^{-1}	☑	☑
e_0495	TDH1	cell	mmol$\cdot$l^{-1}	☑	☑
e_0496	BNA3	cell	mmol$\cdot$l^{-1}	☑	☑
e_0499	ARG3	cell	mmol$\cdot$l^{-1}	☑	☑
e_0506	RPE1	cell	mmol$\cdot$l^{-1}	☑	☑
e_0508	URA2	cell	mmol$\cdot$l^{-1}	☑	☑
e_0510	GLG2	cell	mmol$\cdot$l^{-1}	☑	☑
e_0512	INO1	cell	mmol$\cdot$l^{-1}	☑	☑
e_0514	QCR8	cell	mmol$\cdot$l^{-1}	☑	☑
e_0515	ERG20	cell	mmol$\cdot$l^{-1}	☑	☑
e_0525	TDH2	cell	mmol$\cdot$l^{-1}	☑	☑
e_0528	ILV3	cell	mmol$\cdot$l^{-1}	☑	☑
e_0531	CYC1	cell	mmol$\cdot$l^{-1}	☑	☑
e_0536	OPI3	cell	mmol$\cdot$l^{-1}	☑	☑
e_0540	URA8	cell	mmol$\cdot$l^{-1}	☑	☑
e_0541	ADO1	cell	mmol$\cdot$l^{-1}	☑	☑
e_0542	CPA2	cell	mmol$\cdot$l^{-1}	☑	☑

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
e_0545	STR2	cell	$mmol \cdot l^{-1}$	☑	☑
e_0547	MET5	cell	$mmol \cdot l^{-1}$	☑	☑
e_0548	HOM6	cell	$mmol \cdot l^{-1}$	☑	☑
e_0549	PMT4	cell	$mmol \cdot l^{-1}$	☑	☑
e_0550	BAT2	cell	$mmol \cdot l^{-1}$	☑	☑
e_0556	MET14	cell	$mmol \cdot l^{-1}$	☑	☑
e_0557	AUR1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0561	URA6	cell	$mmol \cdot l^{-1}$	☑	☑
e_0563	GPX1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0565	UGP1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0567	FBA1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0568	YNK1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0571	MDH1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0574	AAT1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0576	PGM1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0578	TGL1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0582	GPM1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0585	PRS1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0586	FAS1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0591	TRP3	cell	$mmol \cdot l^{-1}$	☑	☑
e_0594	URA1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0603	GLG1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0607	GPT2	cell	$mmol \cdot l^{-1}$	☑	☑
e_0610	MTD1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0611	TGL4	cell	$mmol \cdot l^{-1}$	☑	☑
e_0613	YEH1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0615	DPS1	cell	$mmol \cdot l^{-1}$	☑	☑

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
e_0629	AAT2	cell	$mmol \cdot l^{-1}$	☑	☑
e_0631	ADE16	cell	$mmol \cdot l^{-1}$	☑	☑
e_0632	COX12	cell	$mmol \cdot l^{-1}$	☑	☑
e_0633	TRX1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0637	ERG3	cell	$mmol \cdot l^{-1}$	☑	☑
e_0638	SHM2	cell	$mmol \cdot l^{-1}$	☑	☑
e_0639	FRS1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0642	ALT1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0644	ERG27	cell	$mmol \cdot l^{-1}$	☑	☑
e_0645	AHP1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0658	SAM1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0667	GSY2	cell	$mmol \cdot l^{-1}$	☑	☑
e_0674	MET17	cell	$mmol \cdot l^{-1}$	☑	☑
e_0675	ACO1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0682	FKS1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0684	TAL1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0685	ILV5	cell	$mmol \cdot l^{-1}$	☑	☑
e_0686	ADE13	cell	$mmol \cdot l^{-1}$	☑	☑
e_0687	SUR4	cell	$mmol \cdot l^{-1}$	☑	☑
e_0690	COX8	cell	$mmol \cdot l^{-1}$	☑	☑
e_0692	URA4	cell	$mmol \cdot l^{-1}$	☑	☑
e_0693	IMD3	cell	$mmol \cdot l^{-1}$	☑	☑
e_0697	HMG2	cell	$mmol \cdot l^{-1}$	☑	☑
e_0699	ERG6	cell	$mmol \cdot l^{-1}$	☑	☑
e_0705	IMD4	cell	$mmol \cdot l^{-1}$	☑	☑
e_0708	HMG1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0711	TSL1	cell	$mmol \cdot l^{-1}$	☑	☑

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
e_0712	URA5	cell	mmol·l^{-1}	☑	☑
e_0714	NDI1	cell	mmol·l^{-1}	☑	☑
e_0716	ERG13	cell	mmol·l^{-1}	☑	☑
e_0724	ERG5	cell	mmol·l^{-1}	☑	☑
e_0729	ARG7	cell	mmol·l^{-1}	☑	☑
e_0733	PGM2	cell	mmol·l^{-1}	☑	☑
e_0734	ILV2	cell	mmol·l^{-1}	☑	☑
e_0736	ADE17	cell	mmol·l^{-1}	☑	☑
e_0737	NDE1	cell	mmol·l^{-1}	☑	☑
e_0741	GCV2	cell	mmol·l^{-1}	☑	☑
e_0742	ERG2	cell	mmol·l^{-1}	☑	☑
e_0743	PFK2	cell	mmol·l^{-1}	☑	☑
e_0744	HFA1	cell	mmol·l^{-1}	☑	☑
e_0745	ERG12	cell	mmol·l^{-1}	☑	☑
e_0746	GUA1	cell	mmol·l^{-1}	☑	☑
e_0747	ERG8	cell	mmol·l^{-1}	☑	☑
e_0750	FAA4	cell	mmol·l^{-1}	☑	☑
e_0752	COX7	cell	mmol·l^{-1}	☑	☑
e_0753	TPS3	cell	mmol·l^{-1}	☑	☑
e_0754	PPA2	cell	mmol·l^{-1}	☑	☑
e_0755	URA10	cell	mmol·l^{-1}	☑	☑
e_0756	SCS7	cell	mmol·l^{-1}	☑	☑
e_0757	PGM3	cell	mmol·l^{-1}	☑	☑
e_0761	LCB1	cell	mmol·l^{-1}	☑	☑
e_0763	ADE4	cell	mmol·l^{-1}	☑	☑
e_0765	TGL3	cell	mmol·l^{-1}	☑	☑
e_0769	IDP3	cell	mmol·l^{-1}	☑	☑

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
e_0771	IDH1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0774	COX5A	cell	$mmol \cdot l^{-1}$	☑	☑
e_0775	LAT1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0778	LEU4	cell	$mmol \cdot l^{-1}$	☑	☑
e_0788	PSD1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0791	ADE12	cell	$mmol \cdot l^{-1}$	☑	☑
e_0793	YNL247W	cell	$mmol \cdot l^{-1}$	☑	☑
e_0799	MET2	cell	$mmol \cdot l^{-1}$	☑	☑
e_0800	ERG24	cell	$mmol \cdot l^{-1}$	☑	☑
e_0802	PHA2	cell	$mmol \cdot l^{-1}$	☑	☑
e_0805	CIT1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0808	ACC1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0812	MVD1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0813	LYS9	cell	$mmol \cdot l^{-1}$	☑	☑
e_0826	ARG1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0827	GPD2	cell	$mmol \cdot l^{-1}$	☑	☑
e_0829	PRS5	cell	$mmol \cdot l^{-1}$	☑	☑
e_0830	MET22	cell	$mmol \cdot l^{-1}$	☑	☑
e_0832	RIB2	cell	$mmol \cdot l^{-1}$	☑	☑
e_0836	WRS1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0838	MDH2	cell	$mmol \cdot l^{-1}$	☑	☑
e_0840	ARG8	cell	$mmol \cdot l^{-1}$	☑	☑
e_0841	RIB4	cell	$mmol \cdot l^{-1}$	☑	☑
e_0848	CYT1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0850	CDC21	cell	$mmol \cdot l^{-1}$	☑	☑
e_0851	TGL5	cell	$mmol \cdot l^{-1}$	☑	☑
e_0852	RKI1	cell	$mmol \cdot l^{-1}$	☑	☑

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
e_0855	LEU9	cell	$mmol \cdot l^{-1}$	☑	☑
e_0860	ADE2	cell	$mmol \cdot l^{-1}$	☑	☑
e_0862	IDH2	cell	$mmol \cdot l^{-1}$	☑	☑
e_0867	GLN4	cell	$mmol \cdot l^{-1}$	☑	☑
e_0869	ALE1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0872	SER1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0875	HIS3	cell	$mmol \cdot l^{-1}$	☑	☑
e_0880	DFR1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0883	DGA1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0888	CPA1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0889	FAA1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0890	PMT3	cell	$mmol \cdot l^{-1}$	☑	☑
e_0894	ALA1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0895	PYK2	cell	$mmol \cdot l^{-1}$	☑	☑
e_0899	GDH1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0903	MET12	cell	$mmol \cdot l^{-1}$	☑	☑
e_0904	ERG10	cell	$mmol \cdot l^{-1}$	☑	☑
e_0910	GRX5	cell	$mmol \cdot l^{-1}$	☑	☑
e_0914	YDC1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0915	GLR1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0922	IDI1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0926	CDC60	cell	$mmol \cdot l^{-1}$	☑	☑
e_0934	FAS2	cell	$mmol \cdot l^{-1}$	☑	☑
e_0940	FUM1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0947	CIT3	cell	$mmol \cdot l^{-1}$	☑	☑
e_0953	HTS1	cell	$mmol \cdot l^{-1}$	☑	☑
e_0955	GLN1	cell	$mmol \cdot l^{-1}$	☑	☑

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
e_0959	ARO7	cell	mmol$\cdot$l^{-1}	☑	☑
e_0962	TKL1	cell	mmol$\cdot$l^{-1}	☑	☑
e_0963	GRS2	cell	mmol$\cdot$l^{-1}	☑	☑
e_0964	PIS1	cell	mmol$\cdot$l^{-1}	☑	☑
e_0970	ASN1	cell	mmol$\cdot$l^{-1}	☑	☑
e_0973	KRE6	cell	mmol$\cdot$l^{-1}	☑	☑
e_0975	MET16	cell	mmol$\cdot$l^{-1}	☑	☑
e_0976	DPM1	cell	mmol$\cdot$l^{-1}	☑	☑
e_0978	QCR2	cell	mmol$\cdot$l^{-1}	☑	☑
e_0980	YER152C	cell	mmol$\cdot$l^{-1}	☑	☑

5 Parameters

This model contains 309 global parameters.

Table 4: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
zero_flux			0.0	$\mathrm{mmol\cdot l^{-1}\cdot s^{-1}}$	☑
ic0002			0.1	$\mathrm{mmol\cdot l^{-1}}$	☑
ic0004			0.1	$\mathrm{mmol\cdot l^{-1}}$	☑
ic0008			0.1	$\mathrm{mmol\cdot l^{-1}}$	☑
ic0009			0.1	$\mathrm{mmol\cdot l^{-1}}$	☑
ic0010			0.1	$\mathrm{mmol\cdot l^{-1}}$	☑
ic0015			0.1	$\mathrm{mmol\cdot l^{-1}}$	☑
ic0016			0.1	$\mathrm{mmol\cdot l^{-1}}$	☑
ic0018			0.1	$\mathrm{mmol\cdot l^{-1}}$	☑
ic0019			0.1	$\mathrm{mmol\cdot l^{-1}}$	☑
ic0028			0.1	$\mathrm{mmol\cdot l^{-1}}$	☑
ic0037			0.1	$\mathrm{mmol\cdot l^{-1}}$	☑
ic0039			0.1	$\mathrm{mmol\cdot l^{-1}}$	☑
ic0056			0.1	$\mathrm{mmol\cdot l^{-1}}$	☑
ic0061			0.1	$\mathrm{mmol\cdot l^{-1}}$	☑
ic0066			0.1	$\mathrm{mmol\cdot l^{-1}}$	☑
ic0075			0.1	$\mathrm{mmol\cdot l^{-1}}$	☑
ic0076			0.1	$\mathrm{mmol\cdot l^{-1}}$	☑
ic0077			0.1	$\mathrm{mmol\cdot l^{-1}}$	☑
ic0078			0.1	$\mathrm{mmol\cdot l^{-1}}$	☑
ic0082			0.1	$\mathrm{mmol\cdot l^{-1}}$	☑
ic0086			0.1	$\mathrm{mmol\cdot l^{-1}}$	☑
ic0089			0.1	$\mathrm{mmol\cdot l^{-1}}$	☑
ic0118			0.1	$\mathrm{mmol\cdot l^{-1}}$	☑
ic0120			0.1	$\mathrm{mmol\cdot l^{-1}}$	☑
ic0122			0.1	$\mathrm{mmol\cdot l^{-1}}$	☑
ic0126			0.1	$\mathrm{mmol\cdot l^{-1}}$	☑
ic0141			0.1	$\mathrm{mmol\cdot l^{-1}}$	☑
ic0142			0.1	$\mathrm{mmol\cdot l^{-1}}$	☑
ic0145			0.1	$\mathrm{mmol\cdot l^{-1}}$	☑
ic0146			0.1	$\mathrm{mmol\cdot l^{-1}}$	☑
ic0158			0.1	$\mathrm{mmol\cdot l^{-1}}$	☑
ic0162			0.1	$\mathrm{mmol\cdot l^{-1}}$	☑
ic0165			0.1	$\mathrm{mmol\cdot l^{-1}}$	☑
ic0176			0.1	$\mathrm{mmol\cdot l^{-1}}$	☑
ic0178			0.1	$\mathrm{mmol\cdot l^{-1}}$	☑
ic0180			0.1	$\mathrm{mmol\cdot l^{-1}}$	☑

Id	Name	SBO	Value	Unit	Constant
ic0188			0.1	mmol·l^{-1}	✓
ic0190			0.1	mmol·l^{-1}	✓
ic0201			0.1	mmol·l^{-1}	✓
ic0204			0.1	mmol·l^{-1}	✓
ic0207			0.1	mmol·l^{-1}	✓
ic0209			0.1	mmol·l^{-1}	✓
ic0210			0.1	mmol·l^{-1}	✓
ic0211			0.1	mmol·l^{-1}	✓
ic0218			0.1	mmol·l^{-1}	✓
ic0231			0.1	mmol·l^{-1}	✓
ic0232			0.1	mmol·l^{-1}	✓
ic0258			0.1	mmol·l^{-1}	✓
ic0259			0.1	mmol·l^{-1}	✓
ic0260			0.1	mmol·l^{-1}	✓
ic0261			0.1	mmol·l^{-1}	✓
ic0262			0.1	mmol·l^{-1}	✓
ic0291			0.1	mmol·l^{-1}	✓
ic0295			0.1	mmol·l^{-1}	✓
ic0296			0.1	mmol·l^{-1}	✓
ic0297			0.1	mmol·l^{-1}	✓
ic0298			0.1	mmol·l^{-1}	✓
ic0299			0.1	mmol·l^{-1}	✓
ic0300			0.1	mmol·l^{-1}	✓
ic0301			0.1	mmol·l^{-1}	✓
ic0302			0.1	mmol·l^{-1}	✓
ic0304			0.1	mmol·l^{-1}	✓
ic0306			0.1	mmol·l^{-1}	✓
ic0312			0.1	mmol·l^{-1}	✓
ic0313			0.1	mmol·l^{-1}	✓
ic0314			0.1	mmol·l^{-1}	✓
ic0322			0.1	mmol·l^{-1}	✓
ic0324			0.1	mmol·l^{-1}	✓
ic0325			0.1	mmol·l^{-1}	✓
ic0326			0.1	mmol·l^{-1}	✓
ic0327			0.1	mmol·l^{-1}	✓
ic0328			0.1	mmol·l^{-1}	✓
ic0349			0.1	mmol·l^{-1}	✓
ic0362			0.1	mmol·l^{-1}	✓
ic0367			0.1	mmol·l^{-1}	✓
ic0373			0.1	mmol·l^{-1}	✓
ic0380			0.1	mmol·l^{-1}	✓
ic0386			0.1	mmol·l^{-1}	✓

Id	Name	SBO	Value	Unit	Constant
ic0390			0.1	mmol·l^{-1}	☑
ic0393			0.1	mmol·l^{-1}	☑
ic0394			0.1	mmol·l^{-1}	☑
ic0403			0.1	mmol·l^{-1}	☑
ic0404			0.1	mmol·l^{-1}	☑
ic0409			0.1	mmol·l^{-1}	☑
ic0419			0.1	mmol·l^{-1}	☑
ic0420			1.0	mmol·l^{-1}	☑
ic0423			0.1	mmol·l^{-1}	☑
ic0427			0.1	mmol·l^{-1}	☑
ic0428			0.1	mmol·l^{-1}	☑
ic0430			0.1	mmol·l^{-1}	☑
ic0432			0.1	mmol·l^{-1}	☑
ic0434			0.1	mmol·l^{-1}	☑
ic0445			0.1	mmol·l^{-1}	☑
ic0454			0.1	mmol·l^{-1}	☑
ic0455			0.1	mmol·l^{-1}	☑
ic0456			0.1	mmol·l^{-1}	☑
ic0467			0.1	mmol·l^{-1}	☑
ic0471			0.1	mmol·l^{-1}	☑
ic0475			0.1	mmol·l^{-1}	☑
ic0481			0.1	mmol·l^{-1}	☑
ic0493			0.1	mmol·l^{-1}	☑
ic0499			0.1	mmol·l^{-1}	☑
ic0515			0.1	mmol·l^{-1}	☑
ic0516			0.1	mmol·l^{-1}	☑
ic0522			0.1	mmol·l^{-1}	☑
ic0526			0.1	mmol·l^{-1}	☑
ic0529			0.1	mmol·l^{-1}	☑
ic0539			0.1	mmol·l^{-1}	☑
ic0542			0.1	mmol·l^{-1}	☑
ic0550			0.1	mmol·l^{-1}	☑
ic0551			0.1	mmol·l^{-1}	☑
ic0555			0.1	mmol·l^{-1}	☑
ic0557			0.1	mmol·l^{-1}	☑
ic0563			0.1	mmol·l^{-1}	☑
ic0565			1.0	mmol·l^{-1}	☑
ic0567			0.1	mmol·l^{-1}	☑
ic0568			0.1	mmol·l^{-1}	☑
ic0573			0.1	mmol·l^{-1}	☑
ic0574			0.1	mmol·l^{-1}	☑
ic0577			0.1	mmol·l^{-1}	☑

Id	Name	SBO	Value	Unit	Constant
ic0581			0.1	mmol·l^{-1}	✓
ic0582			0.1	mmol·l^{-1}	✓
ic0584			0.1	mmol·l^{-1}	✓
ic0586			0.1	mmol·l^{-1}	✓
ic0587			0.1	mmol·l^{-1}	✓
ic0589			0.1	mmol·l^{-1}	✓
ic0595			0.1	mmol·l^{-1}	✓
ic0602			0.1	mmol·l^{-1}	✓
ic0613			0.1	mmol·l^{-1}	✓
ic0615			0.1	mmol·l^{-1}	✓
ic0619			0.1	mmol·l^{-1}	✓
ic0625			0.1	mmol·l^{-1}	✓
ic0629			0.1	mmol·l^{-1}	✓
ic0633			0.1	mmol·l^{-1}	✓
ic0644			0.1	mmol·l^{-1}	✓
ic0645			0.1	mmol·l^{-1}	✓
ic0649			0.1	mmol·l^{-1}	✓
ic0654			0.1	mmol·l^{-1}	✓
ic0656			0.1	mmol·l^{-1}	✓
ic0657			0.1	mmol·l^{-1}	✓
ic0662			0.1	mmol·l^{-1}	✓
ic0664			0.1	mmol·l^{-1}	✓
ic0666			0.1	mmol·l^{-1}	✓
ic0672			0.1	mmol·l^{-1}	✓
ic0700			0.1	mmol·l^{-1}	✓
ic0709			0.1	mmol·l^{-1}	✓
ic0710			0.1	mmol·l^{-1}	✓
ic0722			0.1	mmol·l^{-1}	✓
ic0725			0.1	mmol·l^{-1}	✓
ic0739			0.1	mmol·l^{-1}	✓
ic0743			0.1	mmol·l^{-1}	✓
ic0745			0.1	mmol·l^{-1}	✓
ic0747			0.1	mmol·l^{-1}	✓
ic0748			0.1	mmol·l^{-1}	✓
ic0750			0.1	mmol·l^{-1}	✓
ic0754			0.1	mmol·l^{-1}	✓
ic0757			0.1	mmol·l^{-1}	✓
ic0764			0.1	mmol·l^{-1}	✓
ic0767			0.1	mmol·l^{-1}	✓
ic0773			0.1	mmol·l^{-1}	✓
ic0782			0.1	mmol·l^{-1}	✓
ic0785			0.1	mmol·l^{-1}	✓

Id	Name	SBO	Value	Unit	Constant
ic0832			0.1	mmol·l^{-1}	✓
ic0835			0.1	mmol·l^{-1}	✓
ic0836			0.1	mmol·l^{-1}	✓
ic0837			0.1	mmol·l^{-1}	✓
ic0841			0.1	mmol·l^{-1}	✓
ic0847			0.1	mmol·l^{-1}	✓
ic0849			0.1	mmol·l^{-1}	✓
ic0918			0.1	mmol·l^{-1}	✓
ic0940			0.1	mmol·l^{-1}	✓
ic0943			0.1	mmol·l^{-1}	✓
ic0951			0.1	mmol·l^{-1}	✓
ic0953			0.1	mmol·l^{-1}	✓
ic0955			0.1	mmol·l^{-1}	✓
ic0959			0.1	mmol·l^{-1}	✓
ic0965			0.1	mmol·l^{-1}	✓
ic0969			0.1	mmol·l^{-1}	✓
ic0973			0.1	mmol·l^{-1}	✓
ic0978			0.1	mmol·l^{-1}	✓
ic0979			0.1	mmol·l^{-1}	✓
ic0980			0.1	mmol·l^{-1}	✓
ic0981			0.1	mmol·l^{-1}	✓
ic0991			0.1	mmol·l^{-1}	✓
ic0999			0.1	mmol·l^{-1}	✓
ic1003			0.1	mmol·l^{-1}	✓
ic1006			0.1	mmol·l^{-1}	✓
ic1010			0.1	mmol·l^{-1}	✓
ic1011			0.1	mmol·l^{-1}	✓
ic1012			0.1	mmol·l^{-1}	✓
ic1014			0.1	mmol·l^{-1}	✓
ic1016			0.1	mmol·l^{-1}	✓
ic1021			0.1	mmol·l^{-1}	✓
ic1025			0.1	mmol·l^{-1}	✓
ic1029			0.1	mmol·l^{-1}	✓
ic1032			0.1	mmol·l^{-1}	✓
ic1035			0.1	mmol·l^{-1}	✓
ic1038			0.1	mmol·l^{-1}	✓
ic1039			0.1	mmol·l^{-1}	✓
ic1045			0.1	mmol·l^{-1}	✓
ic1048			0.1	mmol·l^{-1}	✓
ic1051			0.1	mmol·l^{-1}	✓
ic1056			0.1	mmol·l^{-1}	✓
ic1059			0.1	mmol·l^{-1}	✓

Id	Name	SBO	Value	Unit	Constant
ic1065			0.1	mmol·l^{-1}	✓
ic1073			0.1	mmol·l^{-1}	✓
ic1077			0.1	mmol·l^{-1}	✓
ic1084			0.1	mmol·l^{-1}	✓
ic1099			0.1	mmol·l^{-1}	✓
ic1101			0.1	mmol·l^{-1}	✓
ic1107			0.1	mmol·l^{-1}	✓
ic1148			0.1	mmol·l^{-1}	✓
ic1153			0.1	mmol·l^{-1}	✓
ic1161			0.1	mmol·l^{-1}	✓
ic1176			0.1	mmol·l^{-1}	✓
ic1182			0.1	mmol·l^{-1}	✓
ic1187			0.1	mmol·l^{-1}	✓
ic1191			0.1	mmol·l^{-1}	✓
ic1192			0.1	mmol·l^{-1}	✓
ic1194			0.1	mmol·l^{-1}	✓
ic1198			0.1	mmol·l^{-1}	✓
ic1203			0.1	mmol·l^{-1}	✓
ic1207			0.1	mmol·l^{-1}	✓
ic1212			0.1	mmol·l^{-1}	✓
ic1233			0.1	mmol·l^{-1}	✓
ic1238			0.1	mmol·l^{-1}	✓
ic1255			0.1	mmol·l^{-1}	✓
ic1266			0.1	mmol·l^{-1}	✓
ic1269			0.1	mmol·l^{-1}	✓
ic1270			0.1	mmol·l^{-1}	✓
ic1271			0.1	mmol·l^{-1}	✓
ic1275			0.1	mmol·l^{-1}	✓
ic1277			1.0	mmol·l^{-1}	✓
ic1286			0.1	mmol·l^{-1}	✓
ic1302			0.1	mmol·l^{-1}	✓
ic1314			0.1	mmol·l^{-1}	✓
ic1322			0.1	mmol·l^{-1}	✓
ic1324			1.0	mmol·l^{-1}	✓
ic1331			0.1	mmol·l^{-1}	✓
ic1337			0.1	mmol·l^{-1}	✓
ic1342			0.1	mmol·l^{-1}	✓
ic1343			0.1	mmol·l^{-1}	✓
ic1346			0.1	mmol·l^{-1}	✓
ic1351			0.1	mmol·l^{-1}	✓
ic1360			0.1	mmol·l^{-1}	✓
ic1364			0.1	mmol·l^{-1}	✓

Id	Name	SBO	Value	Unit	Constant
ic1365			0.1	mmol·l^{-1}	✓
ic1366			0.1	mmol·l^{-1}	✓
ic1376			0.1	mmol·l^{-1}	✓
ic1377			0.1	mmol·l^{-1}	✓
ic1379			0.1	mmol·l^{-1}	✓
ic1386			0.1	mmol·l^{-1}	✓
ic1399			0.1	mmol·l^{-1}	✓
ic1405			0.1	mmol·l^{-1}	✓
ic1408			0.1	mmol·l^{-1}	✓
ic1413			0.1	mmol·l^{-1}	✓
ic1416			0.1	mmol·l^{-1}	✓
ic1427			0.1	mmol·l^{-1}	✓
ic1428			0.1	mmol·l^{-1}	✓
ic1429			0.1	mmol·l^{-1}	✓
ic1445			0.1	mmol·l^{-1}	✓
ic1447			0.1	mmol·l^{-1}	✓
ic1449			0.1	mmol·l^{-1}	✓
ic1454			0.1	mmol·l^{-1}	✓
ic1467			0.1	mmol·l^{-1}	✓
ic1468			1.0	mmol·l^{-1}	✓
ic1469			0.1	mmol·l^{-1}	✓
ic1487			0.1	mmol·l^{-1}	✓
ic1491			0.1	mmol·l^{-1}	✓
ic1520			0.1	mmol·l^{-1}	✓
ic1524			0.1	mmol·l^{-1}	✓
ic1527			0.1	mmol·l^{-1}	✓
ic1533			0.1	mmol·l^{-1}	✓
ic1535			0.1	mmol·l^{-1}	✓
ic1537			0.1	mmol·l^{-1}	✓
ic1538			0.1	mmol·l^{-1}	✓
ic1543			0.1	mmol·l^{-1}	✓
ic1545			0.1	mmol·l^{-1}	✓
ic1559			0.1	mmol·l^{-1}	✓
ic1561			0.1	mmol·l^{-1}	✓
ic1565			0.1	mmol·l^{-1}	✓
ic1569			0.1	mmol·l^{-1}	✓
ic1576			0.1	mmol·l^{-1}	✓
ic1577			0.1	mmol·l^{-1}	✓
ic1578			0.1	mmol·l^{-1}	✓
ic1579			0.1	mmol·l^{-1}	✓
ic1582			0.1	mmol·l^{-1}	✓
ic1583			0.1	mmol·l^{-1}	✓

Id	Name	SBO	Value	Unit	Constant
ic1585			0.1	mmol·l^{-1}	☑
ic1587			0.1	mmol·l^{-1}	☑
ic1589			0.1	mmol·l^{-1}	☑
ic1590			0.1	mmol·l^{-1}	☑
ic1591			0.1	mmol·l^{-1}	☑
ic1593			0.1	mmol·l^{-1}	☑
ic1594			0.1	mmol·l^{-1}	☑
ic1596			0.1	mmol·l^{-1}	☑
ic1598			0.1	mmol·l^{-1}	☑
ic1600			0.1	mmol·l^{-1}	☑
ic1602			0.1	mmol·l^{-1}	☑
ic1604			0.1	mmol·l^{-1}	☑
ic1606			0.1	mmol·l^{-1}	☑
ic1607			0.1	mmol·l^{-1}	☑
ic1608			0.1	mmol·l^{-1}	☑
ic1610			0.1	mmol·l^{-1}	☑
ic1612			0.1	mmol·l^{-1}	☑
ic1614			0.1	mmol·l^{-1}	☑
ic1616			0.1	mmol·l^{-1}	☑
ic1620			0.1	mmol·l^{-1}	☑

6 Function definition

This is an overview of one function definition.

6.1 Function definition `max`

Arguments x, y

Mathematical Expression

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

7 Reactions

This model contains 282 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 5: Overview of all reactions

№	Id	Name	Reaction Equation	SBO
1	r_0005	1,3-beta-glucan synthase	$s\_1543 \xrightleftharpoons{e\_0682, e\_0364, s\_1543, s\_0002, s\_1538} s\_0002 +$ s_1538	0000176
2	r_0006	1,6-beta-glucan synthase	$s\_1543 \xrightleftharpoons{e\_0973, e\_0379, s\_1543, s\_0004, s\_1538} s\_0004 +$ s_1538	0000176
3	r_0007	1-(5-phosphoribosyl)-5-[(5-phosphoribosylamino)methylideneamino)imidazole-4-carboxamide isomerase	$s\_0077 \xrightleftharpoons{e\_0465, s\_0077, s\_0312} s\_0312$	0000176
4	r_0008	1-acyl-sn-gylcerol-3-phosphate acyltransferase	$s\_0082 + s\_0380 \xrightleftharpoons{e\_0869, e\_0133, e\_0117, s\_0082, s\_0380, s\_0529, s\_1331} s\_0529 +$ s_1331	0000176
5	r_0012	1-pyrroline-5-carboxylate dehydrogenase	$s\_0991 + s\_1203 \xrightleftharpoons{e\_0431, s\_0991, s\_1203, s\_0118, s\_1198} s\_0118 +$ s_1198	0000176
6	r_0014	2,5-diamino-6-ribitylamino-4(3H)-pyrimidinone 5'-phosphate deaminase	$s_0142 \xrightleftharpoons{e_0832, s_0142, s_0313, s_0419} s_0313 \ + $ s_0419	0000176
7	r_0015	2,5-diamino-6-ribosylamino-4(3H)-pyrimidinone 5'-phosphate reductase (NADPH)	$s\_0141 + s\_1212 \xrightleftharpoons{e\_0071, s\_0141, s\_1212, s\_0142, s\_1207} s\_0142 +$ s_1207	0000176
8	r_0016	2-aceto-2-hydroxybutanoate synthase	$s\_0178 + s\_1399 \xrightleftharpoons{e\_0734, e\_0100, s\_0178, s\_1399, s\_0039, s\_0456} s\_0039 +$ s_0456	0000176

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№	Id	Name	Reaction Equation	SBO
9	r_0018	2-aminoadipate transaminase	s_0176+s_0991 $\xrightleftharpoons[0000176]{\text{e\_0348, e\_0496, e\_0980, s\_0176, s\_0991, s\_0180, s\_0953}}$ s_0180+ s_0953	
10	r_0020	2-deoxy-D-arabino-heptulosonate 7-phosphate synthetase	s_0551+s_1360 $\xrightleftharpoons[0000176]{\text{e\_0169, e\_0088, s\_0551, s\_1360, s\_0349, s\_1322}}$ s_0349+ s_1322	
11	r_0023	2-isopropylmalate hydratase	s_0162 $\xrightleftharpoons{\text{e\_0328, s\_0162, s\_0165}}$ s_0165	0000176
12	r_0024	2-isopropylmalate synthase	s_0232+s_0373 $\xrightleftharpoons[0000176]{\text{e\_0778, e\_0855, s\_0232, s\_0373, s\_0162, s\_0529}}$ s_0162+ s_0529	
13	r_0027	2-methylcitrate dehydratase	s_0835 $\xrightleftharpoons{\text{e\_0196, s\_0835, s\_0454}}$ s_0454	0000176
14	r_0029	2-oxo-4-methyl-3-carboxypentanoate decarboxylation	s_0010 $\xrightleftharpoons{\text{e\_0550, e\_0457, s\_0010, s\_0291, s\_0456}}$ s_0291 s_0456	0000176
15	r_0032	3',5'-bisphosphate nucleotidase	s_0390 $\xrightleftharpoons{\text{e\_0830, s\_0390, s\_0423, s\_1322}}$ s_0423 + s_1322	0000176
16	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
17	r_0039	3-dehydroquinate dehydratase	s_0210 $\xrightleftharpoons{\text{e\_0182, s\_0210, s\_0211}}$ s_0211	0000176
18	r_0040	3-dehydroquinate synthase	s_0349 $\xrightleftharpoons{\text{e\_0182, s\_0349, s\_0210, s\_1322}}$ s_0210 + s_1322	0000176
19	r_0041	3-dehydrosphinganine reductase	s_0231+s_1212 $\xrightleftharpoons[0000176]{\text{e\_0092, s\_0231, s\_1212, s\_1207, s\_1445}}$ s_1207+ s_1445	
20	r_0060	3-isopropylmalate dehydratase	s_0165 $\xrightleftharpoons{\text{e\_0328, s\_0165, s\_0009}}$ s_0009	0000176
21	r_0061	3-isopropylmalate dehydrogenase	s_0009+s_1198 $\xrightleftharpoons[0000176]{\text{e\_0101, s\_0009, s\_1198, s\_0010, s\_1203}}$ s_0010+ s_1203	

№	Id	Name	Reaction Equation	SBO
22	r_0065	3-phoshoshikimate 1-carboxyvinyltransferase	$s\_0261 + s\_1360 \xrightleftharpoons{\text{e\_0182, s\_0261, s\_1360, s\_0324, s\_1322}} s\_0324 + s\_1322$	0000176
23	r_0079	5'-phosphoribosylformyl glycinamidine synthetase	$s\_0301 + s\_0434 + s\_0999 \xrightleftharpoons{\text{e\_0368, s\_0301, s\_0434, s\_0999, s\_0302, s\_0394, s\_0991, s\_1322}} s\_0302 + s\_0394 + s\_0991 + s\_1322$	0000176
24	r_0080	5,10-methylenetetrahydrofolate reductase (NADPH)	$s\_0306 + s\_1212 \xrightleftharpoons{\text{e\_0340, e\_0903, s\_0306, s\_1212, s\_0322, s\_1207}} s\_0322 + s\_1207$	0000176
25	r_0096	acetohydroxy acid isomeroreductase	$s\_0146 + s\_1212 \xrightleftharpoons{\text{e\_0685, s\_0146, s\_1212, s\_0016, s\_1207}} s\_0016 + s\_1207$	0000176
26	r_0097	acetolactate synthase	$2\,s\_1399 \xrightleftharpoons{\text{e\_0734, e\_0100, s\_1399, s\_0146, s\_0456}} s\_0146 + s\_0456$	0000176
27	r_0103	acetyl-CoA C-acetyltransferase	$2\,s\_0373 \xrightleftharpoons{\text{e\_0904, s\_0373, s\_0367, s\_0529}} s\_0367 + s\_0529$	0000176
28	r_0108	acetyl-Coa carboxylase	$s\_0373 + s\_0434 + s\_0445 \xrightleftharpoons{\text{e\_0744, e\_0808, s\_0373, s\_0434, s\_0445, s\_0394, s\_1101, s\_1322}} s\_0394 + s\_1101 + s\_1322$	0000176
29	r_0110	acetyl-CoA hydrolase	$s\_0362 + s\_0529 \xrightleftharpoons{\text{e\_0022, s\_0362, s\_0529, s\_0373}} s\_0373$	0000176
30	r_0115	acetylglutamate kinase	$s\_0434 + s\_1192 \xrightleftharpoons{\text{e\_0290, s\_0434, s\_1192, s\_0394, s\_1191}} s\_0394 + s\_1191$	0000176
31	r_0118	acteylornithine transaminase	$s\_0145 + s\_0991 \xrightleftharpoons{\text{e\_0840, s\_0145, s\_0991, s\_0180, s\_1182}} s\_0180 + s\_1182$	0000176
32	r_0142	adenosine kinase	$s\_0386 + s\_0434 \xrightleftharpoons{\text{e\_0541, s\_0386, s\_0434, s\_0394, s\_0423}} s\_0394 + s\_0423$	0000176

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№	Id	Name	Reaction Equation	SBO
33	r_0144	adenosylhomocysteinase	s_1413 $\xrightleftharpoons{\text{e\_0280, s\_1413, s\_0386, s\_1012}}$ s_0386 + s_1012	0000176
34	r_0148	adenylate kinase	s_0423 + s_0434 $\xrightleftharpoons{\text{e\_0194, e\_0303, s\_0423, s\_0434, s\_0394}}$ 2 s_0394	0000176
35	r_0151	adenylosuccinate lyase (AICAR)	s_0299 $\xrightleftharpoons{\text{e\_0686, s\_0299, s\_0403, s\_0725}}$ s_0403 + s_0725	0000176
36	r_0152	adenylosuccinate lyase	s_0393 $\xrightleftharpoons{\text{e\_0686, s\_0393, s\_0423, s\_0725}}$ s_0423 + s_0725	0000176
37	r_0153	adenylosuccinate synthase	s_0785 + s_0849 + s_0973 $\xrightleftharpoons{\text{e\_0791, s\_0785, s\_0849, s\_0973, s\_0393, s\_0739, s\_1322}}$ s_0393 + s_0739 + s_1322	0000176
38	r_0154	adenylyl-sulfate kinase	s_0298 + s_0434 $\xrightleftharpoons{\text{e\_0556, s\_0298, s\_0434, s\_0201, s\_0394}}$ s_0201 + s_0394	0000176
39	r_0157	alanyl-tRNA synthetase	s_0434 + s_0955 + s_1582 $\xrightleftharpoons{\text{e\_0894, s\_0434, s\_0955, s\_1582, s\_0404, s\_0423, s\_0633}}$ s_0404 + s_0423 + s_0633	0000176
40	r_0195	alpha,alpha-trehalose-phosphate synthase (UDP-forming)	s_0568 + s_1543 + s_1538 $\xrightleftharpoons{\text{e\_0711, e\_0065, e\_0179, e\_0753, s\_0568, s\_1543, s\_0409, s\_1538}}$ s_0...	0000176
41	r_0202	anthranilate phosphoribosyltransferase	s_0427 + s_1386 $\xrightleftharpoons{\text{e\_0219, s\_0427, s\_1386, s\_0633, s\_1187}}$ s_0633 + s_1187	0000176
42	r_0203	anthranilate synthase	s_0515 + s_0999 $\xrightleftharpoons{\text{e\_0297, e\_0591, s\_0515, s\_0999, s\_0427, s\_0991, s\_1399}}$ s_0427 + s_0991 + s_1399	0000176
43	r_0207	argininosuccinate lyase	s_0015 $\xrightleftharpoons{\text{e\_0426, s\_0015, s\_0725, s\_0965}}$ s_0725 + s_0965	0000176

№	Id	Name	Reaction Equation	SBO
44	r_0208	argininosuccinate synthase	s_0434 + s_0973 + s_0979 $\xrightleftharpoons{\text{e_0826, s_0434, s_0973, s_0979, s_0015, s_0423, s_0633}}$ s_0015 + s_0423 + s_0633	0000176
45	r_0209	arginyl-tRNA synthetase	s_0434 + s_0965 + s_1583 $\xrightleftharpoons{\text{e_0214, s_0434, s_0965, s_1583, s_0423, s_0428, s_0633}}$ s_0423 + s_0428 + s_0633	0000176
46	r_0211	asparagine synthase (glutamine-hydrolysing)	s_0434 + s_0973 + s_0999 $\xrightleftharpoons{\text{e_0970, e_0376, s_0434, s_0973, s_0999, s_0423, s_0633, s_0969, s_0991}}$ s_04 + s_0633 + s_0969 + s_0991	0000176
47	r_0212	Asparaginyl-tRNA synthetase	s_0434 + s_0969 + s_1585 $\xrightleftharpoons{\text{e_0427, s_0434, s_0969, s_1585, s_0423, s_0430, s_0633}}$ s_0423 + s_0430 + s_0633	0000176
48	r_0214	aspartate carbamoyltransferase	s_0455 + s_0973 + s_1322 $\xrightleftharpoons{\text{e_0508, s_0455, s_0973, s_1194, s_1322}}$	0000176
49	r_0215	aspartate kinase	s_0434 + s_0973 + s_0394 $\xrightleftharpoons{\text{e_0281, s_0434, s_0973, s_0295, s_0394}}$	0000176
50	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
51	r_0219	aspartate-semialdehyde dehydrogenase	s_0295 + s_1212 $\xrightleftharpoons{\text{e_0186, s_0295, s_1212, s_0978, s_1207, s_1322}}$ s_0978 + s_1207 + s_1322	0000176
52	r_0220	Aspartyl-tRNA synthetase	s_0434 + s_0973 + s_1587 $\xrightleftharpoons{\text{e_0615, s_0434, s_0973, s_1587, s_0423, s_0432, s_0633}}$ s_0423 + s_0432 + s_0633	0000176
53	r_0225	ATP phosphoribosyltransferase	s_0434 + s_1386 $\xrightleftharpoons{\text{e_0283, s_0434, s_1386, s_0326, s_0633}}$ + s_0633	0000176

№	Id	Name	Reaction Equation	SBO
54	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
55	r_0233	C-22 sterol desaturase (NADP)	s_0664 + s_1212 + s_1275 $\xrightleftharpoons{\text{e\_0724, s\_0664, s\_1212, s\_1275, s\_0662, s\_1207}}$ s_0662 + s_1207	0000176
56	r_0234	C-3 sterol dehydrogenase	s_1207 + s_1578 $\xrightleftharpoons{\text{e\_0326, s\_1207, s\_1578, s\_0456, s\_1212, s\_1579}}$ s_0456 + s_1212 + s_1579	0000176
57	r_0235	C-3 sterol dehydrogenase (4-methylzymosterol)	s_0297 + s_1198 $\xrightleftharpoons{\text{e\_0326, s\_0297, s\_1198, s\_0209, s\_0456, s\_1203}}$ s_0209 + s_0456 + s_1203	0000176
58	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
59	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
60	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
61	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
62	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
63	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

№	Id	Name	Reaction Equation	SBO
64	r_0242	C-5 sterol desaturase	s_0657 + s_1212 + s_1275 $\xrightleftharpoons{\text{e\_0637, s\_0657, s\_1212, s\_1275, s\_0664, s\_1207}}$ s_0664 + s_1207	0000176
65	r_0243	C-8 sterol isomerase	s_0700 $\xrightleftharpoons{\text{e\_0742, s\_0700, s\_0657}}$ s_0657	0000176
66	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
67	r_0250	carbamoyl-phosphate synthase (glutamine-hydrolysing)	2 s_0434 + s_0445 + s_0999 $\xrightleftharpoons{\text{e\_0508, e\_0542, e\_0888, s\_0434, s\_0445, s\_0999, s\_0394, s\_0455, s\_0991, s\_13}}$ s_0455 + s_0991 + s_1322	0000176
68	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
69	r_0259	ceramide-1 hydroxylase (24C)	s_0475 + s_1212 + s_1275 $\xrightleftharpoons{\text{e\_0206, s\_0475, s\_1212, s\_1275, s\_0481, s\_1207}}$ s_0481 + s_1207	0000176
70	r_0267	ceramide-3 synthase (24C)	s_0481 + s_1212 + s_1275 $\xrightleftharpoons{\text{e\_0756, s\_0481, s\_1212, s\_1275, s\_0493, s\_1207}}$ s_0493 + s_1207	0000176
71	r_0269	ceramide-4 synthase (24C)	s_0493 + s_1212 + s_1275 $\xrightleftharpoons{\text{e\_0756, s\_0493, s\_1212, s\_1275, s\_0499, s\_1207}}$ s_0499 + s_1207	0000176
72	r_0278	chorismate mutase	s_0515 $\xrightleftharpoons{\text{e\_0959, s\_0515, s\_1377}}$ s_1377	0000176
73	r_0279	chorismate synthase	s_0324 $\xrightleftharpoons{\text{e\_0342, s\_0324, s\_0515, s\_1322}}$ s_0515 + s_1322	0000176
74	r_0280	cis-aconitate(3-) to isocitrate	s_0516 $\xrightleftharpoons{\text{e\_0675, s\_0516, s\_0940}}$ s_0940	0000176

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75	r_0300	citrate synthase	s_0373 + s_1271 $\xrightarrow{\text{e\_0947, e\_0805, e\_0111, s\_0373, s\_1271, s\_0522, s\_0529}}$ s_0522 + s_0529	0000176
76	r_0302	citrate to cis-aconitate(3-)	s_0522 $\xrightleftharpoons{\text{e\_0675, s\_0522, s\_0516}}$ s_0516	0000176
77	r_0307	CTP synthase (NH3)	s_0419 + s_0434 + s_1559 $\xrightarrow{\text{e\_0540, e\_0026, s\_0419, s\_0434, s\_1559, s\_0394, s\_0539, s\_1322}}$ s_0394 + s_0539 + s_1322	0000176
78	r_0309	cystathionine beta-synthase	s_1012 + s_1039 $\xrightarrow{\text{e\_0380, s\_1012, s\_1039, s\_0980}}$ s_0980	0000176
79	r_0310	cystathionine g-lyase	s_0980 $\xrightarrow{\text{e\_0008, s\_0980, s\_0178, s\_0419, s\_0981}}$ s_0178 + s_0419 + s_0981	0000176
80	r_0311	cystathionine gamma-synthase	s_0981 + s_1233 $\xrightarrow{\text{e\_0545, s\_0981, s\_1233, s\_0362, s\_0980}}$ s_0362 + s_0980	0000176
81	r_0313	cysteinyl-tRNA synthetase	s_0434 + s_0981 + s_1589 $\xrightarrow{\text{e\_0793, s\_0434, s\_0981, s\_1589, s\_0423, s\_0542, s\_0633}}$ s_0423 + s_0542 + s_0633	0000176
82	r_0317	cytochrome P450 lanosterol 14-alpha-demethylase (NADP)	s_1059 + 3 s_1212 + 3 s_1275 $\xrightarrow{\text{e\_0434, e\_0424, s\_1059, s\_1212, s\_1275, s\_0262, s\_0722, s\_1207}}$ s_0262 + s_0722 + 3 s_1207	0000176
83	r_0326	dCMP deaminase	s_0589 $\xrightleftharpoons{\text{e\_0452, s\_0589, s\_0419, s\_0654}}$ s_0419 + s_0654	0000176
84	r_0330	deoxyguanylate kinase (dGMP:ATP)	s_0394 + s_0613 $\xrightarrow{\text{e\_0234, s\_0394, s\_0613, s\_0434, s\_0615}}$ s_0434 + s_0615	0000176
85	r_0336	diacylglycerol acyltransferase	s_0529 + s_1524 $\xrightarrow{\text{e\_0883, s\_0529, s\_1524, s\_0380, s\_0619}}$ s_0380 + s_0619	0000176

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86	r_0337	diacylglycerol pyrophosphate phosphatase	s_1331 $\xrightleftharpoons{\text{e\_0203, s\_1331, s\_0619, s\_1322}}$ s_0619 + s_1322	0000176
87	r_0339	dihydoorotic acid dehydrogenase	s_0061 + s_1275 $\xrightleftharpoons{\text{e\_0594, s\_0061, s\_1275, s\_0837, s\_1269}}$ s_0837 + s_1269	0000176
88	r_0340	dihydroceramidase	s_1084 + s_1445 $\xrightleftharpoons{\text{e\_0914, s\_1084, s\_1445, s\_0475}}$ s_0475	0000176
89	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
90	r_0349	dihydroorotase	s_1194 $\xrightleftharpoons{\text{e\_0692, s\_1194, s\_0061}}$ s_0061	0000176
91	r_0352	dihydroxy-acid dehydratase (2,3-dihydroxy-3-methylbutanoate)	s_0016 $\xrightleftharpoons{\text{e\_0528, s\_0016, s\_0232}}$ s_0232	0000176
92	r_0353	dihydroxy-acid dehydratase (2,3-dihydroxy-3-methylpentanoate)	s_0008 $\xrightleftharpoons{\text{e\_0528, s\_0008, s\_0056}}$ s_0056	0000176
93	r_0355	dimethylallyltranstransferase	s_0943 + s_1376 $\xrightleftharpoons{\text{e\_0515, s\_0943, s\_1376, s\_0633, s\_0745}}$ s_0633 + s_0745	0000176
94	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
95	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
96	r_0364	dUTP diphosphatase	s_0656 $\xrightleftharpoons{\text{e\_0089, s\_0656, s\_0633, s\_0654}}$ s_0633 + s_0654	0000176
97	r_0366	enolase	s_0188 $\xrightleftharpoons{\text{e\_0405, e\_0454, s\_0188, s\_1360}}$ s_1360	0000176

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98	r_0386	fatty acid synthase (n-C12:0)	$\mathrm{s\_0595 \ + \ s\_1101 \ + \ 2\,s\_1212 \xrightarrow{\ e\_0808,\ e\_0365,\ e\_0586,\ e\_0934,\ s\_0595,\ s\_1101,\ s\_1212,\ s\_0456,\ s\_0529,\ s\_}\ s\_0529 + s\_1065 + 2\,s\_1207}$	0000176
99	r_0387	fatty acid synthase (n-C14:0)	$\mathrm{s\_1065 \ + \ s\_1101 \ + \ 2\,s\_1212 \xrightarrow{\ e\_0808,\ e\_0365,\ e\_0586,\ e\_0934,\ s\_1065,\ s\_1101,\ s\_1212,\ s\_0456,\ s\_0529,\ s\_}\ s\_0529 + s\_1161 + 2\,s\_1207}$	0000176
100	r_0389	fatty acid synthase (n-C16:0)	$\mathrm{s\_1101 \ + \ s\_1161 \ + \ 2\,s\_1212 \xrightarrow{\ e\_0808,\ e\_0365,\ e\_0586,\ e\_0934,\ s\_1101,\ s\_1161,\ s\_1212,\ s\_0456,\ s\_0529,\ s\_}\ s\_0529 + 2\,s\_1207 + s\_1286}$	0000176
101	r_0391	fatty acid synthase (n-C18:0)	$\mathrm{s\_1101 \ + \ 2\,s\_1212 \ + \ s\_1286 \xrightarrow{\ e\_0808,\ e\_0365,\ e\_0586,\ e\_0934,\ s\_1101,\ s\_1212,\ s\_1286,\ s\_0456,\ s\_0529,\ s\_12}\ s\_0529 + 2\,s\_1207 + s\_1449}$	0000176
102	r_0393	fatty acid synthase (n-C24:0), lumped reaction	$\mathrm{3\,s\_1101 \ + \ 6\,s\_1212 \ + \ s\_1449 \xrightarrow{\ e\_0128,\ e\_0117,\ e\_0687,\ s\_1101,\ s\_1212,\ s\_1449,\ s\_0456,\ s\_0529,\ s\_1084,\ s\_12}\ 3\,s\_0529 + s\_1084 + 6\,s\_1207}$	0000176
103	r_0397	fatty acyl-CoA synthase (n-C10:0CoA)	$\mathrm{s\_1101 \ + \ 2\,s\_1212 \ + \ s\_1255 \xrightarrow{\ e\_0808,\ e\_0365,\ e\_0586,\ e\_0934,\ s\_1101,\ s\_1212,\ s\_1255,\ s\_0456,\ s\_0529,\ s\_06}\ s\_0529 + s\_0602 + 2\,s\_1207}$	0000176
104	r_0398	fatty acyl-CoA synthase (n-C8:0CoA), lumped reaction	$\mathrm{s\_0373 \ + \ 3\,s\_1101 \ + \ 6\,s\_1212 \xrightarrow{\ e\_0808,\ e\_0365,\ e\_0586,\ e\_0934,\ s\_0373,\ s\_1101,\ s\_1212,\ s\_0456,\ s\_0529,\ s\_}\ 3\,s\_0529 + 6\,s\_1207 + s\_1255}$	0000176
105	r_0399	fatty-acid–CoA ligase (decanoate)	$\mathrm{s\_0423 \ + \ s\_0602 \ + \ s\_0633 \xrightarrow{\ e\_0273,\ s\_0423,\ s\_0602,\ s\_0633,\ s\_0434,\ s\_0529,\ s\_0595}\ s\_0434 + s\_0529 + s\_0595}$	0000176

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106	r_0400	fatty-acid–CoA ligase (dodecanoate)	s_0423 + s_0633 + s_1073 $\xrightleftharpoons{\text{e\_0273, s\_0423, s\_0633, s\_1073, s\_0434, s\_0529, s\_1065}}$ s_0434 + s_0529 + s_1065	0000176
107	r_0407	fatty-acid–CoA ligase (octadecanoate)	s_0423 + s_0633 + s_1454 $\xrightleftharpoons{\text{e\_0750, e\_0889, e\_0462, s\_0423, s\_0633, s\_1454, s\_0434, s\_0529, s\_1449}}$ s_04... s_0529 + s_1449	0000176
108	r_0432	fatty-acyl-CoA synthase (n-C12:0CoA)	s_0602 + s_1101 + 2 s_1212 $\xrightleftharpoons{\text{e\_0808, e\_0365, e\_0586, e\_0934, s\_0602, s\_1101, s\_1212, s\_0456, s\_0529, s\_}}$ s_0529 + s_1073 + 2 s_1207	0000176
109	r_0433	fatty-acyl-CoA synthase (n-C14:0CoA)	s_1073 + s_1101 + 2 s_1212 $\xrightleftharpoons{\text{e\_0808, e\_0365, e\_0586, e\_0934, s\_1073, s\_1101, s\_1212, s\_0456, s\_0529, s\_}}$ s_0529 + s_1176 + 2 s_1207	0000176
110	r_0434	fatty-acyl-CoA synthase (n-C16:0CoA)	s_1101 + s_1176 + 2 s_1212 $\xrightleftharpoons{\text{e\_0808, e\_0365, e\_0586, e\_0934, s\_1101, s\_1176, s\_1212, s\_0456, s\_0529, s\_}}$ s_0529 + 2 s_1207 + s_1302	0000176
111	r_0435	fatty-acyl-CoA synthase (n-C18:0CoA)	s_1101 + 2 s_1212 + s_1302 $\xrightleftharpoons{\text{e\_0808, e\_0365, e\_0586, e\_0934, s\_1101, s\_1212, s\_1302, s\_0456, s\_0529, s\_12}}$ s_0529 + 2 s_1207 + s_1454	0000176
112	r_0438	ferrocytochrome-c:oxygen oxidoreductase	4 s_0710 + s_1275 $\xrightleftharpoons{\text{e\_0632, e\_0007, e\_0774, e\_0436, e\_0136, e\_0001, e\_0347, e\_0255, e}}$	0000176
113	r_0439	ferrocytochrome-c:oxygen oxidoreductase	2 s_0709 + s_1535 $\xrightleftharpoons{\text{e\_0514, e\_0978, e\_0422, e\_0250, e\_0004, e\_0243, e\_0389, e\_0255, e}}$ s_1537	0000176
114	r_0446	formate-tetrahydrofolate ligase	s_0120 + s_0394 + s_1322 $\xrightleftharpoons{\text{e\_0396, e\_0057, s\_0120, s\_0394, s\_1322, s\_0434, s\_0722, s\_1487}}$ s_0434 + s_0722 + s_1487	0000176

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115	r_0450	fructose-bisphosphate aldolase	$s\_0555 \xrightarrow{\text{e\_0567, s\_0555, s\_0629, s\_0764}} s\_0629 +$ s_0764	0000176
116	r_0451	fumarase	$s\_0725 \xrightarrow{\text{e\_0940, s\_0725, s\_0066}} s\_0066$	0000176
117	r_0462	geranyltranstransferase	$s\_0745 + s\_0943 \xrightarrow{\text{e\_0515, s\_0745, s\_0943, s\_0190, s\_0633}} s\_0190 +$ s_0633	0000176
118	r_0467	glucose-6-phosphate isomerase	$s\_0568 \xrightarrow{\text{e\_0079, s\_0568, s\_0557}} s\_0557$	0000176
119	r_0470	glutamate dehydrogenase (NAD)	s_0180 + s_0419 + s_1203 $\xrightarrow{\text{e\_0160, s\_0180, s\_0419, s\_1203, s\_0991, s\_1198}} s\_0991 +$ s_1198	0000176
120	r_0471	glutamate dehydrogenase (NADP)	s_0180 + s_0419 + s_1212 $\xrightarrow{\text{e\_0016, e\_0899, s\_0180, s\_0419, s\_1212, s\_0991, s\_1207}} s\_0991 +$ s_1207	0000176
121	r_0476	glutamine synthetase	s_0419 + s_0434 + s_0991 $\xrightarrow{\text{e\_0955, s\_0419, s\_0434, s\_0991, s\_0394, s\_0999, s\_1322}} s\_0394 +$ s_0999 + s_1322	0000176
122	r_0478	glutaminyl-tRNA synthetase	s_0434 + s_0999 + s_1590 $\xrightarrow{\text{e\_0867, s\_0434, s\_0999, s\_1590, s\_0423, s\_0633, s\_0747}} s\_0423 +$ s_0633 + s_0747	0000176
123	r_0479	glutamyl-tRNA synthetase	s_0434 + s_0991 + s_1591 $\xrightarrow{\text{e\_0353, s\_0434, s\_0991, s\_1591, s\_0423, s\_0633, s\_0748}} s\_0423 +$ s_0633 + s_0748	0000176
124	r_0481	glutathione oxidoreductase	s_0754 + s_1212 $\xrightarrow{\text{e_0242, e_0104, e_0181, e_0304, e_0915, e_0910, s_0754, s_1212, s_0}} $ s_1207	0000176
125	r_0483	glutathione peridoxase	2 s_0750 + s_0837 $\xrightarrow{\text{e_0242, e_0563, e_0086, e_0104, e_0490, e_0910, s_0750, s_0837, s}} $	0000176

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126	r_0486	glyceraldehyde-3-phosphate dehydrogenase	s_0764 + s_1198 + s_1322 $\xrightleftharpoons{e\_0392, e\_0495, e\_0525, s\_0764, s\_1198, s\_1322, s\_0075, s\_1203}$ s_0075 + s_1203			0000176
127	r_0491	glycerol-3-phosphate dehydrogenase (NAD)	s_0629 + s_1203 $\xrightleftharpoons{e\_0129, e\_0827, s\_0629, s\_1203, s\_0767, s\_1198}$ s_0767 + s_1198			0000176
128	r_0495	glycerol-3-phosphate/dihydroxyacetone phosphate acyltransferase	s_0380 + s_0767 $\xrightleftharpoons{e\_0020, e\_0607, s\_0380, s\_0767, s\_0082, s\_0529}$ s_0082 + s_0529			0000176
129	r_0499	glycinamide ribotide transformylase	s_0120 + s_0325 $\xrightleftharpoons{e\_0231, s\_0120, s\_0325, s\_0301, s\_1487}$ s_0301 + s_1487			0000176
130	r_0501	glycine cleavage system	s_1003 + s_1198 + s_1487 $\xrightleftharpoons{e\_0741, e\_0012, e\_0167, e\_0311, s\_1003, s\_1198, s\_1487, s\_0306, s\_0419, s\_04...}$ s_0419 + s_0456 + s_1203			0000176
131	r_0502	glycine hydroxymethyltransferase	s_1039 + s_1487 $\xrightleftharpoons{e\_0638, e\_0091, s\_1039, s\_1487, s\_0306, s\_1003}$ s_0306 + s_1003			0000176
132	r_0510	glycogen (starch) synthase	s_1543 $\xrightleftharpoons{e\_0667, e\_0510, e\_0317, e\_0603, s\_1543, s\_0773, s\_1538}$ s_0773 + s_1538			0000176
133	r_0512	glycyl-tRNA synthetase	s_0434 + s_1003 + s_1593 $\xrightleftharpoons{e\_0064, e\_0963, s\_0434, s\_1003, s\_1593, s\_0423, s\_0633, s\_0757}$ s_0423 + s_0633 + s_0757			0000176
134	r_0514	GMP synthase	s_0434 + s_0999 + s_1565 $\xrightleftharpoons{e\_0746, s\_0434, s\_0999, s\_1565, s\_0423, s\_0633, s\_0782, s\_0991}$ s_0423 + s_0633 + s_0782 + s_0991			0000176
135	r_0525	GTP cyclohydrolase II	s_0785 + s_0633 + s_0722 $\xrightleftharpoons{e\_0025, s\_0785, s\_0141, s\_0633, s\_0722}$ s_0141			0000176

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136	r_0528	guanylate kinase	s_0434 + s_0782 $\xrightleftharpoons{\text{e\_0234, s\_0434, s\_0782, s\_0394, s\_0739}}$ s_0394 + s_0739	0000176
137	r_0529	guanylate kinase (GMP:dATP)	s_0586 + s_0782 $\xrightleftharpoons{\text{e\_0234, s\_0586, s\_0782, s\_0582, s\_0739}}$ s_0582 + s_0739	0000176
138	r_0534	hexokinase (D-glucose:ATP)	s_0434 + s_0563 $\xrightarrow{\text{e\_0106, e\_0325, e\_0355, s\_0434, s\_0563, s\_0394, s\_0568}}$ s_0394 + s_0568	0000176
139	r_0536	histidinol dehydrogenase	s_1010 + 2 s_1198 $\xrightleftharpoons{\text{e\_0103, s\_1010, s\_1198, s\_1006, s\_1203}}$ s_1006 + 2 s_1203	0000176
140	r_0537	histidinol-phosphatase	s_1011 $\xrightarrow{\text{e\_0320, s\_1011, s\_1010, s\_1322}}$ s_1010 + s_1322	0000176
141	r_0538	histidinol-phosphate transaminase	s_0207 + s_0991 $\xrightleftharpoons{\text{e\_0476, s\_0207, s\_0991, s\_0180, s\_1011}}$ s_0180 + s_1011	0000176
142	r_0539	histidyl-tRNA synthetase	s_0434 + s_1006 + s_1594 $\xrightleftharpoons{\text{e\_0953, s\_0434, s\_1006, s\_1594, s\_0423, s\_0633, s\_0832}}$ s_0423 + s_0633 + s_0832	0000176
143	r_0542	homoacontinate hydratase	s_0454 $\xrightleftharpoons{\text{e\_0196, s\_0454, s\_0836}}$ s_0836	0000176
144	r_0543	homocitrate synthase	s_0180 + s_0373 $\xrightarrow{\text{e\_0154, e\_0146, s\_0180, s\_0373, s\_0529, s\_0835}}$ s_0529 + s_0835	0000176
145	r_0545	homoisocitrate dehydrogenase	s_0836 + s_1198 $\xrightarrow{\text{e\_0472, s\_0836, s\_1198, s\_0176, s\_1203, s\_0456}}$ s_0176 + s_1203 + s_0456	0000176
146	r_0547	homoserine dehydrogenase (NADP)	s_0978 + s_1212 $\xrightleftharpoons{\text{e\_0548, s\_0978, s\_1212, s\_1014, s\_1207}}$ s_1014 + s_1207	0000176

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147	r_0548	homoserine kinase	$s\_0434 + s\_1014 \overset{e\_0428,\ s\_0434,\ s\_1014,\ s\_0394,\ s\_1238}{\underset{0000704}{\rightleftharpoons}} s\_0394 + s\_1238$	0000176
148	r_0549	homoserine O-trans-acetylase	$s\_0373 + s\_1014 \overset{e\_0799,\ s\_0373,\ s\_1014,\ s\_0529,\ s\_1233}{\underset{0000709}{\rightleftharpoons}} s\_0529 + s\_1233$	0000176
149	r_0550	hydrogen peroxide reductase (thioredoxin)	$s\_0837 + s\_1616 \overset{e\_0633,\ e\_0398,\ e\_0233,\ e\_0463,\ e\_0645,\ e\_0029,\ e\_0124,\ s\_0837,\ s\_\ldots}{\underset{0000176}{\rightleftharpoons}} \ldots$	
150	r_0558	hydroxymethylglutaryl CoA reductase	$s\_0218 + 2\,s\_1212 \overset{e\_0697,\ e\_0708,\ s\_0218,\ s\_1212,\ s\_0028,\ s\_0529,\ s\_1207}{\underset{0000176}{\rightleftharpoons}} s\_0028 + s\_0529 + 2\,s\_1207$	
151	r_0559	hydroxymethylglutaryl CoA synthase	$s\_0367 + s\_0373 \overset{e\_0716,\ s\_0367,\ s\_0373,\ s\_0218,\ s\_0529}{\underset{0000768}{\rightleftharpoons}} s\_0218 + s\_0529$	0000176
152	r_0563	Imidazole-glycerol-3-phosphate synthase	$s\_0312 + s\_0999 \overset{e\_0087,\ s\_0312,\ s\_0999,\ s\_0403,\ s\_0550,\ s\_0991}{\underset{0000176}{\rightarrow}} s\_0403 + s\_0550 + s\_0991$	
153	r_0564	imidazoleglycerol-phosphate dehydratase	$s\_0550 \overset{e\_0875,\ s\_0550,\ s\_0207}{\underset{}{\rightleftharpoons}} s\_0207$	0000176
154	r_0565	IMP dehydrogenase	$s\_0849 + s\_1198 \overset{e\_0705,\ e\_0458,\ e\_0693,\ s\_0849,\ s\_1198,\ s\_1203,\ s\_1565}{\underset{0000176}{\rightarrow}} s\_1203 + s\_1565$	
155	r_0566	indole-3-glycerol-phosphate synthase	$s\_0076 \overset{e\_0591,\ s\_0076,\ s\_0086,\ s\_0456}{\underset{}{\rightleftharpoons}} s\_0086 + s\_0456$	0000176
156	r_0568	inorganic diphosphatase	$s\_0633 \overset{e\_0038,\ e\_0754,\ e\_0633,\ s\_1322}{\underset{}{\rightarrow}} 2\,s\_1322$	0000176
157	r_0570	inosine monophosphate cyclohydrolase	$s\_1365 \overset{e\_0631,\ e\_0736,\ s\_1365,\ s\_0849}{\underset{}{\rightleftharpoons}} s\_0849$	0000176
158	r_0594	IPC synthase	$s\_0089 + s\_0499 \overset{e\_0557,\ e\_0220,\ s\_0089,\ s\_0499,\ s\_0619,\ s\_0918}{\underset{0000176}{\rightarrow}} s\_0619 + s\_0918$	
159	r_0658	isocitrate dehydrogenase (NAD+)	$s\_0940 + s\_1198 \overset{e\_0862,\ e\_0771,\ s\_0940,\ s\_1198,\ s\_0180,\ s\_0456,\ s\_1203}{\underset{0000176}{\rightarrow}} s\_0180 + s\_0456 + s\_1203$	

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160	r_0661	isocitrate dehydrogenase (NADP+), peroxisomal	s_0940 + s_1207 $\xrightleftharpoons{\text{e_0769, e_0135, s_0940, s_1207, s_0180, s_0456, s_1212}}$ s_0180 + s_0456 + s_1212	0000176
161	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
162	r_0665	isoleucyl-tRNA synthetase	s_0434 + s_1016 + s_1596 $\xrightleftharpoons{\text{e_0031, s_0434, s_1016, s_1596, s_0423, s_0633, s_0847}}$ s_0423 + s_0633 + s_0847	0000176
163	r_0667	isopentenyl-diphosphate D-isomerase	s_0943 $\xrightleftharpoons{\text{e_0922, s_0943, s_1376}}$ s_1376	0000176
164	r_0669	ketol-acid reductoisomerase (2-aceto-2-hydroxybutanoate)	s_0039 + s_1212 $\xrightleftharpoons{\text{e_0685, s_0039, s_1212, s_0008, s_1207}}$ s_0008 + s_1207	0000176
165	r_0674	L-alanine transaminase	s_0991 + s_1399 $\xrightleftharpoons{\text{e_0642, s_0991, s_1399, s_0180, s_0955}}$ s_0180 + s_0955	0000176
166	r_0678	L-aminoadipate-semialdehyde dehydrogenase (NADPH)	s_0953 + s_1212 $\xrightleftharpoons{\text{e_0062, e_0343, s_0953, s_1212, s_0959, s_1207}}$ s_0959 + s_1207	0000176
167	r_0698	lanosterol synthase	s_0037 $\xrightleftharpoons{\text{e_0440, s_0037, s_1059}}$ s_1059	0000176
168	r_0699	leucine transaminase	s_0291 + s_0991 $\xrightleftharpoons{\text{e_0550, e_0457, s_0291, s_0991, s_0180, s_1021}}$ s_0180 + s_1021	0000176
169	r_0701	leucyl-tRNA synthetase	s_0434 + s_1021 + s_1598 $\xrightleftharpoons{\text{e_0926, s_0434, s_1021, s_1598, s_0423, s_0633, s_1077}}$ s_0423 + s_0633 + s_1077	0000176
170	r_0711	lysyl-tRNA synthetase	s_0434 + s_1025 + s_1600 $\xrightleftharpoons{\text{e_0171, s_0434, s_1025, s_1600, s_0423, s_0633, s_1099}}$ s_0423 + s_0633 + s_1099	0000176

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171	r_0713	malate dehydrogenase	$s\_0066 + s\_1198 \xrightleftharpoons{\text{e\_0571, e\_0838, e\_0137, s\_0066, s\_1198, s\_1203, s\_1271}}_{0000176} s\_1203 + s\_1271$	
172	r_0722	mannose-1-phosphate guanylyltransferase	$s\_0573 + s\_0785 \xrightleftharpoons{\text{e\_0134, s\_0573, s\_0785, s\_0633, s\_0743}}_{0000176} s\_0633 + s\_0743$	
173	r_0723	mannose-6-phosphate isomerase	$s\_0557 \xrightleftharpoons{\text{e\_0269, s\_0557, s\_0574}} s\_0574$	0000176
174	r_0724	methenyltetrahydrifikate cyclohydrolase	$s\_0304 \xrightleftharpoons{\text{e\_0057, e\_0396, s\_0304, s\_0120}} s\_0120$	0000176
175	r_0726	methionine adenosyltransferase	$s\_0434 + s\_1029 \xrightleftharpoons{\text{e\_0239, e\_0658, s\_0434, s\_1029, s\_0633, s\_1322, s\_1416}}_{0000176} s\_0633 + s\_1322 + s\_1416$	
176	r_0727	methionine synthase	$s\_0322 + s\_1012 \xrightleftharpoons{\text{e\_0298, s\_0322, s\_1012, s\_1029, s\_1487}}_{0000176} s\_1029 + s\_1487$	
177	r_0729	methionyl-tRNA synthetase	$s\_0434 + s\_1029 + s\_1602 \xrightleftharpoons{\text{e\_0409, s\_0434, s\_1029, s\_1602, s\_0423, s\_0633, s\_1148}}_{0000176} s\_0423 + s\_0633 + s\_1148$	
178	r_0731	methylenetetrahydrofolate dehydrogenase (NAD)	$s\_0306 + s\_1198 \xrightleftharpoons{\text{e\_0610, s\_0306, s\_1198, s\_0304, s\_1203}}_{0000176} s\_0304 + s\_1203$	
179	r_0732	methylenetetrahydrofolate dehydrogenase (NADP)	$s\_0306 + s\_1207 \xrightleftharpoons{\text{e\_0396, e\_0057, s\_0306, s\_1207, s\_0304, s\_1212}}_{0000176} s\_0304 + s\_1212$	
180	r_0736	mevalonate kinase (ctp)	$s\_0028 + s\_0539 \xrightleftharpoons{\text{e\_0745, s\_0028, s\_0539, s\_0019, s\_0467}}_{0000176} s\_0019 + s\_0467$	
181	r_0739	mevalonate pyrophoshate decarboxylase	$s\_0018 + s\_0434 \xrightleftharpoons{\text{e\_0812, s\_0018, s\_0434, s\_0394, s\_0456, s\_0943, s\_1322}}_{0000176} s\_0394 + s\_0456 + s\_0943 + s\_1322$	
182	r_0757	myo-inositol 1-phosphatase	$s\_0126 \xrightleftharpoons{\text{e\_0204, e\_0435, s\_0126, s\_1153, s\_1322}} s\_1153 + s\_1322$	0000176

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183	r_0758	myo-inositol-1-phosphate synthase	s_0568 $\xrightleftharpoons{\text{e\_0512, s\_0568, s\_0126}}$ s_0126	0000176
184	r_0759	N-acetyl-g-glutamyl-phosphate reductase	s_1191+s_1212 $\xrightleftharpoons{\text{e\_0290, s\_1191, s\_1212, s\_0145, s\_1207, s\_1322}}$ s_0145+ s_1207+s_1322	0000176
185	r_0770	NADH dehydrogenase, cytosolic/mitochondrial	s_1203+s_1537 $\xrightleftharpoons{\text{e\_0139, e\_0737, e\_0714, s\_1203, s\_1537, s\_1198, s\_1535}}$ s_1198+ s_1535	0000176
186	r_0792	nucleoside diphosphatase	s_0467 $\xrightleftharpoons{\text{e\_0271, s\_0467, s\_0526, s\_1322}}$ s_0526 + s_1322	0000176
187	r_0800	nucleoside diphosphate kinase	s_0434+s_0739 $\xrightleftharpoons{\text{e\_0568, s\_0434, s\_0739, s\_0394, s\_0785}}$ s_0394+ s_0785	0000394
188	r_0811	nucleoside-diphosphate kinase (ATP:UDP)	s_0434+s_1538 $\xrightleftharpoons{\text{e\_0568, s\_0434, s\_1538, s\_0394, s\_1559}}$ s_0394+ s_1559	0000394
189	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
190	r_0816	ornithine carbamoyltransferase	s_0455+s_1266 $\xrightleftharpoons{\text{e\_0499, s\_0455, s\_1266, s\_0979, s\_1322}}$ s_0979+ s_1322	0000176
191	r_0818	ornithine transacetylase	s_0991+s_1182 $\xrightleftharpoons{\text{e\_0729, s\_0991, s\_1182, s\_1192, s\_1266}}$ s_1192+ s_1266	0000176
192	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
193	r_0821	orotidine-5'-phosphate decarboxylase	s_1270 $\xrightleftharpoons{\text{e\_0249, s\_1270, s\_0456, s\_1545}}$ s_0456 + s_1545	0000176
194	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

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195	r_0852	phenylalanyl-tRNA synthetase	$s\_0434 + s\_1032 + s\_1604 \xrightleftharpoons{\text{e\_0639, e\_0312, s\_0434, s\_1032, s\_1604, s\_0423, s\_0633, s\_1314}} s\_0423 + s\_0633 + s\_1314$	0000176
196	r_0855	phopshoribosylaminoimidazole synthetase	$s\_0302 + s\_0434 \xrightleftharpoons{\text{e\_0352, s\_0302, s\_0434, s\_0300, s\_0394, s\_1322}} s\_0300 + s\_0394 + s\_1322$	0000176
197	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
198	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
199	r_0877	phosphatidylserine decarboxylase	$s\_1337 + s\_1351 \xrightleftharpoons{\text{e\_0788, e\_0382, s\_1337, s\_0456, s\_1351}} s\_0456$	0000176
200	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
201	r_0883	phosphoadenylyl-sulfate reductase (thioredoxin)	$s\_0201 + s\_1616 + s\_1469 + s\_1620 \xrightleftharpoons{\text{e\_0633, e\_0975, e\_0398, s\_0201, s\_1616, s\_0390, s\_1469, s\_1620}} s\_0$	0000176
202	r_0886	phosphofructokinase	$s\_0434 + s\_0557 \xrightleftharpoons{\text{e\_0401, e\_0743, s\_0434, s\_0557, s\_0394, s\_0555}} s\_0394 + s\_0555$	0000176
203	r_0888	phosphoglucomutase	$s\_0568 \xrightleftharpoons{\text{e\_0576, e\_0757, e\_0733, s\_0568, s\_0567}} s\_0567$	0000176
204	r_0891	phosphoglycerate dehydrogenase	$s\_0260 + s\_1198 \xrightleftharpoons{\text{e\_0294, e\_0469, s\_0260, s\_1198, s\_0258, s\_1203}} s\_0258 + s\_1203$	0000176
205	r_0892	phosphoglycerate kinase	$s\_0075 + s\_0394 \xrightleftharpoons{\text{e\_0113, s\_0075, s\_0394, s\_0260, s\_0434}} s\_0260 + s\_0434$	0000176
206	r_0893	phosphoglycerate mutase	$s\_0260 \xrightleftharpoons{\text{e\_0582, s\_0260, s\_0188}} s\_0188$	0000176

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207	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
208	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
209	r_0902	phosphomannomutase	s_0574 $\xrightleftharpoons{\text{e\_0314, s\_0574, s\_0573}}$ s_0573	0000176
210	r_0904	phosphomevalonate kinase	s_0019 + s_0434 $\xrightleftharpoons{\text{e\_0747, s\_0019, s\_0434, s\_0018, s\_0394}}$ s_0018 + s_0394	0000176
211	r_0908	phosphoribosyl amino imidazolesuccinocarbozamide synthetase	s_0434 + s_0973 + s_1364 $\xrightleftharpoons{\text{e\_0017, s\_0434, s\_0973, s\_1364, s\_0299, s\_0394, s\_1322}}$ s_0299 + s_0394 + s_1322	0000176
212	r_0909	phosphoribosyl-AMP cyclohydrolase	s_0078 $\xrightleftharpoons{\text{e\_0103, s\_0078, s\_0077}}$ s_0077	0000176
213	r_0910	phosphoribosyl-ATP pyrophosphatase	s_0326 $\xrightleftharpoons{\text{e\_0103, s\_0326, s\_0078, s\_0633}}$ s_0078 + s_0633	0000176
214	r_0911	phosphoribosylaminoimidazole-carboxylase	s_0300 + s_0456 + s_0434 $\xrightleftharpoons{\text{e\_0860, s\_0300, s\_0456, s\_0434, s\_1364, s\_0394, s\_1322}}$ s_1364 + s_0394 + s_1322	0000176
215	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
216	r_0913	phosphoribosylanthranilate isomerase	s_1187 $\xrightleftharpoons{\text{e\_0165, s\_1187, s\_0076}}$ s_0076	0000176
217	r_0914	phosphoribosylglycinamidine synthetase	s_0327 + s_0434 + s_1003 $\xrightleftharpoons{\text{e\_0352, s\_0327, s\_0434, s\_1003, s\_0325, s\_0394, s\_1322}}$ s_0325 + s_0394 + s_1322	0000176
218	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

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219	r_0916	phosphoribosylpyrophosphate synthetase	s_0434 + s_1408 $\xrightleftharpoons{\text{e_0030, e_0299, e_0418, e_0585, e_0829, s_0434, s_1408, s_0423, s_1}}$ s_1386	0000176
220	r_0917	phosphoserine phosphatase (L-serine)	s_0259 $\xrightleftharpoons{\text{e_0397, s_0259, s_1039, s_1322}}$ s_1039 + s_1322	0000176
221	r_0918	phosphoserine transaminase	s_0258 + s_0991 $\xrightleftharpoons{\text{e_0872, s_0258, s_0991, s_0180, s_0259}}$ s_0180 + s_0259	0000176
222	r_0919	phytoceramidase	s_1084 + s_1366 $\xrightleftharpoons{\text{e_0077, s_1084, s_1366, s_0481}}$ s_0481	0000176
223	r_0922	phytosphingosine synthesis	s_1212 + s_1275 + s_1445 $\xrightleftharpoons{\text{e_0206, s_1212, s_1275, s_1445, s_1207, s_1366}}$ s_1207 + s_1366	0000176
224	r_0938	prephenate dehydratase	s_1377 $\xrightleftharpoons{\text{e_0802, s_1377, s_0456, s_0951}}$ s_0456 + s_0951	0000176
225	r_0939	prephenate dehydrogenase (NADP)	s_1207 + s_1377 $\xrightleftharpoons{\text{e_0074, s_1207, s_1377, s_0204, s_0456, s_1212}}$ s_0204 + s_0456 + s_1212	0000176
226	r_0941	prolyl-tRNA synthetase	s_0434 + s_1035 + s_1606 $\xrightleftharpoons{\text{e_0296, s_0434, s_1035, s_1606, s_0423, s_0633, s_1379}}$ s_0423 + s_0633 + s_1379	0000176
227	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
228	r_0958	pyruvate carboxylase	s_0434 + s_0445 + s_1399 $\xrightleftharpoons{\text{e_0334, e_0084, s_0434, s_0445, s_1399, s_0394, s_1271, s_1322}}$ s_0394 + s_1271 + s_1322	0000176

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229	r_0961	pyruvate dehydrogenase	s_0529 $+$ s_1198 $+$ s_1399 $\xrightleftharpoons[\text{e_0085, e_0306, e_0393, e_0311, e_0775, s_0529, s_1198, s_1399, s_0373, s_04}]{}$ s_0456 $+$ s_1203	0000176
230	r_0962	pyruvate kinase	s_0394 $+$ s_1360 $\xrightleftharpoons[0000176]{\text{e_0011, e_0895, s_0394, s_1360, s_0434, s_1399}}$ s_0434 $+$ s_1399	
231	r_0967	riboflavin synthase	s_0158 $+$ s_0314 $\xrightleftharpoons[0000176]{\text{e_0841, s_0158, s_0314, s_0328, s_1322}}$ s_0328 $+$ s_1322	
232	r_0968	riboflavin synthase	2 s_0328 $\xrightleftharpoons[]{\text{e_0090, s_0328, s_0314, s_1405}}$ s_0314 $+$ s_1405	0000176
233	r_0970	ribonucleoside-triphosphate reductase (ATP)	s_0434 $+$ s_1616 $\xrightleftharpoons[0000176]{\text{e_0398, s_0434, s_1616, s_0586, s_1620}}$ s_0586 $+$ s_1620	
234	r_0973	ribonucleoside-triphosphate reductase (UTP)	s_1559 $+$ s_1616 $\xrightleftharpoons[0000176]{\text{e_0398, s_1559, s_1616, s_0656, s_1620}}$ s_0656 $+$ s_1620	
235	r_0974	ribonucleotide reductase	s_0394 $+$ s_1616 $\xrightleftharpoons[0000176]{\text{e_0467, e_0492, e_0387, e_0291, s_0394, s_1616, s_0582, s_1620}}$ s_0 $+$ s_1620	
236	r_0976	ribonucleotide reductase	s_0467 $+$ s_1616 $\xrightleftharpoons[0000176]{\text{e_0467, e_0492, e_0387, e_0291, s_0467, s_1616, s_0587, s_1620}}$ s_0 $+$ s_1620	
237	r_0978	ribonucleotide reductase	s_0739 $+$ s_1616 $\xrightleftharpoons[0000176]{\text{e_0467, e_0492, e_0387, e_0291, s_0739, s_1616, s_0613, s_1620}}$ s_0 $+$ s_1620	
238	r_0982	ribose-5-phosphate isomerase	s_0577 $\xrightleftharpoons[]{\text{e_0852, s_0577, s_1408}}$ s_1408	0000176
239	r_0984	ribulose 5-phosphate 3-epimerase	s_0581 $\xrightleftharpoons[]{\text{e_0506, s_0581, s_0577}}$ s_0577	0000176
240	r_0986	S-adenosyl-methionine delta-24-sterol-c-methyltransferase	s_1416 $+$ s_1569 $\xrightleftharpoons[0000176]{\text{e_0699, s_1416, s_1569, s_0700, s_1413}}$ s_0700 $+$ s_1413	

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241	r_0988	saccharopine dehydrogenase (NAD, L-lysine forming)	$s\_1038 + s\_1198 \xrightleftharpoons{\substack{e\_0489,\ s\_1038,\ s\_1198,\ s\_0180,\ s\_1025,\ s\_1203 \\ 0000176}} s\_0180 + s\_1025 + s\_1203$	
242	r_0989	saccharopine dehydrogenase (NADP, L-glutamate forming)	$s\_0959 + s\_0991 + s\_1212 \xrightleftharpoons{\substack{e\_0813,\ s\_0959,\ s\_0991,\ s\_1212,\ s\_1038,\ s\_1207 \\ 0000176}} s\_1038 + s\_1207$	
243	r_0993	serine palmitotransferase	$s\_1039 + s\_1302 \xrightleftharpoons{\substack{e\_0054,\ e\_0177,\ e\_0761,\ s\_1039,\ s\_1302,\ s\_0231,\ s\_0456,\ s\_0529 \\ 0000176}} s\_0456 + s\_0529$	
244	r_0995	seryl-tRNA synthetase	$s\_0434 + s\_1039 + s\_1607 \xrightleftharpoons{\substack{e\_0168,\ e\_0425,\ s\_0434,\ s\_1039,\ s\_1607,\ s\_0423,\ s\_0633,\ s\_1428 \\ 0000176}} s\_0423 + s\_0633 + s\_1428$	
245	r_0996	shikimate dehydrogenase	$s\_0211 + s\_1212 \xrightleftharpoons{\substack{e\_0182,\ s\_0211,\ s\_1212,\ s\_1207,\ s\_1429 \\ 0000176}} s\_1207 + s\_1429$	
246	r_0997	shikimate kinase	$s\_0434 + s\_1429 \xrightleftharpoons{\substack{e\_0182,\ s\_0434,\ s\_1429,\ s\_0261,\ s\_0394 \\ 0000176}} s\_0261 + s\_0394$	
247	r_1010	squalene epoxidase (NAD)	$s\_1203 + s\_1275 + s\_1447 \xrightleftharpoons{\substack{e\_0385,\ s\_1203,\ s\_1275,\ s\_1447,\ s\_0037,\ s\_1198 \\ 0000176}} s\_0037 + s\_1198$	
248	r_1011	squalene epoxidase (NADP)	$s\_1212 + s\_1275 + s\_1447 \xrightleftharpoons{\substack{e\_0385,\ s\_1212,\ s\_1275,\ s\_1447,\ s\_0037,\ s\_1207 \\ 0000176}} s\_0037 + s\_1207$	
249	r_1012	squalene synthase	$2\,s\_0190 + s\_1212 \xrightleftharpoons{\substack{e\_0456,\ s\_0190,\ s\_1212,\ s\_0633,\ s\_1207,\ s\_1447 \\ 0000176}} 2\,s\_0633 + s\_1207 + s\_1447$	
250	r_1014	steryl ester hydrolase	$s\_0666 + 3\,s\_0056 \xrightleftharpoons{\substack{e\_0578,\ e\_0613,\ s\_0666,\ s\_0056,\ s\_0672 \\ 0000176}} s\_0672$	

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251	r_1026	sulfate adenylyltransferase (ADP)	$s\_0394 + s\_1467 \xrightleftharpoons{e\_0107,\ s\_0394,\ s\_1467,\ s\_0298,\ s\_1322} s\_0298 + s\_1322$	0000176
252	r_1027	sulfite reductase (NADPH2)	$3\,s\_1212 + s\_1469 \xrightleftharpoons{e\_0547,\ e\_0321,\ s\_1212,\ s\_1469,\ s\_0841,\ s\_1207} s\_0841 + 3\,s\_1207$	0000176
253	r_1038	thioredoxin reductase (NADPH)	$s\_1212 + s\_1620 \xrightleftharpoons{e\_0633,\ e\_0218,\ e\_0398,\ e\_0448,\ e\_0915,\ e\_0124,\ s\_1212,\ s\_1620,\ s\_1616} s\_1616$	0000176
254	r_1041	threonine synthase	$s\_1238 \xrightleftharpoons{e\_0122,\ s\_1238,\ s\_1045,\ s\_1322} s\_1045 + s\_1322$	0000176
255	r_1042	threonyl-tRNA synthetase	$s\_0434 + s\_1045 + s\_1608 \xrightleftharpoons{e\_0470,\ s\_0434,\ s\_1045,\ s\_1608,\ s\_0423,\ s\_0633,\ s\_1491} s\_0423 + s\_0633 + s\_1491$	0000176
256	r_1045	thymidylate synthase	$s\_0306 + s\_0654 \xrightleftharpoons{e\_0850,\ s\_0306,\ s\_0654,\ s\_0625,\ s\_0649} s\_0625 + s\_0649$	0000176
257	r_1048	transaldolase	$s\_0551 + s\_0557 \xrightleftharpoons{e\_0684,\ s\_0551,\ s\_0557,\ s\_0764,\ s\_1427} s\_0764 + s\_1427$	0000176
258	r_1049	transketolase 1	$s\_0764 + s\_1427 \xrightleftharpoons{e\_0063,\ e\_0962,\ s\_0764,\ s\_1427,\ s\_0581,\ s\_1408} s\_0581 + s\_1408$	0000176
259	r_1050	transketolase 2	$s\_0557 + s\_0764 \xrightleftharpoons{e\_0063,\ e\_0962,\ s\_0557,\ s\_0764,\ s\_0551,\ s\_0581} s\_0551 + s\_0581$	0000176
260	r_1051	trehalose-phosphatase	$s\_0409 \xrightleftharpoons{e\_0711,\ e\_0065,\ e\_0179,\ e\_0753,\ s\_0409,\ s\_1322,\ s\_1520} s\_1322 + s\_1520$	0000176
261	r_1052	triacylglycerol lipase	$s\_0619 + 4 \cdot 33333333333333\,s\_0056 \xrightleftharpoons{e\_0176,\ e\_0611,\ e\_0765,\ e\_0851,\ s\_0619,\ s\_0056}$	0000176
262	r_1054	triose-phosphate isomerase	$s\_0629 \xrightleftharpoons{e\_0175,\ s\_0629,\ s\_0764} s\_0764$	0000176

№	Id	Name	Reaction Equation	SBO
263	r_1055	tryptophan synthase (indoleglycerol phosphate)	s_0086+s_1039 $\xrightleftharpoons{\text{e\_0330, s\_0086, s\_1039, s\_0764, s\_1048}}$ s_0764+ s_1048	0000176
264	r_1057	tryptophanyl-tRNA synthetase	s_0434 + s_1048 + s_1610 $\xrightleftharpoons{\text{e\_0836, s\_0434, s\_1048, s\_1610, s\_0423, s\_0633, s\_1527}}$ s_0423+ s_0633+s_1527	0000176
265	r_1063	tyrosine transaminase	s_0204+s_0991 $\xrightleftharpoons{\text{e\_0348, e\_0629, s\_0204, s\_0991, s\_0180, s\_1051}}$ s_0180+ s_1051	0000176
266	r_1066	tyrosyl-tRNA synthetase	s_0434 + s_1051 + s_1612 $\xrightleftharpoons{\text{e\_0390, s\_0434, s\_1051, s\_1612, s\_0423, s\_0633, s\_1533}}$ s_0423+ s_0633+s_1533	0000176
267	r_1072	UMP kinase	s_0434+s_1545 $\xrightleftharpoons{\text{e\_0561, s\_0434, s\_1545, s\_0394, s\_1538}}$ s_0394+ s_1538	0000176
268	r_1084	UTP-glucose-1-phosphate uridylyltransferase	s_0567+s_1559 $\xrightleftharpoons{\text{e\_0565, s\_0567, s\_1559, s\_0633, s\_1543}}$ s_0633+ s_1543	0000176
269	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
270	r_1089	valyl-tRNA synthetase	s_0434 + s_1056 + s_1614 $\xrightleftharpoons{\text{e\_0372, s\_0434, s\_1056, s\_1614, s\_0423, s\_0633, s\_1561}}$ s_0423+ s_0633+s_1561	0000176
271	r_1115	ammonia transport	s_0420 $\xrightleftharpoons{\text{s\_0420, s\_0419}}$ s_0419	0000185
272	r_1166	glucose transport	s_0565 $\xrightleftharpoons{\text{s\_0565, s\_0563}}$ s_0563	0000185
273	r_1244	phosphate transport	s_1324 $\xrightleftharpoons{\text{s\_1324, s\_1322}}$ s_1322	0000185
274	r_1266	sulfate uniport	s_1468 $\xrightleftharpoons{\text{s\_1468, s\_1467}}$ s_1467	0000185

№	Id	Name	Reaction Equation	SBO
275	r_1664	bicarbonate formation	$s\_0456 \xrightleftharpoons{s\_0456,\ s\_0445} s\_0445$	0000176
276	r_1697	CO2 transport	$s\_0456 \xrightarrow{s\_0456} s\_0458$	0000185
277	r_1704	cytidylate kinase (dCMP)	$s\_0394 + s\_0587 \xrightleftharpoons{s\_0394,\ s\_0587,\ s\_0434,\ s\_0589} s\_0434 + s\_0589$	0000176
278	r_1729	deoxyadenylate kinase	$s\_0394 + s\_0582 \xrightleftharpoons{s\_0394,\ s\_0582,\ s\_0434,\ s\_0584} s\_0434 + s\_0584$	0000176
279	r_1795	formate transport	$s\_0722 \xrightarrow{s\_0722} s\_0723$	0000185
280	r_1979	O2 transport	$s\_1277 \xrightleftharpoons{s\_1277,\ s\_1275} s\_1275$	0000185
281	r_2030	pyrimidine phosphatase	$s\_0313 \xrightleftharpoons{s\_0313,\ s\_0314,\ s\_1322} s\_0314 + s\_1322$	0000176

№	Id	Name	Reaction Equation	SBO
282	r_2111	growth	$1 \cdot 1348\,\text{s\_0002} + 0 \cdot 046\,\text{s\_0423} + 59 \cdot 276\,\text{s\_0434} +$ $0 \cdot 0447\,\text{s\_0526}\ +\ 0 \cdot 0036\,\text{s\_0584}\ +$ $0 \cdot 0024\,\text{s\_0589}\ +\ 0 \cdot 0024\,\text{s\_0615}\ +$ $0 \cdot 0036\,\text{s\_0649} + 0 \cdot 5185\,\text{s\_0773} + 0 \cdot 046\,\text{s\_0782} +$ $0 \cdot 8079\,\text{s\_1107}\ +\ 9.9 \cdot 10^{-4}\text{s\_1405}\ +$ $0 \cdot 02\,\text{s\_1467} + 0 \cdot 0234\,\text{s\_1520} + 0 \cdot 0599\,\text{s\_1545} +$ $1 \cdot 1348\,\text{s\_0004}\ +\ 0 \cdot 4588\,\text{s\_0404}\ +$ $0 \cdot 1607\,\text{s\_0428}\ +\ 0 \cdot 1017\,\text{s\_0430}\ +$ $0 \cdot 2975\,\text{s\_0432}\ +\ 0 \cdot 0066\,\text{s\_0542}\ +$ $0 \cdot 1054\,\text{s\_0747}\ +\ 0 \cdot 3018\,\text{s\_0748}\ +$ $0 \cdot 2904\,\text{s\_0757}\ +\ 0 \cdot 0663\,\text{s\_0832}\ +$ $0 \cdot 1927\,\text{s\_0847}\ +\ 0 \cdot 2964\,\text{s\_1077}\ +$ $0 \cdot 2862\,\text{s\_1099}\ +\ 0 \cdot 0507\,\text{s\_1148}\ +$ $0 \cdot 1339\,\text{s\_1314}\ +\ 0 \cdot 1647\,\text{s\_1379}\ +$ $3.9 \cdot 10^{-4}\text{s\_1337}\ +\ 0 \cdot 001583\,\text{s\_0089}\ +$ $0 \cdot 1854\,\text{s\_1428}\ +\ 0 \cdot 1914\,\text{s\_1491}\ +$ $0 \cdot 0284\,\text{s\_1527} + 0 \cdot 102\,\text{s\_1533} + 0 \cdot 2646\,\text{s\_1561} +$ $5.6 \cdot 10^{-5}\text{s\_0122}\ +\ 5.38625 \cdot 10^{-4}\text{s\_0918}\ +$ $9.6 \cdot 10^{-5}\text{s\_0657}\ +\ 1.25 \cdot 10^{-4}\text{s\_0662}\ +$ $0 \cdot 0056\,\text{s\_0666}\ +\ 8.12 \cdot 10^{-4}\text{s\_0672}\ +$ $8.92666666666666 \cdot 10^{-4}\text{s\_0056}\ +$ $1.14 \cdot 10^{-4}\text{s\_0700}\ +\ 3.2 \cdot 10^{-5}\text{s\_1059}\ +$ $0 \cdot 00288\,\text{s\_1346}\ +\ 6.97 \cdot 10^{-4}\text{s\_1351}\ +$ $7.81 \cdot 10^{-4}\text{s\_1524}\ +$ $1.5 \cdot 10^{-5}\text{s\_1569} \xrightarrow{\text{s\_0002, s\_0423, s\_0434, s\_0526, s\_0584, s\_0589, s\_0615, s\_0649, s\_0}}$ $58 \cdot 70001\,\text{s\_1322}\ +\ 0 \cdot 4588\,\text{s\_1582}\ +$ $0 \cdot 1607\,\text{s\_1583}\ +\ 0 \cdot 1017\,\text{s\_1585}\ +$ $0 \cdot 2975\,\text{s\_1587}\ +\ 0 \cdot 0066\,\text{s\_1589}\ +$ $0 \cdot 1054\,\text{s\_1590}\ +\ 0 \cdot 3018\,\text{s\_1591}\ +$ $0 \cdot 2904\,\text{s\_1593}\ +\ 0 \cdot 0663\,\text{s\_1594}\ +$ $0 \cdot 1927\,\text{s\_1596}\ +\ 0 \cdot 2964\,\text{s\_1598}\ +$ $0 \cdot 2862\,\text{s\_1600}\ +\ 0 \cdot 0507\,\text{s\_1602}\ +$ $0 \cdot 1339\,\text{s\_1604}\ +\ 0 \cdot 1647\,\text{s\_1606}\ +$ $0 \cdot 1854\,\text{s\_1607}\ +\ 0 \cdot 1914\,\text{s\_1608}\ +$ $0 \cdot 0284\,\text{s\_1610} + 0 \cdot 102\,\text{s\_1612} + 0 \cdot 2646\,\text{s\_1614}$	0000176

№	Id	Name	Reaction Equation	SBO

7.1 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

$$s\_1543 \xrightleftharpoons{\text{e\_0682, e\_0364, s\_1543, s\_0002, s\_1538}} s\_0002 + s\_1538 \tag{2}$$
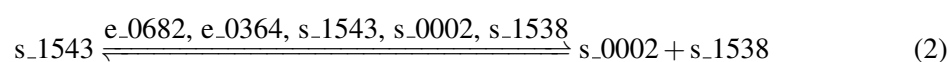
Reactant

Table 6: Properties of each reactant.

Id	Name	SBO
s_1543	UDP-D-glucose	

Modifiers

Table 7: 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 8: Properties of each product.

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

Kinetic Law

Derived unit contains undeclared units

$$v_1 = \text{vol}(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep1543} \cdot \left(\frac{[\text{s\_1543}]}{\text{ic1543}}\right) + \text{ep0002} \cdot \left(\frac{[\text{s\_0002}]}{\text{ic0002}}\right) + \text{ep1538} \cdot \left(\frac{[\text{s\_1538}]}{\text{ic1538}}\right)\right) \tag{3}$$

Table 9: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.043	mmol·l^{-1}·s^{-1}	☑
v0			0.043	mmol·l^{-1}·s^{-1}	☑
ep1543			1.000	dimensionless	☑
ep0002			-1.000	dimensionless	☑
ep1538			-1.000	dimensionless	☑

7.2 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

$$\text{s\_1543} \xrightleftharpoons{\text{e\_0973, e\_0379, s\_1543, s\_0004, s\_1538}} \text{s\_0004} + \text{s\_1538} \tag{4}$$
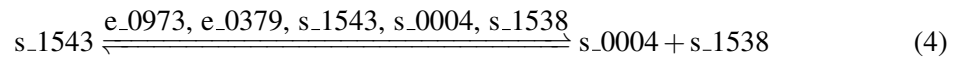
Reactant

Table 10: Properties of each reactant.

Id	Name	SBO
s_1543	UDP-D-glucose	

Modifiers

Table 11: Properties of each modifier.

Id	Name	SBO
e_0973	KRE6	0000460
e_0379	SKN1	0000460
s_1543	UDP-D-glucose	
s_0004	(1->6)-beta-D-glucan	
s_1538	UDP	

Id	Name	SBO

Products

Table 12: Properties of each product.

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

Kinetic Law

Derived unit contains undeclared units

$$v_2 = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep1543} \cdot \left(\frac{[\text{s\_1543}]}{\text{ic1543}} \right) + \text{ep0004} \cdot \left(\frac{[\text{s\_0004}]}{\text{ic0004}} \right) + \text{ep1538} \cdot \left(\frac{[\text{s\_1538}]}{\text{ic1538}} \right) \right)$$

(5)

Table 13: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.043	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.043	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep1543			1.000	dimensionless	☑
ep0004			-1.000	dimensionless	☑
ep1538			-1.000	dimensionless	☑

7.3 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

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

(6)

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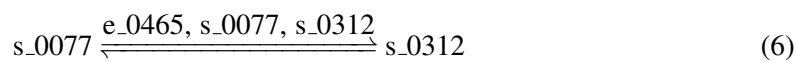
Reactant

Table 14: Properties of each reactant.

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

Modifiers

Table 15: 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 16: 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

$$v_3 = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0077} \cdot \left(\frac{[\text{s\_0077}]}{\text{ic0077}} \right) + \text{ep0312} \cdot \left(\frac{[\text{s\_0312}]}{\text{ic0312}} \right) \right) \tag{7}$$

Table 17: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.003	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
v0			0.003	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
ep0077			1.000	dimensionless	☑
ep0312			-1.000	dimensionless	☑

7.4 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

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

<div align="right">(8)</div>
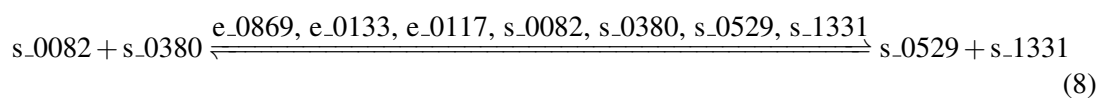
Reactants

Table 18: Properties of each reactant.

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

Modifiers

Table 19: 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 20: Properties of each product.

Id	Name	SBO
s_0529	coenzyme A	
s_1331	phosphatidate	

Kinetic Law

Derived unit contains undeclared units

$$v_4 = \text{vol}(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0082} \cdot \left(\frac{[\text{s\_0082}]}{\text{ic0082}}\right) + \text{ep0380} \cdot \left(\frac{[\text{s\_0380}]}{\text{ic0380}}\right) + \text{ep0529}\right.$$
$$\left. \cdot \left(\frac{[\text{s\_0529}]}{\text{ic0529}}\right) + \text{ep1331} \cdot \left(\frac{[\text{s\_1331}]}{\text{ic1331}}\right)\right) \tag{9}$$

Table 21: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.40277332169094 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$2.40277332169094 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0082			1.000	dimensionless	☑
ep0380			1.000	dimensionless	☑
ep0529			-1.000	dimensionless	☑
ep1331			-1.000	dimensionless	☑

7.5 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

$$\text{s\_0991} + \text{s\_1203} \xrightleftharpoons{\text{e\_0431, s\_0991, s\_1203, s\_0118, s\_1198}} \text{s\_0118} + \text{s\_1198} \tag{10}$$

Reactants

Table 22: Properties of each reactant.

Id	Name	SBO
s_0991	L-glutamate	
s_1203	NADH	

Modifiers

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Table 23: Properties of each modifier.

Id	Name	SBO
e_0431	PUT2	0000460
s_0991	L-glutamate	
s_1203	NADH	
s_0118	1-pyrroline-5-carboxylate	
s_1198	NAD	

Products

Table 24: Properties of each product.

Id	Name	SBO
s_0118	1-pyrroline-5-carboxylate	
s_1198	NAD	

Kinetic Law

Derived unit contains undeclared units

$$v_5 = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0991} \cdot \left(\frac{[\text{s\_0991}]}{\text{ic0991}}\right) + \text{ep1203} \cdot \left(\frac{[\text{s\_1203}]}{\text{ic1203}}\right) + \text{ep0118} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0118}]}{\text{ic0118}}\right) + \text{ep1198} \cdot \left(\frac{[\text{s\_1198}]}{\text{ic1198}}\right)\right) \tag{11}$$

Table 25: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.006	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
v0			0.006	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
ep0991			1.000	dimensionless	☑
ep1203			1.000	dimensionless	☑
ep0118			−1.000	dimensionless	☑
ep1198			−1.000	dimensionless	☑

7.6 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

$$s\_0142 \xrightleftharpoons{\text{e\_0832, s\_0142, s\_0313, s\_0419}} s\_0313 + s\_0419 \qquad (12)$$
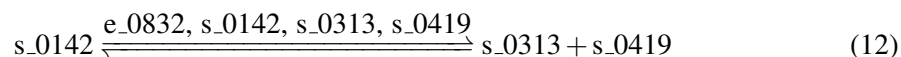
Reactant

Table 26: Properties of each reactant.

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

Modifiers

Table 27: 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 28: 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

$$v_6 = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0142} \cdot \left(\frac{[\text{s\_0142}]}{\text{ic0142}} \right) + \text{ep0313} \cdot \left(\frac{[\text{s\_0313}]}{\text{ic0313}} \right) + \text{ep0419} \cdot \left(\frac{[\text{s\_0419}]}{\text{ic0419}} \right) \right)$$
$$(13)$$

Table 29: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$3.75729835487922 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$3.75729835487922 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0142			1.000	dimensionless	☑
ep0313			-1.000	dimensionless	☑
ep0419			-1.000	dimensionless	☑

7.7 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

$$s\_0141 + s\_1212 \xrightleftharpoons{\text{e\_0071, s\_0141, s\_1212, s\_0142, s\_1207}} s\_0142 + s\_1207 \qquad (14)$$
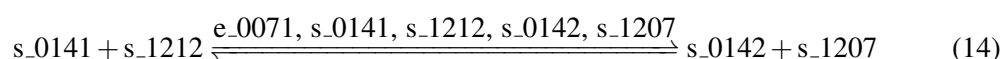
Reactants

Table 30: Properties of each reactant.

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

Modifiers

Table 31: 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 32: 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

$$
v_7 = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0141} \cdot \left(\frac{[\text{s\_0141}]}{\text{ic0141}} \right) + \text{ep1212} \cdot \left(\frac{[\text{s\_1212}]}{\text{ic1212}} \right) + \text{ep0142} \right.
$$
$$
\left. \cdot \left(\frac{[\text{s\_0142}]}{\text{ic0142}} \right) + \text{ep1207} \cdot \left(\frac{[\text{s\_1207}]}{\text{ic1207}} \right) \right)
\tag{15}
$$

Table 33: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$3.75729835487922 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$3.75729835487922 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0141			1.000	dimensionless	☑
ep1212			1.000	dimensionless	☑
ep0142			-1.000	dimensionless	☑
ep1207			-1.000	dimensionless	☑

7.8 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

$$
\text{s\_0178} + \text{s\_1399} \xrightleftharpoons{\text{e\_0734, e\_0100, s\_0178, s\_1399, s\_0039, s\_0456}} \text{s\_0039} + \text{s\_0456}
\tag{16}
$$

Reactants

Table 34: Properties of each reactant.

Id	Name	SBO
s_0178	2-oxobutanoate	
s_1399	pyruvate	

Modifiers

Table 35: Properties of each modifier.

Id	Name	SBO
e_0734	ILV2	0000460
e_0100	ILV6	0000460
s_0178	2-oxobutanoate	
s_1399	pyruvate	
s_0039	(S)-2-acetyl-2-hydroxybutanoate	
s_0456	carbon dioxide	

Products

Table 36: Properties of each product.

Id	Name	SBO
s_0039	(S)-2-acetyl-2-hydroxybutanoate	
s_0456	carbon dioxide	

Kinetic Law

Derived unit contains undeclared units

$$v_8 = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0178} \cdot \left(\frac{[\text{s\_0178}]}{\text{ic0178}} \right) + \text{ep1399} \cdot \left(\frac{[\text{s\_1399}]}{\text{ic1399}} \right) + \text{ep0039} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0039}]}{\text{ic0039}} \right) + \text{ep0456} \cdot \left(\frac{[\text{s\_0456}]}{\text{ic0456}} \right) \right) \tag{17}$$

Table 37: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.010	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
v0			0.010	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑

Id	Name	SBO	Value	Unit	Constant
ep0178			1.000	dimensionless	☑
ep1399			1.000	dimensionless	☑
ep0039			−1.000	dimensionless	☑
ep0456			−1.000	dimensionless	☑

7.9 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

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

(18)
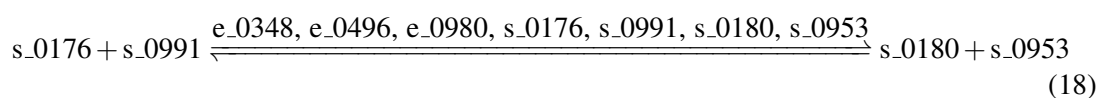
Reactants

Table 38: Properties of each reactant.

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

Modifiers

Table 39: 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	
s_0180	2-oxoglutarate	
s_0953	L-2-aminoadipate	

Products

Table 40: Properties of each product.

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

Kinetic Law

Derived unit contains undeclared units

$$v_9 = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0176} \cdot \left(\frac{[\text{s\_0176}]}{\text{ic0176}} \right) + \text{ep0991} \cdot \left(\frac{[\text{s\_0991}]}{\text{ic0991}} \right) + \text{ep0180} \right. \\ \left. \cdot \left(\frac{[\text{s\_0180}]}{\text{ic0180}} \right) + \text{ep0953} \cdot \left(\frac{[\text{s\_0953}]}{\text{ic0953}} \right) \right) \tag{19}$$

Table 41: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.011	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	✔
v0			0.011	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	✔
ep0176			1.000	dimensionless	✔
ep0991			1.000	dimensionless	✔
ep0180			-1.000	dimensionless	✔
ep0953			-1.000	dimensionless	✔

7.10 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

$$\text{s\_0551} + \text{s\_1360} \xrightleftharpoons{\text{e\_0169, e\_0088, s\_0551, s\_1360, s\_0349, s\_1322}} \text{s\_0349} + \text{s\_1322} \tag{20}$$
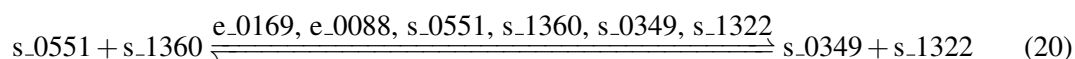
Reactants

Table 42: Properties of each reactant.

Id	Name	SBO
s_0551	D-erythrose 4-phosphate	
s_1360	phosphoenolpyruvate	

Modifiers

Table 43: Properties of each modifier.

Id	Name	SBO
e_0169	ARO3	0000460
e_0088	ARO4	0000460
s_0551	D-erythrose 4-phosphate	
s_1360	phosphoenolpyruvate	
s_0349	7-phospho-2-dehydro-3-deoxy-D-arabino-heptonic acid	
s_1322	phosphate	

Products

Table 44: Properties of each product.

Id	Name	SBO
s_0349	7-phospho-2-dehydro-3-deoxy-D-arabino-heptonic acid	
s_1322	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{10} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0551} \cdot \left(\frac{[\text{s\_0551}]}{\text{ic0551}} \right) + \text{ep1360} \cdot \left(\frac{[\text{s\_1360}]}{\text{ic1360}} \right) + \text{ep0349} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0349}]}{\text{ic0349}} \right) + \text{ep1322} \cdot \left(\frac{[\text{s\_1322}]}{\text{ic1322}} \right) \right) \tag{21}$$

Table 45: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.010	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
v0			0.010	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑

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Id	Name	SBO	Value	Unit	Constant
ep0551			1.000	dimensionless	☑
ep1360			1.000	dimensionless	☑
ep0349			-1.000	dimensionless	☑
ep1322			-1.000	dimensionless	☑

7.11 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

$$\text{s\_0162} \xrightleftharpoons{\text{e\_0328, s\_0162, s\_0165}} \text{s\_0165} \tag{22}$$
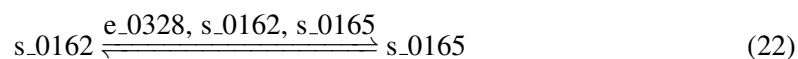
Reactant

Table 46: Properties of each reactant.

Id	Name	SBO
s_0162	2-isopropylmalate	

Modifiers

Table 47: Properties of each modifier.

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

Product

Table 48: Properties of each product.

Id	Name	SBO
s_0165	2-isopropylmaleic acid	

Kinetic Law

Derived unit contains undeclared units

$$v_{11} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0162} \cdot \left(\frac{[\text{s\_0162}]}{\text{ic0162}} \right) + \text{ep0165} \cdot \left(\frac{[\text{s\_0165}]}{\text{ic0165}} \right) \right) \qquad (23)$$

Table 49: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.011	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.011	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0162			1.000	dimensionless	☑
ep0165			-1.000	dimensionless	☑

7.12 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

$$\text{s\_0232} + \text{s\_0373} \xrightleftharpoons{\text{e\_0778, e\_0855, s\_0232, s\_0373, s\_0162, s\_0529}} \text{s\_0162} + \text{s\_0529} \qquad (24)$$
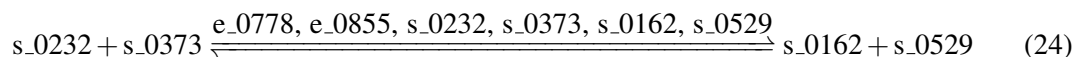
Reactants

Table 50: Properties of each reactant.

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

Modifiers

Table 51: Properties of each modifier.

Id	Name	SBO
e_0778	LEU4	0000460

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

Products

Table 52: Properties of each product.

Id	Name	SBO
s_0162	2-isopropylmalate	
s_0529	coenzyme A	

Kinetic Law

Derived unit contains undeclared units

$$v_{12} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0232} \cdot \left(\frac{[\text{s\_0232}]}{\text{ic0232}}\right) + \text{ep0373} \cdot \left(\frac{[\text{s\_0373}]}{\text{ic0373}}\right) + \text{ep0162} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0162}]}{\text{ic0162}}\right) + \text{ep0529} \cdot \left(\frac{[\text{s\_0529}]}{\text{ic0529}}\right)\right) \tag{25}$$

Table 53: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.011	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.011	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0232			1.000	dimensionless	☑
ep0373			1.000	dimensionless	☑
ep0162			-1.000	dimensionless	☑
ep0529			-1.000	dimensionless	☑

7.13 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

$$\text{s\_0835} \xrightleftharpoons{\text{e\_0196, s\_0835, s\_0454}} \text{s\_0454} \tag{26}$$
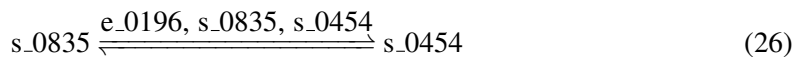
Reactant

Table 54: Properties of each reactant.

Id	Name	SBO
s_0835	homocitrate	

Modifiers

Table 55: 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 56: Properties of each product.

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

Kinetic Law

Derived unit contains undeclared units

$$v_{13} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0835} \cdot \left(\frac{[\text{s\_0835}]}{\text{ic0835}} \right) + \text{ep0454} \cdot \left(\frac{[\text{s\_0454}]}{\text{ic0454}} \right) \right) \tag{27}$$

Table 57: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.011	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.011	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0835			1.000	dimensionless	☑
ep0454			-1.000	dimensionless	☑

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7.14 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

$$s\_0010 \xrightleftharpoons{\text{e\_0550, e\_0457, s\_0010, s\_0291, s\_0456}} s\_0291 + s\_0456 \tag{28}$$
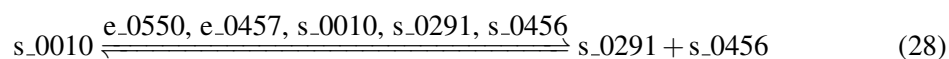
Reactant

Table 58: Properties of each reactant.

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

Modifiers

Table 59: 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	
s_0456	carbon dioxide	

Products

Table 60: Properties of each product.

Id	Name	SBO
s_0291	4-methyl-2-oxopentanoate	
s_0456	carbon dioxide	

Kinetic Law

Derived unit contains undeclared units

$$v_{14} = \text{vol}\,(\text{cell}) \cdot \text{v0}$$
$$\cdot \left(1 + \text{ep0010} \cdot \left(\frac{[\text{s\_0010}]}{\text{ic0010}} \right) + \text{ep0291} \cdot \left(\frac{[\text{s\_0291}]}{\text{ic0291}} \right) + \text{ep0456} \cdot \left(\frac{[\text{s\_0456}]}{\text{ic0456}} \right) \right) \quad (29)$$

Table 61: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.011	mmol $\cdot$ l^{-1} $\cdot$ s^{-1}	☑
v0			0.011	mmol $\cdot$ l^{-1} $\cdot$ s^{-1}	☑
ep0010			1.000	dimensionless	☑
ep0291			-1.000	dimensionless	☑
ep0456			-1.000	dimensionless	☑

7.15 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

$$\text{s\_0390} \xrightleftharpoons{\text{e\_0830, s\_0390, s\_0423, s\_1322}} \text{s\_0423} + \text{s\_1322} \quad (30)$$
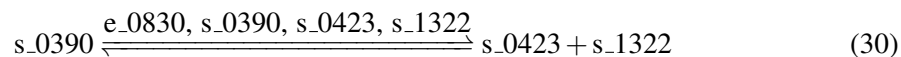
Reactant

Table 62: Properties of each reactant.

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

Modifiers

Table 63: Properties of each modifier.

Id	Name	SBO
e_0830	MET22	0000460
s_0390	adenosine 3',5'-bismonophosphate	
s_0423	AMP	

Id	Name	SBO
s_1322	phosphate	

Products

Table 64: Properties of each product.

Id	Name	SBO
s_0423	AMP	
s_1322	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$
\begin{aligned}
v_{15} = {}& \text{vol}\,(\text{cell}) \cdot \text{v0} \\
& \cdot \left(1 + \text{ep0390} \cdot \left(\frac{[\text{s\_0390}]}{\text{ic0390}}\right) + \text{ep0423} \cdot \left(\frac{[\text{s\_0423}]}{\text{ic0423}}\right) + \text{ep1322} \cdot \left(\frac{[\text{s\_1322}]}{\text{ic1322}}\right)\right)
\end{aligned} \tag{31}
$$

Table 65: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.002	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	✓
v0			0.002	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	✓
ep0390			1.000	dimensionless	✓
ep0423			−1.000	dimensionless	✓
ep1322			−1.000	dimensionless	✓

7.16 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

$$
\text{s\_0577} \xrightleftharpoons{\text{e\_0237, s\_0577, s\_0158, s\_0722}} \text{s\_0158} + \text{s\_0722} \tag{32}
$$
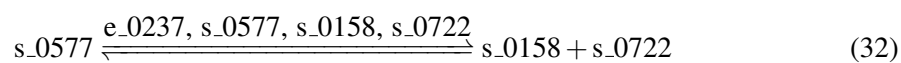
Reactant

Table 66: Properties of each reactant.

Id	Name	SBO
s_0577	D-ribulose 5-phosphate	

Modifiers

Table 67: 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 68: Properties of each product.

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

Kinetic Law

Derived unit contains undeclared units

$$
\begin{aligned}
v_{16} = {} & \text{vol}\,(\text{cell}) \cdot \text{v0} \\
& \cdot \left(1 + \text{ep0577} \cdot \left(\frac{[\text{s\_0577}]}{\text{ic0577}} \right) + \text{ep0158} \cdot \left(\frac{[\text{s\_0158}]}{\text{ic0158}} \right) + \text{ep0722} \cdot \left(\frac{[\text{s\_0722}]}{\text{ic0722}} \right) \right)
\end{aligned} \tag{33}
$$

Table 69: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$7.51459670975844 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	✓
v0			$7.51459670975844 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	✓
ep0577			1.000	dimensionless	✓
ep0158			-1.000	dimensionless	✓

Id	Name	SBO	Value	Unit	Constant
ep0722			-1.000	dimensionless	☑

7.17 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

$$s\_0210 \xrightleftharpoons{e\_0182,\ s\_0210,\ s\_0211} s\_0211 \tag{34}$$
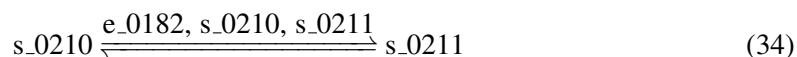
Reactant

Table 70: Properties of each reactant.

Id	Name	SBO
s_0210	3-dehydroquinate	

Modifiers

Table 71: Properties of each modifier.

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

Product

Table 72: Properties of each product.

Id	Name	SBO
s_0211	3-dehydroshikimate	

Kinetic Law

Derived unit contains undeclared units

$$v_{17} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0210} \cdot \left(\frac{[\text{s\_0210}]}{\text{ic0210}}\right) + \text{ep0211} \cdot \left(\frac{[\text{s\_0211}]}{\text{ic0211}}\right)\right) \tag{35}$$

Table 73: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.010	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
v0			0.010	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
ep0210			1.000	dimensionless	☑
ep0211			-1.000	dimensionless	☑

7.18 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

$$\text{s\_0349} \xrightleftharpoons[]{\text{e\_0182, s\_0349, s\_0210, s\_1322}} \text{s\_0210} + \text{s\_1322} \tag{36}$$
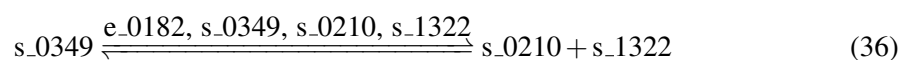
Reactant

Table 74: Properties of each reactant.

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

Modifiers

Table 75: 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	
s_1322	phosphate	

Products

Table 76: Properties of each product.

Id	Name	SBO
s_0210	3-dehydroquinate	
s_1322	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{18} = \text{vol}(\text{cell}) \cdot \text{v0}$$
$$\cdot \left(1 + \text{ep0349} \cdot \left(\frac{[\text{s\_0349}]}{\text{ic0349}}\right) + \text{ep0210} \cdot \left(\frac{[\text{s\_0210}]}{\text{ic0210}}\right) + \text{ep1322} \cdot \left(\frac{[\text{s\_1322}]}{\text{ic1322}}\right)\right) \qquad (37)$$

Table 77: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.010	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.010	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0349			1.000	dimensionless	☑
ep0210			−1.000	dimensionless	☑
ep1322			−1.000	dimensionless	☑

7.19 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

$$\text{s\_0231} + \text{s\_1212} \xrightleftharpoons{\text{e\_0092, s\_0231, s\_1212, s\_1207, s\_1445}} \text{s\_1207} + \text{s\_1445} \qquad (38)$$
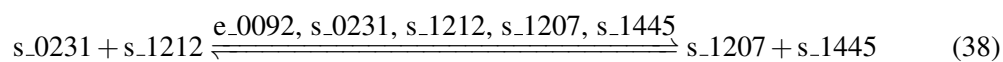
Reactants

Table 78: Properties of each reactant.

Id	Name	SBO
s_0231	3-ketosphinganine	
s_1212	NADPH	

Modifiers

Table 79: 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 80: Properties of each product.

Id	Name	SBO
s_1207	NADP(+)	
s_1445	sphinganine	

Kinetic Law

Derived unit contains undeclared units

$$v_{19} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0231} \cdot \left(\frac{[\text{s\_0231}]}{\text{ic0231}} \right) + \text{ep1212} \cdot \left(\frac{[\text{s\_1212}]}{\text{ic1212}} \right) + \text{ep1207} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_1207}]}{\text{ic1207}} \right) + \text{ep1445} \cdot \left(\frac{[\text{s\_1445}]}{\text{ic1445}} \right) \right) \tag{39}$$

Table 81: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.04421699920047 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	✓
v0			$2.04421699920047 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	✓
ep0231			1.000	dimensionless	✓

Id	Name	SBO	Value	Unit	Constant
ep1212			1.000	dimensionless	☑
ep1207			−1.000	dimensionless	☑
ep1445			−1.000	dimensionless	☑

7.20 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

$$s\_0165 \xrightleftharpoons{e\_0328, \ s\_0165, \ s\_0009} s\_0009 \tag{40}$$
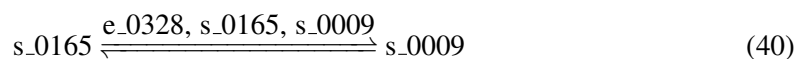
Reactant

Table 82: Properties of each reactant.

Id	Name	SBO
s_0165	2-isopropylmaleic acid	

Modifiers

Table 83: Properties of each modifier.

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

Product

Table 84: Properties of each product.

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

Kinetic Law

Derived unit contains undeclared units

$$v_{20} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0165} \cdot \left(\frac{[\text{s\_0165}]}{\text{ic0165}}\right) + \text{ep0009} \cdot \left(\frac{[\text{s\_0009}]}{\text{ic0009}}\right)\right) \qquad (41)$$

Table 85: Properties of each parameter.

| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.011	mmol·l^{-1}·s^{-1}	☑
v0			0.011	mmol·l^{-1}·s^{-1}	☑
ep0165			1.000	dimensionless	☑
ep0009			-1.000	dimensionless	☑

7.21 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

$$\text{s\_0009} + \text{s\_1198} \xrightleftharpoons{\text{e\_0101, s\_0009, s\_1198, s\_0010, s\_1203}} \text{s\_0010} + \text{s\_1203} \qquad (42)$$

Reactants

Table 86: Properties of each reactant.

Id	Name	SBO
s_0009	(2R,3S)-3-isopropylmalate	
s_1198	NAD	

Modifiers

Table 87: Properties of each modifier.

Id	Name	SBO
e_0101	LEU2	0000460

Id	Name	SBO
s_0009	(2R,3S)-3-isopropylmalate	
s_1198	NAD	
s_0010	(2S)-2-isopropyl-3-oxosuccinate	
s_1203	NADH	

Products

Table 88: Properties of each product.

Id	Name	SBO
s_0010	(2S)-2-isopropyl-3-oxosuccinate	
s_1203	NADH	

Kinetic Law

Derived unit contains undeclared units

$$v_{21} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0009} \cdot \left(\frac{[\text{s\_0009}]}{\text{ic0009}}\right) + \text{ep1198} \cdot \left(\frac{[\text{s\_1198}]}{\text{ic1198}}\right) + \text{ep0010} \right. $$
$$\left. \cdot \left(\frac{[\text{s\_0010}]}{\text{ic0010}}\right) + \text{ep1203} \cdot \left(\frac{[\text{s\_1203}]}{\text{ic1203}}\right)\right) \tag{43}$$

Table 89: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.011	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.011	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0009			1.000	dimensionless	☑
ep1198			1.000	dimensionless	☑
ep0010			-1.000	dimensionless	☑
ep1203			-1.000	dimensionless	☑

7.22 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

$$s\_0261 + s\_1360 \; \underset{\longleftarrow}{\overset{e\_0182, \; s\_0261, \; s\_1360, \; s\_0324, \; s\_1322}{\rightleftharpoons}} \; s\_0324 + s\_1322 \tag{44}$$
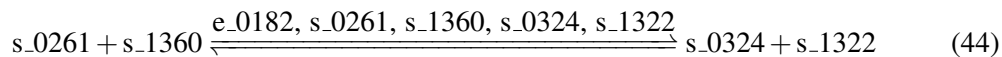
Reactants

Table 90: Properties of each reactant.

Id	Name	SBO
s_0261	3-phosphoshikimic acid	
s_1360	phosphoenolpyruvate	

Modifiers

Table 91: Properties of each modifier.

Id	Name	SBO
e_0182	ARO1	0000460
s_0261	3-phosphoshikimic acid	
s_1360	phosphoenolpyruvate	
s_0324	5-O-(1-carboxyvinyl)-3-phosphoshikimic acid	
s_1322	phosphate	

Products

Table 92: Properties of each product.

Id	Name	SBO
s_0324	5-O-(1-carboxyvinyl)-3-phosphoshikimic acid	
s_1322	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{22} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0261} \cdot \left(\frac{[\text{s\_0261}]}{\text{ic0261}} \right) + \text{ep1360} \cdot \left(\frac{[\text{s\_1360}]}{\text{ic1360}} \right) + \text{ep0324} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0324}]}{\text{ic0324}} \right) + \text{ep1322} \cdot \left(\frac{[\text{s\_1322}]}{\text{ic1322}} \right) \right) \tag{45}$$

Table 93: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.010	mmol $\cdot$ l^{-1} $\cdot$ s^{-1}	☑
v0			0.010	mmol $\cdot$ l^{-1} $\cdot$ s^{-1}	☑
ep0261			1.000	dimensionless	☑
ep1360			1.000	dimensionless	☑
ep0324			-1.000	dimensionless	☑
ep1322			-1.000	dimensionless	☑

7.23 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

$$\text{s\_0301} + \text{s\_0434} + \text{s\_0999} \xrightleftharpoons{\text{e\_0368, s\_0301, s\_0434, s\_0999, s\_0302, s\_0394, s\_0991, s\_1322}} \text{s\_0302} + \text{s\_0394} + \text{s\_099}$$

(46)
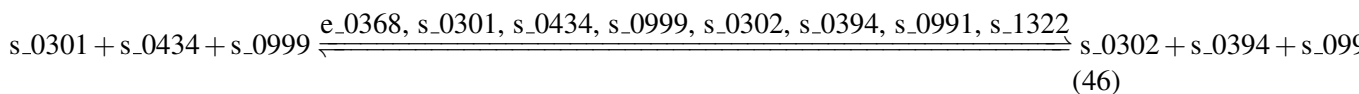
Reactants

Table 94: Properties of each reactant.

Id	Name	SBO
s_0301	5'-phosphoribosyl-N-formylglycineamide	
s_0434	ATP	
s_0999	L-glutamine	

Modifiers

Table 95: Properties of each modifier.

Id	Name	SBO
e_0368	ADE6	0000460
s_0301	5'-phosphoribosyl-N-formylglycineamide	
s_0434	ATP	
s_0999	L-glutamine	

Id	Name	SBO
s_0302	5'-phosphoribosyl-N-formylglycineamidine	
s_0394	ADP	
s_0991	L-glutamate	
s_1322	phosphate	

Products

Table 96: Properties of each product.

Id	Name	SBO
s_0302	5'-phosphoribosyl-N-formylglycineamidine	
s_0394	ADP	
s_0991	L-glutamate	
s_1322	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$
v_{23} = \text{vol}(\text{cell}) \cdot v0
$$
$$
\cdot \left(1 + \text{ep0301} \cdot \left(\frac{[\text{s\_0301}]}{\text{ic0301}} \right) + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}} \right) + \text{ep0999} \cdot \left(\frac{[\text{s\_0999}]}{\text{ic0999}} \right) + \text{ep0302} \right.
$$
$$
\left. \cdot \left(\frac{[\text{s\_0302}]}{\text{ic0302}} \right) + \text{ep0394} \cdot \left(\frac{[\text{s\_0394}]}{\text{ic0394}} \right) + \text{ep0991} \cdot \left(\frac{[\text{s\_0991}]}{\text{ic0991}} \right) + \text{ep1322} \cdot \left(\frac{[\text{s\_1322}]}{\text{ic1322}} \right) \right)
$$

(47)

Table 97: Properties of each parameter.

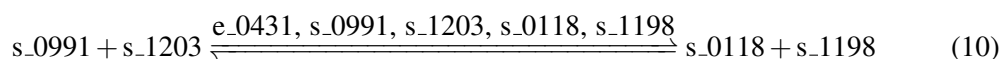| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.004	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	✓
v0			0.004	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	✓
ep0301			1.000	dimensionless	✓
ep0434			1.000	dimensionless	✓
ep0999			1.000	dimensionless	✓
ep0302			−1.000	dimensionless	✓
ep0394			−1.000	dimensionless	✓
ep0991			−1.000	dimensionless	✓
ep1322			−1.000	dimensionless	✓

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7.24 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

$$s\_0306 + s\_1212 \xrightleftharpoons{e\_0340,\ e\_0903,\ s\_0306,\ s\_1212,\ s\_0322,\ s\_1207} s\_0322 + s\_1207 \tag{48}$$
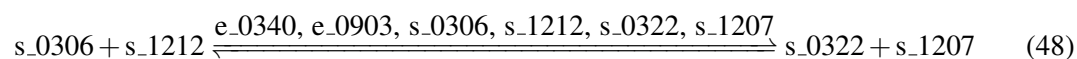
Reactants

Table 98: Properties of each reactant.

Id	Name	SBO
s_0306	5,10-methylenetetrahydrofolate	
s_1212	NADPH	

Modifiers

Table 99: 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 100: Properties of each product.

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

Kinetic Law

Derived unit contains undeclared units

$$v_{24} = \text{vol}\left(\text{cell}\right) \cdot \text{v0} \cdot \left(1 + \text{ep0306} \cdot \left(\frac{[\text{s\_0306}]}{\text{ic0306}}\right) + \text{ep1212} \cdot \left(\frac{[\text{s\_1212}]}{\text{ic1212}}\right) + \text{ep0322} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0322}]}{\text{ic0322}}\right) + \text{ep1207} \cdot \left(\frac{[\text{s\_1207}]}{\text{ic1207}}\right)\right) \quad (49)$$

Table 101: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.003	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.003	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0306			1.000	dimensionless	☑
ep1212			1.000	dimensionless	☑
ep0322			−1.000	dimensionless	☑
ep1207			−1.000	dimensionless	☑

7.25 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

$$\text{s\_0146} + \text{s\_1212} \xrightleftharpoons{\text{e\_0685, s\_0146, s\_1212, s\_0016, s\_1207}} \text{s\_0016} + \text{s\_1207} \quad (50)$$

Reactants

Table 102: Properties of each reactant.

Id	Name	SBO
s_0146	2-acetyllactic acid	
s_1212	NADPH	

Modifiers

Table 103: 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 104: 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

$$
v_{25} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0146} \cdot \left(\frac{[\text{s\_0146}]}{\text{ic0146}} \right) + \text{ep1212} \cdot \left(\frac{[\text{s\_1212}]}{\text{ic1212}} \right) + \text{ep0016} \right.
$$
$$
\left. \cdot \left(\frac{[\text{s\_0016}]}{\text{ic0016}} \right) + \text{ep1207} \cdot \left(\frac{[\text{s\_1207}]}{\text{ic1207}} \right) \right) \tag{51}
$$

Table 105: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.021	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.021	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0146			1.000	dimensionless	☑
ep1212			1.000	dimensionless	☑
ep0016			-1.000	dimensionless	☑
ep1207			-1.000	dimensionless	☑

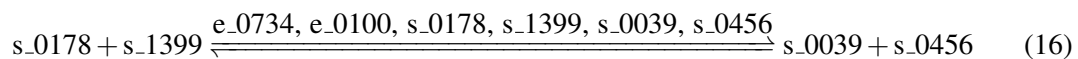## 7.26 Reaction r_0097

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

Name acetolactate synthase

SBO:0000176 biochemical reaction

Reaction equation

$$2\,\text{s\_1399} \xrightleftharpoons{\text{e\_0734, e\_0100, s\_1399, s\_0146, s\_0456}} \text{s\_0146} + \text{s\_0456} \tag{52}$$
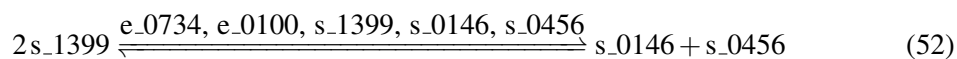
Reactant

Table 106: Properties of each reactant.

Id	Name	SBO
s_1399	pyruvate	

Modifiers

Table 107: Properties of each modifier.

Id	Name	SBO
e_0734	ILV2	0000460
e_0100	ILV6	0000460
s_1399	pyruvate	
s_0146	2-acetyllactic acid	
s_0456	carbon dioxide	

Products

Table 108: Properties of each product.

Id	Name	SBO
s_0146	2-acetyllactic acid	
s_0456	carbon dioxide	

Kinetic Law

Derived unit contains undeclared units

$$\begin{aligned}
v_{26} = {}& \text{vol}\,(\text{cell}) \cdot \text{v0} \\
& \cdot \left(1 + \text{ep1399} \cdot \left(\frac{[\text{s\_1399}]}{\text{ic1399}}\right) + \text{ep0146} \cdot \left(\frac{[\text{s\_0146}]}{\text{ic0146}}\right) + \text{ep0456} \cdot \left(\frac{[\text{s\_0456}]}{\text{ic0456}}\right)\right)
\end{aligned} \tag{53}$$

Table 109: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.021	mmol·l^{-1}·s^{-1}	☑
v0			0.021	mmol·l^{-1}·s^{-1}	☑
ep1399			2.000	dimensionless	☑
ep0146			−1.000	dimensionless	☑
ep0456			−1.000	dimensionless	☑

7.27 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

$$2\,\text{s\_0373} \xrightleftharpoons{\text{e\_0904, s\_0373, s\_0367, s\_0529}} \text{s\_0367} + \text{s\_0529} \qquad (54)$$
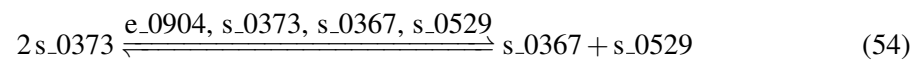
Reactant

Table 110: Properties of each reactant.

Id	Name	SBO
s_0373	acetyl-CoA	

Modifiers

Table 111: 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 112: Properties of each product.

Id	Name	SBO
s_0367	acetoacetyl-CoA	
s_0529	coenzyme A	

Kinetic Law

Derived unit contains undeclared units

$$v_{27} = \text{vol}\,(\text{cell}) \cdot v0$$
$$\cdot \left(1 + \text{ep}0373 \cdot \left(\frac{[\text{s\_0373}]}{\text{ic}0373}\right) + \text{ep}0367 \cdot \left(\frac{[\text{s\_0367}]}{\text{ic}0367}\right) + \text{ep}0529 \cdot \left(\frac{[\text{s\_0529}]}{\text{ic}0529}\right)\right) \quad (55)$$

Table 113: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.002	mmol·l^{-1}·s^{-1}	☑
v0			0.002	mmol·l^{-1}·s^{-1}	☑
ep0373			2.000	dimensionless	☑
ep0367			−1.000	dimensionless	☑
ep0529			−1.000	dimensionless	☑

7.28 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

$$\text{s\_0373} + \text{s\_0434} + \text{s\_0445} \underset{}{\overset{\text{e\_0744, e\_0808, s\_0373, s\_0434, s\_0445, s\_0394, s\_1101, s\_1322}}{\rightleftharpoons}} \text{s\_0394} + \text{s\_1101} + \text{s\_132}$$
$$(56)$$

Reactants

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Table 114: Properties of each reactant.

Id	Name	SBO
s_0373	acetyl-CoA	
s_0434	ATP	
s_0445	bicarbonate	

Modifiers

Table 115: Properties of each modifier.

Id	Name	SBO
e_0744	HFA1	0000460
e_0808	ACC1	0000460
s_0373	acetyl-CoA	
s_0434	ATP	
s_0445	bicarbonate	
s_0394	ADP	
s_1101	malonyl-CoA	
s_1322	phosphate	

Products

Table 116: Properties of each product.

Id	Name	SBO
s_0394	ADP	
s_1101	malonyl-CoA	
s_1322	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{28} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0373} \cdot \left(\frac{[\text{s\_0373}]}{\text{ic0373}} \right) + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}} \right) + \text{ep0445} \cdot \left(\frac{[\text{s\_0445}]}{\text{ic0445}} \right) \right.$$
$$\left. + \text{ep0394} \cdot \left(\frac{[\text{s\_0394}]}{\text{ic0394}} \right) + \text{ep1101} \cdot \left(\frac{[\text{s\_1101}]}{\text{ic1101}} \right) + \text{ep1322} \cdot \left(\frac{[\text{s\_1322}]}{\text{ic1322}} \right) \right) \tag{57}$$

Table 117: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$3.6795905905662 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$3.6795905905662 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0373			1.000	dimensionless	☑
ep0434			1.000	dimensionless	☑
ep0445			1.000	dimensionless	☑
ep0394			-1.000	dimensionless	☑
ep1101			-1.000	dimensionless	☑
ep1322			-1.000	dimensionless	☑

7.29 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

$$\text{s\_0362} + \text{s\_0529} \xrightleftharpoons{\text{e\_0022, s\_0362, s\_0529, s\_0373}} \text{s\_0373} \tag{58}$$
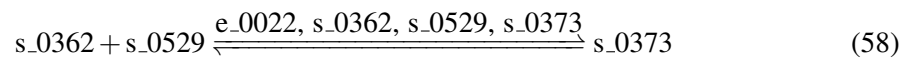
Reactants

Table 118: Properties of each reactant.

Id	Name	SBO
s_0362	acetate	
s_0529	coenzyme A	

Modifiers

Table 119: Properties of each modifier.

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

Product

Table 120: Properties of each product.

Id	Name	SBO
s_0373	acetyl-CoA	

Kinetic Law

Derived unit contains undeclared units

$$v_{29} = \text{vol}\,(\text{cell}) \cdot \text{v0}$$
$$\cdot \left(1 + \text{ep0362} \cdot \left(\frac{[\text{s\_0362}]}{\text{ic0362}}\right) + \text{ep0529} \cdot \left(\frac{[\text{s\_0529}]}{\text{ic0529}}\right) + \text{ep0373} \cdot \left(\frac{[\text{s\_0373}]}{\text{ic0373}}\right)\right) \quad (59)$$

Table 121: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.012	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
v0			0.012	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
ep0362			1.000	dimensionless	☑
ep0529			1.000	dimensionless	☑
ep0373			-1.000	dimensionless	☑

7.30 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

$$\text{s\_0434} + \text{s\_1192} \xrightleftharpoons{\text{e\_0290, s\_0434, s\_1192, s\_0394, s\_1191}} \text{s\_0394} + \text{s\_1191} \quad (60)$$
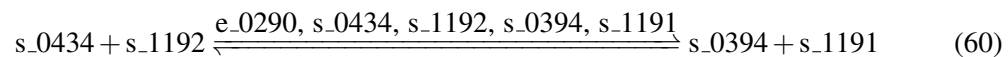
Reactants

Table 122: Properties of each reactant.

Id	Name	SBO
s_0434	ATP	
s_1192	N-acetyl-L-glutamate	

Modifiers

Table 123: Properties of each modifier.

Id	Name	SBO
e_0290	ARG5,6	0000460
s_0434	ATP	
s_1192	N-acetyl-L-glutamate	
s_0394	ADP	
s_1191	N-acetyl-L-gamma-glutamyl phosphate	

Products

Table 124: Properties of each product.

Id	Name	SBO
s_0394	ADP	
s_1191	N-acetyl-L-gamma-glutamyl phosphate	

Kinetic Law

Derived unit contains undeclared units

$$
v_{30} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}} \right) + \text{ep1192} \cdot \left(\frac{[\text{s\_1192}]}{\text{ic1192}} \right) + \text{ep0394} \right.
$$
$$
\left. \cdot \left(\frac{[\text{s\_0394}]}{\text{ic0394}} \right) + \text{ep1191} \cdot \left(\frac{[\text{s\_1191}]}{\text{ic1191}} \right) \right)
\tag{61}
$$

Table 125: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.006	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
v0			0.006	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
ep0434			1.000	dimensionless	☑

Id	Name	SBO	Value	Unit	Constant
ep1192			1.000	dimensionless	☑
ep0394			−1.000	dimensionless	☑
ep1191			−1.000	dimensionless	☑

7.31 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

$$\text{s\_0145} + \text{s\_0991} \xrightleftharpoons{\text{e\_0840, s\_0145, s\_0991, s\_0180, s\_1182}} \text{s\_0180} + \text{s\_1182} \tag{62}$$
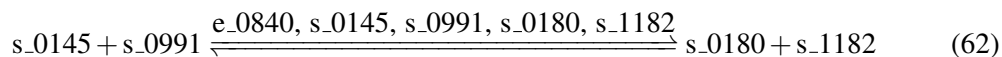
Reactants

Table 126: Properties of each reactant.

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

Modifiers

Table 127: 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 128: 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

$$v_{31} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0145} \cdot \left(\frac{[\text{s\_0145}]}{\text{ic0145}}\right) + \text{ep0991} \cdot \left(\frac{[\text{s\_0991}]}{\text{ic0991}}\right) + \text{ep0180} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0180}]}{\text{ic0180}}\right) + \text{ep1182} \cdot \left(\frac{[\text{s\_1182}]}{\text{ic1182}}\right)\right) \tag{63}$$

Table 129: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.006	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.006	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0145			1.000	dimensionless	☑
ep0991			1.000	dimensionless	☑
ep0180			-1.000	dimensionless	☑
ep1182			-1.000	dimensionless	☑

## 7.32 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

$$\text{s\_0386} + \text{s\_0434} \xrightleftharpoons{\text{e\_0541, s\_0386, s\_0434, s\_0394, s\_0423}} \text{s\_0394} + \text{s\_0423} \tag{64}$$

Reactants

Produced by SBML2LATEX

Table 130: Properties of each reactant.

Id	Name	SBO
s_0386	adenosine	
s_0434	ATP	

Modifiers

Table 131: Properties of each modifier.

Id	Name	SBO
e_0541	ADO1	0000460
s_0386	adenosine	
s_0434	ATP	
s_0394	ADP	
s_0423	AMP	

Products

Table 132: Properties of each product.

Id	Name	SBO
s_0394	ADP	
s_0423	AMP	

Kinetic Law

Derived unit contains undeclared units

$$v_{32} = \text{vol} \left(\text{cell} \right) \cdot \text{v0} \cdot \left(1 + \text{ep0386} \cdot \left(\frac{[\text{s\_0386}]}{\text{ic0386}} \right) + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}} \right) + \text{ep0394} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0394}]}{\text{ic0394}} \right) + \text{ep0423} \cdot \left(\frac{[\text{s\_0423}]}{\text{ic0423}} \right) \right) \tag{65}$$

Table 133: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$5.83975250318604 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	✓
v0			$5.83975250318604 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	✓
ep0386			1.000	dimensionless	✓

| Id	Name	SBO	Value	Unit	Constant
ep0434			1.000	dimensionless	☑
ep0394			−1.000	dimensionless	☑
ep0423			−1.000	dimensionless	☑

7.33 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

$$s\_1413 \xrightleftharpoons{\text{e\_0280, s\_1413, s\_0386, s\_1012}} s\_0386 + s\_1012 \qquad (66)$$
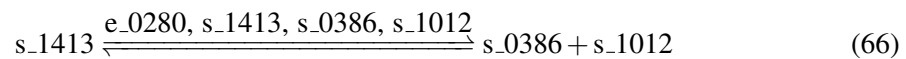
Reactant

Table 134: Properties of each reactant.

Id	Name	SBO
s_1413	S-adenosyl-L-homocysteine	

Modifiers

Table 135: 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 136: Properties of each product.

Id	Name	SBO
s_0386	adenosine	
s_1012	L-homocysteine	

Kinetic Law

Derived unit contains undeclared units

$$v_{33} = \text{vol}\,(\text{cell}) \cdot \text{v0}$$
$$\cdot \left(1 + \text{ep1413} \cdot \left(\frac{[\text{s\_1413}]}{\text{ic1413}} \right) + \text{ep0386} \cdot \left(\frac{[\text{s\_0386}]}{\text{ic0386}} \right) + \text{ep1012} \cdot \left(\frac{[\text{s\_1012}]}{\text{ic1012}} \right) \right) \quad (67)$$

Table 137: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$5.83975250368712 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$5.83975250368712 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep1413			1.000	dimensionless	☑
ep0386			-1.000	dimensionless	☑
ep1012			-1.000	dimensionless	☑

7.34 Reaction r_0148

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

Name adenylate kinase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0423} + \text{s\_0434} \xrightleftharpoons{\text{e\_0194, e\_0303, s\_0423, s\_0434, s\_0394}} 2\,\text{s\_0394} \quad (68)$$
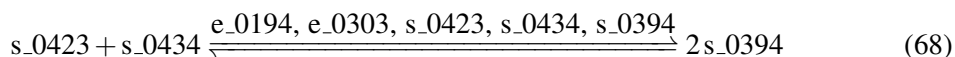
Reactants

Table 138: Properties of each reactant.

Id	Name	SBO
s_0423	AMP	
s_0434	ATP	

Modifiers

Table 139: Properties of each modifier.

Id	Name	SBO
e_0194	ADK1	0000460
e_0303	ADK2	0000460
s_0423	AMP	
s_0434	ATP	
s_0394	ADP	

Product

Table 140: Properties of each product.

Id	Name	SBO
s_0394	ADP	

Kinetic Law

Derived unit contains undeclared units

$$v_{34} = \text{vol}\,(\text{cell}) \cdot v0$$
$$\cdot \left(1 + \text{ep0423} \cdot \left(\frac{[\text{s\_0423}]}{\text{ic0423}}\right) + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}}\right) + \text{ep0394} \cdot \left(\frac{[\text{s\_0394}]}{\text{ic0394}}\right)\right) \quad (69)$$

Table 141: Properties of each parameter.

| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.169	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.169	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0423			1.000	dimensionless	☑
ep0434			1.000	dimensionless	☑
ep0394			-2.000	dimensionless	☑

7.35 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

$$\text{s\_0299} \xrightleftharpoons{\text{e\_0686, s\_0299, s\_0403, s\_0725}} \text{s\_0403} + \text{s\_0725} \tag{70}$$
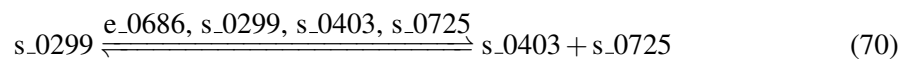
Reactant

Table 142: Properties of each reactant.

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

Modifiers

Table 143: 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 144: Properties of each product.

Id	Name	SBO
s_0403	AICAR	
s_0725	fumarate	

Kinetic Law

Derived unit contains undeclared units

$$v_{35} = \text{vol}\,(\text{cell}) \cdot \text{v0}$$
$$\cdot \left(1 + \text{ep0299} \cdot \left(\frac{[\text{s\_0299}]}{\text{ic0299}}\right) + \text{ep0403} \cdot \left(\frac{[\text{s\_0403}]}{\text{ic0403}}\right) + \text{ep0725} \cdot \left(\frac{[\text{s\_0725}]}{\text{ic0725}}\right)\right) \tag{71}$$

Table 145: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.004	mmol·l^{-1}·s^{-1}	☑
v0			0.004	mmol·l^{-1}·s^{-1}	☑
ep0299			1.000	dimensionless	☑
ep0403			−1.000	dimensionless	☑
ep0725			−1.000	dimensionless	☑

7.36 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

$$\text{s\_0393} \xrightleftharpoons{\text{e\_0686, s\_0393, s\_0423, s\_0725}} \text{s\_0423} + \text{s\_0725} \tag{72}$$
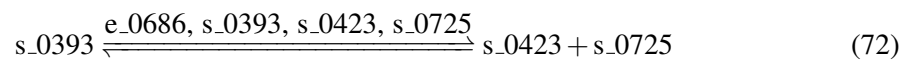
Reactant

Table 146: Properties of each reactant.

Id	Name	SBO
s_0393	adenylo-succinate	

Modifiers

Table 147: Properties of each modifier.

Id	Name	SBO
e_0686	ADE13	0000460
s_0393	adenylo-succinate	
s_0423	AMP	
s_0725	fumarate	

Products

Table 148: Properties of each product.

Id	Name	SBO
s_0423	AMP	
s_0725	fumarate	

Kinetic Law

Derived unit contains undeclared units

$$
\begin{aligned}
v_{36} = {}& \mathrm{vol}\,(\mathrm{cell}) \cdot \mathrm{v0} \\
& \cdot \left(1 + \mathrm{ep0393} \cdot \left(\frac{[\mathrm{s\_0393}]}{\mathrm{ic0393}} \right) + \mathrm{ep0423} \cdot \left(\frac{[\mathrm{s\_0423}]}{\mathrm{ic0423}} \right) + \mathrm{ep0725} \cdot \left(\frac{[\mathrm{s\_0725}]}{\mathrm{ic0725}} \right) \right)
\end{aligned} \tag{73}
$$

Table 149: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.004	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
v0			0.004	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
ep0393			1.000	dimensionless	☑
ep0423			-1.000	dimensionless	☑
ep0725			-1.000	dimensionless	☑

7.37 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

$$
\mathrm{s\_0785} + \mathrm{s\_0849} + \mathrm{s\_0973} \xrightleftharpoons[]{\mathrm{e\_0791,\ s\_0785,\ s\_0849,\ s\_0973,\ s\_0393,\ s\_0739,\ s\_1322}} \mathrm{s\_0393} + \mathrm{s\_0739} + \mathrm{s\_1322} \tag{74}
$$

Reactants

Table 150: Properties of each reactant.

Id	Name	SBO
s_0785	GTP	
s_0849	IMP	
s_0973	L-aspartate	

Modifiers

Table 151: 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	
s_1322	phosphate	

Products

Table 152: Properties of each product.

Id	Name	SBO
s_0393	adenylo-succinate	
s_0739	GDP	
s_1322	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$
\begin{aligned}
v_{37} = \mathrm{vol}\,(\mathrm{cell}) \cdot \mathrm{v0} \cdot \Bigg(& 1 + \mathrm{ep0785} \cdot \left(\frac{[\mathrm{s\_0785}]}{\mathrm{ic0785}} \right) + \mathrm{ep0849} \cdot \left(\frac{[\mathrm{s\_0849}]}{\mathrm{ic0849}} \right) + \mathrm{ep0973} \cdot \left(\frac{[\mathrm{s\_0973}]}{\mathrm{ic0973}} \right) \\
& + \mathrm{ep0393} \cdot \left(\frac{[\mathrm{s\_0393}]}{\mathrm{ic0393}} \right) + \mathrm{ep0739} \cdot \left(\frac{[\mathrm{s\_0739}]}{\mathrm{ic0739}} \right) + \mathrm{ep1322} \cdot \left(\frac{[\mathrm{s\_1322}]}{\mathrm{ic1322}} \right) \Bigg)
\end{aligned}
$$

(75)

Produced by SBML2LATEX

Table 153: Properties of each parameter.

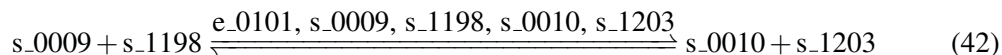| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.004	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
v0			0.004	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
ep0785			1.000	dimensionless	☑
ep0849			1.000	dimensionless	☑
ep0973			1.000	dimensionless	☑
ep0393			-1.000	dimensionless	☑
ep0739			-1.000	dimensionless	☑
ep1322			-1.000	dimensionless	☑

7.38 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

$$s\_0298 + s\_0434 \xrightleftharpoons{e\_0556,\ s\_0298,\ s\_0434,\ s\_0201,\ s\_0394} s\_0201 + s\_0394 \qquad (76)$$
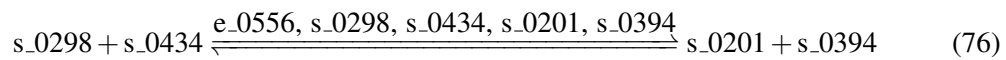
Reactants

Table 154: Properties of each reactant.

Id	Name	SBO
s_0298	5'-adenylyl sulfate	
s_0434	ATP	

Modifiers

Table 155: Properties of each modifier.

Id	Name	SBO
e_0556	MET14	0000460
s_0298	5'-adenylyl sulfate	
s_0434	ATP	
s_0201	3'-phospho-5'-adenylyl sulfate	
s_0394	ADP	

Products

Table 156: Properties of each product.

Id	Name	SBO
s_0201	3'-phospho-5'-adenylyl sulfate	
s_0394	ADP	

Kinetic Law

Derived unit contains undeclared units

$$v_{38} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0298} \cdot \left(\frac{[\text{s\_0298}]}{\text{ic0298}} \right) + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}} \right) + \text{ep0201} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0201}]}{\text{ic0201}} \right) + \text{ep0394} \cdot \left(\frac{[\text{s\_0394}]}{\text{ic0394}} \right) \right) \tag{77}$$

Table 157: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.002	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.002	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0298			1.000	dimensionless	☑
ep0434			1.000	dimensionless	☑
ep0201			-1.000	dimensionless	☑
ep0394			-1.000	dimensionless	☑

7.39 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

$$\text{s\_0434} + \text{s\_0955} + \text{s\_1582} \xrightleftharpoons{\text{e\_0894, s\_0434, s\_0955, s\_1582, s\_0404, s\_0423, s\_0633}} \text{s\_0404} + \text{s\_0423} + \text{s\_0633} \tag{78}$$

Produced by SBML2LATEX
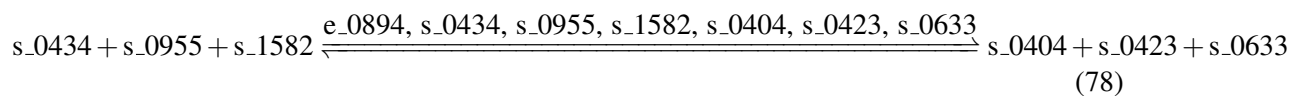
Reactants

Table 158: Properties of each reactant.

Id	Name	SBO
s_0434	ATP	
s_0955	L-alanine	
s_1582	tRNA(Ala)	

Modifiers

Table 159: Properties of each modifier.

Id	Name	SBO
e_0894	ALA1	0000460
s_0434	ATP	
s_0955	L-alanine	
s_1582	tRNA(Ala)	
s_0404	Ala-tRNA(Ala)	
s_0423	AMP	
s_0633	diphosphate	

Products

Table 160: Properties of each product.

Id	Name	SBO
s_0404	Ala-tRNA(Ala)	
s_0423	AMP	
s_0633	diphosphate	

Kinetic Law

Derived unit contains undeclared units

$$
v_{39} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}} \right) + \text{ep0955} \cdot \left(\frac{[\text{s\_0955}]}{\text{ic0955}} \right) + \text{ep1582} \cdot \left(\frac{[\text{s\_1582}]}{\text{ic1582}} \right) \right.
$$
$$
\left. + \text{ep0404} \cdot \left(\frac{[\text{s\_0404}]}{\text{ic0404}} \right) + \text{ep0423} \cdot \left(\frac{[\text{s\_0423}]}{\text{ic0423}} \right) + \text{ep0633} \cdot \left(\frac{[\text{s\_0633}]}{\text{ic0633}} \right) \right)
$$
(79)

Table 161: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.017	mmol·l^{-1}·s^{-1}	☑
v0			0.017	mmol·l^{-1}·s^{-1}	☑
ep0434			1.000	dimensionless	☑
ep0955			1.000	dimensionless	☑
ep1582			1.000	dimensionless	☑
ep0404			-1.000	dimensionless	☑
ep0423			-1.000	dimensionless	☑
ep0633			-1.000	dimensionless	☑

7.40 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

$$\text{s\_0568} + \text{s\_1543} \xrightleftharpoons{\text{e\_0711, e\_0065, e\_0179, e\_0753, s\_0568, s\_1543, s\_0409, s\_1538}} \text{s\_0409} + \text{s\_1538} \tag{80}$$
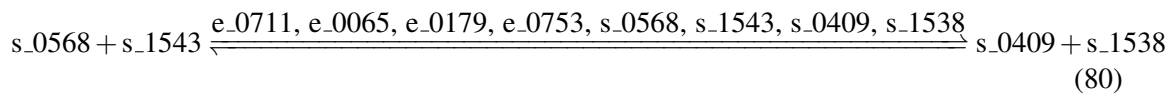
Reactants

Table 162: Properties of each reactant.

Id	Name	SBO
s_0568	D-glucose 6-phosphate	
s_1543	UDP-D-glucose	

Modifiers

Table 163: Properties of each modifier.

Id	Name	SBO
e_0711	TSL1	0000460
e_0065	TPS1	0000460
e_0179	TPS2	0000460
e_0753	TPS3	0000460

Id	Name	SBO
s_0568	D-glucose 6-phosphate	
s_1543	UDP-D-glucose	
s_0409	alpha,alpha-trehalose 6-phosphate	
s_1538	UDP	

Products

Table 164: Properties of each product.

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

Kinetic Law

Derived unit contains undeclared units

$$v_{40} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0568} \cdot \left(\frac{[\text{s\_0568}]}{\text{ic0568}} \right) + \text{ep1543} \cdot \left(\frac{[\text{s\_1543}]}{\text{ic1543}} \right) + \text{ep0409} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0409}]}{\text{ic0409}} \right) + \text{ep1538} \cdot \left(\frac{[\text{s\_1538}]}{\text{ic1538}} \right) \right) \tag{81}$$

Table 165: Properties of each parameter.

| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$8.88088702058448 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$8.88088702058448 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0568			1.000	dimensionless	☑
ep1543			1.000	dimensionless	☑
ep0409			-1.000	dimensionless	☑
ep1538			-1.000	dimensionless	☑

7.41 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

$$\text{s\_0427} + \text{s\_1386} \xrightleftharpoons{\text{e\_0219, s\_0427, s\_1386, s\_0633, s\_1187}} \text{s\_0633} + \text{s\_1187} \qquad (82)$$
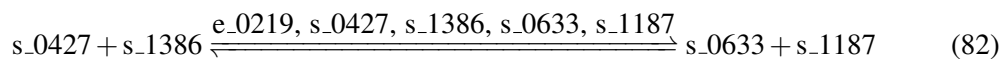
Reactants

Table 166: Properties of each reactant.

Id	Name	SBO
s_0427	anthranilate	
s_1386	PRPP	

Modifiers

Table 167: 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 168: 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

$$v_{41} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0427} \cdot \left(\frac{[\text{s\_0427}]}{\text{ic0427}} \right) + \text{ep1386} \cdot \left(\frac{[\text{s\_1386}]}{\text{ic1386}} \right) + \text{ep0633} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0633}]}{\text{ic0633}} \right) + \text{ep1187} \cdot \left(\frac{[\text{s\_1187}]}{\text{ic1187}} \right) \right) \qquad (83)$$

Table 169: Properties of each parameter.

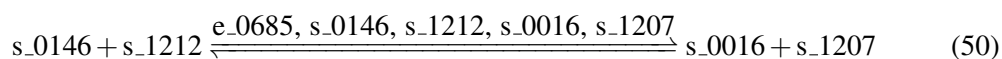| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.001	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
v0			0.001	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
ep0427			1.000	dimensionless	☑
ep1386			1.000	dimensionless	☑
ep0633			-1.000	dimensionless	☑
ep1187			-1.000	dimensionless	☑

7.42 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

$$\mathrm{s\_0515 + s\_0999} \xrightleftharpoons{\mathrm{e\_0297, e\_0591, s\_0515, s\_0999, s\_0427, s\_0991, s\_1399}} \mathrm{s\_0427 + s\_0991 + s\_1399}$$

$$(84)$$

Reactants

Table 170: Properties of each reactant.

Id	Name	SBO
s_0515	chorismate	
s_0999	L-glutamine	

Modifiers

Table 171: 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	

Id	Name	SBO
s_0991	L-glutamate	
s_1399	pyruvate	

Products

Table 172: Properties of each product.

Id	Name	SBO
s_0427	anthranilate	
s_0991	L-glutamate	
s_1399	pyruvate	

Kinetic Law

Derived unit contains undeclared units

$$v_{42} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0515} \cdot \left(\frac{[\text{s\_0515}]}{\text{ic0515}} \right) + \text{ep0999} \cdot \left(\frac{[\text{s\_0999}]}{\text{ic0999}} \right) + \text{ep0427} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0427}]}{\text{ic0427}} \right) + \text{ep0991} \cdot \left(\frac{[\text{s\_0991}]}{\text{ic0991}} \right) + \text{ep1399} \cdot \left(\frac{[\text{s\_1399}]}{\text{ic1399}} \right) \right) \tag{85}$$

Table 173: Properties of each parameter.

| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.001	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.001	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0515			1.000	dimensionless	☑
ep0999			1.000	dimensionless	☑
ep0427			-1.000	dimensionless	☑
ep0991			-1.000	dimensionless	☑
ep1399			-1.000	dimensionless	☑

## 7.43 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

$$\text{s\_0015} \xrightleftharpoons{\text{e\_0426, s\_0015, s\_0725, s\_0965}} \text{s\_0725} + \text{s\_0965} \qquad (86)$$
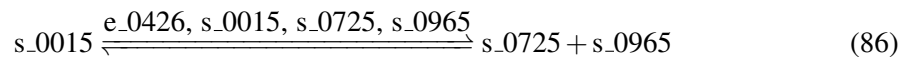
Reactant

Table 174: Properties of each reactant.

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

Modifiers

Table 175: 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 176: Properties of each product.

Id	Name	SBO
s_0725	fumarate	
s_0965	L-arginine	

Kinetic Law

Derived unit contains undeclared units

$$v_{43} = \text{vol}\,(\text{cell}) \cdot \text{v0}$$
$$\cdot \left(1 + \text{ep0015} \cdot \left(\frac{[\text{s\_0015}]}{\text{ic0015}} \right) + \text{ep0725} \cdot \left(\frac{[\text{s\_0725}]}{\text{ic0725}} \right) + \text{ep0965} \cdot \left(\frac{[\text{s\_0965}]}{\text{ic0965}} \right) \right) \qquad (87)$$

Table 177: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.006	mmol·l^{-1}·s^{-1}	☑
v0			0.006	mmol·l^{-1}·s^{-1}	☑
ep0015			1.000	dimensionless	☑
ep0725			-1.000	dimensionless	☑
ep0965			-1.000	dimensionless	☑

7.44 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

$$\text{s\_0434} + \text{s\_0973} + \text{s\_0979} \xrightleftharpoons{\text{e\_0826, s\_0434, s\_0973, s\_0979, s\_0015, s\_0423, s\_0633}} \text{s\_0015} + \text{s\_0423} + \text{s\_0633}$$

(88)
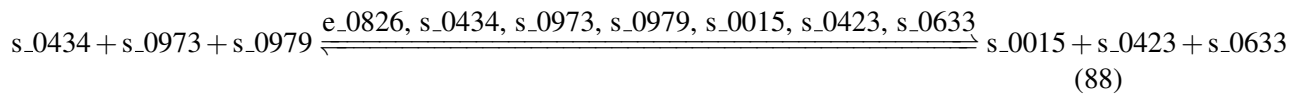
Reactants

Table 178: Properties of each reactant.

Id	Name	SBO
s_0434	ATP	
s_0973	L-aspartate	
s_0979	L-citrulline	

Modifiers

Table 179: Properties of each modifier.

Id	Name	SBO
e_0826	ARG1	0000460
s_0434	ATP	
s_0973	L-aspartate	
s_0979	L-citrulline	
s_0015	(N(omega)-L-arginino)succinic acid	

Id	Name	SBO
s_0423	AMP	
s_0633	diphosphate	

Products

Table 180: Properties of each product.

Id	Name	SBO
s_0015	(N(omega)-L-arginino)succinic acid	
s_0423	AMP	
s_0633	diphosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{44} = \text{vol} \, (\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}} \right) + \text{ep0973} \cdot \left(\frac{[\text{s\_0973}]}{\text{ic0973}} \right) + \text{ep0979} \cdot \left(\frac{[\text{s\_0979}]}{\text{ic0979}} \right) \right.$$
$$\left. + \text{ep0015} \cdot \left(\frac{[\text{s\_0015}]}{\text{ic0015}} \right) + \text{ep0423} \cdot \left(\frac{[\text{s\_0423}]}{\text{ic0423}} \right) + \text{ep0633} \cdot \left(\frac{[\text{s\_0633}]}{\text{ic0633}} \right) \right)$$

$$(89)$$

Table 181: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.006	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
v0			0.006	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
ep0434			1.000	dimensionless	☑
ep0973			1.000	dimensionless	☑
ep0979			1.000	dimensionless	☑
ep0015			-1.000	dimensionless	☑
ep0423			-1.000	dimensionless	☑
ep0633			-1.000	dimensionless	☑

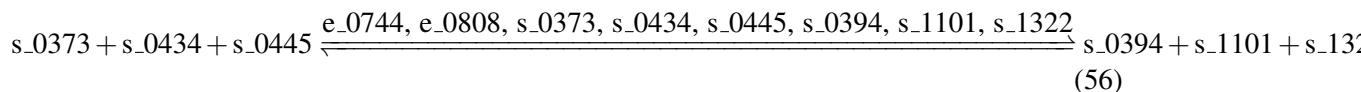## 7.45 Reaction r_0209

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

$$s\_0434 + s\_0965 + s\_1583 \xrightleftharpoons{e\_0214,\ s\_0434,\ s\_0965,\ s\_1583,\ s\_0423,\ s\_0428,\ s\_0633} s\_0423 + s\_0428 + s\_0633$$

$$(90)$$
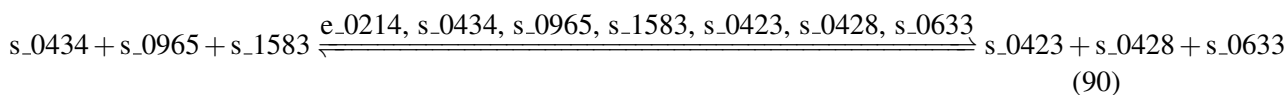
Reactants

Table 182: Properties of each reactant.

Id	Name	SBO
s_0434	ATP	
s_0965	L-arginine	
s_1583	tRNA(Arg)	

Modifiers

Table 183: Properties of each modifier.

Id	Name	SBO
e_0214	YDR341C	0000460
s_0434	ATP	
s_0965	L-arginine	
s_1583	tRNA(Arg)	
s_0423	AMP	
s_0428	Arg-tRNA(Arg)	
s_0633	diphosphate	

Products

Table 184: Properties of each product.

Id	Name	SBO
s_0423	AMP	
s_0428	Arg-tRNA(Arg)	
s_0633	diphosphate	

Kinetic Law

Derived unit contains undeclared units

Produced by SBML2LATEX

$$v_{45} = \mathrm{vol}\,(\mathrm{cell}) \cdot \mathrm{v0} \cdot \left(1 + \mathrm{ep0434} \cdot \left(\frac{[\mathrm{s\_0434}]}{\mathrm{ic0434}} \right) + \mathrm{ep0965} \cdot \left(\frac{[\mathrm{s\_0965}]}{\mathrm{ic0965}} \right) + \mathrm{ep1583} \cdot \left(\frac{[\mathrm{s\_1583}]}{\mathrm{ic1583}} \right) \right.$$
$$\left. + \mathrm{ep0423} \cdot \left(\frac{[\mathrm{s\_0423}]}{\mathrm{ic0423}} \right) + \mathrm{ep0428} \cdot \left(\frac{[\mathrm{s\_0428}]}{\mathrm{ic0428}} \right) + \mathrm{ep0633} \cdot \left(\frac{[\mathrm{s\_0633}]}{\mathrm{ic0633}} \right) \right)$$
$$(91)$$

Table 185: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.006	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
v0			0.006	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
ep0434			1.000	dimensionless	☑
ep0965			1.000	dimensionless	☑
ep1583			1.000	dimensionless	☑
ep0423			-1.000	dimensionless	☑
ep0428			-1.000	dimensionless	☑
ep0633			-1.000	dimensionless	☑

7.46 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

$$\mathrm{s\_0434} + \mathrm{s\_0973} + \mathrm{s\_0999} \xrightleftharpoons{\mathrm{e\_0970,\ e\_0376,\ s\_0434,\ s\_0973,\ s\_0999,\ s\_0423,\ s\_0633,\ s\_0969,\ s\_0991}} \mathrm{s\_0423} + \mathrm{s\_0633}$$
$$(92)$$
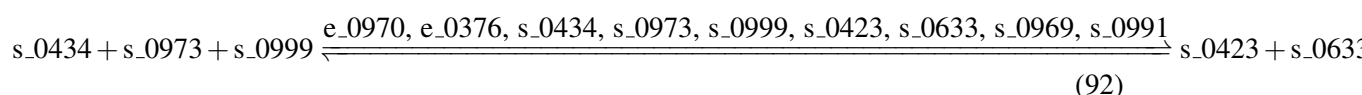
Reactants

Table 186: Properties of each reactant.

Id	Name	SBO
s_0434	ATP	
s_0973	L-aspartate	
s_0999	L-glutamine	

Modifiers

Table 187: Properties of each modifier.

Id	Name	SBO
e_0970	ASN1	0000460
e_0376	ASN2	0000460
s_0434	ATP	
s_0973	L-aspartate	
s_0999	L-glutamine	
s_0423	AMP	
s_0633	diphosphate	
s_0969	L-asparagine	
s_0991	L-glutamate	

Products

Table 188: Properties of each product.

Id	Name	SBO
s_0423	AMP	
s_0633	diphosphate	
s_0969	L-asparagine	
s_0991	L-glutamate	

Kinetic Law

Derived unit contains undeclared units

$$v_{46} = \text{vol}\,(\text{cell}) \cdot \text{v0}$$
$$\cdot \left(1 + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}}\right) + \text{ep0973} \cdot \left(\frac{[\text{s\_0973}]}{\text{ic0973}}\right) + \text{ep0999} \cdot \left(\frac{[\text{s\_0999}]}{\text{ic0999}}\right) + \text{ep0423}\right.$$
$$\left. \cdot \left(\frac{[\text{s\_0423}]}{\text{ic0423}}\right) + \text{ep0633} \cdot \left(\frac{[\text{s\_0633}]}{\text{ic0633}}\right) + \text{ep0969} \cdot \left(\frac{[\text{s\_0969}]}{\text{ic0969}}\right) + \text{ep0991} \cdot \left(\frac{[\text{s\_0991}]}{\text{ic0991}}\right)\right)$$

(93)

Table 189: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.004	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.004	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑

Id	Name	SBO	Value	Unit	Constant
ep0434			1.000	dimensionless	☑
ep0973			1.000	dimensionless	☑
ep0999			1.000	dimensionless	☑
ep0423			−1.000	dimensionless	☑
ep0633			−1.000	dimensionless	☑
ep0969			−1.000	dimensionless	☑
ep0991			−1.000	dimensionless	☑

7.47 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

$$s\_0434 + s\_0969 + s\_1585 \xrightleftharpoons{e\_0427,\ s\_0434,\ s\_0969,\ s\_1585,\ s\_0423,\ s\_0430,\ s\_0633} s\_0423 + s\_0430 + s\_0633 \tag{94}$$
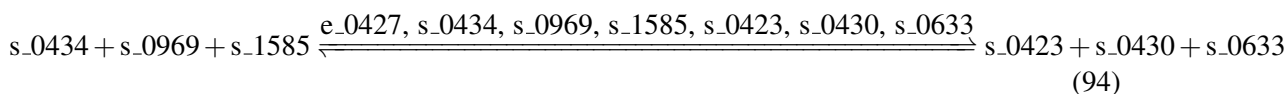
Reactants

Table 190: Properties of each reactant.

Id	Name	SBO
s_0434	ATP	
s_0969	L-asparagine	
s_1585	tRNA(Asn)	

Modifiers

Table 191: Properties of each modifier.

Id	Name	SBO
e_0427	DED81	0000460
s_0434	ATP	
s_0969	L-asparagine	
s_1585	tRNA(Asn)	
s_0423	AMP	

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

Products

Table 192: Properties of each product.

Id	Name	SBO
s_0423	AMP	
s_0430	Asn-tRNA(Asn)	
s_0633	diphosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{47} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}} \right) + \text{ep0969} \cdot \left(\frac{[\text{s\_0969}]}{\text{ic0969}} \right) + \text{ep1585} \cdot \left(\frac{[\text{s\_1585}]}{\text{ic1585}} \right) \right.$$
$$\left. + \text{ep0423} \cdot \left(\frac{[\text{s\_0423}]}{\text{ic0423}} \right) + \text{ep0430} \cdot \left(\frac{[\text{s\_0430}]}{\text{ic0430}} \right) + \text{ep0633} \cdot \left(\frac{[\text{s\_0633}]}{\text{ic0633}} \right) \right)$$

(95)

Table 193: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.004	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	✓
v0			0.004	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	✓
ep0434			1.000	dimensionless	✓
ep0969			1.000	dimensionless	✓
ep1585			1.000	dimensionless	✓
ep0423			−1.000	dimensionless	✓
ep0430			−1.000	dimensionless	✓
ep0633			−1.000	dimensionless	✓

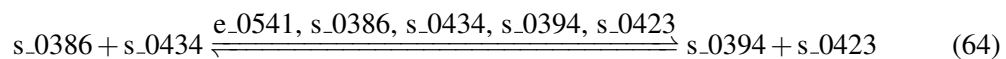## 7.48 Reaction r_0214

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

Name aspartate carbamoyltransferase

SBO:0000176 biochemical reaction

Reaction equation

$$s\_0455 + s\_0973 \xrightleftharpoons{\text{e\_0508, s\_0455, s\_0973, s\_1194, s\_1322}} s\_1194 + s\_1322 \qquad (96)$$
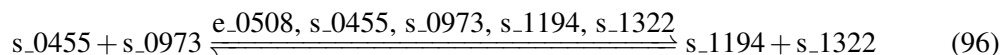
Reactants

Table 194: Properties of each reactant.

Id	Name	SBO
s_0455	carbamoyl phosphate	
s_0973	L-aspartate	

Modifiers

Table 195: 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	
s_1322	phosphate	

Products

Table 196: Properties of each product.

Id	Name	SBO
s_1194	N-carbamoyl-L-aspartate	
s_1322	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{48} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0455} \cdot \left(\frac{[\text{s\_0455}]}{\text{ic0455}} \right) + \text{ep0973} \cdot \left(\frac{[\text{s\_0973}]}{\text{ic0973}} \right) + \text{ep1194} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_1194}]}{\text{ic1194}} \right) + \text{ep1322} \cdot \left(\frac{[\text{s\_1322}]}{\text{ic1322}} \right) \right) \qquad (97)$$

Table 197: Properties of each parameter.

| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.004	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
v0			0.004	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
ep0455			1.000	dimensionless	☑
ep0973			1.000	dimensionless	☑
ep1194			-1.000	dimensionless	☑
ep1322			-1.000	dimensionless	☑

7.49 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

$$\mathrm{s\_0434} + \mathrm{s\_0973} \xrightleftharpoons{\mathrm{e\_0281,\ s\_0434,\ s\_0973,\ s\_0295,\ s\_0394}} \mathrm{s\_0295} + \mathrm{s\_0394} \tag{98}$$
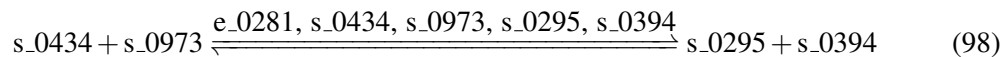
Reactants

Table 198: Properties of each reactant.

Id	Name	SBO
s_0434	ATP	
s_0973	L-aspartate	

Modifiers

Table 199: Properties of each modifier.

Id	Name	SBO
e_0281	HOM3	0000460
s_0434	ATP	
s_0973	L-aspartate	
s_0295	4-phospho-L-aspartate	
s_0394	ADP	

Products

Table 200: Properties of each product.

Id	Name	SBO
s_0295	4-phospho-L-aspartate	
s_0394	ADP	

Kinetic Law

Derived unit contains undeclared units

$$v_{49} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}} \right) + \text{ep0973} \cdot \left(\frac{[\text{s\_0973}]}{\text{ic0973}} \right) + \text{ep0295} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0295}]}{\text{ic0295}} \right) + \text{ep0394} \cdot \left(\frac{[\text{s\_0394}]}{\text{ic0394}} \right) \right) \tag{99}$$

Table 201: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.019	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.019	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0434			1.000	dimensionless	☑
ep0973			1.000	dimensionless	☑
ep0295			-1.000	dimensionless	☑
ep0394			-1.000	dimensionless	☑

7.50 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

$$\text{s\_0991} + \text{s\_1271} \xrightleftharpoons{\text{e\_0629, e\_0574, s\_0991, s\_1271, s\_0180, s\_0973}} \text{s\_0180} + \text{s\_0973} \tag{100}$$
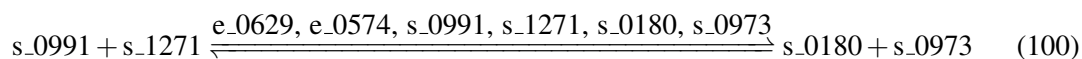
Reactants

Table 202: Properties of each reactant.

Id	Name	SBO
s_0991	L-glutamate	
s_1271	oxaloacetate	

Modifiers

Table 203: 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 204: Properties of each product.

Id	Name	SBO
s_0180	2-oxoglutarate	
s_0973	L-aspartate	

Kinetic Law

Derived unit contains undeclared units

$$v_{50} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0991} \cdot \left(\frac{[\text{s\_0991}]}{\text{ic0991}} \right) + \text{ep1271} \cdot \left(\frac{[\text{s\_1271}]}{\text{ic1271}} \right) + \text{ep0180} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0180}]}{\text{ic0180}} \right) + \text{ep0973} \cdot \left(\frac{[\text{s\_0973}]}{\text{ic0973}} \right) \right) \tag{101}$$

Table 205: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.052	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.052	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑

Produced by SBML2LATEX

Id	Name	SBO	Value	Unit	Constant
ep0991			1.000	dimensionless	☑
ep1271			1.000	dimensionless	☑
ep0180			−1.000	dimensionless	☑
ep0973			−1.000	dimensionless	☑

7.51 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

$$s\_0295 + s\_1212 \xrightleftharpoons{e\_0186,\ s\_0295,\ s\_1212,\ s\_0978,\ s\_1207,\ s\_1322} s\_0978 + s\_1207 + s\_1322 \tag{102}$$
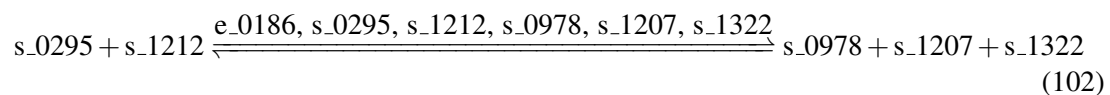
Reactants

Table 206: Properties of each reactant.

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

Modifiers

Table 207: 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(+)	
s_1322	phosphate	

Products

Table 208: Properties of each product.

Id	Name	SBO
s_0978	L-aspartate 4-semialdehyde	
s_1207	NADP(+)	
s_1322	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$
\begin{aligned}
v_{51} = \mathrm{vol}\,(\mathrm{cell}) \cdot \mathrm{v0} \cdot \Bigg(& 1 + \mathrm{ep0295} \cdot \left(\frac{[\mathrm{s\_0295}]}{\mathrm{ic0295}} \right) + \mathrm{ep1212} \cdot \left(\frac{[\mathrm{s\_1212}]}{\mathrm{ic1212}} \right) + \mathrm{ep0978} \\
& \cdot \left(\frac{[\mathrm{s\_0978}]}{\mathrm{ic0978}} \right) + \mathrm{ep1207} \cdot \left(\frac{[\mathrm{s\_1207}]}{\mathrm{ic1207}} \right) + \mathrm{ep1322} \cdot \left(\frac{[\mathrm{s\_1322}]}{\mathrm{ic1322}} \right) \Bigg)
\end{aligned}
\tag{103}
$$

Table 209: Properties of each parameter.

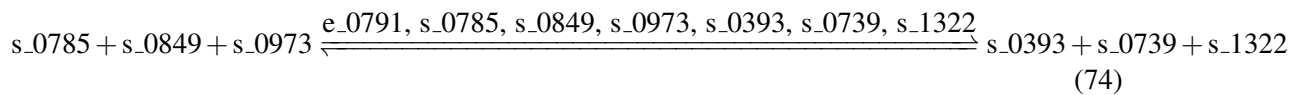| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.019	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
v0			0.019	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
ep0295			1.000	dimensionless	☑
ep1212			1.000	dimensionless	☑
ep0978			-1.000	dimensionless	☑
ep1207			-1.000	dimensionless	☑
ep1322			-1.000	dimensionless	☑

7.52 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

$$
\mathrm{s\_0434} + \mathrm{s\_0973} + \mathrm{s\_1587} \xrightleftharpoons{\mathrm{e\_0615,\ s\_0434,\ s\_0973,\ s\_1587,\ s\_0423,\ s\_0432,\ s\_0633}} \mathrm{s\_0423} + \mathrm{s\_0432} + \mathrm{s\_0633}
\tag{104}
$$

Produced by SBML₂ᴸᴬᵀᴇX
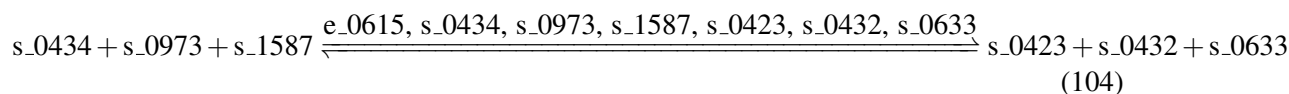
Reactants

Table 210: Properties of each reactant.

Id	Name	SBO
s_0434	ATP	
s_0973	L-aspartate	
s_1587	tRNA(Asp)	

Modifiers

Table 211: Properties of each modifier.

Id	Name	SBO
e_0615	DPS1	0000460
s_0434	ATP	
s_0973	L-aspartate	
s_1587	tRNA(Asp)	
s_0423	AMP	
s_0432	Asp-tRNA(Asp)	
s_0633	diphosphate	

Products

Table 212: Properties of each product.

Id	Name	SBO
s_0423	AMP	
s_0432	Asp-tRNA(Asp)	
s_0633	diphosphate	

Kinetic Law

Derived unit contains undeclared units

$$
\begin{aligned}
v_{52} = \mathrm{vol}\left(\mathrm{cell}\right) \cdot \mathrm{v0} \cdot &\left(1 + \mathrm{ep0434} \cdot \left(\frac{[\mathrm{s\_0434}]}{\mathrm{ic0434}} \right) + \mathrm{ep0973} \cdot \left(\frac{[\mathrm{s\_0973}]}{\mathrm{ic0973}} \right) + \mathrm{ep1587} \cdot \left(\frac{[\mathrm{s\_1587}]}{\mathrm{ic1587}} \right) \right. \\
&\left. + \mathrm{ep0423} \cdot \left(\frac{[\mathrm{s\_0423}]}{\mathrm{ic0423}} \right) + \mathrm{ep0432} \cdot \left(\frac{[\mathrm{s\_0432}]}{\mathrm{ic0432}} \right) + \mathrm{ep0633} \cdot \left(\frac{[\mathrm{s\_0633}]}{\mathrm{ic0633}} \right) \right)
\end{aligned}
\tag{105}
$$

Table 213: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.011	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
v0			0.011	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
ep0434			1.000	dimensionless	☑
ep0973			1.000	dimensionless	☑
ep1587			1.000	dimensionless	☑
ep0423			-1.000	dimensionless	☑
ep0432			-1.000	dimensionless	☑
ep0633			-1.000	dimensionless	☑

7.53 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

$$\mathrm{s\_0434 + s\_1386} \xrightleftharpoons{\mathrm{e\_0283, s\_0434, s\_1386, s\_0326, s\_0633}} \mathrm{s\_0326 + s\_0633} \qquad (106)$$

Reactants

Table 214: Properties of each reactant.

Id	Name	SBO
s_0434	ATP	
s_1386	PRPP	

Modifiers

Table 215: Properties of each modifier.

Id	Name	SBO
e_0283	HIS1	0000460
s_0434	ATP	
s_1386	PRPP	
s_0326	5-phosphoribosyl-ATP	
s_0633	diphosphate	

Products

<div align="center">

Table 216: Properties of each product.

Id	Name	SBO
s_0326	5-phosphoribosyl-ATP	
s_0633	diphosphate	

</div>

Kinetic Law

Derived unit contains undeclared units

$$v_{53} = \text{vol}\,(\text{cell}) \cdot v0 \cdot \left(1 + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}} \right) + \text{ep1386} \cdot \left(\frac{[\text{s\_1386}]}{\text{ic1386}} \right) + \text{ep0326} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0326}]}{\text{ic0326}} \right) + \text{ep0633} \cdot \left(\frac{[\text{s\_0633}]}{\text{ic0633}} \right) \right) \tag{107}$$

<div align="center">

Table 217: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.003	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.003	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0434			1.000	dimensionless	☑
ep1386			1.000	dimensionless	☑
ep0326			-1.000	dimensionless	☑
ep0633			-1.000	dimensionless	☑

</div>

7.54 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

$$\text{s\_0262} + \text{s\_1212} \xrightleftharpoons{\text{e\_0800, s\_0262, s\_1212, s\_0122, s\_1207}} \text{s\_0122} + \text{s\_1207} \tag{108}$$

Reactants

Table 218: 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 219: 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 220: Properties of each product.

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

Kinetic Law

Derived unit contains undeclared units

$$
v_{54} = \mathrm{vol}\,(\mathrm{cell}) \cdot \mathrm{v0} \cdot \left(1 + \mathrm{ep0262} \cdot \left(\frac{[\mathrm{s\_0262}]}{\mathrm{ic0262}} \right) + \mathrm{ep1212} \cdot \left(\frac{[\mathrm{s\_1212}]}{\mathrm{ic1212}} \right) + \mathrm{ep0122} \right.
$$
$$
\left. \cdot \left(\frac{[\mathrm{s\_0122}]}{\mathrm{ic0122}} \right) + \mathrm{ep1207} \cdot \left(\frac{[\mathrm{s\_1207}]}{\mathrm{ic1207}} \right) \right) \tag{109}
$$

Table 221: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.58760203874159 \cdot 10^{-4}$	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
v0			$2.58760203874159 \cdot 10^{-4}$	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
ep0262			1.000	dimensionless	☑

Id	Name	SBO	Value	Unit	Constant
ep1212			1.000	dimensionless	☑
ep0122			−1.000	dimensionless	☑
ep1207			−1.000	dimensionless	☑

7.55 Reaction `r_0233`

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

Name C-22 sterol desaturase (NADP)

SBO:0000176 biochemical reaction

Reaction equation

$$s\_0664 + s\_1212 + s\_1275 \underset{}{\overset{e\_0724,\ s\_0664,\ s\_1212,\ s\_1275,\ s\_0662,\ s\_1207}{\rightleftharpoons}} s\_0662 + s\_1207 \tag{110}$$
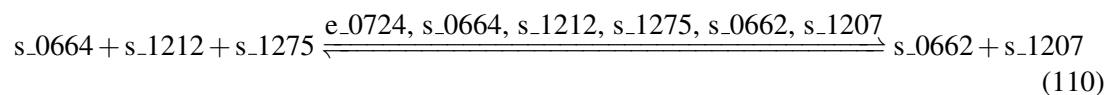
Reactants

Table 222: Properties of each reactant.

Id	Name	SBO
s_0664	ergosta-5,7,24(28)-trien-3beta-ol	
s_1212	NADPH	
s_1275	oxygen	

Modifiers

Table 223: Properties of each modifier.

Id	Name	SBO
e_0724	ERG5	0000460
s_0664	ergosta-5,7,24(28)-trien-3beta-ol	
s_1212	NADPH	
s_1275	oxygen	
s_0662	ergosta-5,7,22,24(28)-tetraen-3beta-ol	
s_1207	NADP(+)	

Products

Table 224: Properties of each product.

Id	Name	SBO
s_0662	ergosta-5,7,22,24(28)-tetraen-3beta-ol	
s_1207	NADP(+)	

Kinetic Law

Derived unit contains undeclared units

$$
\begin{aligned}
v_{55} = \mathrm{vol\,(cell)} \cdot \mathrm{v0} \cdot \Bigg(1 + \mathrm{ep0664} \cdot \left(\frac{[s\_0664]}{\mathrm{ic0664}} \right) + \mathrm{ep1212} \cdot \left(\frac{[s\_1212]}{\mathrm{ic1212}} \right) + \mathrm{ep1275} \\
\cdot \left(\frac{[s\_1275]}{\mathrm{ic1275}} \right) + \mathrm{ep0662} \cdot \left(\frac{[s\_0662]}{\mathrm{ic0662}} \right) + \mathrm{ep1207} \cdot \left(\frac{[s\_1207]}{\mathrm{ic1207}} \right) \Bigg)
\end{aligned}
\tag{111}
$$

Table 225: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.48095549098117 \cdot 10^{-4}$	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
v0			$2.48095549098117 \cdot 10^{-4}$	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
ep0664			1.000	dimensionless	☑
ep1212			1.000	dimensionless	☑
ep1275			1.000	dimensionless	☑
ep0662			−1.000	dimensionless	☑
ep1207			−1.000	dimensionless	☑

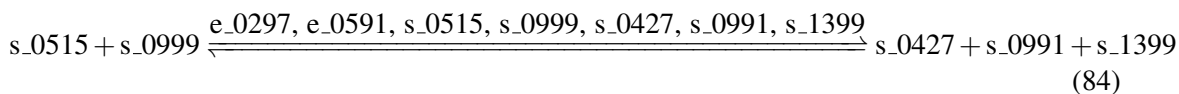## 7.56 Reaction r_0234

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

$$
s\_1207 + s\_1578 \xrightleftharpoons{e\_0326,\ s\_1207,\ s\_1578,\ s\_0456,\ s\_1212,\ s\_1579} s\_0456 + s\_1212 + s\_1579
\tag{112}
$$

Reactants

Table 226: Properties of each reactant.

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

Modifiers

Table 227: Properties of each modifier.

Id	Name	SBO
e_0326	ERG26	0000460
s_1207	NADP(+)	
s_1578	zymosterol intermediate 1c	
s_0456	carbon dioxide	
s_1212	NADPH	
s_1579	zymosterol intermediate 2	

Products

Table 228: Properties of each product.

Id	Name	SBO
s_0456	carbon dioxide	
s_1212	NADPH	
s_1579	zymosterol intermediate 2	

Kinetic Law

Derived unit contains undeclared units

$$
\begin{aligned}
v_{56} = \mathrm{vol}\,(\mathrm{cell}) \cdot \mathrm{v0} \cdot \Bigg(&1 + \mathrm{ep1207} \cdot \left(\frac{[\mathrm{s\_1207}]}{\mathrm{ic1207}} \right) + \mathrm{ep1578} \cdot \left(\frac{[\mathrm{s\_1578}]}{\mathrm{ic1578}} \right) + \mathrm{ep0456} \\
&\cdot \left(\frac{[\mathrm{s\_0456}]}{\mathrm{ic0456}} \right) + \mathrm{ep1212} \cdot \left(\frac{[\mathrm{s\_1212}]}{\mathrm{ic1212}} \right) + \mathrm{ep1579} \cdot \left(\frac{[\mathrm{s\_1579}]}{\mathrm{ic1579}} \right) \Bigg)
\end{aligned}
\tag{113}
$$

Table 229: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.56634863390825 \cdot 10^{-4}$	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑

Id	Name	SBO	Value	Unit	Constant
v0			$2.56634863390825 \cdot 10^{-4}$	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
ep1207			1.000	dimensionless	☑
ep1578			1.000	dimensionless	☑
ep0456			-1.000	dimensionless	☑
ep1212			-1.000	dimensionless	☑
ep1579			-1.000	dimensionless	☑

7.57 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

$$\mathrm{s\_0297} + \mathrm{s\_1198} \xrightleftharpoons{\mathrm{e\_0326,\ s\_0297,\ s\_1198,\ s\_0209,\ s\_0456,\ s\_1203}} \mathrm{s\_0209} + \mathrm{s\_0456} + \mathrm{s\_1203}$$

$$(114)$$
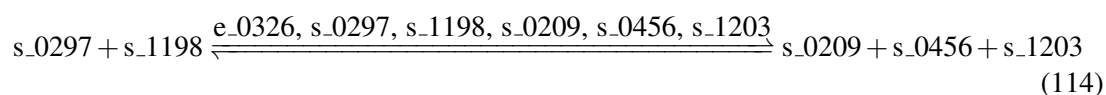
Reactants

Table 230: Properties of each reactant.

Id	Name	SBO
s_0297	4beta-methylzymosterol-4alpha-carboxylic acid	
s_1198	NAD	

Modifiers

Table 231: Properties of each modifier.

Id	Name	SBO
e_0326	ERG26	0000460
s_0297	4beta-methylzymosterol-4alpha-carboxylic acid	
s_1198	NAD	
s_0209	3-dehydro-4-methylzymosterol	
s_0456	carbon dioxide	
s_1203	NADH	

Products

Table 232: Properties of each product.

Id	Name	SBO
s_0209	3-dehydro-4-methylzymosterol	
s_0456	carbon dioxide	
s_1203	NADH	

Kinetic Law

Derived unit contains undeclared units

$$
v_{57} = \text{vol}(\text{cell}) \cdot v0 \cdot \left(1 + \text{ep0297} \cdot \left(\frac{[\text{s\_0297}]}{\text{ic0297}}\right) + \text{ep1198} \cdot \left(\frac{[\text{s\_1198}]}{\text{ic1198}}\right) + \text{ep0209} \right.
$$
$$
\left. \cdot \left(\frac{[\text{s\_0209}]}{\text{ic0209}}\right) + \text{ep0456} \cdot \left(\frac{[\text{s\_0456}]}{\text{ic0456}}\right) + \text{ep1203} \cdot \left(\frac{[\text{s\_1203}]}{\text{ic1203}}\right)\right) \tag{115}
$$

Table 233: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.56634863390825 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$2.56634863390825 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0297			1.000	dimensionless	☑
ep1198			1.000	dimensionless	☑
ep0209			-1.000	dimensionless	☑
ep0456			-1.000	dimensionless	☑
ep1203			-1.000	dimensionless	☑

7.58 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

$$
\text{s\_0209} + \text{s\_1212} \xrightleftharpoons{\text{e\_0644, s\_0209, s\_1212, s\_0296, s\_1207}} \text{s\_0296} + \text{s\_1207} \tag{116}
$$

Reactants

Table 234: Properties of each reactant.

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

Modifiers

Table 235: 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 236: Properties of each product.

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

Kinetic Law

Derived unit contains undeclared units

$$v_{58} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0209} \cdot \left(\frac{[\text{s\_0209}]}{\text{ic0209}} \right) + \text{ep1212} \cdot \left(\frac{[\text{s\_1212}]}{\text{ic1212}} \right) + \text{ep0296} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0296}]}{\text{ic0296}} \right) + \text{ep1207} \cdot \left(\frac{[\text{s\_1207}]}{\text{ic1207}} \right) \right) \tag{117}$$

Table 237: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.56634863390825 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑

Produced by SBML2LATEX

Id	Name	SBO	Value	Unit	Constant
v0			$2.56634863390825 \cdot 10^{-4}$	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
ep0209			1.000	dimensionless	☑
ep1212			1.000	dimensionless	☑
ep0296			-1.000	dimensionless	☑
ep1207			-1.000	dimensionless	☑

7.59 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

$$\mathrm{s\_1212} + \mathrm{s\_1579} \xrightleftharpoons{\mathrm{e\_0644, \ s\_1212, \ s\_1579, \ s\_1207, \ s\_1569}} \mathrm{s\_1207} + \mathrm{s\_1569} \tag{118}$$
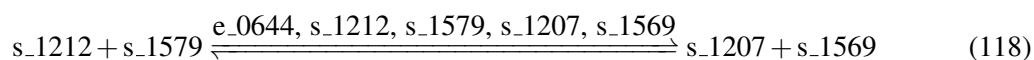
Reactants

Table 238: Properties of each reactant.

Id	Name	SBO
s_1212	NADPH	
s_1579	zymosterol intermediate 2	

Modifiers

Table 239: Properties of each modifier.

Id	Name	SBO
e_0644	ERG27	0000460
s_1212	NADPH	
s_1579	zymosterol intermediate 2	
s_1207	NADP(+)	
s_1569	zymosterol	

Products

Table 240: Properties of each product.

Id	Name	SBO
s_1207	NADP(+)	
s_1569	zymosterol	

Kinetic Law

Derived unit contains undeclared units

$$v_{59} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep1212} \cdot \left(\frac{[\text{s\_1212}]}{\text{ic1212}} \right) + \text{ep1579} \cdot \left(\frac{[\text{s\_1579}]}{\text{ic1579}} \right) + \text{ep1207} \right. $$
$$\left. \cdot \left(\frac{[\text{s\_1207}]}{\text{ic1207}} \right) + \text{ep1569} \cdot \left(\frac{[\text{s\_1569}]}{\text{ic1569}} \right) \right) \tag{119}$$

Table 241: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.56634863390825 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$2.56634863390825 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep1212			1.000	dimensionless	☑
ep1579			1.000	dimensionless	☑
ep1207			-1.000	dimensionless	☑
ep1569			-1.000	dimensionless	☑

7.60 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

$$\text{s\_0296} + \text{s\_1212} + \text{s\_1275} \xrightleftharpoons{\text{e\_0367, s\_0296, s\_1212, s\_1275, s\_1207, s\_1576}} \text{s\_1207} + \text{s\_1576} \tag{120}$$
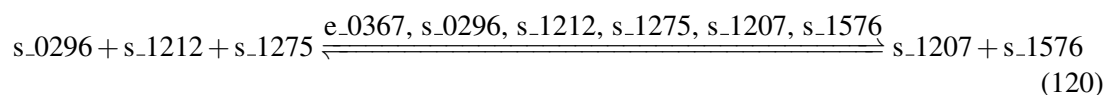
Reactants

Table 242: Properties of each reactant.

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

Modifiers

Table 243: 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 244: Properties of each product.

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

Kinetic Law

Derived unit contains undeclared units

$$
\begin{aligned}
v_{60} = \mathrm{vol}\,(\mathrm{cell}) \cdot \mathrm{v0} \cdot \Bigg(& 1 + \mathrm{ep0296} \cdot \left(\frac{[\mathrm{s\_0296}]}{\mathrm{ic0296}} \right) + \mathrm{ep1212} \cdot \left(\frac{[\mathrm{s\_1212}]}{\mathrm{ic1212}} \right) + \mathrm{ep1275} \\
& \cdot \left(\frac{[\mathrm{s\_1275}]}{\mathrm{ic1275}} \right) + \mathrm{ep1207} \cdot \left(\frac{[\mathrm{s\_1207}]}{\mathrm{ic1207}} \right) + \mathrm{ep1576} \cdot \left(\frac{[\mathrm{s\_1576}]}{\mathrm{ic1576}} \right) \Bigg)
\end{aligned}
\tag{121}
$$

Table 245: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.56634863390825 \cdot 10^{-4}$	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	✓

Id	Name	SBO	Value	Unit	Constant
v0			$2.56634863390825 \cdot 10^{-4}$	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
ep0296			1.000	dimensionless	☑
ep1212			1.000	dimensionless	☑
ep1275			1.000	dimensionless	☑
ep1207			-1.000	dimensionless	☑
ep1576			-1.000	dimensionless	☑

7.61 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

$$\mathrm{s\_1212} + \mathrm{s\_1275} + \mathrm{s\_1576} \xrightleftharpoons{\mathrm{e\_0367,\ s\_1212,\ s\_1275,\ s\_1576,\ s\_1207,\ s\_1577}} \mathrm{s\_1207} + \mathrm{s\_1577}$$

$$(122)$$
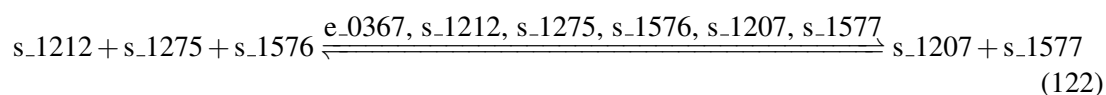
Reactants

Table 246: Properties of each reactant.

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

Modifiers

Table 247: 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 248: Properties of each product.

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

Kinetic Law

Derived unit contains undeclared units

$$v_{61} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep1212} \cdot \left(\frac{[\text{s\_1212}]}{\text{ic1212}} \right) + \text{ep1275} \cdot \left(\frac{[\text{s\_1275}]}{\text{ic1275}} \right) + \text{ep1576} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_1576}]}{\text{ic1576}} \right) + \text{ep1207} \cdot \left(\frac{[\text{s\_1207}]}{\text{ic1207}} \right) + \text{ep1577} \cdot \left(\frac{[\text{s\_1577}]}{\text{ic1577}} \right) \right) \tag{123}$$

Table 249: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.56634863390825 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$2.56634863390825 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep1212			1.000	dimensionless	☑
ep1275			1.000	dimensionless	☑
ep1576			1.000	dimensionless	☑
ep1207			-1.000	dimensionless	☑
ep1577			-1.000	dimensionless	☑

7.62 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

$$\text{s\_1212} + \text{s\_1275} + \text{s\_1577} \overset{\text{e\_0367, s\_1212, s\_1275, s\_1577, s\_1207, s\_1578}}{\rightleftharpoons} \text{s\_1207} + \text{s\_1578} \tag{124}$$
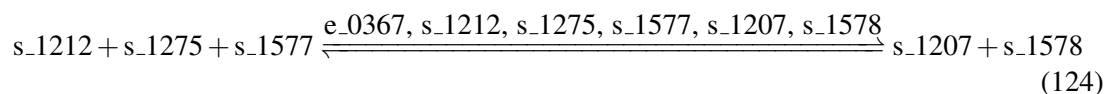
Reactants

Table 250: Properties of each reactant.

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

Modifiers

Table 251: 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 252: Properties of each product.

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

Kinetic Law

Derived unit contains undeclared units

$$
\begin{aligned}
v_{62} = \mathrm{vol}\,(\mathrm{cell}) \cdot \mathrm{v0} \cdot \Bigg(& 1 + \mathrm{ep1212} \cdot \left(\frac{[\mathrm{s\_1212}]}{\mathrm{ic1212}} \right) + \mathrm{ep1275} \cdot \left(\frac{[\mathrm{s\_1275}]}{\mathrm{ic1275}} \right) + \mathrm{ep1577} \\
& \cdot \left(\frac{[\mathrm{s\_1577}]}{\mathrm{ic1577}} \right) + \mathrm{ep1207} \cdot \left(\frac{[\mathrm{s\_1207}]}{\mathrm{ic1207}} \right) + \mathrm{ep1578} \cdot \left(\frac{[\mathrm{s\_1578}]}{\mathrm{ic1578}} \right) \Bigg)
\end{aligned}
\tag{125}
$$

Table 253: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.56634863390825 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$2.56634863390825 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep1212			1.000	dimensionless	☑
ep1275			1.000	dimensionless	☑
ep1577			1.000	dimensionless	☑
ep1207			-1.000	dimensionless	☑
ep1578			-1.000	dimensionless	☑

7.63 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

$$\text{s\_0122} + 3\,\text{s\_1212} + 3\,\text{s\_1275} \xrightleftharpoons{\text{e\_0367, s\_0122, s\_1212, s\_1275, s\_0297, s\_1207}} \text{s\_0297} + 3\,\text{s\_1207} \tag{126}$$
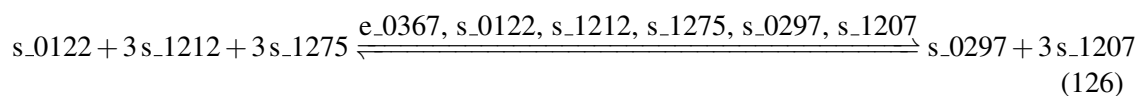
Reactants

Table 254: Properties of each reactant.

Id	Name	SBO
s_0122	14-demethyllanosterol	
s_1212	NADPH	
s_1275	oxygen	

Modifiers

Table 255: Properties of each modifier.

Id	Name	SBO
e_0367	ERG25	0000460
s_0122	14-demethyllanosterol	
s_1212	NADPH	
s_1275	oxygen	

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

Products

Table 256: Properties of each product.

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

Kinetic Law

Derived unit contains undeclared units

$$
v_{63} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0122} \cdot \left(\frac{[\text{s\_0122}]}{\text{ic0122}}\right) + \text{ep1212} \cdot \left(\frac{[\text{s\_1212}]}{\text{ic1212}}\right) + \text{ep1275} \right.
$$
$$
\left. \cdot \left(\frac{[\text{s\_1275}]}{\text{ic1275}}\right) + \text{ep0297} \cdot \left(\frac{[\text{s\_0297}]}{\text{ic0297}}\right) + \text{ep1207} \cdot \left(\frac{[\text{s\_1207}]}{\text{ic1207}}\right)\right)
$$

(127)

Table 257: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.56634863390825 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	✓
v0			$2.56634863390825 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	✓
ep0122			1.000	dimensionless	✓
ep1212			3.000	dimensionless	✓
ep1275			3.000	dimensionless	✓
ep0297			-1.000	dimensionless	✓
ep1207			-3.000	dimensionless	✓

7.64 Reaction r_0242

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

Name C-5 sterol desaturase

SBO:0000176 biochemical reaction

Reaction equation

$$s\_0657 + s\_1212 + s\_1275 \xrightleftharpoons{\text{e\_0637, s\_0657, s\_1212, s\_1275, s\_0664, s\_1207}} s\_0664 + s\_1207 \tag{128}$$
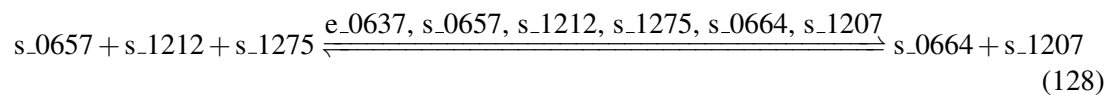
Reactants

Table 258: Properties of each reactant.

Id	Name	SBO
s_0657	episterol	
s_1212	NADPH	
s_1275	oxygen	

Modifiers

Table 259: Properties of each modifier.

Id	Name	SBO
e_0637	ERG3	0000460
s_0657	episterol	
s_1212	NADPH	
s_1275	oxygen	
s_0664	ergosta-5,7,24(28)-trien-3beta-ol	
s_1207	NADP(+)	

Products

Table 260: Properties of each product.

Id	Name	SBO
s_0664	ergosta-5,7,24(28)-trien-3beta-ol	
s_1207	NADP(+)	

Kinetic Law

Derived unit contains undeclared units

$$v_{64} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0657} \cdot \left(\frac{[\text{s\_0657}]}{\text{ic0657}}\right) + \text{ep1212} \cdot \left(\frac{[\text{s\_1212}]}{\text{ic1212}}\right) + \text{ep1275}\right.$$
$$\left. \cdot \left(\frac{[\text{s\_1275}]}{\text{ic1275}}\right) + \text{ep0664} \cdot \left(\frac{[\text{s\_0664}]}{\text{ic0664}}\right) + \text{ep1207} \cdot \left(\frac{[\text{s\_1207}]}{\text{ic1207}}\right)\right) \quad (129)$$

Table 261: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.48095549098117 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$2.48095549098117 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0657			1.000	dimensionless	☑
ep1212			1.000	dimensionless	☑
ep1275			1.000	dimensionless	☑
ep0664			-1.000	dimensionless	☑
ep1207			-1.000	dimensionless	☑

7.65 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

$$\text{s\_0700} \xrightleftharpoons{\text{e\_0742, s\_0700, s\_0657}} \text{s\_0657} \quad (130)$$
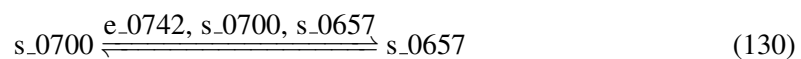
Reactant

Table 262: Properties of each reactant.

Id	Name	SBO
s_0700	fecosterol	

Modifiers

Table 263: Properties of each modifier.

Id	Name	SBO
e_0742	ERG2	0000460
s_0700	fecosterol	
s_0657	episterol	

Product

Table 264: Properties of each product.

Id	Name	SBO
s_0657	episterol	

Kinetic Law

Derived unit contains undeclared units

$$v_{65} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0700} \cdot \left(\frac{[\text{s\_0700}]}{\text{ic0700}} \right) + \text{ep0657} \cdot \left(\frac{[\text{s\_0657}]}{\text{ic0657}} \right) \right) \quad (131)$$

Table 265: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.5173898992709 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$2.5173898992709 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0700			1.000	dimensionless	☑
ep0657			-1.000	dimensionless	☑

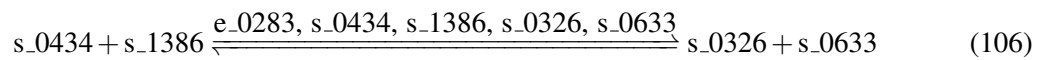## 7.66 Reaction r_0244

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

$$\text{s\_0662} + \text{s\_1212} \xrightleftharpoons[\hspace{3cm}]{\text{e\_0329, s\_0662, s\_1212, s\_0666, s\_1207}} \text{s\_0666} + \text{s\_1207} \quad (132)$$

Reactants

Table 266: Properties of each reactant.

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

Modifiers

Table 267: 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 268: Properties of each product.

Id	Name	SBO
s_0666	ergosterol	
s_1207	NADP(+)	

Kinetic Law

Derived unit contains undeclared units

$$v_{66} = \mathrm{vol}\,(\mathrm{cell}) \cdot \mathrm{v0} \cdot \left(1 + \mathrm{ep0662} \cdot \left(\frac{[\mathrm{s\_0662}]}{\mathrm{ic0662}} \right) + \mathrm{ep1212} \cdot \left(\frac{[\mathrm{s\_1212}]}{\mathrm{ic1212}} \right) + \mathrm{ep0666} \right.$$
$$\left. \cdot \left(\frac{[\mathrm{s\_0666}]}{\mathrm{ic0666}} \right) + \mathrm{ep1207} \cdot \left(\frac{[\mathrm{s\_1207}]}{\mathrm{ic1207}} \right) \right) \tag{133}$$

Table 269: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.43351485368152 \cdot 10^{-4}$	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑

Id	Name	SBO	Value	Unit	Constant
v0			$2.43351485368152 \cdot 10^{-4}$	$\text{mmol} \cdot l^{-1} \cdot s^{-1}$	☑
ep0662			1.000	dimensionless	☑
ep1212			1.000	dimensionless	☑
ep0666			-1.000	dimensionless	☑
ep1207			-1.000	dimensionless	☑

7.67 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

$$2\,s\_0434 + s\_0445 + s\_0999 \xrightleftharpoons{\text{e\_0508, e\_0542, e\_0888, s\_0434, s\_0445, s\_0999, s\_0394, s\_0455, s\_0991, s\_1322}} 2\,s\_03$$

$$(134)$$
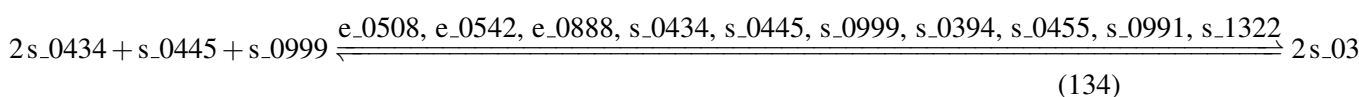
Reactants

Table 270: Properties of each reactant.

Id	Name	SBO
s_0434	ATP	
s_0445	bicarbonate	
s_0999	L-glutamine	

Modifiers

Table 271: Properties of each modifier.

Id	Name	SBO
e_0508	URA2	0000460
e_0542	CPA2	0000460
e_0888	CPA1	0000460
s_0434	ATP	
s_0445	bicarbonate	
s_0999	L-glutamine	
s_0394	ADP	
s_0455	carbamoyl phosphate	

Id	Name	SBO
s_0991	L-glutamate	
s_1322	phosphate	

Products

Table 272: Properties of each product.

Id	Name	SBO
s_0394	ADP	
s_0455	carbamoyl phosphate	
s_0991	L-glutamate	
s_1322	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$
\begin{aligned}
v_{67} = {}& \mathrm{vol}\,(\mathrm{cell}) \cdot \mathrm{v0} \\
& \cdot \left(1 + \mathrm{ep0434} \cdot \left(\frac{[\mathrm{s\_0434}]}{\mathrm{ic0434}} \right) + \mathrm{ep0445} \cdot \left(\frac{[\mathrm{s\_0445}]}{\mathrm{ic0445}} \right) + \mathrm{ep0999} \cdot \left(\frac{[\mathrm{s\_0999}]}{\mathrm{ic0999}} \right) + \mathrm{ep0394} \right. \\
& \left. \cdot \left(\frac{[\mathrm{s\_0394}]}{\mathrm{ic0394}} \right) + \mathrm{ep0455} \cdot \left(\frac{[\mathrm{s\_0455}]}{\mathrm{ic0455}} \right) + \mathrm{ep0991} \cdot \left(\frac{[\mathrm{s\_0991}]}{\mathrm{ic0991}} \right) + \mathrm{ep1322} \cdot \left(\frac{[\mathrm{s\_1322}]}{\mathrm{ic1322}} \right) \right)
\end{aligned}
$$

(135)

Table 273: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.010	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
v0			0.010	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
ep0434			2.000	dimensionless	☑
ep0445			1.000	dimensionless	☑
ep0999			1.000	dimensionless	☑
ep0394			−2.000	dimensionless	☑
ep0455			−1.000	dimensionless	☑
ep0991			−1.000	dimensionless	☑
ep1322			−1.000	dimensionless	☑

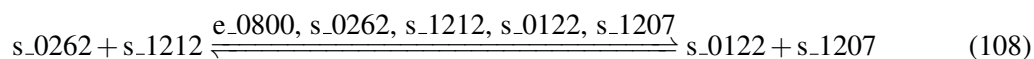## 7.68 Reaction r_0257

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

$$s\_0539 + s\_1331 \xrightleftharpoons{e\_0045,\ s\_0539,\ s\_1331,\ s\_0471,\ s\_0633} s\_0471 + s\_0633 \qquad (136)$$
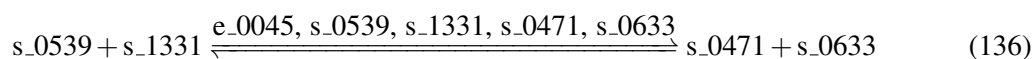
Reactants

Table 274: Properties of each reactant.

Id	Name	SBO
s_0539	CTP	
s_1331	phosphatidate	

Modifiers

Table 275: Properties of each modifier.

Id	Name	SBO
e_0045	CDS1	0000460
s_0539	CTP	
s_1331	phosphatidate	
s_0471	CDP-diacylglycerol	
s_0633	diphosphate	

Products

Table 276: Properties of each product.

Id	Name	SBO
s_0471	CDP-diacylglycerol	
s_0633	diphosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{68} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0539} \cdot \left(\frac{[\text{s\_0539}]}{\text{ic0539}} \right) + \text{ep1331} \cdot \left(\frac{[\text{s\_1331}]}{\text{ic1331}} \right) + \text{ep0471} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0471}]}{\text{ic0471}} \right) + \text{ep0633} \cdot \left(\frac{[\text{s\_0633}]}{\text{ic0633}} \right) \right) \tag{137}$$

Table 277: Properties of each parameter.

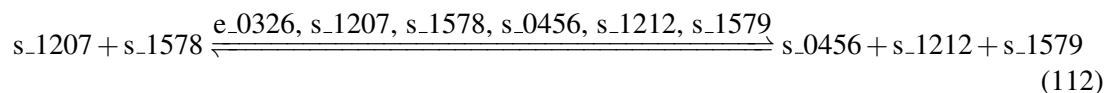| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.3107859282821 \cdot 10^{-4}$	mmol $\cdot$ l^{-1} $\cdot$ s^{-1}	✓
v0			$2.3107859282821 \cdot 10^{-4}$	mmol $\cdot$ l^{-1} $\cdot$ s^{-1}	✓
ep0539			1.000	dimensionless	✓
ep1331			1.000	dimensionless	✓
ep0471			-1.000	dimensionless	✓
ep0633			-1.000	dimensionless	✓

7.69 Reaction r_0259

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

Name ceramide-1 hydroxylase (24C)

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0475} + \text{s\_1212} + \text{s\_1275} \xrightleftharpoons{\text{e\_0206, s\_0475, s\_1212, s\_1275, s\_0481, s\_1207}} \text{s\_0481} + \text{s\_1207} \tag{138}$$
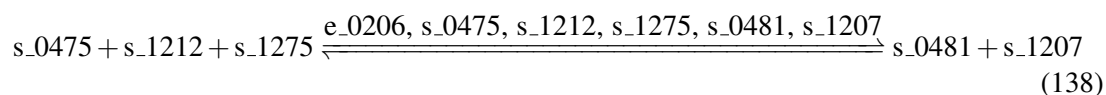
Reactants

Table 278: Properties of each reactant.

Id	Name	SBO
s_0475	ceramide-1 (C24)	
s_1212	NADPH	
s_1275	oxygen	

Modifiers

Produced by SBML2LATEX

Table 279: Properties of each modifier.

Id	Name	SBO
e_0206	SUR2	0000460
s_0475	ceramide-1 (C24)	
s_1212	NADPH	
s_1275	oxygen	
s_0481	ceramide-2 (C24)	
s_1207	NADP(+)	

Products

Table 280: Properties of each product.

Id	Name	SBO
s_0481	ceramide-2 (C24)	
s_1207	NADP(+)	

Kinetic Law

Derived unit contains undeclared units

$$v_{69} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0475} \cdot \left(\frac{[\text{s\_0475}]}{\text{ic0475}} \right) + \text{ep1212} \cdot \left(\frac{[\text{s\_1212}]}{\text{ic1212}} \right) + \text{ep1275} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_1275}]}{\text{ic1275}} \right) + \text{ep0481} \cdot \left(\frac{[\text{s\_0481}]}{\text{ic0481}} \right) + \text{ep1207} \cdot \left(\frac{[\text{s\_1207}]}{\text{ic1207}} \right) \right) \tag{139}$$

Table 281: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.02210849818021 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$1.02210849818021 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0475			1.000	dimensionless	☑
ep1212			1.000	dimensionless	☑
ep1275			1.000	dimensionless	☑
ep0481			-1.000	dimensionless	☑
ep1207			-1.000	dimensionless	☑

7.70 Reaction `r_0267`

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

Name ceramide-3 synthase (24C)

SBO:0000176 biochemical reaction

Reaction equation

$$s\_0481 + s\_1212 + s\_1275 \underset{}{\overset{e\_0756,\ s\_0481,\ s\_1212,\ s\_1275,\ s\_0493,\ s\_1207}{\rightleftharpoons}} s\_0493 + s\_1207 \tag{140}$$
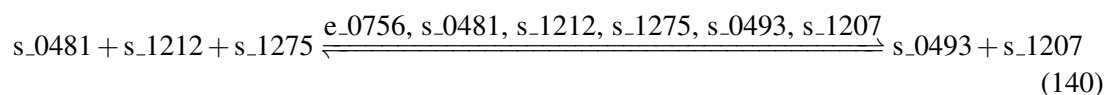
Reactants

Table 282: Properties of each reactant.

Id	Name	SBO
s_0481	ceramide-2 (C24)	
s_1212	NADPH	
s_1275	oxygen	

Modifiers

Table 283: Properties of each modifier.

Id	Name	SBO
e_0756	SCS7	0000460
s_0481	ceramide-2 (C24)	
s_1212	NADPH	
s_1275	oxygen	
s_0493	ceramide-3 (C24)	
s_1207	NADP(+)	

Products

Table 284: Properties of each product.

Id	Name	SBO
s_0493	ceramide-3 (C24)	
s_1207	NADP(+)	

Derived unit contains undeclared units

$$
\begin{aligned}
v_{70} = \mathrm{vol}\,(\mathrm{cell}) \cdot \mathrm{v0} \cdot \Bigg(& 1 + \mathrm{ep0481} \cdot \left(\frac{[\mathrm{s\_0481}]}{\mathrm{ic0481}} \right) + \mathrm{ep1212} \cdot \left(\frac{[\mathrm{s\_1212}]}{\mathrm{ic1212}} \right) + \mathrm{ep1275} \\
& \cdot \left(\frac{[\mathrm{s\_1275}]}{\mathrm{ic1275}} \right) + \mathrm{ep0493} \cdot \left(\frac{[\mathrm{s\_0493}]}{\mathrm{ic0493}} \right) + \mathrm{ep1207} \cdot \left(\frac{[\mathrm{s\_1207}]}{\mathrm{ic1207}} \right) \Bigg)
\end{aligned}
\tag{141}
$$

Table 285: Properties of each parameter.

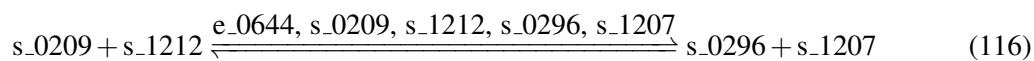| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.04421701081157 \cdot 10^{-5}$	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
v0			$2.04421701081157 \cdot 10^{-5}$	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
ep0481			1.000	dimensionless	☑
ep1212			1.000	dimensionless	☑
ep1275			1.000	dimensionless	☑
ep0493			-1.000	dimensionless	☑
ep1207			-1.000	dimensionless	☑

7.71 Reaction r_0269

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

Name ceramide-4 synthase (24C)

SBO:0000176 biochemical reaction

Reaction equation

$$
\mathrm{s\_0493} + \mathrm{s\_1212} + \mathrm{s\_1275} \xrightleftharpoons[\qquad\qquad\qquad\qquad\qquad\qquad]{\mathrm{e\_0756,\ s\_0493,\ s\_1212,\ s\_1275,\ s\_0499,\ s\_1207}} \mathrm{s\_0499} + \mathrm{s\_1207}
\tag{142}
$$
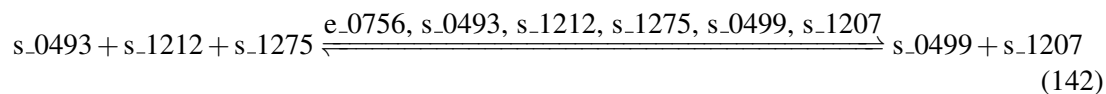
Reactants

Table 286: Properties of each reactant.

Id	Name	SBO
s_0493	ceramide-3 (C24)	
s_1212	NADPH	
s_1275	oxygen	

Modifiers

Table 287: Properties of each modifier.

Id	Name	SBO
e_0756	SCS7	0000460
s_0493	ceramide-3 (C24)	
s_1212	NADPH	
s_1275	oxygen	
s_0499	ceramide-4 (C24)	
s_1207	NADP(+)	

Products

Table 288: Properties of each product.

Id	Name	SBO
s_0499	ceramide-4 (C24)	
s_1207	NADP(+)	

Kinetic Law

Derived unit contains undeclared units

$$v_{71} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0493} \cdot \left(\frac{[\text{s\_0493}]}{\text{ic0493}} \right) + \text{ep1212} \cdot \left(\frac{[\text{s\_1212}]}{\text{ic1212}} \right) + \text{ep1275} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_1275}]}{\text{ic1275}} \right) + \text{ep0499} \cdot \left(\frac{[\text{s\_0499}]}{\text{ic0499}} \right) + \text{ep1207} \cdot \left(\frac{[\text{s\_1207}]}{\text{ic1207}} \right) \right) \tag{143}$$

Table 289: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.04421702621944 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$2.04421702621944 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0493			1.000	dimensionless	☑
ep1212			1.000	dimensionless	☑
ep1275			1.000	dimensionless	☑
ep0499			-1.000	dimensionless	☑
ep1207			-1.000	dimensionless	☑

Produced by SBML2LATEX

7.72 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

$$s\_0515 \xrightleftharpoons{\text{e\_0959, s\_0515, s\_1377}} s\_1377 \tag{144}$$
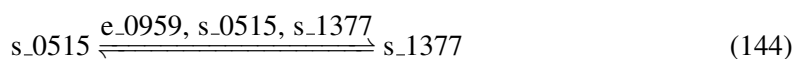
Reactant

Table 290: Properties of each reactant.

Id	Name	SBO
s_0515	chorismate	

Modifiers

Table 291: Properties of each modifier.

Id	Name	SBO
e_0959	ARO7	0000460
s_0515	chorismate	
s_1377	prephenate	

Product

Table 292: Properties of each product.

Id	Name	SBO
s_1377	prephenate	

Kinetic Law

Derived unit contains undeclared units

$$v_{72} = \mathrm{vol\,(cell)} \cdot \mathrm{v0} \cdot \left(1 + \mathrm{ep0515} \cdot \left(\frac{[\mathrm{s\_0515}]}{\mathrm{ic0515}} \right) + \mathrm{ep1377} \cdot \left(\frac{[\mathrm{s\_1377}]}{\mathrm{ic1377}} \right) \right) \tag{145}$$

Table 293: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.009	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.009	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0515			1.000	dimensionless	☑
ep1377			-1.000	dimensionless	☑

7.73 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

$$\text{s\_0324} \xrightleftharpoons{\text{e\_0342, s\_0324, s\_0515, s\_1322}} \text{s\_0515} + \text{s\_1322} \tag{146}$$
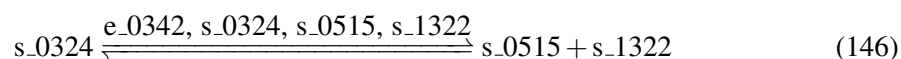
Reactant

Table 294: Properties of each reactant.

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

Modifiers

Table 295: Properties of each modifier.

Id	Name	SBO
e_0342	ARO2	0000460
s_0324	5-O-(1-carboxyvinyl)-3-phosphoshikimic acid	
s_0515	chorismate	
s_1322	phosphate	

Products

Produced by SBML2LATEX

Table 296: Properties of each product.

Id	Name	SBO
s_0515	chorismate	
s_1322	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$
\begin{aligned}
v_{73} = {}& \text{vol}\,(\text{cell}) \cdot \text{v0} \\
& \cdot \left(1 + \text{ep0324} \cdot \left(\frac{[\text{s\_0324}]}{\text{ic0324}} \right) + \text{ep0515} \cdot \left(\frac{[\text{s\_0515}]}{\text{ic0515}} \right) + \text{ep1322} \cdot \left(\frac{[\text{s\_1322}]}{\text{ic1322}} \right) \right)
\end{aligned} \tag{147}
$$

Table 297: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.010	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.010	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0324			1.000	dimensionless	☑
ep0515			−1.000	dimensionless	☑
ep1322			−1.000	dimensionless	☑

7.74 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

$$
\text{s\_0516} \underset{}{\overset{e\_0675,\ s\_0516,\ s\_0940}{\rightleftharpoons}} \text{s\_0940} \tag{148}
$$
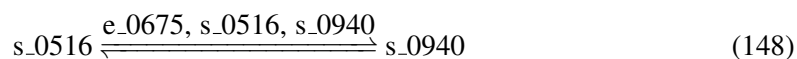
Reactant

Table 298: Properties of each reactant.

Id	Name	SBO
s_0516	cis-aconitate	

Modifiers

Table 299: Properties of each modifier.

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

Product

Table 300: Properties of each product.

Id	Name	SBO
s_0940	isocitrate	

Kinetic Law

Derived unit contains undeclared units

$$v_{74} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0516} \cdot \left(\frac{[\text{s\_0516}]}{\text{ic0516}} \right) + \text{ep0940} \cdot \left(\frac{[\text{s\_0940}]}{\text{ic0940}} \right) \right) \qquad (149)$$

Table 301: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.039	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.039	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0516			1.000	dimensionless	☑
ep0940			-1.000	dimensionless	☑

7.75 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

$$s\_0373 + s\_1271 \xrightleftharpoons{\text{e\_0947, e\_0805, e\_0111, s\_0373, s\_1271, s\_0522, s\_0529}} s\_0522 + s\_0529 \tag{150}$$

Reactants

Table 302: Properties of each reactant.

Id	Name	SBO
s_0373	acetyl-CoA	
s_1271	oxaloacetate	

Modifiers

Table 303: 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 304: Properties of each product.

Id	Name	SBO
s_0522	citrate	
s_0529	coenzyme A	

Kinetic Law

Derived unit contains undeclared units

$$v_{75} = \text{vol}(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0373} \cdot \left(\frac{[\text{s\_0373}]}{\text{ic0373}} \right) + \text{ep1271} \cdot \left(\frac{[\text{s\_1271}]}{\text{ic1271}} \right) + \text{ep0522} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0522}]}{\text{ic0522}} \right) + \text{ep0529} \cdot \left(\frac{[\text{s\_0529}]}{\text{ic0529}} \right) \right) \tag{151}$$

Table 305: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.039	mmol·l^{-1}·s^{-1}	☑
v0			0.039	mmol·l^{-1}·s^{-1}	☑
ep0373			1.000	dimensionless	☑
ep1271			1.000	dimensionless	☑
ep0522			−1.000	dimensionless	☑
ep0529			−1.000	dimensionless	☑

7.76 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

$$\text{s\_0522} \xrightleftharpoons{\text{e\_0675, s\_0522, s\_0516}} \text{s\_0516} \tag{152}$$
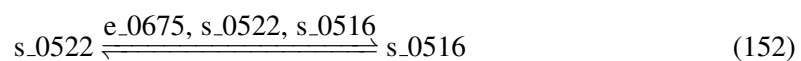
Reactant

Table 306: Properties of each reactant.

Id	Name	SBO
s_0522	citrate	

Modifiers

Table 307: Properties of each modifier.

Id	Name	SBO
e_0675	ACO1	0000460

Id	Name	SBO
s_0522	citrate	
s_0516	cis-aconitate	

Product

Table 308: Properties of each product.

Id	Name	SBO
s_0516	cis-aconitate	

Kinetic Law

Derived unit contains undeclared units

$$v_{76} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0522} \cdot \left(\frac{[\text{s\_0522}]}{\text{ic0522}} \right) + \text{ep0516} \cdot \left(\frac{[\text{s\_0516}]}{\text{ic0516}} \right) \right) \qquad (153)$$

Table 309: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.039	mmol·l^{-1}·s^{-1}	☑
v0			0.039	mmol·l^{-1}·s^{-1}	☑
ep0522			1.000	dimensionless	☑
ep0516			-1.000	dimensionless	☑

7.77 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

$$\text{s\_0419} + \text{s\_0434} + \text{s\_1559} \xrightleftharpoons{\text{e\_0540, e\_0026, s\_0419, s\_0434, s\_1559, s\_0394, s\_0539, s\_1322}} \text{s\_0394} + \text{s\_0539} + \text{s\_13}$$

$$(154)$$

Reactants

Produced by SBML2LATEX
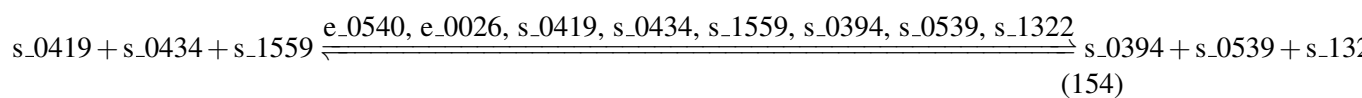
Table 310: Properties of each reactant.

Id	Name	SBO
s_0419	ammonium	
s_0434	ATP	
s_1559	UTP	

Modifiers

Table 311: Properties of each modifier.

Id	Name	SBO
e_0540	URA8	0000460
e_0026	URA7	0000460
s_0419	ammonium	
s_0434	ATP	
s_1559	UTP	
s_0394	ADP	
s_0539	CTP	
s_1322	phosphate	

Products

Table 312: Properties of each product.

Id	Name	SBO
s_0394	ADP	
s_0539	CTP	
s_1322	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{77} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0419} \cdot \left(\frac{[\text{s\_0419}]}{\text{ic0419}} \right) + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}} \right) + \text{ep1559} \cdot \left(\frac{[\text{s\_1559}]}{\text{ic1559}} \right) \right.$$
$$\left. + \text{ep0394} \cdot \left(\frac{[\text{s\_0394}]}{\text{ic0394}} \right) + \text{ep0539} \cdot \left(\frac{[\text{s\_0539}]}{\text{ic0539}} \right) + \text{ep1322} \cdot \left(\frac{[\text{s\_1322}]}{\text{ic1322}} \right) \right)$$

$$(155)$$

Table 313: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.002	mmol·l^{-1}·s^{-1}	☑
v0			0.002	mmol·l^{-1}·s^{-1}	☑
ep0419			1.000	dimensionless	☑
ep0434			1.000	dimensionless	☑
ep1559			1.000	dimensionless	☑
ep0394			-1.000	dimensionless	☑
ep0539			-1.000	dimensionless	☑
ep1322			-1.000	dimensionless	☑

7.78 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

$$s\_1012 + s\_1039 \xrightleftharpoons{e\_0380,\ s\_1012,\ s\_1039,\ s\_0980} s\_0980 \tag{156}$$
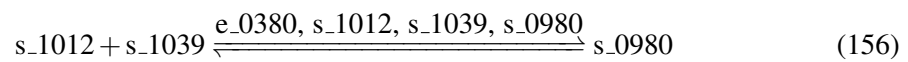
Reactants

Table 314: Properties of each reactant.

Id	Name	SBO
s_1012	L-homocysteine	
s_1039	L-serine	

Modifiers

Table 315: 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 316: Properties of each product.

Id	Name	SBO
s_0980	L-cystathionine	

Kinetic Law

Derived unit contains undeclared units

$$
\begin{aligned}
v_{78} = {}& \mathrm{vol}\,(\mathrm{cell}) \cdot \mathrm{v0} \\
& \cdot \left(1 + \mathrm{ep1012} \cdot \left(\frac{[\mathrm{s\_1012}]}{\mathrm{ic1012}} \right) + \mathrm{ep1039} \cdot \left(\frac{[\mathrm{s\_1039}]}{\mathrm{ic1039}} \right) + \mathrm{ep0980} \cdot \left(\frac{[\mathrm{s\_0980}]}{\mathrm{ic0980}} \right) \right)
\end{aligned} \tag{157}
$$

Table 317: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.50486556092046 \cdot 10^{-4}$	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
v0			$2.50486556092046 \cdot 10^{-4}$	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
ep1012			1.000	dimensionless	☑
ep1039			1.000	dimensionless	☑
ep0980			-1.000	dimensionless	☑

7.79 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

$$
\mathrm{s\_0980} \xrightleftharpoons{\mathrm{e\_0008,\ s\_0980,\ s\_0178,\ s\_0419,\ s\_0981}} \mathrm{s\_0178} + \mathrm{s\_0419} + \mathrm{s\_0981} \tag{158}
$$
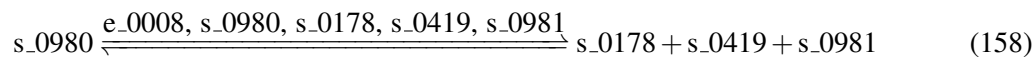
Reactant

Table 318: Properties of each reactant.

Id	Name	SBO
s_0980	L-cystathionine	

Modifiers

Table 319: 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 320: 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

$$v_{79} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0980} \cdot \left(\frac{[\text{s\_0980}]}{\text{ic0980}} \right) + \text{ep0178} \cdot \left(\frac{[\text{s\_0178}]}{\text{ic0178}} \right) + \text{ep0419} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0419}]}{\text{ic0419}} \right) + \text{ep0981} \cdot \left(\frac{[\text{s\_0981}]}{\text{ic0981}} \right) \right) \tag{159}$$

Table 321: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.010	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.010	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0980			1.000	dimensionless	☑

Id	Name	SBO	Value	Unit	Constant
ep0178			-1.000	dimensionless	☑
ep0419			-1.000	dimensionless	☑
ep0981			-1.000	dimensionless	☑

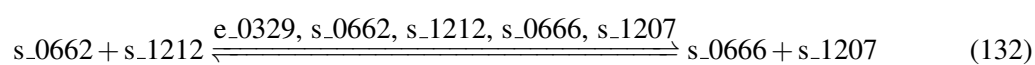## 7.80 Reaction r_0311

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

$$\text{s\_0981} + \text{s\_1233} \xrightleftharpoons{\text{e\_0545, s\_0981, s\_1233, s\_0362, s\_0980}} \text{s\_0362} + \text{s\_0980} \tag{160}$$

Reactants

Table 322: Properties of each reactant.

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

Modifiers

Table 323: Properties of each modifier.

Id	Name	SBO
e_0545	STR2	0000460
s_0981	L-cysteine	
s_1233	O-acetyl-L-homoserine	
s_0362	acetate	
s_0980	L-cystathionine	

Products

Table 324: Properties of each product.

Id	Name	SBO
s_0362	acetate	
s_0980	L-cystathionine	

Kinetic Law

Derived unit contains undeclared units

$$v_{80} = \mathrm{vol}\,(\mathrm{cell}) \cdot v0 \cdot \left(1 + \mathrm{ep0981} \cdot \left(\frac{[\mathrm{s\_0981}]}{\mathrm{ic0981}} \right) + \mathrm{ep1233} \cdot \left(\frac{[\mathrm{s\_1233}]}{\mathrm{ic1233}} \right) + \mathrm{ep0362} \right. \\ \left. \cdot \left(\frac{[\mathrm{s\_0362}]}{\mathrm{ic0362}} \right) + \mathrm{ep0980} \cdot \left(\frac{[\mathrm{s\_0980}]}{\mathrm{ic0980}} \right) \right)$$

(161)

Table 325: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.009	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	✓
v0			0.009	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	✓
ep0981			1.000	dimensionless	✓
ep1233			1.000	dimensionless	✓
ep0362			−1.000	dimensionless	✓
ep0980			−1.000	dimensionless	✓

7.81 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

$$\mathrm{s\_0434} + \mathrm{s\_0981} + \mathrm{s\_1589} \xrightleftharpoons[]{\mathrm{e\_0793,\ s\_0434,\ s\_0981,\ s\_1589,\ s\_0423,\ s\_0542,\ s\_0633}} \mathrm{s\_0423} + \mathrm{s\_0542} + \mathrm{s\_0633}$$

(162)
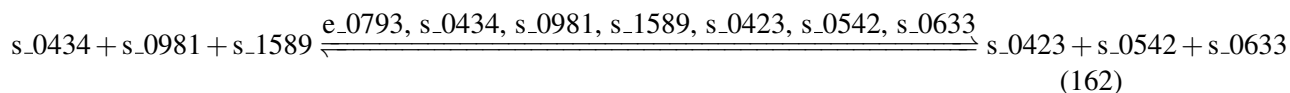
Reactants

Table 326: Properties of each reactant.

Id	Name	SBO
s_0434	ATP	
s_0981	L-cysteine	
s_1589	tRNA(Cys)	

Modifiers

Table 327: Properties of each modifier.

Id	Name	SBO
e_0793	YNL247W	0000460
s_0434	ATP	
s_0981	L-cysteine	
s_1589	tRNA(Cys)	
s_0423	AMP	
s_0542	Cys-tRNA(Cys)	
s_0633	diphosphate	

Products

Table 328: Properties of each product.

Id	Name	SBO
s_0423	AMP	
s_0542	Cys-tRNA(Cys)	
s_0633	diphosphate	

Kinetic Law

Derived unit contains undeclared units

$$
\begin{aligned}
v_{81} = \mathrm{vol}\,(\mathrm{cell}) \cdot \mathrm{v0} \cdot &\left(1 + \mathrm{ep0434} \cdot \left(\frac{[\mathrm{s\_0434}]}{\mathrm{ic0434}} \right) + \mathrm{ep0981} \cdot \left(\frac{[\mathrm{s\_0981}]}{\mathrm{ic0981}} \right) + \mathrm{ep1589} \cdot \left(\frac{[\mathrm{s\_1589}]}{\mathrm{ic1589}} \right) \right. \\
&\left. + \mathrm{ep0423} \cdot \left(\frac{[\mathrm{s\_0423}]}{\mathrm{ic0423}} \right) + \mathrm{ep0542} \cdot \left(\frac{[\mathrm{s\_0542}]}{\mathrm{ic0542}} \right) + \mathrm{ep0633} \cdot \left(\frac{[\mathrm{s\_0633}]}{\mathrm{ic0633}} \right) \right)
\end{aligned}
$$

$$(163)$$

Table 329: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.50486556991948 \cdot 10^{-4}$	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
v0			$2.50486556991948 \cdot 10^{-4}$	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
ep0434			1.000	dimensionless	☑
ep0981			1.000	dimensionless	☑
ep1589			1.000	dimensionless	☑
ep0423			-1.000	dimensionless	☑
ep0542			-1.000	dimensionless	☑
ep0633			-1.000	dimensionless	☑

7.82 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

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

(164)
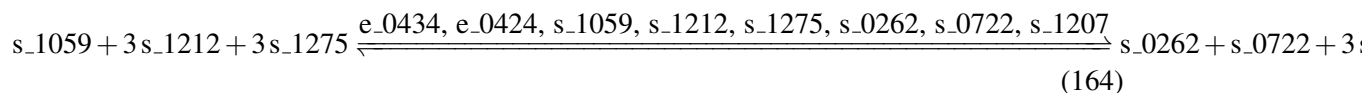
Reactants

Table 330: Properties of each reactant.

Id	Name	SBO
s_1059	lanosterol	
s_1212	NADPH	
s_1275	oxygen	

Modifiers

Table 331: Properties of each modifier.

Id	Name	SBO
e_0434	NCP1	0000460
e_0424	ERG11	0000460

Id	Name	SBO
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 332: 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

$$v_{82} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep1059} \cdot \left(\frac{[\text{s\_1059}]}{\text{ic1059}}\right) + \text{ep1212} \cdot \left(\frac{[\text{s\_1212}]}{\text{ic1212}}\right) + \text{ep1275} \cdot \left(\frac{[\text{s\_1275}]}{\text{ic1275}}\right)\right.$$
$$\left. + \text{ep0262} \cdot \left(\frac{[\text{s\_0262}]}{\text{ic0262}}\right) + \text{ep0722} \cdot \left(\frac{[\text{s\_0722}]}{\text{ic0722}}\right) + \text{ep1207} \cdot \left(\frac{[\text{s\_1207}]}{\text{ic1207}}\right)\right)$$

(165)

Table 333: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.58760203874159 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	✓
v0			$2.58760203874159 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	✓
ep1059			1.000	dimensionless	✓
ep1212			3.000	dimensionless	✓
ep1275			3.000	dimensionless	✓
ep0262			-1.000	dimensionless	✓
ep0722			-1.000	dimensionless	✓
ep1207			-3.000	dimensionless	✓

7.83 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

$$\text{s\_0589} \xrightleftharpoons{\text{e\_0452, s\_0589, s\_0419, s\_0654}} \text{s\_0419} + \text{s\_0654} \tag{166}$$
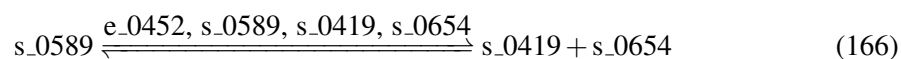
Reactant

Table 334: Properties of each reactant.

Id	Name	SBO
s_0589	dCMP	

Modifiers

Table 335: Properties of each modifier.

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

Products

Table 336: Properties of each product.

Id	Name	SBO
s_0419	ammonium	
s_0654	dUMP	

Kinetic Law

Derived unit contains undeclared units

$$v_{83} = \text{vol}\,(\text{cell}) \cdot \text{v0}$$
$$\cdot \left(1 + \text{ep0589} \cdot \left(\frac{[\text{s\_0589}]}{\text{ic0589}} \right) + \text{ep0419} \cdot \left(\frac{[\text{s\_0419}]}{\text{ic0419}} \right) + \text{ep0654} \cdot \left(\frac{[\text{s\_0654}]}{\text{ic0654}} \right) \right) \quad (167)$$

Table 337: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$3.36354094523684 \cdot 10^{-6}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$3.36354094523684 \cdot 10^{-6}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0589			1.000	dimensionless	☑
ep0419			-1.000	dimensionless	☑
ep0654			-1.000	dimensionless	☑

7.84 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

$$\text{s\_0394} + \text{s\_0613} \xrightleftharpoons{\text{e\_0234, s\_0394, s\_0613, s\_0434, s\_0615}} \text{s\_0434} + \text{s\_0615} \quad (168)$$
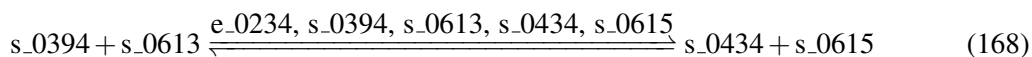
Reactants

Table 338: Properties of each reactant.

Id	Name	SBO
s_0394	ADP	
s_0613	dGDP	

Modifiers

Table 339: Properties of each modifier.

Id	Name	SBO
e_0234	GUK1	0000460
s_0394	ADP	

Id	Name	SBO
s_0613	dGDP	
s_0434	ATP	
s_0615	dGMP	

Products

Table 340: Properties of each product.

Id	Name	SBO
s_0434	ATP	
s_0615	dGMP	

Kinetic Law

Derived unit contains undeclared units

$$v_{84} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0394} \cdot \left(\frac{[\text{s\_0394}]}{\text{ic0394}}\right) + \text{ep0613} \cdot \left(\frac{[\text{s\_0613}]}{\text{ic0613}}\right) + \text{ep0434} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}}\right) + \text{ep0615} \cdot \left(\frac{[\text{s\_0615}]}{\text{ic0615}}\right)\right) \tag{169}$$

Table 341: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$9.10860206737184 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	✓
v0			$9.10860206737184 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	✓
ep0394			1.000	dimensionless	✓
ep0613			1.000	dimensionless	✓
ep0434			-1.000	dimensionless	✓
ep0615			-1.000	dimensionless	✓

7.85 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

$$s\_0529 + s\_1524 \xrightleftharpoons{\text{e\_0883, s\_0529, s\_1524, s\_0380, s\_0619}} s\_0380 + s\_0619 \qquad (170)$$
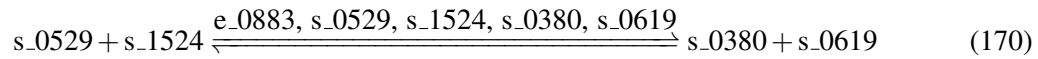
Reactants

Table 342: Properties of each reactant.

Id	Name	SBO
s_0529	coenzyme A	
s_1524	triglyceride	

Modifiers

Table 343: 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 344: Properties of each product.

Id	Name	SBO
s_0380	acyl-CoA	
s_0619	diglyceride	

Kinetic Law

Derived unit contains undeclared units

$$v_{85} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0529} \cdot \left(\frac{[\text{s\_0529}]}{\text{ic0529}} \right) + \text{ep1524} \cdot \left(\frac{[\text{s\_1524}]}{\text{ic1524}} \right) + \text{ep0380} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0380}]}{\text{ic0380}} \right) + \text{ep0619} \cdot \left(\frac{[\text{s\_0619}]}{\text{ic0619}} \right) \right) \qquad (171)$$

Table 345: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$4.80554664340808 \cdot 10^{-4}$	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	✓
v0			$4.80554664340808 \cdot 10^{-4}$	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	✓
ep0529			1.000	dimensionless	✓
ep1524			1.000	dimensionless	✓
ep0380			-1.000	dimensionless	✓
ep0619			-1.000	dimensionless	✓

7.86 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

$$\mathrm{s\_1331} \xrightleftharpoons{\mathrm{e\_0203,\ s\_1331,\ s\_0619,\ s\_1322}} \mathrm{s\_0619} + \mathrm{s\_1322} \qquad (172)$$
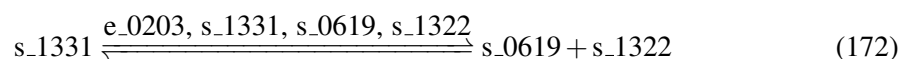
Reactant

Table 346: Properties of each reactant.

Id	Name	SBO
s_1331	phosphatidate	

Modifiers

Table 347: Properties of each modifier.

Id	Name	SBO
e_0203	DPP1	0000460
s_1331	phosphatidate	
s_0619	diglyceride	
s_1322	phosphate	

Products

Produced by SBML2LATEX

Table 348: Properties of each product.

Id	Name	SBO
s_0619	diglyceride	
s_1322	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{86} = \text{vol}\,(\text{cell}) \cdot \text{v0} \\ \cdot \left(1 + \text{ep1331} \cdot \left(\frac{[\text{s\_1331}]}{\text{ic1331}}\right) + \text{ep0619} \cdot \left(\frac{[\text{s\_0619}]}{\text{ic0619}}\right) + \text{ep1322} \cdot \left(\frac{[\text{s\_1322}]}{\text{ic1322}}\right)\right) \quad (173)$$

Table 349: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$9.19873934027924 \cdot 10^{-6}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$9.19873934027924 \cdot 10^{-6}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep1331			1.000	dimensionless	☑
ep0619			-1.000	dimensionless	☑
ep1322			-1.000	dimensionless	☑

7.87 Reaction r_0339

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

Name dihydoorotic acid dehydrogenase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0061} + \text{s\_1275} \xrightleftharpoons{\text{e\_0594, s\_0061, s\_1275, s\_0837, s\_1269}} \text{s\_0837} + \text{s\_1269} \quad (174)$$
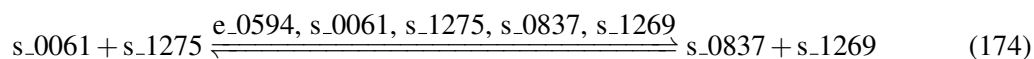
Reactants

Table 350: Properties of each reactant.

Id	Name	SBO
s_0061	(S)-dihydroorotate	

Id	Name	SBO
s_1275	oxygen	

Modifiers

Table 351: Properties of each modifier.

Id	Name	SBO
e_0594	URA1	0000460
s_0061	(S)-dihydroorotate	
s_1275	oxygen	
s_0837	hydrogen peroxide	
s_1269	orotate	

Products

Table 352: Properties of each product.

Id	Name	SBO
s_0837	hydrogen peroxide	
s_1269	orotate	

Kinetic Law

Derived unit contains undeclared units

$$v_{87} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0061} \cdot \left(\frac{[\text{s\_0061}]}{\text{ic0061}} \right) + \text{ep1275} \cdot \left(\frac{[\text{s\_1275}]}{\text{ic1275}} \right) + \text{ep0837} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0837}]}{\text{ic0837}} \right) + \text{ep1269} \cdot \left(\frac{[\text{s\_1269}]}{\text{ic1269}} \right) \right) \tag{175}$$

Table 353: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.004	mmol $\cdot$ l$^{-1} \cdot$ s^{-1}	☑
v0			0.004	mmol $\cdot$ l$^{-1} \cdot$ s^{-1}	☑
ep0061			1.000	dimensionless	☑
ep1275			1.000	dimensionless	☑
ep0837			−1.000	dimensionless	☑
ep1269			−1.000	dimensionless	☑

7.88 Reaction `r_0340`

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

Name dihydroceramidase

SBO:0000176 biochemical reaction

Reaction equation

$$s\_1084 + s\_1445 \xrightleftharpoons{\text{e\_0914, s\_1084, s\_1445, s\_0475}} s\_0475 \qquad (176)$$
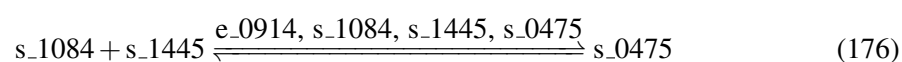
Reactants

Table 354: Properties of each reactant.

Id	Name	SBO
s_1084	lignoceric acid	
s_1445	sphinganine	

Modifiers

Table 355: Properties of each modifier.

Id	Name	SBO
e_0914	YDC1	0000460
s_1084	lignoceric acid	
s_1445	sphinganine	
s_0475	ceramide-1 (C24)	

Product

Table 356: Properties of each product.

Id	Name	SBO
s_0475	ceramide-1 (C24)	

Kinetic Law

Derived unit contains undeclared units

$$v_{88} = \text{vol} \left(\text{cell} \right) \cdot \text{v0}$$
$$\cdot \left(1 + \text{ep}1084 \cdot \left(\frac{[\text{s\_1084}]}{\text{ic}1084} \right) + \text{ep}1445 \cdot \left(\frac{[\text{s\_1445}]}{\text{ic}1445} \right) + \text{ep}0475 \cdot \left(\frac{[\text{s\_0475}]}{\text{ic}0475} \right) \right) \quad (177)$$

Table 357: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.02210849818021 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$1.02210849818021 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep1084			1.000	dimensionless	☑
ep1445			1.000	dimensionless	☑
ep0475			-1.000	dimensionless	☑

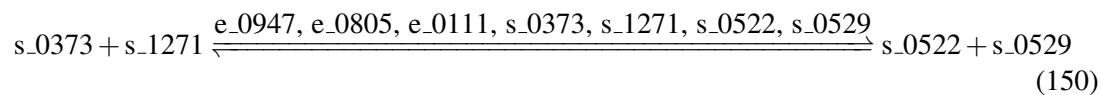## 7.89 Reaction r_0344

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

Name dihydrofolate reductase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0625} + \text{s\_1212} \xrightleftharpoons{\text{e\_0880, s\_0625, s\_1212, s\_1207, s\_1487}} \text{s\_1207} + \text{s\_1487} \quad (178)$$
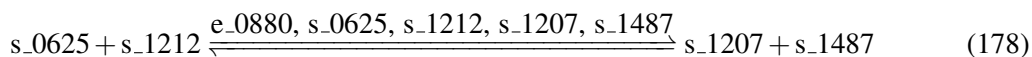
Reactants

Table 358: Properties of each reactant.

Id	Name	SBO
s_0625	dihydrofolic acid	
s_1212	NADPH	

Modifiers

Table 359: Properties of each modifier.

Id	Name	SBO
e_0880	DFR1	0000460
s_0625	dihydrofolic acid	

Id	Name	SBO
s_1212	NADPH	
s_1207	NADP(+)	
s_1487	THF	

Products

Table 360: Properties of each product.

Id	Name	SBO
s_1207	NADP(+)	
s_1487	THF	

Kinetic Law

Derived unit contains undeclared units

$$v_{89} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0625} \cdot \left(\frac{[\text{s\_0625}]}{\text{ic0625}} \right) + \text{ep1212} \cdot \left(\frac{[\text{s\_1212}]}{\text{ic1212}} \right) + \text{ep1207} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_1207}]}{\text{ic1207}} \right) + \text{ep1487} \cdot \left(\frac{[\text{s\_1487}]}{\text{ic1487}} \right) \right) \tag{179}$$

Table 361: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.36629031089924 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$1.36629031089924 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0625			1.000	dimensionless	☑
ep1212			1.000	dimensionless	☑
ep1207			-1.000	dimensionless	☑
ep1487			-1.000	dimensionless	☑

## 7.90 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

$$\text{s\_1194} \xrightleftharpoons[]{\text{e\_0692, s\_1194, s\_0061}} \text{s\_0061} \qquad (180)$$
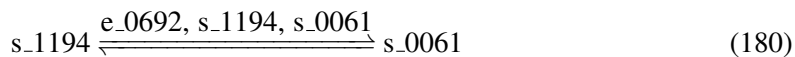
Reactant

Table 362: Properties of each reactant.

Id	Name	SBO
s_1194	N-carbamoyl-L-aspartate	

Modifiers

Table 363: Properties of each modifier.

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

Product

Table 364: Properties of each product.

Id	Name	SBO
s_0061	(S)-dihydroorotate	

Kinetic Law

Derived unit contains undeclared units

$$v_{90} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep1194} \cdot \left(\frac{[\text{s\_1194}]}{\text{ic1194}} \right) + \text{ep0061} \cdot \left(\frac{[\text{s\_0061}]}{\text{ic0061}} \right) \right) \qquad (181)$$

Table 365: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.004	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.004	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep1194			1.000	dimensionless	☑
ep0061			−1.000	dimensionless	☑

7.91 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

$$\text{s\_0016} \xrightleftharpoons{\text{e\_0528, s\_0016, s\_0232}} \text{s\_0232} \tag{182}$$
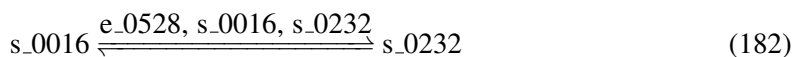
Reactant

Table 366: Properties of each reactant.

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

Modifiers

Table 367: Properties of each modifier.

Id	Name	SBO
e_0528	ILV3	0000460
s_0016	(R)-2,3-dihydroxy-3-methylbutanoate	
s_0232	3-methyl-2-oxobutanoate	

Product

Table 368: Properties of each product.

Id	Name	SBO
s_0232	3-methyl-2-oxobutanoate	

Kinetic Law

Derived unit contains undeclared units

$$v_{91} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0016} \cdot \left(\frac{[\text{s\_0016}]}{\text{ic0016}} \right) + \text{ep0232} \cdot \left(\frac{[\text{s\_0232}]}{\text{ic0232}} \right) \right) \tag{183}$$

Table 369: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.021	mmol$\cdot$l$^{-1}\cdot$s^{-1}	✓
v0			0.021	mmol$\cdot$l$^{-1}\cdot$s^{-1}	✓
ep0016			1.000	dimensionless	✓
ep0232			-1.000	dimensionless	✓

7.92 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

$$s\_0008 \xrightleftharpoons{\text{e\_0528, s\_0008, s\_0056}} s\_0056 \tag{184}$$
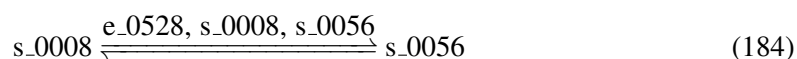
Reactant

Table 370: Properties of each reactant.

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

Modifiers

Table 371: 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 372: Properties of each product.

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

Kinetic Law

Derived unit contains undeclared units

$$v_{92} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0008} \cdot \left(\frac{[\text{s\_0008}]}{\text{ic0008}} \right) + \text{ep0056} \cdot \left(\frac{[\text{s\_0056}]}{\text{ic0056}} \right) \right) \quad (185)$$

Table 373: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.010	mmol·l^{-1}·s^{-1}	☑
v0			0.010	mmol·l^{-1}·s^{-1}	☑
ep0008			1.000	dimensionless	☑
ep0056			-1.000	dimensionless	☑

7.93 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

$$\text{s\_0943} + \text{s\_1376} \underset{}{\overset{\text{e\_0515, s\_0943, s\_1376, s\_0633, s\_0745}}{\rightleftharpoons}} \text{s\_0633} + \text{s\_0745} \quad (186)$$
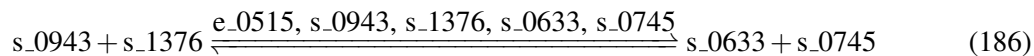
Reactants

Table 374: Properties of each reactant.

Id	Name	SBO
s_0943	isopentenyl diphosphate	
s_1376	prenyl diphosphate	

Modifiers

Table 375: 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 376: Properties of each product.

Id	Name	SBO
s_0633	diphosphate	
s_0745	geranyl diphosphate	

Kinetic Law

Derived unit contains undeclared units

$$
v_{93} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0943} \cdot \left(\frac{[\text{s\_0943}]}{\text{ic0943}} \right) + \text{ep1376} \cdot \left(\frac{[\text{s\_1376}]}{\text{ic1376}} \right) + \text{ep0633} \right.
$$
$$
\left. \cdot \left(\frac{[\text{s\_0633}]}{\text{ic0633}} \right) + \text{ep0745} \cdot \left(\frac{[\text{s\_0745}]}{\text{ic0745}} \right) \right) \tag{187}
$$

Table 377: Properties of each parameter.

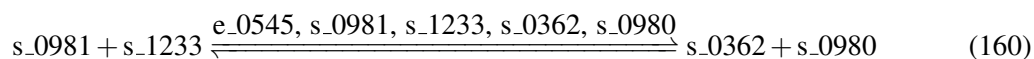| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$5.19949368301002 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$5.19949368301002 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0943			1.000	dimensionless	☑
ep1376			1.000	dimensionless	☑
ep0633			-1.000	dimensionless	☑
ep0745			-1.000	dimensionless	☑

7.94 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

$$s\_0645 + s\_0743 \xrightleftharpoons{\text{e\_0976, s\_0645, s\_0743, s\_0644, s\_0739}} s\_0644 + s\_0739 \qquad (188)$$
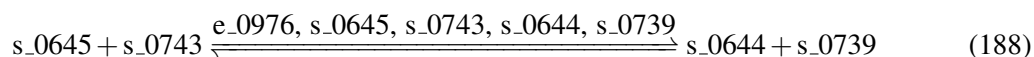
Reactants

Table 378: Properties of each reactant.

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

Modifiers

Table 379: Properties of each modifier.

Id	Name	SBO
e_0976	DPM1	0000460
s_0645	dolichyl phosphate	
s_0743	GDP-alpha-D-mannose	
s_0644	dolichyl D-mannosyl phosphate	
s_0739	GDP	

Products

Table 380: Properties of each product.

Id	Name	SBO
s_0644	dolichyl D-mannosyl phosphate	
s_0739	GDP	

Kinetic Law

Derived unit contains undeclared units

$$v_{94} = \mathrm{vol}\,(\mathrm{cell}) \cdot v0 \cdot \left(1 + \mathrm{ep0645} \cdot \left(\frac{[\mathrm{s\_0645}]}{\mathrm{ic0645}} \right) + \mathrm{ep0743} \cdot \left(\frac{[\mathrm{s\_0743}]}{\mathrm{ic0743}} \right) + \mathrm{ep0644} \right.$$
$$\left. \cdot \left(\frac{[\mathrm{s\_0644}]}{\mathrm{ic0644}} \right) + \mathrm{ep0739} \cdot \left(\frac{[\mathrm{s\_0739}]}{\mathrm{ic0739}} \right) \right) \qquad (189)$$

Table 381: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.031	mmol $\cdot$ l^{-1} $\cdot$ s^{-1}	☑
v0			0.031	mmol $\cdot$ l^{-1} $\cdot$ s^{-1}	☑
ep0645			1.000	dimensionless	☑
ep0743			1.000	dimensionless	☑
ep0644			-1.000	dimensionless	☑
ep0739			-1.000	dimensionless	☑

7.95 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

$$\text{s\_0644} \xrightleftharpoons{\text{e\_0141, e\_0549, e\_0010, e\_0890, e\_0142, s\_0644, s\_0645, s\_1107}} \text{s\_0645} + \text{s\_1107} \tag{190}$$
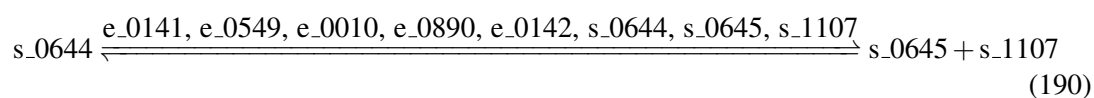
Reactant

Table 382: Properties of each reactant.

Id	Name	SBO
s_0644	dolichyl D-mannosyl phosphate	

Modifiers

Table 383: 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	

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Id	Name	SBO
s_1107	mannan	

Products

Table 384: Properties of each product.

Id	Name	SBO
s_0645	dolichyl phosphate	
s_1107	mannan	

Kinetic Law

Derived unit contains undeclared units

$$v_{95} = \text{vol}\,(\text{cell}) \cdot \text{v0}$$
$$\cdot \left(1 + \text{ep0644} \cdot \left(\frac{[\text{s\_0644}]}{\text{ic0644}}\right) + \text{ep0645} \cdot \left(\frac{[\text{s\_0645}]}{\text{ic0645}}\right) + \text{ep1107} \cdot \left(\frac{[\text{s\_1107}]}{\text{ic1107}}\right)\right) \quad (191)$$

Table 385: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.031	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.031	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0644			1.000	dimensionless	☑
ep0645			−1.000	dimensionless	☑
ep1107			−1.000	dimensionless	☑

7.96 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

$$\text{s\_0656} \xrightleftharpoons{\text{e\_0089, s\_0656, s\_0633, s\_0654}} \text{s\_0633} + \text{s\_0654} \quad (192)$$
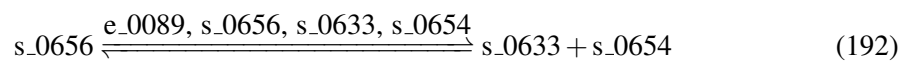
Reactant

Table 386: Properties of each reactant.

Id	Name	SBO
s_0656	dUTP	

Modifiers

Table 387: Properties of each modifier.

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

Products

Table 388: Properties of each product.

Id	Name	SBO
s_0633	diphosphate	
s_0654	dUMP	

Kinetic Law

Derived unit contains undeclared units

$$
\begin{aligned}
v_{96} = {} & \mathrm{vol\,(cell)} \cdot \mathrm{v0} \\
& \cdot \left(1 + \mathrm{ep0656} \cdot \left(\frac{[\mathrm{s\_0656}]}{\mathrm{ic0656}} \right) + \mathrm{ep0633} \cdot \left(\frac{[\mathrm{s\_0633}]}{\mathrm{ic0633}} \right) + \mathrm{ep0654} \cdot \left(\frac{[\mathrm{s\_0654}]}{\mathrm{ic0654}} \right) \right)
\end{aligned} \tag{193}
$$

Table 389: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.33265490575614 \cdot 10^{-4}$	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	✓
v0			$1.33265490575614 \cdot 10^{-4}$	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	✓
ep0656			1.000	dimensionless	✓
ep0633			-1.000	dimensionless	✓

Produced by SBML2LATEX

| Id	Name	SBO	Value	Unit	Constant
ep0654			-1.000	dimensionless	☑

7.97 Reaction `r_0366`

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

Name enolase

SBO:0000176 biochemical reaction

Reaction equation

$$s\_0188 \xrightleftharpoons{\text{e\_0405, e\_0454, s\_0188, s\_1360}} s\_1360 \qquad (194)$$
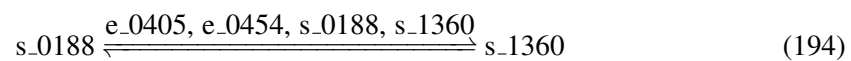
Reactant

Table 390: Properties of each reactant.

Id	Name	SBO
s_0188	2-phospho-D-glyceric acid	

Modifiers

Table 391: Properties of each modifier.

Id	Name	SBO
e_0405	ENO1	0000460
e_0454	ENO2	0000460
s_0188	2-phospho-D-glyceric acid	
s_1360	phosphoenolpyruvate	

Product

Table 392: Properties of each product.

Id	Name	SBO
s_1360	phosphoenolpyruvate	

Kinetic Law

Derived unit contains undeclared units

$$v_{97} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0188} \cdot \left(\frac{[\text{s\_0188}]}{\text{ic0188}}\right) + \text{ep1360} \cdot \left(\frac{[\text{s\_1360}]}{\text{ic1360}}\right)\right) \qquad (195)$$

Table 393: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.231	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.231	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0188			1.000	dimensionless	☑
ep1360			-1.000	dimensionless	☑

7.98 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

$$\text{s\_0595} + \text{s\_1101} + 2\,\text{s\_1212} \overset{\text{e\_0808, e\_0365, e\_0586, e\_0934, s\_0595, s\_1101, s\_1212, s\_0456, s\_0529, s\_1065, s\_120}}{\rightleftharpoons}$$

$$(196)$$

Reactants

Table 394: Properties of each reactant.

Id	Name	SBO
s_0595	decanoate	
s_1101	malonyl-CoA	
s_1212	NADPH	

Modifiers

Table 395: 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	
s_0456	carbon dioxide	
s_0529	coenzyme A	
s_1065	laurate	
s_1207	NADP(+)	

Products

Table 396: Properties of each product.

Id	Name	SBO
s_0456	carbon dioxide	
s_0529	coenzyme A	
s_1065	laurate	
s_1207	NADP(+)	

Kinetic Law

Derived unit contains undeclared units

$$v_{98} = \text{vol}\,(\text{cell}) \cdot \text{v0}$$
$$\cdot \left(1 + \text{ep0595} \cdot \left(\frac{[\text{s\_0595}]}{\text{ic0595}}\right) + \text{ep1101} \cdot \left(\frac{[\text{s\_1101}]}{\text{ic1101}}\right) + \text{ep1212} \cdot \left(\frac{[\text{s\_1212}]}{\text{ic1212}}\right) + \text{ep0456}\right.$$
$$\left.\cdot \left(\frac{[\text{s\_0456}]}{\text{ic0456}}\right) + \text{ep0529} \cdot \left(\frac{[\text{s\_0529}]}{\text{ic0529}}\right) + \text{ep1065} \cdot \left(\frac{[\text{s\_1065}]}{\text{ic1065}}\right) + \text{ep1207} \cdot \left(\frac{[\text{s\_1207}]}{\text{ic1207}}\right)\right)$$

(197)

Table 397: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.02210849110579 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$1.02210849110579 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑

Id	Name	SBO	Value	Unit	Constant
ep0595			1.000	dimensionless	☑
ep1101			1.000	dimensionless	☑
ep1212			2.000	dimensionless	☑
ep0456			−1.000	dimensionless	☑
ep0529			−1.000	dimensionless	☑
ep1065			−1.000	dimensionless	☑
ep1207			−2.000	dimensionless	☑

7.99 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

$$\text{s\_1065} + \text{s\_1101} + 2\,\text{s\_1212} \xrightleftharpoons{\text{e\_0808, e\_0365, e\_0586, e\_0934, s\_1065, s\_1101, s\_1212, s\_0456, s\_0529, s\_1161, s\_120}}$$

$$(198)$$

Reactants

Table 398: Properties of each reactant.

Id	Name	SBO
s_1065	laurate	
s_1101	malonyl-CoA	
s_1212	NADPH	

Modifiers

Table 399: 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	

Id	Name	SBO
s_1101	malonyl-CoA	
s_1212	NADPH	
s_0456	carbon dioxide	
s_0529	coenzyme A	
s_1161	myristate	
s_1207	NADP(+)	

Products

Table 400: Properties of each product.

Id	Name	SBO
s_0456	carbon dioxide	
s_0529	coenzyme A	
s_1161	myristate	
s_1207	NADP(+)	

Kinetic Law

Derived unit contains undeclared units

$$
\begin{aligned}
v_{99} = \mathrm{vol}\left(\mathrm{cell}\right) \cdot \mathrm{v0} \\
\cdot \left(1 + \mathrm{ep1065} \cdot \left(\frac{[\mathrm{s\_1065}]}{\mathrm{ic1065}} \right) + \mathrm{ep1101} \cdot \left(\frac{[\mathrm{s\_1101}]}{\mathrm{ic1101}} \right) + \mathrm{ep1212} \cdot \left(\frac{[\mathrm{s\_1212}]}{\mathrm{ic1212}} \right) + \mathrm{ep0456} \right. \\
\cdot \left. \left(\frac{[\mathrm{s\_0456}]}{\mathrm{ic0456}} \right) + \mathrm{ep0529} \cdot \left(\frac{[\mathrm{s\_0529}]}{\mathrm{ic0529}} \right) + \mathrm{ep1161} \cdot \left(\frac{[\mathrm{s\_1161}]}{\mathrm{ic1161}} \right) + \mathrm{ep1207} \cdot \left(\frac{[\mathrm{s\_1207}]}{\mathrm{ic1207}} \right) \right)
\end{aligned}
$$

(199)

Table 401: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.02210846264081 \cdot 10^{-5}$	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
v0			$1.02210846264081 \cdot 10^{-5}$	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
ep1065			1.000	dimensionless	☑
ep1101			1.000	dimensionless	☑
ep1212			2.000	dimensionless	☑
ep0456			-1.000	dimensionless	☑
ep0529			-1.000	dimensionless	☑
ep1161			-1.000	dimensionless	☑
ep1207			-2.000	dimensionless	☑

7.100 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

$$s\_1101 + s\_1161 + 2\,s\_1212 \xrightleftharpoons{\text{e\_0808, e\_0365, e\_0586, e\_0934, s\_1101, s\_1161, s\_1212, s\_0456, s\_0529, s\_1207, s\_128}}$$

$$(200)$$

Reactants

Table 402: Properties of each reactant.

Id	Name	SBO
s_1101	malonyl-CoA	
s_1161	myristate	
s_1212	NADPH	

Modifiers

Table 403: 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	
s_0456	carbon dioxide	
s_0529	coenzyme A	
s_1207	NADP(+)	
s_1286	palmitate	

Products

Table 404: Properties of each product.

Id	Name	SBO
s_0456	carbon dioxide	
s_0529	coenzyme A	
s_1207	NADP(+)	
s_1286	palmitate	

Kinetic Law

Derived unit contains undeclared units

$$v_{100} = \text{vol}\,(\text{cell}) \cdot \text{v0}$$
$$\cdot \left(1 + \text{ep1101} \cdot \left(\frac{[\text{s\_1101}]}{\text{ic1101}} \right) + \text{ep1161} \cdot \left(\frac{[\text{s\_1161}]}{\text{ic1161}} \right) + \text{ep1212} \cdot \left(\frac{[\text{s\_1212}]}{\text{ic1212}} \right) + \text{ep0456} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0456}]}{\text{ic0456}} \right) + \text{ep0529} \cdot \left(\frac{[\text{s\_0529}]}{\text{ic0529}} \right) + \text{ep1207} \cdot \left(\frac{[\text{s\_1207}]}{\text{ic1207}} \right) + \text{ep1286} \cdot \left(\frac{[\text{s\_1286}]}{\text{ic1286}} \right) \right)$$
$$(201)$$

Table 405: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.02210846264081 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$1.02210846264081 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep1101			1.000	dimensionless	☑
ep1161			1.000	dimensionless	☑
ep1212			2.000	dimensionless	☑
ep0456			−1.000	dimensionless	☑
ep0529			−1.000	dimensionless	☑
ep1207			−2.000	dimensionless	☑
ep1286			−1.000	dimensionless	☑

7.101 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

$$s\_1101 + 2\,s\_1212 + s\_1286 \rightleftharpoons \overline{e\_0808,\ e\_0365,\ e\_0586,\ e\_0934,\ s\_1101,\ s\_1212,\ s\_1286,\ s\_0456,\ s\_0529,\ s\_1207,\ s\_144}$$

$$(202)$$

Reactants

Table 406: Properties of each reactant.

Id	Name	SBO
s_1101	malonyl-CoA	
s_1212	NADPH	
s_1286	palmitate	

Modifiers

Table 407: 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_1286	palmitate	
s_0456	carbon dioxide	
s_0529	coenzyme A	
s_1207	NADP(+)	
s_1449	stearate	

Products

Table 408: Properties of each product.

Id	Name	SBO
s_0456	carbon dioxide	
s_0529	coenzyme A	
s_1207	NADP(+)	
s_1449	stearate	

Produced by SBML2LATEX

Kinetic Law

Derived unit contains undeclared units

$$v_{101} = \text{vol}\,(\text{cell}) \cdot \text{v0}$$
$$\cdot \left(1 + \text{ep1101} \cdot \left(\frac{[\text{s\_1101}]}{\text{ic1101}} \right) + \text{ep1212} \cdot \left(\frac{[\text{s\_1212}]}{\text{ic1212}} \right) + \text{ep1286} \cdot \left(\frac{[\text{s\_1286}]}{\text{ic1286}} \right) + \text{ep0456} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0456}]}{\text{ic0456}} \right) + \text{ep0529} \cdot \left(\frac{[\text{s\_0529}]}{\text{ic0529}} \right) + \text{ep1207} \cdot \left(\frac{[\text{s\_1207}]}{\text{ic1207}} \right) + \text{ep1449} \cdot \left(\frac{[\text{s\_1449}]}{\text{ic1449}} \right) \right)$$

(203)

Table 409: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.02210846264081 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$1.02210846264081 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep1101			1.000	dimensionless	☑
ep1212			2.000	dimensionless	☑
ep1286			1.000	dimensionless	☑
ep0456			-1.000	dimensionless	☑
ep0529			-1.000	dimensionless	☑
ep1207			-2.000	dimensionless	☑
ep1449			-1.000	dimensionless	☑

7.102 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

$$3\,\text{s\_1101} + 6\,\text{s\_1212} + \text{s\_1449} \xrightleftharpoons{\text{e\_0128, e\_0117, e\_0687, s\_1101, s\_1212, s\_1449, s\_0456, s\_0529, s\_1084, s\_1207}} 3\,\text{s\_0}$$

(204)

Reactants

Table 410: Properties of each reactant.

Id	Name	SBO
s_1101	malonyl-CoA	
s_1212	NADPH	
s_1449	stearate	

Modifiers

Table 411: 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	
s_0456	carbon dioxide	
s_0529	coenzyme A	
s_1084	lignoceric acid	
s_1207	NADP(+)	

Products

Table 412: Properties of each product.

Id	Name	SBO
s_0456	carbon dioxide	
s_0529	coenzyme A	
s_1084	lignoceric acid	
s_1207	NADP(+)	

Kinetic Law

Derived unit contains undeclared units

Produced by SBML2LATEX

$$v_{102} = \text{vol}\,(\text{cell}) \cdot \text{v0}$$
$$\cdot \left(1 + \text{ep1101} \cdot \left(\frac{[\text{s\_1101}]}{\text{ic1101}}\right) + \text{ep1212} \cdot \left(\frac{[\text{s\_1212}]}{\text{ic1212}}\right) + \text{ep1449} \cdot \left(\frac{[\text{s\_1449}]}{\text{ic1449}}\right) + \text{ep0456}\right.$$
$$\left. \cdot \left(\frac{[\text{s\_0456}]}{\text{ic0456}}\right) + \text{ep0529} \cdot \left(\frac{[\text{s\_0529}]}{\text{ic0529}}\right) + \text{ep1084} \cdot \left(\frac{[\text{s\_1084}]}{\text{ic1084}}\right) + \text{ep1207} \cdot \left(\frac{[\text{s\_1207}]}{\text{ic1207}}\right)\right)$$
$$(205)$$

Table 413: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.04421699980673 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$2.04421699980673 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep1101			3.000	dimensionless	☑
ep1212			6.000	dimensionless	☑
ep1449			1.000	dimensionless	☑
ep0456			−3.000	dimensionless	☑
ep0529			−3.000	dimensionless	☑
ep1084			−1.000	dimensionless	☑
ep1207			−6.000	dimensionless	☑

7.103 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

$$\text{s\_1101} + 2\,\text{s\_1212} + \text{s\_1255} \xrightleftharpoons{\text{e\_0808, e\_0365, e\_0586, e\_0934, s\_1101, s\_1212, s\_1255, s\_0456, s\_0529, s\_0602, s\_120}}$$
$$(206)$$
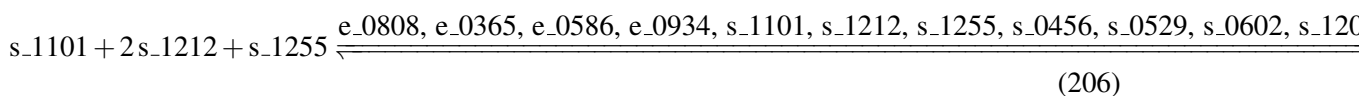
Reactants

Table 414: Properties of each reactant.

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

Modifiers

Table 415: 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	
s_0456	carbon dioxide	
s_0529	coenzyme A	
s_0602	decanoyl-CoA	
s_1207	NADP(+)	

Products

Table 416: Properties of each product.

Id	Name	SBO
s_0456	carbon dioxide	
s_0529	coenzyme A	
s_0602	decanoyl-CoA	
s_1207	NADP(+)	

Kinetic Law

Derived unit contains undeclared units

$$
\begin{aligned}
v_{103} = {}& \mathrm{vol}\,(\mathrm{cell}) \cdot \mathrm{v0} \\
& \cdot \left(1 + \mathrm{ep1101} \cdot \left(\frac{[\mathrm{s\_1101}]}{\mathrm{ic1101}} \right) + \mathrm{ep1212} \cdot \left(\frac{[\mathrm{s\_1212}]}{\mathrm{ic1212}} \right) + \mathrm{ep1255} \cdot \left(\frac{[\mathrm{s\_1255}]}{\mathrm{ic1255}} \right) + \mathrm{ep0456} \right. \\
& \left. \cdot \left(\frac{[\mathrm{s\_0456}]}{\mathrm{ic0456}} \right) + \mathrm{ep0529} \cdot \left(\frac{[\mathrm{s\_0529}]}{\mathrm{ic0529}} \right) + \mathrm{ep0602} \cdot \left(\frac{[\mathrm{s\_0602}]}{\mathrm{ic0602}} \right) + \mathrm{ep1207} \cdot \left(\frac{[\mathrm{s\_1207}]}{\mathrm{ic1207}} \right) \right)
\end{aligned}
$$

$$(207)$$

Table 417: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$4.0884339927971 \cdot 10^{-5}$	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
v0			$4.0884339927971 \cdot 10^{-5}$	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
ep1101			1.000	dimensionless	☑
ep1212			2.000	dimensionless	☑
ep1255			1.000	dimensionless	☑
ep0456			-1.000	dimensionless	☑
ep0529			-1.000	dimensionless	☑
ep0602			-1.000	dimensionless	☑
ep1207			-2.000	dimensionless	☑

7.104 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

$$\mathrm{s\_0373} + 3\,\mathrm{s\_1101} + 6\,\mathrm{s\_1212} \xrightleftharpoons{\mathrm{e\_0808,\ e\_0365,\ e\_0586,\ e\_0934,\ s\_0373,\ s\_1101,\ s\_1212,\ s\_0456,\ s\_0529,\ s\_1207,\ s\_12}}$$

(208)
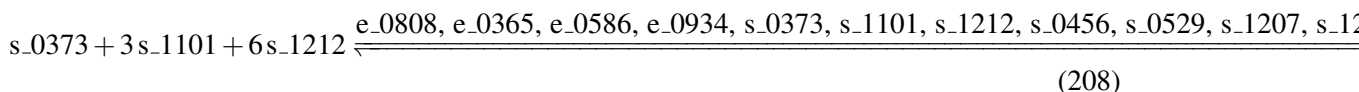
Reactants

Table 418: Properties of each reactant.

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

Modifiers

Table 419: Properties of each modifier.

Id	Name	SBO
e_0808	ACC1	0000460

Id	Name	SBO
e_0365	ACB1	0000460
e_0586	FAS1	0000460
e_0934	FAS2	0000460
s_0373	acetyl-CoA	
s_1101	malonyl-CoA	
s_1212	NADPH	
s_0456	carbon dioxide	
s_0529	coenzyme A	
s_1207	NADP(+)	
s_1255	octanoyl-CoA	

Products

Table 420: Properties of each product.

Id	Name	SBO
s_0456	carbon dioxide	
s_0529	coenzyme A	
s_1207	NADP(+)	
s_1255	octanoyl-CoA	

Kinetic Law

Derived unit contains undeclared units

$$v_{104} = \text{vol}\,(\text{cell}) \cdot v0$$
$$\cdot \left(1 + \text{ep0373} \cdot \left(\frac{[\text{s\_0373}]}{\text{ic0373}} \right) + \text{ep1101} \cdot \left(\frac{[\text{s\_1101}]}{\text{ic1101}} \right) + \text{ep1212} \cdot \left(\frac{[\text{s\_1212}]}{\text{ic1212}} \right) + \text{ep0456} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0456}]}{\text{ic0456}} \right) + \text{ep0529} \cdot \left(\frac{[\text{s\_0529}]}{\text{ic0529}} \right) + \text{ep1207} \cdot \left(\frac{[\text{s\_1207}]}{\text{ic1207}} \right) + \text{ep1255} \cdot \left(\frac{[\text{s\_1255}]}{\text{ic1255}} \right) \right)$$
$$\tag{209}$$

Table 421: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$4.08843399368032 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	✓
v0			$4.08843399368032 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	✓
ep0373			1.000	dimensionless	✓
ep1101			3.000	dimensionless	✓
ep1212			6.000	dimensionless	✓

Produced by SBML2LATEX

Id	Name	SBO	Value	Unit	Constant
ep0456			−3.000	dimensionless	☑
ep0529			−3.000	dimensionless	☑
ep1207			−6.000	dimensionless	☑
ep1255			−1.000	dimensionless	☑

7.105 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

$$\text{s\_0423} + \text{s\_0602} + \text{s\_0633} \xrightleftharpoons{\text{e\_0273, s\_0423, s\_0602, s\_0633, s\_0434, s\_0529, s\_0595}} \text{s\_0434} + \text{s\_0529} + \text{s\_0595}$$

(210)
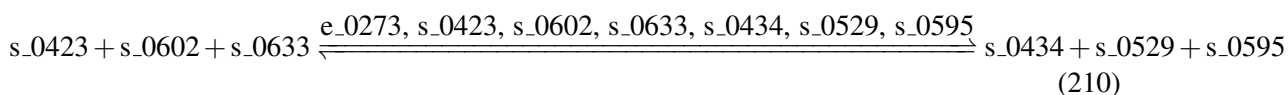
Reactants

Table 422: Properties of each reactant.

Id	Name	SBO
s_0423	AMP	
s_0602	decanoyl-CoA	
s_0633	diphosphate	

Modifiers

Table 423: Properties of each modifier.

Id	Name	SBO
e_0273	FAA2	0000460
s_0423	AMP	
s_0602	decanoyl-CoA	
s_0633	diphosphate	
s_0434	ATP	
s_0529	coenzyme A	
s_0595	decanoate	

Products

Table 424: Properties of each product.

Id	Name	SBO
s_0434	ATP	
s_0529	coenzyme A	
s_0595	decanoate	

Kinetic Law

Derived unit contains undeclared units

$$
v_{105} = \text{vol}\,(\text{cell}) \cdot v0 \cdot \left(1 + \text{ep0423} \cdot \left(\frac{[\text{s\_0423}]}{\text{ic0423}} \right) + \text{ep0602} \cdot \left(\frac{[\text{s\_0602}]}{\text{ic0602}} \right) + \text{ep0633} \cdot \left(\frac{[\text{s\_0633}]}{\text{ic0633}} \right) \right.
$$
$$
\left. + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}} \right) + \text{ep0529} \cdot \left(\frac{[\text{s\_0529}]}{\text{ic0529}} \right) + \text{ep0595} \cdot \left(\frac{[\text{s\_0595}]}{\text{ic0595}} \right) \right)
$$

(211)

Table 425: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.02210849110579 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$1.02210849110579 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0423			1.000	dimensionless	☑
ep0602			1.000	dimensionless	☑
ep0633			1.000	dimensionless	☑
ep0434			-1.000	dimensionless	☑
ep0529			-1.000	dimensionless	☑
ep0595			-1.000	dimensionless	☑

7.106 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

$$s\_0423 + s\_0633 + s\_1073 \xrightleftharpoons{e\_0273,\ s\_0423,\ s\_0633,\ s\_1073,\ s\_0434,\ s\_0529,\ s\_1065} s\_0434 + s\_0529 + s\_1065$$

(212)
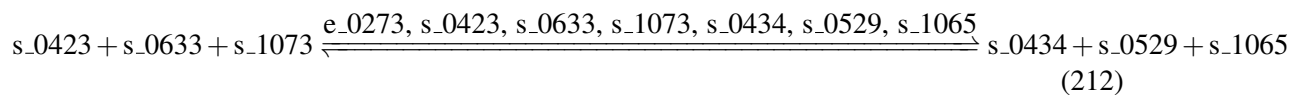
Reactants

Table 426: Properties of each reactant.

Id	Name	SBO
s_0423	AMP	
s_0633	diphosphate	
s_1073	lauroyl-CoA	

Modifiers

Table 427: Properties of each modifier.

Id	Name	SBO
e_0273	FAA2	0000460
s_0423	AMP	
s_0633	diphosphate	
s_1073	lauroyl-CoA	
s_0434	ATP	
s_0529	coenzyme A	
s_1065	laurate	

Products

Table 428: Properties of each product.

Id	Name	SBO
s_0434	ATP	
s_0529	coenzyme A	
s_1065	laurate	

Kinetic Law

Derived unit contains undeclared units

$$v_{106} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0423} \cdot \left(\frac{[\text{s\_0423}]}{\text{ic0423}} \right) + \text{ep0633} \cdot \left(\frac{[\text{s\_0633}]}{\text{ic0633}} \right) + \text{ep1073} \cdot \left(\frac{[\text{s\_1073}]}{\text{ic1073}} \right) \right.$$
$$\left. + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}} \right) + \text{ep0529} \cdot \left(\frac{[\text{s\_0529}]}{\text{ic0529}} \right) + \text{ep1065} \cdot \left(\frac{[\text{s\_1065}]}{\text{ic1065}} \right) \right)$$

(213)

Table 429: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.32100771565048 \cdot 10^{-12}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$1.32100771565048 \cdot 10^{-12}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0423			1.000	dimensionless	☑
ep0633			1.000	dimensionless	☑
ep1073			1.000	dimensionless	☑
ep0434			-1.000	dimensionless	☑
ep0529			-1.000	dimensionless	☑
ep1065			-1.000	dimensionless	☑

7.107 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

$$\text{s\_0423} + \text{s\_0633} + \text{s\_1454} \xrightleftharpoons{\text{e\_0750, e\_0889, e\_0462, s\_0423, s\_0633, s\_1454, s\_0434, s\_0529, s\_1449}} \text{s\_0434} + \text{s\_0529}$$

(214)
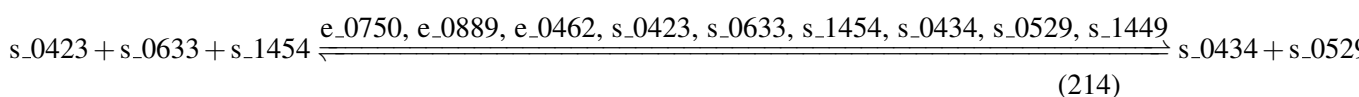
Reactants

Table 430: Properties of each reactant.

Id	Name	SBO
s_0423	AMP	
s_0633	diphosphate	
s_1454	stearoyl-CoA	

Modifiers

Table 431: Properties of each modifier.

Id	Name	SBO
e_0750	FAA4	0000460
e_0889	FAA1	0000460
e_0462	FAA3	0000460
s_0423	AMP	
s_0633	diphosphate	
s_1454	stearoyl-CoA	
s_0434	ATP	
s_0529	coenzyme A	
s_1449	stearate	

Products

Table 432: Properties of each product.

Id	Name	SBO
s_0434	ATP	
s_0529	coenzyme A	
s_1449	stearate	

Kinetic Law

Derived unit contains undeclared units

$$
v_{107} = \mathrm{vol\,(cell)} \cdot \mathrm{v0} \cdot \left(1 + \mathrm{ep0423} \cdot \left(\frac{[\mathrm{s\_0423}]}{\mathrm{ic0423}} \right) + \mathrm{ep0633} \cdot \left(\frac{[\mathrm{s\_0633}]}{\mathrm{ic0633}} \right) + \mathrm{ep1454} \cdot \left(\frac{[\mathrm{s\_1454}]}{\mathrm{ic1454}} \right) \right.
$$
$$
\left. + \, \mathrm{ep0434} \cdot \left(\frac{[\mathrm{s\_0434}]}{\mathrm{ic0434}} \right) + \mathrm{ep0529} \cdot \left(\frac{[\mathrm{s\_0529}]}{\mathrm{ic0529}} \right) + \mathrm{ep1449} \cdot \left(\frac{[\mathrm{s\_1449}]}{\mathrm{ic1449}} \right) \right)
\tag{215}
$$

Table 433: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.02210853716592 \cdot 10^{-5}$	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	✓
v0			$1.02210853716592 \cdot 10^{-5}$	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	✓
ep0423			1.000	dimensionless	✓
ep0633			1.000	dimensionless	✓

Id	Name	SBO	Value	Unit	Constant
ep1454			1.000	dimensionless	✓
ep0434			−1.000	dimensionless	✓
ep0529			−1.000	dimensionless	✓
ep1449			−1.000	dimensionless	✓

7.108 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

$$\text{s\_0602} + \text{s\_1101} + 2\,\text{s\_1212} \xrightleftharpoons{\text{e\_0808, e\_0365, e\_0586, e\_0934, s\_0602, s\_1101, s\_1212, s\_0456, s\_0529, s\_1073, s\_120}}$$

$$(216)$$
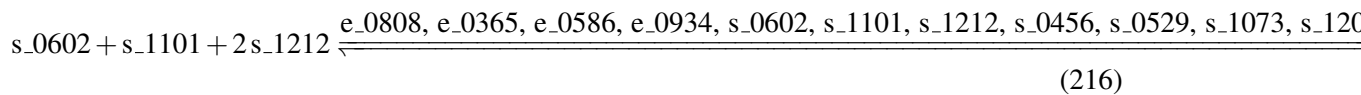
Reactants

Table 434: Properties of each reactant.

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

Modifiers

Table 435: 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	
s_0456	carbon dioxide	

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

Products

Table 436: Properties of each product.

Id	Name	SBO
s_0456	carbon dioxide	
s_0529	coenzyme A	
s_1073	lauroyl-CoA	
s_1207	NADP(+)	

Kinetic Law

Derived unit contains undeclared units

$$
v_{108} = \text{vol (cell)} \cdot \text{v0}
$$
$$
\cdot \left(1 + \text{ep0602} \cdot \left(\frac{[\text{s\_0602}]}{\text{ic0602}} \right) + \text{ep1101} \cdot \left(\frac{[\text{s\_1101}]}{\text{ic1101}} \right) + \text{ep1212} \cdot \left(\frac{[\text{s\_1212}]}{\text{ic1212}} \right) + \text{ep0456} \right.
$$
$$
\left. \cdot \left(\frac{[\text{s\_0456}]}{\text{ic0456}} \right) + \text{ep0529} \cdot \left(\frac{[\text{s\_0529}]}{\text{ic0529}} \right) + \text{ep1073} \cdot \left(\frac{[\text{s\_1073}]}{\text{ic1073}} \right) + \text{ep1207} \cdot \left(\frac{[\text{s\_1207}]}{\text{ic1207}} \right) \right)
$$
$$(217)$$

Table 437: Properties of each parameter.

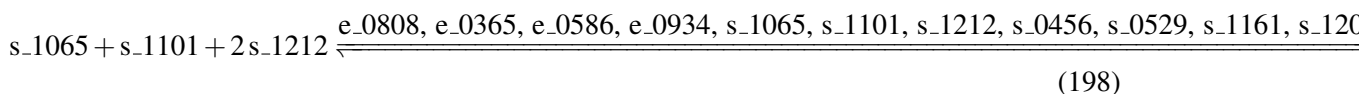| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$3.06632550169132 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	✓
v0			$3.06632550169132 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	✓
ep0602			1.000	dimensionless	✓
ep1101			1.000	dimensionless	✓
ep1212			2.000	dimensionless	✓
ep0456			-1.000	dimensionless	✓
ep0529			-1.000	dimensionless	✓
ep1073			-1.000	dimensionless	✓
ep1207			-2.000	dimensionless	✓

7.109 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

$$s\_1073 + s\_1101 + 2\,s\_1212 \xleftrightarrow{\text{e\_0808, e\_0365, e\_0586, e\_0934, s\_1073, s\_1101, s\_1212, s\_0456, s\_0529, s\_1176, s\_120}}$$

(218)

Reactants

Table 438: Properties of each reactant.

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

Modifiers

Table 439: 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	
s_0456	carbon dioxide	
s_0529	coenzyme A	
s_1176	myristoyl-CoA	
s_1207	NADP(+)	

Products

Table 440: Properties of each product.

Id	Name	SBO
s_0456	carbon dioxide	
s_0529	coenzyme A	
s_1176	myristoyl-CoA	
s_1207	NADP(+)	

Kinetic Law

Derived unit contains undeclared units

$$v_{109} = \text{vol}\,(\text{cell}) \cdot \text{v0}$$
$$\cdot \left(1 + \text{ep1073} \cdot \left(\frac{[\text{s\_1073}]}{\text{ic1073}} \right) + \text{ep1101} \cdot \left(\frac{[\text{s\_1101}]}{\text{ic1101}} \right) + \text{ep1212} \cdot \left(\frac{[\text{s\_1212}]}{\text{ic1212}} \right) + \text{ep0456} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0456}]}{\text{ic0456}} \right) + \text{ep0529} \cdot \left(\frac{[\text{s\_0529}]}{\text{ic0529}} \right) + \text{ep1176} \cdot \left(\frac{[\text{s\_1176}]}{\text{ic1176}} \right) + \text{ep1207} \cdot \left(\frac{[\text{s\_1207}]}{\text{ic1207}} \right) \right)$$

(219)

Table 441: Properties of each parameter.

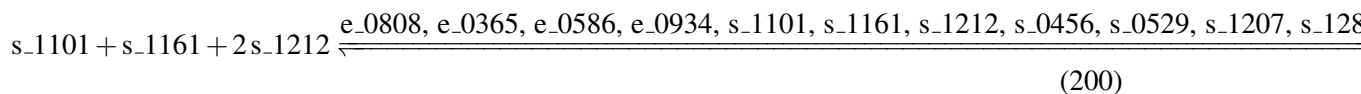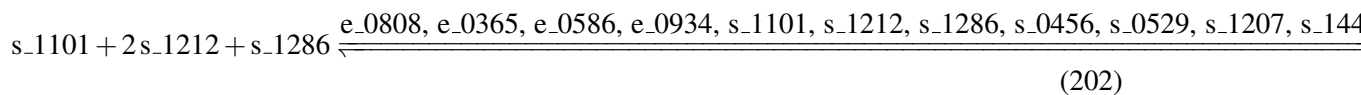| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$3.06632551696157 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$3.06632551696157 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep1073			1.000	dimensionless	☑
ep1101			1.000	dimensionless	☑
ep1212			2.000	dimensionless	☑
ep0456			-1.000	dimensionless	☑
ep0529			-1.000	dimensionless	☑
ep1176			-1.000	dimensionless	☑
ep1207			-2.000	dimensionless	☑

7.110 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

$$s\_1101 + s\_1176 + 2\,s\_1212 \xrightleftharpoons[\text{e\_0808, e\_0365, e\_0586, e\_0934, s\_1101, s\_1176, s\_1212, s\_0456, s\_0529, s\_1207, s\_130}]{}$$

$$(220)$$

Reactants

Table 442: Properties of each reactant.

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

Modifiers

Table 443: 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	
s_0456	carbon dioxide	
s_0529	coenzyme A	
s_1207	NADP(+)	
s_1302	palmitoyl-CoA	

Products

Table 444: Properties of each product.

Id	Name	SBO
s_0456	carbon dioxide	
s_0529	coenzyme A	
s_1207	NADP(+)	
s_1302	palmitoyl-CoA	

Kinetic Law

Derived unit contains undeclared units

$$v_{110} = \text{vol}\,(\text{cell}) \cdot v0$$
$$\cdot \left(1 + \text{ep1101} \cdot \left(\frac{[\text{s\_1101}]}{\text{ic1101}}\right) + \text{ep1176} \cdot \left(\frac{[\text{s\_1176}]}{\text{ic1176}}\right) + \text{ep1212} \cdot \left(\frac{[\text{s\_1212}]}{\text{ic1212}}\right) + \text{ep0456}\right.$$
$$\left. \cdot \left(\frac{[\text{s\_0456}]}{\text{ic0456}}\right) + \text{ep0529} \cdot \left(\frac{[\text{s\_0529}]}{\text{ic0529}}\right) + \text{ep1207} \cdot \left(\frac{[\text{s\_1207}]}{\text{ic1207}}\right) + \text{ep1302} \cdot \left(\frac{[\text{s\_1302}]}{\text{ic1302}}\right)\right)$$
$$\tag{221}$$

Table 445: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$3.06632551696157 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$3.06632551696157 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep1101			1.000	dimensionless	☑
ep1176			1.000	dimensionless	☑
ep1212			2.000	dimensionless	☑
ep0456			-1.000	dimensionless	☑
ep0529			-1.000	dimensionless	☑
ep1207			-2.000	dimensionless	☑
ep1302			-1.000	dimensionless	☑

7.111 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

$$\text{s\_1101} + 2\,\text{s\_1212} + \text{s\_1302} \xrightleftharpoons{\text{e\_0808, e\_0365, e\_0586, e\_0934, s\_1101, s\_1212, s\_1302, s\_0456, s\_0529, s\_1207, s\_145}}$$
$$\tag{222}$$

Reactants

Table 446: Properties of each reactant.

Id	Name	SBO
s_1101	malonyl-CoA	
s_1212	NADPH	
s_1302	palmitoyl-CoA	

Modifiers

Table 447: 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	
s_0456	carbon dioxide	
s_0529	coenzyme A	
s_1207	NADP(+)	
s_1454	stearoyl-CoA	

Products

Table 448: Properties of each product.

Id	Name	SBO
s_0456	carbon dioxide	
s_0529	coenzyme A	
s_1207	NADP(+)	
s_1454	stearoyl-CoA	

Kinetic Law

Derived unit contains undeclared units

Produced by SBML2LATEX

$$v_{111} = \text{vol}\,(\text{cell}) \cdot \text{v0}$$
$$\cdot \left(1 + \text{ep1101} \cdot \left(\frac{[\text{s\_1101}]}{\text{ic1101}} \right) + \text{ep1212} \cdot \left(\frac{[\text{s\_1212}]}{\text{ic1212}} \right) + \text{ep1302} \cdot \left(\frac{[\text{s\_1302}]}{\text{ic1302}} \right) + \text{ep0456} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0456}]}{\text{ic0456}} \right) + \text{ep0529} \cdot \left(\frac{[\text{s\_0529}]}{\text{ic0529}} \right) + \text{ep1207} \cdot \left(\frac{[\text{s\_1207}]}{\text{ic1207}} \right) + \text{ep1454} \cdot \left(\frac{[\text{s\_1454}]}{\text{ic1454}} \right) \right)$$

$$(223)$$

Table 449: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.0221085177611 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$1.0221085177611 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep1101			1.000	dimensionless	☑
ep1212			2.000	dimensionless	☑
ep1302			1.000	dimensionless	☑
ep0456			-1.000	dimensionless	☑
ep0529			-1.000	dimensionless	☑
ep1207			-2.000	dimensionless	☑
ep1454			-1.000	dimensionless	☑

7.112 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

$$4\,\text{s\_0710} + \text{s\_1275} \xrightleftharpoons{\text{e\_0632, e\_0007, e\_0774, e\_0436, e\_0136, e\_0001, e\_0347, e\_0255, e\_0752, e\_0690, e\_0006, e\_053}}$$

$$(224)$$
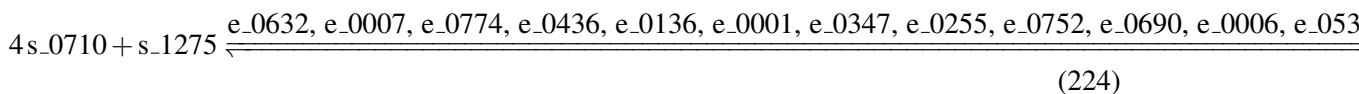
Reactants

Table 450: Properties of each reactant.

Id	Name	SBO
s_0710	ferrocytochrome c	
s_1275	oxygen	

Modifiers

Table 451: 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
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 452: Properties of each product.

Id	Name	SBO
s_0709	ferricytochrome c	

Kinetic Law

Derived unit contains undeclared units

$$v_{112} = \text{vol}\,(\text{cell}) \cdot \text{v0}$$
$$\cdot \left(1 + \text{ep0710} \cdot \left(\frac{[\text{s\_0710}]}{\text{ic0710}}\right) + \text{ep1275} \cdot \left(\frac{[\text{s\_1275}]}{\text{ic1275}}\right) + \text{ep0709} \cdot \left(\frac{[\text{s\_0709}]}{\text{ic0709}}\right)\right) \quad (225)$$

Produced by SBML2LATEX

Table 453: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			2.934	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	✓
v0			2.934	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	✓
ep0710			4.000	dimensionless	✓
ep1275			1.000	dimensionless	✓
ep0709			−4.000	dimensionless	✓

7.113 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

$$2\,\mathrm{s\_0709} + \mathrm{s\_1535} \xrightleftharpoons{\mathrm{e\_0514,\ e\_0978,\ e\_0422,\ e\_0250,\ e\_0004,\ e\_0243,\ e\_0389,\ e\_0255,\ e\_0848,\ e\_0028,\ e\_0531,\ e\_032}}$$

$$\tag{226}$$
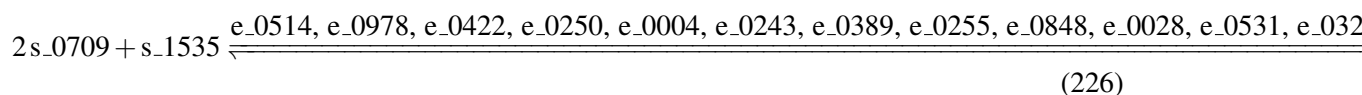
Reactants

Table 454: Properties of each reactant.

Id	Name	SBO
s_0709	ferricytochrome c	
s_1535	ubiquinol-6	

Modifiers

Table 455: 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

Id	Name	SBO
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 456: Properties of each product.

Id	Name	SBO
s_0710	ferrocytochrome c	
s_1537	ubiquinone-6	

Kinetic Law

Derived unit contains undeclared units

$$v_{113} = \mathrm{vol\,(cell)} \cdot \mathrm{v0} \cdot \left(1 + \mathrm{ep0709} \cdot \left(\frac{[\mathrm{s\_0709}]}{\mathrm{ic0709}} \right) + \mathrm{ep1535} \cdot \left(\frac{[\mathrm{s\_1535}]}{\mathrm{ic1535}} \right) + \mathrm{ep0710} \right.$$
$$\left. \cdot \left(\frac{[\mathrm{s\_0710}]}{\mathrm{ic0710}} \right) + \mathrm{ep1537} \cdot \left(\frac{[\mathrm{s\_1537}]}{\mathrm{ic1537}} \right) \right) \tag{227}$$

Table 457: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			5.868	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
v0			5.868	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
ep0709			2.000	dimensionless	☑
ep1535			1.000	dimensionless	☑
ep0710			−2.000	dimensionless	☑
ep1537			−1.000	dimensionless	☑

Produced by SBML2LATEX

7.114 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

$$s\_0120 + s\_0394 + s\_1322 \xrightleftharpoons{\text{e\_0396, e\_0057, s\_0120, s\_0394, s\_1322, s\_0434, s\_0722, s\_1487}} s\_0434 + s\_0722 + s\_148$$

$$(228)$$
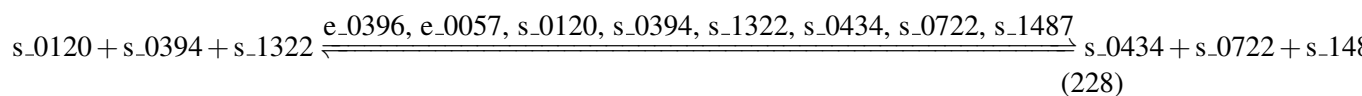
Reactants

Table 458: Properties of each reactant.

Id	Name	SBO
s_0120	10-formyl-THF	
s_0394	ADP	
s_1322	phosphate	

Modifiers

Table 459: Properties of each modifier.

Id	Name	SBO
e_0396	ADE3	0000460
e_0057	MIS1	0000460
s_0120	10-formyl-THF	
s_0394	ADP	
s_1322	phosphate	
s_0434	ATP	
s_0722	formate	
s_1487	THF	

Products

Table 460: Properties of each product.

Id	Name	SBO
s_0434	ATP	
s_0722	formate	
s_1487	THF	

Kinetic Law

Derived unit contains undeclared units

$$
\begin{aligned}
v_{114} = \mathrm{vol\,(cell)} \cdot \mathrm{v0} \cdot \Bigg(1 + \mathrm{ep0120} \cdot \left(\frac{[\mathrm{s\_0120}]}{\mathrm{ic0120}} \right) + \mathrm{ep0394} \cdot \left(\frac{[\mathrm{s\_0394}]}{\mathrm{ic0394}} \right) + \mathrm{ep1322} \cdot \left(\frac{[\mathrm{s\_1322}]}{\mathrm{ic1322}} \right) \\
+ \mathrm{ep0434} \cdot \left(\frac{[\mathrm{s\_0434}]}{\mathrm{ic0434}} \right) + \mathrm{ep0722} \cdot \left(\frac{[\mathrm{s\_0722}]}{\mathrm{ic0722}} \right) + \mathrm{ep1487} \cdot \left(\frac{[\mathrm{s\_1487}]}{\mathrm{ic1487}} \right) \Bigg)
\end{aligned}
\tag{229}
$$

Table 461: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			2.876	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
v0			2.876	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
ep0120			1.000	dimensionless	☑
ep0394			1.000	dimensionless	☑
ep1322			1.000	dimensionless	☑
ep0434			−1.000	dimensionless	☑
ep0722			−1.000	dimensionless	☑
ep1487			−1.000	dimensionless	☑

7.115 Reaction r_0450

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

$$
\mathrm{s\_0555} \xrightleftharpoons{\mathrm{e\_0567,\ s\_0555,\ s\_0629,\ s\_0764}} \mathrm{s\_0629} + \mathrm{s\_0764}
\tag{230}
$$

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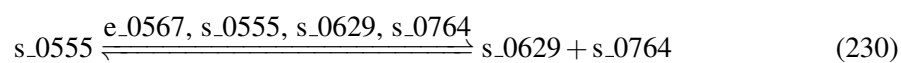
Reactant

Table 462: Properties of each reactant.

Id	Name	SBO
s_0555	D-fructose 1,6-bisphosphate	

Modifiers

Table 463: Properties of each modifier.

Id	Name	SBO
e_0567	FBA1	0000460
s_0555	D-fructose 1,6-bisphosphate	
s_0629	dihydroxyacetone phosphate	
s_0764	glyceraldehyde 3-phosphate	

Products

Table 464: Properties of each product.

Id	Name	SBO
s_0629	dihydroxyacetone phosphate	
s_0764	glyceraldehyde 3-phosphate	

Kinetic Law

Derived unit contains undeclared units

$$
\begin{aligned}
v_{115} = {} & \mathrm{vol}\,(\mathrm{cell}) \cdot \mathrm{v0} \\
& \cdot \left(1 + \mathrm{ep0555} \cdot \left(\frac{[\mathrm{s\_0555}]}{\mathrm{ic0555}}\right) + \mathrm{ep0629} \cdot \left(\frac{[\mathrm{s\_0629}]}{\mathrm{ic0629}}\right) + \mathrm{ep0764} \cdot \left(\frac{[\mathrm{s\_0764}]}{\mathrm{ic0764}}\right)\right)
\end{aligned} \tag{231}
$$

Table 465: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.851	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
v0			0.851	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
ep0555			1.000	dimensionless	☑
ep0629			-1.000	dimensionless	☑
ep0764			-1.000	dimensionless	☑

Produced by SBML2LATEX

7.116 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

$$\text{s\_0725} \xrightleftharpoons{\text{e\_0940, s\_0725, s\_0066}} \text{s\_0066} \tag{232}$$
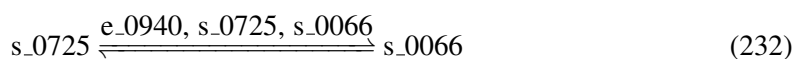
Reactant

Table 466: Properties of each reactant.

Id	Name	SBO
s_0725	fumarate	

Modifiers

Table 467: Properties of each modifier.

Id	Name	SBO
e_0940	FUM1	0000460
s_0725	fumarate	
s_0066	(S)-malate	

Product

Table 468: Properties of each product.

Id	Name	SBO
s_0066	(S)-malate	

Kinetic Law

Derived unit contains undeclared units

$$v_{116} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0725} \cdot \left(\frac{[\text{s\_0725}]}{\text{ic0725}} \right) + \text{ep0066} \cdot \left(\frac{[\text{s\_0066}]}{\text{ic0066}} \right) \right) \tag{233}$$

Table 469: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.014	mmol·l^{-1}·s^{-1}	☑
v0			0.014	mmol·l^{-1}·s^{-1}	☑
ep0725			1.000	dimensionless	☑
ep0066			-1.000	dimensionless	☑

7.117 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

$$s\_0745 + s\_0943 \xrightleftharpoons{e\_0515,\ s\_0745,\ s\_0943,\ s\_0190,\ s\_0633} s\_0190 + s\_0633 \qquad (234)$$
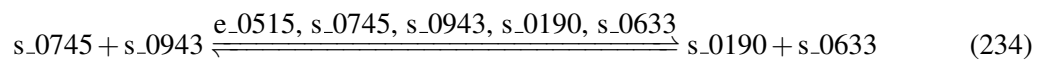
Reactants

Table 470: Properties of each reactant.

Id	Name	SBO
s_0745	geranyl diphosphate	
s_0943	isopentenyl diphosphate	

Modifiers

Table 471: 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

Produced by SBML2LATEX

Table 472: Properties of each product.

Id	Name	SBO
s_0190	farnesyl diphosphate	
s_0633	diphosphate	

Kinetic Law

Derived unit contains undeclared units

$$
v_{117} = \text{vol}(\text{cell}) \cdot v0 \cdot \left(1 + \text{ep0745} \cdot \left(\frac{[\text{s\_0745}]}{\text{ic0745}} \right) + \text{ep0943} \cdot \left(\frac{[\text{s\_0943}]}{\text{ic0943}} \right) + \text{ep0190} \right. \\
\left. \cdot \left(\frac{[\text{s\_0190}]}{\text{ic0190}} \right) + \text{ep0633} \cdot \left(\frac{[\text{s\_0633}]}{\text{ic0633}} \right) \right)
$$

(235)

Table 473: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$5.19949368301002 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$5.19949368301002 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0745			1.000	dimensionless	☑
ep0943			1.000	dimensionless	☑
ep0190			-1.000	dimensionless	☑
ep0633			-1.000	dimensionless	☑

7.118 Reaction r_0467

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

$$
\text{s\_0568} \xrightleftharpoons{\text{e\_0079, s\_0568, s\_0557}} \text{s\_0557}
$$

(236)
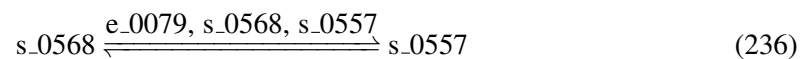
Reactant

Table 474: Properties of each reactant.

Id	Name	SBO
s_0568	D-glucose 6-phosphate	

Modifiers

Table 475: Properties of each modifier.

Id	Name	SBO
e_0079	PGI1	0000460
s_0568	D-glucose 6-phosphate	
s_0557	D-fructose 6-phosphate	

Product

Table 476: Properties of each product.

Id	Name	SBO
s_0557	D-fructose 6-phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{118} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0568} \cdot \left(\frac{[\text{s\_0568}]}{\text{ic0568}} \right) + \text{ep0557} \cdot \left(\frac{[\text{s\_0557}]}{\text{ic0557}} \right) \right) \quad (237)$$

Table 477: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.892	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
v0			0.892	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
ep0568			1.000	dimensionless	☑
ep0557			-1.000	dimensionless	☑

7.119 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

$$s\_0180 + s\_0419 + s\_1203 \underset{}{\xrightarrow{e\_0160, \, s\_0180, \, s\_0419, \, s\_1203, \, s\_0991, \, s\_1198}} s\_0991 + s\_1198 \tag{238}$$

Reactants

Table 478: Properties of each reactant.

Id	Name	SBO
s_0180	2-oxoglutarate	
s_0419	ammonium	
s_1203	NADH	

Modifiers

Table 479: Properties of each modifier.

Id	Name	SBO
e_0160	GDH2	0000460
s_0180	2-oxoglutarate	
s_0419	ammonium	
s_1203	NADH	
s_0991	L-glutamate	
s_1198	NAD	

Products

Table 480: Properties of each product.

Id	Name	SBO
s_0991	L-glutamate	
s_1198	NAD	

Kinetic Law

Derived unit contains undeclared units

$$v_{119} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0180} \cdot \left(\frac{[\text{s\_0180}]}{\text{ic0180}} \right) + \text{ep0419} \cdot \left(\frac{[\text{s\_0419}]}{\text{ic0419}} \right) + \text{ep1203} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_1203}]}{\text{ic1203}} \right) + \text{ep0991} \cdot \left(\frac{[\text{s\_0991}]}{\text{ic0991}} \right) + \text{ep1198} \cdot \left(\frac{[\text{s\_1198}]}{\text{ic1198}} \right) \right) \tag{239}$$

Table 481: Properties of each parameter.

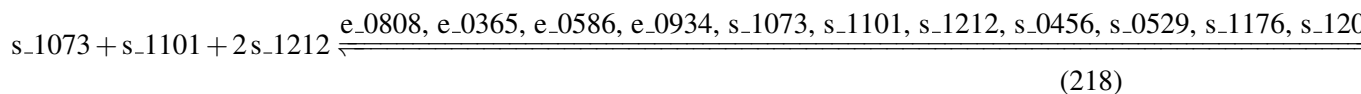| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.813	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.813	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0180			1.000	dimensionless	☑
ep0419			1.000	dimensionless	☑
ep1203			1.000	dimensionless	☑
ep0991			−1.000	dimensionless	☑
ep1198			−1.000	dimensionless	☑

7.120 Reaction r_0471

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

Name glutamate dehydrogenase (NADP)

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0180} + \text{s\_0419} + \text{s\_1212} \xrightleftharpoons{\text{e\_0016, e\_0899, s\_0180, s\_0419, s\_1212, s\_0991, s\_1207}} \text{s\_0991} + \text{s\_1207} \tag{240}$$

Reactants

Table 482: Properties of each reactant.

Id	Name	SBO
s_0180	2-oxoglutarate	
s_0419	ammonium	
s_1212	NADPH	

Modifiers

Table 483: Properties of each modifier.

Id	Name	SBO
e_0016	GDH3	0000460
e_0899	GDH1	0000460
s_0180	2-oxoglutarate	
s_0419	ammonium	
s_1212	NADPH	
s_0991	L-glutamate	
s_1207	NADP(+)	

Products

Table 484: Properties of each product.

Id	Name	SBO
s_0991	L-glutamate	
s_1207	NADP(+)	

Kinetic Law

Derived unit contains undeclared units

$$v_{120} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0180} \cdot \left(\frac{[\text{s\_0180}]}{\text{ic0180}} \right) + \text{ep0419} \cdot \left(\frac{[\text{s\_0419}]}{\text{ic0419}} \right) + \text{ep1212} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_1212}]}{\text{ic1212}} \right) + \text{ep0991} \cdot \left(\frac{[\text{s\_0991}]}{\text{ic0991}} \right) + \text{ep1207} \cdot \left(\frac{[\text{s\_1207}]}{\text{ic1207}} \right) \right)$$

(241)

Table 485: Properties of each parameter.

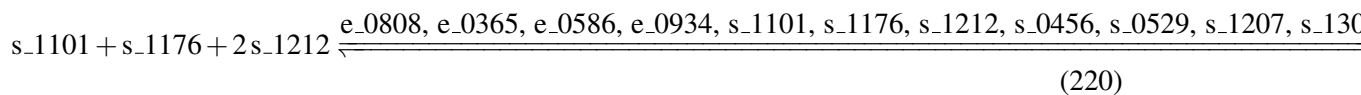| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.813	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.813	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0180			1.000	dimensionless	☑
ep0419			1.000	dimensionless	☑
ep1212			1.000	dimensionless	☑
ep0991			−1.000	dimensionless	☑
ep1207			−1.000	dimensionless	☑

7.121 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

$$s\_0419 + s\_0434 + s\_0991 \xrightleftharpoons{\text{e\_0955, s\_0419, s\_0434, s\_0991, s\_0394, s\_0999, s\_1322}} s\_0394 + s\_0999 + s\_1322 \tag{242}$$
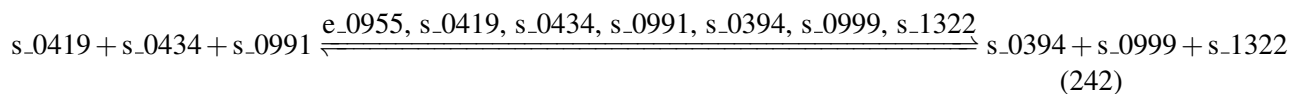
Reactants

Table 486: Properties of each reactant.

Id	Name	SBO
s_0419	ammonium	
s_0434	ATP	
s_0991	L-glutamate	

Modifiers

Table 487: Properties of each modifier.

Id	Name	SBO
e_0955	GLN1	0000460
s_0419	ammonium	
s_0434	ATP	
s_0991	L-glutamate	
s_0394	ADP	
s_0999	L-glutamine	
s_1322	phosphate	

Products

Table 488: Properties of each product.

Id	Name	SBO
s_0394	ADP	

Id	Name	SBO
s_0999	L-glutamine	
s_1322	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{121} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0419} \cdot \left(\frac{[\text{s\_0419}]}{\text{ic0419}}\right) + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}}\right) + \text{ep0991} \cdot \left(\frac{[\text{s\_0991}]}{\text{ic0991}}\right)\right.$$
$$\left. + \text{ep0394} \cdot \left(\frac{[\text{s\_0394}]}{\text{ic0394}}\right) + \text{ep0999} \cdot \left(\frac{[\text{s\_0999}]}{\text{ic0999}}\right) + \text{ep1322} \cdot \left(\frac{[\text{s\_1322}]}{\text{ic1322}}\right)\right)$$

(243)

Table 489: Properties of each parameter.

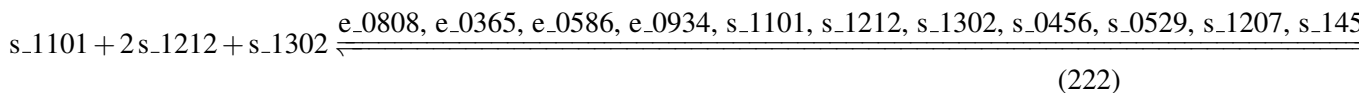| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.031	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.031	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0419			1.000	dimensionless	☑
ep0434			1.000	dimensionless	☑
ep0991			1.000	dimensionless	☑
ep0394			-1.000	dimensionless	☑
ep0999			-1.000	dimensionless	☑
ep1322			-1.000	dimensionless	☑

7.122 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

$$\text{s\_0434} + \text{s\_0999} + \text{s\_1590} \xrightleftharpoons{\text{e\_0867, s\_0434, s\_0999, s\_1590, s\_0423, s\_0633, s\_0747}} \text{s\_0423} + \text{s\_0633} + \text{s\_0747}$$

(244)

Reactants

Table 490: Properties of each reactant.

Id	Name	SBO
s_0434	ATP	
s_0999	L-glutamine	
s_1590	tRNA(Gln)	

Modifiers

Table 491: Properties of each modifier.

Id	Name	SBO
e_0867	GLN4	0000460
s_0434	ATP	
s_0999	L-glutamine	
s_1590	tRNA(Gln)	
s_0423	AMP	
s_0633	diphosphate	
s_0747	Gln-tRNA(Gln)	

Products

Table 492: Properties of each product.

Id	Name	SBO
s_0423	AMP	
s_0633	diphosphate	
s_0747	Gln-tRNA(Gln)	

Kinetic Law

Derived unit contains undeclared units

$$
\begin{aligned}
v_{122} = \mathrm{vol}\,(\mathrm{cell}) \cdot \mathrm{v0} \cdot \Bigg(& 1 + \mathrm{ep0434} \cdot \left(\frac{[\mathrm{s\_0434}]}{\mathrm{ic0434}} \right) + \mathrm{ep0999} \cdot \left(\frac{[\mathrm{s\_0999}]}{\mathrm{ic0999}} \right) + \mathrm{ep1590} \cdot \left(\frac{[\mathrm{s\_1590}]}{\mathrm{ic1590}} \right) \\
& + \mathrm{ep0423} \cdot \left(\frac{[\mathrm{s\_0423}]}{\mathrm{ic0423}} \right) + \mathrm{ep0633} \cdot \left(\frac{[\mathrm{s\_0633}]}{\mathrm{ic0633}} \right) + \mathrm{ep0747} \cdot \left(\frac{[\mathrm{s\_0747}]}{\mathrm{ic0747}} \right) \Bigg)
\end{aligned}
$$

(245)

Table 493: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.004	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	✓
v0			0.004	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	✓
ep0434			1.000	dimensionless	✓
ep0999			1.000	dimensionless	✓
ep1590			1.000	dimensionless	✓
ep0423			-1.000	dimensionless	✓
ep0633			-1.000	dimensionless	✓
ep0747			-1.000	dimensionless	✓

7.123 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

$$\mathrm{s\_0434} + \mathrm{s\_0991} + \mathrm{s\_1591} \xrightleftharpoons{\mathrm{e\_0353,\ s\_0434,\ s\_0991,\ s\_1591,\ s\_0423,\ s\_0633,\ s\_0748}} \mathrm{s\_0423} + \mathrm{s\_0633} + \mathrm{s\_0748}$$

(246)

Reactants

Table 494: Properties of each reactant.

Id	Name	SBO
s_0434	ATP	
s_0991	L-glutamate	
s_1591	tRNA(Glu)	

Modifiers

Table 495: Properties of each modifier.

Id	Name	SBO
e_0353	GUS1	0000460
s_0434	ATP	

Id	Name	SBO
s_0991	L-glutamate	
s_1591	tRNA(Glu)	
s_0423	AMP	
s_0633	diphosphate	
s_0748	Glu-tRNA(Glu)	

Products

Table 496: Properties of each product.

Id	Name	SBO
s_0423	AMP	
s_0633	diphosphate	
s_0748	Glu-tRNA(Glu)	

Kinetic Law

Derived unit contains undeclared units

$$
v_{123} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}} \right) + \text{ep0991} \cdot \left(\frac{[\text{s\_0991}]}{\text{ic0991}} \right) + \text{ep1591} \cdot \left(\frac{[\text{s\_1591}]}{\text{ic1591}} \right) \right.
$$
$$
\left. + \text{ep0423} \cdot \left(\frac{[\text{s\_0423}]}{\text{ic0423}} \right) + \text{ep0633} \cdot \left(\frac{[\text{s\_0633}]}{\text{ic0633}} \right) + \text{ep0748} \cdot \left(\frac{[\text{s\_0748}]}{\text{ic0748}} \right) \right)
$$

(247)

Table 497: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.011	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.011	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0434			1.000	dimensionless	☑
ep0991			1.000	dimensionless	☑
ep1591			1.000	dimensionless	☑
ep0423			-1.000	dimensionless	☑
ep0633			-1.000	dimensionless	☑
ep0748			-1.000	dimensionless	☑

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7.124 Reaction r_0481

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

Name glutathione oxidoreductase

SBO:0000176 biochemical reaction

Reaction equation

$$s\_0754 + s\_1212 \xrightleftharpoons{\ e\_0242,\ e\_0104,\ e\_0181,\ e\_0304,\ e\_0915,\ e\_0910,\ s\_0754,\ s\_1212,\ s\_0750,\ s\_1207\ } 2\,s\_0750 + s\_120 \tag{248}$$
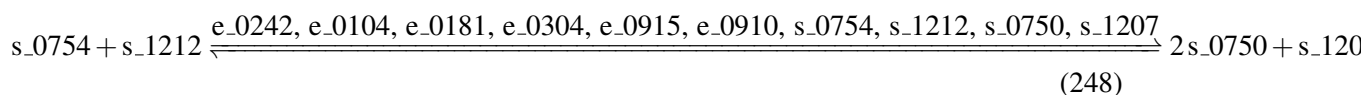
Reactants

Table 498: Properties of each reactant.

Id	Name	SBO
s_0754	glutathione disulfide	
s_1212	NADPH	

Modifiers

Table 499: Properties of each modifier.

Id	Name	SBO
e_0242	GRX2	0000460
e_0104	GRX1	0000460
e_0181	GRX3	0000460
e_0304	GRX4	0000460
e_0915	GLR1	0000460
e_0910	GRX5	0000460
s_0754	glutathione disulfide	
s_1212	NADPH	
s_0750	glutathione	
s_1207	NADP(+)	

Products

Table 500: Properties of each product.

Id	Name	SBO
s_0750	glutathione	
s_1207	NADP(+)	

Kinetic Law

Derived unit contains undeclared units

$$
v_{124} = \text{vol}\,(\text{cell}) \cdot v0 \cdot \left(1 + \text{ep0754} \cdot \left(\frac{[\text{s\_0754}]}{\text{ic0754}} \right) + \text{ep1212} \cdot \left(\frac{[\text{s\_1212}]}{\text{ic1212}} \right) + \text{ep0750} \right.
$$
$$
\left. \cdot \left(\frac{[\text{s\_0750}]}{\text{ic0750}} \right) + \text{ep1207} \cdot \left(\frac{[\text{s\_1207}]}{\text{ic1207}} \right) \right) \tag{249}
$$

Table 501: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.002	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.002	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0754			1.000	dimensionless	☑
ep1212			1.000	dimensionless	☑
ep0750			−2.000	dimensionless	☑
ep1207			−1.000	dimensionless	☑

7.125 Reaction r_0483

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

Name glutathione peridoxase

SBO:0000176 biochemical reaction

Reaction equation

$$
2\,\text{s\_0750} + \text{s\_0837} \xrightleftharpoons{\text{e\_0242, e\_0563, e\_0086, e\_0104, e\_0490, e\_0910, s\_0750, s\_0837, s\_0754}} \text{s\_0754} \tag{250}
$$
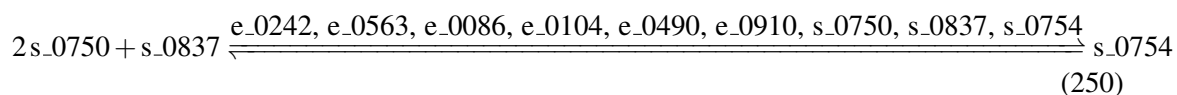
Reactants

Table 502: Properties of each reactant.

Id	Name	SBO
s_0750	glutathione	
s_0837	hydrogen peroxide	

Modifiers

Table 503: Properties of each modifier.

Id	Name	SBO
e_0242	GRX2	0000460
e_0563	GPX1	0000460
e_0086	GPX2	0000460
e_0104	GRX1	0000460
e_0490	HYR1	0000460
e_0910	GRX5	0000460
s_0750	glutathione	
s_0837	hydrogen peroxide	
s_0754	glutathione disulfide	

Product

Table 504: Properties of each product.

Id	Name	SBO
s_0754	glutathione disulfide	

Kinetic Law

Derived unit contains undeclared units

$$v_{125} = \text{vol}\,(\text{cell}) \cdot \text{v0}$$
$$\cdot \left(1 + \text{ep0750} \cdot \left(\frac{[\text{s\_0750}]}{\text{ic0750}} \right) + \text{ep0837} \cdot \left(\frac{[\text{s\_0837}]}{\text{ic0837}} \right) + \text{ep0754} \cdot \left(\frac{[\text{s\_0754}]}{\text{ic0754}} \right) \right) \quad (251)$$

Table 505: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.002	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑

Id	Name	SBO	Value	Unit	Constant
v0			0.002	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
ep0750			2.000	dimensionless	☑
ep0837			1.000	dimensionless	☑
ep0754			-1.000	dimensionless	☑

7.126 Reaction `r_0486`

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

$$s\_0764 + s\_1198 + s\_1322 \overset{e\_0392,\ e\_0495,\ e\_0525,\ s\_0764,\ s\_1198,\ s\_1322,\ s\_0075,\ s\_1203}{\rightleftharpoons} s\_0075 + s\_1203 \tag{252}$$
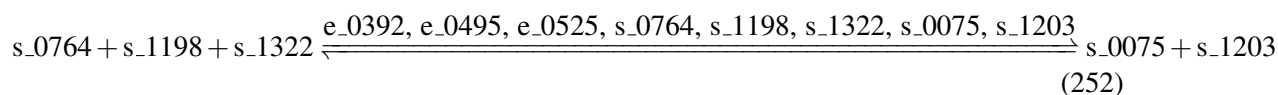
Reactants

Table 506: Properties of each reactant.

Id	Name	SBO
s_0764	glyceraldehyde 3-phosphate	
s_1198	NAD	
s_1322	phosphate	

Modifiers

Table 507: Properties of each modifier.

Id	Name	SBO
e_0392	TDH3	0000460
e_0495	TDH1	0000460
e_0525	TDH2	0000460
s_0764	glyceraldehyde 3-phosphate	
s_1198	NAD	
s_1322	phosphate	
s_0075	1,3-bisphospho-D-glycerate	
s_1203	NADH	

Products

Table 508: Properties of each product.

Id	Name	SBO
s_0075	1,3-bisphospho-D-glycerate	
s_1203	NADH	

Kinetic Law

Derived unit contains undeclared units

$$
\begin{aligned}
v_{126} = \mathrm{vol\,(cell)} \cdot \mathrm{v0} \cdot & \left(1 + \mathrm{ep0764} \cdot \left(\frac{[\mathrm{s\_0764}]}{\mathrm{ic0764}} \right) + \mathrm{ep1198} \cdot \left(\frac{[\mathrm{s\_1198}]}{\mathrm{ic1198}} \right) + \mathrm{ep1322} \right. \\
& \left. \cdot \left(\frac{[\mathrm{s\_1322}]}{\mathrm{ic1322}} \right) + \mathrm{ep0075} \cdot \left(\frac{[\mathrm{s\_0075}]}{\mathrm{ic0075}} \right) + \mathrm{ep1203} \cdot \left(\frac{[\mathrm{s\_1203}]}{\mathrm{ic1203}} \right) \right)
\end{aligned}
\tag{253}
$$

Table 509: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			1.691	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
v0			1.691	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
ep0764			1.000	dimensionless	☑
ep1198			1.000	dimensionless	☑
ep1322			1.000	dimensionless	☑
ep0075			-1.000	dimensionless	☑
ep1203			-1.000	dimensionless	☑

7.127 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

$$
\mathrm{s\_0629} + \mathrm{s\_1203} \xrightleftharpoons[\quad\quad]{\mathrm{e\_0129, \ e\_0827, \ s\_0629, \ s\_1203, \ s\_0767, \ s\_1198}} \mathrm{s\_0767} + \mathrm{s\_1198}
\tag{254}
$$

Reactants

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Table 510: Properties of each reactant.

Id	Name	SBO
s_0629	dihydroxyacetone phosphate	
s_1203	NADH	

Modifiers

Table 511: Properties of each modifier.

Id	Name	SBO
e_0129	GPD1	0000460
e_0827	GPD2	0000460
s_0629	dihydroxyacetone phosphate	
s_1203	NADH	
s_0767	glycerol 3-phosphate	
s_1198	NAD	

Products

Table 512: Properties of each product.

Id	Name	SBO
s_0767	glycerol 3-phosphate	
s_1198	NAD	

Kinetic Law

Derived unit contains undeclared units

$$v_{127} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0629} \cdot \left(\frac{[\text{s\_0629}]}{\text{ic0629}} \right) + \text{ep1203} \cdot \left(\frac{[\text{s\_1203}]}{\text{ic1203}} \right) + \text{ep0767} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0767}]}{\text{ic0767}} \right) + \text{ep1198} \cdot \left(\frac{[\text{s\_1198}]}{\text{ic1198}} \right) \right) \tag{255}$$

Table 513: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.40277331835412 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$2.40277331835412 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑

Id	Name	SBO	Value	Unit	Constant
ep0629			1.000	dimensionless	☑
ep1203			1.000	dimensionless	☑
ep0767			−1.000	dimensionless	☑
ep1198			−1.000	dimensionless	☑

## 7.128 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

$$\text{s\_0380} + \text{s\_0767} \xrightleftharpoons{\text{e\_0020, e\_0607, s\_0380, s\_0767, s\_0082, s\_0529}} \text{s\_0082} + \text{s\_0529} \quad (256)$$

Reactants

Table 514: Properties of each reactant.

Id	Name	SBO
s_0380	acyl-CoA	
s_0767	glycerol 3-phosphate	

Modifiers

Table 515: 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 516: 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

$$v_{128} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0380} \cdot \left(\frac{[\text{s\_0380}]}{\text{ic0380}} \right) + \text{ep0767} \cdot \left(\frac{[\text{s\_0767}]}{\text{ic0767}} \right) + \text{ep0082} \right. $$
$$\left. \cdot \left(\frac{[\text{s\_0082}]}{\text{ic0082}} \right) + \text{ep0529} \cdot \left(\frac{[\text{s\_0529}]}{\text{ic0529}} \right) \right) \tag{257}$$

Table 517: Properties of each parameter.

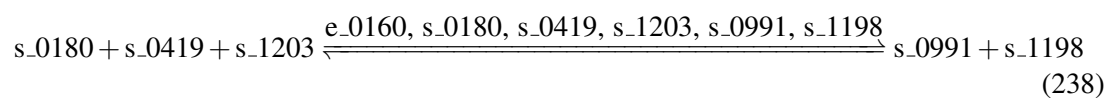| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.40277332169094 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$2.40277332169094 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0380			1.000	dimensionless	☑
ep0767			1.000	dimensionless	☑
ep0082			-1.000	dimensionless	☑
ep0529			-1.000	dimensionless	☑

7.129 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

$$\text{s\_0120} + \text{s\_0325} \xrightleftharpoons{\text{e\_0231, s\_0120, s\_0325, s\_0301, s\_1487}} \text{s\_0301} + \text{s\_1487} \tag{258}$$
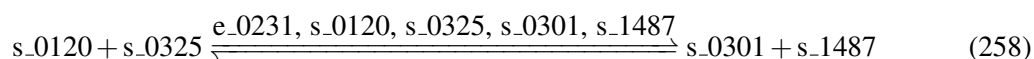
Reactants

Table 518: Properties of each reactant.

Id	Name	SBO
s_0120	10-formyl-THF	
s_0325	5-phospho-ribosyl-glycineamide	

Modifiers

Table 519: 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 520: Properties of each product.

Id	Name	SBO
s_0301	5'-phosphoribosyl-N-formylglycineamide	
s_1487	THF	

Kinetic Law

Derived unit contains undeclared units

$$v_{129} = \text{vol}\left(\text{cell}\right) \cdot \text{v0} \cdot \left(1 + \text{ep0120} \cdot \left(\frac{[\text{s\_0120}]}{\text{ic0120}}\right) + \text{ep0325} \cdot \left(\frac{[\text{s\_0325}]}{\text{ic0325}}\right) + \text{ep0301} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0301}]}{\text{ic0301}}\right) + \text{ep1487} \cdot \left(\frac{[\text{s\_1487}]}{\text{ic1487}}\right)\right) \quad (259)$$

Table 521: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.004	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.004	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0120			1.000	dimensionless	☑

Produced by SBML2LATEX

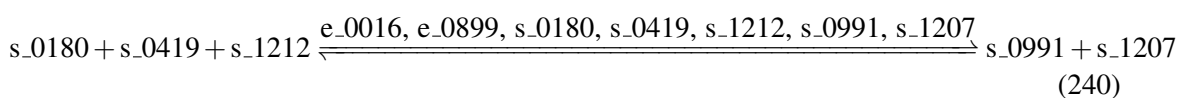| Id	Name	SBO	Value	Unit	Constant
ep0325			1.000	dimensionless	☑
ep0301			−1.000	dimensionless	☑
ep1487			−1.000	dimensionless	☑

7.130 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

$$s\_1003 + s\_1198 + s\_1487 \xrightleftharpoons{e\_0741, e\_0012, e\_0167, e\_0311, s\_1003, s\_1198, s\_1487, s\_0306, s\_0419, s\_0456, s\_1203}$$

$$(260)$$

Reactants

Table 522: Properties of each reactant.

Id	Name	SBO
s_1003	L-glycine	
s_1198	NAD	
s_1487	THF	

Modifiers

Table 523: 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	
s_1198	NAD	
s_1487	THF	
s_0306	5,10-methylenetetrahydrofolate	
s_0419	ammonium	

Id	Name	SBO
s_0456	carbon dioxide	
s_1203	NADH	

Products

Table 524: Properties of each product.

Id	Name	SBO
s_0306	5,10-methylenetetrahydrofolate	
s_0419	ammonium	
s_0456	carbon dioxide	
s_1203	NADH	

Kinetic Law

Derived unit contains undeclared units

$$
\begin{aligned}
v_{130} = {} & \mathrm{vol\,(cell)} \cdot \mathrm{v0} \\
& \cdot \left(1 + \mathrm{ep1003} \cdot \left(\frac{[\mathrm{s\_1003}]}{\mathrm{ic1003}} \right) + \mathrm{ep1198} \cdot \left(\frac{[\mathrm{s\_1198}]}{\mathrm{ic1198}} \right) + \mathrm{ep1487} \cdot \left(\frac{[\mathrm{s\_1487}]}{\mathrm{ic1487}} \right) + \mathrm{ep0306} \right. \\
& \left. \cdot \left(\frac{[\mathrm{s\_0306}]}{\mathrm{ic0306}} \right) + \mathrm{ep0419} \cdot \left(\frac{[\mathrm{s\_0419}]}{\mathrm{ic0419}} \right) + \mathrm{ep0456} \cdot \left(\frac{[\mathrm{s\_0456}]}{\mathrm{ic0456}} \right) + \mathrm{ep1203} \cdot \left(\frac{[\mathrm{s\_1203}]}{\mathrm{ic1203}} \right) \right)
\end{aligned}
\tag{261}
$$

Table 525: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			1.437	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
v0			1.437	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
ep1003			1.000	dimensionless	☑
ep1198			1.000	dimensionless	☑
ep1487			1.000	dimensionless	☑
ep0306			−1.000	dimensionless	☑
ep0419			−1.000	dimensionless	☑
ep0456			−1.000	dimensionless	☑
ep1203			−1.000	dimensionless	☑

Produced by SBML2LATEX

7.131 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

$$s\_1039 + s\_1487 \underset{\xrightarrow{\hspace{4cm}}}{\overset{e\_0638,\ e\_0091,\ s\_1039,\ s\_1487,\ s\_0306,\ s\_1003}{}} s\_0306 + s\_1003 \qquad (262)$$

Reactants

Table 526: Properties of each reactant.

Id	Name	SBO
s_1039	L-serine	
s_1487	THF	

Modifiers

Table 527: Properties of each modifier.

Id	Name	SBO
e_0638	SHM2	0000460
e_0091	SHM1	0000460
s_1039	L-serine	
s_1487	THF	
s_0306	5,10-methylenetetrahydrofolate	
s_1003	L-glycine	

Products

Table 528: Properties of each product.

Id	Name	SBO
s_0306	5,10-methylenetetrahydrofolate	
s_1003	L-glycine	

Kinetic Law

Derived unit contains undeclared units

$$v_{131} = \mathrm{vol}\,(\mathrm{cell}) \cdot \mathrm{v0} \cdot \left(1 + \mathrm{ep1039} \cdot \left(\frac{[\mathrm{s\_1039}]}{\mathrm{ic1039}} \right) + \mathrm{ep1487} \cdot \left(\frac{[\mathrm{s\_1487}]}{\mathrm{ic1487}} \right) + \mathrm{ep0306} \right.$$
$$\left. \cdot \left(\frac{[\mathrm{s\_0306}]}{\mathrm{ic0306}} \right) + \mathrm{ep1003} \cdot \left(\frac{[\mathrm{s\_1003}]}{\mathrm{ic1003}} \right) \right) \tag{263}$$

Table 529: Properties of each parameter.

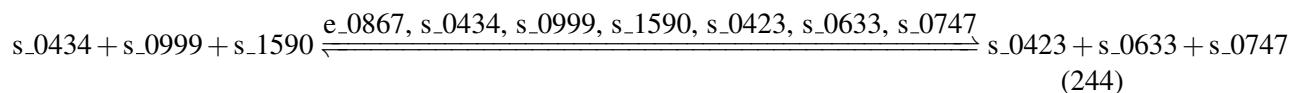| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			1.452	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
v0			1.452	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
ep1039			1.000	dimensionless	☑
ep1487			1.000	dimensionless	☑
ep0306			−1.000	dimensionless	☑
ep1003			−1.000	dimensionless	☑

7.132 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

$$\mathrm{s\_1543} \xrightleftharpoons{\mathrm{e\_0667,\ e\_0510,\ e\_0317,\ e\_0603,\ s\_1543,\ s\_0773,\ s\_1538}} \mathrm{s\_0773} + \mathrm{s\_1538} \tag{264}$$
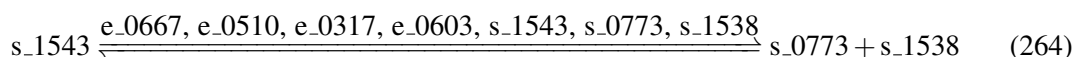
Reactant

Table 530: Properties of each reactant.

Id	Name	SBO
s_1543	UDP-D-glucose	

Modifiers

Table 531: Properties of each modifier.

Id	Name	SBO
e_0667	GSY2	0000460
e_0510	GLG2	0000460
e_0317	GSY1	0000460
e_0603	GLG1	0000460
s_1543	UDP-D-glucose	
s_0773	glycogen	
s_1538	UDP	

Products

Table 532: Properties of each product.

Id	Name	SBO
s_0773	glycogen	
s_1538	UDP	

Kinetic Law

Derived unit contains undeclared units

$$
v_{132} = \text{vol}\,(\text{cell}) \cdot \text{v0}
$$
$$
\cdot \left(1 + \text{ep1543} \cdot \left(\frac{[\text{s\_1543}]}{\text{ic1543}} \right) + \text{ep0773} \cdot \left(\frac{[\text{s\_0773}]}{\text{ic0773}} \right) + \text{ep1538} \cdot \left(\frac{[\text{s\_1538}]}{\text{ic1538}} \right) \right) \quad (265)
$$

Table 533: Properties of each parameter.

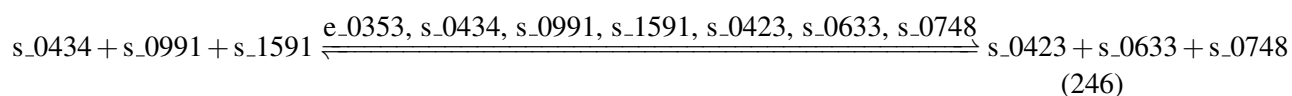| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.020	$\text{mmol} \cdot l^{-1} \cdot s^{-1}$	☑
v0			0.020	$\text{mmol} \cdot l^{-1} \cdot s^{-1}$	☑
ep1543			1.000	dimensionless	☑
ep0773			−1.000	dimensionless	☑
ep1538			−1.000	dimensionless	☑

7.133 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

$$\text{s\_0434} + \text{s\_1003} + \text{s\_1593} \xrightleftharpoons{\text{e\_0064, e\_0963, s\_0434, s\_1003, s\_1593, s\_0423, s\_0633, s\_0757}} \text{s\_0423} + \text{s\_0633} + \text{s\_07}$$

$$(266)$$

Reactants

Table 534: Properties of each reactant.

Id	Name	SBO
s_0434	ATP	
s_1003	L-glycine	
s_1593	tRNA(Gly)	

Modifiers

Table 535: Properties of each modifier.

Id	Name	SBO
e_0064	GRS1	0000460
e_0963	GRS2	0000460
s_0434	ATP	
s_1003	L-glycine	
s_1593	tRNA(Gly)	
s_0423	AMP	
s_0633	diphosphate	
s_0757	Gly-tRNA(Gly)	

Products

Table 536: Properties of each product.

Id	Name	SBO
s_0423	AMP	
s_0633	diphosphate	
s_0757	Gly-tRNA(Gly)	

Produced by SBML2LATEX

Kinetic Law

Derived unit contains undeclared units

$$v_{133} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}}\right) + \text{ep1003} \cdot \left(\frac{[\text{s\_1003}]}{\text{ic1003}}\right) + \text{ep1593} \cdot \left(\frac{[\text{s\_1593}]}{\text{ic1593}}\right)\right.$$
$$\left. + \text{ep0423} \cdot \left(\frac{[\text{s\_0423}]}{\text{ic0423}}\right) + \text{ep0633} \cdot \left(\frac{[\text{s\_0633}]}{\text{ic0633}}\right) + \text{ep0757} \cdot \left(\frac{[\text{s\_0757}]}{\text{ic0757}}\right)\right)$$

$$(267)$$

Table 537: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.011	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
v0			0.011	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
ep0434			1.000	dimensionless	☑
ep1003			1.000	dimensionless	☑
ep1593			1.000	dimensionless	☑
ep0423			-1.000	dimensionless	☑
ep0633			-1.000	dimensionless	☑
ep0757			-1.000	dimensionless	☑

7.134 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

$$\text{s\_0434} + \text{s\_0999} + \text{s\_1565} \xrightleftharpoons{\text{e\_0746, s\_0434, s\_0999, s\_1565, s\_0423, s\_0633, s\_0782, s\_0991}} \text{s\_0423} + \text{s\_0633} + \text{s\_078}$$

$$(268)$$
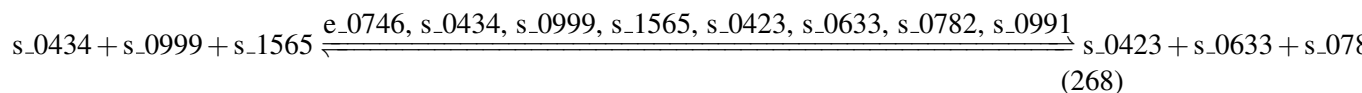
Reactants

Table 538: Properties of each reactant.

Id	Name	SBO
s_0434	ATP	

Id	Name	SBO
s_0999	L-glutamine	
s_1565	xanthosine-5-phosphate	

Modifiers

Table 539: Properties of each modifier.

Id	Name	SBO
e_0746	GUA1	0000460
s_0434	ATP	
s_0999	L-glutamine	
s_1565	xanthosine-5-phosphate	
s_0423	AMP	
s_0633	diphosphate	
s_0782	GMP	
s_0991	L-glutamate	

Products

Table 540: Properties of each product.

Id	Name	SBO
s_0423	AMP	
s_0633	diphosphate	
s_0782	GMP	
s_0991	L-glutamate	

Kinetic Law

Derived unit contains undeclared units

$$v_{134} = \text{vol}\,(\text{cell}) \cdot \text{v0}$$
$$\cdot \left(1 + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}} \right) + \text{ep0999} \cdot \left(\frac{[\text{s\_0999}]}{\text{ic0999}} \right) + \text{ep1565} \cdot \left(\frac{[\text{s\_1565}]}{\text{ic1565}} \right) + \text{ep0423} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0423}]}{\text{ic0423}} \right) + \text{ep0633} \cdot \left(\frac{[\text{s\_0633}]}{\text{ic0633}} \right) + \text{ep0782} \cdot \left(\frac{[\text{s\_0782}]}{\text{ic0782}} \right) + \text{ep0991} \cdot \left(\frac{[\text{s\_0991}]}{\text{ic0991}} \right) \right)$$

(269)

Table 541: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.002	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	✓
v0			0.002	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	✓
ep0434			1.000	dimensionless	✓
ep0999			1.000	dimensionless	✓
ep1565			1.000	dimensionless	✓
ep0423			-1.000	dimensionless	✓
ep0633			-1.000	dimensionless	✓
ep0782			-1.000	dimensionless	✓
ep0991			-1.000	dimensionless	✓

7.135 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

$$s\_0785 \xrightleftharpoons{e\_0025,\ s\_0785,\ s\_0141,\ s\_0633,\ s\_0722} s\_0141 + s\_0633 + s\_0722 \qquad (270)$$
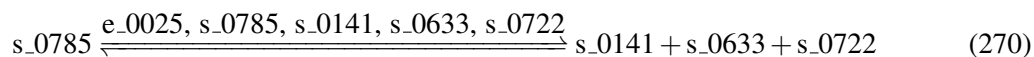
Reactant

Table 542: Properties of each reactant.

Id	Name	SBO
s_0785	GTP	

Modifiers

Table 543: 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 544: 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

$$v_{135} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0785} \cdot \left(\frac{[\text{s\_0785}]}{\text{ic0785}} \right) + \text{ep0141} \cdot \left(\frac{[\text{s\_0141}]}{\text{ic0141}} \right) + \text{ep0633} \right. \\ \left. \cdot \left(\frac{[\text{s\_0633}]}{\text{ic0633}} \right) + \text{ep0722} \cdot \left(\frac{[\text{s\_0722}]}{\text{ic0722}} \right) \right) \tag{271}$$

Table 545: Properties of each parameter.

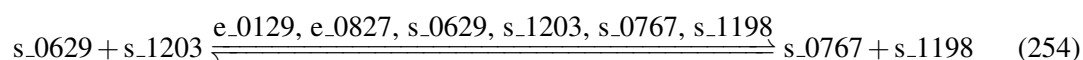| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$3.75729835487922 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$3.75729835487922 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0785			1.000	dimensionless	☑
ep0141			-1.000	dimensionless	☑
ep0633			-1.000	dimensionless	☑
ep0722			-1.000	dimensionless	☑

7.136 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

$$\text{s\_0434} + \text{s\_0782} \xrightleftharpoons{\text{e\_0234, s\_0434, s\_0782, s\_0394, s\_0739}} \text{s\_0394} + \text{s\_0739} \tag{272}$$
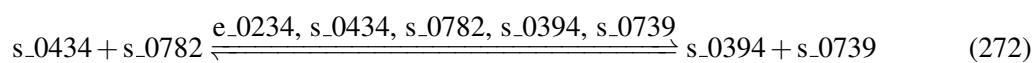
Reactants

Table 546: Properties of each reactant.

Id	Name	SBO
s_0434	ATP	
s_0782	GMP	

Modifiers

Table 547: Properties of each modifier.

Id	Name	SBO
e_0234	GUK1	0000460
s_0434	ATP	
s_0782	GMP	
s_0394	ADP	
s_0739	GDP	

Products

Table 548: Properties of each product.

Id	Name	SBO
s_0394	ADP	
s_0739	GDP	

Kinetic Law

Derived unit contains undeclared units

$$v_{136} = \text{vol}\,(\text{cell}) \cdot v0 \cdot \left(1 + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}} \right) + \text{ep0782} \cdot \left(\frac{[\text{s\_0782}]}{\text{ic0782}} \right) + \text{ep0394} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0394}]}{\text{ic0394}} \right) + \text{ep0739} \cdot \left(\frac{[\text{s\_0739}]}{\text{ic0739}} \right) \right) \tag{273}$$

Table 549: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$6.43295020859241 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$6.43295020859241 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0434			1.000	dimensionless	☑

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Id	Name	SBO	Value	Unit	Constant
ep0782			1.000	dimensionless	☑
ep0394			-1.000	dimensionless	☑
ep0739			-1.000	dimensionless	☑

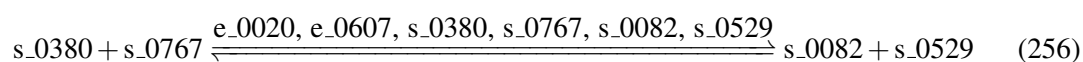## 7.137 Reaction r_0529

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

$$\text{s\_0586} + \text{s\_0782} \xrightleftharpoons{\text{e\_0234, s\_0586, s\_0782, s\_0582, s\_0739}} \text{s\_0582} + \text{s\_0739} \tag{274}$$

Reactants

Table 550: Properties of each reactant.

Id	Name	SBO
s_0586	dATP	
s_0782	GMP	

Modifiers

Table 551: 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 552: Properties of each product.

Id	Name	SBO
s_0582	dADP	
s_0739	GDP	

Kinetic Law

Derived unit contains undeclared units

$$v_{137} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0586} \cdot \left(\frac{[\text{s\_0586}]}{\text{ic0586}} \right) + \text{ep0782} \cdot \left(\frac{[\text{s\_0782}]}{\text{ic0782}} \right) + \text{ep0582} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0582}]}{\text{ic0582}} \right) + \text{ep0739} \cdot \left(\frac{[\text{s\_0739}]}{\text{ic0739}} \right) \right) \tag{275}$$

Table 553: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$6.43295039602845 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$6.43295039602845 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0586			1.000	dimensionless	☑
ep0782			1.000	dimensionless	☑
ep0582			-1.000	dimensionless	☑
ep0739			-1.000	dimensionless	☑

7.138 Reaction r_0534

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

$$\text{s\_0434} + \text{s\_0563} \xrightleftharpoons{\text{e\_0106, e\_0325, e\_0355, s\_0434, s\_0563, s\_0394, s\_0568}} \text{s\_0394} + \text{s\_0568} \tag{276}$$

Reactants

Table 554: Properties of each reactant.

Id	Name	SBO
s_0434	ATP	
s_0563	D-glucose	

Modifiers

Table 555: Properties of each modifier.

Id	Name	SBO
e_0106	GLK1	0000460
e_0325	HXK1	0000460
e_0355	HXK2	0000460
s_0434	ATP	
s_0563	D-glucose	
s_0394	ADP	
s_0568	D-glucose 6-phosphate	

Products

Table 556: Properties of each product.

Id	Name	SBO
s_0394	ADP	
s_0568	D-glucose 6-phosphate	

Kinetic Law

Derived unit contains undeclared units

$$
\begin{aligned}
v_{138} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \Bigg(1 + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}} \right) + \text{ep0563} \cdot \left(\frac{[\text{s\_0563}]}{\text{ic0563}} \right) + \text{ep0394} \\
\cdot \left(\frac{[\text{s\_0394}]}{\text{ic0394}} \right) + \text{ep0568} \cdot \left(\frac{[\text{s\_0568}]}{\text{ic0568}} \right) \Bigg)
\end{aligned}
\tag{277}
$$

Table 557: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			1.000	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑

Id	Name	SBO	Value	Unit	Constant
v0			1.000	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
ep0434			1.000	dimensionless	☑
ep0563			1.000	dimensionless	☑
ep0394			-1.000	dimensionless	☑
ep0568			-1.000	dimensionless	☑

7.139 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

$$\mathrm{s\_1010 + 2\,s\_1198} \xrightleftharpoons{\mathrm{e\_0103,\ s\_1010,\ s\_1198,\ s\_1006,\ s\_1203}} \mathrm{s\_1006 + 2\,s\_1203} \qquad (278)$$

Reactants

Table 558: Properties of each reactant.

Id	Name	SBO
s_1010	L-histidinol	
s_1198	NAD	

Modifiers

Table 559: Properties of each modifier.

Id	Name	SBO
e_0103	HIS4	0000460
s_1010	L-histidinol	
s_1198	NAD	
s_1006	L-histidine	
s_1203	NADH	

Products

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Table 560: Properties of each product.

Id	Name	SBO
s_1006	L-histidine	
s_1203	NADH	

Kinetic Law

Derived unit contains undeclared units

$$v_{139} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep1010} \cdot \left(\frac{[\text{s\_1010}]}{\text{ic1010}} \right) + \text{ep1198} \cdot \left(\frac{[\text{s\_1198}]}{\text{ic1198}} \right) + \text{ep1006} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_1006}]}{\text{ic1006}} \right) + \text{ep1203} \cdot \left(\frac{[\text{s\_1203}]}{\text{ic1203}} \right) \right) \tag{279}$$

Table 561: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.003	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.003	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep1010			1.000	dimensionless	☑
ep1198			2.000	dimensionless	☑
ep1006			-1.000	dimensionless	☑
ep1203			-2.000	dimensionless	☑

7.140 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

$$\text{s\_1011} \xrightleftharpoons{\text{e\_0320, s\_1011, s\_1010, s\_1322}} \text{s\_1010} + \text{s\_1322} \tag{280}$$
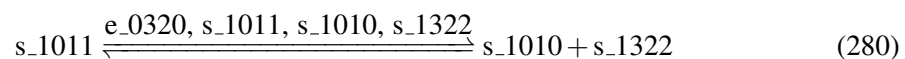
Reactant

Table 562: Properties of each reactant.

Id	Name	SBO
s_1011	L-histidinol phosphate	

Modifiers

Table 563: Properties of each modifier.

Id	Name	SBO
e_0320	HIS2	0000460
s_1011	L-histidinol phosphate	
s_1010	L-histidinol	
s_1322	phosphate	

Products

Table 564: Properties of each product.

Id	Name	SBO
s_1010	L-histidinol	
s_1322	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$
\begin{aligned}
v_{140} = \text{vol}\,(\text{cell}) \cdot \text{v0} \\
\cdot \left(1 + \text{ep1011} \cdot \left(\frac{[\text{s\_1011}]}{\text{ic1011}} \right) + \text{ep1010} \cdot \left(\frac{[\text{s\_1010}]}{\text{ic1010}} \right) + \text{ep1322} \cdot \left(\frac{[\text{s\_1322}]}{\text{ic1322}} \right) \right)
\end{aligned}
\tag{281}
$$

Table 565: Properties of each parameter.

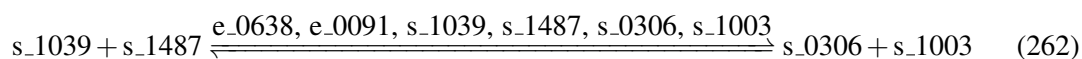| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.003	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.003	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep1011			1.000	dimensionless	☑
ep1010			-1.000	dimensionless	☑
ep1322			-1.000	dimensionless	☑

7.141 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

$$s\_0207 + s\_0991 \xrightleftharpoons{e\_0476,\ s\_0207,\ s\_0991,\ s\_0180,\ s\_1011} s\_0180 + s\_1011 \qquad (282)$$
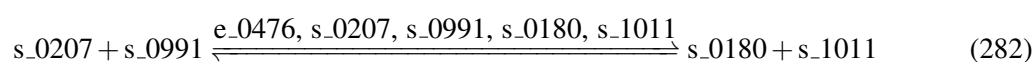
Reactants

Table 566: Properties of each reactant.

Id	Name	SBO
s_0207	3-(imidazol-4-yl)-2-oxopropyl dihydrogen phosphate	
s_0991	L-glutamate	

Modifiers

Table 567: 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 568: Properties of each product.

Id	Name	SBO
s_0180	2-oxoglutarate	
s_1011	L-histidinol phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{141} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0207} \cdot \left(\frac{[\text{s\_0207}]}{\text{ic0207}} \right) + \text{ep0991} \cdot \left(\frac{[\text{s\_0991}]}{\text{ic0991}} \right) + \text{ep0180} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0180}]}{\text{ic0180}} \right) + \text{ep1011} \cdot \left(\frac{[\text{s\_1011}]}{\text{ic1011}} \right) \right) \quad (283)$$

Table 569: Properties of each parameter.

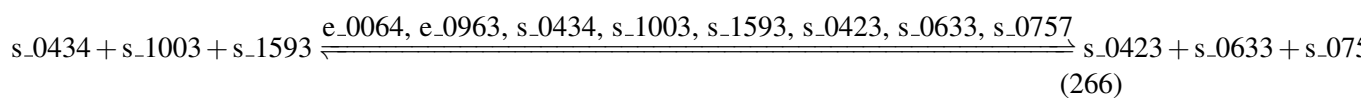| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.003	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.003	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0207			1.000	dimensionless	☑
ep0991			1.000	dimensionless	☑
ep0180			-1.000	dimensionless	☑
ep1011			-1.000	dimensionless	☑

7.142 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

$$\text{s\_0434} + \text{s\_1006} + \text{s\_1594} \xrightleftharpoons{\text{e\_0953, s\_0434, s\_1006, s\_1594, s\_0423, s\_0633, s\_0832}} \text{s\_0423} + \text{s\_0633} + \text{s\_0832}$$
$$(284)$$
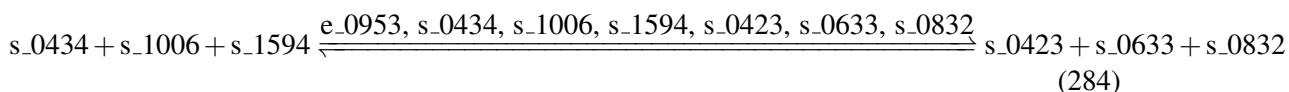
Reactants

Table 570: Properties of each reactant.

Id	Name	SBO
s_0434	ATP	
s_1006	L-histidine	
s_1594	tRNA(His)	

Modifiers

Produced by SBML2LATEX

Table 571: Properties of each modifier.

Id	Name	SBO
e_0953	HTS1	0000460
s_0434	ATP	
s_1006	L-histidine	
s_1594	tRNA(His)	
s_0423	AMP	
s_0633	diphosphate	
s_0832	His-tRNA(His)	

Products

Table 572: Properties of each product.

Id	Name	SBO
s_0423	AMP	
s_0633	diphosphate	
s_0832	His-tRNA(His)	

Kinetic Law

Derived unit contains undeclared units

$$
v_{142} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}} \right) + \text{ep1006} \cdot \left(\frac{[\text{s\_1006}]}{\text{ic1006}} \right) + \text{ep1594} \cdot \left(\frac{[\text{s\_1594}]}{\text{ic1594}} \right) \right.
$$
$$
\left. + \text{ep0423} \cdot \left(\frac{[\text{s\_0423}]}{\text{ic0423}} \right) + \text{ep0633} \cdot \left(\frac{[\text{s\_0633}]}{\text{ic0633}} \right) + \text{ep0832} \cdot \left(\frac{[\text{s\_0832}]}{\text{ic0832}} \right) \right)
$$
$$(285)$$

Table 573: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.003	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.003	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0434			1.000	dimensionless	☑
ep1006			1.000	dimensionless	☑
ep1594			1.000	dimensionless	☑
ep0423			-1.000	dimensionless	☑
ep0633			-1.000	dimensionless	☑
ep0832			-1.000	dimensionless	☑

7.143 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

$$s\_0454 \xrightleftharpoons{\text{e\_0196, s\_0454, s\_0836}} s\_0836 \tag{286}$$
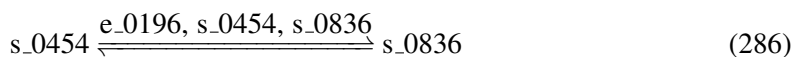
Reactant

Table 574: Properties of each reactant.

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

Modifiers

Table 575: 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 576: Properties of each product.

Id	Name	SBO
s_0836	homoisocitrate	

Kinetic Law

Derived unit contains undeclared units

$$v_{143} = \text{vol}\left(\text{cell}\right) \cdot \text{v0} \cdot \left(1 + \text{ep0454} \cdot \left(\frac{[\text{s\_0454}]}{\text{ic0454}} \right) + \text{ep0836} \cdot \left(\frac{[\text{s\_0836}]}{\text{ic0836}} \right) \right) \tag{287}$$

Table 577: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.011	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
v0			0.011	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
ep0454			1.000	dimensionless	☑
ep0836			-1.000	dimensionless	☑

7.144 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

$$s\_0180 + s\_0373 \underset{}{\overset{e\_0154,\ e\_0146,\ s\_0180,\ s\_0373,\ s\_0529,\ s\_0835}{\rightleftharpoons}} s\_0529 + s\_0835 \qquad (288)$$
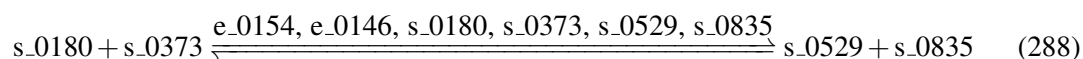
Reactants

Table 578: Properties of each reactant.

Id	Name	SBO
s_0180	2-oxoglutarate	
s_0373	acetyl-CoA	

Modifiers

Table 579: 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 580: Properties of each product.

Id	Name	SBO
s_0529	coenzyme A	
s_0835	homocitrate	

Kinetic Law

Derived unit contains undeclared units

$$v_{144} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0180} \cdot \left(\frac{[\text{s\_0180}]}{\text{ic0180}} \right) + \text{ep0373} \cdot \left(\frac{[\text{s\_0373}]}{\text{ic0373}} \right) + \text{ep0529} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0529}]}{\text{ic0529}} \right) + \text{ep0835} \cdot \left(\frac{[\text{s\_0835}]}{\text{ic0835}} \right) \right) \tag{289}$$

Table 581: Properties of each parameter.

| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.011	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.011	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0180			1.000	dimensionless	☑
ep0373			1.000	dimensionless	☑
ep0529			-1.000	dimensionless	☑
ep0835			-1.000	dimensionless	☑

7.145 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

$$\text{s\_0836} + \text{s\_1198} \xrightleftharpoons{\text{e\_0472, s\_0836, s\_1198, s\_0176, s\_1203, s\_0456}} \text{s\_0176} + \text{s\_1203} + \text{s\_0456} \tag{290}$$

Reactants

Table 582: Properties of each reactant.

Id	Name	SBO
s_0836	homoisocitrate	
s_1198	NAD	

Modifiers

Table 583: Properties of each modifier.

Id	Name	SBO
e_0472	LYS12	0000460
s_0836	homoisocitrate	
s_1198	NAD	
s_0176	2-oxoadipic acid	
s_1203	NADH	
s_0456	carbon dioxide	

Products

Table 584: Properties of each product.

Id	Name	SBO
s_0176	2-oxoadipic acid	
s_1203	NADH	
s_0456	carbon dioxide	

Kinetic Law

Derived unit contains undeclared units

$$
\begin{aligned}
v_{145} = \mathrm{vol}\left(\mathrm{cell}\right) \cdot \mathrm{v0} \cdot \Bigg(& 1 + \mathrm{ep0836} \cdot \left(\frac{[\mathrm{s\_0836}]}{\mathrm{ic0836}} \right) + \mathrm{ep1198} \cdot \left(\frac{[\mathrm{s\_1198}]}{\mathrm{ic1198}} \right) + \mathrm{ep0176} \\
& \cdot \left(\frac{[\mathrm{s\_0176}]}{\mathrm{ic0176}} \right) + \mathrm{ep1203} \cdot \left(\frac{[\mathrm{s\_1203}]}{\mathrm{ic1203}} \right) + \mathrm{ep0456} \cdot \left(\frac{[\mathrm{s\_0456}]}{\mathrm{ic0456}} \right) \Bigg)
\end{aligned}
\tag{291}
$$

Table 585: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.011	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑

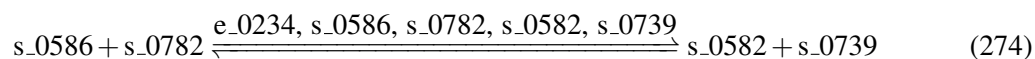| Id	Name	SBO	Value	Unit	Constant
v0			0.011	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0836			1.000	dimensionless	☑
ep1198			1.000	dimensionless	☑
ep0176			-1.000	dimensionless	☑
ep1203			-1.000	dimensionless	☑
ep0456			-1.000	dimensionless	☑

7.146 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

$$\text{s\_0978} + \text{s\_1212} \xrightleftharpoons{\text{e\_0548, s\_0978, s\_1212, s\_1014, s\_1207}} \text{s\_1014} + \text{s\_1207} \tag{292}$$

Reactants

Table 586: Properties of each reactant.

Id	Name	SBO
s_0978	L-aspartate 4-semialdehyde	
s_1212	NADPH	

Modifiers

Table 587: 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 588: Properties of each product.

Id	Name	SBO
s_1014	L-homoserine	
s_1207	NADP(+)	

Kinetic Law

Derived unit contains undeclared units

$$v_{146} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0978} \cdot \left(\frac{[\text{s\_0978}]}{\text{ic0978}}\right) + \text{ep1212} \cdot \left(\frac{[\text{s\_1212}]}{\text{ic1212}}\right) + \text{ep1014}\right.$$
$$\left. \cdot \left(\frac{[\text{s\_1014}]}{\text{ic1014}}\right) + \text{ep1207} \cdot \left(\frac{[\text{s\_1207}]}{\text{ic1207}}\right)\right) \tag{293}$$

Table 589: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.019	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.019	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0978			1.000	dimensionless	☑
ep1212			1.000	dimensionless	☑
ep1014			-1.000	dimensionless	☑
ep1207			-1.000	dimensionless	☑

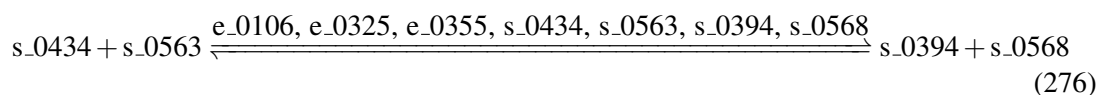## 7.147 Reaction r_0548

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

Name homoserine kinase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0434} + \text{s\_1014} \xrightleftharpoons{\text{e\_0428, s\_0434, s\_1014, s\_0394, s\_1238}} \text{s\_0394} + \text{s\_1238} \tag{294}$$
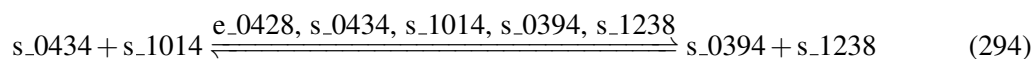
Reactants

Table 590: Properties of each reactant.

Id	Name	SBO
s_0434	ATP	
s_1014	L-homoserine	

Modifiers

Table 591: Properties of each modifier.

Id	Name	SBO
e_0428	THR1	0000460
s_0434	ATP	
s_1014	L-homoserine	
s_0394	ADP	
s_1238	O-phospho-L-homoserine	

Products

Table 592: Properties of each product.

Id	Name	SBO
s_0394	ADP	
s_1238	O-phospho-L-homoserine	

Kinetic Law

Derived unit contains undeclared units

$$v_{147} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}} \right) + \text{ep1014} \cdot \left(\frac{[\text{s\_1014}]}{\text{ic1014}} \right) + \text{ep0394} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0394}]}{\text{ic0394}} \right) + \text{ep1238} \cdot \left(\frac{[\text{s\_1238}]}{\text{ic1238}} \right) \right) \tag{295}$$

Table 593: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.007	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.007	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0434			1.000	dimensionless	☑

Produced by SBML2LATEX

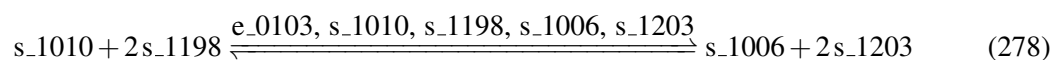| Id	Name	SBO	Value	Unit	Constant
ep1014			1.000	dimensionless	☑
ep0394			−1.000	dimensionless	☑
ep1238			−1.000	dimensionless	☑

7.148 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

$$s\_0373 + s\_1014 \xrightleftharpoons{e\_0799,\ s\_0373,\ s\_1014,\ s\_0529,\ s\_1233} s\_0529 + s\_1233 \tag{296}$$
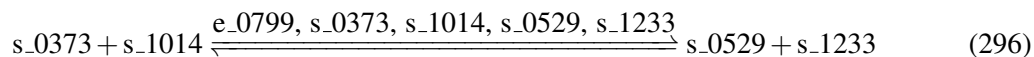
Reactants

Table 594: Properties of each reactant.

Id	Name	SBO
s_0373	acetyl-CoA	
s_1014	L-homoserine	

Modifiers

Table 595: 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 596: Properties of each product.

Id	Name	SBO
s_0529	coenzyme A	
s_1233	O-acetyl-L-homoserine	

Kinetic Law

Derived unit contains undeclared units

$$v_{148} = \text{vol}(\text{cell}) \cdot v0 \cdot \left(1 + \text{ep0373} \cdot \left(\frac{[\text{s\_0373}]}{\text{ic0373}}\right) + \text{ep1014} \cdot \left(\frac{[\text{s\_1014}]}{\text{ic1014}}\right) + \text{ep0529}\right.$$
$$\left. \cdot \left(\frac{[\text{s\_0529}]}{\text{ic0529}}\right) + \text{ep1233} \cdot \left(\frac{[\text{s\_1233}]}{\text{ic1233}}\right)\right) \tag{297}$$

Table 597: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.012	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	✓
v0			0.012	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	✓
ep0373			1.000	dimensionless	✓
ep1014			1.000	dimensionless	✓
ep0529			-1.000	dimensionless	✓
ep1233			-1.000	dimensionless	✓

7.149 Reaction r_0550

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

Name hydrogen peroxide reductase (thioredoxin)

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0837} + \text{s\_1616} \xrightleftharpoons{\text{e\_0633, e\_0398, e\_0233, e\_0463, e\_0645, e\_0029, e\_0124, s\_0837, s\_1616, s\_1620}} \text{s\_1620} \tag{298}$$
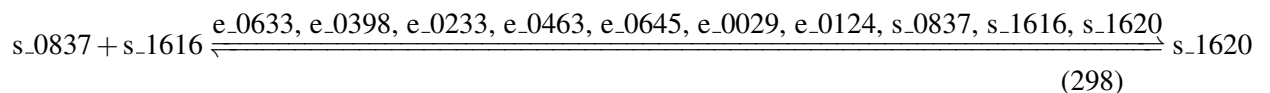
Reactants

Table 598: Properties of each reactant.

Id	Name	SBO
s_0837	hydrogen peroxide	
s_1616	TRX1	

Modifiers

Table 599: Properties of each modifier.

Id	Name	SBO
e_0633	TRX1	0000460
e_0398	TRX2	0000460
e_0233	TSA2	0000460
e_0463	DOT5	0000460
e_0645	AHP1	0000460
e_0029	PRX1	0000460
e_0124	TRX3	0000460
s_0837	hydrogen peroxide	
s_1616	TRX1	
s_1620	TRX1 disulphide	

Product

Table 600: Properties of each product.

Id	Name	SBO
s_1620	TRX1 disulphide	

Kinetic Law

Derived unit contains undeclared units

$$v_{149} = \text{vol}\left(\text{cell}\right) \cdot \text{v0}$$
$$\cdot \left(1 + \text{ep0837} \cdot \left(\frac{[\text{s\_0837}]}{\text{ic0837}}\right) + \text{ep1616} \cdot \left(\frac{[\text{s\_1616}]}{\text{ic1616}}\right) + \text{ep1620} \cdot \left(\frac{[\text{s\_1620}]}{\text{ic1620}}\right)\right) \quad (299)$$

Table 601: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.002	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.002	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0837			1.000	dimensionless	☑
ep1616			1.000	dimensionless	☑
ep1620			-1.000	dimensionless	☑

7.150 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

$$s\_0218 + 2\,s\_1212 \underset{}{\overset{e\_0697,\ e\_0708,\ s\_0218,\ s\_1212,\ s\_0028,\ s\_0529,\ s\_1207}{\rightleftharpoons}} s\_0028 + s\_0529 + 2\,s\_1207$$

$$(300)$$
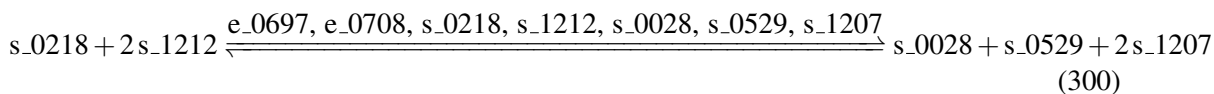
Reactants

Table 602: Properties of each reactant.

Id	Name	SBO
s_0218	3-hydroxy-3-methylglutaryl-CoA	
s_1212	NADPH	

Modifiers

Table 603: 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	

Id	Name	SBO
s_1207	NADP(+)	

Products

Table 604: Properties of each product.

Id	Name	SBO
s_0028	(R)-mevalonate	
s_0529	coenzyme A	
s_1207	NADP(+)	

Kinetic Law

Derived unit contains undeclared units

$$
\begin{aligned}
v_{150} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \Bigg(&1 + \text{ep0218} \cdot \left(\frac{[\text{s\_0218}]}{\text{ic0218}} \right) + \text{ep1212} \cdot \left(\frac{[\text{s\_1212}]}{\text{ic1212}} \right) + \text{ep0028} \\
&\cdot \left(\frac{[\text{s\_0028}]}{\text{ic0028}} \right) + \text{ep0529} \cdot \left(\frac{[\text{s\_0529}]}{\text{ic0529}} \right) + \text{ep1207} \cdot \left(\frac{[\text{s\_1207}]}{\text{ic1207}} \right) \Bigg)
\end{aligned}
\tag{301}
$$

Table 605: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.002	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.002	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0218			1.000	dimensionless	☑
ep1212			2.000	dimensionless	☑
ep0028			−1.000	dimensionless	☑
ep0529			−1.000	dimensionless	☑
ep1207			−2.000	dimensionless	☑

7.151 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

$$s\_0367 + s\_0373 \xrightleftharpoons{\text{e\_0716, s\_0367, s\_0373, s\_0218, s\_0529}} s\_0218 + s\_0529 \qquad (302)$$
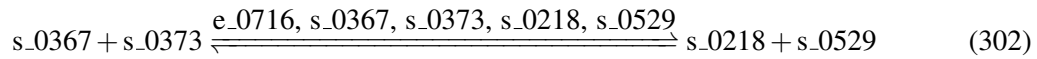
Reactants

Table 606: Properties of each reactant.

Id	Name	SBO
s_0367	acetoacetyl-CoA	
s_0373	acetyl-CoA	

Modifiers

Table 607: 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 608: 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

$$v_{151} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0367} \cdot \left(\frac{[\text{s\_0367}]}{\text{ic0367}} \right) + \text{ep0373} \cdot \left(\frac{[\text{s\_0373}]}{\text{ic0373}} \right) + \text{ep0218} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0218}]}{\text{ic0218}} \right) + \text{ep0529} \cdot \left(\frac{[\text{s\_0529}]}{\text{ic0529}} \right) \right) \qquad (303)$$

Produced by SBML2LATEX

Table 609: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.002	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.002	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0367			1.000	dimensionless	☑
ep0373			1.000	dimensionless	☑
ep0218			-1.000	dimensionless	☑
ep0529			-1.000	dimensionless	☑

7.152 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

$$\text{s\_0312} + \text{s\_0999} \xrightleftharpoons{\text{e\_0087, s\_0312, s\_0999, s\_0403, s\_0550, s\_0991}} \text{s\_0403} + \text{s\_0550} + \text{s\_0991}$$

(304)

Reactants

Table 610: 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 611: 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 612: 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

$$v_{152} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0312} \cdot \left(\frac{[\text{s\_0312}]}{\text{ic0312}}\right) + \text{ep0999} \cdot \left(\frac{[\text{s\_0999}]}{\text{ic0999}}\right) + \text{ep0403} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0403}]}{\text{ic0403}}\right) + \text{ep0550} \cdot \left(\frac{[\text{s\_0550}]}{\text{ic0550}}\right) + \text{ep0991} \cdot \left(\frac{[\text{s\_0991}]}{\text{ic0991}}\right)\right) \tag{305}$$

Table 613: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.003	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.003	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0312			1.000	dimensionless	☑
ep0999			1.000	dimensionless	☑
ep0403			−1.000	dimensionless	☑
ep0550			−1.000	dimensionless	☑
ep0991			−1.000	dimensionless	☑

7.153 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

$$\text{s\_0550} \xrightleftharpoons{\text{e\_0875, s\_0550, s\_0207}} \text{s\_0207} \tag{306}$$
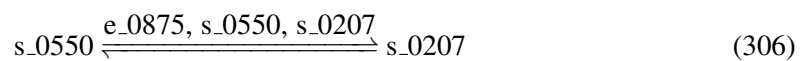
Reactant

Table 614: Properties of each reactant.

Id	Name	SBO
s_0550	D-erythro-1-(imidazol-4-yl)glycerol 3-phosphate	

Modifiers

Table 615: 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 616: Properties of each product.

Id	Name	SBO
s_0207	3-(imidazol-4-yl)-2-oxopropyl dihydrogen phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{153} = \mathrm{vol}\,(\mathrm{cell}) \cdot \mathrm{v0} \cdot \left(1 + \mathrm{ep0550} \cdot \left(\frac{[\mathrm{s\_0550}]}{\mathrm{ic0550}} \right) + \mathrm{ep0207} \cdot \left(\frac{[\mathrm{s\_0207}]}{\mathrm{ic0207}} \right) \right) \quad (307)$$

Table 617: Properties of each parameter.

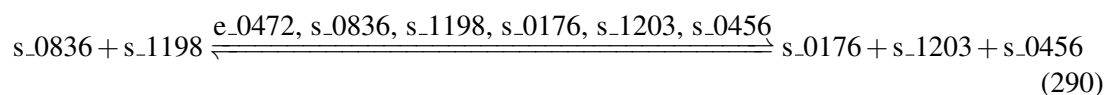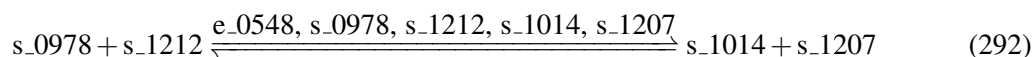| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.003	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
v0			0.003	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
ep0550			1.000	dimensionless	☑
ep0207			-1.000	dimensionless	☑

7.154 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

$$s\_0849 + s\_1198 \xrightleftharpoons{\text{e\_0705, e\_0458, e\_0693, s\_0849, s\_1198, s\_1203, s\_1565}} s\_1203 + s\_1565 \tag{308}$$
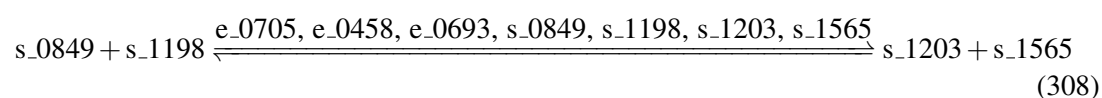
Reactants

Table 618: Properties of each reactant.

Id	Name	SBO
s_0849	IMP	
s_1198	NAD	

Modifiers

Table 619: Properties of each modifier.

Id	Name	SBO
e_0705	IMD4	0000460
e_0458	IMD2	0000460
e_0693	IMD3	0000460
s_0849	IMP	
s_1198	NAD	
s_1203	NADH	
s_1565	xanthosine-5-phosphate	

Products

Table 620: Properties of each product.

Id	Name	SBO
s_1203	NADH	
s_1565	xanthosine-5-phosphate	

Produced by SBML2LATEX

Kinetic Law

Derived unit contains undeclared units

$$v_{154} = \text{vol} \left(\text{cell} \right) \cdot \text{v0} \cdot \left(1 + \text{ep0849} \cdot \left(\frac{[\text{s\_0849}]}{\text{ic0849}} \right) + \text{ep1198} \cdot \left(\frac{[\text{s\_1198}]}{\text{ic1198}} \right) + \text{ep1203} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_1203}]}{\text{ic1203}} \right) + \text{ep1565} \cdot \left(\frac{[\text{s\_1565}]}{\text{ic1565}} \right) \right) \quad (309)$$

Table 621: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.002	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.002	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0849			1.000	dimensionless	☑
ep1198			1.000	dimensionless	☑
ep1203			-1.000	dimensionless	☑
ep1565			-1.000	dimensionless	☑

7.155 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

$$\text{s\_0076} \xrightleftharpoons{\text{e\_0591, s\_0076, s\_0086, s\_0456}} \text{s\_0086} + \text{s\_0456} \quad (310)$$
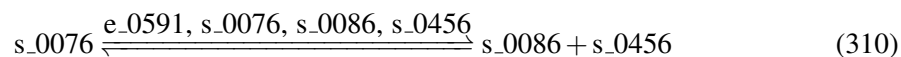
Reactant

Table 622: Properties of each reactant.

Id	Name	SBO
s_0076	1-(2-carboxyphenylamino)-1-deoxy-D-ribulose 5-phosphate	

Modifiers

Table 623: 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	
s_0456	carbon dioxide	

Products

Table 624: Properties of each product.

Id	Name	SBO
s_0086	1-C-(indol-3-yl)glycerol 3-phosphate	
s_0456	carbon dioxide	

Kinetic Law

Derived unit contains undeclared units

$$v_{155} = \text{vol}\,(\text{cell}) \cdot \text{v0}$$
$$\cdot \left(1 + \text{ep0076} \cdot \left(\frac{[\text{s\_0076}]}{\text{ic0076}}\right) + \text{ep0086} \cdot \left(\frac{[\text{s\_0086}]}{\text{ic0086}}\right) + \text{ep0456} \cdot \left(\frac{[\text{s\_0456}]}{\text{ic0456}}\right)\right) \quad (311)$$

Table 625: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.001	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
v0			0.001	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
ep0076			1.000	dimensionless	☑
ep0086			-1.000	dimensionless	☑
ep0456			-1.000	dimensionless	☑

7.156 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

$$\text{s\_0633} \xrightleftharpoons{\text{e\_0038, e\_0754, s\_0633, s\_1322}} 2\,\text{s\_1322} \tag{312}$$
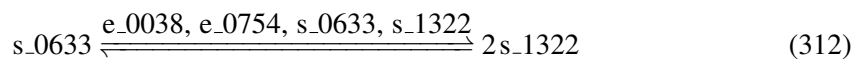
Reactant

Table 626: Properties of each reactant.

Id	Name	SBO
s_0633	diphosphate	

Modifiers

Table 627: Properties of each modifier.

Id	Name	SBO
e_0038	IPP1	0000460
e_0754	PPA2	0000460
s_0633	diphosphate	
s_1322	phosphate	

Product

Table 628: Properties of each product.

Id	Name	SBO
s_1322	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{156} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0633} \cdot \left(\frac{[\text{s\_0633}]}{\text{ic0633}} \right) + \text{ep1322} \cdot \left(\frac{[\text{s\_1322}]}{\text{ic1322}} \right) \right) \tag{313}$$

Table 629: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.306	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.306	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑

Id	Name	SBO	Value	Unit	Constant
ep0633			1.000	dimensionless	☑
ep1322			−2.000	dimensionless	☑

7.157 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

$$\text{s\_1365} \xrightleftharpoons{\text{e\_0631, e\_0736, s\_1365, s\_0849}} \text{s\_0849} \tag{314}$$
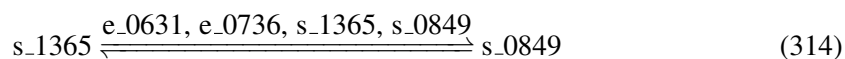
Reactant

Table 630: Properties of each reactant.

Id	Name	SBO
s_1365	phosphoribosyl-formamido-carboxamide	

Modifiers

Table 631: 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 632: Properties of each product.

Id	Name	SBO
s_0849	IMP	

Kinetic Law

Derived unit contains undeclared units

$$v_{157} = \mathrm{vol}\,(\mathrm{cell}) \cdot \mathrm{v0} \cdot \left(1 + \mathrm{ep1365} \cdot \left(\frac{[\mathrm{s\_1365}]}{\mathrm{ic1365}} \right) + \mathrm{ep0849} \cdot \left(\frac{[\mathrm{s\_0849}]}{\mathrm{ic0849}} \right) \right) \qquad (315)$$

Table 633: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.006	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
v0			0.006	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
ep1365			1.000	dimensionless	☑
ep0849			-1.000	dimensionless	☑

7.158 Reaction r_0594

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

Name IPC synthase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0089} + \mathrm{s\_0499} \xrightleftharpoons{\mathrm{e\_0557,\ e\_0220,\ s\_0089,\ s\_0499,\ s\_0619,\ s\_0918}} \mathrm{s\_0619} + \mathrm{s\_0918} \qquad (316)$$

Reactants

Table 634: Properties of each reactant.

Id	Name	SBO
s_0089	1-phosphatidyl-1D-myo-inositol	
s_0499	ceramide-4 (C24)	

Modifiers

Table 635: Properties of each modifier.

Id	Name	SBO
e_0557	AUR1	0000460

Id	Name	SBO
e_0220	KEI1	0000460
s_0089	1-phosphatidyl-1D-myo-inositol	
s_0499	ceramide-4 (C24)	
s_0619	diglyceride	
s_0918	inositol-P-ceramide D (C24)	

Products

Table 636: Properties of each product.

Id	Name	SBO
s_0619	diglyceride	
s_0918	inositol-P-ceramide D (C24)	

Kinetic Law

Derived unit contains undeclared units

$$
v_{158} = \text{vol}\,(\text{cell}) \cdot v0 \cdot \left(1 + \text{ep0089} \cdot \left(\frac{[\text{s\_0089}]}{\text{ic0089}} \right) + \text{ep0499} \cdot \left(\frac{[\text{s\_0499}]}{\text{ic0499}} \right) + \text{ep0619} \right.
$$
$$
\left. \cdot \left(\frac{[\text{s\_0619}]}{\text{ic0619}} \right) + \text{ep0918} \cdot \left(\frac{[\text{s\_0918}]}{\text{ic0918}} \right) \right) \tag{317}
$$

Table 637: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.04421705708177 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$2.04421705708177 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0089			1.000	dimensionless	☑
ep0499			1.000	dimensionless	☑
ep0619			-1.000	dimensionless	☑
ep0918			-1.000	dimensionless	☑

7.159 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

$$s\_0940 + s\_1198 \xrightleftharpoons{\quad e\_0862,\ e\_0771,\ s\_0940,\ s\_1198,\ s\_0180,\ s\_0456,\ s\_1203 \quad} s\_0180 + s\_0456 + s\_1203$$

(318)
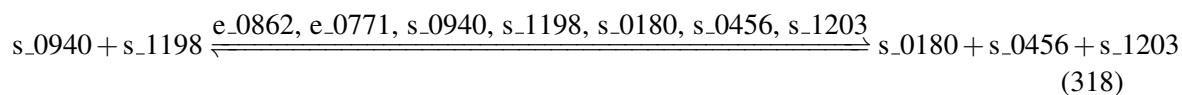
Reactants

Table 638: Properties of each reactant.

Id	Name	SBO
s_0940	isocitrate	
s_1198	NAD	

Modifiers

Table 639: Properties of each modifier.

Id	Name	SBO
e_0862	IDH2	0000460
e_0771	IDH1	0000460
s_0940	isocitrate	
s_1198	NAD	
s_0180	2-oxoglutarate	
s_0456	carbon dioxide	
s_1203	NADH	

Products

Table 640: Properties of each product.

Id	Name	SBO
s_0180	2-oxoglutarate	
s_0456	carbon dioxide	
s_1203	NADH	

Kinetic Law

Derived unit contains undeclared units

$$v_{159} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0940} \cdot \left(\frac{[\text{s\_0940}]}{\text{ic0940}} \right) + \text{ep1198} \cdot \left(\frac{[\text{s\_1198}]}{\text{ic1198}} \right) + \text{ep0180} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0180}]}{\text{ic0180}} \right) + \text{ep0456} \cdot \left(\frac{[\text{s\_0456}]}{\text{ic0456}} \right) + \text{ep1203} \cdot \left(\frac{[\text{s\_1203}]}{\text{ic1203}} \right) \right) \tag{319}$$

Table 641: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.019	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
v0			0.019	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
ep0940			1.000	dimensionless	☑
ep1198			1.000	dimensionless	☑
ep0180			-1.000	dimensionless	☑
ep0456			-1.000	dimensionless	☑
ep1203			-1.000	dimensionless	☑

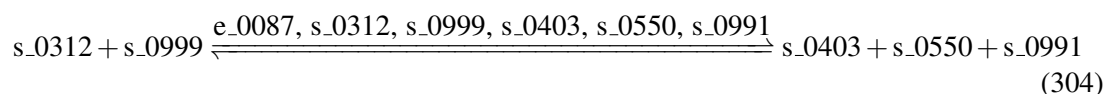## 7.160 Reaction r_0661

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

$$\text{s\_0940} + \text{s\_1207} \xrightleftharpoons{\text{e\_0769, e\_0135, s\_0940, s\_1207, s\_0180, s\_0456, s\_1212}} \text{s\_0180} + \text{s\_0456} + \text{s\_1212} \tag{320}$$
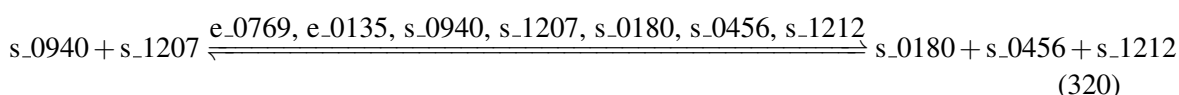
Reactants

Table 642: Properties of each reactant.

Id	Name	SBO
s_0940	isocitrate	
s_1207	NADP(+)	

Modifiers

Table 643: 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	
s_0456	carbon dioxide	
s_1212	NADPH	

Products

Table 644: Properties of each product.

Id	Name	SBO
s_0180	2-oxoglutarate	
s_0456	carbon dioxide	
s_1212	NADPH	

Kinetic Law

Derived unit contains undeclared units

$$
v_{160} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0940} \cdot \left(\frac{[\text{s\_0940}]}{\text{ic0940}} \right) + \text{ep1207} \cdot \left(\frac{[\text{s\_1207}]}{\text{ic1207}} \right) + \text{ep0180} \right.
$$
$$
\left. \cdot \left(\frac{[\text{s\_0180}]}{\text{ic0180}} \right) + \text{ep0456} \cdot \left(\frac{[\text{s\_0456}]}{\text{ic0456}} \right) + \text{ep1212} \cdot \left(\frac{[\text{s\_1212}]}{\text{ic1212}} \right) \right)
\tag{321}
$$

Table 645: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.019	mmol·l^{-1}·s^{-1}	☑
v0			0.019	mmol·l^{-1}·s^{-1}	☑
ep0940			1.000	dimensionless	☑
ep1207			1.000	dimensionless	☑
ep0180			-1.000	dimensionless	☑
ep0456			-1.000	dimensionless	☑
ep1212			-1.000	dimensionless	☑

7.161 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

$$s\_0056 + s\_0991 \xrightleftharpoons{\text{e\_0550, e\_0457, s\_0056, s\_0991, s\_0180, s\_1016}} s\_0180 + s\_1016 \qquad (322)$$

Reactants

Table 646: Properties of each reactant.

Id	Name	SBO
s_0056	(S)-3-methyl-2-oxopentanoate	
s_0991	L-glutamate	

Modifiers

Table 647: 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 648: Properties of each product.

Id	Name	SBO
s_0180	2-oxoglutarate	
s_1016	L-isoleucine	

Produced by SBML2LATEX

Kinetic Law

Derived unit contains undeclared units

$$v_{161} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0056} \cdot \left(\frac{[\text{s\_0056}]}{\text{ic0056}}\right) + \text{ep0991} \cdot \left(\frac{[\text{s\_0991}]}{\text{ic0991}}\right) + \text{ep0180} \\ \cdot \left(\frac{[\text{s\_0180}]}{\text{ic0180}}\right) + \text{ep1016} \cdot \left(\frac{[\text{s\_1016}]}{\text{ic1016}}\right)\right)$$

(323)

Table 649: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.007	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.007	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0056			1.000	dimensionless	☑
ep0991			1.000	dimensionless	☑
ep0180			-1.000	dimensionless	☑
ep1016			-1.000	dimensionless	☑

7.162 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

$$\text{s\_0434} + \text{s\_1016} + \text{s\_1596} \xrightleftharpoons{\text{e\_0031, s\_0434, s\_1016, s\_1596, s\_0423, s\_0633, s\_0847}} \text{s\_0423} + \text{s\_0633} + \text{s\_0847}$$

(324)

Reactants

Table 650: Properties of each reactant.

Id	Name	SBO
s_0434	ATP	
s_1016	L-isoleucine	
s_1596	tRNA(Ile)	

Modifiers

Table 651: Properties of each modifier.

Id	Name	SBO
e_0031	ILS1	0000460
s_0434	ATP	
s_1016	L-isoleucine	
s_1596	tRNA(Ile)	
s_0423	AMP	
s_0633	diphosphate	
s_0847	Ile-tRNA(Ile)	

Products

Table 652: Properties of each product.

Id	Name	SBO
s_0423	AMP	
s_0633	diphosphate	
s_0847	Ile-tRNA(Ile)	

Kinetic Law

Derived unit contains undeclared units

$$v_{162} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}} \right) + \text{ep1016} \cdot \left(\frac{[\text{s\_1016}]}{\text{ic1016}} \right) + \text{ep1596} \cdot \left(\frac{[\text{s\_1596}]}{\text{ic1596}} \right) \right.$$
$$\left. + \text{ep0423} \cdot \left(\frac{[\text{s\_0423}]}{\text{ic0423}} \right) + \text{ep0633} \cdot \left(\frac{[\text{s\_0633}]}{\text{ic0633}} \right) + \text{ep0847} \cdot \left(\frac{[\text{s\_0847}]}{\text{ic0847}} \right) \right)$$

(325)

Table 653: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.007	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.007	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0434			1.000	dimensionless	☑
ep1016			1.000	dimensionless	☑
ep1596			1.000	dimensionless	☑
ep0423			-1.000	dimensionless	☑

Produced by SBML2LATEX

| Id	Name	SBO	Value	Unit	Constant
ep0633			-1.000	dimensionless	☑
ep0847			-1.000	dimensionless	☑

7.163 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

$$s\_0943 \xrightleftharpoons{\text{e\_0922, s\_0943, s\_1376}} s\_1376 \tag{326}$$
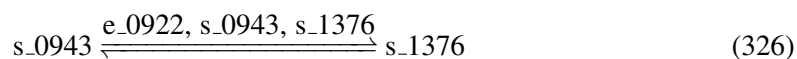
Reactant

Table 654: Properties of each reactant.

Id	Name	SBO
s_0943	isopentenyl diphosphate	

Modifiers

Table 655: Properties of each modifier.

Id	Name	SBO
e_0922	IDI1	0000460
s_0943	isopentenyl diphosphate	
s_1376	prenyl diphosphate	

Product

Table 656: Properties of each product.

Id	Name	SBO
s_1376	prenyl diphosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{163} = \mathrm{vol}\,(\mathrm{cell}) \cdot \mathrm{v0} \cdot \left(1 + \mathrm{ep0943} \cdot \left(\frac{[\mathrm{s\_0943}]}{\mathrm{ic0943}} \right) + \mathrm{ep1376} \cdot \left(\frac{[\mathrm{s\_1376}]}{\mathrm{ic1376}} \right) \right) \qquad (327)$$

Table 657: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$5.19949368301002 \cdot 10^{-4}$	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
v0			$5.19949368301002 \cdot 10^{-4}$	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
ep0943			1.000	dimensionless	☑
ep1376			-1.000	dimensionless	☑

7.164 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

$$\mathrm{s\_0039} + \mathrm{s\_1212} \xrightleftharpoons{\mathrm{e\_0685,\ s\_0039,\ s\_1212,\ s\_0008,\ s\_1207}} \mathrm{s\_0008} + \mathrm{s\_1207} \qquad (328)$$

Reactants

Table 658: Properties of each reactant.

Id	Name	SBO
s_0039	(S)-2-acetyl-2-hydroxybutanoate	
s_1212	NADPH	

Modifiers

Table 659: Properties of each modifier.

Id	Name	SBO
e_0685	ILV5	0000460

Id	Name	SBO
s_0039	(S)-2-acetyl-2-hydroxybutanoate	
s_1212	NADPH	
s_0008	(2R,3R)-2,3-dihydroxy-3-methylpentanoate	
s_1207	NADP(+)	

Products

Table 660: 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

$$
v_{164} = \text{vol}(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0039} \cdot \left(\frac{[\text{s\_0039}]}{\text{ic0039}} \right) + \text{ep1212} \cdot \left(\frac{[\text{s\_1212}]}{\text{ic1212}} \right) + \text{ep0008} \right.
$$
$$
\left. \cdot \left(\frac{[\text{s\_0008}]}{\text{ic0008}} \right) + \text{ep1207} \cdot \left(\frac{[\text{s\_1207}]}{\text{ic1207}} \right) \right) \tag{329}
$$

Table 661: Properties of each parameter.

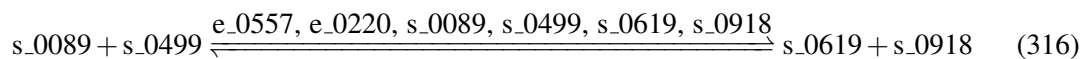| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.010	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.010	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0039			1.000	dimensionless	☑
ep1212			1.000	dimensionless	☑
ep0008			-1.000	dimensionless	☑
ep1207			-1.000	dimensionless	☑

7.165 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

$$s\_0991 + s\_1399 \xrightleftharpoons{\;e\_0642,\ s\_0991,\ s\_1399,\ s\_0180,\ s\_0955\;} s\_0180 + s\_0955 \tag{330}$$
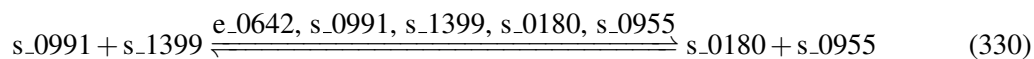
Reactants

Table 662: Properties of each reactant.

Id	Name	SBO
s_0991	L-glutamate	
s_1399	pyruvate	

Modifiers

Table 663: Properties of each modifier.

Id	Name	SBO
e_0642	ALT1	0000460
s_0991	L-glutamate	
s_1399	pyruvate	
s_0180	2-oxoglutarate	
s_0955	L-alanine	

Products

Table 664: Properties of each product.

Id	Name	SBO
s_0180	2-oxoglutarate	
s_0955	L-alanine	

Kinetic Law

Derived unit contains undeclared units

$$v_{165} = \mathrm{vol}\left(\mathrm{cell}\right) \cdot \mathrm{v0} \cdot \left(1 + \mathrm{ep0991} \cdot \left(\frac{[\mathrm{s\_0991}]}{\mathrm{ic0991}}\right) + \mathrm{ep1399} \cdot \left(\frac{[\mathrm{s\_1399}]}{\mathrm{ic1399}}\right) + \mathrm{ep0180}\right.$$
$$\left. \cdot \left(\frac{[\mathrm{s\_0180}]}{\mathrm{ic0180}}\right) + \mathrm{ep0955} \cdot \left(\frac{[\mathrm{s\_0955}]}{\mathrm{ic0955}}\right)\right) \tag{331}$$

Produced by SBML2LATEX

Table 665: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.017	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
v0			0.017	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
ep0991			1.000	dimensionless	☑
ep1399			1.000	dimensionless	☑
ep0180			-1.000	dimensionless	☑
ep0955			-1.000	dimensionless	☑

7.166 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

$$\text{s\_0953} + \text{s\_1212} \xrightleftharpoons{\text{e\_0062, e\_0343, s\_0953, s\_1212, s\_0959, s\_1207}} \text{s\_0959} + \text{s\_1207} \tag{332}$$
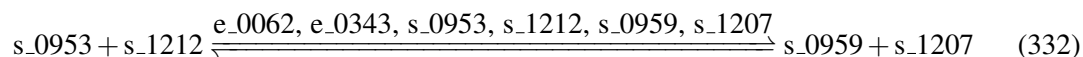
Reactants

Table 666: Properties of each reactant.

Id	Name	SBO
s_0953	L-2-aminoadipate	
s_1212	NADPH	

Modifiers

Table 667: 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 668: Properties of each product.

Id	Name	SBO
s_0959	L-allysine	
s_1207	NADP(+)	

Kinetic Law

Derived unit contains undeclared units

$$v_{166} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0953} \cdot \left(\frac{[\text{s\_0953}]}{\text{ic0953}}\right) + \text{ep1212} \cdot \left(\frac{[\text{s\_1212}]}{\text{ic1212}}\right) + \text{ep0959} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0959}]}{\text{ic0959}}\right) + \text{ep1207} \cdot \left(\frac{[\text{s\_1207}]}{\text{ic1207}}\right)\right) \tag{333}$$

Table 669: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.011	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	✓
v0			0.011	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	✓
ep0953			1.000	dimensionless	✓
ep1212			1.000	dimensionless	✓
ep0959			−1.000	dimensionless	✓
ep1207			−1.000	dimensionless	✓

7.167 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

$$\text{s\_0037} \xrightleftharpoons{\text{e\_0440, s\_0037, s\_1059}} \text{s\_1059} \tag{334}$$
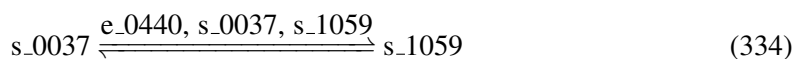
Reactant

Table 670: Properties of each reactant.

Id	Name	SBO
s_0037	(S)-2,3-epoxysqualene	

Modifiers

Table 671: Properties of each modifier.

Id	Name	SBO
e_0440	ERG7	0000460
s_0037	(S)-2,3-epoxysqualene	
s_1059	lanosterol	

Product

Table 672: Properties of each product.

Id	Name	SBO
s_1059	lanosterol	

Kinetic Law

Derived unit contains undeclared units

$$v_{167} = \text{vol}\left(\text{cell}\right) \cdot \text{v0} \cdot \left(1 + \text{ep0037} \cdot \left(\frac{[\text{s\_0037}]}{\text{ic0037}} \right) + \text{ep1059} \cdot \left(\frac{[\text{s\_1059}]}{\text{ic1059}} \right) \right) \qquad (335)$$

Table 673: Properties of each parameter.

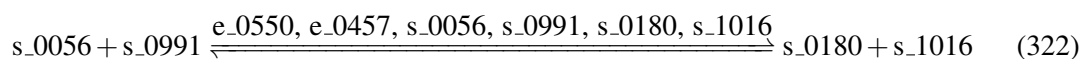| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.59974684150501 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$2.59974684150501 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0037			1.000	dimensionless	☑
ep1059			-1.000	dimensionless	☑

7.168 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

$$\text{s\_0291} + \text{s\_0991} \xrightleftharpoons{\text{e\_0550, e\_0457, s\_0291, s\_0991, s\_0180, s\_1021}} \text{s\_0180} + \text{s\_1021} \quad (336)$$
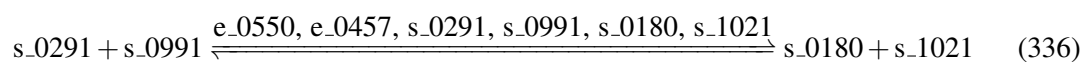
Reactants

Table 674: Properties of each reactant.

Id	Name	SBO
s_0291	4-methyl-2-oxopentanoate	
s_0991	L-glutamate	

Modifiers

Table 675: 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 676: Properties of each product.

Id	Name	SBO
s_0180	2-oxoglutarate	
s_1021	L-leucine	

Kinetic Law

Derived unit contains undeclared units

Produced by SBML2LATEX

$$v_{168} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0291} \cdot \left(\frac{[\text{s\_0291}]}{\text{ic0291}} \right) + \text{ep0991} \cdot \left(\frac{[\text{s\_0991}]}{\text{ic0991}} \right) + \text{ep0180} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0180}]}{\text{ic0180}} \right) + \text{ep1021} \cdot \left(\frac{[\text{s\_1021}]}{\text{ic1021}} \right) \right) \tag{337}$$

Table 677: Properties of each parameter.

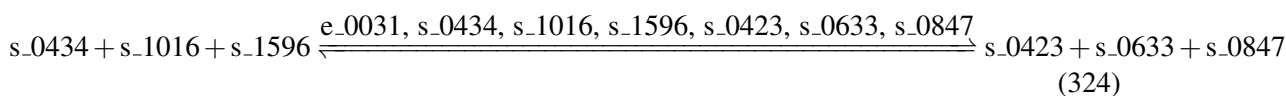| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.011	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
v0			0.011	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
ep0291			1.000	dimensionless	☑
ep0991			1.000	dimensionless	☑
ep0180			-1.000	dimensionless	☑
ep1021			-1.000	dimensionless	☑

7.169 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

$$\text{s\_0434} + \text{s\_1021} + \text{s\_1598} \xrightleftharpoons{\text{e\_0926, s\_0434, s\_1021, s\_1598, s\_0423, s\_0633, s\_1077}} \text{s\_0423} + \text{s\_0633} + \text{s\_1077} \tag{338}$$

Reactants

Table 678: Properties of each reactant.

Id	Name	SBO
s_0434	ATP	
s_1021	L-leucine	
s_1598	tRNA(Leu)	

Modifiers

Table 679: Properties of each modifier.

Id	Name	SBO
e_0926	CDC60	0000460
s_0434	ATP	
s_1021	L-leucine	
s_1598	tRNA(Leu)	
s_0423	AMP	
s_0633	diphosphate	
s_1077	Leu-tRNA(Leu)	

Products

Table 680: Properties of each product.

Id	Name	SBO
s_0423	AMP	
s_0633	diphosphate	
s_1077	Leu-tRNA(Leu)	

Kinetic Law

Derived unit contains undeclared units

$$
v_{169} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}} \right) + \text{ep1021} \cdot \left(\frac{[\text{s\_1021}]}{\text{ic1021}} \right) + \text{ep1598} \cdot \left(\frac{[\text{s\_1598}]}{\text{ic1598}} \right) \right.
$$
$$
\left. + \text{ep0423} \cdot \left(\frac{[\text{s\_0423}]}{\text{ic0423}} \right) + \text{ep0633} \cdot \left(\frac{[\text{s\_0633}]}{\text{ic0633}} \right) + \text{ep1077} \cdot \left(\frac{[\text{s\_1077}]}{\text{ic1077}} \right) \right)
$$

(339)

Table 681: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.011	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.011	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0434			1.000	dimensionless	☑
ep1021			1.000	dimensionless	☑
ep1598			1.000	dimensionless	☑
ep0423			−1.000	dimensionless	☑
ep0633			−1.000	dimensionless	☑
ep1077			−1.000	dimensionless	☑

7.170 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

$$s\_0434 + s\_1025 + s\_1600 \underset{}{\overset{e\_0171, s\_0434, s\_1025, s\_1600, s\_0423, s\_0633, s\_1099}{\rightleftharpoons}} s\_0423 + s\_0633 + s\_1099 \tag{340}$$

Reactants

Table 682: Properties of each reactant.

Id	Name	SBO
s_0434	ATP	
s_1025	L-lysine	
s_1600	tRNA(Lys)	

Modifiers

Table 683: Properties of each modifier.

Id	Name	SBO
e_0171	KRS1	0000460
s_0434	ATP	
s_1025	L-lysine	
s_1600	tRNA(Lys)	
s_0423	AMP	
s_0633	diphosphate	
s_1099	Lys-tRNA(Lys)	

Products

Table 684: Properties of each product.

Id	Name	SBO
s_0423	AMP	

Id	Name	SBO
s_0633	diphosphate	
s_1099	Lys-tRNA(Lys)	

Kinetic Law

Derived unit contains undeclared units

$$v_{170} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}} \right) + \text{ep1025} \cdot \left(\frac{[\text{s\_1025}]}{\text{ic1025}} \right) + \text{ep1600} \cdot \left(\frac{[\text{s\_1600}]}{\text{ic1600}} \right) \right.$$
$$\left. + \text{ep0423} \cdot \left(\frac{[\text{s\_0423}]}{\text{ic0423}} \right) + \text{ep0633} \cdot \left(\frac{[\text{s\_0633}]}{\text{ic0633}} \right) + \text{ep1099} \cdot \left(\frac{[\text{s\_1099}]}{\text{ic1099}} \right) \right)$$

(341)

Table 685: Properties of each parameter.

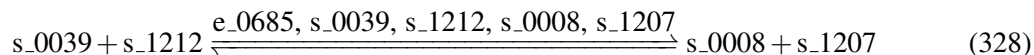| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.011	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.011	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0434			1.000	dimensionless	☑
ep1025			1.000	dimensionless	☑
ep1600			1.000	dimensionless	☑
ep0423			−1.000	dimensionless	☑
ep0633			−1.000	dimensionless	☑
ep1099			−1.000	dimensionless	☑

7.171 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

$$\text{s\_0066} + \text{s\_1198} \underset{\longleftarrow}{\overset{\text{e\_0571, e\_0838, e\_0137, s\_0066, s\_1198, s\_1203, s\_1271}}{\rightleftharpoons}} \text{s\_1203} + \text{s\_1271}$$

(342)

Reactants

Table 686: Properties of each reactant.

Id	Name	SBO
s_0066	(S)-malate	
s_1198	NAD	

Modifiers

Table 687: Properties of each modifier.

Id	Name	SBO
e_0571	MDH1	0000460
e_0838	MDH2	0000460
e_0137	MDH3	0000460
s_0066	(S)-malate	
s_1198	NAD	
s_1203	NADH	
s_1271	oxaloacetate	

Products

Table 688: Properties of each product.

Id	Name	SBO
s_1203	NADH	
s_1271	oxaloacetate	

Kinetic Law

Derived unit contains undeclared units

$$v_{171} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0066} \cdot \left(\frac{[\text{s\_0066}]}{\text{ic0066}}\right) + \text{ep1198} \cdot \left(\frac{[\text{s\_1198}]}{\text{ic1198}}\right) + \text{ep1203} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_1203}]}{\text{ic1203}}\right) + \text{ep1271} \cdot \left(\frac{[\text{s\_1271}]}{\text{ic1271}}\right)\right) \tag{343}$$

Table 689: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.014	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑

| Id	Name	SBO	Value	Unit	Constant
v0			0.014	mmol $\cdot$ l^{-1} $\cdot$ s^{-1}	☑
ep0066			1.000	dimensionless	☑
ep1198			1.000	dimensionless	☑
ep1203			−1.000	dimensionless	☑
ep1271			−1.000	dimensionless	☑

7.172 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

$$\text{s\_0573} + \text{s\_0785} \xrightleftharpoons{\text{e\_0134, s\_0573, s\_0785, s\_0633, s\_0743}} \text{s\_0633} + \text{s\_0743} \qquad (344)$$

Reactants

Table 690: Properties of each reactant.

Id	Name	SBO
s_0573	D-mannose 1-phosphate	
s_0785	GTP	

Modifiers

Table 691: 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

Produced by SBML2LATEX

Table 692: Properties of each product.

Id	Name	SBO
s_0633	diphosphate	
s_0743	GDP-alpha-D-mannose	

Kinetic Law

Derived unit contains undeclared units

$$v_{172} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0573} \cdot \left(\frac{[\text{s\_0573}]}{\text{ic0573}} \right) + \text{ep0785} \cdot \left(\frac{[\text{s\_0785}]}{\text{ic0785}} \right) + \text{ep0633} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0633}]}{\text{ic0633}} \right) + \text{ep0743} \cdot \left(\frac{[\text{s\_0743}]}{\text{ic0743}} \right) \right) \tag{345}$$

Table 693: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.031	mmol·l^{-1}·s^{-1}	☑
v0			0.031	mmol·l^{-1}·s^{-1}	☑
ep0573			1.000	dimensionless	☑
ep0785			1.000	dimensionless	☑
ep0633			-1.000	dimensionless	☑
ep0743			-1.000	dimensionless	☑

## 7.173 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

$$\text{s\_0557} \xrightleftharpoons{\text{e\_0269, s\_0557, s\_0574}} \text{s\_0574} \tag{346}$$
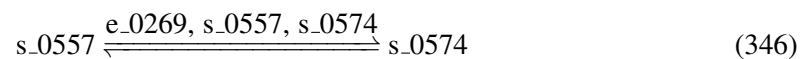
Reactant

Table 694: Properties of each reactant.

Id	Name	SBO
s_0557	D-fructose 6-phosphate	

Modifiers

Table 695: Properties of each modifier.

Id	Name	SBO
e_0269	PMI40	0000460
s_0557	D-fructose 6-phosphate	
s_0574	D-mannose 6-phosphate	

Product

Table 696: Properties of each product.

Id	Name	SBO
s_0574	D-mannose 6-phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{173} = \mathrm{vol\,(cell)} \cdot \mathrm{v0} \cdot \left(1 + \mathrm{ep0557} \cdot \left(\frac{[\mathrm{s\_0557}]}{\mathrm{ic0557}} \right) + \mathrm{ep0574} \cdot \left(\frac{[\mathrm{s\_0574}]}{\mathrm{ic0574}} \right) \right) \quad (347)$$

Table 697: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.031	mmol$\cdot$l$^{-1}\cdot$s^{-1}	✓
v0			0.031	mmol$\cdot$l$^{-1}\cdot$s^{-1}	✓
ep0557			1.000	dimensionless	✓
ep0574			-1.000	dimensionless	✓

7.174 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

$$s\_0304 \xrightleftharpoons{\text{e\_0057, e\_0396, s\_0304, s\_0120}} s\_0120 \qquad (348)$$
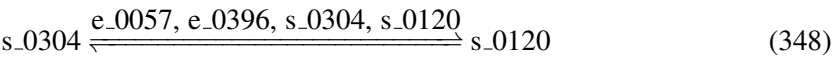
Reactant

Table 698: Properties of each reactant.

Id	Name	SBO
s_0304	5,10-methenyl-THF	

Modifiers

Table 699: 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 700: Properties of each product.

Id	Name	SBO
s_0120	10-formyl-THF	

Kinetic Law

Derived unit contains undeclared units

$$v_{174} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0304} \cdot \left(\frac{[\text{s\_0304}]}{\text{ic0304}} \right) + \text{ep0120} \cdot \left(\frac{[\text{s\_0120}]}{\text{ic0120}} \right) \right) \qquad (349)$$

Table 701: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			2.886	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
v0			2.886	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
ep0304			1.000	dimensionless	☑
ep0120			-1.000	dimensionless	☑

7.175 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

$$\text{s\_0434} + \text{s\_1029} \xrightleftharpoons{\text{e\_0239, e\_0658, s\_0434, s\_1029, s\_0633, s\_1322, s\_1416}} \text{s\_0633} + \text{s\_1322} + \text{s\_1416} \tag{350}$$

Reactants

Table 702: Properties of each reactant.

Id	Name	SBO
s_0434	ATP	
s_1029	L-methionine	

Modifiers

Table 703: Properties of each modifier.

Id	Name	SBO
e_0239	SAM2	0000460
e_0658	SAM1	0000460
s_0434	ATP	
s_1029	L-methionine	
s_0633	diphosphate	
s_1322	phosphate	
s_1416	S-adenosyl-L-methionine	

Products

Table 704: Properties of each product.

Id	Name	SBO
s_0633	diphosphate	
s_1322	phosphate	
s_1416	S-adenosyl-L-methionine	

Kinetic Law

Derived unit contains undeclared units

$$v_{175} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}}\right) + \text{ep1029} \cdot \left(\frac{[\text{s\_1029}]}{\text{ic1029}}\right) + \text{ep0633} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0633}]}{\text{ic0633}}\right) + \text{ep1322} \cdot \left(\frac{[\text{s\_1322}]}{\text{ic1322}}\right) + \text{ep1416} \cdot \left(\frac{[\text{s\_1416}]}{\text{ic1416}}\right)\right)$$

(351)

Table 705: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$5.83975250367414 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$5.83975250367414 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0434			1.000	dimensionless	☑
ep1029			1.000	dimensionless	☑
ep0633			-1.000	dimensionless	☑
ep1322			-1.000	dimensionless	☑
ep1416			-1.000	dimensionless	☑

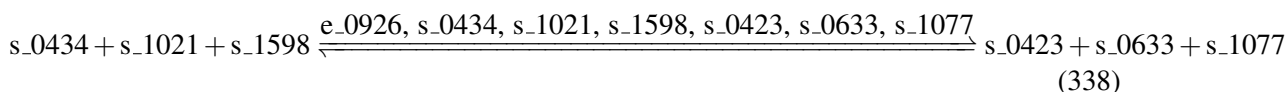## 7.176 Reaction r_0727

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

Name methionine synthase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0322} + \text{s\_1012} \xrightleftharpoons{\text{e\_0298, s\_0322, s\_1012, s\_1029, s\_1487}} \text{s\_1029} + \text{s\_1487}$$

(352)

Reactants

Table 706: Properties of each reactant.

Id	Name	SBO
s_0322	5-methyltetrahydrofolate	
s_1012	L-homocysteine	

Modifiers

Table 707: 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 708: Properties of each product.

Id	Name	SBO
s_1029	L-methionine	
s_1487	THF	

Kinetic Law

Derived unit contains undeclared units

$$v_{176} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0322} \cdot \left(\frac{[\text{s\_0322}]}{\text{ic0322}} \right) + \text{ep1012} \cdot \left(\frac{[\text{s\_1012}]}{\text{ic1012}} \right) + \text{ep1029} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_1029}]}{\text{ic1029}} \right) + \text{ep1487} \cdot \left(\frac{[\text{s\_1487}]}{\text{ic1487}} \right) \right) \tag{353}$$

Table 709: Properties of each parameter.

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

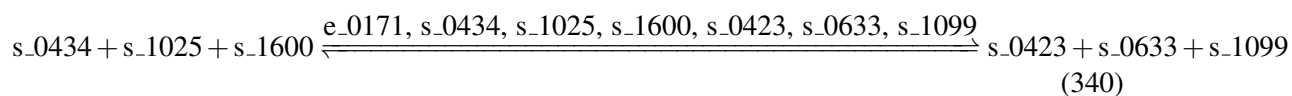| Id	Name	SBO	Value	Unit	Constant
v0			0.003	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
ep0322			1.000	dimensionless	☑
ep1012			1.000	dimensionless	☑
ep1029			-1.000	dimensionless	☑
ep1487			-1.000	dimensionless	☑

7.177 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

$$\mathrm{s\_0434 + s\_1029 + s\_1602} \xrightleftharpoons{\mathrm{e\_0409,\ s\_0434,\ s\_1029,\ s\_1602,\ s\_0423,\ s\_0633,\ s\_1148}} \mathrm{s\_0423 + s\_0633 + s\_1148} \tag{354}$$
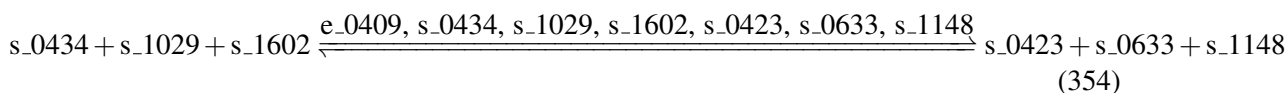
Reactants

Table 710: Properties of each reactant.

Id	Name	SBO
s_0434	ATP	
s_1029	L-methionine	
s_1602	tRNA(Met)	

Modifiers

Table 711: Properties of each modifier.

Id	Name	SBO
e_0409	MES1	0000460
s_0434	ATP	
s_1029	L-methionine	
s_1602	tRNA(Met)	
s_0423	AMP	
s_0633	diphosphate	
s_1148	Met-tRNA(Met)	

Products

Table 712: Properties of each product.

Id	Name	SBO
s_0423	AMP	
s_0633	diphosphate	
s_1148	Met-tRNA(Met)	

Kinetic Law

Derived unit contains undeclared units

$$v_{177} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}} \right) + \text{ep1029} \cdot \left(\frac{[\text{s\_1029}]}{\text{ic1029}} \right) + \text{ep1602} \cdot \left(\frac{[\text{s\_1602}]}{\text{ic1602}} \right) \right.$$
$$\left. + \text{ep0423} \cdot \left(\frac{[\text{s\_0423}]}{\text{ic0423}} \right) + \text{ep0633} \cdot \left(\frac{[\text{s\_0633}]}{\text{ic0633}} \right) + \text{ep1148} \cdot \left(\frac{[\text{s\_1148}]}{\text{ic1148}} \right) \right)$$

(355)

Table 713: Properties of each parameter.

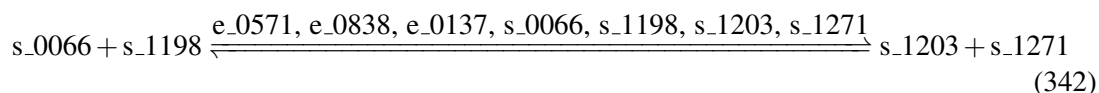| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.002	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.002	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0434			1.000	dimensionless	☑
ep1029			1.000	dimensionless	☑
ep1602			1.000	dimensionless	☑
ep0423			-1.000	dimensionless	☑
ep0633			-1.000	dimensionless	☑
ep1148			-1.000	dimensionless	☑

7.178 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

$$\text{s\_0306} + \text{s\_1198} \xrightleftharpoons{\text{e\_0610, s\_0306, s\_1198, s\_0304, s\_1203}} \text{s\_0304} + \text{s\_1203} \qquad (356)$$
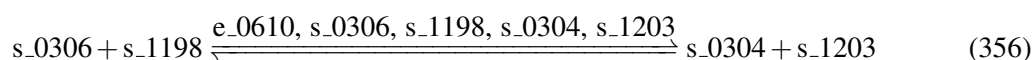
Reactants

Table 714: Properties of each reactant.

Id	Name	SBO
s_0306	5,10-methylenetetrahydrofolate	
s_1198	NAD	

Modifiers

Table 715: Properties of each modifier.

Id	Name	SBO
e_0610	MTD1	0000460
s_0306	5,10-methylenetetrahydrofolate	
s_1198	NAD	
s_0304	5,10-methenyl-THF	
s_1203	NADH	

Products

Table 716: Properties of each product.

Id	Name	SBO
s_0304	5,10-methenyl-THF	
s_1203	NADH	

Kinetic Law

Derived unit contains undeclared units

$$
v_{178} = \mathrm{vol}\,(\mathrm{cell}) \cdot \mathrm{v0} \cdot \left(1 + \mathrm{ep0306} \cdot \left(\frac{[\mathrm{s\_0306}]}{\mathrm{ic0306}} \right) + \mathrm{ep1198} \cdot \left(\frac{[\mathrm{s\_1198}]}{\mathrm{ic1198}} \right) + \mathrm{ep0304} \right.
$$
$$
\left. \cdot \left(\frac{[\mathrm{s\_0304}]}{\mathrm{ic0304}} \right) + \mathrm{ep1203} \cdot \left(\frac{[\mathrm{s\_1203}]}{\mathrm{ic1203}} \right) \right) \tag{357}
$$

Table 717: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			1.959	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑

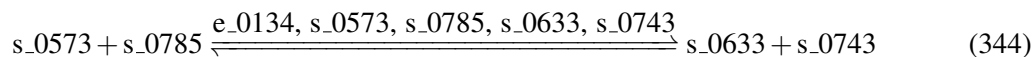| Id	Name	SBO	Value	Unit	Constant
v0			1.959	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
ep0306			1.000	dimensionless	☑
ep1198			1.000	dimensionless	☑
ep0304			-1.000	dimensionless	☑
ep1203			-1.000	dimensionless	☑

7.179 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

$$\mathrm{s\_0306 + s\_1207} \underset{}{\overset{\mathrm{e\_0396,\ e\_0057,\ s\_0306,\ s\_1207,\ s\_0304,\ s\_1212}}{\rightleftharpoons}} \mathrm{s\_0304 + s\_1212} \qquad (358)$$

Reactants

Table 718: Properties of each reactant.

Id	Name	SBO
s_0306	5,10-methylenetetrahydrofolate	
s_1207	NADP(+)	

Modifiers

Table 719: 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 720: Properties of each product.

Id	Name	SBO
s_0304	5,10-methenyl-THF	
s_1212	NADPH	

Kinetic Law

Derived unit contains undeclared units

$$
v_{179} = \text{vol}\,(\text{cell}) \cdot v0 \cdot \left(1 + \text{ep0306} \cdot \left(\frac{[\text{s\_0306}]}{\text{ic0306}} \right) + \text{ep1207} \cdot \left(\frac{[\text{s\_1207}]}{\text{ic1207}} \right) + \text{ep0304} \right.
$$
$$
\left. \cdot \left(\frac{[\text{s\_0304}]}{\text{ic0304}} \right) + \text{ep1212} \cdot \left(\frac{[\text{s\_1212}]}{\text{ic1212}} \right) \right)
$$

(359)

Table 721: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.926	mmol·l^{-1}·s^{-1}	☑
v0			0.926	mmol·l^{-1}·s^{-1}	☑
ep0306			1.000	dimensionless	☑
ep1207			1.000	dimensionless	☑
ep0304			−1.000	dimensionless	☑
ep1212			−1.000	dimensionless	☑

7.180 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

$$
\text{s\_0028} + \text{s\_0539} \xrightleftharpoons{\text{e\_0745, s\_0028, s\_0539, s\_0019, s\_0467}} \text{s\_0019} + \text{s\_0467}
$$

(360)
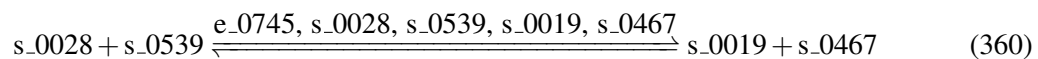
Reactants

Table 722: Properties of each reactant.

Id	Name	SBO
s_0028	(R)-mevalonate	
s_0539	CTP	

Modifiers

Table 723: 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 724: Properties of each product.

Id	Name	SBO
s_0019	(R)-5-phosphomevalonic acid	
s_0467	CDP	

Kinetic Law

Derived unit contains undeclared units

$$v_{180} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0028} \cdot \left(\frac{[\text{s\_0028}]}{\text{ic0028}} \right) + \text{ep0539} \cdot \left(\frac{[\text{s\_0539}]}{\text{ic0539}} \right) + \text{ep0019} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0019}]}{\text{ic0019}} \right) + \text{ep0467} \cdot \left(\frac{[\text{s\_0467}]}{\text{ic0467}} \right) \right) \tag{361}$$

Table 725: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.002	mmol $\cdot$ l^{-1} $\cdot$ s^{-1}	☑
v0			0.002	mmol $\cdot$ l^{-1} $\cdot$ s^{-1}	☑
ep0028			1.000	dimensionless	☑

Id	Name	SBO	Value	Unit	Constant
ep0539			1.000	dimensionless	☑
ep0019			−1.000	dimensionless	☑
ep0467			−1.000	dimensionless	☑

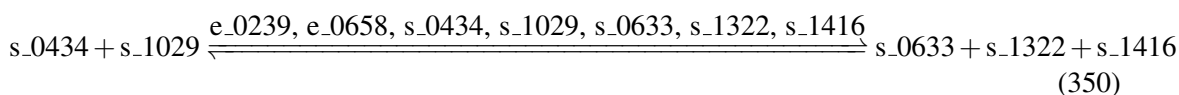## 7.181 Reaction r_0739

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

$$s\_0018 + s\_0434 \xrightleftharpoons{e\_0812,\ s\_0018,\ s\_0434,\ s\_0394,\ s\_0456,\ s\_0943,\ s\_1322} s\_0394 + s\_0456 + s\_0943 + s\_1322 \tag{362}$$

Reactants

Table 726: Properties of each reactant.

Id	Name	SBO
s_0018	(R)-5-diphosphomevalonic acid	
s_0434	ATP	

Modifiers

Table 727: Properties of each modifier.

Id	Name	SBO
e_0812	MVD1	0000460
s_0018	(R)-5-diphosphomevalonic acid	
s_0434	ATP	
s_0394	ADP	
s_0456	carbon dioxide	
s_0943	isopentenyl diphosphate	
s_1322	phosphate	

Products

Table 728: Properties of each product.

Id	Name	SBO
s_0394	ADP	
s_0456	carbon dioxide	
s_0943	isopentenyl diphosphate	
s_1322	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{181} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0018} \cdot \left(\frac{[\text{s\_0018}]}{\text{ic0018}}\right) + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}}\right) + \text{ep0394} \cdot \left(\frac{[\text{s\_0394}]}{\text{ic0394}}\right)\right.$$
$$\left. + \text{ep0456} \cdot \left(\frac{[\text{s\_0456}]}{\text{ic0456}}\right) + \text{ep0943} \cdot \left(\frac{[\text{s\_0943}]}{\text{ic0943}}\right) + \text{ep1322} \cdot \left(\frac{[\text{s\_1322}]}{\text{ic1322}}\right)\right) \tag{363}$$

Table 729: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.002	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.002	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0018			1.000	dimensionless	☑
ep0434			1.000	dimensionless	☑
ep0394			−1.000	dimensionless	☑
ep0456			−1.000	dimensionless	☑
ep0943			−1.000	dimensionless	☑
ep1322			−1.000	dimensionless	☑

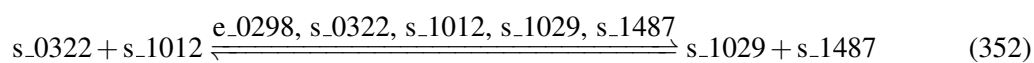## 7.182 Reaction r_0757

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

$$\text{s\_0126} \xrightleftharpoons{\text{e\_0204, e\_0435, s\_0126, s\_1153, s\_1322}} \text{s\_1153} + \text{s\_1322} \tag{364}$$
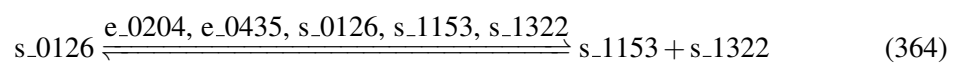
Reactant

Table 730: Properties of each reactant.

Id	Name	SBO
s_0126	1D-myo-inositol 1-phosphate	

Modifiers

Table 731: 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	
s_1322	phosphate	

Products

Table 732: Properties of each product.

Id	Name	SBO
s_1153	myo-inositol	
s_1322	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{182} = \text{vol}\left(\text{cell}\right) \cdot \text{v0}$$
$$\cdot \left(1 + \text{ep0126} \cdot \left(\frac{[\text{s\_0126}]}{\text{ic0126}}\right) + \text{ep1153} \cdot \left(\frac{[\text{s\_1153}]}{\text{ic1153}}\right) + \text{ep1322} \cdot \left(\frac{[\text{s\_1322}]}{\text{ic1322}}\right)\right) \quad (365)$$

Table 733: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$8.05209910738368 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$8.05209910738368 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0126			1.000	dimensionless	☑

Id	Name	SBO	Value	Unit	Constant
ep1153			-1.000	dimensionless	☑
ep1322			-1.000	dimensionless	☑

7.183 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

$$s\_0568 \xrightleftharpoons{e\_0512,\ s\_0568,\ s\_0126} s\_0126 \tag{366}$$
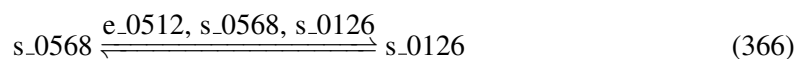
Reactant

Table 734: Properties of each reactant.

Id	Name	SBO
s_0568	D-glucose 6-phosphate	

Modifiers

Table 735: Properties of each modifier.

Id	Name	SBO
e_0512	INO1	0000460
s_0568	D-glucose 6-phosphate	
s_0126	1D-myo-inositol 1-phosphate	

Product

Table 736: Properties of each product.

Id	Name	SBO
s_0126	1D-myo-inositol 1-phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{183} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0568} \cdot \left(\frac{[\text{s\_0568}]}{\text{ic0568}} \right) + \text{ep0126} \cdot \left(\frac{[\text{s\_0126}]}{\text{ic0126}} \right) \right) \qquad (367)$$

Table 737: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$8.05209911324267 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$8.05209911324267 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0568			1.000	dimensionless	☑
ep0126			-1.000	dimensionless	☑

7.184 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

$$\text{s\_1191} + \text{s\_1212} \xrightleftharpoons{\text{e\_0290, s\_1191, s\_1212, s\_0145, s\_1207, s\_1322}} \text{s\_0145} + \text{s\_1207} + \text{s\_1322}$$
$$(368)$$
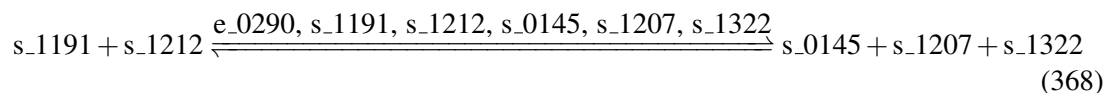
Reactants

Table 738: Properties of each reactant.

Id	Name	SBO
s_1191	N-acetyl-L-gamma-glutamyl phosphate	
s_1212	NADPH	

Modifiers

Table 739: Properties of each modifier.

Id	Name	SBO
e_0290	ARG5,6	0000460

Id	Name	SBO
s_1191	N-acetyl-L-gamma-glutamyl phosphate	
s_1212	NADPH	
s_0145	2-acetamido-5-oxopentanoate	
s_1207	NADP(+)	
s_1322	phosphate	

Products

Table 740: Properties of each product.

Id	Name	SBO
s_0145	2-acetamido-5-oxopentanoate	
s_1207	NADP(+)	
s_1322	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$
\begin{aligned}
v_{184} = \mathrm{vol}\,(\mathrm{cell}) \cdot \mathrm{v0} \cdot \Bigg(&1 + \mathrm{ep1191} \cdot \left(\frac{[\mathrm{s\_1191}]}{\mathrm{ic1191}} \right) + \mathrm{ep1212} \cdot \left(\frac{[\mathrm{s\_1212}]}{\mathrm{ic1212}} \right) + \mathrm{ep0145} \\
&\cdot \left(\frac{[\mathrm{s\_0145}]}{\mathrm{ic0145}} \right) + \mathrm{ep1207} \cdot \left(\frac{[\mathrm{s\_1207}]}{\mathrm{ic1207}} \right) + \mathrm{ep1322} \cdot \left(\frac{[\mathrm{s\_1322}]}{\mathrm{ic1322}} \right) \Bigg)
\end{aligned}
\tag{369}
$$

Table 741: Properties of each parameter.

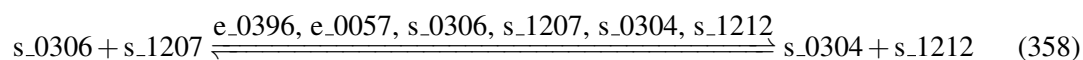| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.006	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
v0			0.006	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
ep1191			1.000	dimensionless	☑
ep1212			1.000	dimensionless	☑
ep0145			-1.000	dimensionless	☑
ep1207			-1.000	dimensionless	☑
ep1322			-1.000	dimensionless	☑

7.185 Reaction r_0770

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

Name NADH dehydrogenase, cytosolic/mitochondrial

SBO:0000176 biochemical reaction

Reaction equation

$$s\_1203 + s\_1537 \xrightleftharpoons{\text{e\_0139, e\_0737, e\_0714, s\_1203, s\_1537, s\_1198, s\_1535}} s\_1198 + s\_1535 \tag{370}$$

Reactants

Table 742: Properties of each reactant.

Id	Name	SBO
s_1203	NADH	
s_1537	ubiquinone-6	

Modifiers

Table 743: Properties of each modifier.

Id	Name	SBO
e_0139	NDE2	0000460
e_0737	NDE1	0000460
e_0714	NDI1	0000460
s_1203	NADH	
s_1537	ubiquinone-6	
s_1198	NAD	
s_1535	ubiquinol-6	

Products

Table 744: Properties of each product.

Id	Name	SBO
s_1198	NAD	
s_1535	ubiquinol-6	

Kinetic Law

Derived unit contains undeclared units

$$v_{185} = \mathrm{vol}\,(\mathrm{cell}) \cdot \mathrm{v0} \cdot \left(1 + \mathrm{ep1203} \cdot \left(\frac{[\mathrm{s\_1203}]}{\mathrm{ic1203}} \right) + \mathrm{ep1537} \cdot \left(\frac{[\mathrm{s\_1537}]}{\mathrm{ic1537}} \right) + \mathrm{ep1198} \right.$$
$$\left. \cdot \left(\frac{[\mathrm{s\_1198}]}{\mathrm{ic1198}} \right) + \mathrm{ep1535} \cdot \left(\frac{[\mathrm{s\_1535}]}{\mathrm{ic1535}} \right) \right) \tag{371}$$

Table 745: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			5.868	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
v0			5.868	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
ep1203			1.000	dimensionless	☑
ep1537			1.000	dimensionless	☑
ep1198			-1.000	dimensionless	☑
ep1535			-1.000	dimensionless	☑

7.186 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

$$\mathrm{s\_0467} \xrightleftharpoons{\mathrm{e\_0271,\ s\_0467,\ s\_0526,\ s\_1322}} \mathrm{s\_0526} + \mathrm{s\_1322} \tag{372}$$
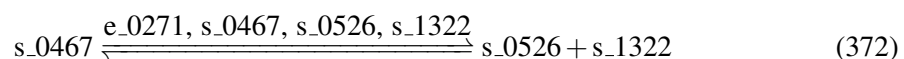
Reactant

Table 746: Properties of each reactant.

Id	Name	SBO
s_0467	CDP	

Modifiers

Table 747: Properties of each modifier.

Id	Name	SBO
e_0271	YND1	0000460

Id	Name	SBO
s_0467	CDP	
s_0526	CMP	
s_1322	phosphate	

Products

Table 748: Properties of each product.

Id	Name	SBO
s_0526	CMP	
s_1322	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{186} = \mathrm{vol}\,(\mathrm{cell}) \cdot \mathrm{v0}$$
$$\cdot \left(1 + \mathrm{ep0467} \cdot \left(\frac{[\mathrm{s\_0467}]}{\mathrm{ic0467}} \right) + \mathrm{ep0526} \cdot \left(\frac{[\mathrm{s\_0526}]}{\mathrm{ic0526}} \right) + \mathrm{ep1322} \cdot \left(\frac{[\mathrm{s\_1322}]}{\mathrm{ic1322}} \right) \right) \quad (373)$$

Table 749: Properties of each parameter.

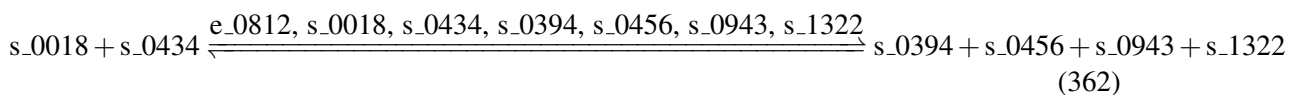| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.001	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
v0			0.001	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
ep0467			1.000	dimensionless	☑
ep0526			-1.000	dimensionless	☑
ep1322			-1.000	dimensionless	☑

7.187 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

$$\mathrm{s\_0434} + \mathrm{s\_0739} \xrightleftharpoons{\mathrm{e\_0568,\ s\_0434,\ s\_0739,\ s\_0394,\ s\_0785}} \mathrm{s\_0394} + \mathrm{s\_0785} \quad (374)$$

Reactants

Table 750: Properties of each reactant.

Id	Name	SBO
s_0434	ATP	
s_0739	GDP	

Modifiers

Table 751: Properties of each modifier.

Id	Name	SBO
e_0568	YNK1	0000460
s_0434	ATP	
s_0739	GDP	
s_0394	ADP	
s_0785	GTP	

Products

Table 752: Properties of each product.

Id	Name	SBO
s_0394	ADP	
s_0785	GTP	

Kinetic Law

Derived unit contains undeclared units

$$
v_{187} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}} \right) + \text{ep0739} \cdot \left(\frac{[\text{s\_0739}]}{\text{ic0739}} \right) + \text{ep0394} \right.
$$
$$
\left. \cdot \left(\frac{[\text{s\_0394}]}{\text{ic0394}} \right) + \text{ep0785} \cdot \left(\frac{[\text{s\_0785}]}{\text{ic0785}} \right) \right) \tag{375}
$$

Table 753: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.035	mmol·l^{-1}·s^{-1}	☑

| Id	Name	SBO	Value	Unit	Constant
v0			0.035	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
ep0434			1.000	dimensionless	☑
ep0739			1.000	dimensionless	☑
ep0394			-1.000	dimensionless	☑
ep0785			-1.000	dimensionless	☑

7.188 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

$$\text{s\_0434} + \text{s\_1538} \xrightleftharpoons{\text{e\_0568, s\_0434, s\_1538, s\_0394, s\_1559}} \text{s\_0394} + \text{s\_1559} \tag{376}$$

Reactants

Table 754: Properties of each reactant.

Id	Name	SBO
s_0434	ATP	
s_1538	UDP	

Modifiers

Table 755: Properties of each modifier.

Id	Name	SBO
e_0568	YNK1	0000460
s_0434	ATP	
s_1538	UDP	
s_0394	ADP	
s_1559	UTP	

Products

Table 756: Properties of each product.

Id	Name	SBO
s_0394	ADP	
s_1559	UTP	

Kinetic Law

Derived unit contains undeclared units

$$v_{188} = \text{vol}\,(\text{cell}) \cdot v0 \cdot \left(1 + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}} \right) + \text{ep1538} \cdot \left(\frac{[\text{s\_1538}]}{\text{ic1538}} \right) + \text{ep0394} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0394}]}{\text{ic0394}} \right) + \text{ep1559} \cdot \left(\frac{[\text{s\_1559}]}{\text{ic1559}} \right) \right) \tag{377}$$

Table 757: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.109	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.109	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0434			1.000	dimensionless	☑
ep1538			1.000	dimensionless	☑
ep0394			-1.000	dimensionless	☑
ep1559			-1.000	dimensionless	☑

7.189 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

$$\text{s\_0841} + \text{s\_1233} \xrightleftharpoons{\text{e\_0674, s\_0841, s\_1233, s\_0362, s\_1012}} \text{s\_0362} + \text{s\_1012} \tag{378}$$

Reactants

Produced by SBML2ᴬTEX

Table 758: Properties of each reactant.

Id	Name	SBO
s_0841	hydrogen sulfide	
s_1233	O-acetyl-L-homoserine	

Modifiers

Table 759: 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 760: Properties of each product.

Id	Name	SBO
s_0362	acetate	
s_1012	L-homocysteine	

Kinetic Law

Derived unit contains undeclared units

$$
v_{189} = \mathrm{vol}\,(\mathrm{cell}) \cdot v0 \cdot \left(1 + \mathrm{ep0841} \cdot \left(\frac{[\mathrm{s\_0841}]}{\mathrm{ic0841}} \right) + \mathrm{ep1233} \cdot \left(\frac{[\mathrm{s\_1233}]}{\mathrm{ic1233}} \right) + \mathrm{ep0362} \right. \\
\left. \cdot \left(\frac{[\mathrm{s\_0362}]}{\mathrm{ic0362}} \right) + \mathrm{ep1012} \cdot \left(\frac{[\mathrm{s\_1012}]}{\mathrm{ic1012}} \right) \right)
$$

(379)

Table 761: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.002	mmol·l^{-1}·s^{-1}	☑
v0			0.002	mmol·l^{-1}·s^{-1}	☑
ep0841			1.000	dimensionless	☑

Id	Name	SBO	Value	Unit	Constant
ep1233			1.000	dimensionless	☑
ep0362			−1.000	dimensionless	☑
ep1012			−1.000	dimensionless	☑

7.190 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

$$s\_0455 + s\_1266 \xrightleftharpoons{e\_0499,\ s\_0455,\ s\_1266,\ s\_0979,\ s\_1322} s\_0979 + s\_1322 \qquad (380)$$
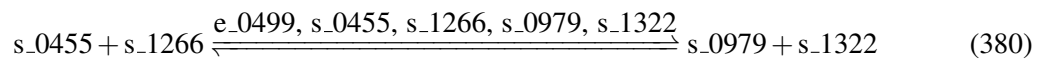
Reactants

Table 762: Properties of each reactant.

Id	Name	SBO
s_0455	carbamoyl phosphate	
s_1266	ornithine	

Modifiers

Table 763: Properties of each modifier.

Id	Name	SBO
e_0499	ARG3	0000460
s_0455	carbamoyl phosphate	
s_1266	ornithine	
s_0979	L-citrulline	
s_1322	phosphate	

Products

Table 764: Properties of each product.

Id	Name	SBO
s_0979	L-citrulline	
s_1322	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{190} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0455} \cdot \left(\frac{[\text{s\_0455}]}{\text{ic0455}} \right) + \text{ep1266} \cdot \left(\frac{[\text{s\_1266}]}{\text{ic1266}} \right) + \text{ep0979} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0979}]}{\text{ic0979}} \right) + \text{ep1322} \cdot \left(\frac{[\text{s\_1322}]}{\text{ic1322}} \right) \right) \tag{381}$$

Table 765: Properties of each parameter.

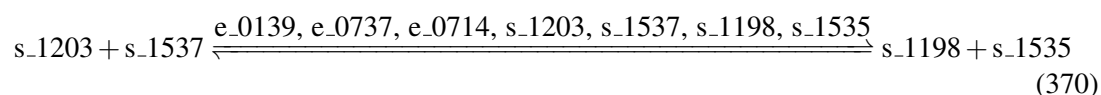| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.006	mmol·l^{-1}·s^{-1}	✓
v0			0.006	mmol·l^{-1}·s^{-1}	✓
ep0455			1.000	dimensionless	✓
ep1266			1.000	dimensionless	✓
ep0979			−1.000	dimensionless	✓
ep1322			−1.000	dimensionless	✓

7.191 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

$$\text{s\_0991} + \text{s\_1182} \xrightleftharpoons{\text{e\_0729, s\_0991, s\_1182, s\_1192, s\_1266}} \text{s\_1192} + \text{s\_1266} \tag{382}$$
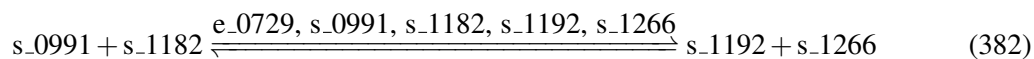
Reactants

Table 766: Properties of each reactant.

Id	Name	SBO
s_0991	L-glutamate	
s_1182	N(2)-acetyl-L-ornithine	

Modifiers

Table 767: 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 768: Properties of each product.

Id	Name	SBO
s_1192	N-acetyl-L-glutamate	
s_1266	ornithine	

Kinetic Law

Derived unit contains undeclared units

$$
\begin{aligned}
v_{191} = \mathrm{vol}\,(\mathrm{cell}) \cdot \mathrm{v0} \cdot \Bigg(1 + \mathrm{ep0991} \cdot \left(\frac{[\mathrm{s\_0991}]}{\mathrm{ic0991}} \right) + \mathrm{ep1182} \cdot \left(\frac{[\mathrm{s\_1182}]}{\mathrm{ic1182}} \right) + \mathrm{ep1192} \\
\cdot \left(\frac{[\mathrm{s\_1192}]}{\mathrm{ic1192}} \right) + \mathrm{ep1266} \cdot \left(\frac{[\mathrm{s\_1266}]}{\mathrm{ic1266}} \right) \Bigg)
\end{aligned}
\tag{383}
$$

Table 769: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.006	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
v0			0.006	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
ep0991			1.000	dimensionless	☑

Id	Name	SBO	Value	Unit	Constant
ep1182			1.000	dimensionless	☑
ep1192			−1.000	dimensionless	☑
ep1266			−1.000	dimensionless	☑

7.192 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

$$s\_1269 + s\_1386 \xrightleftharpoons{\text{e\_0755, e\_0712, s\_1269, s\_1386, s\_0633, s\_1270}} s\_0633 + s\_1270 \qquad (384)$$

Reactants

Table 770: Properties of each reactant.

Id	Name	SBO
s_1269	orotate	
s_1386	PRPP	

Modifiers

Table 771: 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 772: Properties of each product.

Id	Name	SBO
s_0633	diphosphate	
s_1270	orotidine 5'-(dihydrogen phosphate)	

Kinetic Law

Derived unit contains undeclared units

$$v_{192} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep1269} \cdot \left(\frac{[\text{s\_1269}]}{\text{ic1269}} \right) + \text{ep1386} \cdot \left(\frac{[\text{s\_1386}]}{\text{ic1386}} \right) + \text{ep0633} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0633}]}{\text{ic0633}} \right) + \text{ep1270} \cdot \left(\frac{[\text{s\_1270}]}{\text{ic1270}} \right) \right) \tag{385}$$

Table 773: Properties of each parameter.

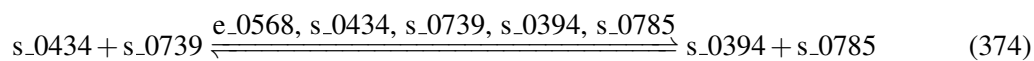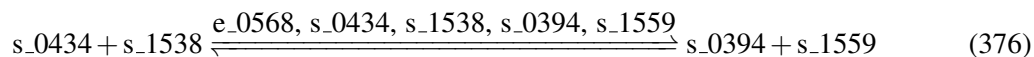| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.004	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.004	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep1269			1.000	dimensionless	☑
ep1386			1.000	dimensionless	☑
ep0633			-1.000	dimensionless	☑
ep1270			-1.000	dimensionless	☑

7.193 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

$$\text{s\_1270} \xrightleftharpoons{\text{e\_0249, s\_1270, s\_0456, s\_1545}} \text{s\_0456} + \text{s\_1545} \tag{386}$$
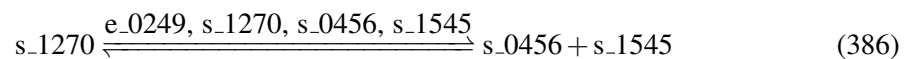
Reactant

Table 774: Properties of each reactant.

Id	Name	SBO
s_1270	orotidine 5'-(dihydrogen phosphate)	

Modifiers

Table 775: Properties of each modifier.

Id	Name	SBO
e_0249	URA3	0000460
s_1270	orotidine 5'-(dihydrogen phosphate)	
s_0456	carbon dioxide	
s_1545	UMP	

Products

Table 776: Properties of each product.

Id	Name	SBO
s_0456	carbon dioxide	
s_1545	UMP	

Kinetic Law

Derived unit contains undeclared units

$$v_{193} = \text{vol}\,(\text{cell}) \cdot \text{v0}$$
$$\cdot \left(1 + \text{ep1270} \cdot \left(\frac{[\text{s\_1270}]}{\text{ic1270}} \right) + \text{ep0456} \cdot \left(\frac{[\text{s\_0456}]}{\text{ic0456}} \right) + \text{ep1545} \cdot \left(\frac{[\text{s\_1545}]}{\text{ic1545}} \right) \right) \quad (387)$$

Table 777: Properties of each parameter.

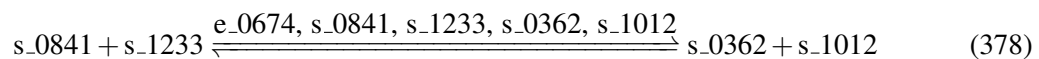| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.004	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.004	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep1270			1.000	dimensionless	☑
ep0456			-1.000	dimensionless	☑
ep1545			-1.000	dimensionless	☑

7.194 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

$$s\_0951 + s\_0991 \xrightleftharpoons{e\_0348,\ s\_0951,\ s\_0991,\ s\_0180,\ s\_1032} s\_0180 + s\_1032 \qquad (388)$$
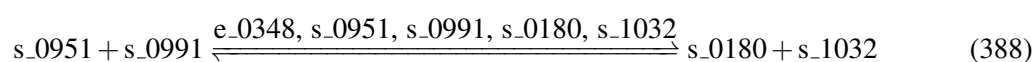
Reactants

Table 778: Properties of each reactant.

Id	Name	SBO
s_0951	keto-phenylpyruvate	
s_0991	L-glutamate	

Modifiers

Table 779: 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 780: Properties of each product.

Id	Name	SBO
s_0180	2-oxoglutarate	
s_1032	L-phenylalanine	

Kinetic Law

Derived unit contains undeclared units

Produced by SBML2L^AT_EX

$$v_{194} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0951} \cdot \left(\frac{[\text{s\_0951}]}{\text{ic0951}} \right) + \text{ep0991} \cdot \left(\frac{[\text{s\_0991}]}{\text{ic0991}} \right) + \text{ep0180} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0180}]}{\text{ic0180}} \right) + \text{ep1032} \cdot \left(\frac{[\text{s\_1032}]}{\text{ic1032}} \right) \right)$$
(389)

Table 781: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.005	mmol $\cdot$ l^{-1} $\cdot$ s^{-1}	✓
v0			0.005	mmol $\cdot$ l^{-1} $\cdot$ s^{-1}	✓
ep0951			1.000	dimensionless	✓
ep0991			1.000	dimensionless	✓
ep0180			-1.000	dimensionless	✓
ep1032			-1.000	dimensionless	✓

7.195 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

$$\text{s\_0434} + \text{s\_1032} + \text{s\_1604} \xrightleftharpoons{\text{e\_0639, e\_0312, s\_0434, s\_1032, s\_1604, s\_0423, s\_0633, s\_1314}} \text{s\_0423} + \text{s\_0633} + \text{s\_13}$$
(390)
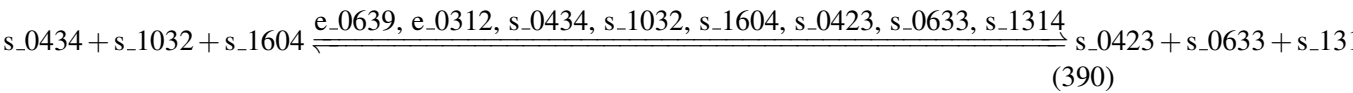
Reactants

Table 782: Properties of each reactant.

Id	Name	SBO
s_0434	ATP	
s_1032	L-phenylalanine	
s_1604	tRNA(Phe)	

Modifiers

Table 783: Properties of each modifier.

Id	Name	SBO
e_0639	FRS1	0000460
e_0312	FRS2	0000460
s_0434	ATP	
s_1032	L-phenylalanine	
s_1604	tRNA(Phe)	
s_0423	AMP	
s_0633	diphosphate	
s_1314	Phe-tRNA(Phe)	

Products

Table 784: Properties of each product.

Id	Name	SBO
s_0423	AMP	
s_0633	diphosphate	
s_1314	Phe-tRNA(Phe)	

Kinetic Law

Derived unit contains undeclared units

$$v_{195} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}} \right) + \text{ep1032} \cdot \left(\frac{[\text{s\_1032}]}{\text{ic1032}} \right) + \text{ep1604} \cdot \left(\frac{[\text{s\_1604}]}{\text{ic1604}} \right) \right.$$
$$\left. + \text{ep0423} \cdot \left(\frac{[\text{s\_0423}]}{\text{ic0423}} \right) + \text{ep0633} \cdot \left(\frac{[\text{s\_0633}]}{\text{ic0633}} \right) + \text{ep1314} \cdot \left(\frac{[\text{s\_1314}]}{\text{ic1314}} \right) \right)$$

(391)

Table 785: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.005	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.005	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0434			1.000	dimensionless	☑
ep1032			1.000	dimensionless	☑
ep1604			1.000	dimensionless	☑
ep0423			-1.000	dimensionless	☑
ep0633			-1.000	dimensionless	☑
ep1314			-1.000	dimensionless	☑

Produced by SBML2LATEX

7.196 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

$$s\_0302 + s\_0434 \underset{}{\overset{e\_0352, s\_0302, s\_0434, s\_0300, s\_0394, s\_1322}{\rightleftharpoons}} s\_0300 + s\_0394 + s\_1322 \tag{392}$$

Reactants

Table 786: Properties of each reactant.

Id	Name	SBO
s_0302	5'-phosphoribosyl-N-formylglycineamidine	
s_0434	ATP	

Modifiers

Table 787: Properties of each modifier.

Id	Name	SBO
e_0352	ADE5,7	0000460
s_0302	5'-phosphoribosyl-N-formylglycineamidine	
s_0434	ATP	
s_0300	5'-phosphoribosyl-5-aminoimidazole	
s_0394	ADP	
s_1322	phosphate	

Products

Table 788: Properties of each product.

Id	Name	SBO
s_0300	5'-phosphoribosyl-5-aminoimidazole	
s_0394	ADP	
s_1322	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$
\begin{aligned}
v_{196} = \mathrm{vol}\,(\mathrm{cell}) \cdot \mathrm{v0} \cdot \Bigg(& 1 + \mathrm{ep0302} \cdot \left(\frac{[\mathrm{s\_0302}]}{\mathrm{ic0302}} \right) + \mathrm{ep0434} \cdot \left(\frac{[\mathrm{s\_0434}]}{\mathrm{ic0434}} \right) + \mathrm{ep0300} \\
& \cdot \left(\frac{[\mathrm{s\_0300}]}{\mathrm{ic0300}} \right) + \mathrm{ep0394} \cdot \left(\frac{[\mathrm{s\_0394}]}{\mathrm{ic0394}} \right) + \mathrm{ep1322} \cdot \left(\frac{[\mathrm{s\_1322}]}{\mathrm{ic1322}} \right) \Bigg)
\end{aligned}
\tag{393}
$$

Table 789: Properties of each parameter.

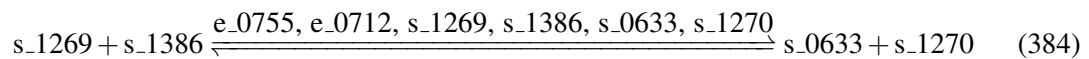| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.004	$\mathrm{mmol} \cdot l^{-1} \cdot s^{-1}$	✓
v0			0.004	$\mathrm{mmol} \cdot l^{-1} \cdot s^{-1}$	✓
ep0302			1.000	dimensionless	✓
ep0434			1.000	dimensionless	✓
ep0300			-1.000	dimensionless	✓
ep0394			-1.000	dimensionless	✓
ep1322			-1.000	dimensionless	✓

7.197 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

$$
\mathrm{s\_1351} + \mathrm{s\_1416} \xrightleftharpoons{\mathrm{e\_0536,\ e\_0381,\ s\_1351,\ s\_1416,\ s\_1343,\ s\_1413}} \mathrm{s\_1343} + \mathrm{s\_1413}
\tag{394}
$$

Reactants

Table 790: Properties of each reactant.

Id	Name	SBO
s_1351	phosphatidylethanolamine	
s_1416	S-adenosyl-L-methionine	

Modifiers

Table 791: 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 792: 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

$$
v_{197} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep1351} \cdot \left(\frac{[\text{s\_1351}]}{\text{ic1351}} \right) + \text{ep1416} \cdot \left(\frac{[\text{s\_1416}]}{\text{ic1416}} \right) + \text{ep1343} \right.
$$
$$
\left. \cdot \left(\frac{[\text{s\_1343}]}{\text{ic1343}} \right) + \text{ep1413} \cdot \left(\frac{[\text{s\_1413}]}{\text{ic1413}} \right) \right)
$$

(395)

Table 793: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.09303224869629 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$1.09303224869629 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep1351			1.000	dimensionless	☑
ep1416			1.000	dimensionless	☑
ep1343			−1.000	dimensionless	☑
ep1413			−1.000	dimensionless	☑

## 7.198 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

$$s\_0471 + s\_1153 \xrightleftharpoons{\text{e\_0964, s\_0471, s\_1153, s\_0089, s\_0526}} s\_0089 + s\_0526 \qquad (396)$$
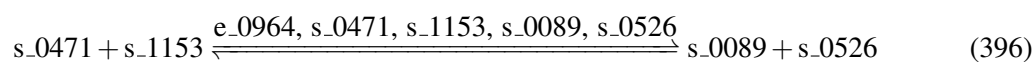
Reactants

Table 794: Properties of each reactant.

Id	Name	SBO
s_0471	CDP-diacylglycerol	
s_1153	myo-inositol	

Modifiers

Table 795: 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 796: Properties of each product.

Id	Name	SBO
s_0089	1-phosphatidyl-1D-myo-inositol	
s_0526	CMP	

Kinetic Law

Derived unit contains undeclared units

Produced by SBML2LATEX

$$v_{198} = \mathrm{vol}\,(\mathrm{cell}) \cdot \mathrm{v0} \cdot \left(1 + \mathrm{ep0471} \cdot \left(\frac{[\mathrm{s\_0471}]}{\mathrm{ic0471}}\right) + \mathrm{ep1153} \cdot \left(\frac{[\mathrm{s\_1153}]}{\mathrm{ic1153}}\right) + \mathrm{ep0089} \right.$$
$$\left. \cdot \left(\frac{[\mathrm{s\_0089}]}{\mathrm{ic0089}}\right) + \mathrm{ep0526} \cdot \left(\frac{[\mathrm{s\_0526}]}{\mathrm{ic0526}}\right)\right) \tag{397}$$

Table 797: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$8.05209910738368 \cdot 10^{-5}$	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
v0			$8.05209910738368 \cdot 10^{-5}$	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
ep0471			1.000	dimensionless	☑
ep1153			1.000	dimensionless	☑
ep0089			-1.000	dimensionless	☑
ep0526			-1.000	dimensionless	☑

7.199 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

$$\mathrm{s\_1337} \xrightleftharpoons{\mathrm{e\_0788,\ e\_0382,\ s\_1337,\ s\_0456,\ s\_1351}} \mathrm{s\_0456} + \mathrm{s\_1351} \tag{398}$$

Reactant

Table 798: Properties of each reactant.

Id	Name	SBO
s_1337	phosphatidyl-L-serine	

Modifiers

Table 799: Properties of each modifier.

Id	Name	SBO
e_0788	PSD1	0000460

Id	Name	SBO
e_0382	PSD2	0000460
s_1337	phosphatidyl-L-serine	
s_0456	carbon dioxide	
s_1351	phosphatidylethanolamine	

Products

Table 800: Properties of each product.

Id	Name	SBO
s_0456	carbon dioxide	
s_1351	phosphatidylethanolamine	

Kinetic Law

Derived unit contains undeclared units

$$v_{199} = \text{vol}\,(\text{cell}) \cdot \text{v0}$$
$$\cdot \left(1 + \text{ep1337} \cdot \left(\frac{[\text{s\_1337}]}{\text{ic1337}} \right) + \text{ep0456} \cdot \left(\frac{[\text{s\_0456}]}{\text{ic0456}} \right) + \text{ep1351} \cdot \left(\frac{[\text{s\_1351}]}{\text{ic1351}} \right) \right) \quad (399)$$

Table 801: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.3575612338737 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	✓
v0			$1.3575612338737 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	✓
ep1337			1.000	dimensionless	✓
ep0456			-1.000	dimensionless	✓
ep1351			-1.000	dimensionless	✓

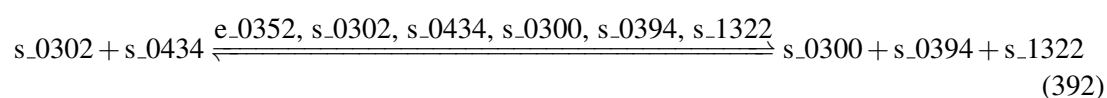## 7.200 Reaction r_0880

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

Name phosphatidylserine synthase

SBO:0000176 biochemical reaction

Reaction equation

$$s\_0471 + s\_1039 \xrightleftharpoons{\text{e\_0278, s\_0471, s\_1039, s\_0526, s\_1337}} s\_0526 + s\_1337 \qquad (400)$$
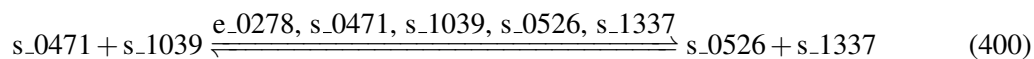
Reactants

Table 802: Properties of each reactant.

Id	Name	SBO
s_0471	CDP-diacylglycerol	
s_1039	L-serine	

Modifiers

Table 803: 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 804: Properties of each product.

Id	Name	SBO
s_0526	CMP	
s_1337	phosphatidyl-L-serine	

Kinetic Law

Derived unit contains undeclared units

$$v_{200} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0471} \cdot \left(\frac{[\text{s\_0471}]}{\text{ic0471}} \right) + \text{ep1039} \cdot \left(\frac{[\text{s\_1039}]}{\text{ic1039}} \right) + \text{ep0526} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0526}]}{\text{ic0526}} \right) + \text{ep1337} \cdot \left(\frac{[\text{s\_1337}]}{\text{ic1337}} \right) \right) \qquad (401)$$

Table 805: Properties of each parameter.

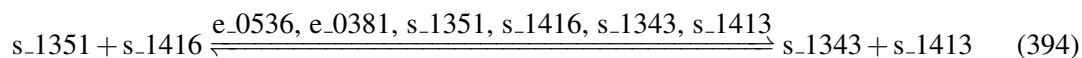| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.50557601754342 \cdot 10^{-4}$	$\text{mmol} \cdot l^{-1} \cdot s^{-1}$	✓
v0			$1.50557601754342 \cdot 10^{-4}$	$\text{mmol} \cdot l^{-1} \cdot s^{-1}$	✓
ep0471			1.000	dimensionless	✓
ep1039			1.000	dimensionless	✓
ep0526			-1.000	dimensionless	✓
ep1337			-1.000	dimensionless	✓

7.201 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

$$s\_0201 + s\_1616 \xrightleftharpoons{e\_0633, e\_0975, e\_0398, s\_0201, s\_1616, s\_0390, s\_1469, s\_1620} s\_0390 + s\_1469 + s\_1620 \tag{402}$$

Reactants

Table 806: Properties of each reactant.

Id	Name	SBO
s_0201	3'-phospho-5'-adenylyl sulfate	
s_1616	TRX1	

Modifiers

Table 807: 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	
s_1616	TRX1	

Id	Name	SBO
s_0390	adenosine 3',5'-bismonophosphate	
s_1469	sulphite	
s_1620	TRX1 disulphide	

Products

Table 808: 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

$$
\begin{aligned}
v_{201} = \text{vol}\,(\text{cell}) \cdot v0 \cdot &\left(1 + \text{ep0201} \cdot \left(\frac{[\text{s\_0201}]}{\text{ic0201}} \right) + \text{ep1616} \cdot \left(\frac{[\text{s\_1616}]}{\text{ic1616}} \right) + \text{ep0390} \right. \\
&\left. \cdot \left(\frac{[\text{s\_0390}]}{\text{ic0390}} \right) + \text{ep1469} \cdot \left(\frac{[\text{s\_1469}]}{\text{ic1469}} \right) + \text{ep1620} \cdot \left(\frac{[\text{s\_1620}]}{\text{ic1620}} \right) \right)
\end{aligned}
\tag{403}
$$

Table 809: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.002	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.002	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0201			1.000	dimensionless	☑
ep1616			1.000	dimensionless	☑
ep0390			-1.000	dimensionless	☑
ep1469			-1.000	dimensionless	☑
ep1620			-1.000	dimensionless	☑

## 7.202 Reaction r_0886

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

Name phosphofructokinase

SBO:0000176 biochemical reaction

Reaction equation

$$s\_0434 + s\_0557 \xrightleftharpoons{\text{e\_0401, e\_0743, s\_0434, s\_0557, s\_0394, s\_0555}} s\_0394 + s\_0555 \quad (404)$$

Reactants

Table 810: Properties of each reactant.

Id	Name	SBO
s_0434	ATP	
s_0557	D-fructose 6-phosphate	

Modifiers

Table 811: Properties of each modifier.

Id	Name	SBO
e_0401	PFK1	0000460
e_0743	PFK2	0000460
s_0434	ATP	
s_0557	D-fructose 6-phosphate	
s_0394	ADP	
s_0555	D-fructose 1,6-bisphosphate	

Products

Table 812: Properties of each product.

Id	Name	SBO
s_0394	ADP	
s_0555	D-fructose 1,6-bisphosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{202} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}} \right) + \text{ep0557} \cdot \left(\frac{[\text{s\_0557}]}{\text{ic0557}} \right) + \text{ep0394} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0394}]}{\text{ic0394}} \right) + \text{ep0555} \cdot \left(\frac{[\text{s\_0555}]}{\text{ic0555}} \right) \right) \quad (405)$$

Table 813: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.851	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	✓
v0			0.851	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	✓
ep0434			1.000	dimensionless	✓
ep0557			1.000	dimensionless	✓
ep0394			-1.000	dimensionless	✓
ep0555			-1.000	dimensionless	✓

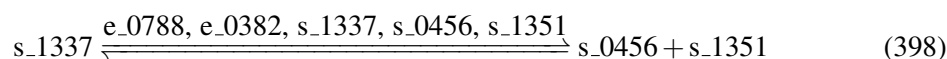## 7.203 Reaction r_0888

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

Name phosphoglucomutase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_0568} \xrightleftharpoons{\mathrm{e\_0576,\ e\_0757,\ e\_0733,\ s\_0568,\ s\_0567}} \mathrm{s\_0567} \tag{406}$$
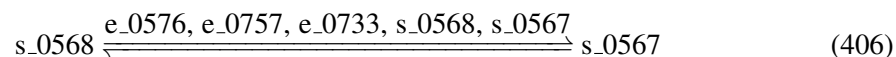
Reactant

Table 814: Properties of each reactant.

Id	Name	SBO
s_0568	D-glucose 6-phosphate	

Modifiers

Table 815: Properties of each modifier.

Id	Name	SBO
e_0576	PGM1	0000460
e_0757	PGM3	0000460
e_0733	PGM2	0000460
s_0568	D-glucose 6-phosphate	
s_0567	D-glucose 1-phosphate	

Product

Table 816: Properties of each product.

Id	Name	SBO
s_0567	D-glucose 1-phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{203} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0568} \cdot \left(\frac{[\text{s\_0568}]}{\text{ic0568}} \right) + \text{ep0567} \cdot \left(\frac{[\text{s\_0567}]}{\text{ic0567}} \right) \right) \quad (407)$$

Table 817: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.107	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.107	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0568			1.000	dimensionless	☑
ep0567			-1.000	dimensionless	☑

7.204 Reaction r_0891

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

Name phosphoglycerate dehydrogenase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0260} + \text{s\_1198} \xleftrightharpoons{\text{e\_0294, e\_0469, s\_0260, s\_1198, s\_0258, s\_1203}} \text{s\_0258} + \text{s\_1203} \quad (408)$$

Reactants

Table 818: Properties of each reactant.

Id	Name	SBO
s_0260	3-phosphoglycerate	
s_1198	NAD	

Modifiers

Table 819: Properties of each modifier.

Id	Name	SBO
e_0294	SER3	0000460
e_0469	SER33	0000460
s_0260	3-phosphoglycerate	
s_1198	NAD	
s_0258	3-phospho-hydroxypyruvate	
s_1203	NADH	

Products

Table 820: Properties of each product.

Id	Name	SBO
s_0258	3-phospho-hydroxypyruvate	
s_1203	NADH	

Kinetic Law

Derived unit contains undeclared units

$$
\begin{aligned}
v_{204} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \Bigg(1 + \text{ep0260} \cdot \left(\frac{[\text{s\_0260}]}{\text{ic0260}} \right) + \text{ep1198} \cdot \left(\frac{[\text{s\_1198}]}{\text{ic1198}} \right) + \text{ep0258} \\
\cdot \left(\frac{[\text{s\_0258}]}{\text{ic0258}} \right) + \text{ep1203} \cdot \left(\frac{[\text{s\_1203}]}{\text{ic1203}} \right) \Bigg)
\end{aligned}
\tag{409}
$$

Table 821: Properties of each parameter.

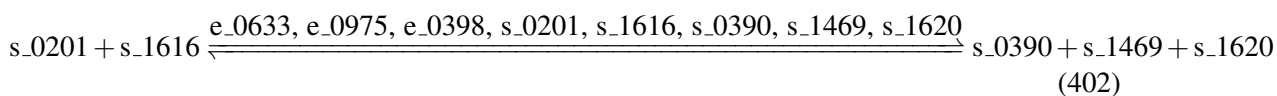| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			1.460	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			1.460	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0260			1.000	dimensionless	☑
ep1198			1.000	dimensionless	☑
ep0258			-1.000	dimensionless	☑
ep1203			-1.000	dimensionless	☑

7.205 Reaction r_0892

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

Name phosphoglycerate kinase

SBO:0000176 biochemical reaction

Reaction equation

$$s\_0075 + s\_0394 \xrightleftharpoons{\quad e\_0113,\ s\_0075,\ s\_0394,\ s\_0260,\ s\_0434 \quad} s\_0260 + s\_0434 \qquad (410)$$
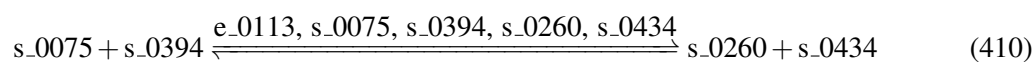
Reactants

Table 822: Properties of each reactant.

Id	Name	SBO
s_0075	1,3-bisphospho-D-glycerate	
s_0394	ADP	

Modifiers

Table 823: Properties of each modifier.

Id	Name	SBO
e_0113	PGK1	0000460
s_0075	1,3-bisphospho-D-glycerate	
s_0394	ADP	
s_0260	3-phosphoglycerate	
s_0434	ATP	

Products

Table 824: Properties of each product.

Id	Name	SBO
s_0260	3-phosphoglycerate	
s_0434	ATP	

Kinetic Law

Derived unit contains undeclared units

Produced by SBML2LATEX

$$v_{205} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0075} \cdot \left(\frac{[\text{s\_0075}]}{\text{ic0075}} \right) + \text{ep0394} \cdot \left(\frac{[\text{s\_0394}]}{\text{ic0394}} \right) + \text{ep0260} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0260}]}{\text{ic0260}} \right) + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}} \right) \right) \tag{411}$$

Table 825: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			1.691	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			1.691	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0075			1.000	dimensionless	☑
ep0394			1.000	dimensionless	☑
ep0260			-1.000	dimensionless	☑
ep0434			-1.000	dimensionless	☑

7.206 Reaction r_0893

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

Name phosphoglycerate mutase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0260} \xrightleftharpoons{\text{e\_0582, s\_0260, s\_0188}} \text{s\_0188} \tag{412}$$
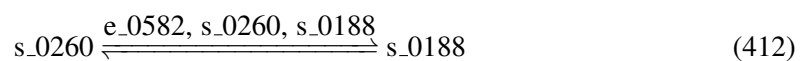
Reactant

Table 826: Properties of each reactant.

Id	Name	SBO
s_0260	3-phosphoglycerate	

Modifiers

Table 827: Properties of each modifier.

Id	Name	SBO
e_0582	GPM1	0000460

Id	Name	SBO
s_0260	3-phosphoglycerate	
s_0188	2-phospho-D-glyceric acid	

Product

Table 828: Properties of each product.

Id	Name	SBO
s_0188	2-phospho-D-glyceric acid	

Kinetic Law

Derived unit contains undeclared units

$$v_{206} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0260} \cdot \left(\frac{[\text{s\_0260}]}{\text{ic0260}} \right) + \text{ep0188} \cdot \left(\frac{[\text{s\_0188}]}{\text{ic0188}} \right) \right) \quad (413)$$

Table 829: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.231	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.231	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0260			1.000	dimensionless	☑
ep0188			-1.000	dimensionless	☑

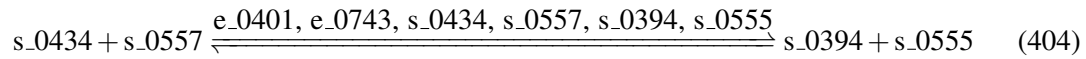## 7.207 Reaction r_0900

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

Name phospholipid methyltransferase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_1342} + \text{s\_1416} \xrightleftharpoons{\text{e\_0536, s\_1342, s\_1416, s\_1346, s\_1413}} \text{s\_1346} + \text{s\_1413} \quad (414)$$
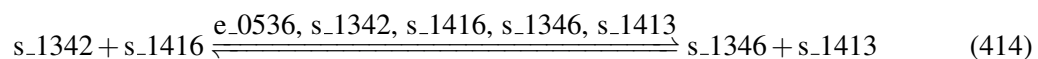
Reactants

Table 830: Properties of each reactant.

Id	Name	SBO
s_1342	phosphatidyl-N,N-dimethylethanolamine	
s_1416	S-adenosyl-L-methionine	

Modifiers

Table 831: 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 832: Properties of each product.

Id	Name	SBO
s_1346	phosphatidylcholine	
s_1413	S-adenosyl-L-homocysteine	

Kinetic Law

Derived unit contains undeclared units

$$v_{207} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep1342} \cdot \left(\frac{[\text{s\_1342}]}{\text{ic1342}} \right) + \text{ep1416} \cdot \left(\frac{[\text{s\_1416}]}{\text{ic1416}} \right) + \text{ep1346} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_1346}]}{\text{ic1346}} \right) + \text{ep1413} \cdot \left(\frac{[\text{s\_1413}]}{\text{ic1413}} \right) \right) \tag{415}$$

Table 833: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.09303224869629 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$1.09303224869629 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep1342			1.000	dimensionless	☑

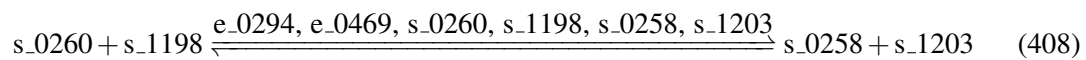| Id	Name	SBO	Value	Unit	Constant
ep1416			1.000	dimensionless	☑
ep1346			-1.000	dimensionless	☑
ep1413			-1.000	dimensionless	☑

7.208 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

$$\text{s\_1343} + \text{s\_1416} \underset{}{\overset{\text{e\_0536, s\_1343, s\_1416, s\_1342, s\_1413}}{\rightleftharpoons}} \text{s\_1342} + \text{s\_1413} \tag{416}$$
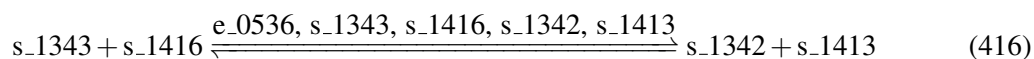
Reactants

Table 834: Properties of each reactant.

Id	Name	SBO
s_1343	phosphatidyl-N-methylethanolamine	
s_1416	S-adenosyl-L-methionine	

Modifiers

Table 835: Properties of each modifier.

Id	Name	SBO
e_0536	OPI3	0000460
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 836: 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

$$v_{208} = \text{vol} \left(\text{cell} \right) \cdot \text{v0} \cdot \left(1 + \text{ep1343} \cdot \left(\frac{[\text{s\_1343}]}{\text{ic1343}} \right) + \text{ep1416} \cdot \left(\frac{[\text{s\_1416}]}{\text{ic1416}} \right) + \text{ep1342} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_1342}]}{\text{ic1342}} \right) + \text{ep1413} \cdot \left(\frac{[\text{s\_1413}]}{\text{ic1413}} \right) \right)$$

(417)

Table 837: Properties of each parameter.

| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.09303224869629 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$1.09303224869629 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep1343			1.000	dimensionless	☑
ep1416			1.000	dimensionless	☑
ep1342			-1.000	dimensionless	☑
ep1413			-1.000	dimensionless	☑

7.209 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

$$\text{s\_0574} \xrightleftharpoons{\text{e\_0314, s\_0574, s\_0573}} \text{s\_0573}$$

(418)
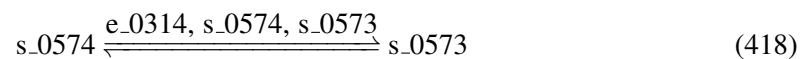
Reactant

Table 838: Properties of each reactant.

Id	Name	SBO
s_0574	D-mannose 6-phosphate	

Modifiers

Table 839: 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 840: Properties of each product.

Id	Name	SBO
s_0573	D-mannose 1-phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{209} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0574} \cdot \left(\frac{[\text{s\_0574}]}{\text{ic0574}} \right) + \text{ep0573} \cdot \left(\frac{[\text{s\_0573}]}{\text{ic0573}} \right) \right) \qquad (419)$$

Table 841: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.031	mmol$\cdot$l$^{-1}\cdot$s^{-1}	✓
v0			0.031	mmol$\cdot$l$^{-1}\cdot$s^{-1}	✓
ep0574			1.000	dimensionless	✓
ep0573			-1.000	dimensionless	✓

7.210 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

$$s\_0019 + s\_0434 \xrightleftharpoons{\text{e\_0747, s\_0019, s\_0434, s\_0018, s\_0394}} s\_0018 + s\_0394 \tag{420}$$
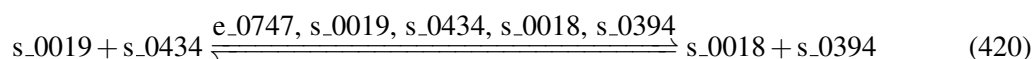
Reactants

Table 842: Properties of each reactant.

Id	Name	SBO
s_0019	(R)-5-phosphomevalonic acid	
s_0434	ATP	

Modifiers

Table 843: Properties of each modifier.

Id	Name	SBO
e_0747	ERG8	0000460
s_0019	(R)-5-phosphomevalonic acid	
s_0434	ATP	
s_0018	(R)-5-diphosphomevalonic acid	
s_0394	ADP	

Products

Table 844: Properties of each product.

Id	Name	SBO
s_0018	(R)-5-diphosphomevalonic acid	
s_0394	ADP	

Kinetic Law

Derived unit contains undeclared units

$$v_{210} = \text{vol}(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0019} \cdot \left(\frac{[\text{s\_0019}]}{\text{ic0019}} \right) + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}} \right) + \text{ep0018} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0018}]}{\text{ic0018}} \right) + \text{ep0394} \cdot \left(\frac{[\text{s\_0394}]}{\text{ic0394}} \right) \right) \tag{421}$$

Table 845: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.002	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.002	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0019			1.000	dimensionless	☑
ep0434			1.000	dimensionless	☑
ep0018			-1.000	dimensionless	☑
ep0394			-1.000	dimensionless	☑

7.211 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

$$\text{s\_0434} + \text{s\_0973} + \text{s\_1364} \xrightleftharpoons{\text{e\_0017, s\_0434, s\_0973, s\_1364, s\_0299, s\_0394, s\_1322}} \text{s\_0299} + \text{s\_0394} + \text{s\_1322} \tag{422}$$
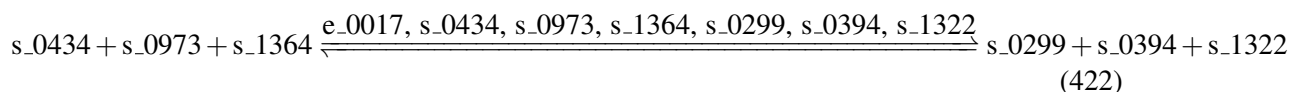
Reactants

Table 846: Properties of each reactant.

Id	Name	SBO
s_0434	ATP	
s_0973	L-aspartate	
s_1364	phosphoribosyl-carboxy-aminoimidazole	

Modifiers

Table 847: Properties of each modifier.

Id	Name	SBO
e_0017	ADE1	0000460
s_0434	ATP	
s_0973	L-aspartate	
s_1364	phosphoribosyl-carboxy-aminoimidazole	
s_0299	5'-phosphoribosyl-4-(N-succinocarboxamide)-5-aminoimidazole	
s_0394	ADP	
s_1322	phosphate	

Products

Table 848: Properties of each product.

Id	Name	SBO
s_0299	5'-phosphoribosyl-4-(N-succinocarboxamide)-5-aminoimidazole	
s_0394	ADP	
s_1322	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$
\begin{aligned}
v_{211} = \mathrm{vol}\,(\mathrm{cell}) \cdot \mathrm{v0} \cdot \Bigg(& 1 + \mathrm{ep0434} \cdot \left(\frac{[\mathrm{s\_0434}]}{\mathrm{ic0434}} \right) + \mathrm{ep0973} \cdot \left(\frac{[\mathrm{s\_0973}]}{\mathrm{ic0973}} \right) + \mathrm{ep1364} \cdot \left(\frac{[\mathrm{s\_1364}]}{\mathrm{ic1364}} \right) \\
& + \mathrm{ep0299} \cdot \left(\frac{[\mathrm{s\_0299}]}{\mathrm{ic0299}} \right) + \mathrm{ep0394} \cdot \left(\frac{[\mathrm{s\_0394}]}{\mathrm{ic0394}} \right) + \mathrm{ep1322} \cdot \left(\frac{[\mathrm{s\_1322}]}{\mathrm{ic1322}} \right) \Bigg)
\end{aligned}
\tag{423}
$$

Table 849: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.004	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
v0			0.004	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
ep0434			1.000	dimensionless	☑
ep0973			1.000	dimensionless	☑
ep1364			1.000	dimensionless	☑
ep0299			-1.000	dimensionless	☑
ep0394			-1.000	dimensionless	☑
ep1322			-1.000	dimensionless	☑

7.212 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

$$\text{s\_0078} \xrightleftharpoons{\text{e\_0103, s\_0078, s\_0077}} \text{s\_0077} \tag{424}$$
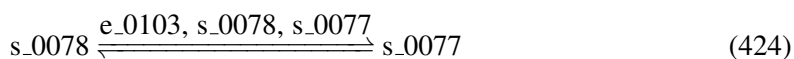
Reactant

Table 850: Properties of each reactant.

Id	Name	SBO
s_0078	1-(5-phosphoribosyl)-5'-AMP	

Modifiers

Table 851: 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 852: 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

$$v_{212} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0078} \cdot \left(\frac{[\text{s\_0078}]}{\text{ic0078}} \right) + \text{ep0077} \cdot \left(\frac{[\text{s\_0077}]}{\text{ic0077}} \right) \right) \tag{425}$$

Table 853: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.003	$\mathrm{mmol}\cdot\mathrm{l}^{-1}\cdot\mathrm{s}^{-1}$	☑
v0			0.003	$\mathrm{mmol}\cdot\mathrm{l}^{-1}\cdot\mathrm{s}^{-1}$	☑
ep0078			1.000	dimensionless	☑
ep0077			-1.000	dimensionless	☑

## 7.213 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

$$\text{s\_0326} \xrightleftharpoons{\text{e\_0103, s\_0326, s\_0078, s\_0633}} \text{s\_0078} + \text{s\_0633} \tag{426}$$
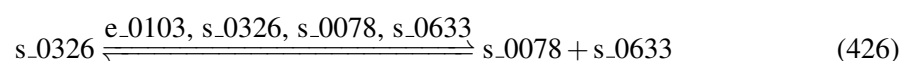
Reactant

Table 854: Properties of each reactant.

Id	Name	SBO
s_0326	5-phosphoribosyl-ATP	

Modifiers

Table 855: 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 856: Properties of each product.

Id	Name	SBO
s_0078	1-(5-phosphoribosyl)-5'-AMP	
s_0633	diphosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{213} = \text{vol}\,(\text{cell}) \cdot \text{v0}$$
$$\cdot \left(1 + \text{ep0326} \cdot \left(\frac{[\text{s\_0326}]}{\text{ic0326}}\right) + \text{ep0078} \cdot \left(\frac{[\text{s\_0078}]}{\text{ic0078}}\right) + \text{ep0633} \cdot \left(\frac{[\text{s\_0633}]}{\text{ic0633}}\right)\right) \quad (427)$$

Table 857: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.003	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.003	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0326			1.000	dimensionless	☑
ep0078			-1.000	dimensionless	☑
ep0633			-1.000	dimensionless	☑

7.214 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

$$\text{s\_0300} + \text{s\_0456} + \text{s\_0434} \xrightleftharpoons{\text{e\_0860, s\_0300, s\_0456, s\_0434, s\_1364, s\_0394, s\_1322}} \text{s\_1364} + \text{s\_0394} + \text{s\_1322}$$
$$(428)$$

Reactants

Table 858: Properties of each reactant.

Id	Name	SBO
s_0300	5'-phosphoribosyl-5-aminoimidazole	
s_0456	carbon dioxide	
s_0434	ATP	

Modifiers

Table 859: Properties of each modifier.

Id	Name	SBO
e_0860	ADE2	0000460
s_0300	5'-phosphoribosyl-5-aminoimidazole	
s_0456	carbon dioxide	
s_0434	ATP	
s_1364	phosphoribosyl-carboxy-aminoimidazole	
s_0394	ADP	
s_1322	phosphate	

Products

Table 860: Properties of each product.

Id	Name	SBO
s_1364	phosphoribosyl-carboxy-aminoimidazole	
s_0394	ADP	
s_1322	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$
v_{214} = \mathrm{vol}\,(\mathrm{cell}) \cdot \mathrm{v0} \cdot \left(1 + \mathrm{ep0300} \cdot \left(\frac{[\mathrm{s\_0300}]}{\mathrm{ic0300}} \right) + \mathrm{ep0456} \cdot \left(\frac{[\mathrm{s\_0456}]}{\mathrm{ic0456}} \right) + \mathrm{ep0434} \cdot \left(\frac{[\mathrm{s\_0434}]}{\mathrm{ic0434}} \right) \right.
$$
$$
\left. + \mathrm{ep1364} \cdot \left(\frac{[\mathrm{s\_1364}]}{\mathrm{ic1364}} \right) + \mathrm{ep0394} \cdot \left(\frac{[\mathrm{s\_0394}]}{\mathrm{ic0394}} \right) + \mathrm{ep1322} \cdot \left(\frac{[\mathrm{s\_1322}]}{\mathrm{ic1322}} \right) \right)
$$

$$(429)$$

Table 861: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.004	mmol·l^{-1}·s^{-1}	☑
v0			0.004	mmol·l^{-1}·s^{-1}	☑
ep0300			1.000	dimensionless	☑
ep0456			1.000	dimensionless	☑
ep0434			1.000	dimensionless	☑
ep1364			-1.000	dimensionless	☑
ep0394			-1.000	dimensionless	☑
ep1322			-1.000	dimensionless	☑

7.215 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

$$\text{s\_0120} + \text{s\_0403} \xrightleftharpoons{\text{e\_0631, e\_0736, s\_0120, s\_0403, s\_1365, s\_1487}} \text{s\_1365} + \text{s\_1487} \qquad (430)$$
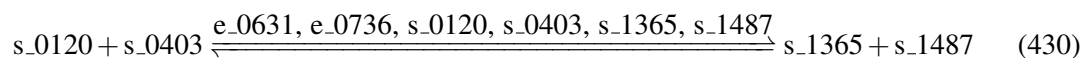
Reactants

Table 862: Properties of each reactant.

Id	Name	SBO
s_0120	10-formyl-THF	
s_0403	AICAR	

Modifiers

Table 863: 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	

Id	Name	SBO
s_1487	THF	

Products

Table 864: Properties of each product.

Id	Name	SBO
s_1365	phosphoribosyl-formamido-carboxamide	
s_1487	THF	

Kinetic Law

Derived unit contains undeclared units

$$v_{215} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0120} \cdot \left(\frac{[\text{s\_0120}]}{\text{ic0120}} \right) + \text{ep0403} \cdot \left(\frac{[\text{s\_0403}]}{\text{ic0403}} \right) + \text{ep1365} \right. $$
$$\left. \cdot \left(\frac{[\text{s\_1365}]}{\text{ic1365}} \right) + \text{ep1487} \cdot \left(\frac{[\text{s\_1487}]}{\text{ic1487}} \right) \right) \tag{431}$$

Table 865: Properties of each parameter.

| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.006	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
v0			0.006	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
ep0120			1.000	dimensionless	☑
ep0403			1.000	dimensionless	☑
ep1365			-1.000	dimensionless	☑
ep1487			-1.000	dimensionless	☑

7.216 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

$$\text{s\_1187} \xrightleftharpoons{\text{e\_0165, s\_1187, s\_0076}} \text{s\_0076} \tag{432}$$
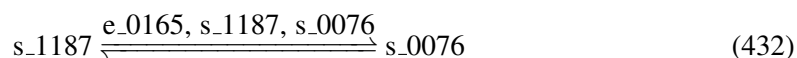
Reactant

Table 866: Properties of each reactant.

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

Modifiers

Table 867: 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 868: 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

$$v_{216} = \text{vol}\left(\text{cell}\right) \cdot \text{v0} \cdot \left(1 + \text{ep1187} \cdot \left(\frac{[\text{s\_1187}]}{\text{ic1187}}\right) + \text{ep0076} \cdot \left(\frac{[\text{s\_0076}]}{\text{ic0076}}\right)\right) \quad (433)$$

Table 869: Properties of each parameter.

| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.001	mmol·l^{-1}·s^{-1}	✓
v0			0.001	mmol·l^{-1}·s^{-1}	✓
ep1187			1.000	dimensionless	✓
ep0076			−1.000	dimensionless	✓

7.217 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

$$s\_0327 + s\_0434 + s\_1003 \xrightleftharpoons{e\_0352, s\_0327, s\_0434, s\_1003, s\_0325, s\_0394, s\_1322} s\_0325 + s\_0394 + s\_1322 \tag{434}$$

Reactants

Table 870: Properties of each reactant.

Id	Name	SBO
s_0327	5-phosphoribosylamine	
s_0434	ATP	
s_1003	L-glycine	

Modifiers

Table 871: Properties of each modifier.

Id	Name	SBO
e_0352	ADE5,7	0000460
s_0327	5-phosphoribosylamine	
s_0434	ATP	
s_1003	L-glycine	
s_0325	5-phospho-ribosyl-glycineamide	
s_0394	ADP	
s_1322	phosphate	

Products

Table 872: Properties of each product.

Id	Name	SBO
s_0325	5-phospho-ribosyl-glycineamide	

Id	Name	SBO
s_0394	ADP	
s_1322	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$
v_{217} = \text{vol}\,(\text{cell}) \cdot v0 \cdot \left(1 + \text{ep0327} \cdot \left(\frac{[\text{s\_0327}]}{\text{ic0327}} \right) + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}} \right) + \text{ep1003} \cdot \left(\frac{[\text{s\_1003}]}{\text{ic1003}} \right) \right.
$$
$$
\left. + \text{ep0325} \cdot \left(\frac{[\text{s\_0325}]}{\text{ic0325}} \right) + \text{ep0394} \cdot \left(\frac{[\text{s\_0394}]}{\text{ic0394}} \right) + \text{ep1322} \cdot \left(\frac{[\text{s\_1322}]}{\text{ic1322}} \right) \right)
$$
(435)

Table 873: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.004	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.004	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0327			1.000	dimensionless	☑
ep0434			1.000	dimensionless	☑
ep1003			1.000	dimensionless	☑
ep0325			-1.000	dimensionless	☑
ep0394			-1.000	dimensionless	☑
ep1322			-1.000	dimensionless	☑

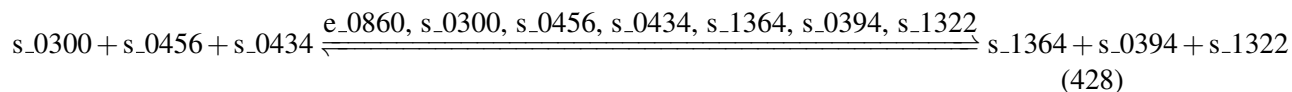## 7.218 Reaction r_0915

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

Name phosphoribosylpyrophosphate amidotransferase

SBO:0000176 biochemical reaction

Reaction equation

$$
\text{s\_0999} + \text{s\_1386} \xrightleftharpoons{\text{e\_0763, s\_0999, s\_1386, s\_0327, s\_0633, s\_0991}} \text{s\_0327} + \text{s\_0633} + \text{s\_0991}
$$
(436)
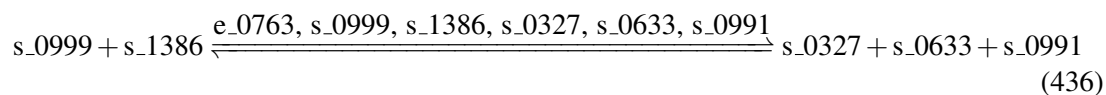
Reactants

Table 874: Properties of each reactant.

Id	Name	SBO
s_0999	L-glutamine	
s_1386	PRPP	

Modifiers

Table 875: 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 876: 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

$$
\begin{aligned}
v_{218} = \mathrm{vol\,(cell)} \cdot \mathrm{v0} \cdot \Bigg(& 1 + \mathrm{ep0999} \cdot \left(\frac{[\mathrm{s\_0999}]}{\mathrm{ic0999}} \right) + \mathrm{ep1386} \cdot \left(\frac{[\mathrm{s\_1386}]}{\mathrm{ic1386}} \right) + \mathrm{ep0327} \\
& \cdot \left(\frac{[\mathrm{s\_0327}]}{\mathrm{ic0327}} \right) + \mathrm{ep0633} \cdot \left(\frac{[\mathrm{s\_0633}]}{\mathrm{ic0633}} \right) + \mathrm{ep0991} \cdot \left(\frac{[\mathrm{s\_0991}]}{\mathrm{ic0991}} \right) \Bigg)
\end{aligned}
\tag{437}
$$

Table 877: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.004	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑

Id	Name	SBO	Value	Unit	Constant
v0			0.004	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
ep0999			1.000	dimensionless	☑
ep1386			1.000	dimensionless	☑
ep0327			-1.000	dimensionless	☑
ep0633			-1.000	dimensionless	☑
ep0991			-1.000	dimensionless	☑

7.219 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

$$\mathrm{s\_0434 + s\_1408} \xrightleftharpoons{\mathrm{e\_0030,\ e\_0299,\ e\_0418,\ e\_0585,\ e\_0829,\ s\_0434,\ s\_1408,\ s\_0423,\ s\_1386}} \mathrm{s\_0423 + s\_1386}$$

(438)

Reactants

Table 878: Properties of each reactant.

Id	Name	SBO
s_0434	ATP	
s_1408	ribose-5-phosphate	

Modifiers

Table 879: 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
s_0434	ATP	
s_1408	ribose-5-phosphate	
s_0423	AMP	

Id	Name	SBO
s_1386	PRPP	

Products

Table 880: Properties of each product.

Id	Name	SBO
s_0423	AMP	
s_1386	PRPP	

Kinetic Law

Derived unit contains undeclared units

$$
v_{219} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}} \right) + \text{ep1408} \cdot \left(\frac{[\text{s\_1408}]}{\text{ic1408}} \right) + \text{ep0423} \right.
$$
$$
\left. \cdot \left(\frac{[\text{s\_0423}]}{\text{ic0423}} \right) + \text{ep1386} \cdot \left(\frac{[\text{s\_1386}]}{\text{ic1386}} \right) \right)
\tag{439}
$$

Table 881: Properties of each parameter.

| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.012	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
v0			0.012	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
ep0434			1.000	dimensionless	☑
ep1408			1.000	dimensionless	☑
ep0423			-1.000	dimensionless	☑
ep1386			-1.000	dimensionless	☑

7.220 Reaction r_0917

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

Name phosphoserine phosphatase (L-serine)

SBO:0000176 biochemical reaction

Reaction equation

$$
\text{s\_0259} \xrightleftharpoons{\text{e\_0397, s\_0259, s\_1039, s\_1322}} \text{s\_1039} + \text{s\_1322}
\tag{440}
$$
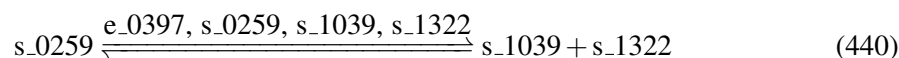
Reactant

Table 882: Properties of each reactant.

Id	Name	SBO
s_0259	3-phospho-serine	

Modifiers

Table 883: Properties of each modifier.

Id	Name	SBO
e_0397	SER2	0000460
s_0259	3-phospho-serine	
s_1039	L-serine	
s_1322	phosphate	

Products

Table 884: Properties of each product.

Id	Name	SBO
s_1039	L-serine	
s_1322	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$
\begin{aligned}
v_{220} = {} & \mathrm{vol}\,(\mathrm{cell}) \cdot \mathrm{v0} \\
& \cdot \left(1 + \mathrm{ep0259} \cdot \left(\frac{[\mathrm{s\_0259}]}{\mathrm{ic0259}}\right) + \mathrm{ep1039} \cdot \left(\frac{[\mathrm{s\_1039}]}{\mathrm{ic1039}}\right) + \mathrm{ep1322} \cdot \left(\frac{[\mathrm{s\_1322}]}{\mathrm{ic1322}}\right)\right)
\end{aligned}
\tag{441}
$$

Table 885: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			1.460	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
v0			1.460	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
ep0259			1.000	dimensionless	☑
ep1039			-1.000	dimensionless	☑

Id	Name	SBO	Value	Unit	Constant
ep1322			−1.000	dimensionless	☑

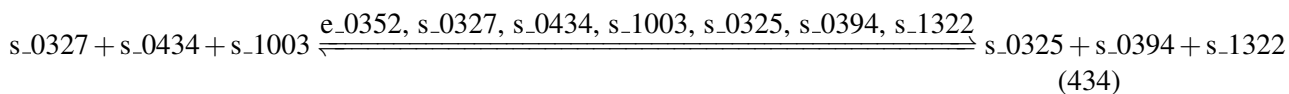## 7.221 Reaction r_0918

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

Name phosphoserine transaminase

SBO:0000176 biochemical reaction

Reaction equation

$$s\_0258 + s\_0991 \xrightleftharpoons{e\_0872,\ s\_0258,\ s\_0991,\ s\_0180,\ s\_0259} s\_0180 + s\_0259 \tag{442}$$
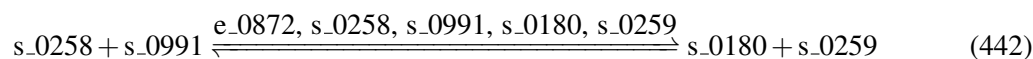
Reactants

Table 886: Properties of each reactant.

Id	Name	SBO
s_0258	3-phospho-hydroxypyruvate	
s_0991	L-glutamate	

Modifiers

Table 887: Properties of each modifier.

Id	Name	SBO
e_0872	SER1	0000460
s_0258	3-phospho-hydroxypyruvate	
s_0991	L-glutamate	
s_0180	2-oxoglutarate	
s_0259	3-phospho-serine	

Products

Table 888: Properties of each product.

Id	Name	SBO
s_0180	2-oxoglutarate	
s_0259	3-phospho-serine	

Kinetic Law

Derived unit contains undeclared units

$$v_{221} = \mathrm{vol}\,(\mathrm{cell}) \cdot \mathrm{v0} \cdot \left(1 + \mathrm{ep0258} \cdot \left(\frac{[\mathrm{s\_0258}]}{\mathrm{ic0258}} \right) + \mathrm{ep0991} \cdot \left(\frac{[\mathrm{s\_0991}]}{\mathrm{ic0991}} \right) + \mathrm{ep0180} \right.$$
$$\left. \cdot \left(\frac{[\mathrm{s\_0180}]}{\mathrm{ic0180}} \right) + \mathrm{ep0259} \cdot \left(\frac{[\mathrm{s\_0259}]}{\mathrm{ic0259}} \right) \right) \qquad (443)$$

Table 889: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			1.460	mmol·l^{-1}·s^{-1}	☑
v0			1.460	mmol·l^{-1}·s^{-1}	☑
ep0258			1.000	dimensionless	☑
ep0991			1.000	dimensionless	☑
ep0180			−1.000	dimensionless	☑
ep0259			−1.000	dimensionless	☑

7.222 Reaction r_0919

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

Name phytoceramidase

SBO:0000176 biochemical reaction

Reaction equation

$$\mathrm{s\_1084} + \mathrm{s\_1366} \xrightleftharpoons{\mathrm{e\_0077,\ s\_1084,\ s\_1366,\ s\_0481}} \mathrm{s\_0481} \qquad (444)$$
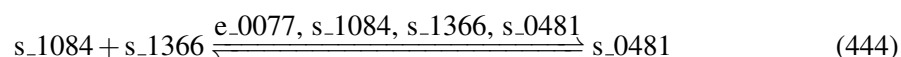
Reactants

Table 890: Properties of each reactant.

Id	Name	SBO
s_1084	lignoceric acid	
s_1366	phytosphingosine	

Modifiers

Table 891: Properties of each modifier.

Id	Name	SBO
e_0077	YPC1	0000460
s_1084	lignoceric acid	
s_1366	phytosphingosine	
s_0481	ceramide-2 (C24)	

Product

Table 892: Properties of each product.

Id	Name	SBO
s_0481	ceramide-2 (C24)	

Kinetic Law

Derived unit contains undeclared units

$$
v_{222} = \text{vol}\,(\text{cell}) \cdot \text{v0} \\
\cdot \left(1 + \text{ep1084} \cdot \left(\frac{[\text{s\_1084}]}{\text{ic1084}} \right) + \text{ep1366} \cdot \left(\frac{[\text{s\_1366}]}{\text{ic1366}} \right) + \text{ep0481} \cdot \left(\frac{[\text{s\_0481}]}{\text{ic0481}} \right) \right) \quad (445)
$$

Table 893: Properties of each parameter.

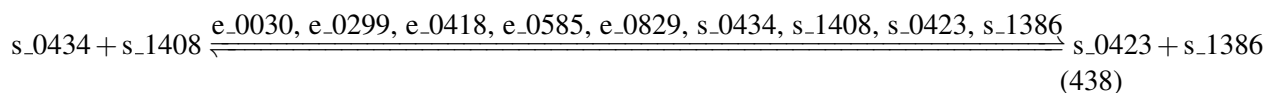| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.02210851263136 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$1.02210851263136 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep1084			1.000	dimensionless	☑
ep1366			1.000	dimensionless	☑
ep0481			-1.000	dimensionless	☑

7.223 Reaction r_0922

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

Name phytosphingosine synthesis

SBO:0000176 biochemical reaction

Reaction equation

$$s\_1212 + s\_1275 + s\_1445 \xrightleftharpoons{\text{e\_0206, s\_1212, s\_1275, s\_1445, s\_1207, s\_1366}} s\_1207 + s\_1366$$

$$(446)$$

Reactants

Table 894: Properties of each reactant.

Id	Name	SBO
s_1212	NADPH	
s_1275	oxygen	
s_1445	sphinganine	

Modifiers

Table 895: Properties of each modifier.

Id	Name	SBO
e_0206	SUR2	0000460
s_1212	NADPH	
s_1275	oxygen	
s_1445	sphinganine	
s_1207	NADP(+)	
s_1366	phytosphingosine	

Products

Table 896: Properties of each product.

Id	Name	SBO
s_1207	NADP(+)	
s_1366	phytosphingosine	

Kinetic Law

Derived unit contains undeclared units

$$v_{223} = \text{vol} (\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep1212} \cdot \left(\frac{[\text{s\_1212}]}{\text{ic1212}} \right) + \text{ep1275} \cdot \left(\frac{[\text{s\_1275}]}{\text{ic1275}} \right) + \text{ep1445} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_1445}]}{\text{ic1445}} \right) + \text{ep1207} \cdot \left(\frac{[\text{s\_1207}]}{\text{ic1207}} \right) + \text{ep1366} \cdot \left(\frac{[\text{s\_1366}]}{\text{ic1366}} \right) \right) \tag{447}$$

Table 897: Properties of each parameter.

| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.02210838883012 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$1.02210838883012 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep1212			1.000	dimensionless	☑
ep1275			1.000	dimensionless	☑
ep1445			1.000	dimensionless	☑
ep1207			-1.000	dimensionless	☑
ep1366			-1.000	dimensionless	☑

7.224 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

$$\text{s\_1377} \xrightleftharpoons{\text{e\_0802, s\_1377, s\_0456, s\_0951}} \text{s\_0456} + \text{s\_0951} \tag{448}$$
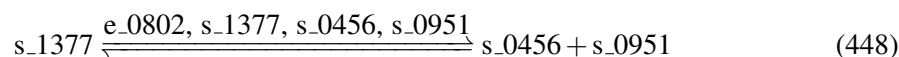
Reactant

Table 898: Properties of each reactant.

Id	Name	SBO
s_1377	prephenate	

Modifiers

Table 899: Properties of each modifier.

Id	Name	SBO
e_0802	PHA2	0000460
s_1377	prephenate	
s_0456	carbon dioxide	
s_0951	keto-phenylpyruvate	

Products

Table 900: Properties of each product.

Id	Name	SBO
s_0456	carbon dioxide	
s_0951	keto-phenylpyruvate	

Kinetic Law

Derived unit contains undeclared units

$$v_{224} = \text{vol}\,(\text{cell}) \cdot \text{v0}$$
$$\cdot \left(1 + \text{ep1377} \cdot \left(\frac{[\text{s\_1377}]}{\text{ic1377}} \right) + \text{ep0456} \cdot \left(\frac{[\text{s\_0456}]}{\text{ic0456}} \right) + \text{ep0951} \cdot \left(\frac{[\text{s\_0951}]}{\text{ic0951}} \right) \right) \quad (449)$$

Table 901: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.005	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.005	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep1377			1.000	dimensionless	☑
ep0456			-1.000	dimensionless	☑
ep0951			-1.000	dimensionless	☑

## 7.225 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

$$s\_1207 + s\_1377 \xrightleftharpoons{\text{e\_0074, s\_1207, s\_1377, s\_0204, s\_0456, s\_1212}} s\_0204 + s\_0456 + s\_1212 \tag{450}$$

Reactants

Table 902: Properties of each reactant.

Id	Name	SBO
s_1207	NADP(+)	
s_1377	prephenate	

Modifiers

Table 903: Properties of each modifier.

Id	Name	SBO
e_0074	TYR1	0000460
s_1207	NADP(+)	
s_1377	prephenate	
s_0204	3-(4-hydroxyphenyl)pyruvate	
s_0456	carbon dioxide	
s_1212	NADPH	

Products

Table 904: Properties of each product.

Id	Name	SBO
s_0204	3-(4-hydroxyphenyl)pyruvate	
s_0456	carbon dioxide	
s_1212	NADPH	

Kinetic Law

Derived unit contains undeclared units

$$v_{225} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep1207} \cdot \left(\frac{[\text{s\_1207}]}{\text{ic1207}} \right) + \text{ep1377} \cdot \left(\frac{[\text{s\_1377}]}{\text{ic1377}} \right) + \text{ep0204} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0204}]}{\text{ic0204}} \right) + \text{ep0456} \cdot \left(\frac{[\text{s\_0456}]}{\text{ic0456}} \right) + \text{ep1212} \cdot \left(\frac{[\text{s\_1212}]}{\text{ic1212}} \right) \right)$$

(451)

Table 905: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.004	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
v0			0.004	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
ep1207			1.000	dimensionless	☑
ep1377			1.000	dimensionless	☑
ep0204			-1.000	dimensionless	☑
ep0456			-1.000	dimensionless	☑
ep1212			-1.000	dimensionless	☑

7.226 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

$$\text{s\_0434} + \text{s\_1035} + \text{s\_1606} \xrightleftharpoons{\text{e\_0296, s\_0434, s\_1035, s\_1606, s\_0423, s\_0633, s\_1379}} \text{s\_0423} + \text{s\_0633} + \text{s\_1379}$$

(452)

Reactants

Table 906: Properties of each reactant.

Id	Name	SBO
s_0434	ATP	
s_1035	L-proline	
s_1606	tRNA(Pro)	

Modifiers

Table 907: Properties of each modifier.

Id	Name	SBO
e_0296	AIM10	0000460
s_0434	ATP	
s_1035	L-proline	
s_1606	tRNA(Pro)	
s_0423	AMP	
s_0633	diphosphate	
s_1379	Pro-tRNA(Pro)	

Products

Table 908: Properties of each product.

Id	Name	SBO
s_0423	AMP	
s_0633	diphosphate	
s_1379	Pro-tRNA(Pro)	

Kinetic Law

Derived unit contains undeclared units

$$v_{226} = \mathrm{vol}\,(\mathrm{cell}) \cdot \mathrm{v0} \cdot \left(1 + \mathrm{ep0434} \cdot \left(\frac{[\mathrm{s\_0434}]}{\mathrm{ic0434}}\right) + \mathrm{ep1035} \cdot \left(\frac{[\mathrm{s\_1035}]}{\mathrm{ic1035}}\right) + \mathrm{ep1606} \cdot \left(\frac{[\mathrm{s\_1606}]}{\mathrm{ic1606}}\right)\right.$$
$$\left. + \mathrm{ep0423} \cdot \left(\frac{[\mathrm{s\_0423}]}{\mathrm{ic0423}}\right) + \mathrm{ep0633} \cdot \left(\frac{[\mathrm{s\_0633}]}{\mathrm{ic0633}}\right) + \mathrm{ep1379} \cdot \left(\frac{[\mathrm{s\_1379}]}{\mathrm{ic1379}}\right)\right)$$

(453)

Table 909: Properties of each parameter.

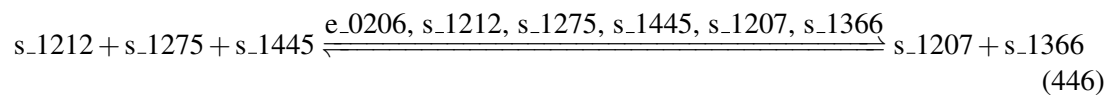| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.006	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
v0			0.006	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
ep0434			1.000	dimensionless	☑
ep1035			1.000	dimensionless	☑
ep1606			1.000	dimensionless	☑
ep0423			-1.000	dimensionless	☑
ep0633			-1.000	dimensionless	☑
ep1379			-1.000	dimensionless	☑

7.227 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

$$s\_0118 + s\_1212 \xrightleftharpoons{\text{e\_0276, s\_0118, s\_1212, s\_1035, s\_1207}} s\_1035 + s\_1207 \tag{454}$$
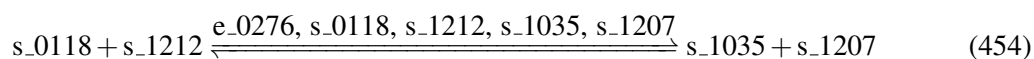
Reactants

Table 910: Properties of each reactant.

Id	Name	SBO
s_0118	1-pyrroline-5-carboxylate	
s_1212	NADPH	

Modifiers

Table 911: 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 912: Properties of each product.

Id	Name	SBO
s_1035	L-proline	
s_1207	NADP(+)	

Kinetic Law

Derived unit contains undeclared units

$$v_{227} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0118} \cdot \left(\frac{[\text{s\_0118}]}{\text{ic0118}}\right) + \text{ep1212} \cdot \left(\frac{[\text{s\_1212}]}{\text{ic1212}}\right) + \text{ep1035}\right.$$
$$\left. \cdot \left(\frac{[\text{s\_1035}]}{\text{ic1035}}\right) + \text{ep1207} \cdot \left(\frac{[\text{s\_1207}]}{\text{ic1207}}\right)\right) \tag{455}$$

Table 913: Properties of each parameter.

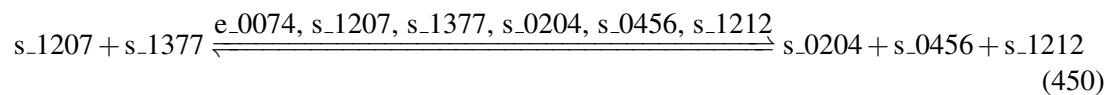| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.006	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.006	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0118			1.000	dimensionless	☑
ep1212			1.000	dimensionless	☑
ep1035			-1.000	dimensionless	☑
ep1207			-1.000	dimensionless	☑

7.228 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

$$\text{s\_0434} + \text{s\_0445} + \text{s\_1399} \xrightleftharpoons{\text{e\_0334, e\_0084, s\_0434, s\_0445, s\_1399, s\_0394, s\_1271, s\_1322}} \text{s\_0394} + \text{s\_1271} + \text{s\_132} \tag{456}$$
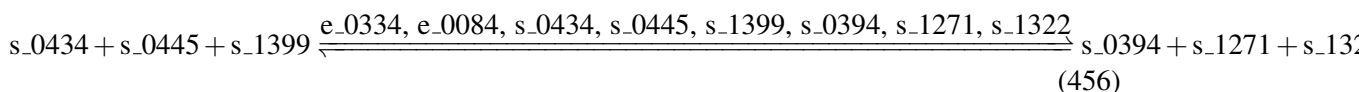
Reactants

Table 914: Properties of each reactant.

Id	Name	SBO
s_0434	ATP	
s_0445	bicarbonate	
s_1399	pyruvate	

Modifiers

Table 915: Properties of each modifier.

Id	Name	SBO
e_0334	PYC1	0000460
e_0084	PYC2	0000460
s_0434	ATP	
s_0445	bicarbonate	
s_1399	pyruvate	
s_0394	ADP	
s_1271	oxaloacetate	
s_1322	phosphate	

Products

Table 916: Properties of each product.

Id	Name	SBO
s_0394	ADP	
s_1271	oxaloacetate	
s_1322	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$
\begin{aligned}
v_{228} = \operatorname{vol}(\text{cell}) \cdot v0 \cdot \Bigg(& 1 + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}} \right) + \text{ep0445} \cdot \left(\frac{[\text{s\_0445}]}{\text{ic0445}} \right) + \text{ep1399} \cdot \left(\frac{[\text{s\_1399}]}{\text{ic1399}} \right) \\
& + \text{ep0394} \cdot \left(\frac{[\text{s\_0394}]}{\text{ic0394}} \right) + \text{ep1271} \cdot \left(\frac{[\text{s\_1271}]}{\text{ic1271}} \right) + \text{ep1322} \cdot \left(\frac{[\text{s\_1322}]}{\text{ic1322}} \right) \Bigg)
\end{aligned}
\tag{457}
$$

Table 917: Properties of each parameter.

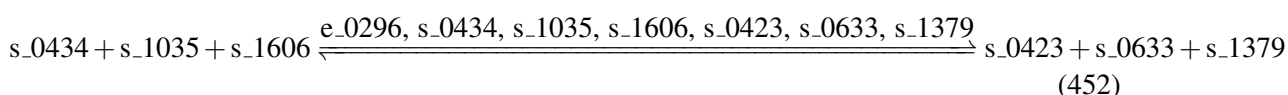| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.077	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.077	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0434			1.000	dimensionless	☑
ep0445			1.000	dimensionless	☑
ep1399			1.000	dimensionless	☑
ep0394			−1.000	dimensionless	☑
ep1271			−1.000	dimensionless	☑
ep1322			−1.000	dimensionless	☑

Produced by SBML2LATEX

7.229 Reaction `r_0961`

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

Name pyruvate dehydrogenase

SBO:0000176 biochemical reaction

Reaction equation

$$s\_0529 + s\_1198 + s\_1399 \xrightleftharpoons{\text{e\_0085, e\_0306, e\_0393, e\_0311, e\_0775, s\_0529, s\_1198, s\_1399, s\_0373, s\_0456, s\_1203}}$$

$$(458)$$

Reactants

Table 918: Properties of each reactant.

Id	Name	SBO
s_0529	coenzyme A	
s_1198	NAD	
s_1399	pyruvate	

Modifiers

Table 919: Properties of each modifier.

Id	Name	SBO
e_0085	PDB1	0000460
e_0306	PDA1	0000460
e_0393	PDX1	0000460
e_0311	LPD1	0000460
e_0775	LAT1	0000460
s_0529	coenzyme A	
s_1198	NAD	
s_1399	pyruvate	
s_0373	acetyl-CoA	
s_0456	carbon dioxide	
s_1203	NADH	

Products

Table 920: Properties of each product.

Id	Name	SBO
s_0373	acetyl-CoA	
s_0456	carbon dioxide	
s_1203	NADH	

Kinetic Law

Derived unit contains undeclared units

$$v_{229} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0529} \cdot \left(\frac{[\text{s\_0529}]}{\text{ic0529}} \right) + \text{ep1198} \cdot \left(\frac{[\text{s\_1198}]}{\text{ic1198}} \right) + \text{ep1399} \cdot \left(\frac{[\text{s\_1399}]}{\text{ic1399}} \right) \right.$$
$$\left. + \text{ep0373} \cdot \left(\frac{[\text{s\_0373}]}{\text{ic0373}} \right) + \text{ep0456} \cdot \left(\frac{[\text{s\_0456}]}{\text{ic0456}} \right) + \text{ep1203} \cdot \left(\frac{[\text{s\_1203}]}{\text{ic1203}} \right) \right) \tag{459}$$

Table 921: Properties of each parameter.

| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.066	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.066	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0529			1.000	dimensionless	☑
ep1198			1.000	dimensionless	☑
ep1399			1.000	dimensionless	☑
ep0373			−1.000	dimensionless	☑
ep0456			−1.000	dimensionless	☑
ep1203			−1.000	dimensionless	☑

7.230 Reaction r_0962

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

Name pyruvate kinase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0394} + \text{s\_1360} \underset{}{\overset{\text{e\_0011, e\_0895, s\_0394, s\_1360, s\_0434, s\_1399}}{\rightleftharpoons}} \text{s\_0434} + \text{s\_1399} \tag{460}$$

Produced by SBML2LATEX

Reactants

Table 922: Properties of each reactant.

Id	Name	SBO
s_0394	ADP	
s_1360	phosphoenolpyruvate	

Modifiers

Table 923: Properties of each modifier.

Id	Name	SBO
e_0011	CDC19	0000460
e_0895	PYK2	0000460
s_0394	ADP	
s_1360	phosphoenolpyruvate	
s_0434	ATP	
s_1399	pyruvate	

Products

Table 924: Properties of each product.

Id	Name	SBO
s_0434	ATP	
s_1399	pyruvate	

Kinetic Law

Derived unit contains undeclared units

$$v_{230} = \text{vol}(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0394} \cdot \left(\frac{[\text{s\_0394}]}{\text{ic0394}} \right) + \text{ep1360} \cdot \left(\frac{[\text{s\_1360}]}{\text{ic1360}} \right) + \text{ep0434} \right. $$
$$\left. \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}} \right) + \text{ep1399} \cdot \left(\frac{[\text{s\_1399}]}{\text{ic1399}} \right) \right) \tag{461}$$

Table 925: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.211	mmol·l^{-1}·s^{-1}	☑
v0			0.211	mmol·l^{-1}·s^{-1}	☑

Id	Name	SBO	Value	Unit	Constant
ep0394			1.000	dimensionless	☑
ep1360			1.000	dimensionless	☑
ep0434			−1.000	dimensionless	☑
ep1399			−1.000	dimensionless	☑

7.231 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

$$s\_0158 + s\_0314 \xrightleftharpoons{\quad e\_0841,\ s\_0158,\ s\_0314,\ s\_0328,\ s\_1322 \quad} s\_0328 + s\_1322 \qquad (462)$$
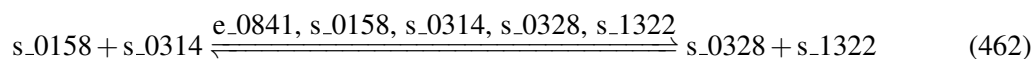
Reactants

Table 926: Properties of each reactant.

Id	Name	SBO
s_0158	2-hydroxy-3-oxobutyl phosphate	
s_0314	5-amino-6-(D-ribitylamino)uracil	

Modifiers

Table 927: 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	
s_1322	phosphate	

Products

Table 928: Properties of each product.

Id	Name	SBO
s_0328	6,7-dimethyl-8-(1-D-ribityl)lumazine	
s_1322	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{231} = \mathrm{vol}\,(\mathrm{cell}) \cdot \mathrm{v0} \cdot \left(1 + \mathrm{ep0158} \cdot \left(\frac{[\mathrm{s\_0158}]}{\mathrm{ic0158}} \right) + \mathrm{ep0314} \cdot \left(\frac{[\mathrm{s\_0314}]}{\mathrm{ic0314}} \right) + \mathrm{ep0328} \right.$$
$$\left. \cdot \left(\frac{[\mathrm{s\_0328}]}{\mathrm{ic0328}} \right) + \mathrm{ep1322} \cdot \left(\frac{[\mathrm{s\_1322}]}{\mathrm{ic1322}} \right) \right) \tag{463}$$

Table 929: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$7.51459670975844 \cdot 10^{-5}$	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
v0			$7.51459670975844 \cdot 10^{-5}$	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
ep0158			1.000	dimensionless	☑
ep0314			1.000	dimensionless	☑
ep0328			-1.000	dimensionless	☑
ep1322			-1.000	dimensionless	☑

7.232 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

$$2\,\mathrm{s\_0328} \xrightleftharpoons{\mathrm{e\_0090,\ s\_0328,\ s\_0314,\ s\_1405}} \mathrm{s\_0314} + \mathrm{s\_1405} \tag{464}$$
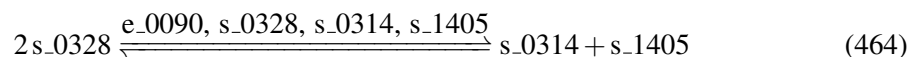
Reactant

Table 930: Properties of each reactant.

Id	Name	SBO
s_0328	6,7-dimethyl-8-(1-D-ribityl)lumazine	

Modifiers

Table 931: 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 932: 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

$$
\begin{aligned}
v_{232} = {} & \mathrm{vol}\,(\mathrm{cell}) \cdot \mathrm{v0} \\
& \cdot \left(1 + \mathrm{ep0328} \cdot \left(\frac{[\mathrm{s\_0328}]}{\mathrm{ic0328}}\right) + \mathrm{ep0314} \cdot \left(\frac{[\mathrm{s\_0314}]}{\mathrm{ic0314}}\right) + \mathrm{ep1405} \cdot \left(\frac{[\mathrm{s\_1405}]}{\mathrm{ic1405}}\right)\right)
\end{aligned}
\tag{465}
$$

Table 933: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$3.75729835487922 \cdot 10^{-5}$	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
v0			$3.75729835487922 \cdot 10^{-5}$	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
ep0328			2.000	dimensionless	☑
ep0314			-1.000	dimensionless	☑
ep1405			-1.000	dimensionless	☑

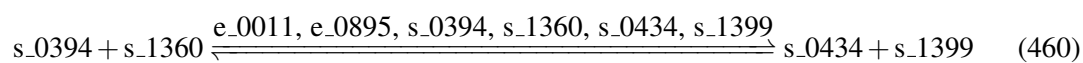## 7.233 Reaction r_0970

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

$$\text{s\_0434} + \text{s\_1616} \xrightleftharpoons{\text{e\_0398, s\_0434, s\_1616, s\_0586, s\_1620}} \text{s\_0586} + \text{s\_1620} \qquad (466)$$

Reactants

Table 934: Properties of each reactant.

Id	Name	SBO
s_0434	ATP	
s_1616	TRX1	

Modifiers

Table 935: Properties of each modifier.

Id	Name	SBO
e_0398	TRX2	0000460
s_0434	ATP	
s_1616	TRX1	
s_0586	dATP	
s_1620	TRX1 disulphide	

Products

Table 936: Properties of each product.

Id	Name	SBO
s_0586	dATP	
s_1620	TRX1 disulphide	

Kinetic Law

Derived unit contains undeclared units

$$v_{233} = \text{vol} \, (\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}} \right) + \text{ep1616} \cdot \left(\frac{[\text{s\_1616}]}{\text{ic1616}} \right) + \text{ep0586} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0586}]}{\text{ic0586}} \right) + \text{ep1620} \cdot \left(\frac{[\text{s\_1620}]}{\text{ic1620}} \right) \right) \tag{467}$$

Table 937: Properties of each parameter.

| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$6.43295039602845 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$6.43295039602845 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0434			1.000	dimensionless	☑
ep1616			1.000	dimensionless	☑
ep0586			-1.000	dimensionless	☑
ep1620			-1.000	dimensionless	☑

7.234 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

$$\text{s\_1559} + \text{s\_1616} \xrightleftharpoons{\text{e\_0398, s\_1559, s\_1616, s\_0656, s\_1620}} \text{s\_0656} + \text{s\_1620} \tag{468}$$

Reactants

Table 938: Properties of each reactant.

Id	Name	SBO
s_1559	UTP	
s_1616	TRX1	

Modifiers

Table 939: 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 940: Properties of each product.

Id	Name	SBO
s_0656	dUTP	
s_1620	TRX1 disulphide	

Kinetic Law

Derived unit contains undeclared units

$$
v_{234} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep1559} \cdot \left(\frac{[\text{s\_1559}]}{\text{ic1559}}\right) + \text{ep1616} \cdot \left(\frac{[\text{s\_1616}]}{\text{ic1616}}\right) + \text{ep0656} \right.
$$
$$
\left. \cdot \left(\frac{[\text{s\_0656}]}{\text{ic0656}}\right) + \text{ep1620} \cdot \left(\frac{[\text{s\_1620}]}{\text{ic1620}}\right)\right)
\tag{469}
$$

Table 941: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.33265490575614 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$1.33265490575614 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep1559			1.000	dimensionless	☑
ep1616			1.000	dimensionless	☑
ep0656			−1.000	dimensionless	☑
ep1620			−1.000	dimensionless	☑

7.235 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

$$s\_0394 + s\_1616 \xrightleftharpoons{\text{e\_0467, e\_0492, e\_0387, e\_0291, s\_0394, s\_1616, s\_0582, s\_1620}} s\_0582 + s\_1620$$

(470)
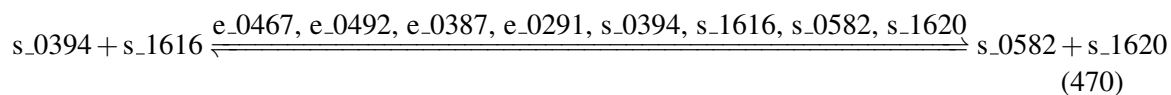
Reactants

Table 942: Properties of each reactant.

Id	Name	SBO
s_0394	ADP	
s_1616	TRX1	

Modifiers

Table 943: Properties of each modifier.

Id	Name	SBO
e_0467	RNR3	0000460
e_0492	RNR2	0000460
e_0387	RNR4	0000460
e_0291	RNR1	0000460
s_0394	ADP	
s_1616	TRX1	
s_0582	dADP	
s_1620	TRX1 disulphide	

Products

Table 944: Properties of each product.

Id	Name	SBO
s_0582	dADP	
s_1620	TRX1 disulphide	

Kinetic Law

Derived unit contains undeclared units

$$v_{235} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0394} \cdot \left(\frac{[\text{s\_0394}]}{\text{ic0394}} \right) + \text{ep1616} \cdot \left(\frac{[\text{s\_1616}]}{\text{ic1616}} \right) + \text{ep0582} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0582}]}{\text{ic0582}} \right) + \text{ep1620} \cdot \left(\frac{[\text{s\_1620}]}{\text{ic1620}} \right) \right) \tag{471}$$

Table 945: Properties of each parameter.

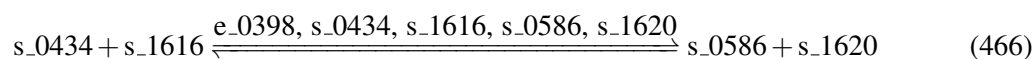| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$7.22995270761245 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$7.22995270761245 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0394			1.000	dimensionless	☑
ep1616			1.000	dimensionless	☑
ep0582			-1.000	dimensionless	☑
ep1620			-1.000	dimensionless	☑

7.236 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

$$\text{s\_0467} + \text{s\_1616} \xrightleftharpoons{\text{e\_0467, e\_0492, e\_0387, e\_0291, s\_0467, s\_1616, s\_0587, s\_1620}} \text{s\_0587} + \text{s\_1620} \tag{472}$$
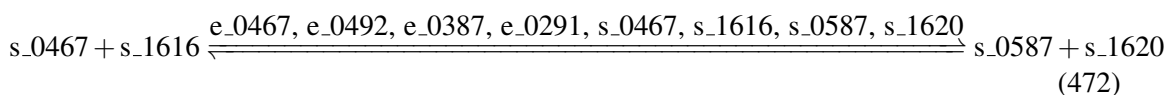
Reactants

Table 946: Properties of each reactant.

Id	Name	SBO
s_0467	CDP	
s_1616	TRX1	

Modifiers

Table 947: 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 948: Properties of each product.

Id	Name	SBO
s_0587	dCDP	
s_1620	TRX1 disulphide	

Kinetic Law

Derived unit contains undeclared units

$$v_{236} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0467} \cdot \left(\frac{[\text{s\_0467}]}{\text{ic0467}} \right) + \text{ep1616} \cdot \left(\frac{[\text{s\_1616}]}{\text{ic1616}} \right) + \text{ep0587} \right. \\ \left. \cdot \left(\frac{[\text{s\_0587}]}{\text{ic0587}} \right) + \text{ep1620} \cdot \left(\frac{[\text{s\_1620}]}{\text{ic1620}} \right) \right) \tag{473}$$

Table 949: Properties of each parameter.

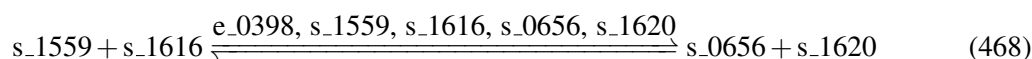| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$9.44495616410234 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$9.44495616410234 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0467			1.000	dimensionless	☑
ep1616			1.000	dimensionless	☑
ep0587			-1.000	dimensionless	☑
ep1620			-1.000	dimensionless	☑

7.237 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

$$s\_0739 + s\_1616 \xrightleftharpoons{e\_0467, e\_0492, e\_0387, e\_0291, s\_0739, s\_1616, s\_0613, s\_1620} s\_0613 + s\_1620 \tag{474}$$

Reactants

Table 950: Properties of each reactant.

Id	Name	SBO
s_0739	GDP	
s_1616	TRX1	

Modifiers

Table 951: 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 952: Properties of each product.

Id	Name	SBO
s_0613	dGDP	
s_1620	TRX1 disulphide	

Kinetic Law

Derived unit contains undeclared units

$$v_{237} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0739} \cdot \left(\frac{[\text{s\_0739}]}{\text{ic0739}} \right) + \text{ep1616} \cdot \left(\frac{[\text{s\_1616}]}{\text{ic1616}} \right) + \text{ep0613} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0613}]}{\text{ic0613}} \right) + \text{ep1620} \cdot \left(\frac{[\text{s\_1620}]}{\text{ic1620}} \right) \right) \tag{475}$$

Table 953: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$9.10860206851083 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$9.10860206851083 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0739			1.000	dimensionless	☑
ep1616			1.000	dimensionless	☑
ep0613			-1.000	dimensionless	☑
ep1620			-1.000	dimensionless	☑

7.238 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

$$\text{s\_0577} \underset{}{\overset{\text{e\_0852, s\_0577, s\_1408}}{\rightleftharpoons}} \text{s\_1408} \tag{476}$$
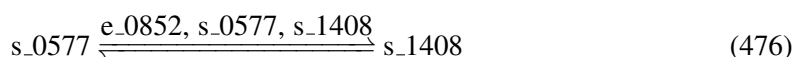
Reactant

Table 954: Properties of each reactant.

Id	Name	SBO
s_0577	D-ribulose 5-phosphate	

Modifiers

Table 955: Properties of each modifier.

Id	Name	SBO
e_0852	RKI1	0000460
s_0577	D-ribulose 5-phosphate	
s_1408	ribose-5-phosphate	

Product

Table 956: Properties of each product.

Id	Name	SBO
s_1408	ribose-5-phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{238} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0577} \cdot \left(\frac{[\text{s\_0577}]}{\text{ic0577}} \right) + \text{ep1408} \cdot \left(\frac{[\text{s\_1408}]}{\text{ic1408}} \right) \right) \qquad (477)$$

Table 957: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.011	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.011	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0577			1.000	dimensionless	☑
ep1408			-1.000	dimensionless	☑

7.239 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

$$\text{s\_0581} \xrightleftharpoons{\text{e\_0506, s\_0581, s\_0577}} \text{s\_0577} \qquad (478)$$
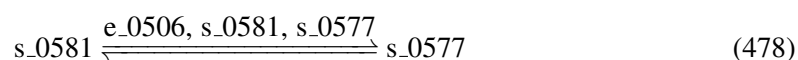
Reactant

Table 958: Properties of each reactant.

Id	Name	SBO
s_0581	D-xylulose 5-phosphate	

Modifiers

Table 959: Properties of each modifier.

Id	Name	SBO
e_0506	RPE1	0000460
s_0581	D-xylulose 5-phosphate	
s_0577	D-ribulose 5-phosphate	

Product

Table 960: Properties of each product.

Id	Name	SBO
s_0577	D-ribulose 5-phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{239} = \text{vol}\left(\text{cell}\right) \cdot \text{v0} \cdot \left(1 + \text{ep0581} \cdot \left(\frac{[\text{s\_0581}]}{\text{ic0581}}\right) + \text{ep0577} \cdot \left(\frac{[\text{s\_0577}]}{\text{ic0577}}\right)\right) \quad (479)$$

Table 961: Properties of each parameter.

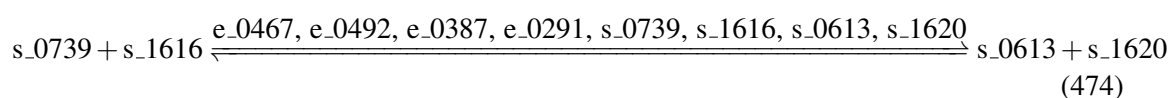| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.011	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	✓
v0			0.011	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	✓
ep0581			1.000	dimensionless	✓
ep0577			-1.000	dimensionless	✓

7.240 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

$$\text{s\_1416} + \text{s\_1569} \xrightleftharpoons{\text{e\_0699, s\_1416, s\_1569, s\_0700, s\_1413}} \text{s\_0700} + \text{s\_1413} \tag{480}$$
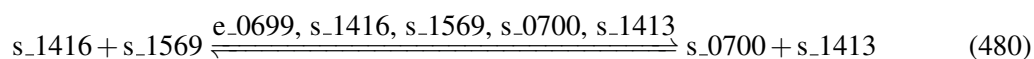
Reactants

Table 962: Properties of each reactant.

Id	Name	SBO
s_1416	S-adenosyl-L-methionine	
s_1569	zymosterol	

Modifiers

Table 963: 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 964: Properties of each product.

Id	Name	SBO
s_0700	fecosterol	
s_1413	S-adenosyl-L-homocysteine	

Kinetic Law

Derived unit contains undeclared units

$$v_{240} = \text{vol} (\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep1416} \cdot \left(\frac{[\text{s\_1416}]}{\text{ic1416}} \right) + \text{ep1569} \cdot \left(\frac{[\text{s\_1569}]}{\text{ic1569}} \right) + \text{ep0700} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0700}]}{\text{ic0700}} \right) + \text{ep1413} \cdot \left(\frac{[\text{s\_1413}]}{\text{ic1413}} \right) \right) \tag{481}$$

Table 965: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.56065575909038 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$2.56065575909038 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep1416			1.000	dimensionless	☑
ep1569			1.000	dimensionless	☑
ep0700			-1.000	dimensionless	☑
ep1413			-1.000	dimensionless	☑

7.241 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

$$\text{s\_1038} + \text{s\_1198} \xrightleftharpoons{\text{e\_0489, s\_1038, s\_1198, s\_0180, s\_1025, s\_1203}} \text{s\_0180} + \text{s\_1025} + \text{s\_1203} \tag{482}$$
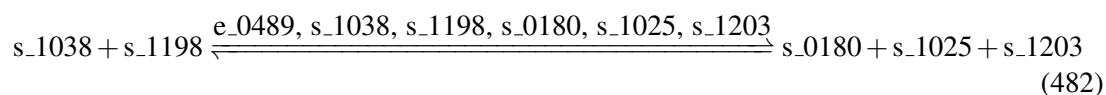
Reactants

Table 966: Properties of each reactant.

Id	Name	SBO
s_1038	L-saccharopine	
s_1198	NAD	

Modifiers

Table 967: Properties of each modifier.

Id	Name	SBO
e_0489	LYS1	0000460
s_1038	L-saccharopine	
s_1198	NAD	
s_0180	2-oxoglutarate	
s_1025	L-lysine	
s_1203	NADH	

Products

Table 968: Properties of each product.

Id	Name	SBO
s_0180	2-oxoglutarate	
s_1025	L-lysine	
s_1203	NADH	

Kinetic Law

Derived unit contains undeclared units

$$
\begin{aligned}
v_{241} = \mathrm{vol}\,(\mathrm{cell}) \cdot \mathrm{v0} \cdot \Bigg(1 + \mathrm{ep1038} \cdot \left(\frac{[\mathrm{s\_1038}]}{\mathrm{ic1038}} \right) + \mathrm{ep1198} \cdot \left(\frac{[\mathrm{s\_1198}]}{\mathrm{ic1198}} \right) + \mathrm{ep0180} \\
\cdot \left(\frac{[\mathrm{s\_0180}]}{\mathrm{ic0180}} \right) + \mathrm{ep1025} \cdot \left(\frac{[\mathrm{s\_1025}]}{\mathrm{ic1025}} \right) + \mathrm{ep1203} \cdot \left(\frac{[\mathrm{s\_1203}]}{\mathrm{ic1203}} \right) \Bigg)
\end{aligned}
\tag{483}
$$

Table 969: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.011	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
v0			0.011	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
ep1038			1.000	dimensionless	☑
ep1198			1.000	dimensionless	☑
ep0180			-1.000	dimensionless	☑
ep1025			-1.000	dimensionless	☑
ep1203			-1.000	dimensionless	☑

7.242 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

$$s\_0959 + s\_0991 + s\_1212 \xrightleftharpoons{e\_0813,\ s\_0959,\ s\_0991,\ s\_1212,\ s\_1038,\ s\_1207} s\_1038 + s\_1207$$

(484)

Reactants

Table 970: Properties of each reactant.

Id	Name	SBO
s_0959	L-allysine	
s_0991	L-glutamate	
s_1212	NADPH	

Modifiers

Table 971: 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 972: Properties of each product.

Id	Name	SBO
s_1038	L-saccharopine	
s_1207	NADP(+)	

Kinetic Law

Derived unit contains undeclared units

$$v_{242} = \text{vol}\left(\text{cell}\right) \cdot \text{v0} \cdot \left(1 + \text{ep0959} \cdot \left(\frac{[\text{s\_0959}]}{\text{ic0959}}\right) + \text{ep0991} \cdot \left(\frac{[\text{s\_0991}]}{\text{ic0991}}\right) + \text{ep1212} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_1212}]}{\text{ic1212}}\right) + \text{ep1038} \cdot \left(\frac{[\text{s\_1038}]}{\text{ic1038}}\right) + \text{ep1207} \cdot \left(\frac{[\text{s\_1207}]}{\text{ic1207}}\right)\right) \tag{485}$$

Table 973: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.011	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.011	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0959			1.000	dimensionless	☑
ep0991			1.000	dimensionless	☑
ep1212			1.000	dimensionless	☑
ep1038			-1.000	dimensionless	☑
ep1207			-1.000	dimensionless	☑

7.243 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

$$\text{s\_1039} + \text{s\_1302} \underset{}{\overset{\text{e\_0054, e\_0177, e\_0761, s\_1039, s\_1302, s\_0231, s\_0456, s\_0529}}{\rightleftharpoons}} \text{s\_0231} + \text{s\_0456} + \text{s\_0529} \tag{486}$$

Reactants

Table 974: Properties of each reactant.

Id	Name	SBO
s_1039	L-serine	
s_1302	palmitoyl-CoA	

Modifiers

Table 975: 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	
s_0456	carbon dioxide	
s_0529	coenzyme A	

Products

Table 976: Properties of each product.

Id	Name	SBO
s_0231	3-ketosphinganine	
s_0456	carbon dioxide	
s_0529	coenzyme A	

Kinetic Law

Derived unit contains undeclared units

$$
\begin{aligned}
v_{243} = \text{vol}\left(\text{cell}\right) \cdot \text{v0} \cdot \Bigg(& 1 + \text{ep1039} \cdot \left(\frac{[\text{s\_1039}]}{\text{ic1039}}\right) + \text{ep1302} \cdot \left(\frac{[\text{s\_1302}]}{\text{ic1302}}\right) + \text{ep0231} \\
& \cdot \left(\frac{[\text{s\_0231}]}{\text{ic0231}}\right) + \text{ep0456} \cdot \left(\frac{[\text{s\_0456}]}{\text{ic0456}}\right) + \text{ep0529} \cdot \left(\frac{[\text{s\_0529}]}{\text{ic0529}}\right) \Bigg)
\end{aligned}
\tag{487}
$$

Table 977: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.04421699920047 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$2.04421699920047 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep1039			1.000	dimensionless	☑
ep1302			1.000	dimensionless	☑
ep0231			-1.000	dimensionless	☑

Id	Name	SBO	Value	Unit	Constant
ep0456			-1.000	dimensionless	☑
ep0529			-1.000	dimensionless	☑

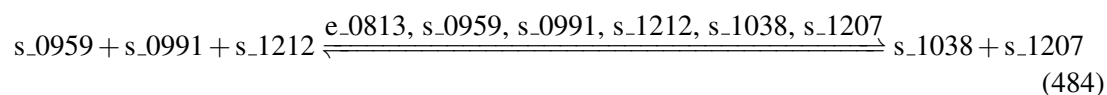## 7.244 Reaction `r_0995`

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

$$\text{s\_0434} + \text{s\_1039} + \text{s\_1607} \xrightleftharpoons{\text{e\_0168, e\_0425, s\_0434, s\_1039, s\_1607, s\_0423, s\_0633, s\_1428}} \text{s\_0423} + \text{s\_0633} + \text{s\_142}$$

(488)

Reactants

Table 978: Properties of each reactant.

Id	Name	SBO
s_0434	ATP	
s_1039	L-serine	
s_1607	tRNA(Ser)	

Modifiers

Table 979: Properties of each modifier.

Id	Name	SBO
e_0168	SES1	0000460
e_0425	DIA4	0000460
s_0434	ATP	
s_1039	L-serine	
s_1607	tRNA(Ser)	
s_0423	AMP	
s_0633	diphosphate	
s_1428	Ser-tRNA(Ser)	

Products

Table 980: Properties of each product.

Id	Name	SBO
s_0423	AMP	
s_0633	diphosphate	
s_1428	Ser-tRNA(Ser)	

Kinetic Law

Derived unit contains undeclared units

$$v_{244} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}} \right) + \text{ep1039} \cdot \left(\frac{[\text{s\_1039}]}{\text{ic1039}} \right) + \text{ep1607} \cdot \left(\frac{[\text{s\_1607}]}{\text{ic1607}} \right) \right.$$
$$\left. + \text{ep0423} \cdot \left(\frac{[\text{s\_0423}]}{\text{ic0423}} \right) + \text{ep0633} \cdot \left(\frac{[\text{s\_0633}]}{\text{ic0633}} \right) + \text{ep1428} \cdot \left(\frac{[\text{s\_1428}]}{\text{ic1428}} \right) \right)$$

(489)

Table 981: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.007	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.007	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0434			1.000	dimensionless	☑
ep1039			1.000	dimensionless	☑
ep1607			1.000	dimensionless	☑
ep0423			-1.000	dimensionless	☑
ep0633			-1.000	dimensionless	☑
ep1428			-1.000	dimensionless	☑

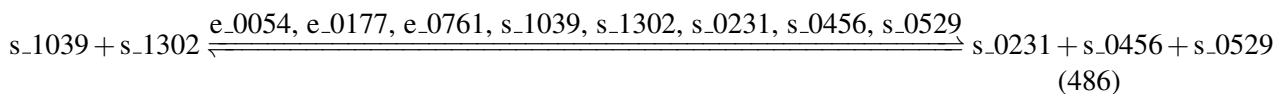## 7.245 Reaction r_0996

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

Name shikimate dehydrogenase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0211} + \text{s\_1212} \xrightleftharpoons{\text{e\_0182, s\_0211, s\_1212, s\_1207, s\_1429}} \text{s\_1207} + \text{s\_1429}$$

(490)
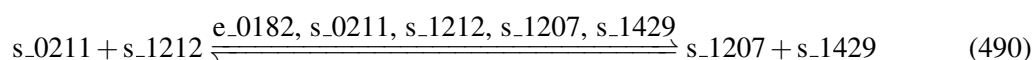
Reactants

Table 982: Properties of each reactant.

Id	Name	SBO
s_0211	3-dehydroshikimate	
s_1212	NADPH	

Modifiers

Table 983: Properties of each modifier.

Id	Name	SBO
e_0182	ARO1	0000460
s_0211	3-dehydroshikimate	
s_1212	NADPH	
s_1207	NADP(+)	
s_1429	shikimate	

Products

Table 984: Properties of each product.

Id	Name	SBO
s_1207	NADP(+)	
s_1429	shikimate	

Kinetic Law

Derived unit contains undeclared units

$$
\begin{aligned}
v_{245} = \mathrm{vol}\,(\mathrm{cell}) \cdot \mathrm{v0} \cdot \Bigg(1 + \mathrm{ep0211} \cdot \left(\frac{[\mathrm{s\_0211}]}{\mathrm{ic0211}} \right) + \mathrm{ep1212} \cdot \left(\frac{[\mathrm{s\_1212}]}{\mathrm{ic1212}} \right) + \mathrm{ep1207} \\
\cdot \left(\frac{[\mathrm{s\_1207}]}{\mathrm{ic1207}} \right) + \mathrm{ep1429} \cdot \left(\frac{[\mathrm{s\_1429}]}{\mathrm{ic1429}} \right) \Bigg)
\end{aligned}
\tag{491}
$$

Table 985: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.010	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑

Id	Name	SBO	Value	Unit	Constant
v0			0.010	$\mathrm{mmol \cdot l^{-1} \cdot s^{-1}}$	☑
ep0211			1.000	dimensionless	☑
ep1212			1.000	dimensionless	☑
ep1207			-1.000	dimensionless	☑
ep1429			-1.000	dimensionless	☑

7.246 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

$$\mathrm{s\_0434 + s\_1429} \xrightleftharpoons{\mathrm{e\_0182, \; s\_0434, \; s\_1429, \; s\_0261, \; s\_0394}} \mathrm{s\_0261 + s\_0394} \qquad (492)$$
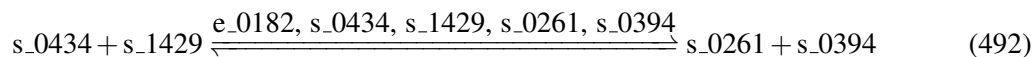
Reactants

Table 986: Properties of each reactant.

Id	Name	SBO
s_0434	ATP	
s_1429	shikimate	

Modifiers

Table 987: Properties of each modifier.

Id	Name	SBO
e_0182	ARO1	0000460
s_0434	ATP	
s_1429	shikimate	
s_0261	3-phosphoshikimic acid	
s_0394	ADP	

Products

Table 988: Properties of each product.

Id	Name	SBO
s_0261	3-phosphoshikimic acid	
s_0394	ADP	

Kinetic Law

Derived unit contains undeclared units

$$v_{246} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}}\right) + \text{ep1429} \cdot \left(\frac{[\text{s\_1429}]}{\text{ic1429}}\right) + \text{ep0261} \right. $$
$$\left. \cdot \left(\frac{[\text{s\_0261}]}{\text{ic0261}}\right) + \text{ep0394} \cdot \left(\frac{[\text{s\_0394}]}{\text{ic0394}}\right)\right) \tag{493}$$

Table 989: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.010	mmol·l^{-1}·s^{-1}	☑
v0			0.010	mmol·l^{-1}·s^{-1}	☑
ep0434			1.000	dimensionless	☑
ep1429			1.000	dimensionless	☑
ep0261			−1.000	dimensionless	☑
ep0394			−1.000	dimensionless	☑

7.247 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

$$\text{s\_1203} + \text{s\_1275} + \text{s\_1447} \xrightleftharpoons{\text{e\_0385, s\_1203, s\_1275, s\_1447, s\_0037, s\_1198}} \text{s\_0037} + \text{s\_1198} \tag{494}$$

Reactants

Table 990: Properties of each reactant.

Id	Name	SBO
s_1203	NADH	
s_1275	oxygen	
s_1447	squalene	

Modifiers

Table 991: Properties of each modifier.

Id	Name	SBO
e_0385	ERG1	0000460
s_1203	NADH	
s_1275	oxygen	
s_1447	squalene	
s_0037	(S)-2,3-epoxysqualene	
s_1198	NAD	

Products

Table 992: Properties of each product.

Id	Name	SBO
s_0037	(S)-2,3-epoxysqualene	
s_1198	NAD	

Kinetic Law

Derived unit contains undeclared units

$$
\begin{aligned}
v_{247} = \mathrm{vol\,(cell)} \cdot \mathrm{v0} \cdot \Bigg(1 + \mathrm{ep1203} \cdot \left(\frac{[\mathrm{s\_1203}]}{\mathrm{ic1203}} \right) + \mathrm{ep1275} \cdot \left(\frac{[\mathrm{s\_1275}]}{\mathrm{ic1275}} \right) + \mathrm{ep1447} \\
\cdot \left(\frac{[\mathrm{s\_1447}]}{\mathrm{ic1447}} \right) + \mathrm{ep0037} \cdot \left(\frac{[\mathrm{s\_0037}]}{\mathrm{ic0037}} \right) + \mathrm{ep1198} \cdot \left(\frac{[\mathrm{s\_1198}]}{\mathrm{ic1198}} \right) \Bigg)
\end{aligned}
\tag{495}
$$

Table 993: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.29987342075721 \cdot 10^{-4}$	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑

Id	Name	SBO	Value	Unit	Constant
v0			$1.29987342075721 \cdot 10^{-4}$	$\mathrm{mmol} \cdot l^{-1} \cdot s^{-1}$	☑
ep1203			1.000	dimensionless	☑
ep1275			1.000	dimensionless	☑
ep1447			1.000	dimensionless	☑
ep0037			-1.000	dimensionless	☑
ep1198			-1.000	dimensionless	☑

7.248 Reaction `r_1011`

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

Name squalene epoxidase (NADP)

SBO:0000176 biochemical reaction

Reaction equation

$$s\_1212 + s\_1275 + s\_1447 \xrightleftharpoons{e\_0385,\ s\_1212,\ s\_1275,\ s\_1447,\ s\_0037,\ s\_1207} s\_0037 + s\_1207$$

$$\tag{496}$$
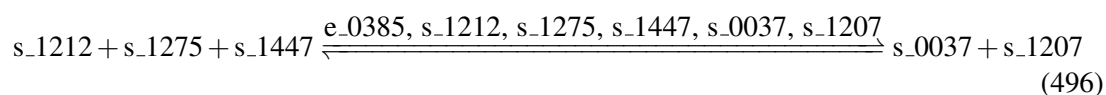
Reactants

Table 994: Properties of each reactant.

Id	Name	SBO
s_1212	NADPH	
s_1275	oxygen	
s_1447	squalene	

Modifiers

Table 995: Properties of each modifier.

Id	Name	SBO
e_0385	ERG1	0000460
s_1212	NADPH	
s_1275	oxygen	
s_1447	squalene	
s_0037	(S)-2,3-epoxysqualene	
s_1207	NADP(+)	

Products

Table 996: Properties of each product.

Id	Name	SBO
s_0037	(S)-2,3-epoxysqualene	
s_1207	NADP(+)	

Kinetic Law

Derived unit contains undeclared units

$$v_{248} = \text{vol}(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep1212} \cdot \left(\frac{[\text{s\_1212}]}{\text{ic1212}} \right) + \text{ep1275} \cdot \left(\frac{[\text{s\_1275}]}{\text{ic1275}} \right) + \text{ep1447} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_1447}]}{\text{ic1447}} \right) + \text{ep0037} \cdot \left(\frac{[\text{s\_0037}]}{\text{ic0037}} \right) + \text{ep1207} \cdot \left(\frac{[\text{s\_1207}]}{\text{ic1207}} \right) \right)$$

$$(497)$$

Table 997: Properties of each parameter.

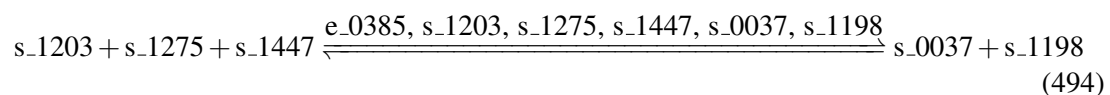| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.2998734207478 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$1.2998734207478 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep1212			1.000	dimensionless	☑
ep1275			1.000	dimensionless	☑
ep1447			1.000	dimensionless	☑
ep0037			-1.000	dimensionless	☑
ep1207			-1.000	dimensionless	☑

7.249 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

$$2\,\text{s\_0190} + \text{s\_1212} \xrightleftharpoons{\text{e\_0456, s\_0190, s\_1212, s\_0633, s\_1207, s\_1447}} 2\,\text{s\_0633} + \text{s\_1207} + \text{s\_1447}$$

$$(498)$$

Reactants

<div align="center">

Table 998: Properties of each reactant.

Id	Name	SBO
s_0190	farnesyl diphosphate	
s_1212	NADPH	

</div>

Modifiers

<div align="center">

Table 999: 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	

</div>

Products

<div align="center">

Table 1000: Properties of each product.

Id	Name	SBO
s_0633	diphosphate	
s_1207	NADP(+)	
s_1447	squalene	

</div>

Kinetic Law

Derived unit contains undeclared units

$$
\begin{aligned}
v_{249} = \mathrm{vol}\,(\mathrm{cell}) \cdot \mathrm{v0} \cdot \Bigg(1 + \mathrm{ep0190} \cdot \left(\frac{[\mathrm{s\_0190}]}{\mathrm{ic0190}} \right) + \mathrm{ep1212} \cdot \left(\frac{[\mathrm{s\_1212}]}{\mathrm{ic1212}} \right) + \mathrm{ep0633} \\
\cdot \left(\frac{[\mathrm{s\_0633}]}{\mathrm{ic0633}} \right) + \mathrm{ep1207} \cdot \left(\frac{[\mathrm{s\_1207}]}{\mathrm{ic1207}} \right) + \mathrm{ep1447} \cdot \left(\frac{[\mathrm{s\_1447}]}{\mathrm{ic1447}} \right) \Bigg)
\end{aligned}
\tag{499}
$$

Table 1001: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$2.59974684150501 \cdot 10^{-4}$	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
v0			$2.59974684150501 \cdot 10^{-4}$	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
ep0190			2.000	dimensionless	☑
ep1212			1.000	dimensionless	☑
ep0633			-2.000	dimensionless	☑
ep1207			-1.000	dimensionless	☑
ep1447			-1.000	dimensionless	☑

7.250 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

$$\mathrm{s\_0666} + 3\,\mathrm{s\_0056} \xrightleftharpoons{\mathrm{e\_0578,\ e\_0613,\ s\_0666,\ s\_0056,\ s\_0672}} \mathrm{s\_0672} \qquad (500)$$
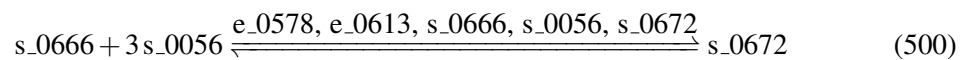
Reactants

Table 1002: Properties of each reactant.

Id	Name	SBO
s_0666	ergosterol	
s_0056	(S)-3-methyl-2-oxopentanoate	

Modifiers

Table 1003: Properties of each modifier.

Id	Name	SBO
e_0578	TGL1	0000460
e_0613	YEH1	0000460
s_0666	ergosterol	
s_0056	(S)-3-methyl-2-oxopentanoate	
s_0672	ergosterol ester	

Product

Table 1004: Properties of each product.

Id	Name	SBO
s_0672	ergosterol ester	

Kinetic Law

Derived unit contains undeclared units

$$v_{250} = \text{vol}\,(\text{cell}) \cdot \text{v0}$$
$$\cdot \left(1 + \text{ep0666} \cdot \left(\frac{[\text{s\_0666}]}{\text{ic0666}}\right) + \text{ep0056} \cdot \left(\frac{[\text{s\_0056}]}{\text{ic0056}}\right) + \text{ep0672} \cdot \left(\frac{[\text{s\_0672}]}{\text{ic0672}}\right)\right) \quad (501)$$

Table 1005: Properties of each parameter.

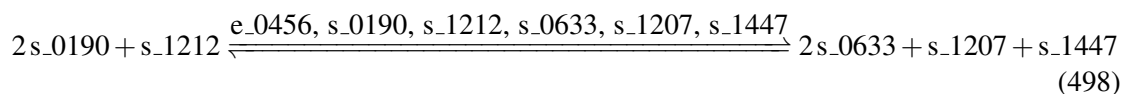| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$3.08174379214594 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$3.08174379214594 \cdot 10^{-5}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0666			1.000	dimensionless	☑
ep0056			3.000	dimensionless	☑
ep0672			-1.000	dimensionless	☑

7.251 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

$$\text{s\_0394} + \text{s\_1467} \xrightleftharpoons{\text{e\_0107, s\_0394, s\_1467, s\_0298, s\_1322}} \text{s\_0298} + \text{s\_1322} \quad (502)$$

Reactants

Table 1006: Properties of each reactant.

Id	Name	SBO
s_0394	ADP	
s_1467	sulphate	

Modifiers

Table 1007: Properties of each modifier.

Id	Name	SBO
e_0107	APA1	0000460
s_0394	ADP	
s_1467	sulphate	
s_0298	5'-adenylyl sulfate	
s_1322	phosphate	

Products

Table 1008: Properties of each product.

Id	Name	SBO
s_0298	5'-adenylyl sulfate	
s_1322	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{251} = \mathrm{vol}\,(\mathrm{cell}) \cdot \mathrm{v0} \cdot \left(1 + \mathrm{ep0394} \cdot \left(\frac{[\mathrm{s\_0394}]}{\mathrm{ic0394}} \right) + \mathrm{ep1467} \cdot \left(\frac{[\mathrm{s\_1467}]}{\mathrm{ic1467}} \right) + \mathrm{ep0298} \right.$$
$$\left. \cdot \left(\frac{[\mathrm{s\_0298}]}{\mathrm{ic0298}} \right) + \mathrm{ep1322} \cdot \left(\frac{[\mathrm{s\_1322}]}{\mathrm{ic1322}} \right) \right) \tag{503}$$

Table 1009: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.002	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
v0			0.002	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
ep0394			1.000	dimensionless	☑

Id	Name	SBO	Value	Unit	Constant
ep1467			1.000	dimensionless	☑
ep0298			−1.000	dimensionless	☑
ep1322			−1.000	dimensionless	☑

7.252 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

$$3\,s\_1212 + s\_1469 \xrightleftharpoons{\text{e\_0547, e\_0321, s\_1212, s\_1469, s\_0841, s\_1207}} s\_0841 + 3\,s\_1207 \quad (504)$$
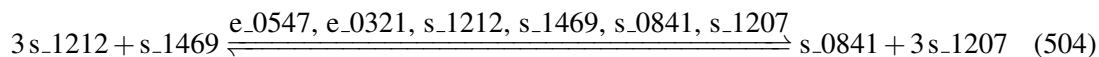
Reactants

Table 1010: Properties of each reactant.

Id	Name	SBO
s_1212	NADPH	
s_1469	sulphite	

Modifiers

Table 1011: 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 1012: Properties of each product.

Id	Name	SBO
s_0841	hydrogen sulfide	
s_1207	NADP(+)	

Kinetic Law

Derived unit contains undeclared units

$$v_{252} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep1212} \cdot \left(\frac{[\text{s\_1212}]}{\text{ic1212}} \right) + \text{ep1469} \cdot \left(\frac{[\text{s\_1469}]}{\text{ic1469}} \right) + \text{ep0841} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0841}]}{\text{ic0841}} \right) + \text{ep1207} \cdot \left(\frac{[\text{s\_1207}]}{\text{ic1207}} \right) \right) \tag{505}$$

Table 1013: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.002	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.002	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep1212			3.000	dimensionless	☑
ep1469			1.000	dimensionless	☑
ep0841			-1.000	dimensionless	☑
ep1207			-3.000	dimensionless	☑

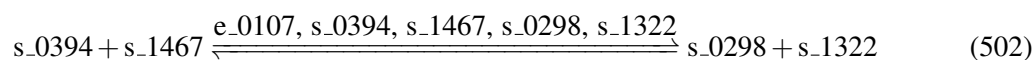## 7.253 Reaction r_1038

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

$$\text{s\_1212} + \text{s\_1620} \xrightleftharpoons{\text{e\_0633, e\_0218, e\_0398, e\_0448, e\_0915, e\_0124, s\_1212, s\_1620, s\_1207, s\_1616}} \text{s\_1207} + \text{s\_1616} \tag{506}$$

Reactants

Table 1014: Properties of each reactant.

Id	Name	SBO
s_1212	NADPH	
s_1620	TRX1 disulphide	

Modifiers

Table 1015: 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 1016: Properties of each product.

Id	Name	SBO
s_1207	NADP(+)	
s_1616	TRX1	

Kinetic Law

Derived unit contains undeclared units

$$v_{253} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep1212} \cdot \left(\frac{[\text{s\_1212}]}{\text{ic1212}} \right) + \text{ep1620} \cdot \left(\frac{[\text{s\_1620}]}{\text{ic1620}} \right) + \text{ep1207} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_1207}]}{\text{ic1207}} \right) + \text{ep1616} \cdot \left(\frac{[\text{s\_1616}]}{\text{ic1616}} \right) \right) \tag{507}$$

Table 1017: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.005	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.005	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep1212			1.000	dimensionless	☑
ep1620			1.000	dimensionless	☑
ep1207			-1.000	dimensionless	☑
ep1616			-1.000	dimensionless	☑

7.254 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

$$s\_1238 \xrightleftharpoons{\text{e\_0122, s\_1238, s\_1045, s\_1322}} s\_1045 + s\_1322 \tag{508}$$
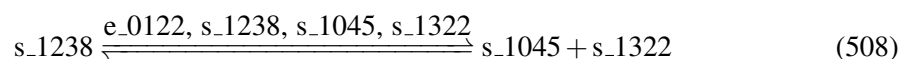
Reactant

Table 1018: Properties of each reactant.

Id	Name	SBO
s_1238	O-phospho-L-homoserine	

Modifiers

Table 1019: Properties of each modifier.

Id	Name	SBO
e_0122	THR4	0000460
s_1238	O-phospho-L-homoserine	
s_1045	L-threonine	
s_1322	phosphate	

Products

Table 1020: Properties of each product.

Id	Name	SBO
s_1045	L-threonine	
s_1322	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{254} = \text{vol}(\text{cell}) \cdot \text{v0}$$
$$\cdot \left(1 + \text{ep1238} \cdot \left(\frac{[\text{s\_1238}]}{\text{ic1238}}\right) + \text{ep1045} \cdot \left(\frac{[\text{s\_1045}]}{\text{ic1045}}\right) + \text{ep1322} \cdot \left(\frac{[\text{s\_1322}]}{\text{ic1322}}\right)\right) \quad (509)$$

Table 1021: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.007	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.007	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep1238			1.000	dimensionless	☑
ep1045			−1.000	dimensionless	☑
ep1322			−1.000	dimensionless	☑

7.255 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

$$\text{s\_0434} + \text{s\_1045} + \text{s\_1608} \underset{}{\overset{\text{e\_0470, s\_0434, s\_1045, s\_1608, s\_0423, s\_0633, s\_1491}}{\rightleftharpoons}} \text{s\_0423} + \text{s\_0633} + \text{s\_1491}$$
$$(510)$$

Reactants

Table 1022: Properties of each reactant.

Id	Name	SBO
s_0434	ATP	
s_1045	L-threonine	
s_1608	tRNA(Thr)	

Modifiers

Table 1023: Properties of each modifier.

Id	Name	SBO
e_0470	THS1	0000460
s_0434	ATP	
s_1045	L-threonine	
s_1608	tRNA(Thr)	
s_0423	AMP	
s_0633	diphosphate	
s_1491	Thr-tRNA(Thr)	

Products

Table 1024: Properties of each product.

Id	Name	SBO
s_0423	AMP	
s_0633	diphosphate	
s_1491	Thr-tRNA(Thr)	

Kinetic Law

Derived unit contains undeclared units

$$v_{255} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}} \right) + \text{ep1045} \cdot \left(\frac{[\text{s\_1045}]}{\text{ic1045}} \right) + \text{ep1608} \cdot \left(\frac{[\text{s\_1608}]}{\text{ic1608}} \right) \right.$$
$$\left. + \text{ep0423} \cdot \left(\frac{[\text{s\_0423}]}{\text{ic0423}} \right) + \text{ep0633} \cdot \left(\frac{[\text{s\_0633}]}{\text{ic0633}} \right) + \text{ep1491} \cdot \left(\frac{[\text{s\_1491}]}{\text{ic1491}} \right) \right)$$

(511)

Table 1025: Properties of each parameter.

| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.007	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
v0			0.007	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
ep0434			1.000	dimensionless	☑
ep1045			1.000	dimensionless	☑
ep1608			1.000	dimensionless	☑
ep0423			-1.000	dimensionless	☑
ep0633			-1.000	dimensionless	☑
ep1491			-1.000	dimensionless	☑

7.256 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

$$\mathrm{s\_0306 + s\_0654} \xrightleftharpoons{\mathrm{e\_0850,\ s\_0306,\ s\_0654,\ s\_0625,\ s\_0649}} \mathrm{s\_0625 + s\_0649} \qquad (512)$$

Reactants

Table 1026: Properties of each reactant.

Id	Name	SBO
s_0306	5,10-methylenetetrahydrofolate	
s_0654	dUMP	

Modifiers

Table 1027: 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 1028: Properties of each product.

Id	Name	SBO
s_0625	dihydrofolic acid	
s_0649	dTMP	

Kinetic Law

Derived unit contains undeclared units

$$v_{256} = \text{vol (cell)} \cdot v0 \cdot \left(1 + \text{ep0306} \cdot \left(\frac{[\text{s\_0306}]}{\text{ic0306}} \right) + \text{ep0654} \cdot \left(\frac{[\text{s\_0654}]}{\text{ic0654}} \right) + \text{ep0625} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0625}]}{\text{ic0625}} \right) + \text{ep0649} \cdot \left(\frac{[\text{s\_0649}]}{\text{ic0649}} \right) \right) \tag{513}$$

Table 1029: Properties of each parameter.

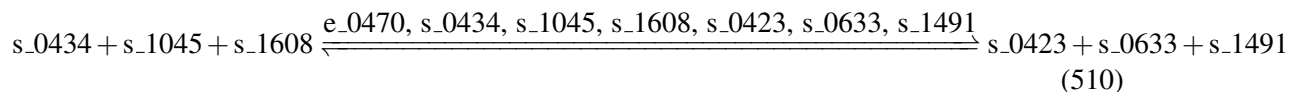| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.36629031085814 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$1.36629031085814 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0306			1.000	dimensionless	☑
ep0654			1.000	dimensionless	☑
ep0625			-1.000	dimensionless	☑
ep0649			-1.000	dimensionless	☑

7.257 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

$$\text{s\_0551} + \text{s\_0557} \xrightleftharpoons{\text{e\_0684, s\_0551, s\_0557, s\_0764, s\_1427}} \text{s\_0764} + \text{s\_1427} \tag{514}$$

Reactants

Table 1030: Properties of each reactant.

Id	Name	SBO
s_0551	D-erythrose 4-phosphate	
s_0557	D-fructose 6-phosphate	

Modifiers

Table 1031: Properties of each modifier.

Id	Name	SBO
e_0684	TAL1	0000460
s_0551	D-erythrose 4-phosphate	
s_0557	D-fructose 6-phosphate	
s_0764	glyceraldehyde 3-phosphate	
s_1427	sedoheptulose 7-phosphate	

Products

Table 1032: Properties of each product.

Id	Name	SBO
s_0764	glyceraldehyde 3-phosphate	
s_1427	sedoheptulose 7-phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{257} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0551} \cdot \left(\frac{[\text{s\_0551}]}{\text{ic0551}} \right) + \text{ep0557} \cdot \left(\frac{[\text{s\_0557}]}{\text{ic0557}} \right) + \text{ep0764} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0764}]}{\text{ic0764}} \right) + \text{ep1427} \cdot \left(\frac{[\text{s\_1427}]}{\text{ic1427}} \right) \right)$$

(515)

Table 1033: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$5.30955594768567 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$5.30955594768567 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0551			1.000	dimensionless	☑

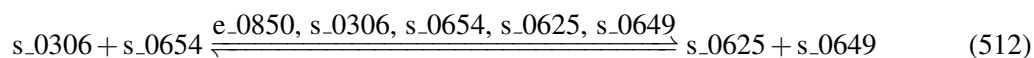| Id	Name	SBO	Value	Unit	Constant
ep0557			1.000	dimensionless	☑
ep0764			-1.000	dimensionless	☑
ep1427			-1.000	dimensionless	☑

7.258 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

$$\text{s\_0764} + \text{s\_1427} \xrightleftharpoons{\text{e\_0063, e\_0962, s\_0764, s\_1427, s\_0581, s\_1408}} \text{s\_0581} + \text{s\_1408} \qquad (516)$$

Reactants

Table 1034: Properties of each reactant.

Id	Name	SBO
s_0764	glyceraldehyde 3-phosphate	
s_1427	sedoheptulose 7-phosphate	

Modifiers

Table 1035: Properties of each modifier.

Id	Name	SBO
e_0063	TKL2	0000460
e_0962	TKL1	0000460
s_0764	glyceraldehyde 3-phosphate	
s_1427	sedoheptulose 7-phosphate	
s_0581	D-xylulose 5-phosphate	
s_1408	ribose-5-phosphate	

Products

Table 1036: Properties of each product.

Id	Name	SBO
s_0581	D-xylulose 5-phosphate	
s_1408	ribose-5-phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{258} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0764} \cdot \left(\frac{[\text{s\_0764}]}{\text{ic0764}} \right) + \text{ep1427} \cdot \left(\frac{[\text{s\_1427}]}{\text{ic1427}} \right) + \text{ep0581} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0581}]}{\text{ic0581}} \right) + \text{ep1408} \cdot \left(\frac{[\text{s\_1408}]}{\text{ic1408}} \right) \right) \tag{517}$$

Table 1037: Properties of each parameter.

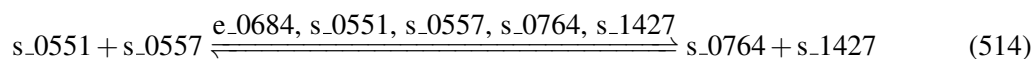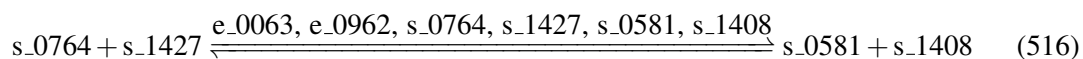| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$5.30955595806181 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$5.30955595806181 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0764			1.000	dimensionless	☑
ep1427			1.000	dimensionless	☑
ep0581			-1.000	dimensionless	☑
ep1408			-1.000	dimensionless	☑

7.259 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

$$\text{s\_0557} + \text{s\_0764} \xrightleftharpoons{\text{e\_0063, e\_0962, s\_0557, s\_0764, s\_0551, s\_0581}} \text{s\_0551} + \text{s\_0581} \tag{518}$$
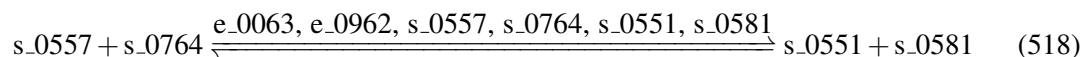
Reactants

Table 1038: Properties of each reactant.

Id	Name	SBO
s_0557	D-fructose 6-phosphate	
s_0764	glyceraldehyde 3-phosphate	

Modifiers

Table 1039: Properties of each modifier.

Id	Name	SBO
e_0063	TKL2	0000460
e_0962	TKL1	0000460
s_0557	D-fructose 6-phosphate	
s_0764	glyceraldehyde 3-phosphate	
s_0551	D-erythrose 4-phosphate	
s_0581	D-xylulose 5-phosphate	

Products

Table 1040: Properties of each product.

Id	Name	SBO
s_0551	D-erythrose 4-phosphate	
s_0581	D-xylulose 5-phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{259} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0557} \cdot \left(\frac{[\text{s\_0557}]}{\text{ic0557}} \right) + \text{ep0764} \cdot \left(\frac{[\text{s\_0764}]}{\text{ic0764}} \right) + \text{ep0551} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0551}]}{\text{ic0551}} \right) + \text{ep0581} \cdot \left(\frac{[\text{s\_0581}]}{\text{ic0581}} \right) \right)$$

(519)

Table 1041: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.011	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
v0			0.011	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑

Id	Name	SBO	Value	Unit	Constant
ep0557			1.000	dimensionless	☑
ep0764			1.000	dimensionless	☑
ep0551			−1.000	dimensionless	☑
ep0581			−1.000	dimensionless	☑

7.260 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

$$s\_0409 \xrightleftharpoons{\text{e\_0711, e\_0065, e\_0179, e\_0753, s\_0409, s\_1322, s\_1520}} s\_1322 + s\_1520 \qquad (520)$$

Reactant

Table 1042: Properties of each reactant.

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

Modifiers

Table 1043: 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	
s_1322	phosphate	
s_1520	trehalose	

Products

Produced by SBML2LATEX

Table 1044: Properties of each product.

Id	Name	SBO
s_1322	phosphate	
s_1520	trehalose	

Kinetic Law

Derived unit contains undeclared units

$$v_{260} = \text{vol}\,(\text{cell}) \cdot \text{v0}$$
$$\cdot \left(1 + \text{ep0409} \cdot \left(\frac{[\text{s\_0409}]}{\text{ic0409}} \right) + \text{ep1322} \cdot \left(\frac{[\text{s\_1322}]}{\text{ic1322}} \right) + \text{ep1520} \cdot \left(\frac{[\text{s\_1520}]}{\text{ic1520}} \right) \right) \tag{521}$$

Table 1045: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$8.88088702062361 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$8.88088702062361 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0409			1.000	dimensionless	☑
ep1322			-1.000	dimensionless	☑
ep1520			-1.000	dimensionless	☑

7.261 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

$$\text{s\_0619} + 4 \cdot 33333333333333 \, \text{s\_0056} \xrightleftharpoons{\text{e\_0176, e\_0611, e\_0765, e\_0851, s\_0619, s\_0056, s\_1524}} \text{s\_1524} \tag{522}$$

Reactants

Table 1046: Properties of each reactant.

Id	Name	SBO
s_0619	diglyceride	
s_0056	(S)-3-methyl-2-oxopentanoate	

Modifiers

Table 1047: 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_0056	(S)-3-methyl-2-oxopentanoate	
s_1524	triglyceride	

Product

Table 1048: Properties of each product.

Id	Name	SBO
s_1524	triglyceride	

Kinetic Law

Derived unit contains undeclared units

$$v_{261} = \text{vol}(\text{cell}) \cdot \text{v0}$$
$$\cdot \left(1 + \text{ep0619} \cdot \left(\frac{[\text{s\_0619}]}{\text{ic0619}}\right) + \text{ep0056} \cdot \left(\frac{[\text{s\_0056}]}{\text{ic0056}}\right) + \text{ep1524} \cdot \left(\frac{[\text{s\_1524}]}{\text{ic1524}}\right)\right) \quad (523)$$

Table 1049: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$5.10195573579038 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	✓
v0			$5.10195573579038 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	✓
ep0619			1.000	dimensionless	✓

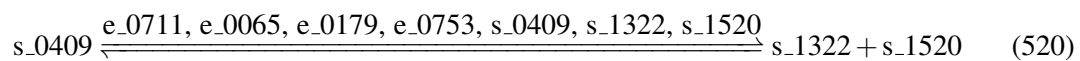| Id	Name	SBO	Value	Unit	Constant
ep0056			4.333	dimensionless	☑
ep1524			-1.000	dimensionless	☑

7.262 Reaction r_1054

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

$$s\_0629 \xrightleftharpoons{e\_0175,\ s\_0629,\ s\_0764} s\_0764 \tag{524}$$
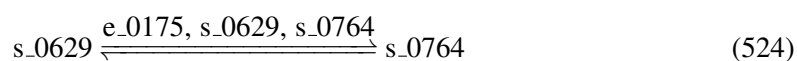
Reactant

Table 1050: Properties of each reactant.

Id	Name	SBO
s_0629	dihydroxyacetone phosphate	

Modifiers

Table 1051: Properties of each modifier.

Id	Name	SBO
e_0175	TPI1	0000460
s_0629	dihydroxyacetone phosphate	
s_0764	glyceraldehyde 3-phosphate	

Product

Table 1052: Properties of each product.

Id	Name	SBO
s_0764	glyceraldehyde 3-phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{262} = \mathrm{vol}\,(\mathrm{cell}) \cdot \mathrm{v0} \cdot \left(1 + \mathrm{ep0629} \cdot \left(\frac{[\mathrm{s\_0629}]}{\mathrm{ic0629}}\right) + \mathrm{ep0764} \cdot \left(\frac{[\mathrm{s\_0764}]}{\mathrm{ic0764}}\right)\right) \quad (525)$$

Table 1053: Properties of each parameter.

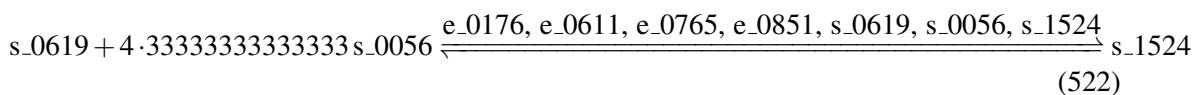| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.850	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
v0			0.850	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
ep0629			1.000	dimensionless	☑
ep0764			-1.000	dimensionless	☑

7.263 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

$$\mathrm{s\_0086} + \mathrm{s\_1039} \underset{}{\overset{\mathrm{e\_0330,\ s\_0086,\ s\_1039,\ s\_0764,\ s\_1048}}{\rightleftharpoons}} \mathrm{s\_0764} + \mathrm{s\_1048} \quad (526)$$

Reactants

Table 1054: Properties of each reactant.

Id	Name	SBO
s_0086	1-C-(indol-3-yl)glycerol 3-phosphate	
s_1039	L-serine	

Modifiers

Table 1055: Properties of each modifier.

Id	Name	SBO
e_0330	TRP5	0000460

Id	Name	SBO
s_0086	1-C-(indol-3-yl)glycerol 3-phosphate	
s_1039	L-serine	
s_0764	glyceraldehyde 3-phosphate	
s_1048	L-tryptophan	

Products

Table 1056: Properties of each product.

Id	Name	SBO
s_0764	glyceraldehyde 3-phosphate	
s_1048	L-tryptophan	

Kinetic Law

Derived unit contains undeclared units

$$
v_{263} = \mathrm{vol\,(cell)} \cdot \mathrm{v0} \cdot \left(1 + \mathrm{ep0086} \cdot \left(\frac{[\mathrm{s\_0086}]}{\mathrm{ic0086}} \right) + \mathrm{ep1039} \cdot \left(\frac{[\mathrm{s\_1039}]}{\mathrm{ic1039}} \right) + \mathrm{ep0764} \right.
$$
$$
\left. \cdot \left(\frac{[\mathrm{s\_0764}]}{\mathrm{ic0764}} \right) + \mathrm{ep1048} \cdot \left(\frac{[\mathrm{s\_1048}]}{\mathrm{ic1048}} \right) \right) \tag{527}
$$

Table 1057: Properties of each parameter.

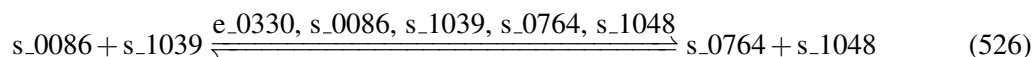| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.001	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
v0			0.001	$\mathrm{mmol} \cdot \mathrm{l}^{-1} \cdot \mathrm{s}^{-1}$	☑
ep0086			1.000	dimensionless	☑
ep1039			1.000	dimensionless	☑
ep0764			-1.000	dimensionless	☑
ep1048			-1.000	dimensionless	☑

7.264 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

$$s\_0434 + s\_1048 + s\_1610 \xrightleftharpoons{e\_0836,\ s\_0434,\ s\_1048,\ s\_1610,\ s\_0423,\ s\_0633,\ s\_1527} s\_0423 + s\_0633 + s\_1527 \tag{528}$$
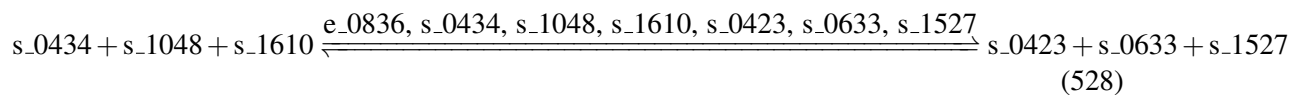
Reactants

Table 1058: Properties of each reactant.

Id	Name	SBO
s_0434	ATP	
s_1048	L-tryptophan	
s_1610	tRNA(Trp)	

Modifiers

Table 1059: Properties of each modifier.

Id	Name	SBO
e_0836	WRS1	0000460
s_0434	ATP	
s_1048	L-tryptophan	
s_1610	tRNA(Trp)	
s_0423	AMP	
s_0633	diphosphate	
s_1527	Trp-tRNA(Trp)	

Products

Table 1060: Properties of each product.

Id	Name	SBO
s_0423	AMP	
s_0633	diphosphate	
s_1527	Trp-tRNA(Trp)	

Kinetic Law

Derived unit contains undeclared units

Produced by SBML2LATEX

$$v_{264} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}} \right) + \text{ep1048} \cdot \left(\frac{[\text{s\_1048}]}{\text{ic1048}} \right) + \text{ep1610} \cdot \left(\frac{[\text{s\_1610}]}{\text{ic1610}} \right) \right.$$
$$\left. + \text{ep0423} \cdot \left(\frac{[\text{s\_0423}]}{\text{ic0423}} \right) + \text{ep0633} \cdot \left(\frac{[\text{s\_0633}]}{\text{ic0633}} \right) + \text{ep1527} \cdot \left(\frac{[\text{s\_1527}]}{\text{ic1527}} \right) \right)$$

$$(529)$$

Table 1061: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.001	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.001	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0434			1.000	dimensionless	☑
ep1048			1.000	dimensionless	☑
ep1610			1.000	dimensionless	☑
ep0423			-1.000	dimensionless	☑
ep0633			-1.000	dimensionless	☑
ep1527			-1.000	dimensionless	☑

7.265 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

$$\text{s\_0204} + \text{s\_0991} \xrightleftharpoons{\text{e\_0348, e\_0629, s\_0204, s\_0991, s\_0180, s\_1051}} \text{s\_0180} + \text{s\_1051} \qquad (530)$$

Reactants

Table 1062: Properties of each reactant.

Id	Name	SBO
s_0204	3-(4-hydroxyphenyl)pyruvate	
s_0991	L-glutamate	

Modifiers

Table 1063: 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 1064: Properties of each product.

Id	Name	SBO
s_0180	2-oxoglutarate	
s_1051	L-tyrosine	

Kinetic Law

Derived unit contains undeclared units

$$
v_{265} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0204} \cdot \left(\frac{[\text{s\_0204}]}{\text{ic0204}} \right) + \text{ep0991} \cdot \left(\frac{[\text{s\_0991}]}{\text{ic0991}} \right) + \text{ep0180} \right. \\
\left. \cdot \left(\frac{[\text{s\_0180}]}{\text{ic0180}} \right) + \text{ep1051} \cdot \left(\frac{[\text{s\_1051}]}{\text{ic1051}} \right) \right) \tag{531}
$$

Table 1065: Properties of each parameter.

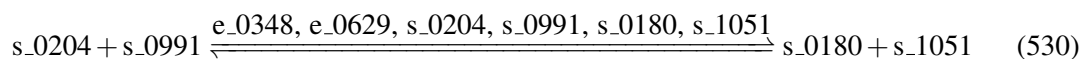| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.004	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	✓
v0			0.004	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	✓
ep0204			1.000	dimensionless	✓
ep0991			1.000	dimensionless	✓
ep0180			−1.000	dimensionless	✓
ep1051			−1.000	dimensionless	✓

7.266 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

$$s\_0434 + s\_1051 + s\_1612 \xrightleftharpoons{\text{e\_0390, s\_0434, s\_1051, s\_1612, s\_0423, s\_0633, s\_1533}} s\_0423 + s\_0633 + s\_1533$$

$$(532)$$
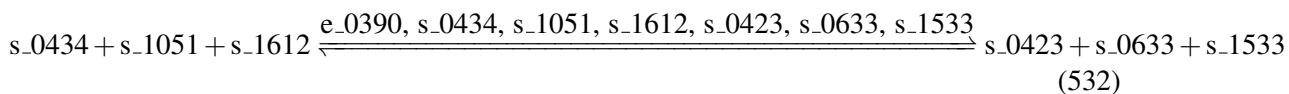
Reactants

Table 1066: Properties of each reactant.

Id	Name	SBO
s_0434	ATP	
s_1051	L-tyrosine	
s_1612	tRNA(Tyr)	

Modifiers

Table 1067: Properties of each modifier.

Id	Name	SBO
e_0390	TYS1	0000460
s_0434	ATP	
s_1051	L-tyrosine	
s_1612	tRNA(Tyr)	
s_0423	AMP	
s_0633	diphosphate	
s_1533	Tyr-tRNA(Tyr)	

Products

Table 1068: Properties of each product.

Id	Name	SBO
s_0423	AMP	

Id	Name	SBO
s_0633	diphosphate	
s_1533	Tyr-tRNA(Tyr)	

Kinetic Law

Derived unit contains undeclared units

$$
v_{266} = \text{vol}\,(\text{cell}) \cdot v0 \cdot \left(1 + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}} \right) + \text{ep1051} \cdot \left(\frac{[\text{s\_1051}]}{\text{ic1051}} \right) + \text{ep1612} \cdot \left(\frac{[\text{s\_1612}]}{\text{ic1612}} \right) \right.
$$
$$
\left. + \text{ep0423} \cdot \left(\frac{[\text{s\_0423}]}{\text{ic0423}} \right) + \text{ep0633} \cdot \left(\frac{[\text{s\_0633}]}{\text{ic0633}} \right) + \text{ep1533} \cdot \left(\frac{[\text{s\_1533}]}{\text{ic1533}} \right) \right)
$$
(533)

Table 1069: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.004	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.004	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0434			1.000	dimensionless	☑
ep1051			1.000	dimensionless	☑
ep1612			1.000	dimensionless	☑
ep0423			-1.000	dimensionless	☑
ep0633			-1.000	dimensionless	☑
ep1533			-1.000	dimensionless	☑

7.267 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

$$
\text{s\_0434} + \text{s\_1545} \xrightleftharpoons{\text{e\_0561, s\_0434, s\_1545, s\_0394, s\_1538}} \text{s\_0394} + \text{s\_1538}
$$
(534)

Reactants

Produced by SBML2LATEX

Table 1070: Properties of each reactant.

Id	Name	SBO
s_0434	ATP	
s_1545	UMP	

Modifiers

Table 1071: Properties of each modifier.

Id	Name	SBO
e_0561	URA6	0000460
s_0434	ATP	
s_1545	UMP	
s_0394	ADP	
s_1538	UDP	

Products

Table 1072: Properties of each product.

Id	Name	SBO
s_0394	ADP	
s_1538	UDP	

Kinetic Law

Derived unit contains undeclared units

$$v_{267} = \text{vol}\left(\text{cell}\right) \cdot \text{v0} \cdot \left(1 + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}} \right) + \text{ep1545} \cdot \left(\frac{[\text{s\_1545}]}{\text{ic1545}} \right) + \text{ep0394} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0394}]}{\text{ic0394}} \right) + \text{ep1538} \cdot \left(\frac{[\text{s\_1538}]}{\text{ic1538}} \right) \right) \tag{535}$$

Table 1073: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.002	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.002	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0434			1.000	dimensionless	☑

Id	Name	SBO	Value	Unit	Constant
ep1545			1.000	dimensionless	☑
ep0394			−1.000	dimensionless	☑
ep1538			−1.000	dimensionless	☑

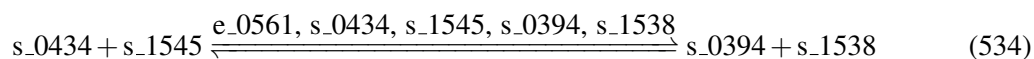## 7.268 Reaction `r_1084`

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

$$s\_0567 + s\_1559 \xrightleftharpoons{\text{e\_0565, s\_0567, s\_1559, s\_0633, s\_1543}} s\_0633 + s\_1543 \tag{536}$$
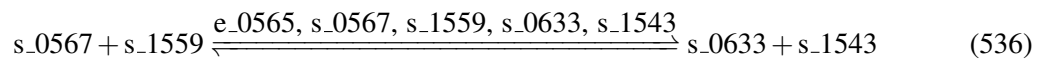
Reactants

Table 1074: Properties of each reactant.

Id	Name	SBO
s_0567	D-glucose 1-phosphate	
s_1559	UTP	

Modifiers

Table 1075: 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

Produced by SBML2LATEX

Table 1076: Properties of each product.

Id	Name	SBO
s_0633	diphosphate	
s_1543	UDP-D-glucose	

Kinetic Law

Derived unit contains undeclared units

$$v_{268} = \text{vol}\,(\text{cell}) \cdot v0 \cdot \left(1 + ep0567 \cdot \left(\frac{[\text{s\_0567}]}{\text{ic0567}} \right) + ep1559 \cdot \left(\frac{[\text{s\_1559}]}{\text{ic1559}} \right) + ep0633 \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0633}]}{\text{ic0633}} \right) + ep1543 \cdot \left(\frac{[\text{s\_1543}]}{\text{ic1543}} \right) \right) \tag{537}$$

Table 1077: Properties of each parameter.

| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.107	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.107	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0567			1.000	dimensionless	☑
ep1559			1.000	dimensionless	☑
ep0633			-1.000	dimensionless	☑
ep1543			-1.000	dimensionless	☑

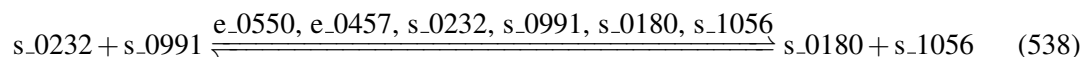## 7.269 Reaction r_1087

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

Name valine transaminase

SBO:0000176 biochemical reaction

Reaction equation

$$\text{s\_0232} + \text{s\_0991} \xrightleftharpoons{\text{e\_0550, e\_0457, s\_0232, s\_0991, s\_0180, s\_1056}} \text{s\_0180} + \text{s\_1056} \tag{538}$$

Reactants

Table 1078: Properties of each reactant.

Id	Name	SBO
s_0232	3-methyl-2-oxobutanoate	
s_0991	L-glutamate	

Modifiers

Table 1079: 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 1080: Properties of each product.

Id	Name	SBO
s_0180	2-oxoglutarate	
s_1056	L-valine	

Kinetic Law

Derived unit contains undeclared units

$$v_{269} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0232} \cdot \left(\frac{[\text{s\_0232}]}{\text{ic0232}} \right) + \text{ep0991} \cdot \left(\frac{[\text{s\_0991}]}{\text{ic0991}} \right) + \text{ep0180} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0180}]}{\text{ic0180}} \right) + \text{ep1056} \cdot \left(\frac{[\text{s\_1056}]}{\text{ic1056}} \right) \right) \tag{539}$$

Table 1081: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.010	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	✓
v0			0.010	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	✓

Id	Name	SBO	Value	Unit	Constant
ep0232			1.000	dimensionless	☑
ep0991			1.000	dimensionless	☑
ep0180			−1.000	dimensionless	☑
ep1056			−1.000	dimensionless	☑

7.270 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

$$s\_0434 + s\_1056 + s\_1614 \xrightleftharpoons{e\_0372,\ s\_0434,\ s\_1056,\ s\_1614,\ s\_0423,\ s\_0633,\ s\_1561} s\_0423 + s\_0633 + s\_1561 \tag{540}$$
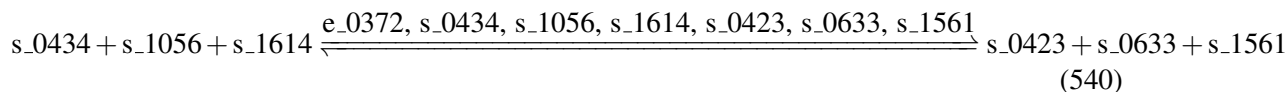
Reactants

Table 1082: Properties of each reactant.

Id	Name	SBO
s_0434	ATP	
s_1056	L-valine	
s_1614	tRNA(Val)	

Modifiers

Table 1083: Properties of each modifier.

Id	Name	SBO
e_0372	VAS1	0000460
s_0434	ATP	
s_1056	L-valine	
s_1614	tRNA(Val)	
s_0423	AMP	
s_0633	diphosphate	
s_1561	Val-tRNA(Val)	

Products

Table 1084: Properties of each product.

Id	Name	SBO
s_0423	AMP	
s_0633	diphosphate	
s_1561	Val-tRNA(Val)	

Kinetic Law

Derived unit contains undeclared units

$$
v_{270} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}} \right) + \text{ep1056} \cdot \left(\frac{[\text{s\_1056}]}{\text{ic1056}} \right) + \text{ep1614} \cdot \left(\frac{[\text{s\_1614}]}{\text{ic1614}} \right) \right.
$$
$$
\left. + \text{ep0423} \cdot \left(\frac{[\text{s\_0423}]}{\text{ic0423}} \right) + \text{ep0633} \cdot \left(\frac{[\text{s\_0633}]}{\text{ic0633}} \right) + \text{ep1561} \cdot \left(\frac{[\text{s\_1561}]}{\text{ic1561}} \right) \right)
$$
(541)

Table 1085: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.010	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.010	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0434			1.000	dimensionless	☑
ep1056			1.000	dimensionless	☑
ep1614			1.000	dimensionless	☑
ep0423			−1.000	dimensionless	☑
ep0633			−1.000	dimensionless	☑
ep1561			−1.000	dimensionless	☑

7.271 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

$$
\text{s\_0420} \xrightleftharpoons{\text{s\_0420, s\_0419}} \text{s\_0419}
$$
(542)

Produced by SBML2LATEX

Reactant

Table 1086: Properties of each reactant.

Id	Name	SBO
s_0420	ammonium	

Modifiers

Table 1087: Properties of each modifier.

Id	Name	SBO
s_0420	ammonium	
s_0419	ammonium	

Product

Table 1088: Properties of each product.

Id	Name	SBO
s_0419	ammonium	

Kinetic Law

Derived unit contains undeclared units

$$v_{271} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0420} \cdot \left(\frac{[\text{s\_0420}]}{\text{ic0420}} \right) + \text{ep0419} \cdot \left(\frac{[\text{s\_0419}]}{\text{ic0419}} \right) \right) \qquad (543)$$

Table 1089: Properties of each parameter.

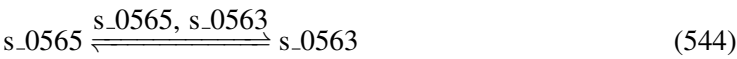| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.212	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.212	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0420			1.000	dimensionless	☑
ep0419			-1.000	dimensionless	☑

7.272 Reaction r_1166

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

Name glucose transport

SBO:0000185 transport reaction

Reaction equation

$$s\_0565 \xrightleftharpoons{\text{s\_0565, s\_0563}} s\_0563 \qquad (544)$$

Reactant

Table 1090: Properties of each reactant.

Id	Name	SBO
s_0565	D-glucose	

Modifiers

Table 1091: Properties of each modifier.

Id	Name	SBO
s_0565	D-glucose	
s_0563	D-glucose	

Product

Table 1092: Properties of each product.

Id	Name	SBO
s_0563	D-glucose	

Kinetic Law

Derived unit contains undeclared units

$$v_{272} = \text{vol}\left(\text{cell}\right) \cdot \text{v0} \cdot \left(1 + \text{ep0565} \cdot \left(\frac{[\text{s\_0565}]}{\text{ic0565}}\right) + \text{ep0563} \cdot \left(\frac{[\text{s\_0563}]}{\text{ic0563}}\right)\right) \qquad (545)$$

Table 1093: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			1.0	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			1.0	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0565			1.0	dimensionless	☑
ep0563			-1.0	dimensionless	☑

7.273 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

$$\text{s\_1324} \xrightleftharpoons{\text{s\_1324, s\_1322}} \text{s\_1322} \tag{546}$$

Reactant

Table 1094: Properties of each reactant.

Id	Name	SBO
s_1324	phosphate	

Modifiers

Table 1095: Properties of each modifier.

Id	Name	SBO
s_1324	phosphate	
s_1322	phosphate	

Product

Table 1096: Properties of each product.

Id	Name	SBO
s_1322	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{273} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep1324} \cdot \left(\frac{[\text{s\_1324}]}{\text{ic1324}} \right) + \text{ep1322} \cdot \left(\frac{[\text{s\_1322}]}{\text{ic1322}} \right) \right) \qquad (547)$$

Table 1097: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.030	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
v0			0.030	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
ep1324			1.000	dimensionless	☑
ep1322			-1.000	dimensionless	☑

7.274 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

$$\text{s\_1468} \xrightleftharpoons{\text{s\_1468, s\_1467}} \text{s\_1467} \qquad (548)$$

Reactant

Table 1098: Properties of each reactant.

Id	Name	SBO
s_1468	sulphate	

Modifiers

Table 1099: Properties of each modifier.

Id	Name	SBO
s_1468	sulphate	
s_1467	sulphate	

Product

Table 1100: Properties of each product.

Id	Name	SBO
s_1467	sulphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{274} = \text{vol}\left(\text{cell}\right) \cdot v0 \cdot \left(1 + \text{ep}1468 \cdot \left(\frac{[\text{s\_1468}]}{\text{ic}1468}\right) + \text{ep}1467 \cdot \left(\frac{[\text{s\_1467}]}{\text{ic}1467}\right)\right) \quad (549)$$

Table 1101: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.003	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.003	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep1468			1.000	dimensionless	☑
ep1467			-1.000	dimensionless	☑

7.275 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

$$\text{s\_0456} \xrightleftharpoons{\text{s\_0456, s\_0445}} \text{s\_0445} \quad (550)$$

Reactant

Table 1102: Properties of each reactant.

Id	Name	SBO
s_0456	carbon dioxide	

Modifiers

Table 1103: Properties of each modifier.

Id	Name	SBO
s_0456	carbon dioxide	
s_0445	bicarbonate	

Product

Table 1104: Properties of each product.

Id	Name	SBO
s_0445	bicarbonate	

Kinetic Law

Derived unit contains undeclared units

$$v_{275} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0456} \cdot \left(\frac{[\text{s\_0456}]}{\text{ic0456}} \right) + \text{ep0445} \cdot \left(\frac{[\text{s\_0445}]}{\text{ic0445}} \right) \right) \quad (551)$$

Table 1105: Properties of each parameter.

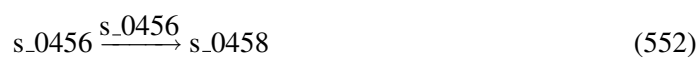| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.088	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			0.088	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0456			1.000	dimensionless	☑
ep0445			-1.000	dimensionless	☑

7.276 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

$$\text{s\_0456} \xrightarrow{\text{s\_0456}} \text{s\_0458} \quad (552)$$

Reactant

Table 1106: Properties of each reactant.

Id	Name	SBO
s_0456	carbon dioxide	

Modifier

Table 1107: Properties of each modifier.

Id	Name	SBO
s_0456	carbon dioxide	

Product

Table 1108: Properties of each product.

Id	Name	SBO
s_0458	carbon dioxide	

Kinetic Law

Derived unit contains undeclared units

$$v_{276} = \text{vol}\,(\text{cell}) \cdot \max\left(v0 \cdot \left(1 + \text{ep0456} \cdot \left(\frac{[\text{s\_0456}]}{\text{ic0456}} \right) \right), \text{zero\_flux} \right) \tag{553}$$

$$\max\,(x, y) = \frac{x + y + |x - y|}{2} \tag{554}$$

$$\max\,(x, y) = \frac{x + y + |x - y|}{2} \tag{555}$$

Table 1109: Properties of each parameter.

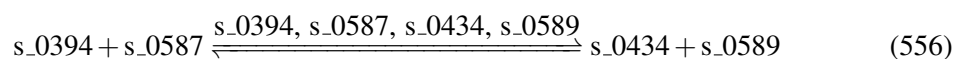| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			1.520	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			1.520	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0456			1.000	dimensionless	☑

7.277 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

$$s\_0394 + s\_0587 \xrightleftharpoons{\text{s\_0394, s\_0587, s\_0434, s\_0589}} s\_0434 + s\_0589 \qquad (556)$$

Reactants

Table 1110: Properties of each reactant.

Id	Name	SBO
s_0394	ADP	
s_0587	dCDP	

Modifiers

Table 1111: Properties of each modifier.

Id	Name	SBO
s_0394	ADP	
s_0587	dCDP	
s_0434	ATP	
s_0589	dCMP	

Products

Table 1112: Properties of each product.

Id	Name	SBO
s_0434	ATP	
s_0589	dCMP	

Kinetic Law

Derived unit contains undeclared units

$$v_{277} = \text{vol}\,(\text{cell}) \cdot v0 \cdot \left(1 + \text{ep0394} \cdot \left(\frac{[\text{s\_0394}]}{\text{ic0394}}\right) + \text{ep0587} \cdot \left(\frac{[\text{s\_0587}]}{\text{ic0587}}\right) + \text{ep0434}\right.$$
$$\left.\cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}}\right) + \text{ep0589} \cdot \left(\frac{[\text{s\_0589}]}{\text{ic0589}}\right)\right) \tag{557}$$

Table 1113: Properties of each parameter.

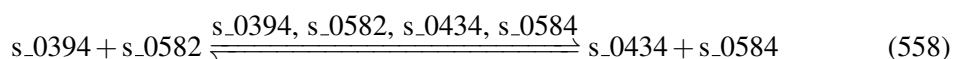| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$9.44495616916319 \cdot 10^{-5}$	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
v0			$9.44495616916319 \cdot 10^{-5}$	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
ep0394			1.000	dimensionless	☑
ep0587			1.000	dimensionless	☑
ep0434			-1.000	dimensionless	☑
ep0589			-1.000	dimensionless	☑

7.278 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

$$\text{s\_0394} + \text{s\_0582} \xrightleftharpoons{\text{s\_0394, s\_0582, s\_0434, s\_0584}} \text{s\_0434} + \text{s\_0584} \tag{558}$$

Reactants

Table 1114: Properties of each reactant.

Id	Name	SBO
s_0394	ADP	
s_0582	dADP	

Modifiers

Table 1115: Properties of each modifier.

Id	Name	SBO
s_0394	ADP	
s_0582	dADP	
s_0434	ATP	
s_0584	dAMP	

Products

Table 1116: Properties of each product.

Id	Name	SBO
s_0434	ATP	
s_0584	dAMP	

Kinetic Law

Derived unit contains undeclared units

$$v_{278} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep0394} \cdot \left(\frac{[\text{s\_0394}]}{\text{ic0394}} \right) + \text{ep0582} \cdot \left(\frac{[\text{s\_0582}]}{\text{ic0582}} \right) + \text{ep0434} \right.$$
$$\left. \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}} \right) + \text{ep0584} \cdot \left(\frac{[\text{s\_0584}]}{\text{ic0584}} \right) \right) \tag{559}$$

Table 1117: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$1.36629031036409 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
v0			$1.36629031036409 \cdot 10^{-4}$	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	☑
ep0394			1.000	dimensionless	☑
ep0582			1.000	dimensionless	☑
ep0434			-1.000	dimensionless	☑
ep0584			-1.000	dimensionless	☑

7.279 Reaction r_1795

This is an irreversible reaction of one reactant forming one product influenced by one modifier.

Name formate transport

SBO:0000185 transport reaction

Reaction equation

$$s\_0722 \xrightarrow{s\_0722} s\_0723 \tag{560}$$

Reactant

Table 1118: Properties of each reactant.

Id	Name	SBO
s_0722	formate	

Modifier

Table 1119: Properties of each modifier.

Id	Name	SBO
s_0722	formate	

Product

Table 1120: Properties of each product.

Id	Name	SBO
s_0723	formate	

Kinetic Law

Derived unit contains undeclared units

$$v_{279} = \text{vol}\left(\text{cell}\right) \cdot \max\left(v0 \cdot \left(1 + \text{ep0722} \cdot \left(\frac{[\text{s\_0722}]}{\text{ic0722}} \right) \right), \text{zero\_flux} \right) \tag{561}$$

$$\max\left(x, y\right) = \frac{x + y + |x - y|}{2} \tag{562}$$

$$\max\left(x, y\right) = \frac{x + y + |x - y|}{2} \tag{563}$$

Table 1121: Properties of each parameter.

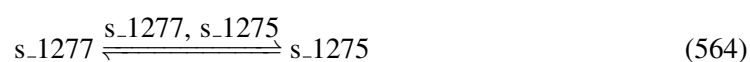| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			2.876	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
v0			2.876	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
ep0722			1.000	dimensionless	☑

7.280 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

$$s\_1277 \xrightleftharpoons{s\_1277,\ s\_1275} s\_1275 \tag{564}$$

Reactant

Table 1122: Properties of each reactant.

Id	Name	SBO
s_1277	oxygen	

Modifiers

Table 1123: Properties of each modifier.

Id	Name	SBO
s_1277	oxygen	
s_1275	oxygen	

Product

Table 1124: Properties of each product.

Id	Name	SBO
s_1275	oxygen	

Kinetic Law

Derived unit contains undeclared units

$$v_{280} = \text{vol}\,(\text{cell}) \cdot \text{v0} \cdot \left(1 + \text{ep1277} \cdot \left(\frac{[\text{s\_1277}]}{\text{ic1277}}\right) + \text{ep1275} \cdot \left(\frac{[\text{s\_1275}]}{\text{ic1275}}\right)\right) \qquad (565)$$

Table 1125: Properties of each parameter.

| Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			2.941	mmol $\cdot$ l^{-1} $\cdot$ s^{-1}	☑
v0			2.941	mmol $\cdot$ l^{-1} $\cdot$ s^{-1}	☑
ep1277			1.000	dimensionless	☑
ep1275			-1.000	dimensionless	☑

7.281 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

$$\text{s\_0313} \xrightleftharpoons[]{\text{s\_0313, s\_0314, s\_1322}} \text{s\_0314} + \text{s\_1322} \qquad (566)$$
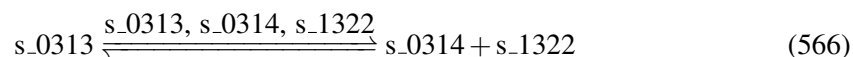
Reactant

Table 1126: Properties of each reactant.

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

Modifiers

Table 1127: 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
s_1322	phosphate	

Products

Table 1128: Properties of each product.

Id	Name	SBO
s_0314	5-amino-6-(D-ribitylamino)uracil	
s_1322	phosphate	

Kinetic Law

Derived unit contains undeclared units

$$v_{281} = \text{vol}\,(\text{cell}) \cdot \text{v0}$$
$$\cdot \left(1 + \text{ep0313} \cdot \left(\frac{[\text{s\_0313}]}{\text{ic0313}} \right) + \text{ep0314} \cdot \left(\frac{[\text{s\_0314}]}{\text{ic0314}} \right) + \text{ep1322} \cdot \left(\frac{[\text{s\_1322}]}{\text{ic1322}} \right) \right) \quad (567)$$

Table 1129: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			$3.75729835487922 \cdot 10^{-5}$	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
v0			$3.75729835487922 \cdot 10^{-5}$	mmol$\cdot$l$^{-1}\cdot$s^{-1}	☑
ep0313			1.000	dimensionless	☑
ep0314			-1.000	dimensionless	☑
ep1322			-1.000	dimensionless	☑

7.282 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

$$1 \cdot 1348 \,\text{s\_0002} + 0 \cdot 046 \,\text{s\_0423} + 59 \cdot 276 \,\text{s\_0434} + 0 \cdot 0447 \,\text{s\_0526} + 0 \cdot 0036 \,\text{s\_0584} + 0 \cdot 0024 \,\text{s\_0589} + 0 \cdot 0024 \,\text{s\_0615} \cdot$$
$$(568)$$

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Reactants

Table 1130: Properties of each reactant.

Id	Name	SBO
s_0002	(1->3)-beta-D-glucan	
s_0423	AMP	
s_0434	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)	
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)	

Id	Name	SBO
s_0122	14-demethyllanosterol	
s_0918	inositol-P-ceramide D (C24)	
s_0657	episterol	
s_0662	ergosta-5,7,22,24(28)-tetraen-3beta-ol	
s_0666	ergosterol	
s_0672	ergosterol ester	
s_0056	(S)-3-methyl-2-oxopentanoate	
s_0700	fecosterol	
s_1059	lanosterol	
s_1346	phosphatidylcholine	
s_1351	phosphatidylethanolamine	
s_1524	triglyceride	
s_1569	zymosterol	

Modifiers

Table 1131: Properties of each modifier.

Id	Name	SBO
s_0002	(1->3)-beta-D-glucan	
s_0423	AMP	
s_0434	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)	

Id	Name	SBO
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_0918	inositol-P-ceramide D (C24)	
s_0657	episterol	
s_0662	ergosta-5,7,22,24(28)-tetraen-3beta-ol	
s_0666	ergosterol	
s_0672	ergosterol ester	
s_0056	(S)-3-methyl-2-oxopentanoate	
s_0700	fecosterol	
s_1059	lanosterol	
s_1346	phosphatidylcholine	
s_1351	phosphatidylethanolamine	
s_1524	triglyceride	
s_1569	zymosterol	

Products

Table 1132: Properties of each product.

Id	Name	SBO
s_0394	ADP	
s_1322	phosphate	
s_1582	tRNA(Ala)	
s_1583	tRNA(Arg)	
s_1585	tRNA(Asn)	
s_1587	tRNA(Asp)	

Id	Name	SBO
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

$$v_{282} = \text{vol}\,(\text{cell}) \tag{569}$$

$$\cdot \max \Bigg(\text{v0} \cdot \Bigg(1 + \text{ep0002} \cdot \left(\frac{[\text{s\_0002}]}{\text{ic0002}} \right) + \text{ep0423} \cdot \left(\frac{[\text{s\_0423}]}{\text{ic0423}} \right) + \text{ep0434} \cdot \left(\frac{[\text{s\_0434}]}{\text{ic0434}} \right)$$

$$+ \text{ep0526} \cdot \left(\frac{[\text{s\_0526}]}{\text{ic0526}} \right) + \text{ep0584} \cdot \left(\frac{[\text{s\_0584}]}{\text{ic0584}} \right) + \text{ep0589} \cdot \left(\frac{[\text{s\_0589}]}{\text{ic0589}} \right) + \text{ep0615}$$

$$\cdot \left(\frac{[\text{s\_0615}]}{\text{ic0615}} \right) + \text{ep0649} \cdot \left(\frac{[\text{s\_0649}]}{\text{ic0649}} \right) + \text{ep0773} \cdot \left(\frac{[\text{s\_0773}]}{\text{ic0773}} \right) + \text{ep0782} \cdot \left(\frac{[\text{s\_0782}]}{\text{ic0782}} \right)$$

$$+ \text{ep1107} \cdot \left(\frac{[\text{s\_1107}]}{\text{ic1107}} \right) + \text{ep1405} \cdot \left(\frac{[\text{s\_1405}]}{\text{ic1405}} \right) + \text{ep1467} \cdot \left(\frac{[\text{s\_1467}]}{\text{ic1467}} \right) + \text{ep1520}$$

$$\cdot \left(\frac{[\text{s\_1520}]}{\text{ic1520}} \right) + \text{ep1545} \cdot \left(\frac{[\text{s\_1545}]}{\text{ic1545}} \right) + \text{ep0004} \cdot \left(\frac{[\text{s\_0004}]}{\text{ic0004}} \right) + \text{ep0404} \cdot \left(\frac{[\text{s\_0404}]}{\text{ic0404}} \right)$$

$$+ \text{ep0428} \cdot \left(\frac{[\text{s\_0428}]}{\text{ic0428}} \right) + \text{ep0430} \cdot \left(\frac{[\text{s\_0430}]}{\text{ic0430}} \right) + \text{ep0432} \cdot \left(\frac{[\text{s\_0432}]}{\text{ic0432}} \right) + \text{ep0542}$$

$$\cdot \left(\frac{[\text{s\_0542}]}{\text{ic0542}} \right) + \text{ep0747} \cdot \left(\frac{[\text{s\_0747}]}{\text{ic0747}} \right) + \text{ep0748} \cdot \left(\frac{[\text{s\_0748}]}{\text{ic0748}} \right) + \text{ep0757} \cdot \left(\frac{[\text{s\_0757}]}{\text{ic0757}} \right)$$

$$+ \text{ep0832} \cdot \left(\frac{[\text{s\_0832}]}{\text{ic0832}} \right) + \text{ep0847} \cdot \left(\frac{[\text{s\_0847}]}{\text{ic0847}} \right) + \text{ep1077} \cdot \left(\frac{[\text{s\_1077}]}{\text{ic1077}} \right) + \text{ep1099}$$

$$\cdot \left(\frac{[\text{s\_1099}]}{\text{ic1099}} \right) + \text{ep1148} \cdot \left(\frac{[\text{s\_1148}]}{\text{ic1148}} \right) + \text{ep1314} \cdot \left(\frac{[\text{s\_1314}]}{\text{ic1314}} \right) + \text{ep1379} \cdot \left(\frac{[\text{s\_1379}]}{\text{ic1379}} \right)$$

$$+ \text{ep1337} \cdot \left(\frac{[\text{s\_1337}]}{\text{ic1337}} \right) + \text{ep0089} \cdot \left(\frac{[\text{s\_0089}]}{\text{ic0089}} \right) + \text{ep1428} \cdot \left(\frac{[\text{s\_1428}]}{\text{ic1428}} \right) + \text{ep1491}$$

$$\cdot \left(\frac{[\text{s\_1491}]}{\text{ic1491}} \right) + \text{ep1527} \cdot \left(\frac{[\text{s\_1527}]}{\text{ic1527}} \right) + \text{ep1533} \cdot \left(\frac{[\text{s\_1533}]}{\text{ic1533}} \right) + \text{ep1561} \cdot \left(\frac{[\text{s\_1561}]}{\text{ic1561}} \right)$$

$$+ \text{ep0122} \cdot \left(\frac{[\text{s\_0122}]}{\text{ic0122}} \right) + \text{ep0918} \cdot \left(\frac{[\text{s\_0918}]}{\text{ic0918}} \right) + \text{ep0657} \cdot \left(\frac{[\text{s\_0657}]}{\text{ic0657}} \right) + \text{ep0662} \cdot \left(\frac{[\text{s\_0662}]}{\text{ic0662}} \right)$$

$$+ \text{ep0666} \cdot \left(\frac{[\text{s\_0666}]}{\text{ic0666}} \right) + \text{ep0672} \cdot \left(\frac{[\text{s\_0672}]}{\text{ic0672}} \right) + \text{ep0056} \cdot \left(\frac{[\text{s\_0056}]}{\text{ic0056}} \right) + \text{ep0700} \cdot \left(\frac{[\text{s\_0700}]}{\text{ic0700}} \right)$$

$$+ \text{ep1059} \cdot \left(\frac{[\text{s\_1059}]}{\text{ic1059}} \right) + \text{ep1346} \cdot \left(\frac{[\text{s\_1346}]}{\text{ic1346}} \right) + \text{ep1351} \cdot \left(\frac{[\text{s\_1351}]}{\text{ic1351}} \right) + \text{ep1524} \cdot \left(\frac{[\text{s\_1524}]}{\text{ic1524}} \right)$$

$$+ \text{ep1569} \cdot \left(\frac{[\text{s\_1569}]}{\text{ic1569}} \right) \Bigg) , \text{zero\_flux} \Bigg)$$

$$\max\,(x, y) = \frac{x + y + |x - y|}{2} \tag{570}$$

$$\max\,(x, y) = \frac{x + y + |x - y|}{2} \tag{571}$$

Table 1133: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
FLUX_VALUE			0.038	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	✓
v0			0.038	$\text{mmol} \cdot \text{l}^{-1} \cdot \text{s}^{-1}$	✓
ep0002			1.135	dimensionless	✓
ep0423			0.046	dimensionless	✓
ep0434			59.276	dimensionless	✓
ep0526			0.045	dimensionless	✓
ep0584			0.004	dimensionless	✓
ep0589			0.002	dimensionless	✓
ep0615			0.002	dimensionless	✓
ep0649			0.004	dimensionless	✓
ep0773			0.519	dimensionless	✓
ep0782			0.046	dimensionless	✓
ep1107			0.808	dimensionless	✓
ep1405			$9.9 \cdot 10^{-4}$	dimensionless	✓
ep1467			0.020	dimensionless	✓
ep1520			0.023	dimensionless	✓
ep1545			0.060	dimensionless	✓
ep0004			1.135	dimensionless	✓
ep0404			0.459	dimensionless	✓
ep0428			0.161	dimensionless	✓
ep0430			0.102	dimensionless	✓
ep0432			0.298	dimensionless	✓
ep0542			0.007	dimensionless	✓
ep0747			0.105	dimensionless	✓
ep0748			0.302	dimensionless	✓
ep0757			0.290	dimensionless	✓
ep0832			0.066	dimensionless	✓
ep0847			0.193	dimensionless	✓
ep1077			0.296	dimensionless	✓
ep1099			0.286	dimensionless	✓
ep1148			0.051	dimensionless	✓
ep1314			0.134	dimensionless	✓
ep1379			0.165	dimensionless	✓
ep1337			$3.9 \cdot 10^{-4}$	dimensionless	✓
ep0089			0.002	dimensionless	✓
ep1428			0.185	dimensionless	✓
ep1491			0.191	dimensionless	✓
ep1527			0.028	dimensionless	✓
ep1533			0.102	dimensionless	✓
ep1561			0.265	dimensionless	✓

Id	Name	SBO	Value	Unit	Constant
ep0122			$5.6 \cdot 10^{-5}$	dimensionless	☑
ep0918			$5.38625 \cdot 10^{-4}$	dimensionless	☑
ep0657			$9.6 \cdot 10^{-5}$	dimensionless	☑
ep0662			$1.25 \cdot 10^{-4}$	dimensionless	☑
ep0666			0.006	dimensionless	☑
ep0672			$8.12 \cdot 10^{-4}$	dimensionless	☑
ep0056			$8.92666666666666 \cdot 10^{-4}$	dimensionless	☑
ep0700			$1.14 \cdot 10^{-4}$	dimensionless	☑
ep1059			$3.2 \cdot 10^{-5}$	dimensionless	☑
ep1346			0.003	dimensionless	☑
ep1351			$6.97 \cdot 10^{-4}$	dimensionless	☑
ep1524			$7.81 \cdot 10^{-4}$	dimensionless	☑
ep1569			$1.5 \cdot 10^{-5}$	dimensionless	☑

8 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.

8.1 Species s_0002

Name (1->3)-beta-D-glucan

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_0005 and as a modifier in r_0005, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0002} = v_1 - 1.1348 v_{282} \tag{572}$$

8.2 Species s_0004

Name (1->6)-beta-D-glucan

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_0006 and as a modifier in r_0006, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0004} = v_2 - 1.1348 v_{282} \tag{573}$$

8.3 Species s_0008

Name (2R,3R)-2,3-dihydroxy-3-methylpentanoate

SBO:0000247 simple chemical

Initial concentration 0.1 mmol $\cdot$ 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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0008} = v_{164} - v_{92} \tag{574}$$

8.4 Species s_0009

Name (2R,3S)-3-isopropylmalate

SBO:0000247 simple chemical

Initial concentration 0.1 mmol $\cdot$ 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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0009} = v_{20} - v_{21} \tag{575}$$

8.5 Species s_0010

Name (2S)-2-isopropyl-3-oxosuccinate

SBO:0000247 simple chemical

Initial concentration 0.1 mmol $\cdot$ 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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0010} = v_{21} - v_{14} \tag{576}$$

8.6 Species s_0015

Name (N(omega)-L-arginino)succinic acid

SBO:0000247 simple chemical

Initial concentration 0.1 mmol $\cdot$ 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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0015} = v_{44} - v_{43} \tag{577}$$

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8.7 Species s_0016

Name (R)-2,3-dihydroxy-3-methylbutanoate

SBO:0000247 simple chemical

Initial concentration $0.1 \text{ mmol} \cdot l^{-1}$

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).

$$\frac{d}{dt}s\_0016 = v_{25} - v_{91} \tag{578}$$

8.8 Species s_0018

Name (R)-5-diphosphomevalonic acid

SBO:0000247 simple chemical

Initial concentration $0.1 \text{ mmol} \cdot l^{-1}$

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).

$$\frac{d}{dt}s\_0018 = v_{210} - v_{181} \tag{579}$$

8.9 Species s_0019

Name (R)-5-phosphomevalonic acid

SBO:0000247 simple chemical

Initial concentration $0.1 \text{ mmol} \cdot l^{-1}$

This species takes part in four reactions (as a reactant in r_0904 and as a product in r_0736 and as a modifier in r_0736, r_0904).

$$\frac{d}{dt}s\_0019 = v_{180} - v_{210} \tag{580}$$

8.10 Species s_0028

Name (R)-mevalonate

SBO:0000247 simple chemical

Initial concentration $0.1 \text{ mmol} \cdot l^{-1}$

This species takes part in four reactions (as a reactant in r_0736 and as a product in r_0558 and as a modifier in r_0558, r_0736).

$$\frac{d}{dt}s\_0028 = v_{150} - v_{180} \tag{581}$$

8.11 Species s_0037

Name (S)-2,3-epoxysqualene

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

This species takes part in six reactions (as a reactant in r_0698 and as a product in r_1010, r_1011 and as a modifier in r_0698, r_1010, r_1011).

$$\frac{d}{dt} \text{s\_0037} = v_{247} + v_{248} - v_{167} \tag{582}$$

8.12 Species s_0039

Name (S)-2-acetyl-2-hydroxybutanoate

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

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).

$$\frac{d}{dt} \text{s\_0039} = v_8 - v_{164} \tag{583}$$

8.13 Species s_0056

Name (S)-3-methyl-2-oxopentanoate

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

This species takes part in ten reactions (as a reactant in r_0663, r_1014, r_1052, r_2111 and as a product in r_0353 and as a modifier in r_0353, r_0663, r_1014, r_1052, r_2111).

$$\frac{d}{dt} \text{s\_0056} = v_{92} - v_{161} - 3v_{250} - 4.33333333333333 v_{261} - 8.92666666666666 \cdot 10^{-4} v_{282} \tag{584}$$

8.14 Species s_0061

Name (S)-dihydroorotate

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

This species takes part in four reactions (as a reactant in r_0339 and as a product in r_0349 and as a modifier in r_0339, r_0349).

$$\frac{d}{dt} \text{s\_0061} = v_{90} - v_{87} \tag{585}$$

8.15 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).

$$\frac{\text{d}}{\text{d}t}\text{s\_0066} = v_{116} - v_{171} \tag{586}$$

8.16 Species s_0075

Name 1,3-bisphospho-D-glycerate

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_0892 and as a product in r_0486 and as a modifier in r_0486, r_0892).

$$\frac{\text{d}}{\text{d}t}\text{s\_0075} = v_{126} - v_{205} \tag{587}$$

8.17 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).

$$\frac{\text{d}}{\text{d}t}\text{s\_0076} = v_{216} - v_{155} \tag{588}$$

8.18 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`).

$$\frac{d}{dt} s\_0077 = v_{212} - v_3 \tag{589}$$

8.19 Species `s_0078`

Name 1-(5-phosphoribosyl)-5'-AMP

SBO:0000247 simple chemical

Initial concentration 0.1 mmol $\cdot$ 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`).

$$\frac{d}{dt} s\_0078 = v_{213} - v_{212} \tag{590}$$

8.20 Species `s_0082`

Name 1-acyl-sn-glycerol 3-phosphate

SBO:0000247 simple chemical

Initial concentration 0.1 mmol $\cdot$ 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`).

$$\frac{d}{dt} s\_0082 = v_{128} - v_4 \tag{591}$$

8.21 Species `s_0086`

Name 1-C-(indol-3-yl)glycerol 3-phosphate

SBO:0000247 simple chemical

Initial concentration 0.1 mmol $\cdot$ 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`).

$$\frac{d}{dt} s\_0086 = v_{155} - v_{263} \tag{592}$$

8.22 Species s_0089

Name 1-phosphatidyl-1D-myo-inositol

SBO:0000247 simple chemical

Initial concentration 0.1 mmol·l⁻¹

This species takes part in six reactions (as a reactant in r_0594, r_2111 and as a product in r_0874 and as a modifier in r_0594, r_0874, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0089} = v_{198} - v_{158} - 0.001583v_{282} \tag{593}$$

8.23 Species s_0118

Name 1-pyrroline-5-carboxylate

SBO:0000247 simple chemical

Initial concentration 0.1 mmol·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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0118} = v_5 - v_{227} \tag{594}$$

8.24 Species s_0120

Name 10-formyl-THF

SBO:0000247 simple chemical

Initial concentration 0.1 mmol·l⁻¹

This species takes part in eight reactions (as a reactant in r_0446, r_0499, r_0912 and as a product in r_0724 and as a modifier in r_0446, r_0499, r_0724, r_0912).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0120} = v_{174} - v_{114} - v_{129} - v_{215} \tag{595}$$

8.25 Species s_0122

Name 14-demethyllanosterol

SBO:0000247 simple chemical

Initial concentration 0.1 mmol·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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0122} = v_{54} - v_{63} - 5.6 \cdot 10^{-5}v_{282} \tag{596}$$

8.26 Species s_0126

Name 1D-myo-inositol 1-phosphate

SBO:0000247 simple chemical

Initial concentration 0.1 mmol $\cdot$ 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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0126} = v_{183} - v_{182} \tag{597}$$

8.27 Species s_0141

Name 2,5-diamino-4-hydroxy-6-(5-phosphoribosylamino)pyrimidine

SBO:0000247 simple chemical

Initial concentration 0.1 mmol $\cdot$ 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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0141} = v_{135} - v_{7} \tag{598}$$

8.28 Species s_0142

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

SBO:0000247 simple chemical

Initial concentration 0.1 mmol $\cdot$ 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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0142} = v_{7} - v_{6} \tag{599}$$

8.29 Species s_0145

Name 2-acetamido-5-oxopentanoate

SBO:0000247 simple chemical

Initial concentration 0.1 mmol $\cdot$ 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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0145} = v_{184} - v_{31} \tag{600}$$

8.30 Species s_0146

Name 2-acetyllactic acid

SBO:0000247 simple chemical

Initial concentration $0.1 \text{ mmol} \cdot l^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0146} = v_{26} - v_{25} \tag{601}$$

8.31 Species s_0158

Name 2-hydroxy-3-oxobutyl phosphate

SBO:0000247 simple chemical

Initial concentration $0.1 \text{ mmol} \cdot l^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0158} = v_{16} - v_{231} \tag{602}$$

8.32 Species s_0162

Name 2-isopropylmalate

SBO:0000247 simple chemical

Initial concentration $0.1 \text{ mmol} \cdot l^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0162} = v_{12} - v_{11} \tag{603}$$

8.33 Species s_0165

Name 2-isopropylmaleic acid

SBO:0000247 simple chemical

Initial concentration $0.1 \text{ mmol} \cdot l^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0165} = v_{11} - v_{20} \tag{604}$$

8.34 Species s_0176

Name 2-oxoadipic 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_0018 and as a product in r_0545 and as a modifier in r_0018, r_0545).

$$\frac{\text{d}}{\text{d}t}\text{s\_0176} = v_{145} - v_9 \tag{605}$$

8.35 Species s_0178

Name 2-oxobutanoate

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_0016 and as a product in r_0310 and as a modifier in r_0016, r_0310).

$$\frac{\text{d}}{\text{d}t}\text{s\_0178} = v_{79} - v_8 \tag{606}$$

8.36 Species s_0180

Name 2-oxoglutarate

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot \text{l}^{-1}$

This species takes part in 34 reactions (as a reactant in r_0470, r_0471, 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_0918, r_0988, r_1063, r_1087 and as a modifier in r_0018, r_0118, r_0216, r_0470, r_0471, r_0538, r_0543, r_0658, r_0661, r_0663, r_0674, r_0699, r_0851, r_0918, r_0988, r_1063, r_1087).

$$\frac{\text{d}}{\text{d}t}\text{s\_0180} = v_9 + v_{31} + v_{50} + v_{141} + v_{159} + v_{160} + v_{161} + v_{165} + v_{168} \tag{607}$$
$$+ v_{194} + v_{221} + v_{241} + v_{265} + v_{269} - v_{119} - v_{120} - v_{144}$$

8.37 Species s_0188

Name 2-phospho-D-glyceric 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_0366 and as a product in r_0893 and as a modifier in r_0366, r_0893).

$$\frac{\mathrm{d}}{\mathrm{d}t} \text{s\_0188} = v_{206} - v_{97} \tag{608}$$

8.38 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).

$$\frac{\mathrm{d}}{\mathrm{d}t} \text{s\_0190} = v_{117} - 2v_{249} \tag{609}$$

8.39 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).

$$\frac{\mathrm{d}}{\mathrm{d}t} \text{s\_0201} = v_{38} - v_{201} \tag{610}$$

8.40 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).

$$\frac{\mathrm{d}}{\mathrm{d}t} \text{s\_0204} = v_{225} - v_{265} \tag{611}$$

8.41 Species s_0207

Name 3-(imidazol-4-yl)-2-oxopropyl 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_0538 and as a product in r_0564 and as a modifier in r_0538, r_0564).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0207} = v_{153} - v_{141} \tag{612}$$

8.42 Species s_0209

Name 3-dehydro-4-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_0236 and as a product in r_0235 and as a modifier in r_0235, r_0236).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0209} = v_{57} - v_{58} \tag{613}$$

8.43 Species s_0210

Name 3-dehydroquinate

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_0039 and as a product in r_0040 and as a modifier in r_0039, r_0040).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0210} = v_{18} - v_{17} \tag{614}$$

8.44 Species s_0211

Name 3-dehydroshikimate

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_0996 and as a product in r_0039 and as a modifier in r_0039, r_0996).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0211} = v_{17} - v_{245} \tag{615}$$

8.45 Species s_0218

Name 3-hydroxy-3-methylglutaryl-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_0558 and as a product in r_0559 and as a modifier in r_0558, r_0559).

$$\frac{\mathrm{d}}{\mathrm{d}t} \text{s}\_0218 = v_{151} - v_{150} \tag{616}$$

8.46 Species s_0231

Name 3-ketosphinganine

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_0041 and as a product in r_0993 and as a modifier in r_0041, r_0993).

$$\frac{\mathrm{d}}{\mathrm{d}t} \text{s}\_0231 = v_{243} - v_{19} \tag{617}$$

8.47 Species s_0232

Name 3-methyl-2-oxobutanoate

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_0024, r_1087 and as a product in r_0352 and as a modifier in r_0024, r_0352, r_1087).

$$\frac{\mathrm{d}}{\mathrm{d}t} \text{s}\_0232 = v_{91} - v_{12} - v_{269} \tag{618}$$

8.48 Species s_0258

Name 3-phospho-hydroxypyruvate

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_0918 and as a product in r_0891 and as a modifier in r_0891, r_0918).

$$\frac{\mathrm{d}}{\mathrm{d}t} \text{s}\_0258 = v_{204} - v_{221} \tag{619}$$

8.49 Species s_0259

Name 3-phospho-serine

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

This species takes part in four reactions (as a reactant in r_0917 and as a product in r_0918 and as a modifier in r_0917, r_0918).

$$\frac{\text{d}}{\text{d}t}\text{s\_0259} = v_{221} - v_{220} \tag{620}$$

8.50 Species s_0260

Name 3-phosphoglycerate

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

This species takes part in six reactions (as a reactant in r_0891, r_0893 and as a product in r_0892 and as a modifier in r_0891, r_0892, r_0893).

$$\frac{\text{d}}{\text{d}t}\text{s\_0260} = v_{205} - v_{204} - v_{206} \tag{621}$$

8.51 Species s_0261

Name 3-phosphoshikimic acid

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

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).

$$\frac{\text{d}}{\text{d}t}\text{s\_0261} = v_{246} - v_{22} \tag{622}$$

8.52 Species s_0262

Name 4,4-dimethyl-5alpha-cholesta-8,14,24-trien-3beta-ol

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

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).

$$\frac{\text{d}}{\text{d}t}\text{s\_0262} = v_{82} - v_{54} \tag{623}$$

8.53 Species s_0291

Name 4-methyl-2-oxopentanoate

SBO:0000247 simple chemical

Initial concentration $0.1 \text{ mmol} \cdot l^{-1}$

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).

$$\frac{d}{dt}s\_0291 = v_{14} - v_{168} \tag{624}$$

8.54 Species s_0295

Name 4-phospho-L-aspartate

SBO:0000247 simple chemical

Initial concentration $0.1 \text{ mmol} \cdot l^{-1}$

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).

$$\frac{d}{dt}s\_0295 = v_{49} - v_{51} \tag{625}$$

8.55 Species s_0296

Name 4alpha-methylzymosterol

SBO:0000247 simple chemical

Initial concentration $0.1 \text{ mmol} \cdot l^{-1}$

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).

$$\frac{d}{dt}s\_0296 = v_{58} - v_{60} \tag{626}$$

8.56 Species s_0297

Name 4beta-methylzymosterol-4alpha-carboxylic acid

SBO:0000247 simple chemical

Initial concentration $0.1 \text{ mmol} \cdot l^{-1}$

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).

$$\frac{d}{dt}s\_0297 = v_{63} - v_{57} \tag{627}$$

8.57 Species s_0298

Name 5'-adenylyl sulfate

SBO:0000247 simple chemical

Initial concentration $0.1 \text{ mmol} \cdot l^{-1}$

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).

$$\frac{d}{dt} s\_0298 = v_{251} - v_{38} \tag{628}$$

8.58 Species s_0299

Name 5'-phosphoribosyl-4-(N-succinocarboxamide)-5-aminoimidazole

SBO:0000247 simple chemical

Initial concentration $0.1 \text{ mmol} \cdot l^{-1}$

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).

$$\frac{d}{dt} s\_0299 = v_{211} - v_{35} \tag{629}$$

8.59 Species s_0300

Name 5'-phosphoribosyl-5-aminoimidazole

SBO:0000247 simple chemical

Initial concentration $0.1 \text{ mmol} \cdot l^{-1}$

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).

$$\frac{d}{dt} s\_0300 = v_{196} - v_{214} \tag{630}$$

8.60 Species s_0301

Name 5'-phosphoribosyl-N-formylglycineamide

SBO:0000247 simple chemical

Initial concentration $0.1 \text{ mmol} \cdot l^{-1}$

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).

$$\frac{d}{dt} s\_0301 = v_{129} - v_{23} \tag{631}$$

8.61 Species s_0302

Name 5'-phosphoribosyl-N-formylglycineamidine

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0302} = v_{23} - v_{196} \tag{632}$$

8.62 Species s_0304

Name 5,10-methenyl-THF

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

This species takes part in six reactions (as a reactant in r_0724 and as a product in r_0731, r_0732 and as a modifier in r_0724, r_0731, r_0732).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0304} = v_{178} + v_{179} - v_{174} \tag{633}$$

8.63 Species s_0306

Name 5,10-methylenetetrahydrofolate

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

This species takes part in twelve reactions (as a reactant in r_0080, r_0731, r_0732, r_1045 and as a product in r_0501, r_0502 and as a modifier in r_0080, r_0501, r_0502, r_0731, r_0732, r_1045).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0306} = v_{130} + v_{131} - v_{24} - v_{178} - v_{179} - v_{256} \tag{634}$$

8.64 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 mmol·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).

$$\frac{d}{dt}s\_0312 = v_3 - v_{152} \tag{635}$$

8.65 Species s_0313

Name 5-amino-6-(5-phosphoribitylamino)uracil

SBO:0000247 simple chemical

Initial concentration 0.1 mmol·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).

$$\frac{d}{dt}s\_0313 = v_6 - v_{281} \tag{636}$$

8.66 Species s_0314

Name 5-amino-6-(D-ribitylamino)uracil

SBO:0000247 simple chemical

Initial concentration 0.1 mmol·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).

$$\frac{d}{dt}s\_0314 = v_{232} + v_{281} - v_{231} \tag{637}$$

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8.67 Species s_0322

Name 5-methyltetrahydrofolate

SBO:0000247 simple chemical

Initial concentration 0.1 mmol · 1^{-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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0322} = v_{24} - v_{176} \tag{638}$$

8.68 Species s_0324

Name 5-O-(1-carboxyvinyl)-3-phosphoshikimic acid

SBO:0000247 simple chemical

Initial concentration 0.1 mmol · 1^{-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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0324} = v_{22} - v_{73} \tag{639}$$

8.69 Species s_0325

Name 5-phospho-ribosyl-glycineamide

SBO:0000247 simple chemical

Initial concentration 0.1 mmol · 1^{-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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0325} = v_{217} - v_{129} \tag{640}$$

8.70 Species s_0326

Name 5-phosphoribosyl-ATP

SBO:0000247 simple chemical

Initial concentration 0.1 mmol · 1^{-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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0326} = v_{53} - v_{213} \tag{641}$$

8.71 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).

$$\frac{\text{d}}{\text{d}t}\text{s\_0327} = v_{218} - v_{217} \tag{642}$$

8.72 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).

$$\frac{\text{d}}{\text{d}t}\text{s\_0328} = v_{231} - 2v_{232} \tag{643}$$

8.73 Species s_0349

Name 7-phospho-2-dehydro-3-deoxy-D-arabino-heptonic 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_0040 and as a product in r_0020 and as a modifier in r_0020, r_0040).

$$\frac{\text{d}}{\text{d}t}\text{s\_0349} = v_{10} - v_{18} \tag{644}$$

8.74 Species s_0362

Name acetate

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_0110 and as a product in r_0311, r_0813 and as a modifier in r_0110, r_0311, r_0813).

$$\frac{\text{d}}{\text{d}t}\text{s\_0362} = v_{80} + v_{189} - v_{29} \tag{645}$$

8.75 Species s_0367

Name acetoacetyl-CoA

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0367} = v_{27} - v_{151} \tag{646}$$

8.76 Species s_0373

Name acetyl-CoA

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

This species takes part in 20 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, r_0961 and as a modifier in r_0024, r_0103, r_0108, r_0110, r_0300, r_0398, r_0543, r_0549, r_0559, r_0961).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0373} = v_{29} + v_{229} - v_{12} - 2v_{27} - v_{28} - v_{75} - v_{104} - v_{144} - v_{148} - v_{151} \tag{647}$$

8.77 Species s_0380

Name acyl-CoA

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0380} = v_{85} - v_{4} - v_{128} \tag{648}$$

8.78 Species s_0386

Name adenosine

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_0142 and as a product in r_0144 and as a modifier in r_0142, r_0144).

$$\frac{\text{d}}{\text{d}t}\text{s\_0386} = v_{33} - v_{32} \tag{649}$$

8.79 Species s_0390

Name adenosine 3',5'-bismonophosphate

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_0032 and as a product in r_0883 and as a modifier in r_0032, r_0883).

$$\frac{\text{d}}{\text{d}t}\text{s\_0390} = v_{201} - v_{15} \tag{650}$$

8.80 Species s_0393

Name adenylo-succinate

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_0152 and as a product in r_0153 and as a modifier in r_0152, r_0153).

$$\frac{\text{d}}{\text{d}t}\text{s\_0393} = v_{37} - v_{36} \tag{651}$$

8.81 Species s_0394

Name ADP

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot \text{l}^{-1}$

This species takes part in 67 reactions (as a reactant in r_0330, r_0446, r_0892, r_0962, r_0974, r_1026, r_1704, r_1729 and as a product in r_0079, r_0108, r_0115, r_0142, r_0148, r_0154, r_0215, r_0250, r_0307, r_0476, r_0528, r_0534, r_0548, r_0739, r_0800, r_0811, r_0855, r_0886, 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, r_0148, r_0154, r_0215, r_0250, r_0307, r_0330, r_0446, r_0476, r_0528, r_0534, r_0548, r_0739, r_0800, r_0811, r_0855, r_0886, r_0892, r_0904, r_0908, r_0911, r_0914, r_0958, r_0962, r_0974, r_0997, r_1026, r_1072, r_1704, r_1729).

$$
\begin{aligned}
\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0394} = {} & v_{23} + v_{28} + v_{30} + v_{32} + 2v_{34} + v_{38} + v_{49} + 2v_{67} + v_{77} + v_{121} + v_{136} + v_{138} + v_{147} \\
& + v_{181} + v_{187} + v_{188} + v_{196} + v_{202} + v_{210} + v_{211} + v_{214} + v_{217} + v_{228} + v_{246} \\
& + v_{267} + 59.276v_{282} - v_{84} - v_{114} - v_{205} - v_{230} - v_{235} - v_{251} - v_{277} - v_{278}
\end{aligned}
\tag{652}
$$

8.82 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).

$$
\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0403} = v_{35} + v_{152} - v_{215}
\tag{653}
$$

8.83 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).

$$
\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0404} = v_{39} - 0.4588v_{282}
\tag{654}
$$

8.84 Species s_0409

Name alpha,alpha-trehalose 6-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_1051 and as a product in r_0195 and as a modifier in r_0195, r_1051).

$$\frac{\text{d}}{\text{d}t}\text{s\_0409} = v_{40} - v_{260} \tag{655}$$

8.85 Species s_0419

Name ammonium

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_0307, r_0470, r_0471, r_0476 and as a product in r_0014, r_0310, r_0326, r_0501, r_1115 and as a modifier in r_0014, r_0307, r_0310, r_0326, r_0470, r_0471, r_0476, r_0501, r_1115).

$$\frac{\text{d}}{\text{d}t}\text{s\_0419} = v_6 + v_{79} + v_{83} + v_{130} + v_{271} - v_{77} - v_{119} - v_{120} - v_{121} \tag{656}$$

8.86 Species s_0420

Name ammonium

SBO:0000247 simple chemical

Initial concentration $1\,\text{mmol}\cdot\text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{s\_0420} = 0 \tag{657}$$

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8.87 Species s_0423

Name AMP

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

This species takes part in 64 reactions (as a reactant in r_0148, r_0399, r_0400, r_0407, r_2111 and as a product in r_0032, r_0142, r_0152, r_0157, r_0208, r_0209, r_0211, r_0212, r_0220, r_0313, 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, r_0148, r_0152, r_0157, r_0208, r_0209, r_0211, r_0212, r_0220, r_0313, r_0399, r_0400, r_0407, 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, r_2111).

$$
\begin{aligned}
\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0423} = {} & v_{15} + v_{32} + v_{36} + v_{39} + v_{44} + v_{45} + v_{46} + v_{47} + v_{52} + v_{81} + v_{122} + v_{123} \\
& + v_{133} + v_{134} + v_{142} + v_{162} + v_{169} + v_{170} + v_{177} + v_{195} + v_{219} + v_{226} \\
& + v_{244} + v_{255} + v_{264} + v_{266} + v_{270} - v_{34} - v_{105} - v_{106} - v_{107} - 0.046v_{282}
\end{aligned}
$$

(658)

8.88 Species s_0427

Name anthranilate

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

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).

$$
\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0427} = v_{42} - v_{41}
$$

(659)

8.89 Species s_0428

Name Arg-tRNA(Arg)

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

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).

$$
\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0428} = v_{45} - 0.1607v_{282}
$$

(660)

8.90 Species s_0430

Name Asn-tRNA(Asn)

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0430} = v_{47} - 0.1017 v_{282} \tag{661}$$

8.91 Species s_0432

Name Asp-tRNA(Asp)

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0432} = v_{52} - 0.2975 v_{282} \tag{662}$$

8.92 Species s_0434

Name ATP

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

This species takes part in 124 reactions (as a reactant in r_0079, r_0108, r_0115, r_0142, r_0148, r_0154, r_0157, r_0208, r_0209, r_0211, r_0212, r_0215, r_0220, r_0225, r_0250, r_0307, r_0313, r_0476, r_0478, r_0479, r_0512, r_0514, r_0528, r_0534, r_0539, r_0548, r_0665, r_0701, r_0711, r_0726, r_0729, r_0739, r_0800, r_0811, r_0852, r_0855, r_0886, 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 r_0330, r_0399, r_0400, r_0407, r_0446, r_0892, r_0962, r_1704, r_1729 and as a modifier in r_0079, r_0108, r_0115, r_0142, r_0148, r_0154, r_0157, r_0208, r_0209, r_0211, r_0212, r_0215, r_0220, r_0225, r_0250, r_0307, r_0313, r_0330, r_0399, r_0400, r_0407, r_0446, r_0476, r_0478, r_0479, r_0512, r_0514, r_0528, r_0534, r_0539, r_0548, r_0665, r_0701, r_0711, r_0726, r_0729, r_0739, r_0800, r_0811, r_0852, r_0855, r_0886, r_0892, r_0904, r_0908, r_0911, r_0914, r_0916, r_0941, r_0958, r_0962, r_0970, r_0995, r_0997, r_1042, r_1057, r_1066, r_1072, r_1089, r_1704, r_1729, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0434} = v_{84} + v_{105} + v_{106} + v_{107} + v_{114} + v_{205} + v_{230} + v_{277} + v_{278} - v_{23} - v_{28} - v_{30} - v_{32}$$
$$- v_{34} - v_{38} - v_{39} - v_{44} - v_{45} - v_{46} - v_{47} - v_{49} - v_{52} - v_{53} - 2v_{67} - v_{77} - v_{81} - v_{121}$$
$$- v_{122} - v_{123} - v_{133} - v_{134} - v_{136} - v_{138} - v_{142} - v_{147} - v_{162} - v_{169} - v_{170} - v_{175}$$
$$- v_{177} - v_{181} - v_{187} - v_{188} - v_{195} - v_{196} - v_{202} - v_{210} - v_{211} - v_{214} - v_{217} - v_{219}$$
$$- v_{226} - v_{228} - v_{233} - v_{244} - v_{246} - v_{255} - v_{264} - v_{266} - v_{267} - v_{270} - 59.276v_{282}$$
$$(663)$$

8.93 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`).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0445} = v_{275} - v_{28} - v_{67} - v_{228} \tag{664}$$

8.94 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`).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0454} = v_{13} - v_{143} \tag{665}$$

8.95 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`).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0455} = v_{67} - v_{48} - v_{190} \tag{666}$$

8.96 Species s_0456

Name carbon dioxide

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot \text{l}^{-1}$

This species takes part in 62 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_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_0938, r_0939, r_0961, 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_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_0911, r_0938, r_0939, r_0961, r_0993, r_1664, r_1697).

$$
\begin{aligned}
\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0456} = {} & v_8 + v_{14} + v_{26} + v_{56} + v_{57} + v_{98} + v_{99} + v_{100} + v_{101} + 3v_{102} + v_{103} \\
& + 3v_{104} + v_{108} + v_{109} + v_{110} + v_{111} + v_{130} + v_{145} + v_{155} + v_{159} + v_{160} \\
& + v_{181} + v_{193} + v_{199} + v_{224} + v_{225} + v_{229} + v_{243} - v_{214} - v_{275} - v_{276}
\end{aligned}
\tag{667}
$$

8.97 Species s_0458

Name carbon dioxide

SBO:0000247 simple chemical

Initial concentration $0 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$
\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0458} = 0
\tag{668}
$$

8.98 Species s_0467

Name CDP

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_0792, r_0976 and as a product in r_0736 and as a modifier in r_0736, r_0792, r_0976).

$$
\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0467} = v_{180} - v_{186} - v_{236}
\tag{669}
$$

8.99 Species s_0471

Name CDP-diacylglycerol

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t} \text{s\_0471} = v_{68} - v_{198} - v_{200} \tag{670}$$

8.100 Species s_0475

Name ceramide-1 (C24)

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

This species takes part in four reactions (as a reactant in r_0259 and as a product in r_0340 and as a modifier in r_0259, r_0340).

$$\frac{\mathrm{d}}{\mathrm{d}t} \text{s\_0475} = v_{88} - v_{69} \tag{671}$$

8.101 Species s_0481

Name ceramide-2 (C24)

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

This species takes part in six reactions (as a reactant in r_0267 and as a product in r_0259, r_0919 and as a modifier in r_0259, r_0267, r_0919).

$$\frac{\mathrm{d}}{\mathrm{d}t} \text{s\_0481} = v_{69} + v_{222} - v_{70} \tag{672}$$

8.102 Species s_0493

Name ceramide-3 (C24)

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

This species takes part in four reactions (as a reactant in r_0269 and as a product in r_0267 and as a modifier in r_0267, r_0269).

$$\frac{\mathrm{d}}{\mathrm{d}t} \text{s\_0493} = v_{70} - v_{71} \tag{673}$$

8.103 Species s_0499

Name ceramide-4 (C24)

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

This species takes part in four reactions (as a reactant in r_0594 and as a product in r_0269 and as a modifier in r_0269, r_0594).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0499} = v_{71} - v_{158} \tag{674}$$

8.104 Species s_0515

Name chorismate

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0515} = v_{73} - v_{42} - v_{72} \tag{675}$$

8.105 Species s_0516

Name cis-aconitate

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0516} = v_{76} - v_{74} \tag{676}$$

8.106 Species s_0522

Name citrate

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0522} = v_{75} - v_{76} \tag{677}$$

8.107 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).

$$\frac{\text{d}}{\text{d}t}\text{s\_0526} = v_{186} + v_{198} + v_{200} - 0.0447 v_{282} \tag{678}$$

8.108 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 54 reactions (as a reactant in r_0110, r_0336, r_0961 and as a product in r_0008, r_0024, r_0103, r_0300, r_0386, r_0387, r_0389, r_0391, r_0393, r_0397, r_0398, r_0399, r_0400, 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_0300, r_0336, r_0386, r_0387, r_0389, r_0391, r_0393, r_0397, r_0398, r_0399, r_0400, r_0407, r_0432, r_0433, r_0434, r_0435, r_0495, r_0543, r_0549, r_0558, r_0559, r_0961, r_0993).

$$\frac{\text{d}}{\text{d}t}\text{s\_0529} = v_4 + v_{12} + v_{27} + v_{75} + v_{98} + v_{99} + v_{100} + v_{101} + 3v_{102} + v_{103} + 3v_{104} + v_{105} + v_{106} + v_{107}$$
$$+ v_{108} + v_{109} + v_{110} + v_{111} + v_{128} + v_{144} + v_{148} + v_{150} + v_{151} + v_{243} - v_{29} - v_{85} - v_{229} \tag{679}$$

8.109 Species s_0539

Name CTP

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_0257, r_0736 and as a product in r_0307 and as a modifier in r_0257, r_0307, r_0736).

$$\frac{\text{d}}{\text{d}t}\text{s\_0539} = v_{77} - v_{68} - v_{180} \tag{680}$$

8.110 Species s_0542

Name Cys-tRNA(Cys)

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0542} = v_{81} - 0.0066v_{282} \tag{681}$$

8.111 Species s_0550

Name D-erythro-1-(imidazol-4-yl)glycerol 3-phosphate

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0550} = v_{152} - v_{153} \tag{682}$$

8.112 Species s_0551

Name D-erythrose 4-phosphate

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

This species takes part in six reactions (as a reactant in r_0020, r_1048 and as a product in r_1050 and as a modifier in r_0020, r_1048, r_1050).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0551} = v_{259} - v_{10} - v_{257} \tag{683}$$

8.113 Species s_0555

Name D-fructose 1,6-bisphosphate

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

This species takes part in four reactions (as a reactant in r_0450 and as a product in r_0886 and as a modifier in r_0450, r_0886).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0555} = v_{202} - v_{115} \tag{684}$$

8.114 Species s_0557

Name D-fructose 6-phosphate

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_0723, r_0886, r_1048, r_1050 and as a product in r_0467 and as a modifier in r_0467, r_0723, r_0886, r_1048, r_1050).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0557} = v_{118} - v_{173} - v_{202} - v_{257} - v_{259} \tag{685}$$

8.115 Species s_0563

Name D-glucose

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_0534 and as a product in r_1166 and as a modifier in r_0534, r_1166).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0563} = v_{272} - v_{138} \tag{686}$$

8.116 Species s_0565

Name D-glucose

SBO:0000247 simple chemical

Initial concentration $1 \, \text{mmol} \cdot \text{l}^{-1}$

This species takes part in two reactions (as a reactant in r_1166 and as a modifier in r_1166), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0565} = 0 \tag{687}$$

8.117 Species s_0567

Name D-glucose 1-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_1084 and as a product in r_0888 and as a modifier in r_0888, r_1084).

$$\frac{d}{dt}s\_0567 = v_{203} - v_{268} \tag{688}$$

8.118 Species s_0568

Name D-glucose 6-phosphate

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_0195, r_0467, r_0758, r_0888 and as a product in r_0534 and as a modifier in r_0195, r_0467, r_0534, r_0758, r_0888).

$$\frac{d}{dt}s\_0568 = v_{138} - v_{40} - v_{118} - v_{183} - v_{203} \tag{689}$$

8.119 Species s_0573

Name D-mannose 1-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_0722 and as a product in r_0902 and as a modifier in r_0722, r_0902).

$$\frac{d}{dt}s\_0573 = v_{209} - v_{172} \tag{690}$$

8.120 Species s_0574

Name D-mannose 6-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_0902 and as a product in r_0723 and as a modifier in r_0723, r_0902).

$$\frac{d}{dt}s\_0574 = v_{173} - v_{209} \tag{691}$$

8.121 Species s_0577

Name D-ribulose 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_0038, r_0982 and as a product in r_0984 and as a modifier in r_0038, r_0982, r_0984).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0577} = v_{239} - v_{16} - v_{238} \tag{692}$$

8.122 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_0984 and as a product in r_1049, r_1050 and as a modifier in r_0984, r_1049, r_1050).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0581} = v_{258} + v_{259} - v_{239} \tag{693}$$

8.123 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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0582} = v_{137} + v_{235} - v_{278} \tag{694}$$

8.124 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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0584} = v_{278} - 0.0036 v_{282} \tag{695}$$

8.125 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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0586} = v_{233} - v_{137} \tag{696}$$

8.126 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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0587} = v_{236} - v_{277} \tag{697}$$

8.127 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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0589} = v_{277} - v_{83} - 0.0024v_{282} \tag{698}$$

8.128 Species s_0595

Name decanoate

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_0386 and as a product in r_0399 and as a modifier in r_0386, r_0399).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0595} = v_{105} - v_{98} \tag{699}$$

8.129 Species s_0602

Name decanoyl-CoA

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0602} = v_{103} - v_{105} - v_{108} \tag{700}$$

8.130 Species s_0613

Name dGDP

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0613} = v_{237} - v_{84} \tag{701}$$

8.131 Species s_0615

Name dGMP

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0615} = v_{84} - 0.0024 v_{282} \tag{702}$$

8.132 Species s_0619

Name diglyceride

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

This species takes part in eight reactions (as a reactant in r_1052 and as a product in r_0336, r_0337, r_0594 and as a modifier in r_0336, r_0337, r_0594, r_1052).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_0619} = v_{85} + v_{86} + v_{158} - v_{261} \tag{703}$$

8.133 Species s_0625

Name dihydrofolic acid

SBO:0000247 simple chemical

Initial concentration $0.1 \text{ mmol} \cdot l^{-1}$

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).

$$\frac{d}{dt}s\_0625 = v_{256} - v_{89} \tag{704}$$

8.134 Species s_0629

Name dihydroxyacetone phosphate

SBO:0000247 simple chemical

Initial concentration $0.1 \text{ mmol} \cdot l^{-1}$

This species takes part in six reactions (as a reactant in r_0491, r_1054 and as a product in r_0450 and as a modifier in r_0450, r_0491, r_1054).

$$\frac{d}{dt}s\_0629 = v_{115} - v_{127} - v_{262} \tag{705}$$

8.135 Species s_0633

Name diphosphate

SBO:0000247 simple chemical

Initial concentration $0.1 \text{ mmol} \cdot l^{-1}$

This species takes part in 82 reactions (as a reactant in r_0399, r_0400, 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_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_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).

$$\frac{d}{dt}s\_0633 = v_{39} + v_{41} + v_{44} + v_{45} + v_{46} + v_{47} + v_{52} + v_{53} + v_{68} + v_{81} + v_{93} + v_{96} + v_{117} + v_{122} + v_{123}$$
$$+ v_{133} + v_{134} + v_{135} + v_{142} + v_{162} + v_{169} + v_{170} + v_{172} + v_{175} + v_{177} + v_{192} + v_{195} + v_{213}$$
$$+ v_{218} + v_{226} + v_{244} + 2v_{249} + v_{255} + v_{264} + v_{266} + v_{268} + v_{270} - v_{105} - v_{106} - v_{107} - v_{156} \tag{706}$$

8.136 Species s_0644

Name dolichyl D-mannosyl 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_0362 and as a product in r_0361 and as a modifier in r_0361, r_0362).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0644} = v_{94} - v_{95} \tag{707}$$

8.137 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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0645} = v_{95} - v_{94} \tag{708}$$

8.138 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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0649} = v_{256} - 0.0036 v_{282} \tag{709}$$

8.139 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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0654} = v_{83} + v_{96} - v_{256} \tag{710}$$

8.140 Species s_0656

Name dUTP

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

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).

$$\frac{\text{d}}{\text{d}t}\text{s\_0656} = v_{234} - v_{96} \tag{711}$$

8.141 Species s_0657

Name episterol

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

This species takes part in six reactions (as a reactant in r_0242, r_2111 and as a product in r_0243 and as a modifier in r_0242, r_0243, r_2111).

$$\frac{\text{d}}{\text{d}t}\text{s\_0657} = v_{65} - v_{64} - 9.6 \cdot 10^{-5} v_{282} \tag{712}$$

8.142 Species s_0662

Name ergosta-5,7,22,24(28)-tetraen-3beta-ol

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

This species takes part in six reactions (as a reactant in r_0244, r_2111 and as a product in r_0233 and as a modifier in r_0233, r_0244, r_2111).

$$\frac{\text{d}}{\text{d}t}\text{s\_0662} = v_{55} - v_{66} - 1.25 \cdot 10^{-4} v_{282} \tag{713}$$

8.143 Species s_0664

Name ergosta-5,7,24(28)-trien-3beta-ol

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

This species takes part in four reactions (as a reactant in r_0233 and as a product in r_0242 and as a modifier in r_0233, r_0242).

$$\frac{\text{d}}{\text{d}t}\text{s\_0664} = v_{64} - v_{55} \tag{714}$$

8.144 Species s_0666

Name ergosterol

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0666} = v_{66} - v_{250} - 0.0056v_{282} \tag{715}$$

8.145 Species s_0672

Name ergosterol ester

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0672} = v_{250} - 8.12 \cdot 10^{-4}v_{282} \tag{716}$$

8.146 Species s_0700

Name fecosterol

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0700} = v_{240} - v_{65} - 1.14 \cdot 10^{-4}v_{282} \tag{717}$$

8.147 Species s_0709

Name ferricytochrome c

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

This species takes part in four reactions (as a reactant in r_0439 and as a product in r_0438 and as a modifier in r_0438, r_0439).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0709} = 4v_{112} - 2v_{113} \tag{718}$$

8.148 Species s_0710

Name ferrocytochrome c

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

This species takes part in four reactions (as a reactant in r_0438 and as a product in r_0439 and as a modifier in r_0438, r_0439).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0710} = 2v_{113} - 4v_{112} \tag{719}$$

8.149 Species s_0722

Name formate

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

This species takes part in ten reactions (as a reactant in r_1795 and as a product in r_0038, r_0317, r_0446, r_0525 and as a modifier in r_0038, r_0317, r_0446, r_0525, r_1795).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0722} = v_{16} + v_{82} + v_{114} + v_{135} - v_{279} \tag{720}$$

8.150 Species s_0723

Name formate

SBO:0000247 simple chemical

Initial concentration $0 \, \text{mmol} \cdot 1^{-1}$

This species takes part in one reaction (as a product in r_1795), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0723} = 0 \tag{721}$$

8.151 Species s_0725

Name fumarate

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

This species takes part in eight reactions (as a reactant in r_0451 and as a product in r_0151, r_0152, r_0207 and as a modifier in r_0151, r_0152, r_0207, r_0451).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0725} = v_{35} + v_{36} + v_{43} - v_{116} \tag{722}$$

8.152 Species s_0739

Name GDP

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

This species takes part in twelve reactions (as a reactant in r_0800, r_0978 and as a product in r_0153, r_0361, r_0528, r_0529 and as a modifier in r_0153, r_0361, r_0528, r_0529, r_0800, r_0978).

$$\frac{\text{d}}{\text{d}t}\text{s\_0739} = v_{37} + v_{94} + v_{136} + v_{137} - v_{187} - v_{237} \tag{723}$$

8.153 Species s_0743

Name GDP-alpha-D-mannose

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

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).

$$\frac{\text{d}}{\text{d}t}\text{s\_0743} = v_{172} - v_{94} \tag{724}$$

8.154 Species s_0745

Name geranyl diphosphate

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

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).

$$\frac{\text{d}}{\text{d}t}\text{s\_0745} = v_{93} - v_{117} \tag{725}$$

8.155 Species s_0747

Name Gln-tRNA(Gln)

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

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).

$$\frac{\text{d}}{\text{d}t}\text{s\_0747} = v_{122} - 0.1054 v_{282} \tag{726}$$

8.156 Species s_0748

Name Glu-tRNA(Glu)

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

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).

$$\frac{\text{d}}{\text{d}t}\text{s\_0748} = v_{123} - 0.3018 v_{282} \tag{727}$$

8.157 Species s_0750

Name glutathione

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

This species takes part in four reactions (as a reactant in r_0483 and as a product in r_0481 and as a modifier in r_0481, r_0483).

$$\frac{\text{d}}{\text{d}t}\text{s\_0750} = 2v_{124} - 2v_{125} \tag{728}$$

8.158 Species s_0754

Name glutathione disulfide

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

This species takes part in four reactions (as a reactant in r_0481 and as a product in r_0483 and as a modifier in r_0481, r_0483).

$$\frac{\text{d}}{\text{d}t}\text{s\_0754} = v_{125} - v_{124} \tag{729}$$

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8.159 Species s_0757

Name Gly-tRNA(Gly)

SBO:0000247 simple chemical

Initial concentration $0.1 \text{ mmol} \cdot 1^{-1}$

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).

$$\frac{d}{dt}\text{s\_0757} = v_{133} - 0.2904 v_{282} \tag{730}$$

8.160 Species s_0764

Name glyceraldehyde 3-phosphate

SBO:0000247 simple chemical

Initial concentration $0.1 \text{ mmol} \cdot 1^{-1}$

This species takes part in 14 reactions (as a reactant in r_0486, r_1049, r_1050 and as a product in r_0450, r_1048, r_1054, r_1055 and as a modifier in r_0450, r_0486, r_1048, r_1049, r_1050, r_1054, r_1055).

$$\frac{d}{dt}\text{s\_0764} = v_{115} + v_{257} + v_{262} + v_{263} - v_{126} - v_{258} - v_{259} \tag{731}$$

8.161 Species s_0767

Name glycerol 3-phosphate

SBO:0000247 simple chemical

Initial concentration $0.1 \text{ mmol} \cdot 1^{-1}$

This species takes part in four reactions (as a reactant in r_0495 and as a product in r_0491 and as a modifier in r_0491, r_0495).

$$\frac{d}{dt}\text{s\_0767} = v_{127} - v_{128} \tag{732}$$

8.162 Species s_0773

Name glycogen

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

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).

$$\frac{\text{d}}{\text{d}t}\text{s\_0773} = v_{132} - 0.5185v_{282} \tag{733}$$

8.163 Species s_0782

Name GMP

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

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).

$$\frac{\text{d}}{\text{d}t}\text{s\_0782} = v_{134} - v_{136} - v_{137} - 0.046v_{282} \tag{734}$$

8.164 Species s_0785

Name GTP

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

This species takes part in eight reactions (as a reactant in r_0153, r_0525, r_0722 and as a product in r_0800 and as a modifier in r_0153, r_0525, r_0722, r_0800).

$$\frac{\text{d}}{\text{d}t}\text{s\_0785} = v_{187} - v_{37} - v_{135} - v_{172} \tag{735}$$

8.165 Species s_0832

Name His-tRNA(His)

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

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).

$$\frac{\text{d}}{\text{d}t}\text{s\_0832} = v_{142} - 0.0663v_{282} \tag{736}$$

8.166 Species s_0835

Name homocitrate

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0835} = v_{144} - v_{13} \tag{737}$$

8.167 Species s_0836

Name homoisocitrate

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0836} = v_{143} - v_{145} \tag{738}$$

8.168 Species s_0837

Name hydrogen peroxide

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

This species takes part in six reactions (as a reactant in r_0483, r_0550 and as a product in r_0339 and as a modifier in r_0339, r_0483, r_0550).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0837} = v_{87} - v_{125} - v_{149} \tag{739}$$

8.169 Species s_0841

Name hydrogen sulfide

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0841} = v_{252} - v_{189} \tag{740}$$

8.170 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).

$$\frac{d}{dt} s\_0847 = v_{162} - 0.1927 v_{282} \tag{741}$$

8.171 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).

$$\frac{d}{dt} s\_0849 = v_{157} - v_{37} - v_{154} \tag{742}$$

8.172 Species s_0918

Name inositol-P-ceramide D (C24)

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_0594 and as a modifier in r_0594, r_2111).

$$\frac{d}{dt} s\_0918 = v_{158} - 5.38625 \cdot 10^{-4} v_{282} \tag{743}$$

8.173 Species s_0940

Name isocitrate

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_0658, r_0661 and as a product in r_0280 and as a modifier in r_0280, r_0658, r_0661).

$$\frac{d}{dt} s\_0940 = v_{74} - v_{159} - v_{160} \tag{744}$$

8.174 Species s_0943

Name isopentenyl diphosphate

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_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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0943} = v_{181} - v_{93} - v_{117} - v_{163} \tag{745}$$

8.175 Species s_0951

Name keto-phenylpyruvate

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_0851 and as a product in r_0938 and as a modifier in r_0851, r_0938).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0951} = v_{224} - v_{194} \tag{746}$$

8.176 Species s_0953

Name L-2-aminoadipate

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_0678 and as a product in r_0018 and as a modifier in r_0018, r_0678).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0953} = v_9 - v_{166} \tag{747}$$

8.177 Species s_0955

Name L-alanine

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_0157 and as a product in r_0674 and as a modifier in r_0157, r_0674).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0955} = v_{165} - v_{39} \tag{748}$$

8.178 Species s_0959

Name L-allysine

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0959} = v_{166} - v_{242} \tag{749}$$

8.179 Species s_0965

Name L-arginine

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0965} = v_{43} - v_{45} \tag{750}$$

8.180 Species s_0969

Name L-asparagine

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0969} = v_{46} - v_{47} \tag{751}$$

8.181 Species s_0973

Name L-aspartate

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

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).

$$\frac{d}{dt}s\_0973 = v_{50} - v_{37} - v_{44} - v_{46} - v_{48} - v_{49} - v_{52} - v_{211} \tag{752}$$

8.182 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).

$$\frac{d}{dt}s\_0978 = v_{51} - v_{146} \tag{753}$$

8.183 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).

$$\frac{d}{dt}s\_0979 = v_{190} - v_{44} \tag{754}$$

8.184 Species s_0980

Name L-cystathionine

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_0310 and as a product in r_0309, r_0311 and as a modifier in r_0309, r_0310, r_0311).

$$\frac{d}{dt}s\_0980 = v_{78} + v_{80} - v_{79} \tag{755}$$

8.185 Species s_0981

Name L-cysteine

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0981} = v_{79} - v_{80} - v_{81} \tag{756}$$

8.186 Species s_0991

Name L-glutamate

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

This species takes part in 50 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_0918, r_0989, r_1063, r_1087 and as a product in r_0079, r_0203, r_0211, r_0250, r_0470, r_0471, 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_0471, r_0476, r_0479, r_0514, r_0538, r_0563, r_0663, r_0674, r_0699, r_0818, r_0851, r_0915, r_0918, r_0989, r_1063, r_1087).

$$\begin{aligned}
\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0991} = {} & v_{23} + v_{42} + v_{46} + v_{67} + v_{119} + v_{120} + v_{134} + v_{152} + v_{218} - v_{5} - v_{9} - v_{31} - v_{50} \\
& - v_{121} - v_{123} - v_{141} - v_{161} - v_{165} - v_{168} - v_{191} - v_{194} - v_{221} - v_{242} - v_{265} - v_{269}
\end{aligned} \tag{757}$$

8.187 Species s_0999

Name L-glutamine

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_0999} = v_{121} - v_{23} - v_{42} - v_{46} - v_{67} - v_{122} - v_{134} - v_{152} - v_{218} \tag{758}$$

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8.188 Species s_1003

Name L-glycine

SBO:0000247 simple chemical

Initial concentration $0.1 \text{ mmol} \cdot 1^{-1}$

This species takes part in eight reactions (as a reactant in r_0501, r_0512, r_0914 and as a product in r_0502 and as a modifier in r_0501, r_0502, r_0512, r_0914).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_1003} = v_{131} - v_{130} - v_{133} - v_{217} \tag{759}$$

8.189 Species s_1006

Name L-histidine

SBO:0000247 simple chemical

Initial concentration $0.1 \text{ mmol} \cdot 1^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_1006} = v_{139} - v_{142} \tag{760}$$

8.190 Species s_1010

Name L-histidinol

SBO:0000247 simple chemical

Initial concentration $0.1 \text{ mmol} \cdot 1^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_1010} = v_{140} - v_{139} \tag{761}$$

8.191 Species s_1011

Name L-histidinol phosphate

SBO:0000247 simple chemical

Initial concentration $0.1 \text{ mmol} \cdot 1^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_1011} = v_{141} - v_{140} \tag{762}$$

8.192 Species s_1012

Name L-homocysteine

SBO:0000247 simple chemical

Initial concentration $0.1 \text{ mmol} \cdot 1^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_1012} = v_{33} + v_{189} - v_{78} - v_{176} \tag{763}$$

8.193 Species s_1014

Name L-homoserine

SBO:0000247 simple chemical

Initial concentration $0.1 \text{ mmol} \cdot 1^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_1014} = v_{146} - v_{147} - v_{148} \tag{764}$$

8.194 Species s_1016

Name L-isoleucine

SBO:0000247 simple chemical

Initial concentration $0.1 \text{ mmol} \cdot 1^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_1016} = v_{161} - v_{162} \tag{765}$$

8.195 Species s_1021

Name L-leucine

SBO:0000247 simple chemical

Initial concentration $0.1 \text{ mmol} \cdot 1^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_1021} = v_{168} - v_{169} \tag{766}$$

8.196 Species s_1025

Name L-lysine

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_0711 and as a product in r_0988 and as a modifier in r_0711, r_0988).

$$\frac{\text{d}}{\text{d}t}\text{s\_1025} = v_{241} - v_{170} \tag{767}$$

8.197 Species s_1029

Name L-methionine

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_0726, r_0729 and as a product in r_0727 and as a modifier in r_0726, r_0727, r_0729).

$$\frac{\text{d}}{\text{d}t}\text{s\_1029} = v_{176} - v_{175} - v_{177} \tag{768}$$

8.198 Species s_1032

Name L-phenylalanine

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_0852 and as a product in r_0851 and as a modifier in r_0851, r_0852).

$$\frac{\text{d}}{\text{d}t}\text{s\_1032} = v_{194} - v_{195} \tag{769}$$

8.199 Species s_1035

Name L-proline

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_0941 and as a product in r_0957 and as a modifier in r_0941, r_0957).

$$\frac{\text{d}}{\text{d}t}\text{s\_1035} = v_{227} - v_{226} \tag{770}$$

8.200 Species s_1038

Name L-saccharopine

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_0988 and as a product in r_0989 and as a modifier in r_0988, r_0989).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_1038} = v_{242} - v_{241} \tag{771}$$

8.201 Species s_1039

Name L-serine

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_0309, r_0502, r_0880, r_0993, r_0995, r_1055 and as a product in r_0917 and as a modifier in r_0309, r_0502, r_0880, r_0917, r_0993, r_0995, r_1055).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_1039} = v_{220} - v_{78} - v_{131} - v_{200} - v_{243} - v_{244} - v_{263} \tag{772}$$

8.202 Species s_1045

Name L-threonine

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_1042 and as a product in r_1041 and as a modifier in r_1041, r_1042).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_1045} = v_{254} - v_{255} \tag{773}$$

8.203 Species s_1048

Name L-tryptophan

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_1057 and as a product in r_1055 and as a modifier in r_1055, r_1057).

$$\frac{\text{d}}{\text{d}t}\text{s\_1048} = v_{263} - v_{264} \qquad (774)$$

8.204 Species s_1051

Name L-tyrosine

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_1066 and as a product in r_1063 and as a modifier in r_1063, r_1066).

$$\frac{\text{d}}{\text{d}t}\text{s\_1051} = v_{265} - v_{266} \qquad (775)$$

8.205 Species s_1056

Name L-valine

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_1089 and as a product in r_1087 and as a modifier in r_1087, r_1089).

$$\frac{\text{d}}{\text{d}t}\text{s\_1056} = v_{269} - v_{270} \qquad (776)$$

8.206 Species s_1059

Name lanosterol

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_0317, r_2111 and as a product in r_0698 and as a modifier in r_0317, r_0698, r_2111).

$$\frac{\text{d}}{\text{d}t}\text{s\_1059} = v_{167} - v_{82} - 3.2 \cdot 10^{-5} v_{282} \qquad (777)$$

8.207 Species s_1065

Name laurate

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

This species takes part in six reactions (as a reactant in r_0387 and as a product in r_0386, r_0400 and as a modifier in r_0386, r_0387, r_0400).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_1065} = v_{98} + v_{106} - v_{99} \tag{778}$$

8.208 Species s_1073

Name lauroyl-CoA

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

This species takes part in six reactions (as a reactant in r_0400, r_0433 and as a product in r_0432 and as a modifier in r_0400, r_0432, r_0433).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_1073} = v_{108} - v_{106} - v_{109} \tag{779}$$

8.209 Species s_1077

Name Leu-tRNA(Leu)

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_1077} = v_{169} - 0.2964 v_{282} \tag{780}$$

8.210 Species s_1084

Name lignoceric acid

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

This species takes part in six reactions (as a reactant in r_0340, r_0919 and as a product in r_0393 and as a modifier in r_0340, r_0393, r_0919).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_1084} = v_{102} - v_{88} - v_{222} \tag{781}$$

8.211 Species s_1099

Name Lys-tRNA(Lys)

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

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).

$$\frac{\text{d}}{\text{d}t}\text{s\_1099} = v_{170} - 0.2862 v_{282} \tag{782}$$

8.212 Species s_1101

Name malonyl-CoA

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

This species takes part in 24 reactions (as a reactant in r_0386, r_0387, r_0389, r_0391, r_0393, 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_0397, r_0398, r_0432, r_0433, r_0434, r_0435).

$$\frac{\text{d}}{\text{d}t}\text{s\_1101} = v_{28} - v_{98} - v_{99} - v_{100} - v_{101} - 3v_{102} - v_{103} - 3v_{104} - v_{108} - v_{109} - v_{110} - v_{111} \tag{783}$$

8.213 Species s_1107

Name mannan

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

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).

$$\frac{\text{d}}{\text{d}t}\text{s\_1107} = v_{95} - 0.8079 v_{282} \tag{784}$$

8.214 Species s_1148

Name Met-tRNA(Met)

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_0729 and as a modifier in r_0729, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t} \text{s\_1148} = v_{177} - 0.0507 v_{282} \tag{785}$$

8.215 Species s_1153

Name myo-inositol

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_0874 and as a product in r_0757 and as a modifier in r_0757, r_0874).

$$\frac{\mathrm{d}}{\mathrm{d}t} \text{s\_1153} = v_{182} - v_{198} \tag{786}$$

8.216 Species s_1161

Name myristate

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_0389 and as a product in r_0387 and as a modifier in r_0387, r_0389).

$$\frac{\mathrm{d}}{\mathrm{d}t} \text{s\_1161} = v_{99} - v_{100} \tag{787}$$

8.217 Species s_1176

Name myristoyl-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_0434 and as a product in r_0433 and as a modifier in r_0433, r_0434).

$$\frac{\mathrm{d}}{\mathrm{d}t} \text{s\_1176} = v_{109} - v_{110} \tag{788}$$

8.218 Species s_1182

Name N(2)-acetyl-L-ornithine

SBO:0000247 simple chemical

Initial concentration $0.1 \text{ mmol} \cdot l^{-1}$

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).

$$\frac{d}{dt}\text{s\_1182} = v_{31} - v_{191} \tag{789}$$

8.219 Species s_1187

Name N-(5-phospho-beta-D-ribosyl)anthranilate

SBO:0000247 simple chemical

Initial concentration $0.1 \text{ mmol} \cdot l^{-1}$

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).

$$\frac{d}{dt}\text{s\_1187} = v_{41} - v_{216} \tag{790}$$

8.220 Species s_1191

Name N-acetyl-L-gamma-glutamyl phosphate

SBO:0000247 simple chemical

Initial concentration $0.1 \text{ mmol} \cdot l^{-1}$

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).

$$\frac{d}{dt}\text{s\_1191} = v_{30} - v_{184} \tag{791}$$

8.221 Species s_1192

Name N-acetyl-L-glutamate

SBO:0000247 simple chemical

Initial concentration $0.1 \text{ mmol} \cdot l^{-1}$

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).

$$\frac{d}{dt}\text{s\_1192} = v_{191} - v_{30} \tag{792}$$

8.222 Species s_1194

Name N-carbamoyl-L-aspartate

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

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).

$$\frac{d}{dt} s\_1194 = v_{48} - v_{90} \tag{793}$$

8.223 Species s_1198

Name NAD

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

This species takes part in 36 reactions (as a reactant in r_0061, r_0235, r_0486, r_0501, r_0536, r_0545, r_0565, r_0658, r_0713, r_0731, r_0891, r_0961, r_0988 and as a product in r_0012, r_0470, r_0491, r_0770, r_1010 and as a modifier in r_0012, r_0061, r_0235, r_0470, r_0486, r_0491, r_0501, r_0536, r_0545, r_0565, r_0658, r_0713, r_0731, r_0770, r_0891, r_0961, r_0988, r_1010).

$$\frac{d}{dt} s\_1198 = v_5 + v_{119} + v_{127} + v_{185} + v_{247} - v_{21} - v_{57} - v_{126} - v_{130} \tag{794}$$
$$- 2v_{139} - v_{145} - v_{154} - v_{159} - v_{171} - v_{178} - v_{204} - v_{229} - v_{241}$$

8.224 Species s_1203

Name NADH

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

This species takes part in 36 reactions (as a reactant in r_0012, r_0470, r_0491, r_0770, r_1010 and as a product in r_0061, r_0235, r_0486, r_0501, r_0536, r_0545, r_0565, r_0658, r_0713, r_0731, r_0891, r_0961, r_0988 and as a modifier in r_0012, r_0061, r_0235, r_0470, r_0486, r_0491, r_0501, r_0536, r_0545, r_0565, r_0658, r_0713, r_0731, r_0770, r_0891, r_0961, r_0988, r_1010).

$$\frac{d}{dt} s\_1203 = v_{21} + v_{57} + v_{126} + v_{130} + 2v_{139} + v_{145} + v_{154} + v_{159} + v_{171} \tag{795}$$
$$+ v_{178} + v_{204} + v_{229} + v_{241} - v_5 - v_{119} - v_{127} - v_{185} - v_{247}$$

8.225 Species s_1207

Name NADP(+)

SBO:0000247 simple chemical

Initial concentration $0.1 \text{ mmol} \cdot 1^{-1}$

This species takes part in 100 reactions (as a reactant in r_0234, r_0661, r_0732, r_0939 and as a product in r_0015, r_0041, r_0080, r_0096, r_0219, r_0231, r_0233, r_0236, r_0237, r_0238, r_0239, r_0240, r_0241, r_0242, r_0244, r_0259, r_0267, r_0269, r_0317, r_0344, r_0386, r_0387, r_0389, r_0391, r_0393, r_0397, r_0398, r_0432, r_0433, r_0434, r_0435, r_0471, r_0481, r_0547, r_0558, r_0669, r_0678, r_0759, r_0922, r_0957, r_0989, r_0996, r_1011, r_1012, r_1027, r_1038 and as a modifier in r_0015, r_0041, r_0080, r_0096, r_0219, r_0231, r_0233, r_0234, r_0236, r_0237, r_0238, r_0239, r_0240, r_0241, r_0242, r_0244, r_0259, r_0267, r_0269, r_0317, r_0344, r_0386, r_0387, r_0389, r_0391, r_0393, r_0397, r_0398, r_0432, r_0433, r_0434, r_0435, r_0471, r_0481, r_0547, r_0558, r_0661, r_0669, r_0678, r_0732, r_0759, r_0922, r_0939, r_0957, r_0989, r_0996, r_1011, r_1012, r_1027, r_1038).

$$
\begin{aligned}
\frac{d}{dt}\text{s\_1207} = {} & v_7 + v_{19} + v_{24} + v_{25} + v_{51} + v_{54} + v_{55} + v_{58} + v_{59} + v_{60} + v_{61} + v_{62} + 3v_{63} + v_{64} + v_{66} \\
& + v_{69} + v_{70} + v_{71} + 3v_{82} + v_{89} + 2v_{98} + 2v_{99} + 2v_{100} + 2v_{101} + 6v_{102} + 2v_{103} + 6v_{104} \\
& + 2v_{108} + 2v_{109} + 2v_{110} + 2v_{111} + v_{120} + v_{124} + v_{146} + 2v_{150} + v_{164} + v_{166} + v_{184} \\
& + v_{223} + v_{227} + v_{242} + v_{245} + v_{248} + v_{249} + 3v_{252} + v_{253} - v_{56} - v_{160} - v_{179} - v_{225}
\end{aligned}
$$
(796)

8.226 Species s_1212

Name NADPH

SBO:0000247 simple chemical

Initial concentration $0.1 \text{ mmol} \cdot 1^{-1}$

This species takes part in 100 reactions (as a reactant in r_0015, r_0041, r_0080, r_0096, r_0219, r_0231, r_0233, r_0236, r_0237, r_0238, r_0239, r_0240, r_0241, r_0242, r_0244, r_0259, r_0267, r_0269, r_0317, r_0344, r_0386, r_0387, r_0389, r_0391, r_0393, r_0397, r_0398, r_0432, r_0433, r_0434, r_0435, r_0471, r_0481, r_0547, r_0558, r_0669, r_0678, r_0759, r_0922, r_0957, r_0989, r_0996, r_1011, r_1012, r_1027, r_1038 and as a product in r_0234, r_0661, r_0732, r_0939 and as a modifier in r_0015, r_0041, r_0080, r_0096, r_0219, r_0231, r_0233, r_0234, r_0236, r_0237, r_0238, r_0239, r_0240, r_0241, r_0242, r_0244, r_0259, r_0267, r_0269, r_0317, r_0344, r_0386, r_0387, r_0389, r_0391, r_0393, r_0397, r_0398, r_0432, r_0433, r_0434, r_0435, r_0471, r_0481, r_0547, r_0558, r_0661, r_0669, r_0678, r_0732, r_0759, r_0922, r_0939, r_0957, r_0989, r_0996, r_1011, r_1012, r_1027, r_1038).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1212} = v_{56} + v_{160} + v_{179} + v_{225} - v_7 - v_{19} - v_{24} - v_{25} - v_{51} - v_{54} - v_{55} - v_{58} - v_{59} - v_{60}$$
$$- v_{61} - v_{62} - 3v_{63} - v_{64} - v_{66} - v_{69} - v_{70} - v_{71} - 3v_{82} - v_{89} - 2v_{98} - 2v_{99} - 2v_{100}$$
$$- 2v_{101} - 6v_{102} - 2v_{103} - 6v_{104} - 2v_{108} - 2v_{109} - 2v_{110} - 2v_{111} - v_{120} - v_{124} - v_{146}$$
$$- 2v_{150} - v_{164} - v_{166} - v_{184} - v_{223} - v_{227} - v_{242} - v_{245} - v_{248} - v_{249} - 3v_{252} - v_{253}$$

$$(797)$$

8.227 Species s_1233

Name O-acetyl-L-homoserine

SBO:0000247 simple chemical

Initial concentration $0.1 \, \mathrm{mmol \cdot l^{-1}}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1233} = v_{148} - v_{80} - v_{189} \tag{798}$$

8.228 Species s_1238

Name O-phospho-L-homoserine

SBO:0000247 simple chemical

Initial concentration $0.1 \, \mathrm{mmol \cdot l^{-1}}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1238} = v_{147} - v_{254} \tag{799}$$

8.229 Species s_1255

Name octanoyl-CoA

SBO:0000247 simple chemical

Initial concentration $0.1 \, \mathrm{mmol \cdot l^{-1}}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1255} = v_{104} - v_{103} \tag{800}$$

8.230 Species s_1266

Name ornithine

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

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).

$$\frac{d}{dt}s\_1266 = v_{191} - v_{190} \tag{801}$$

8.231 Species s_1269

Name orotate

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

This species takes part in four reactions (as a reactant in r_0820 and as a product in r_0339 and as a modifier in r_0339, r_0820).

$$\frac{d}{dt}s\_1269 = v_{87} - v_{192} \tag{802}$$

8.232 Species s_1270

Name orotidine 5'-(dihydrogen phosphate)

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

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).

$$\frac{d}{dt}s\_1270 = v_{192} - v_{193} \tag{803}$$

8.233 Species s_1271

Name oxaloacetate

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

This species takes part in eight reactions (as a reactant in r_0216, r_0300 and as a product in r_0713, r_0958 and as a modifier in r_0216, r_0300, r_0713, r_0958).

$$\frac{d}{dt}s\_1271 = v_{171} + v_{228} - v_{50} - v_{75} \tag{804}$$

8.234 Species s_1275

Name oxygen

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot \text{l}^{-1}$

This species takes part in 32 reactions (as a reactant in r_0233, r_0238, r_0239, r_0240, r_0241, r_0242, r_0259, r_0267, r_0269, r_0317, r_0339, r_0438, r_0922, r_1010, r_1011 and as a product in r_1979 and as a modifier in r_0233, r_0238, r_0239, r_0240, r_0241, r_0242, r_0259, r_0267, r_0269, r_0317, r_0339, r_0438, r_0922, r_1010, r_1011, r_1979).

$$\frac{\text{d}}{\text{d}t}\text{s\_1275} = v_{280} - v_{55} - v_{60} - v_{61} - v_{62} - 3v_{63} - v_{64} - v_{69} \tag{805}$$
$$- v_{70} - v_{71} - 3v_{82} - v_{87} - v_{112} - v_{223} - v_{247} - v_{248}$$

8.235 Species s_1277

Name oxygen

SBO:0000247 simple chemical

Initial concentration $1 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{s\_1277} = 0 \tag{806}$$

8.236 Species s_1286

Name palmitate

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_0391 and as a product in r_0389 and as a modifier in r_0389, r_0391).

$$\frac{\text{d}}{\text{d}t}\text{s\_1286} = v_{100} - v_{101} \tag{807}$$

8.237 Species s_1302

Name palmitoyl-CoA

SBO:0000247 simple chemical

Initial concentration $0.1 \text{ mmol} \cdot l^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_1302} = v_{110} - v_{111} - v_{243} \tag{808}$$

8.238 Species s_1314

Name Phe-tRNA(Phe)

SBO:0000247 simple chemical

Initial concentration $0.1 \text{ mmol} \cdot l^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_1314} = v_{195} - 0.1339 v_{282} \tag{809}$$

8.239 Species s_1322

Name phosphate

SBO:0000247 simple chemical

Initial concentration $0.1 \text{ mmol} \cdot l^{-1}$

This species takes part in 73 reactions (as a reactant in r_0446, r_0486 and as a product in r_0020, r_0032, r_0040, r_0065, r_0079, r_0108, r_0153, r_0214, r_0219, r_0250, r_0279, r_0307, r_0337, r_0476, 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_0917, r_0958, r_0967, r_1026, r_1041, r_1051, r_1244, r_2030, r_2111 and as a modifier in r_0020, r_0032, r_0040, r_0065, r_0079, r_0108, r_0153, r_0214, r_0219, r_0250, r_0279, r_0307, r_0337, r_0446, r_0476, r_0486, 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_0917, r_0958, r_0967, r_1026, r_1041, r_1051, r_1244, r_2030).

$$\begin{aligned}
\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_1322} = {} & v_{10} + v_{15} + v_{18} + v_{22} + v_{23} + v_{28} + v_{37} + v_{48} + v_{51} + v_{67} + v_{73} + v_{77} + v_{86} + v_{121} \\
& + v_{140} + 2v_{156} + v_{175} + v_{181} + v_{182} + v_{184} + v_{186} + v_{190} + v_{196} + v_{211} + v_{214} + v_{217} \\
& + v_{220} + v_{228} + v_{231} + v_{251} + v_{254} + v_{260} + v_{273} + v_{281} + 58.70001 v_{282} - v_{114} - v_{126}
\end{aligned} \tag{810}$$

8.240 Species s_1324

Name phosphate

SBO:0000247 simple chemical

Initial concentration $1\,\mathrm{mmol\cdot l^{-1}}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1324} = 0 \tag{811}$$

8.241 Species s_1331

Name phosphatidate

SBO:0000247 simple chemical

Initial concentration $0.1\,\mathrm{mmol\cdot l^{-1}}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1331} = v_4 - v_{68} - v_{86} \tag{812}$$

8.242 Species s_1337

Name phosphatidyl-L-serine

SBO:0000247 simple chemical

Initial concentration $0.1\,\mathrm{mmol\cdot l^{-1}}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1337} = v_{200} - v_{199} - 3.9 \cdot 10^{-4} v_{282} \tag{813}$$

8.243 Species s_1342

Name phosphatidyl-N,N-dimethylethanolamine

SBO:0000247 simple chemical

Initial concentration $0.1\,\mathrm{mmol\cdot l^{-1}}$

Produced by SBML2LATEX

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1342} = v_{208} - v_{207} \tag{814}$$

8.244 Species s_1343

Name phosphatidyl-N-methylethanolamine

SBO:0000247 simple chemical

Initial concentration $0.1\,\mathrm{mmol\cdot l^{-1}}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1343} = v_{197} - v_{208} \tag{815}$$

8.245 Species s_1346

Name phosphatidylcholine

SBO:0000247 simple chemical

Initial concentration $0.1\,\mathrm{mmol\cdot l^{-1}}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1346} = v_{207} - 0.00288 v_{282} \tag{816}$$

8.246 Species s_1351

Name phosphatidylethanolamine

SBO:0000247 simple chemical

Initial concentration $0.1\,\mathrm{mmol\cdot l^{-1}}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1351} = v_{199} - v_{197} - 6.97 \cdot 10^{-4} v_{282} \tag{817}$$

8.247 Species s_1360

Name phosphoenolpyruvate

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

This species takes part in eight reactions (as a reactant in r_0020, r_0065, r_0962 and as a product in r_0366 and as a modifier in r_0020, r_0065, r_0366, r_0962).

$$\frac{d}{dt}s\_1360 = v_{97} - v_{10} - v_{22} - v_{230} \tag{818}$$

8.248 Species s_1364

Name phosphoribosyl-carboxy-aminoimidazole

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

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).

$$\frac{d}{dt}s\_1364 = v_{214} - v_{211} \tag{819}$$

8.249 Species s_1365

Name phosphoribosyl-formamido-carboxamide

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

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).

$$\frac{d}{dt}s\_1365 = v_{215} - v_{157} \tag{820}$$

8.250 Species s_1366

Name phytosphingosine

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

This species takes part in four reactions (as a reactant in r_0919 and as a product in r_0922 and as a modifier in r_0919, r_0922).

$$\frac{d}{dt}s\_1366 = v_{223} - v_{222} \tag{821}$$

8.251 Species s_1376

Name prenyl diphosphate

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_1376} = v_{163} - v_{93} \tag{822}$$

8.252 Species s_1377

Name prephenate

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_1377} = v_{72} - v_{224} - v_{225} \tag{823}$$

8.253 Species s_1379

Name Pro-tRNA(Pro)

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_1379} = v_{226} - 0.1647 v_{282} \tag{824}$$

8.254 Species s_1386

Name PRPP

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_1386} = v_{219} - v_{41} - v_{53} - v_{192} - v_{218} \tag{825}$$

8.255 Species s_1399

Name pyruvate

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

This species takes part in 14 reactions (as a reactant in r_0016, r_0097, r_0674, r_0958, r_0961 and as a product in r_0203, r_0962 and as a modifier in r_0016, r_0097, r_0203, r_0674, r_0958, r_0961, r_0962).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_1399} = v_{42} + v_{230} - v_8 - 2v_{26} - v_{165} - v_{228} - v_{229} \tag{826}$$

8.256 Species s_1405

Name riboflavin

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_1405} = v_{232} - 9.9 \cdot 10^{-4} v_{282} \tag{827}$$

8.257 Species s_1408

Name ribose-5-phosphate

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

This species takes part in six reactions (as a reactant in r_0916 and as a product in r_0982, r_1049 and as a modifier in r_0916, r_0982, r_1049).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_1408} = v_{238} + v_{258} - v_{219} \tag{828}$$

8.258 Species s_1413

Name S-adenosyl-L-homocysteine

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_0144 and as a product in r_0858, r_0900, r_0901, r_0986 and as a modifier in r_0144, r_0858, r_0900, r_0901, r_0986).

$$\frac{\text{d}}{\text{d}t}\text{s\_1413} = v_{197} + v_{207} + v_{208} + v_{240} - v_{33} \tag{829}$$

8.259 Species s_1416

Name S-adenosyl-L-methionine

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_0858, r_0900, r_0901, r_0986 and as a product in r_0726 and as a modifier in r_0726, r_0858, r_0900, r_0901, r_0986).

$$\frac{\text{d}}{\text{d}t}\text{s\_1416} = v_{175} - v_{197} - v_{207} - v_{208} - v_{240} \tag{830}$$

8.260 Species s_1427

Name sedoheptulose 7-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_1049 and as a product in r_1048 and as a modifier in r_1048, r_1049).

$$\frac{\text{d}}{\text{d}t}\text{s\_1427} = v_{257} - v_{258} \tag{831}$$

8.261 Species s_1428

Name Ser-tRNA(Ser)

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_0995 and as a modifier in r_0995, r_2111).

$$\frac{\text{d}}{\text{d}t}\text{s\_1428} = v_{244} - 0.1854 v_{282} \tag{832}$$

8.262 Species s_1429

Name shikimate

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_0997 and as a product in r_0996 and as a modifier in r_0996, r_0997).

$$\frac{\text{d}}{\text{d}t}\text{s\_1429} = v_{245} - v_{246} \tag{833}$$

8.263 Species s_1445

Name sphinganine

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_0340, r_0922 and as a product in r_0041 and as a modifier in r_0041, r_0340, r_0922).

$$\frac{\text{d}}{\text{d}t}\text{s\_1445} = v_{19} - v_{88} - v_{223} \tag{834}$$

8.264 Species s_1447

Name squalene

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_1010, r_1011 and as a product in r_1012 and as a modifier in r_1010, r_1011, r_1012).

$$\frac{\text{d}}{\text{d}t}\text{s\_1447} = v_{249} - v_{247} - v_{248} \tag{835}$$

8.265 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).

$$\frac{\text{d}}{\text{d}t}\text{s\_1449} = v_{101} + v_{107} - v_{102} \tag{836}$$

8.266 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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_1454} = v_{111} - v_{107} \tag{837}$$

8.267 Species s_1467

Name sulphate

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_1026, r_2111 and as a product in r_1266 and as a modifier in r_1026, r_1266, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_1467} = v_{274} - v_{251} - 0.02 v_{282} \tag{838}$$

8.268 Species s_1468

Name sulphate

SBO:0000247 simple chemical

Initial concentration $1 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_1468} = 0 \tag{839}$$

8.269 Species s_1469

Name sulphite

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_1027 and as a product in r_0883 and as a modifier in r_0883, r_1027).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1469} = v_{201} - v_{252} \tag{840}$$

8.270 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_0501, r_0502 and as a product in r_0344, r_0446, r_0499, r_0727, r_0912 and as a modifier in r_0344, r_0446, r_0499, r_0501, r_0502, r_0727, r_0912).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1487} = v_{89} + v_{114} + v_{129} + v_{176} + v_{215} - v_{130} - v_{131} \tag{841}$$

8.271 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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1491} = v_{255} - 0.1914 v_{282} \tag{842}$$

8.272 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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1520} = v_{260} - 0.0234 v_{282} \tag{843}$$

8.273 Species s_1524

Name triglyceride

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

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).

$$\frac{d}{dt}s\_1524 = v_{261} - v_{85} - 7.81 \cdot 10^{-4} v_{282} \tag{844}$$

8.274 Species s_1527

Name Trp-tRNA(Trp)

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

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).

$$\frac{d}{dt}s\_1527 = v_{264} - 0.0284 v_{282} \tag{845}$$

8.275 Species s_1533

Name Tyr-tRNA(Tyr)

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

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).

$$\frac{d}{dt}s\_1533 = v_{266} - 0.102 v_{282} \tag{846}$$

8.276 Species s_1535

Name ubiquinol-6

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

This species takes part in four reactions (as a reactant in r_0439 and as a product in r_0770 and as a modifier in r_0439, r_0770).

$$\frac{d}{dt}s\_1535 = v_{185} - v_{113} \tag{847}$$

8.277 Species s_1537

Name ubiquinone-6

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

This species takes part in four reactions (as a reactant in r_0770 and as a product in r_0439 and as a modifier in r_0439, r_0770).

$$\frac{d}{dt} s\_1537 = v_{113} - v_{185} \tag{848}$$

8.278 Species s_1538

Name UDP

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

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).

$$\frac{d}{dt} s\_1538 = v_1 + v_2 + v_{40} + v_{132} + v_{267} - v_{188} \tag{849}$$

8.279 Species s_1543

Name UDP-D-glucose

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

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).

$$\frac{d}{dt} s\_1543 = v_{268} - v_1 - v_2 - v_{40} - v_{132} \tag{850}$$

8.280 Species s_1545

Name UMP

SBO:0000247 simple chemical

Initial concentration $0.1 \, \mathrm{mmol \cdot l^{-1}}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1545} = v_{193} - v_{267} - 0.0599v_{282} \tag{851}$$

8.281 Species s_1559

Name UTP

SBO:0000247 simple chemical

Initial concentration $0.1 \, \mathrm{mmol \cdot l^{-1}}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1559} = v_{188} - v_{77} - v_{234} - v_{268} \tag{852}$$

8.282 Species s_1561

Name Val-tRNA(Val)

SBO:0000247 simple chemical

Initial concentration $0.1 \, \mathrm{mmol \cdot l^{-1}}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1561} = v_{270} - 0.2646v_{282} \tag{853}$$

8.283 Species s_1565

Name xanthosine-5-phosphate

SBO:0000247 simple chemical

Initial concentration $0.1 \, \mathrm{mmol \cdot l^{-1}}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1565} = v_{154} - v_{134} \tag{854}$$

8.284 Species s_1569

Name zymosterol

SBO:0000247 simple chemical

Initial concentration $0.1\,\mathrm{mmol} \cdot l^{-1}$

This species takes part in six reactions (as a reactant in r_0986, r_2111 and as a product in r_0237 and as a modifier in r_0237, r_0986, r_2111).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1569} = v_{59} - v_{240} - 1.5 \cdot 10^{-5} v_{282} \tag{855}$$

8.285 Species s_1576

Name zymosterol intermediate 1a

SBO:0000247 simple chemical

Initial concentration $0.1\,\mathrm{mmol} \cdot l^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1576} = v_{60} - v_{61} \tag{856}$$

8.286 Species s_1577

Name zymosterol intermediate 1b

SBO:0000247 simple chemical

Initial concentration $0.1\,\mathrm{mmol} \cdot l^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1577} = v_{61} - v_{62} \tag{857}$$

8.287 Species s_1578

Name zymosterol intermediate 1c

SBO:0000247 simple chemical

Initial concentration $0.1\,\mathrm{mmol} \cdot l^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{s\_1578} = v_{62} - v_{56} \tag{858}$$

8.288 Species s_1579

Name zymosterol intermediate 2

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_0237 and as a product in r_0234 and as a modifier in r_0234, r_0237).

$$\frac{\text{d}}{\text{d}t}\text{s\_1579} = v_{56} - v_{59} \tag{859}$$

8.289 Species s_1582

Name tRNA(Ala)

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot \text{l}^{-1}$

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).

$$\frac{\text{d}}{\text{d}t}\text{s\_1582} = 0.4588v_{282} - v_{39} \tag{860}$$

8.290 Species s_1583

Name tRNA(Arg)

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot \text{l}^{-1}$

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).

$$\frac{\text{d}}{\text{d}t}\text{s\_1583} = 0.1607v_{282} - v_{45} \tag{861}$$

8.291 Species s_1585

Name tRNA(Asn)

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot \text{l}^{-1}$

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).

$$\frac{\text{d}}{\text{d}t}\text{s\_1585} = 0.1017v_{282} - v_{47} \tag{862}$$

8.292 Species s_1587

Name tRNA(Asp)

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

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).

$$\frac{d}{dt} s\_1587 = 0.2975 v_{282} - v_{52} \tag{863}$$

8.293 Species s_1589

Name tRNA(Cys)

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

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).

$$\frac{d}{dt} s\_1589 = 0.0066 v_{282} - v_{81} \tag{864}$$

8.294 Species s_1590

Name tRNA(Gln)

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

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).

$$\frac{d}{dt} s\_1590 = 0.1054 v_{282} - v_{122} \tag{865}$$

8.295 Species s_1591

Name tRNA(Glu)

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

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).

$$\frac{d}{dt} s\_1591 = 0.3018 v_{282} - v_{123} \tag{866}$$

8.296 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).

$$\frac{\mathrm{d}}{\mathrm{d}t} \mathrm{s\_1593} = 0.2904 v_{282} - v_{133} \tag{867}$$

8.297 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).

$$\frac{\mathrm{d}}{\mathrm{d}t} \mathrm{s\_1594} = 0.0663 v_{282} - v_{142} \tag{868}$$

8.298 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).

$$\frac{\mathrm{d}}{\mathrm{d}t} \mathrm{s\_1596} = 0.1927 v_{282} - v_{162} \tag{869}$$

8.299 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).

$$\frac{\mathrm{d}}{\mathrm{d}t} \mathrm{s\_1598} = 0.2964 v_{282} - v_{169} \tag{870}$$

8.300 Species s_1600

Name tRNA(Lys)

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

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).

$$\frac{\text{d}}{\text{d}t}\text{s\_1600} = 0.2862 v_{282} - v_{170} \tag{871}$$

8.301 Species s_1602

Name tRNA(Met)

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

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).

$$\frac{\text{d}}{\text{d}t}\text{s\_1602} = 0.0507 v_{282} - v_{177} \tag{872}$$

8.302 Species s_1604

Name tRNA(Phe)

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

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).

$$\frac{\text{d}}{\text{d}t}\text{s\_1604} = 0.1339 v_{282} - v_{195} \tag{873}$$

8.303 Species s_1606

Name tRNA(Pro)

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot 1^{-1}$

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).

$$\frac{\text{d}}{\text{d}t}\text{s\_1606} = 0.1647 v_{282} - v_{226} \tag{874}$$

8.304 Species s_1607

Name tRNA(Ser)

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_1607} = 0.1854 v_{282} - v_{244} \tag{875}$$

8.305 Species s_1608

Name tRNA(Thr)

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_1608} = 0.1914 v_{282} - v_{255} \tag{876}$$

8.306 Species s_1610

Name tRNA(Trp)

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_1610} = 0.0284 v_{282} - v_{264} \tag{877}$$

8.307 Species s_1612

Name tRNA(Tyr)

SBO:0000247 simple chemical

Initial concentration $0.1 \, \text{mmol} \cdot l^{-1}$

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).

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{s\_1612} = 0.102 v_{282} - v_{266} \tag{878}$$

8.308 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).

$$\frac{\mathrm{d}}{\mathrm{d}t} \mathrm{s\_1614} = 0.2646 v_{282} - v_{270} \tag{879}$$

8.309 Species s_1616

Name TRX1

SBO:0000247 simple chemical

Initial concentration $0.1 \, \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in 16 reactions (as a reactant in r_0550, 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_0550, r_0883, r_0970, r_0973, r_0974, r_0976, r_0978, r_1038).

$$\frac{\mathrm{d}}{\mathrm{d}t} \mathrm{s\_1616} = v_{253} - v_{149} - v_{201} - v_{233} - v_{234} - v_{235} - v_{236} - v_{237} \tag{880}$$

8.310 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 16 reactions (as a reactant in r_1038 and as a product in r_0550, r_0883, r_0970, r_0973, r_0974, r_0976, r_0978 and as a modifier in r_0550, r_0883, r_0970, r_0973, r_0974, r_0976, r_0978, r_1038).

$$\frac{\mathrm{d}}{\mathrm{d}t} \mathrm{s\_1620} = v_{149} + v_{201} + v_{233} + v_{234} + v_{235} + v_{236} + v_{237} - v_{253} \tag{881}$$

8.311 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0001} = 0 \tag{882}$$

8.312 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0004} = 0 \tag{883}$$

8.313 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0006} = 0 \tag{884}$$

8.314 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0007} = 0 \tag{885}$$

8.315 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0008} = 0 \qquad (886)$$

8.316 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0010} = 0 \qquad (887)$$

8.317 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 r_0962), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0011} = 0 \qquad (888)$$

8.318 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0012} = 0 \qquad (889)$$

8.319 Species e_0016

Name GDH3

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0471), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t} \text{e\_0016} = 0 \tag{890}$$

8.320 Species e_0017

Name ADE1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t} \text{e\_0017} = 0 \tag{891}$$

8.321 Species e_0020

Name SCT1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t} \text{e\_0020} = 0 \tag{892}$$

8.322 Species e_0022

Name ACH1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t} \text{e\_0022} = 0 \tag{893}$$

8.323 Species e_0025

Name RIB1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot 1^{-1}$

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:

$$\frac{d}{dt} e\_0025 = 0 \qquad (894)$$

8.324 Species e_0026

Name URA7

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot 1^{-1}$

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:

$$\frac{d}{dt} e\_0026 = 0 \qquad (895)$$

8.325 Species e_0028

Name COR1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot 1^{-1}$

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:

$$\frac{d}{dt} e\_0028 = 0 \qquad (896)$$

8.326 Species e_0029

Name PRX1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot 1^{-1}$

This species takes part in one reaction (as a modifier in r_0550), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{d}{dt} e\_0029 = 0 \qquad (897)$$

8.327 Species e_0030

Name PRS4

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0030} = 0 \tag{898}$$

8.328 Species e_0031

Name ILS1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0031} = 0 \tag{899}$$

8.329 Species e_0038

Name IPP1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0038} = 0 \tag{900}$$

8.330 Species e_0045

Name CDS1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0045} = 0 \tag{901}$$

8.331 Species e_0054

Name TSC3

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot l^{-1}$

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:

$$\frac{d}{dt} \text{e\_0054} = 0 \tag{902}$$

8.332 Species e_0057

Name MIS1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot l^{-1}$

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:

$$\frac{d}{dt} \text{e\_0057} = 0 \tag{903}$$

8.333 Species e_0062

Name LYS2

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot l^{-1}$

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:

$$\frac{d}{dt} \text{e\_0062} = 0 \tag{904}$$

8.334 Species e_0063

Name TKL2

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot l^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0063} = 0 \qquad (905)$$

8.335 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0064} = 0 \qquad (906)$$

8.336 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0065} = 0 \qquad (907)$$

8.337 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0071} = 0 \qquad (908)$$

8.338 Species e_0074

Name TYR1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0074} = 0 \qquad (909)$$

8.339 Species e_0077

Name YPC1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0919), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\text{d}}{\text{d}t}\text{e\_0077} = 0 \qquad (910)$$

8.340 Species e_0079

Name PGI1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0467), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\text{d}}{\text{d}t}\text{e\_0079} = 0 \qquad (911)$$

8.341 Species e_0084

Name PYC2

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0084} = 0 \qquad (912)$$

8.342 Species e_0085

Name PDB1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0961), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0085} = 0 \tag{913}$$

8.343 Species e_0086

Name GPX2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0483), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0086} = 0 \tag{914}$$

8.344 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0087} = 0 \tag{915}$$

8.345 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0088} = 0 \tag{916}$$

8.346 Species e_0089

Name DUT1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\mathrm{mmol \cdot l^{-1}}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0089} = 0 \tag{917}$$

8.347 Species e_0090

Name RIB5

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\mathrm{mmol \cdot l^{-1}}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0090} = 0 \tag{918}$$

8.348 Species e_0091

Name SHM1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\mathrm{mmol \cdot l^{-1}}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0091} = 0 \tag{919}$$

8.349 Species e_0092

Name TSC10

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\mathrm{mmol \cdot l^{-1}}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0092} = 0 \tag{920}$$

8.350 Species e_0100

Name ILV6

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot 1^{-1}$

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:

$$\frac{\text{d}}{\text{d}t} \text{e\_0100} = 0 \tag{921}$$

8.351 Species e_0101

Name LEU2

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot 1^{-1}$

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:

$$\frac{\text{d}}{\text{d}t} \text{e\_0101} = 0 \tag{922}$$

8.352 Species e_0103

Name HIS4

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot 1^{-1}$

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:

$$\frac{\text{d}}{\text{d}t} \text{e\_0103} = 0 \tag{923}$$

8.353 Species e_0104

Name GRX1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot 1^{-1}$

This species takes part in two reactions (as a modifier in r_0481, r_0483), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0104} = 0 \tag{924}$$

8.354 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 r_0534), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0106} = 0 \tag{925}$$

8.355 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0107} = 0 \tag{926}$$

8.356 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0111} = 0 \tag{927}$$

8.357 Species e_0113

Name PGK1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0892), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{e\_0113} = 0 \qquad (928)$$

8.358 Species e_0117

Name FEN1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

This species takes part in two reactions (as a modifier in r_0008, r_0393), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{e\_0117} = 0 \qquad (929)$$

8.359 Species e_0122

Name THR4

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{e\_0122} = 0 \qquad (930)$$

8.360 Species e_0124

Name TRX3

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

This species takes part in two reactions (as a modifier in r_0550, r_1038), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{e\_0124} = 0 \qquad (931)$$

8.361 Species e_0128

Name TSC13

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0393), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0128} = 0 \tag{932}$$

8.362 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0129} = 0 \tag{933}$$

8.363 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0133} = 0 \tag{934}$$

8.364 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0134} = 0 \tag{935}$$

8.365 Species e_0135

Name IDP1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot 1^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0135} = 0 \tag{936}$$

8.366 Species e_0136

Name COX9

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot 1^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0136} = 0 \tag{937}$$

8.367 Species e_0137

Name MDH3

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot 1^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0137} = 0 \tag{938}$$

8.368 Species e_0139

Name NDE2

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot 1^{-1}$

This species takes part in one reaction (as a modifier in r_0770), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\text{d}}{\text{d}t}\text{e\_0139} = 0 \tag{939}$$

8.369 Species e_0141

Name PMT5

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0141} = 0 \tag{940}$$

8.370 Species e_0142

Name PMT1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0142} = 0 \tag{941}$$

8.371 Species e_0146

Name LYS21

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0146} = 0 \tag{942}$$

8.372 Species e_0154

Name LYS20

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0154} = 0 \tag{943}$$

8.373 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0160} = 0 \tag{944}$$

8.374 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0165} = 0 \tag{945}$$

8.375 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0167} = 0 \tag{946}$$

8.376 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0168} = 0 \tag{947}$$

8.377 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:

$$\frac{\mathrm{d}}{\mathrm{d}t} \mathrm{e\_0169} = 0 \tag{948}$$

8.378 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:

$$\frac{\mathrm{d}}{\mathrm{d}t} \mathrm{e\_0171} = 0 \tag{949}$$

8.379 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 r_1054), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t} \mathrm{e\_0175} = 0 \tag{950}$$

8.380 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:

$$\frac{\mathrm{d}}{\mathrm{d}t} \mathrm{e\_0176} = 0 \tag{951}$$

8.381 Species e_0177

Name LCB2

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{e\_0177} = 0 \qquad (952)$$

8.382 Species e_0179

Name TPS2

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{e\_0179} = 0 \qquad (953)$$

8.383 Species e_0181

Name GRX3

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0481), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{e\_0181} = 0 \qquad (954)$$

8.384 Species e_0182

Name ARO1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{d}{dt}e\_0182 = 0 \qquad (955)$$

8.385 Species e_0186

Name HOM2

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{d}{dt}e\_0186 = 0 \qquad (956)$$

8.386 Species e_0194

Name ADK1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

This species takes part in one reaction (as a modifier in `r_0148`), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{d}{dt}e\_0194 = 0 \qquad (957)$$

8.387 Species e_0196

Name LYS4

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{d}{dt}e\_0196 = 0 \qquad (958)$$

8.388 Species e_0203

Name DPP1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot 1^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0203} = 0 \tag{959}$$

8.389 Species e_0204

Name INM2

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot 1^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0204} = 0 \tag{960}$$

8.390 Species e_0206

Name SUR2

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot 1^{-1}$

This species takes part in two reactions (as a modifier in r_0259, r_0922), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\text{d}}{\text{d}t}\text{e\_0206} = 0 \tag{961}$$

8.391 Species e_0214

Name YDR341C

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot 1^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0214} = 0 \tag{962}$$

8.392 Species e_0218

Name TRR1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\text{mmol}\cdot\text{l}^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0218} = 0 \tag{963}$$

8.393 Species e_0219

Name TRP4

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\text{mmol}\cdot\text{l}^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0219} = 0 \tag{964}$$

8.394 Species e_0220

Name KEI1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\text{mmol}\cdot\text{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0594), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0220} = 0 \tag{965}$$

8.395 Species e_0231

Name ADE8

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\text{mmol}\cdot\text{l}^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0231} = 0 \tag{966}$$

8.396 Species e_0233

Name TSA2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0550), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0233} = 0 \tag{967}$$

8.397 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0234} = 0 \tag{968}$$

8.398 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0237} = 0 \tag{969}$$

8.399 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0239} = 0 \tag{970}$$

8.400 Species e_0242

Name GRX2

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_0481, r_0483), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0242} = 0 \tag{971}$$

8.401 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0243} = 0 \tag{972}$$

8.402 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0249} = 0 \tag{973}$$

8.403 Species e_0250

Name RIP1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\text{mmol}\cdot\text{l}^{-1}$

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:

$$\frac{d}{dt}\text{e\_0250} = 0 \tag{974}$$

8.404 Species e_0255

Name CYC7

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\text{mmol}\cdot\text{l}^{-1}$

This species takes part in two reactions (as a modifier in r_0438, r_0439), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{d}{dt}\text{e\_0255} = 0 \tag{975}$$

8.405 Species e_0269

Name PMI40

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\text{mmol}\cdot\text{l}^{-1}$

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:

$$\frac{d}{dt}\text{e\_0269} = 0 \tag{976}$$

8.406 Species e_0271

Name YND1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\text{mmol}\cdot\text{l}^{-1}$

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:

$$\frac{d}{dt}\text{e\_0271} = 0 \tag{977}$$

8.407 Species e_0273

Name FAA2

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot l^{-1}$

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:

$$\frac{d}{dt} e\_0273 = 0 \qquad (978)$$

8.408 Species e_0276

Name PRO3

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot l^{-1}$

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:

$$\frac{d}{dt} e\_0276 = 0 \qquad (979)$$

8.409 Species e_0278

Name CHO1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot l^{-1}$

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:

$$\frac{d}{dt} e\_0278 = 0 \qquad (980)$$

8.410 Species e_0280

Name SAH1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot l^{-1}$

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:

$$\frac{d}{dt} e\_0280 = 0 \qquad (981)$$

8.411 Species e_0281

Name HOM3

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t} \text{e\_0281} = 0 \qquad (982)$$

8.412 Species e_0283

Name HIS1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t} \text{e\_0283} = 0 \qquad (983)$$

8.413 Species e_0290

Name ARG5,6

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t} \text{e\_0290} = 0 \qquad (984)$$

8.414 Species e_0291

Name RNR1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0291} = 0 \tag{985}$$

8.415 Species e_0294

Name SER3

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\mathrm{mmol\cdot l^{-1}}$

This species takes part in one reaction (as a modifier in r_0891), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0294} = 0 \tag{986}$$

8.416 Species e_0296

Name AIM10

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\mathrm{mmol\cdot l^{-1}}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0296} = 0 \tag{987}$$

8.417 Species e_0297

Name TRP2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\mathrm{mmol\cdot l^{-1}}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0297} = 0 \tag{988}$$

8.418 Species e_0298

Name MET6

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0298} = 0 \tag{989}$$

8.419 Species e_0299

Name PRS2

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0299} = 0 \tag{990}$$

8.420 Species e_0303

Name ADK2

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0148), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\text{d}}{\text{d}t}\text{e\_0303} = 0 \tag{991}$$

8.421 Species e_0304

Name GRX4

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0481), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\text{d}}{\text{d}t}\text{e\_0304} = 0 \tag{992}$$

8.422 Species e_0306

Name PDA1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\text{mmol}\cdot\text{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0961), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\text{d}}{\text{d}t}\text{e\_0306} = 0 \tag{993}$$

8.423 Species e_0311

Name LPD1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\text{mmol}\cdot\text{l}^{-1}$

This species takes part in two reactions (as a modifier in r_0501, r_0961), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\text{d}}{\text{d}t}\text{e\_0311} = 0 \tag{994}$$

8.424 Species e_0312

Name FRS2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\text{mmol}\cdot\text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0312} = 0 \tag{995}$$

8.425 Species e_0314

Name SEC53

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\text{mmol}\cdot\text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0314} = 0 \tag{996}$$

8.426 Species e_0317

Name GSY1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot 1^{-1}$

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:

$$\frac{d}{dt}e\_0317 = 0 \tag{997}$$

8.427 Species e_0320

Name HIS2

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot 1^{-1}$

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:

$$\frac{d}{dt}e\_0320 = 0 \tag{998}$$

8.428 Species e_0321

Name MET10

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot 1^{-1}$

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:

$$\frac{d}{dt}e\_0321 = 0 \tag{999}$$

8.429 Species e_0322

Name QCR6

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot 1^{-1}$

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:

$$\frac{d}{dt}e\_0322 = 0 \tag{1000}$$

8.430 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 r_0534), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t} \mathrm{e\_0325} = 0 \tag{1001}$$

8.431 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:

$$\frac{\mathrm{d}}{\mathrm{d}t} \mathrm{e\_0326} = 0 \tag{1002}$$

8.432 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:

$$\frac{\mathrm{d}}{\mathrm{d}t} \mathrm{e\_0328} = 0 \tag{1003}$$

8.433 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:

$$\frac{\mathrm{d}}{\mathrm{d}t} \mathrm{e\_0329} = 0 \tag{1004}$$

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8.434 Species e_0330

Name TRP5

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0330} = 0 \tag{1005}$$

8.435 Species e_0334

Name PYC1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0334} = 0 \tag{1006}$$

8.436 Species e_0340

Name MET13

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0340} = 0 \tag{1007}$$

8.437 Species e_0342

Name ARO2

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0342} = 0 \tag{1008}$$

8.438 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0343} = 0 \tag{1009}$$

8.439 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0346} = 0 \tag{1010}$$

8.440 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0347} = 0 \tag{1011}$$

8.441 Species e_0348

Name ARO8

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\mathrm{mmol}\cdot\mathrm{l}^{-1}$

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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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0348} = 0 \tag{1012}$$

8.442 Species e_0352

Name ADE5,7

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \mathrm{mmol \cdot 1^{-1}}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0352} = 0 \tag{1013}$$

8.443 Species e_0353

Name GUS1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \mathrm{mmol \cdot 1^{-1}}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0353} = 0 \tag{1014}$$

8.444 Species e_0355

Name HXK2

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \mathrm{mmol \cdot 1^{-1}}$

This species takes part in one reaction (as a modifier in r_0534), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0355} = 0 \tag{1015}$$

8.445 Species e_0364

Name GSC2

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \mathrm{mmol \cdot l^{-1}}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t} \mathrm{e\_0364} = 0 \qquad (1016)$$

8.446 Species e_0365

Name ACB1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \mathrm{mmol \cdot l^{-1}}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t} \mathrm{e\_0365} = 0 \qquad (1017)$$

8.447 Species e_0367

Name ERG25

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \mathrm{mmol \cdot l^{-1}}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t} \mathrm{e\_0367} = 0 \qquad (1018)$$

8.448 Species e_0368

Name ADE6

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{e\_0368} = 0 \tag{1019}$$

8.449 Species e_0372

Name VAS1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{e\_0372} = 0 \tag{1020}$$

8.450 Species e_0376

Name ASN2

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{e\_0376} = 0 \tag{1021}$$

8.451 Species e_0379

Name SKN1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{e\_0379} = 0 \tag{1022}$$

8.452 Species e_0380

Name CYS4

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0380} = 0 \tag{1023}$$

8.453 Species e_0381

Name CHO2

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0381} = 0 \tag{1024}$$

8.454 Species e_0382

Name PSD2

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0382} = 0 \tag{1025}$$

8.455 Species e_0385

Name ERG1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

This species takes part in two reactions (as a modifier in r_1010, r_1011), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\text{d}}{\text{d}t}\text{e\_0385} = 0 \tag{1026}$$

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8.456 Species e_0387

Name RNR4

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{e\_0387} = 0 \tag{1027}$$

8.457 Species e_0389

Name QCR9

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{e\_0389} = 0 \tag{1028}$$

8.458 Species e_0390

Name TYS1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{e\_0390} = 0 \tag{1029}$$

8.459 Species e_0392

Name TDH3

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0486), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0392} = 0 \tag{1030}$$

8.460 Species e_0393

Name PDX1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0961), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0393} = 0 \tag{1031}$$

8.461 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0396} = 0 \tag{1032}$$

8.462 Species e_0397

Name SER2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0917), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0397} = 0 \tag{1033}$$

8.463 Species e_0398

Name TRX2

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_0550, 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0398} = 0 \tag{1034}$$

8.464 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 r_0886), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0401} = 0 \tag{1035}$$

8.465 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 r_0366), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0405} = 0 \tag{1036}$$

8.466 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0409} = 0 \tag{1037}$$

8.467 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0418} = 0 \tag{1038}$$

8.468 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0422} = 0 \tag{1039}$$

8.469 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0424} = 0 \tag{1040}$$

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8.470 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:

$$\frac{\mathrm{d}}{\mathrm{d}t} \mathrm{e\_0425} = 0 \tag{1041}$$

8.471 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:

$$\frac{\mathrm{d}}{\mathrm{d}t} \mathrm{e\_0426} = 0 \tag{1042}$$

8.472 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:

$$\frac{\mathrm{d}}{\mathrm{d}t} \mathrm{e\_0427} = 0 \tag{1043}$$

8.473 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:

$$\frac{\mathrm{d}}{\mathrm{d}t} \mathrm{e\_0428} = 0 \tag{1044}$$

8.474 Species e_0431

Name PUT2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\mathrm{mmol \cdot l^{-1}}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0431} = 0 \tag{1045}$$

8.475 Species e_0434

Name NCP1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\mathrm{mmol \cdot l^{-1}}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0434} = 0 \tag{1046}$$

8.476 Species e_0435

Name INM1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\mathrm{mmol \cdot l^{-1}}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0435} = 0 \tag{1047}$$

8.477 Species e_0436

Name COX6

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\mathrm{mmol \cdot l^{-1}}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0436} = 0 \tag{1048}$$

8.478 Species e_0440

Name ERG7

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0440} = 0 \tag{1049}$$

8.479 Species e_0448

Name TRR2

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0448} = 0 \tag{1050}$$

8.480 Species e_0452

Name DCD1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0452} = 0 \tag{1051}$$

8.481 Species e_0454

Name ENO2

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0366), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\text{d}}{\text{d}t}\text{e\_0454} = 0 \tag{1052}$$

8.482 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:

$$\frac{\mathrm{d}}{\mathrm{d}t} \mathrm{e\_0456} = 0 \tag{1053}$$

8.483 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:

$$\frac{\mathrm{d}}{\mathrm{d}t} \mathrm{e\_0457} = 0 \tag{1054}$$

8.484 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:

$$\frac{\mathrm{d}}{\mathrm{d}t} \mathrm{e\_0458} = 0 \tag{1055}$$

8.485 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e}\_0462 = 0 \tag{1056}$$

8.486 Species e_0463

Name DOT5

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\mathrm{mmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0550), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e}\_0463 = 0 \tag{1057}$$

8.487 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e}\_0465 = 0 \tag{1058}$$

8.488 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e}\_0467 = 0 \tag{1059}$$

8.489 Species e_0469

Name SER33

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0891), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\text{d}}{\text{d}t}\text{e\_0469} = 0 \tag{1060}$$

8.490 Species e_0470

Name THS1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0470} = 0 \tag{1061}$$

8.491 Species e_0472

Name LYS12

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0472} = 0 \tag{1062}$$

8.492 Species e_0475

Name COX5B

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0475} = 0 \tag{1063}$$

8.493 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0476} = 0 \tag{1064}$$

8.494 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0489} = 0 \tag{1065}$$

8.495 Species e_0490

Name HYR1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0483), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0490} = 0 \tag{1066}$$

8.496 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0492} = 0 \tag{1067}$$

8.497 Species e_0495

Name TDH1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \mathrm{mmol \cdot l^{-1}}$

This species takes part in one reaction (as a modifier in `r_0486`), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0495} = 0 \tag{1068}$$

8.498 Species e_0496

Name BNA3

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \mathrm{mmol \cdot l^{-1}}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0496} = 0 \tag{1069}$$

8.499 Species e_0499

Name ARG3

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \mathrm{mmol \cdot l^{-1}}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0499} = 0 \tag{1070}$$

8.500 Species e_0506

Name RPE1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\mathrm{mmol\cdot l^{-1}}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0506} = 0 \tag{1071}$$

8.501 Species e_0508

Name URA2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\mathrm{mmol\cdot l^{-1}}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0508} = 0 \tag{1072}$$

8.502 Species e_0510

Name GLG2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\mathrm{mmol\cdot l^{-1}}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0510} = 0 \tag{1073}$$

8.503 Species e_0512

Name INO1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\mathrm{mmol\cdot l^{-1}}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0512} = 0 \tag{1074}$$

8.504 Species e_0514

Name QCR8

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\text{mmol}\cdot\text{l}^{-1}$

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:

$$\frac{d}{dt}\text{e\_0514} = 0 \tag{1075}$$

8.505 Species e_0515

Name ERG20

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\text{mmol}\cdot\text{l}^{-1}$

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:

$$\frac{d}{dt}\text{e\_0515} = 0 \tag{1076}$$

8.506 Species e_0525

Name TDH2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\text{mmol}\cdot\text{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0486), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{d}{dt}\text{e\_0525} = 0 \tag{1077}$$

8.507 Species e_0528

Name ILV3

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\text{mmol}\cdot\text{l}^{-1}$

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:

$$\frac{d}{dt}\text{e\_0528} = 0 \tag{1078}$$

8.508 Species e_0531

Name CYC1

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_0438`, `r_0439`), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0531} = 0 \tag{1079}$$

8.509 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0536} = 0 \tag{1080}$$

8.510 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0540} = 0 \tag{1081}$$

8.511 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0541} = 0 \tag{1082}$$

8.512 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0542} = 0 \tag{1083}$$

8.513 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0545} = 0 \tag{1084}$$

8.514 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0547} = 0 \tag{1085}$$

8.515 Species e_0548

Name HOM6

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\text{mmol}\cdot\text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0548} = 0 \tag{1086}$$

8.516 Species e_0549

Name PMT4

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\text{mmol}\cdot\text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0549} = 0 \tag{1087}$$

8.517 Species e_0550

Name BAT2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\text{mmol}\cdot\text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0550} = 0 \tag{1088}$$

8.518 Species e_0556

Name MET14

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\text{mmol}\cdot\text{l}^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0556} = 0 \qquad (1089)$$

8.519 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_0594), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0557} = 0 \qquad (1090)$$

8.520 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0561} = 0 \qquad (1091)$$

8.521 Species e_0563

Name GPX1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\mathrm{mmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0483), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0563} = 0 \qquad (1092)$$

8.522 Species e_0565

Name UGP1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\text{mmol}\cdot\text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0565} = 0 \tag{1093}$$

8.523 Species e_0567

Name FBA1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\text{mmol}\cdot\text{l}^{-1}$

This species takes part in one reaction (as a modifier in `r_0450`), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\text{d}}{\text{d}t}\text{e\_0567} = 0 \tag{1094}$$

8.524 Species e_0568

Name YNK1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\text{mmol}\cdot\text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0568} = 0 \tag{1095}$$

8.525 Species e_0571

Name MDH1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\text{mmol}\cdot\text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0571} = 0 \tag{1096}$$

8.526 Species e_0574

Name AAT1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \mathrm{mmol \cdot l^{-1}}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0574} = 0 \tag{1097}$$

8.527 Species e_0576

Name PGM1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \mathrm{mmol \cdot l^{-1}}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0576} = 0 \tag{1098}$$

8.528 Species e_0578

Name TGL1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \mathrm{mmol \cdot l^{-1}}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0578} = 0 \tag{1099}$$

8.529 Species e_0582

Name GPM1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \mathrm{mmol \cdot l^{-1}}$

This species takes part in one reaction (as a modifier in r_0893), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0582} = 0 \tag{1100}$$

8.530 Species e_0585

Name PRS1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{e\_0585} = 0 \tag{1101}$$

8.531 Species e_0586

Name FAS1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{e\_0586} = 0 \tag{1102}$$

8.532 Species e_0591

Name TRP3

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{e\_0591} = 0 \tag{1103}$$

8.533 Species e_0594

Name URA1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot 1^{-1}$

This species takes part in one reaction (as a modifier in r_0339), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{d}{dt} e\_0594 = 0 \tag{1104}$$

8.534 Species e_0603

Name GLG1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot 1^{-1}$

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:

$$\frac{d}{dt} e\_0603 = 0 \tag{1105}$$

8.535 Species e_0607

Name GPT2

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot 1^{-1}$

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:

$$\frac{d}{dt} e\_0607 = 0 \tag{1106}$$

8.536 Species e_0610

Name MTD1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot 1^{-1}$

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:

$$\frac{d}{dt} e\_0610 = 0 \tag{1107}$$

8.537 Species e_0611

Name TGL4

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t} \mathrm{e\_0611} = 0 \tag{1108}$$

8.538 Species e_0613

Name YEH1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t} \mathrm{e\_0613} = 0 \tag{1109}$$

8.539 Species e_0615

Name DPS1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t} \mathrm{e\_0615} = 0 \tag{1110}$$

8.540 Species e_0629

Name AAT2

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t} \mathrm{e\_0629} = 0 \tag{1111}$$

8.541 Species e_0631

Name ADE16

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t} \text{e\_0631} = 0 \tag{1112}$$

8.542 Species e_0632

Name COX12

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t} \text{e\_0632} = 0 \tag{1113}$$

8.543 Species e_0633

Name TRX1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

This species takes part in three reactions (as a modifier in r_0550, r_0883, r_1038), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t} \text{e\_0633} = 0 \tag{1114}$$

8.544 Species e_0637

Name ERG3

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0242), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0637} = 0 \tag{1115}$$

8.545 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0638} = 0 \tag{1116}$$

8.546 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0639} = 0 \tag{1117}$$

8.547 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0642} = 0 \tag{1118}$$

8.548 Species e_0644

Name ERG27

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t} \text{e\_0644} = 0 \qquad (1119)$$

8.549 Species e_0645

Name AHP1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0550), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\text{d}}{\text{d}t} \text{e\_0645} = 0 \qquad (1120)$$

8.550 Species e_0658

Name SAM1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t} \text{e\_0658} = 0 \qquad (1121)$$

8.551 Species e_0667

Name GSY2

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t} \text{e\_0667} = 0 \qquad (1122)$$

8.552 Species e_0674

Name MET17

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\text{mmol}\cdot\text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0674} = 0 \tag{1123}$$

8.553 Species e_0675

Name ACO1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\text{mmol}\cdot\text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0675} = 0 \tag{1124}$$

8.554 Species e_0682

Name FKS1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\text{mmol}\cdot\text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0682} = 0 \tag{1125}$$

8.555 Species e_0684

Name TAL1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\text{mmol}\cdot\text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0684} = 0 \tag{1126}$$

8.556 Species e_0685

Name ILV5

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \mathrm{mmol \cdot l^{-1}}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0685} = 0 \tag{1127}$$

8.557 Species e_0686

Name ADE13

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \mathrm{mmol \cdot l^{-1}}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0686} = 0 \tag{1128}$$

8.558 Species e_0687

Name SUR4

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \mathrm{mmol \cdot l^{-1}}$

This species takes part in one reaction (as a modifier in r_0393), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0687} = 0 \tag{1129}$$

8.559 Species e_0690

Name COX8

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \mathrm{mmol \cdot l^{-1}}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0690} = 0 \tag{1130}$$

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8.560 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0692} = 0 \tag{1131}$$

8.561 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0693} = 0 \tag{1132}$$

8.562 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0697} = 0 \tag{1133}$$

8.563 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0699} = 0 \tag{1134}$$

8.564 Species e_0705

Name IMD4

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot 1^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t} \text{e\_0705} = 0 \tag{1135}$$

8.565 Species e_0708

Name HMG1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot 1^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t} \text{e\_0708} = 0 \tag{1136}$$

8.566 Species e_0711

Name TSL1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot 1^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t} \text{e\_0711} = 0 \tag{1137}$$

8.567 Species e_0712

Name URA5

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot 1^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t} \text{e\_0712} = 0 \tag{1138}$$

8.568 Species e_0714

Name NDI1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0770), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t} \text{e\_0714} = 0 \tag{1139}$$

8.569 Species e_0716

Name ERG13

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t} \text{e\_0716} = 0 \tag{1140}$$

8.570 Species e_0724

Name ERG5

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0233), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t} \text{e\_0724} = 0 \tag{1141}$$

8.571 Species e_0729

Name ARG7

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t} \text{e\_0729} = 0 \tag{1142}$$

8.572 Species e_0733

Name PGM2

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \mathrm{mmol \cdot l^{-1}}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0733} = 0 \tag{1143}$$

8.573 Species e_0734

Name ILV2

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \mathrm{mmol \cdot l^{-1}}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0734} = 0 \tag{1144}$$

8.574 Species e_0736

Name ADE17

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \mathrm{mmol \cdot l^{-1}}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0736} = 0 \tag{1145}$$

8.575 Species e_0737

Name NDE1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \mathrm{mmol \cdot l^{-1}}$

This species takes part in one reaction (as a modifier in `r_0770`), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0737} = 0 \tag{1146}$$

8.576 Species e_0741

Name GCV2

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0741} = 0 \tag{1147}$$

8.577 Species e_0742

Name ERG2

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0742} = 0 \tag{1148}$$

8.578 Species e_0743

Name PFK2

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0886), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\text{d}}{\text{d}t}\text{e\_0743} = 0 \tag{1149}$$

8.579 Species e_0744

Name HFA1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0744} = 0 \tag{1150}$$

8.580 Species e_0745

Name ERG12

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\mathrm{mmol\cdot l^{-1}}$

This species takes part in one reaction (as a modifier in r_0736), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0745} = 0 \tag{1151}$$

8.581 Species e_0746

Name GUA1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\mathrm{mmol\cdot l^{-1}}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0746} = 0 \tag{1152}$$

8.582 Species e_0747

Name ERG8

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\mathrm{mmol\cdot l^{-1}}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0747} = 0 \tag{1153}$$

8.583 Species e_0750

Name FAA4

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\mathrm{mmol\cdot l^{-1}}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0750} = 0 \tag{1154}$$

8.584 Species e_0752

Name COX7

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0752} = 0 \tag{1155}$$

8.585 Species e_0753

Name TPS3

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0753} = 0 \tag{1156}$$

8.586 Species e_0754

Name PPA2

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0754} = 0 \tag{1157}$$

8.587 Species e_0755

Name URA10

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0755} = 0 \tag{1158}$$

8.588 Species e_0756

Name SCS7

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

This species takes part in two reactions (as a modifier in r_0267, r_0269), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t} \text{e\_0756} = 0 \tag{1159}$$

8.589 Species e_0757

Name PGM3

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t} \text{e\_0757} = 0 \tag{1160}$$

8.590 Species e_0761

Name LCB1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t} \text{e\_0761} = 0 \tag{1161}$$

8.591 Species e_0763

Name ADE4

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t} \text{e\_0763} = 0 \tag{1162}$$

8.592 Species e_0765

Name TGL3

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \mathrm{mmol \cdot l^{-1}}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t} \mathrm{e\_0765} = 0 \tag{1163}$$

8.593 Species e_0769

Name IDP3

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \mathrm{mmol \cdot l^{-1}}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t} \mathrm{e\_0769} = 0 \tag{1164}$$

8.594 Species e_0771

Name IDH1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \mathrm{mmol \cdot l^{-1}}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t} \mathrm{e\_0771} = 0 \tag{1165}$$

8.595 Species e_0774

Name COX5A

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \mathrm{mmol \cdot l^{-1}}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t} \mathrm{e\_0774} = 0 \tag{1166}$$

8.596 Species e_0775

Name LAT1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0961), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{d}{dt} \text{e\_0775} = 0 \tag{1167}$$

8.597 Species e_0778

Name LEU4

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{d}{dt} \text{e\_0778} = 0 \tag{1168}$$

8.598 Species e_0788

Name PSD1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{d}{dt} \text{e\_0788} = 0 \tag{1169}$$

8.599 Species e_0791

Name ADE12

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{d}{dt} \text{e\_0791} = 0 \tag{1170}$$

8.600 Species e_0793

Name YNL247W

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0793} = 0 \tag{1171}$$

8.601 Species e_0799

Name MET2

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0799} = 0 \tag{1172}$$

8.602 Species e_0800

Name ERG24

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0800} = 0 \tag{1173}$$

8.603 Species e_0802

Name PHA2

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0802} = 0 \tag{1174}$$

8.604 Species e_0805

Name CIT1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\text{mmol}\cdot\text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0805} = 0 \tag{1175}$$

8.605 Species e_0808

Name ACC1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\text{mmol}\cdot\text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0808} = 0 \tag{1176}$$

8.606 Species e_0812

Name MVD1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\text{mmol}\cdot\text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0812} = 0 \tag{1177}$$

8.607 Species e_0813

Name LYS9

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{e\_0813} = 0 \tag{1178}$$

8.608 Species e_0826

Name ARG1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{e\_0826} = 0 \tag{1179}$$

8.609 Species e_0827

Name GPD2

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{e\_0827} = 0 \tag{1180}$$

8.610 Species e_0829

Name PRS5

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\text{e\_0829} = 0 \tag{1181}$$

8.611 Species e_0830

Name MET22

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot l^{-1}$

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:

$$\frac{d}{dt} e\_0830 = 0 \tag{1182}$$

8.612 Species e_0832

Name RIB2

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot l^{-1}$

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:

$$\frac{d}{dt} e\_0832 = 0 \tag{1183}$$

8.613 Species e_0836

Name WRS1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot l^{-1}$

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:

$$\frac{d}{dt} e\_0836 = 0 \tag{1184}$$

8.614 Species e_0838

Name MDH2

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot l^{-1}$

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:

$$\frac{d}{dt} e\_0838 = 0 \tag{1185}$$

8.615 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0840} = 0 \qquad (1186)$$

8.616 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0841} = 0 \qquad (1187)$$

8.617 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0848} = 0 \qquad (1188)$$

8.618 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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0850} = 0 \qquad (1189)$$

8.619 Species e_0851

Name TGL5

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \mathrm{mmol \cdot l^{-1}}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0851} = 0 \qquad (1190)$$

8.620 Species e_0852

Name RKI1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \mathrm{mmol \cdot l^{-1}}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0852} = 0 \qquad (1191)$$

8.621 Species e_0855

Name LEU9

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \mathrm{mmol \cdot l^{-1}}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0855} = 0 \qquad (1192)$$

8.622 Species e_0860

Name ADE2

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \mathrm{mmol \cdot l^{-1}}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0860} = 0 \qquad (1193)$$

8.623 Species e_0862

Name IDH2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\text{mmol}\cdot\text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0862} = 0 \tag{1194}$$

8.624 Species e_0867

Name GLN4

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\text{mmol}\cdot\text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0867} = 0 \tag{1195}$$

8.625 Species e_0869

Name ALE1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\text{mmol}\cdot\text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0869} = 0 \tag{1196}$$

8.626 Species e_0872

Name SER1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\text{mmol}\cdot\text{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0918), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\text{d}}{\text{d}t}\text{e\_0872} = 0 \tag{1197}$$

8.627 Species e_0875

Name HIS3

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\mathrm{mmol}\cdot 1^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0875} = 0 \tag{1198}$$

8.628 Species e_0880

Name DFR1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\mathrm{mmol}\cdot 1^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0880} = 0 \tag{1199}$$

8.629 Species e_0883

Name DGA1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\mathrm{mmol}\cdot 1^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0883} = 0 \tag{1200}$$

8.630 Species e_0888

Name CPA1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\mathrm{mmol}\cdot 1^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0888} = 0 \tag{1201}$$

8.631 Species e_0889

Name FAA1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0889} = 0 \qquad (1202)$$

8.632 Species e_0890

Name PMT3

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0890} = 0 \qquad (1203)$$

8.633 Species e_0894

Name ALA1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0894} = 0 \qquad (1204)$$

8.634 Species e_0895

Name PYK2

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0962), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{e\_0895} = 0 \qquad (1205)$$

8.635 Species e_0899

Name GDH1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0471), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t} \text{e\_0899} = 0 \tag{1206}$$

8.636 Species e_0903

Name MET12

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t} \text{e\_0903} = 0 \tag{1207}$$

8.637 Species e_0904

Name ERG10

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\mathrm{d}}{\mathrm{d}t} \text{e\_0904} = 0 \tag{1208}$$

8.638 Species e_0910

Name GRX5

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

This species takes part in two reactions (as a modifier in r_0481, r_0483), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\mathrm{d}}{\mathrm{d}t} \text{e\_0910} = 0 \tag{1209}$$

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8.639 Species e_0914

Name YDC1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

This species takes part in one reaction (as a modifier in r_0340), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\text{d}}{\text{d}t} \text{e\_0914} = 0 \tag{1210}$$

8.640 Species e_0915

Name GLR1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

This species takes part in two reactions (as a modifier in r_0481, r_1038), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{\text{d}}{\text{d}t} \text{e\_0915} = 0 \tag{1211}$$

8.641 Species e_0922

Name IDI1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t} \text{e\_0922} = 0 \tag{1212}$$

8.642 Species e_0926

Name CDC60

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t} \text{e\_0926} = 0 \tag{1213}$$

8.643 Species e_0934

Name FAS2

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t} \text{e\_0934} = 0 \tag{1214}$$

8.644 Species e_0940

Name FUM1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t} \text{e\_0940} = 0 \tag{1215}$$

8.645 Species e_0947

Name CIT3

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t} \text{e\_0947} = 0 \tag{1216}$$

8.646 Species e_0953

Name HTS1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t} \text{e\_0953} = 0 \tag{1217}$$

8.647 Species e_0955

Name GLN1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t} \text{e\_0955} = 0 \tag{1218}$$

8.648 Species e_0959

Name ARO7

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t} \text{e\_0959} = 0 \tag{1219}$$

8.649 Species e_0962

Name TKL1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot \text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t} \text{e\_0962} = 0 \tag{1220}$$

8.650 Species e_0963

Name GRS2

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\text{mmol}\cdot\text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0963} = 0 \tag{1221}$$

8.651 Species e_0964

Name PIS1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\text{mmol}\cdot\text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0964} = 0 \tag{1222}$$

8.652 Species e_0970

Name ASN1

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\text{mmol}\cdot\text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0970} = 0 \tag{1223}$$

8.653 Species e_0973

Name KRE6

SBO:0000252 polypeptide chain

Initial concentration $0.0010\,\text{mmol}\cdot\text{l}^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0973} = 0 \tag{1224}$$

8.654 Species e_0975

Name MET16

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot 1^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0975} = 0 \tag{1225}$$

8.655 Species e_0976

Name DPM1

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot 1^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0976} = 0 \tag{1226}$$

8.656 Species e_0978

Name QCR2

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot 1^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0978} = 0 \tag{1227}$$

8.657 Species e_0980

Name YER152C

SBO:0000252 polypeptide chain

Initial concentration $0.0010 \, \text{mmol} \cdot 1^{-1}$

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:

$$\frac{\text{d}}{\text{d}t}\text{e\_0980} = 0 \tag{1228}$$

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:0000290 physical compartment: Specific location of space, that can be bounded or not. A physical compartment can have 1, 2 or 3 dimensions

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