

SBML Model Report

Model name: “Nishio2008 - Design of the phosphotransferase system for enhanced glucose uptake in E. coli.”



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: Kieran Smallbone¹, Audald Lloret i Villas² and Pierre Millard³ at January first 2015 at noon. and last time modified at March 27th 2015 at 4:08 p.m. Table 1 provides 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	1
species types	0	species	76
events	1	constraints	0
reactions	92	function definitions	0
global parameters	18	unit definitions	8
rules	17	initial assignments	0

Model Notes

Nishio2008 - Design of the phosphotransferasesystem for enhanced glucose uptake in E. coli.

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This model is described in the article: [Computer-aided rational design of the phosphotransferase system for enhanced glucose uptake in Escherichia coli](#). Nishio Y, Usuda Y, Matsui K, Kurata H. Mol. Syst. Biol. 2008; 4: 160

Abstract:

The phosphotransferase system (PTS) is the sugar transportation machinery that is widely distributed in prokaryotes and is critical for enhanced production of useful metabolites. To increase the glucose uptake rate, we propose a rational strategy for designing the molecular architecture of the Escherichia coli glucose PTS by using a computer-aided design (CAD) system and verified the simulated results with biological experiments. CAD supports construction of a biochemical map, mathematical modeling, simulation, and system analysis. Assuming that the PTS aims at controlling the glucose uptake rate, the PTS was decomposed into hierarchical modules, functional and flux modules, and the effect of changes in gene expression on the glucose uptake rate was simulated to make a rational strategy of how the gene regulatory network is engineered. Such design and analysis predicted that the *mlc* knockout mutant with *ptsI* gene overexpression would greatly increase the specific glucose uptake rate. By using biological experiments, we validated the prediction and the presented strategy, thereby enhancing the specific glucose uptake rate.

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2 Unit Definitions

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

2.1 Unit *substance*

Definition mol

2.2 Unit *time*

Definition 60 s

2.3 Unit *volume*

Definition l

2.4 Unit *M*

Definition mol · l⁻¹

2.5 Unit `per_min`

Definition $(60\text{ s})^{-1}$

2.6 Unit `per_M`

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

2.7 Unit `per_M_per_min`

Definition $\text{mol}^{-1} \cdot \text{l} \cdot (60\text{ s})^{-1}$

2.8 Unit `per_M_squared`

Definition $\text{mol}^{-2} \cdot \text{l}^2$

2.9 Unit `area`

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

Definition m^2

2.10 Unit `length`

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

Definition m

3 Compartment

This model contains one compartment.

Table 2: Properties of all compartments.

Id	Name	SBO	Spatial Dimensions	Size	Unit	Constant	Outside
cyt			3	1	litre	<input checked="" type="checkbox"/>	

3.1 Compartment `cyt`

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

4 Species

This model contains 76 species. The boundary condition of 18 of these species is set to `true` so that these species' amount cannot be changed by any reaction. Section 9 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 Condi- tion
CRP		cyt	$\text{mol} \cdot \text{l}^{-1}$	<input type="checkbox"/>	<input type="checkbox"/>
CRPsiteI_crp		cyt	$\text{mol} \cdot \text{l}^{-1}$	<input type="checkbox"/>	<input type="checkbox"/>
CRPsiteII_crp		cyt	$\text{mol} \cdot \text{l}^{-1}$	<input type="checkbox"/>	<input type="checkbox"/>
CRPsite_cyaA		cyt	$\text{mol} \cdot \text{l}^{-1}$	<input type="checkbox"/>	<input type="checkbox"/>
CRPsite_genome		cyt	$\text{mol} \cdot \text{l}^{-1}$	<input type="checkbox"/>	<input type="checkbox"/>
CRPsite_ptsGp1		cyt	$\text{mol} \cdot \text{l}^{-1}$	<input type="checkbox"/>	<input type="checkbox"/>
CRPsite_ptsGp2		cyt	$\text{mol} \cdot \text{l}^{-1}$	<input type="checkbox"/>	<input type="checkbox"/>
CRPsite_ptsHp0		cyt	$\text{mol} \cdot \text{l}^{-1}$	<input type="checkbox"/>	<input type="checkbox"/>
CRPsite_ptsHp1		cyt	$\text{mol} \cdot \text{l}^{-1}$	<input type="checkbox"/>	<input type="checkbox"/>
CRPsite_ptsIp0		cyt	$\text{mol} \cdot \text{l}^{-1}$	<input type="checkbox"/>	<input type="checkbox"/>
CRPsite_ptsIp1		cyt	$\text{mol} \cdot \text{l}^{-1}$	<input type="checkbox"/>	<input type="checkbox"/>
CRPsite_mlcp1		cyt	$\text{mol} \cdot \text{l}^{-1}$	<input type="checkbox"/>	<input type="checkbox"/>
CRPsite_mlcp2		cyt	$\text{mol} \cdot \text{l}^{-1}$	<input type="checkbox"/>	<input type="checkbox"/>
Mlc		cyt	$\text{mol} \cdot \text{l}^{-1}$	<input type="checkbox"/>	<input type="checkbox"/>
Mlcsite_mlcp1		cyt	$\text{mol} \cdot \text{l}^{-1}$	<input type="checkbox"/>	<input type="checkbox"/>
Mlcsite_mlcp2		cyt	$\text{mol} \cdot \text{l}^{-1}$	<input type="checkbox"/>	<input type="checkbox"/>
Mlcsite_ptsGp1		cyt	$\text{mol} \cdot \text{l}^{-1}$	<input type="checkbox"/>	<input type="checkbox"/>
Mlcsite_ptsGp2		cyt	$\text{mol} \cdot \text{l}^{-1}$	<input type="checkbox"/>	<input type="checkbox"/>
Mlcsite_ptsHp0		cyt	$\text{mol} \cdot \text{l}^{-1}$	<input type="checkbox"/>	<input type="checkbox"/>
Mlcsite_ptsIp0		cyt	$\text{mol} \cdot \text{l}^{-1}$	<input type="checkbox"/>	<input type="checkbox"/>
CRP_cAMP		cyt	$\text{mol} \cdot \text{l}^{-1}$	<input type="checkbox"/>	<input type="checkbox"/>

Id	Name	Compartment	Derived Unit	Constant	Boundary Condi- tion
CRP_cAMP-		cyt	$\text{mol} \cdot \text{l}^{-1}$	\boxtimes	\boxtimes
_CRPsiteI_crp					
CRP_cAMP-		cyt	$\text{mol} \cdot \text{l}^{-1}$	\boxtimes	\boxtimes
_CRPsiteII_crp					
CRP_cAMP_CRPsite-		cyt	$\text{mol} \cdot \text{l}^{-1}$	\boxtimes	\boxtimes
_cyaA					
CRP_cAMP_CRPsite-		cyt	$\text{mol} \cdot \text{l}^{-1}$	\boxtimes	\boxtimes
_genome					
CRP_cAMP_CRPsite-		cyt	$\text{mol} \cdot \text{l}^{-1}$	\boxtimes	\boxtimes
_ptsGp1					
CRP_cAMP_CRPsite-		cyt	$\text{mol} \cdot \text{l}^{-1}$	\boxtimes	\boxtimes
_ptsGp2					
CRP_cAMP_CRPsite-		cyt	$\text{mol} \cdot \text{l}^{-1}$	\boxtimes	\boxtimes
_ptsHp0					
CRP_cAMP_CRPsite-		cyt	$\text{mol} \cdot \text{l}^{-1}$	\boxtimes	\boxtimes
_ptsHp1					
CRP_cAMP_CRPsite-		cyt	$\text{mol} \cdot \text{l}^{-1}$	\boxtimes	\boxtimes
_ptsIp0					
CRP_cAMP_CRPsite-		cyt	$\text{mol} \cdot \text{l}^{-1}$	\boxtimes	\boxtimes
_ptsIp1					
CRP_cAMP_CRPsite-		cyt	$\text{mol} \cdot \text{l}^{-1}$	\boxtimes	\boxtimes
_mlcp1					
CRP_cAMP_CRPsite-		cyt	$\text{mol} \cdot \text{l}^{-1}$	\boxtimes	\boxtimes
_mlcp2					
Mlc_Mlcsite-		cyt	$\text{mol} \cdot \text{l}^{-1}$	\boxtimes	\boxtimes
_ptsGp1					

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
Mlc_Mlcsite- _ptsGp2		cyt	$\text{mol} \cdot \text{l}^{-1}$	\boxplus	\boxplus
Mlc_Mlcsite- _ptsIp0		cyt	$\text{mol} \cdot \text{l}^{-1}$	\boxplus	\boxplus
Mlc_Mlcsite- _ptsHp0		cyt	$\text{mol} \cdot \text{l}^{-1}$	\boxplus	\boxplus
Mlc_Mlcsite_mlcp1		cyt	$\text{mol} \cdot \text{l}^{-1}$	\boxplus	\boxplus
Mlc_Mlcsite_mlcp2		cyt	$\text{mol} \cdot \text{l}^{-1}$	\boxplus	\boxplus
IICB		cyt	$\text{mol} \cdot \text{l}^{-1}$	\boxplus	\boxplus
IICB_Mlc		cyt	$\text{mol} \cdot \text{l}^{-1}$	\boxplus	\boxplus
CYA		cyt	$\text{mol} \cdot \text{l}^{-1}$	\boxplus	\boxplus
IIA_P		cyt	$\text{mol} \cdot \text{l}^{-1}$	\boxplus	\boxplus
IIA_P_CYA		cyt	$\text{mol} \cdot \text{l}^{-1}$	\boxplus	\boxplus
mRNA_cyaA		cyt	$\text{mol} \cdot \text{l}^{-1}$	\boxplus	\boxplus
mRNA_crp		cyt	$\text{mol} \cdot \text{l}^{-1}$	\boxplus	\boxplus
mRNA_ptsG		cyt	$\text{mol} \cdot \text{l}^{-1}$	\boxplus	\boxplus
mRNA_ptsH		cyt	$\text{mol} \cdot \text{l}^{-1}$	\boxplus	\boxplus
mRNA_ptsI		cyt	$\text{mol} \cdot \text{l}^{-1}$	\boxplus	\boxplus
mRNA_crr		cyt	$\text{mol} \cdot \text{l}^{-1}$	\boxplus	\boxplus
mRNA_mlc		cyt	$\text{mol} \cdot \text{l}^{-1}$	\boxplus	\boxplus
IICB_P		cyt	$\text{mol} \cdot \text{l}^{-1}$	\boxplus	\boxplus
IIA		cyt	$\text{mol} \cdot \text{l}^{-1}$	\boxplus	\boxplus
HPr_P		cyt	$\text{mol} \cdot \text{l}^{-1}$	\boxplus	\boxplus
HPr		cyt	$\text{mol} \cdot \text{l}^{-1}$	\boxplus	\boxplus
EI_P		cyt	$\text{mol} \cdot \text{l}^{-1}$	\boxplus	\boxplus
EI		cyt	$\text{mol} \cdot \text{l}^{-1}$	\boxplus	\boxplus
cAMP		cyt	$\text{mol} \cdot \text{l}^{-1}$	\boxplus	\boxplus

Id	Name	Compartment	Derived Unit	Constant	Boundary Condi- tion
cyaA		cyt	$\text{mol} \cdot \text{l}^{-1}$	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
cyaA_basal		cyt	$\text{mol} \cdot \text{l}^{-1}$	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
crp		cyt	$\text{mol} \cdot \text{l}^{-1}$	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
crp_basal		cyt	$\text{mol} \cdot \text{l}^{-1}$	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
ptsGp1		cyt	$\text{mol} \cdot \text{l}^{-1}$	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
ptsGp2		cyt	$\text{mol} \cdot \text{l}^{-1}$	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
ptsHp0		cyt	$\text{mol} \cdot \text{l}^{-1}$	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
ptsHp1		cyt	$\text{mol} \cdot \text{l}^{-1}$	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
ptsIp0		cyt	$\text{mol} \cdot \text{l}^{-1}$	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
ptsIp1		cyt	$\text{mol} \cdot \text{l}^{-1}$	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
crr		cyt	$\text{mol} \cdot \text{l}^{-1}$	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
mlcp1		cyt	$\text{mol} \cdot \text{l}^{-1}$	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
mlcp2		cyt	$\text{mol} \cdot \text{l}^{-1}$	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Pyr		cyt	$\text{mol} \cdot \text{l}^{-1}$	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
PEP		cyt	$\text{mol} \cdot \text{l}^{-1}$	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Glc6P		cyt	$\text{mol} \cdot \text{l}^{-1}$	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Glucose		cyt	$\text{mol} \cdot \text{l}^{-1}$	<input type="checkbox"/>	<input checked="" type="checkbox"/>
ATP		cyt	$\text{mol} \cdot \text{l}^{-1}$	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

5 Parameters

This model contains 18 global parameters.

Table 4: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
fast			10^9	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>
TCRPSite-			$2.43 \cdot 10^{-10}$	$\text{mol} \cdot \text{l}^{-1}$	<input type="checkbox"/>
_cyaA					
TCRPSiteI-			$2.43 \cdot 10^{-10}$	$\text{mol} \cdot \text{l}^{-1}$	<input type="checkbox"/>
_crp					
TCRPSiteII-			$2.43 \cdot 10^{-10}$	$\text{mol} \cdot \text{l}^{-1}$	<input type="checkbox"/>
_crp					
TCRPSite-			$2.43 \cdot 10^{-10}$	$\text{mol} \cdot \text{l}^{-1}$	<input type="checkbox"/>
_ptsGp1					
TMLcSite-			$2.43 \cdot 10^{-10}$	$\text{mol} \cdot \text{l}^{-1}$	<input type="checkbox"/>
_ptsGp1					
TCRPSite-			$2.43 \cdot 10^{-10}$	$\text{mol} \cdot \text{l}^{-1}$	<input type="checkbox"/>
_ptsGp2					
TMLcSite-			$2.43 \cdot 10^{-10}$	$\text{mol} \cdot \text{l}^{-1}$	<input type="checkbox"/>
_ptsGp2					
TCRPSite-			$2.43 \cdot 10^{-10}$	$\text{mol} \cdot \text{l}^{-1}$	<input type="checkbox"/>
_ptsHp0					
TMLcSite-			$2.43 \cdot 10^{-10}$	$\text{mol} \cdot \text{l}^{-1}$	<input type="checkbox"/>
_ptsHp0					
TCRPSite-			$2.43 \cdot 10^{-10}$	$\text{mol} \cdot \text{l}^{-1}$	<input type="checkbox"/>
_ptsHp1					
TCRPSite-			$2.43 \cdot 10^{-10}$	$\text{mol} \cdot \text{l}^{-1}$	<input type="checkbox"/>
_ptsIp0					
TMLcSite-			$2.43 \cdot 10^{-10}$	$\text{mol} \cdot \text{l}^{-1}$	<input type="checkbox"/>
_ptsIp0					
TCRPSite-			$2.43 \cdot 10^{-10}$	$\text{mol} \cdot \text{l}^{-1}$	<input type="checkbox"/>
_ptsIp1					
TCRPSite-			$2.43 \cdot 10^{-10}$	$\text{mol} \cdot \text{l}^{-1}$	<input type="checkbox"/>
_mlcp1					
TMLcSite-			$2.43 \cdot 10^{-10}$	$\text{mol} \cdot \text{l}^{-1}$	<input type="checkbox"/>
_mlcp1					
TCRPSite-			$2.43 \cdot 10^{-10}$	$\text{mol} \cdot \text{l}^{-1}$	<input type="checkbox"/>
_mlcp2					
TMLcSite-			$2.43 \cdot 10^{-10}$	$\text{mol} \cdot \text{l}^{-1}$	<input type="checkbox"/>
_mlcp2					

6 Rules

This is an overview of 17 rules.

6.1 Rule `TCRPsites_cyaA`

Rule `TCRPsites_cyaA` is an assignment rule for parameter `TCRPsites_cyaA`:

$$\text{TCRPsites_cyaA} = [\text{CRPsites_cyaA}] + [\text{CRP_cAMP_CRPsites_cyaA}] \quad (1)$$

Derived unit $\text{mol} \cdot \text{l}^{-1}$

6.2 Rule `TCRPsitesI_crp`

Rule `TCRPsitesI_crp` is an assignment rule for parameter `TCRPsitesI_crp`:

$$\text{TCRPsitesI_crp} = [\text{CRPsitesI_crp}] + [\text{CRP_cAMP_CRPsitesI_crp}] \quad (2)$$

Derived unit $\text{mol} \cdot \text{l}^{-1}$

6.3 Rule `TCRPsitesII_crp`

Rule `TCRPsitesII_crp` is an assignment rule for parameter `TCRPsitesII_crp`:

$$\text{TCRPsitesII_crp} = [\text{CRPsitesII_crp}] + [\text{CRP_cAMP_CRPsitesII_crp}] \quad (3)$$

Derived unit $\text{mol} \cdot \text{l}^{-1}$

6.4 Rule `TCRPsites_ptsGp1`

Rule `TCRPsites_ptsGp1` is an assignment rule for parameter `TCRPsites_ptsGp1`:

$$\text{TCRPsites_ptsGp1} = [\text{CRPsites_ptsGp1}] + [\text{CRP_cAMP_CRPsites_ptsGp1}] \quad (4)$$

Derived unit $\text{mol} \cdot \text{l}^{-1}$

6.5 Rule `TMlcsites_ptsGp1`

Rule `TMlcsites_ptsGp1` is an assignment rule for parameter `TMlcsites_ptsGp1`:

$$\text{TMlcsites_ptsGp1} = [\text{Mlcsites_ptsGp1}] + [\text{Mlc_Mlcsites_ptsGp1}] \quad (5)$$

Derived unit $\text{mol} \cdot \text{l}^{-1}$

6.6 Rule `TCRPsites_ptsGp2`

Rule `TCRPsites_ptsGp2` is an assignment rule for parameter `TCRPsites_ptsGp2`:

$$\text{TCRPsites_ptsGp2} = [\text{CRPsites_ptsGp2}] + [\text{CRP_cAMP_CRPsites_ptsGp2}] \quad (6)$$

Derived unit $\text{mol} \cdot \text{l}^{-1}$

6.7 Rule `TMlcsite_ptsGp2`

Rule `TMlcsite_ptsGp2` is an assignment rule for parameter `TMlcsite_ptsGp2`:

$$\text{TMlcsite_ptsGp2} = [\text{Mlcsite_ptsGp2}] + [\text{Mlc_Mlcsite_ptsGp2}] \quad (7)$$

Derived unit $\text{mol} \cdot \text{l}^{-1}$

6.8 Rule `TCRPsite_ptsHp0`

Rule `TCRPsite_ptsHp0` is an assignment rule for parameter `TCRPsite_ptsHp0`:

$$\text{TCRPsite_ptsHp0} = [\text{CRPsite_ptsHp0}] + [\text{CRP_cAMP_CRPsite_ptsHp0}] \quad (8)$$

Derived unit $\text{mol} \cdot \text{l}^{-1}$

6.9 Rule `TMlcsite_ptsHp0`

Rule `TMlcsite_ptsHp0` is an assignment rule for parameter `TMlcsite_ptsHp0`:

$$\text{TMlcsite_ptsHp0} = [\text{Mlcsite_ptsHp0}] + [\text{Mlc_Mlcsite_ptsHp0}] \quad (9)$$

Derived unit $\text{mol} \cdot \text{l}^{-1}$

6.10 Rule `TCRPsite_ptsHp1`

Rule `TCRPsite_ptsHp1` is an assignment rule for parameter `TCRPsite_ptsHp1`:

$$\text{TCRPsite_ptsHp1} = [\text{CRPsite_ptsHp1}] + [\text{CRP_cAMP_CRPsite_ptsHp1}] \quad (10)$$

Derived unit $\text{mol} \cdot \text{l}^{-1}$

6.11 Rule `TCRPsite_ptsIp0`

Rule `TCRPsite_ptsIp0` is an assignment rule for parameter `TCRPsite_ptsIp0`:

$$\text{TCRPsite_ptsIp0} = [\text{CRPsite_ptsIp0}] + [\text{CRP_cAMP_CRPsite_ptsIp0}] \quad (11)$$

Derived unit $\text{mol} \cdot \text{l}^{-1}$

6.12 Rule `TMlcsite_ptsIp0`

Rule `TMlcsite_ptsIp0` is an assignment rule for parameter `TMlcsite_ptsIp0`:

$$\text{TMlcsite_ptsIp0} = [\text{Mlcsite_ptsIp0}] + [\text{Mlc_Mlcsite_ptsIp0}] \quad (12)$$

Derived unit $\text{mol} \cdot \text{l}^{-1}$

6.13 Rule `TCRPsites_ptsIp1`

Rule `TCRPsites_ptsIp1` is an assignment rule for parameter `TCRPsites_ptsIp1`:

$$\text{TCRPsites_ptsIp1} = [\text{CRPsites_ptsIp1}] + [\text{CRP_cAMP_CRPsites_ptsIp1}] \quad (13)$$

Derived unit $\text{mol} \cdot \text{l}^{-1}$

6.14 Rule `TCRPsites_mlcp1`

Rule `TCRPsites_mlcp1` is an assignment rule for parameter `TCRPsites_mlcp1`:

$$\text{TCRPsites_mlcp1} = [\text{CRPsites_mlcp1}] + [\text{CRP_cAMP_CRPsites_mlcp1}] \quad (14)$$

Derived unit $\text{mol} \cdot \text{l}^{-1}$

6.15 Rule `TMlcsites_mlcp1`

Rule `TMlcsites_mlcp1` is an assignment rule for parameter `TMlcsites_mlcp1`:

$$\text{TMlcsites_mlcp1} = [\text{Mlcsites_mlcp1}] + [\text{Mlc_Mlcsites_mlcp1}] \quad (15)$$

Derived unit $\text{mol} \cdot \text{l}^{-1}$

6.16 Rule `TCRPsites_mlcp2`

Rule `TCRPsites_mlcp2` is an assignment rule for parameter `TCRPsites_mlcp2`:

$$\text{TCRPsites_mlcp2} = [\text{CRPsites_mlcp2}] + [\text{CRP_cAMP_CRPsites_mlcp2}] \quad (16)$$

Derived unit $\text{mol} \cdot \text{l}^{-1}$

6.17 Rule `TMlcsites_mlcp2`

Rule `TMlcsites_mlcp2` is an assignment rule for parameter `TMlcsites_mlcp2`:

$$\text{TMlcsites_mlcp2} = [\text{Mlcsites_mlcp2}] + [\text{Mlc_Mlcsites_mlcp2}] \quad (17)$$

Derived unit $\text{mol} \cdot \text{l}^{-1}$

7 Event

This is an overview of one event. Each event is initiated whenever its trigger condition switches from false to true. A delay function postpones the effects of an event to a later time point. At the time of execution, an event can assign values to species, parameters or compartments if these are not set to constant.

7.1 Event `event_0`

Trigger condition

$$T \geq 500 \quad (18)$$

Assignment

$$\text{Glucose} = 2.0E - 9 \quad (19)$$

8 Reactions

This model contains 92 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

Nº	Id	Name	Reaction Equation	SBO
1	binding_CRP-_cAMP		$\text{CRP} + \text{cAMP} \xrightleftharpoons{\text{CRP, cAMP, CRP_cAMP}} \text{CRP_cAMP}$	
2	binding_CRP-_cAMP_CRPsite-_cyaA		$\text{CRP_cAMP} + \text{CRPsite_cyaA} \xrightleftharpoons{\text{CRP_cAMP, CRPsite_cyaA, CRP_cAMP_CRPsite_cyaA}}$	
3	binding_CRP-_cAMP_CRPsiteI-_crp		$\text{CRP_cAMP} + \text{CRPsiteI_crp} \xrightleftharpoons{\text{CRP_cAMP, CRPsiteI_crp, CRP_cAMP_CRPsiteI_crp}} \text{CRP_cAMP_CRPsiteI_crp}$	
4	binding-_CRP_cAMP-_CRPsiteII_crp		$\text{CRP_cAMP} + \text{CRPsiteII_crp} \xrightleftharpoons{\text{CRP_cAMP, CRPsiteII_crp, CRP_cAMP_CRPsiteII_crp}}$	
5	binding_CRP-_cAMP_CRPsite-_ptsGp1		$\text{CRP_cAMP} + \text{CRPsite_ptsGp1} \xrightleftharpoons{\text{CRP_cAMP, CRPsite_ptsGp1, CRP_cAMP_CRPsite_ptsGp1}}$	
6	binding_CRP-_cAMP_CRPsite-_ptsGp2		$\text{CRP_cAMP} + \text{CRPsite_ptsGp2} \xrightleftharpoons{\text{CRP_cAMP, CRPsite_ptsGp2, CRP_cAMP_CRPsite_ptsGp2}}$	

Nº	Id	Name	Reaction Equation	SBO
7	binding_CRP- _cAMP_CRPsite- _ptsHp0		$\text{CRP_cAMP} + \text{CRPsite_ptsHp0} \xrightleftharpoons{\text{CRP_cAMP, CRPsite_ptsHp0, CRP_cAMP_CRPsite_ptsHp0}}$	
8	binding_CRP- _cAMP_CRPsite- _ptsHp1		$\text{CRP_cAMP} + \text{CRPsite_ptsHp1} \xrightleftharpoons{\text{CRP_cAMP, CRPsite_ptsHp1, CRP_cAMP_CRPsite_ptsHp1}}$	
9	binding_CRP- _cAMP_CRPsite- _ptsIp0		$\text{CRP_cAMP} + \text{CRPsite_ptsIp0} \xrightleftharpoons{\text{CRP_cAMP, CRPsite_ptsIp0, CRP_cAMP_CRPsite_ptsIp0}}$	
10	binding_CRP- _cAMP_CRPsite- _ptsIp1		$\text{CRP_cAMP} + \text{CRPsite_ptsIp1} \xrightleftharpoons{\text{CRP_cAMP, CRPsite_ptsIp1, CRP_cAMP_CRPsite_ptsIp1}}$	
11	binding_CRP- _cAMP_CRPsite- _mlcp1		$\text{CRP_cAMP} + \text{CRPsite_mlcp1} \xrightleftharpoons{\text{CRP_cAMP, CRPsite_mlcp1, CRP_cAMP_CRPsite_mlcp1}}$	
12	binding_CRP- _cAMP_CRPsite- _mlcp2		$\text{CRP_cAMP} + \text{CRPsite_mlcp2} \xrightleftharpoons{\text{CRP_cAMP, CRPsite_mlcp2, CRP_cAMP_CRPsite_mlcp2}}$	
13	binding_CRP- _cAMP_CRPsite- _genome		$\text{CRP_cAMP} + \text{CRPsite_genome} \xrightleftharpoons{\text{CRP_cAMP, CRPsite_genome, CRP_cAMP_CRPsite_genome}}$	
14	binding_Mlc- _Mlcsite_ptsGp1		$\text{Mlc} + \text{Mlcsite_ptsGp1} \xrightleftharpoons{\text{Mlc, Mlcsite_ptsGp1, Mlc_Mlcsite_ptsGp1}} \text{Mlc_Mlcsite_ptsGp1}$	

Nº	Id	Name	Reaction Equation	SBO
15	binding_Mlc- _Mlcsite_ptsGp2		$\text{Mlc} + \text{Mlcsite_ptsGp2} \xrightleftharpoons{\text{Mlc, Mlcsite_ptsGp2, Mlc_Mlcsite_ptsGp2}} \text{Mlc_Mlcsite_ptsGp2}$	
16	binding_Mlc- _Mlcsite_ptsHp0		$\text{Mlc} + \text{Mlcsite_ptsHp0} \xrightleftharpoons{\text{Mlc, Mlcsite_ptsHp0, Mlc_Mlcsite_ptsHp0}} \text{Mlc_Mlcsite_ptsHp0}$	
17	binding_Mlc- _Mlcsite_ptsIp0		$\text{Mlc} + \text{Mlcsite_ptsIp0} \xrightleftharpoons{\text{Mlc, Mlcsite_ptsIp0, Mlc_Mlcsite_ptsIp0}} \text{Mlc_Mlcsite_ptsIp0}$	
18	binding_Mlc- _Mlcsite_mlcp1		$\text{Mlc} + \text{Mlcsite_mlcp1} \xrightleftharpoons{\text{Mlc, Mlcsite_mlcp1, Mlc_Mlcsite_mlcp1}} \text{Mlc_Mlcsite_mlcp1}$	
19	binding_Mlc- _Mlcsite_mlcp2		$\text{Mlc} + \text{Mlcsite_mlcp2} \xrightleftharpoons{\text{Mlc, Mlcsite_mlcp2, Mlc_Mlcsite_mlcp2}} \text{Mlc_Mlcsite_mlcp2}$	
20	binding_IICB- _Mlc		$\text{IICB} + \text{Mlc} \xrightleftharpoons{\text{IICB, Mlc, IICB_Mlc}} \text{IICB_Mlc}$	
21	binding_IIA_P- _CYA		$\text{CYA} + \text{IIA_P} \xrightleftharpoons{\text{CYA, IIA_P, IIA_P_CYA}} \text{IIA_P_CYA}$	
22	transcription- _CRP_cAMP- _CRPsite_cyaA- _cyaA		$\emptyset \xrightleftharpoons{\text{CRP_cAMP_CRPsite_cyaA, cyaA, CRP_cAMP_CRPsite_cyaA, cyaA}} \text{mRNA_cyaA}$	
23	transcription- _cyaA_basal		$\emptyset \xrightleftharpoons{\text{cyaA_basal, cyaA_basal}} \text{mRNA_cyaA}$	

Nº	Id	Name	Reaction Equation	SBO
24	transcription- _CRP_cAMP- _CRPsiteI- _crp_CRP_cAMP- _CRPsiteII_crp- _crp		$\emptyset \xrightarrow{\text{CRP_cAMP_CRPsiteI_crp, CRP_cAMP_CRPsiteII_crp, crp, CRP_cAMP_CRPsiteII_c}} \text{mRNA_crp}$	
25	transcription- _crp_basal		$\emptyset \xrightarrow{\text{crp_basal, crp_basal}} \text{mRNA_crp}$	
26	transcription- _CRP_cAMP- _CRPsite- _ptsGp1_Mlc- _Mlcsite- _ptsGp1_ptsGp1		$\emptyset \xrightarrow{\text{CRP_cAMP_CRPsite_ptsGp1, Mlc_Mlcsite_ptsGp1, ptsGp1, CRP_cAMP_CRPsite_ptsGp1}} \text{mRNA_ptsGp1}$	
27	transcription- _CRP_cAMP- _CRPsite- _ptsGp2_Mlc- _Mlcsite- _ptsGp2_ptsGp2		$\emptyset \xrightarrow{\text{CRP_cAMP_CRPsite_ptsGp2, Mlc_Mlcsite_ptsGp2, ptsGp2, CRP_cAMP_CRPsite_ptsGp2}} \text{mRNA_ptsGp2}$	
28	transcription- _CRP_cAMP- _CRPsite- _ptsHp0_Mlc- _Mlcsite- _ptsHp0_ptsHp0		$\emptyset \xrightarrow{\text{CRP_cAMP_CRPsite_ptsHp0, Mlc_Mlcsite_ptsHp0, ptsHp0, CRP_cAMP_CRPsite_ptsHp0}} \text{mRNA_ptsHp0}$	

Nº	Id	Name	Reaction Equation	SBO
29	transcription- _CRP_cAMP- _CRPsite- _ptsHp1_ptsHp1		$\emptyset \xrightarrow{\text{CRP_cAMP_CRPsite_ptsHp1, ptsHp1, CRP_cAMP_CRPsite_ptsHp1, ptsHp1}} \text{mRNA}$	
30	transcription- _CRP_cAMP- _CRPsite- _ptsIp0_Mlc- _Mlcsite- _ptsIp0_ptsIp0		$\emptyset \xrightarrow{\text{CRP_cAMP_CRPsite_ptsIp0, Mlc_Mlcsite_ptsIp0, ptsIp0, CRP_cAMP_CRPsite_ptsIp0}}$	
31	transcription- _CRP_cAMP- _CRPsite- _ptsIp1_ptsIp1		$\emptyset \xrightarrow{\text{CRP_cAMP_CRPsite_ptsIp1, ptsIp1, CRP_cAMP_CRPsite_ptsIp1, ptsIp1}} \text{mRNA_ptsIp1}$	
32	transcription- _crr		$\emptyset \xrightleftharpoons{\text{crr, crr}} \text{mRNA_crr}$	
33	transcription- _CRP_cAMP- _CRPsite_mlcp1- _Mlc_Mlcsite- _mlcp1_mlcp1		$\emptyset \xrightarrow{\text{CRP_cAMP_CRPsite_mlcp1, Mlc_Mlcsite_mlcp1, mlcp1, CRP_cAMP_CRPsite_mlcp1}}$	
34	transcription- _CRP_cAMP- _CRPsite_mlcp2- _Mlc_Mlcsite- _mlcp2_mlcp2		$\emptyset \xrightarrow{\text{CRP_cAMP_CRPsite_mlcp2, Mlc_Mlcsite_mlcp2, mlcp2, CRP_cAMP_CRPsite_mlcp2}}$	

Nº	Id	Name	Reaction Equation	SBO
35	decomposition- _mRNA_cyaA		$\text{mRNA_cyaA} \xrightleftharpoons{\text{mRNA_cyaA}} \emptyset$	
36	decomposition- _mRNA_crp		$\text{mRNA_crp} \xrightleftharpoons{\text{mRNA_crp}} \emptyset$	
37	decomposition- _mRNA_ptsG		$\text{mRNA_ptsG} \xrightleftharpoons{\text{mRNA_ptsG}} \emptyset$	
38	decomposition- _mRNA_ptsH		$\text{mRNA_ptsH} \xrightleftharpoons{\text{mRNA_ptsH}} \emptyset$	
39	decomposition- _mRNA_ptsI		$\text{mRNA_ptsI} \xrightleftharpoons{\text{mRNA_ptsI}} \emptyset$	
40	decomposition- _mRNA_crr		$\text{mRNA_crr} \xrightleftharpoons{\text{mRNA_crr}} \emptyset$	
41	decomposition- _mRNA_mlc		$\text{mRNA_mlc} \xrightleftharpoons{\text{mRNA_mlc}} \emptyset$	
42	translation- _mRNA_cyaA		$\emptyset \xrightleftharpoons{\text{mRNA_cyaA, mRNA_cyaA}} \text{CYA}$	
43	translation- _mRNA_crp		$\emptyset \xrightleftharpoons{\text{mRNA_crp, mRNA_crp}} \text{CRP}$	
44	translation- _mRNA_ptsG		$\emptyset \xrightleftharpoons{\text{mRNA_ptsG, mRNA_ptsG}} \text{IICB}$	
45	translation- _mRNA_ptsH		$\emptyset \xrightleftharpoons{\text{mRNA_ptsH, mRNA_ptsH}} \text{HPr}$	

Nº	Id	Name	Reaction Equation	SBO
46	translation- _mRNA_ptsI		$\emptyset \xrightarrow{\text{mRNA_ptsI, mRNA_ptsI}} \text{EI}$	
47	translation- _mRNA_crr		$\emptyset \xrightarrow{\text{mRNA_crr, mRNA_crr}} \text{IIA}$	
48	translation_mlc		$\emptyset \xrightarrow{\text{mRNA_mlc, mRNA_mlc}} \text{Mlc}$	
49	decomposition- _CYA		$\text{CYA} \xrightarrow{\text{CYA}} \emptyset$	
50	decomposition- _CRP		$\text{CRP} \xrightarrow{\text{CRP}} \emptyset$	
51	decomposition- _Mlc		$\text{Mlc} \xrightarrow{\text{Mlc}} \emptyset$	
52	decomposition- _cAMP		$\text{cAMP} \xrightarrow{\text{cAMP}} \emptyset$	
53	decomposition- _CRP_cAMP		$\text{CRP_cAMP} \xrightarrow{\text{CRP_cAMP}} \emptyset$	
54	decomposition- _CRP_cAMP- _CRPsite_cyaA		$\text{CRP_cAMP_CRPsite_cyaA} \xrightarrow{\text{CRP_cAMP_CRPsite_cyaA}} \text{CRPsite_cyaA}$	
55	decomposition- _CRP_cAMP- _CRPsiteI_crp		$\text{CRP_cAMP_CRPsiteI_crp} \xrightarrow{\text{CRP_cAMP_CRPsiteI_crp}} \text{CRPsiteI_crp}$	
56	decomposition- _CRP_cAMP- _CRPsiteII_crp		$\text{CRP_cAMP_CRPsiteII_crp} \xrightarrow{\text{CRP_cAMP_CRPsiteII_crp}} \text{CRPsiteII_crp}$	

Nº	Id	Name	Reaction Equation	SBO
57	decomposition- _CRP_cAMP- _CRPsite_ptsGp1		$\text{CRP_cAMP_CRPsite_ptsGp1} \xrightleftharpoons{\text{CRP_cAMP_CRPsite_ptsGp1}} \text{CRPsite_ptsGp1}$	
58	decomposition- _CRP_cAMP- _CRPsite_ptsGp2		$\text{CRP_cAMP_CRPsite_ptsGp2} \xrightleftharpoons{\text{CRP_cAMP_CRPsite_ptsGp2}} \text{CRPsite_ptsGp2}$	
59	decomposition- _CRP_cAMP- _CRPsite_ptsHp0		$\text{CRP_cAMP_CRPsite_ptsHp0} \xrightleftharpoons{\text{CRP_cAMP_CRPsite_ptsHp0}} \text{CRPsite_ptsHp0}$	
60	decomposition- _CRP_cAMP- _CRPsite_ptsHp1		$\text{CRP_cAMP_CRPsite_ptsHp1} \xrightleftharpoons{\text{CRP_cAMP_CRPsite_ptsHp1}} \text{CRPsite_ptsHp1}$	
61	decomposition- _CRP_cAMP- _CRPsite_ptsIp0		$\text{CRP_cAMP_CRPsite_ptsIp0} \xrightleftharpoons{\text{CRP_cAMP_CRPsite_ptsIp0}} \text{CRPsite_ptsIp0}$	
62	decomposition- _CRP_cAMP- _CRPsite_ptsIp1		$\text{CRP_cAMP_CRPsite_ptsIp1} \xrightleftharpoons{\text{CRP_cAMP_CRPsite_ptsIp1}} \text{CRPsite_ptsIp1}$	
63	decomposition- _CRP_cAMP- _CRPsite_mlcp1		$\text{CRP_cAMP_CRPsite_mlcp1} \xrightleftharpoons{\text{CRP_cAMP_CRPsite_mlcp1}} \text{CRPsite_mlcp1}$	
64	decomposition- _CRP_cAMP- _CRPsite_mlcp2		$\text{CRP_cAMP_CRPsite_mlcp2} \xrightleftharpoons{\text{CRP_cAMP_CRPsite_mlcp2}} \text{CRPsite_mlcp2}$	

Nº	Id	Name	Reaction Equation	SBO
65	decomposition- _CRP_cAMP- _CRPsite_genome		$\text{CRP_cAMP_CRPsite_genome} \xrightleftharpoons{\text{CRP_cAMP_CRPsite_genome}} \text{CRPsite_genome}$	
66	decomposition- _Mlc_Mlcsite- _ptsGp1		$\text{Mlc_Mlcsite_ptsGp1} \xrightleftharpoons{\text{Mlc_Mlcsite_ptsGp1}} \text{Mlcsite_ptsGp1}$	
67	decomposition- _Mlc_Mlcsite- _ptsGp2		$\text{Mlc_Mlcsite_ptsGp2} \xrightleftharpoons{\text{Mlc_Mlcsite_ptsGp2}} \text{Mlcsite_ptsGp2}$	
68	decomposition- _Mlc_Mlcsite- _ptsHp0		$\text{Mlc_Mlcsite_ptsHp0} \xrightleftharpoons{\text{Mlc_Mlcsite_ptsHp0}} \text{Mlcsite_ptsHp0}$	
69	decomposition- _Mlc_Mlcsite- _ptsIp0		$\text{Mlc_Mlcsite_ptsIp0} \xrightleftharpoons{\text{Mlc_Mlcsite_ptsIp0}} \text{Mlcsite_ptsIp0}$	
70	decomposition- _Mlc_Mlcsite- _mlcp1		$\text{Mlc_Mlcsite_mlcp1} \xrightleftharpoons{\text{Mlc_Mlcsite_mlcp1}} \text{Mlcsite_mlcp1}$	
71	decomposition- _Mlc_Mlcsite- _mlcp2		$\text{Mlc_Mlcsite_mlcp2} \xrightleftharpoons{\text{Mlc_Mlcsite_mlcp2}} \text{Mlcsite_mlcp2}$	
72	decomposition- _IICB_Mlc		$\text{IICB_Mlc} \xrightleftharpoons{\text{IICB_Mlc}} \emptyset$	

Nº	Id	Name	Reaction Equation	SBO
73	decomposition- _EI_P		$\text{EI_P} \xrightleftharpoons{\text{EI_P}} \emptyset$	
74	decomposition- _EI		$\text{EI} \xrightleftharpoons{\text{EI}} \emptyset$	
75	decomposition- _HPr_P		$\text{HPr_P} \xrightleftharpoons{\text{HPr_P}} \emptyset$	
76	decomposition- _HPr		$\text{HPr} \xrightleftharpoons{\text{HPr}} \emptyset$	
77	decomposition- _IIA_P		$\text{IIA_P} \xrightleftharpoons{\text{IIA_P}} \emptyset$	
78	decomposition- _IIA		$\text{IIA} \xrightleftharpoons{\text{IIA}} \emptyset$	
79	decomposition- _IICB_P		$\text{IICB_P} \xrightleftharpoons{\text{IICB_P}} \emptyset$	
80	decomposition- _IICB		$\text{IICB} \xrightleftharpoons{\text{IICB}} \emptyset$	
81	PTS2for		$\text{HPr} + \text{EI_P} \xrightleftharpoons{\text{HPr, EI_P}} \text{HPr_P} + \text{EI}$	
82	PTS2rev		$\text{HPr_P} + \text{EI} \xrightleftharpoons{\text{EI, HPr_P}} \text{HPr} + \text{EI_P}$	
83	PTS3for		$\text{IIA} + \text{HPr_P} \xrightleftharpoons{\text{IIA, HPr_P}} \text{IIA_P} + \text{HPr}$	
84	PTS3rev		$\text{IIA_P} + \text{HPr} \xrightleftharpoons{\text{HPr, IIA_P}} \text{IIA} + \text{HPr_P}$	
85	PTS4for		$\text{IICB} + \text{IIA_P} \xrightleftharpoons{\text{IICB, IIA_P}} \text{IICB_P} + \text{IIA}$	
86	PTS4rev		$\text{IICB_P} + \text{IIA} \xrightleftharpoons{\text{IIA, IICB_P}} \text{IICB} + \text{IIA_P}$	

Nº	Id	Name	Reaction Equation	SBO
87	reaction_CYA- _ATP		$\text{ATP} \xrightleftharpoons{\text{CYA, CYA, ATP}} \text{cAMP}$	
88	reaction_IIA_P- _CYA_ATP		$\text{ATP} \xrightleftharpoons{\text{IIA_P_CYA, IIA_P_CYA, ATP}} \text{cAMP}$	
89	reaction_EI_PEP		$\text{EI} + \text{PEP} \xrightleftharpoons{\text{EI, PEP}} \text{EI_P} + \text{Pyr}$	
90	reaction_EIP- _Pyr		$\text{EI_P} + \text{Pyr} \xrightleftharpoons{\text{EI_P, Pyr}} \text{EI} + \text{PEP}$	
91	reaction_IICB- _P_Glucose		$\text{IICB_P} + \text{Glucose} \xrightleftharpoons{\text{IICB_P, Glucose}} \text{IICB} + \text{Glc6P}$	
92	reaction_IICB- _Glc6P		$\text{IICB} + \text{Glc6P} \xrightleftharpoons{\text{IICB, Glc6P}} \text{IICB_P} + \text{Glucose}$	

8.1 Reaction `binding_CRP_cAMP`

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

Reaction equation



Reactants

Table 6: Properties of each reactant.

Id	Name	SBO
CRP		
cAMP		

Modifiers

Table 7: Properties of each modifier.

Id	Name	SBO
CRP		
cAMP		
CRP_cAMP		

Product

Table 8: Properties of each product.

Id	Name	SBO
CRP_cAMP		

Kinetic Law

Derived unit $(60 \text{ s})^{-1} \cdot \text{mol}$

$$v_1 = \text{vol}(\text{cyt}) \cdot \text{fast} \cdot \text{one_per_M} \cdot \left(\text{Kb}^2 \cdot ([\text{CRP}] \cdot [\text{cAMP}])^2 - [\text{CRP_cAMP}]^2 \right) \quad (21)$$

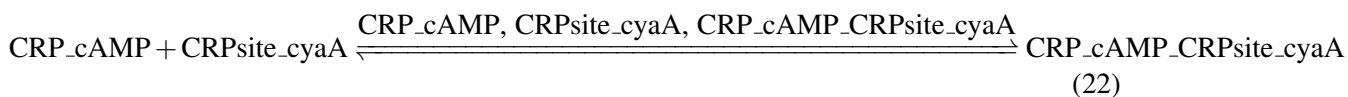
Table 9: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
Kb			40000.0	mol ⁻¹ · l	<input checked="" type="checkbox"/>
one_per_M			1.0	mol ⁻¹ · l	<input checked="" type="checkbox"/>

8.2 Reaction `binding_CRP_cAMP_CRPsite_cyaA`

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

Reaction equation



Reactants

Table 10: Properties of each reactant.

Id	Name	SBO
	CRP_cAMP	
	CRPsite_cyaA	

Modifiers

Table 11: Properties of each modifier.

Id	Name	SBO
	CRP_cAMP	
	CRPsite_cyaA	
	CRP_cAMP_CRPsite_cyaA	

Product

Table 12: Properties of each product.

Id	Name	SBO
	CRP_cAMP_CRPsite_cyaA	

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_2 = \text{vol}(\text{cyt}) \cdot \text{fast} \cdot (\text{Kb} \cdot [\text{CRP_cAMP}] \cdot [\text{CRPsite_cyaA}] - [\text{CRP_cAMP_CRPsite_cyaA}]) \quad (23)$$

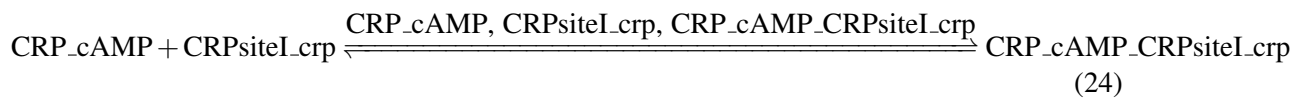
Table 13: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
Kb			$6.67 \cdot 10^7$	$\text{mol}^{-1} \cdot \text{l}$	<input checked="" type="checkbox"/>

8.3 Reaction `binding_CRP_cAMP_CRPsiteI_crp`

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

Reaction equation



Reactants

Table 14: Properties of each reactant.

Id	Name	SBO
	CRP_cAMP	
	CRPsiteI_crp	

Modifiers

Table 15: Properties of each modifier.

Id	Name	SBO
	CRP_cAMP	
	CRPsiteI_crp	
	CRP_cAMP_CRPsiteI_crp	

Product

Table 16: Properties of each product.

Id	Name	SBO
CRP_cAMP_CRPsiteI_crp		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_3 = \text{vol}(\text{cyt}) \cdot \text{fast} \cdot (\text{Kb} \cdot [\text{CRP_cAMP}] \cdot [\text{CRPsiteI_crp}] - [\text{CRP_cAMP_CRPsiteI_crp}]) \quad (25)$$

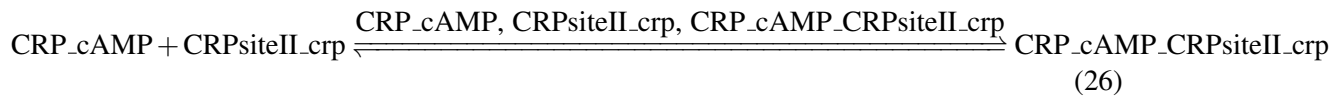
Table 17: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
Kb			$2.22 \cdot 10^7$	$\text{mol}^{-1} \cdot \text{l}$	<input checked="" type="checkbox"/>

8.4 Reaction [binding_CRP_cAMP_CRPsiteII_crp](#)

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

Reaction equation



Reactants

Table 18: Properties of each reactant.

Id	Name	SBO
CRP_cAMP		
CRPsiteII_crp		

Modifiers

Table 19: Properties of each modifier.

Id	Name	SBO
CRP_cAMP		
CRPsiteII_crp		

Id	Name	SBO
CRP_cAMP_CRPsiteII_crp		

Product

Table 20: Properties of each product.

Id	Name	SBO
CRP_cAMP_CRPsiteII_crp		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_4 = \text{vol}(\text{cyt}) \cdot \text{fast} \cdot (\text{Kb} \cdot [\text{CRP_cAMP}] \cdot [\text{CRPsiteII_crp}] - [\text{CRP_cAMP_CRPsiteII_crp}]) \quad (27)$$

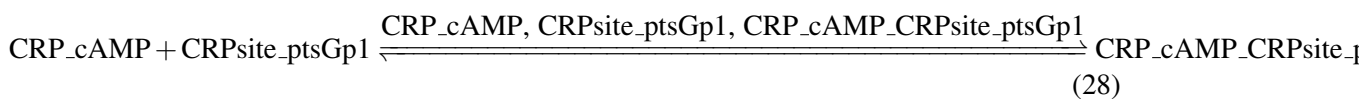
Table 21: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
Kb			2700000.0	$\text{mol}^{-1} \cdot \text{l}$	<input checked="" type="checkbox"/>

8.5 Reaction binding_CRP_cAMP_CRPsite_ptsGp1

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

Reaction equation



Reactants

Table 22: Properties of each reactant.

Id	Name	SBO
CRP_cAMP		
CRPsite_ptsGp1		

Modifiers

Table 23: Properties of each modifier.

Id	Name	SBO
CRP_cAMP		
CRPsite_ptsGp1		
CRP_cAMP_CRPsite_ptsGp1		

Product

Table 24: Properties of each product.

Id	Name	SBO
CRP_cAMP_CRPsite_ptsGp1		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_5 = \text{vol}(\text{cyt}) \cdot \text{fast} \cdot (\text{Kb} \cdot [\text{CRP_cAMP}] \cdot [\text{CRPsite_ptsGp1}] - [\text{CRP_cAMP_CRPsite_ptsGp1}]) \quad (29)$$

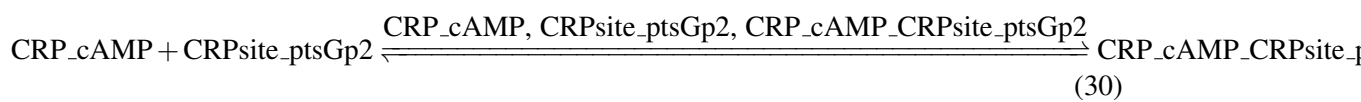
Table 25: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
Kb			10^7	$\text{mol}^{-1} \cdot \text{l}$	<input checked="" type="checkbox"/>

8.6 Reaction binding_CRP_cAMP_CRPsite_ptsGp2

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

Reaction equation



Reactants

Table 26: Properties of each reactant.

Id	Name	SBO
CRP_cAMP		
CRPsite_ptsGp2		

Modifiers

Table 27: Properties of each modifier.

Id	Name	SBO
CRP_cAMP		
CRPsite_ptsGp2		
CRP_cAMP_CRPsite_ptsGp2		

Product

Table 28: Properties of each product.

Id	Name	SBO
CRP_cAMP_CRPsite_ptsGp2		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_6 = \text{vol}(\text{cyt}) \cdot \text{fast} \cdot (\text{Kb} \cdot [\text{CRP_cAMP}] \cdot [\text{CRPsite_ptsGp2}] - [\text{CRP_cAMP_CRPsite_ptsGp2}]) \quad (31)$$

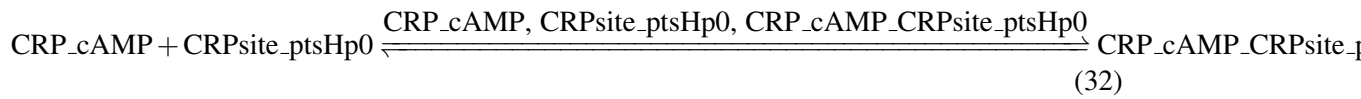
Table 29: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
Kb			10^7	$\text{mol}^{-1} \cdot \text{l}$	<input checked="" type="checkbox"/>

8.7 Reaction binding_CRP_cAMP_CRPsite_ptsHp0

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

Reaction equation



Reactants

Table 30: Properties of each reactant.

Id	Name	SBO
CRP_cAMP		
CRPsite_ptsHp0		

Modifiers

Table 31: Properties of each modifier.

Id	Name	SBO
CRP_cAMP		
CRPsite_ptsHp0		
CRP_cAMP_CRPsite_ptsHp0		

Product

Table 32: Properties of each product.

Id	Name	SBO
CRP_cAMP_CRPsite_ptsHp0		

Kinetic Law

Derived unit $(60 \text{ s})^{-1} \cdot \text{mol}$

$$v_7 = \text{vol}(\text{cyt}) \cdot \text{fast} \cdot (\text{Kb} \cdot [\text{CRP_cAMP}] \cdot [\text{CRPsite_ptsHp0}] - [\text{CRP_cAMP_CRPsite_ptsHp0}]) \quad (33)$$

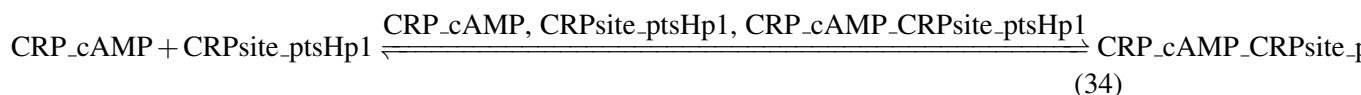
Table 33: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
Kb			10^7	$\text{mol}^{-1} \cdot \text{l}$	<input checked="" type="checkbox"/>

8.8 Reaction binding_CRP_cAMP_CRPsite_ptsHp1

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

Reaction equation



Reactants

Table 34: Properties of each reactant.

Id	Name	SBO
CRP_cAMP		
CRPsite_ptsHp1		

Modifiers

Table 35: Properties of each modifier.

Id	Name	SBO
CRP_cAMP		
CRPsite_ptsHp1		
CRP_cAMP_CRPsite_ptsHp1		

Product

Table 36: Properties of each product.

Id	Name	SBO
CRP_cAMP_CRPsite_ptsHp1		

Kinetic Law

Derived unit $(60 \text{ s})^{-1} \cdot \text{mol}$

$$v_8 = \text{vol}(\text{cyt}) \cdot \text{fast} \cdot (\text{Kb} \cdot [\text{CRP_cAMP}] \cdot [\text{CRPsite_ptsHp1}] - [\text{CRP_cAMP_CRPsite_ptsHp1}]) \quad (35)$$

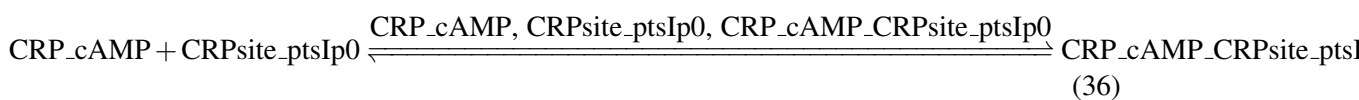
Table 37: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
Kb			10^7	$\text{mol}^{-1} \cdot \text{l}$	<input checked="" type="checkbox"/>

8.9 Reaction `binding_CRP_cAMP_CRPsite_ptsIp0`

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

Reaction equation



Reactants

Table 38: Properties of each reactant.

Id	Name	SBO
CRP_cAMP		
CRPsite_ptsIp0		

Modifiers

Table 39: Properties of each modifier.

Id	Name	SBO
CRP_cAMP		
CRPsite_ptsIp0		
CRP_cAMP_CRPsite_ptsIp0		

Product

Table 40: Properties of each product.

Id	Name	SBO
CRP_cAMP_CRPsite_ptsIp0		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_9 = \text{vol}(\text{cyt}) \cdot \text{fast} \cdot (\text{Kb} \cdot [\text{CRP_cAMP}] \cdot [\text{CRPsite_ptsIp0}] - [\text{CRP_cAMP_CRPsite_ptsIp0}]) \quad (37)$$

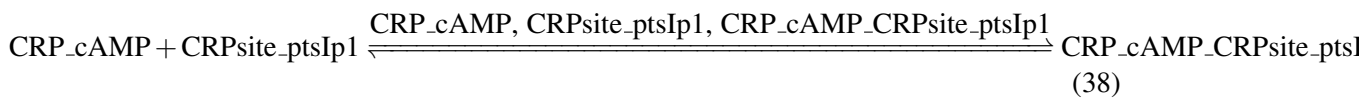
Table 41: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
Kb			10^7	$\text{mol}^{-1} \cdot \text{l}$	<input checked="" type="checkbox"/>

8.10 Reaction `binding_CRP_cAMP_CRPsite_ptsIp1`

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

Reaction equation



Reactants

Table 42: Properties of each reactant.

Id	Name	SBO
CRP_cAMP		
CRPsite_ptsIp1		

Modifiers

Table 43: Properties of each modifier.

Id	Name	SBO
CRP_cAMP		
CRPsite_ptsIp1		
CRP_cAMP_CRPsite_ptsIp1		

Product

Table 44: Properties of each product.

Id	Name	SBO
CRP_cAMP_CRPsite_ptsIp1		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{10} = \text{vol}(\text{cyt}) \cdot \text{fast} \cdot (\text{Kb} \cdot [\text{CRP_cAMP}] \cdot [\text{CRPsite_ptsIp1}] - [\text{CRP_cAMP_CRPsite_ptsIp1}]) \quad (39)$$

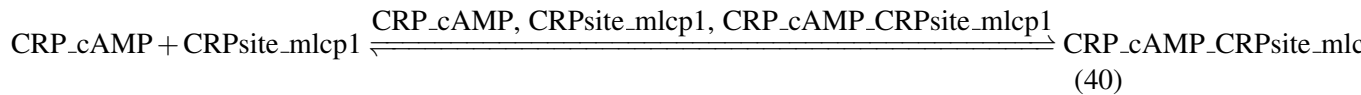
Table 45: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
Kb			10^7	$\text{mol}^{-1} \cdot \text{l}$	<input checked="" type="checkbox"/>

8.11 Reaction `binding_CRP_cAMP_CRPsite_mlcp1`

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

Reaction equation



Reactants

Table 46: Properties of each reactant.

Id	Name	SBO
CRP_cAMP		
CRPsite_mlcp1		

Modifiers

Table 47: Properties of each modifier.

Id	Name	SBO
CRP_cAMP		

Id	Name	SBO
CRPsite_mlcp1		
CRP_cAMP_CRPsite_mlcp1		

Product

Table 48: Properties of each product.

Id	Name	SBO
CRP_cAMP_CRPsite_mlcp1		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{11} = \text{vol}(\text{cyt}) \cdot \text{fast} \cdot (\text{Kb} \cdot [\text{CRP_cAMP}] \cdot [\text{CRPsite_mlcp1}] - [\text{CRP_cAMP_CRPsite_mlcp1}]) \quad (41)$$

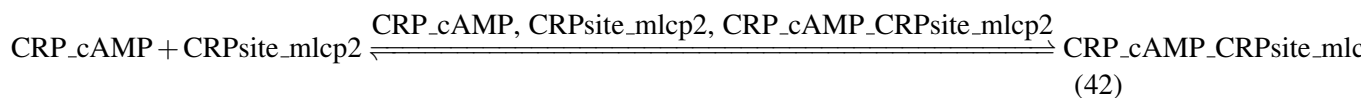
Table 49: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
Kb			10^7	$\text{mol}^{-1} \cdot \text{l}$	<input checked="" type="checkbox"/>

8.12 Reaction `binding_CRP_cAMP_CRPsite_mlcp2`

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

Reaction equation



Reactants

Table 50: Properties of each reactant.

Id	Name	SBO
CRP_cAMP		
CRPsite_mlcp2		

Modifiers

Table 51: Properties of each modifier.

Id	Name	SBO
CRP_cAMP		
CRPsite_mlcp2		
CRP_cAMP_CRPsite_mlcp2		

Product

Table 52: Properties of each product.

Id	Name	SBO
CRP_cAMP_CRPsite_mlcp2		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{12} = \text{vol}(\text{cyt}) \cdot \text{fast} \cdot (\text{Kb} \cdot [\text{CRP_cAMP}] \cdot [\text{CRPsite_mlcp2}] - [\text{CRP_cAMP_CRPsite_mlcp2}]) \quad (43)$$

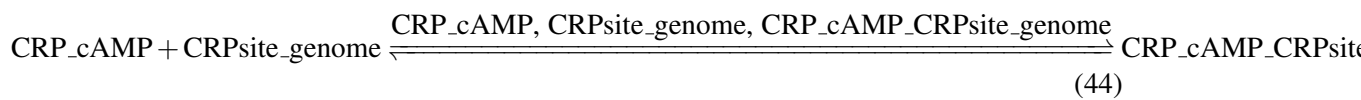
Table 53: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
Kb			10^7	$\text{mol}^{-1} \cdot \text{l}$	<input checked="" type="checkbox"/>

8.13 Reaction `binding_CRP_cAMP_CRPsite_genome`

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

Reaction equation



Reactants

Table 54: Properties of each reactant.

Id	Name	SBO
CRP_cAMP		
CRPsite_genome		

Modifiers

Table 55: Properties of each modifier.

Id	Name	SBO
CRP_cAMP		
CRPsite_genome		
CRP_cAMP_CRPsite_genome		

Product

Table 56: Properties of each product.

Id	Name	SBO
CRP_cAMP_CRPsite_genome		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{13} = \text{vol}(\text{cyt}) \cdot \text{fast} \cdot (\text{Kb} \cdot [\text{CRP_cAMP}] \cdot [\text{CRPsite_genome}] - [\text{CRP_cAMP_CRPsite_genome}]) \quad (45)$$

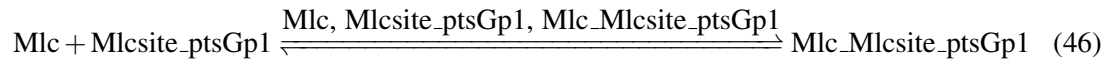
Table 57: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
Kb			10^7	$\text{mol}^{-1} \cdot \text{l}$	<input checked="" type="checkbox"/>

8.14 Reaction binding_Mlc_Mlcsite_ptsGp1

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

Reaction equation



Reactants

Table 58: Properties of each reactant.

Id	Name	SBO
Mlc		
Mlcsite_ptsGp1		

Modifiers

Table 59: Properties of each modifier.

Id	Name	SBO
Mlc		
Mlcsite_ptsGp1		
Mlc_Mlcsite_ptsGp1		

Product

Table 60: Properties of each product.

Id	Name	SBO
Mlc_Mlcsite_ptsGp1		

Kinetic Law

Derived unit $(60 \text{ s})^{-1} \cdot \text{mol}$

$$v_{14} = \text{vol}(\text{cyt}) \cdot \text{fast} \cdot (\text{Kb} \cdot [\text{Mlc}] \cdot [\text{Mlcsite_ptsGp1}] - [\text{Mlc_Mlcsite_ptsGp1}]) \quad (47)$$

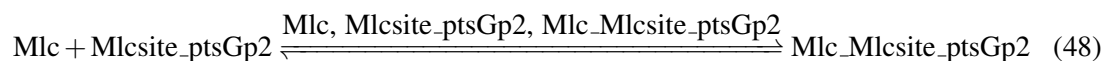
Table 61: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
Kb			$2 \cdot 10^8$	$\text{mol}^{-1} \cdot \text{l}$	<input checked="" type="checkbox"/>

8.15 Reaction `binding_Mlc_Mlcsite_ptsGp2`

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

Reaction equation



Reactants

Table 62: Properties of each reactant.

Id	Name	SBO
Mlc		
Mlcsite_ptsGp2		

Modifiers

Table 63: Properties of each modifier.

Id	Name	SBO
Mlc		
Mlcsite_ptsGp2		
Mlc_Mlcsite_ptsGp2		

Product

Table 64: Properties of each product.

Id	Name	SBO
Mlc_Mlcsite_ptsGp2		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{15} = \text{vol}(\text{cyt}) \cdot \text{fast} \cdot (\text{Kb} \cdot [\text{Mlc}] \cdot [\text{Mlcsite_ptsGp2}] - [\text{Mlc_Mlcsite_ptsGp2}]) \quad (49)$$

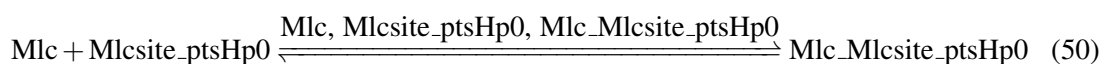
Table 65: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
Kb			$2 \cdot 10^8$	$\text{mol}^{-1} \cdot \text{l}$	<input checked="" type="checkbox"/>

8.16 Reaction `binding_Mlc_Mlcsite_ptsHp0`

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

Reaction equation



Reactants

Table 66: Properties of each reactant.

Id	Name	SBO
Mlc		
Mlcsite_ptsHp0		

Modifiers

Table 67: Properties of each modifier.

Id	Name	SBO
Mlc		
Mlcsite_ptsHp0		
Mlc_Mlcsite_ptsHp0		

Product

Table 68: Properties of each product.

Id	Name	SBO
Mlc_Mlcsite_ptsHp0		

Kinetic Law

Derived unit $(60 \text{ s})^{-1} \cdot \text{mol}$

$$v_{16} = \text{vol}(\text{cyt}) \cdot \text{fast} \cdot (\text{Kb} \cdot [\text{Mlc}] \cdot [\text{Mlcsite_ptsHp0}] - [\text{Mlc_Mlcsite_ptsHp0}]) \quad (51)$$

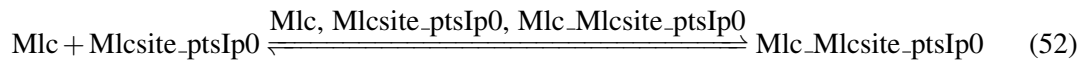
Table 69: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
Kb			$2 \cdot 10^8$	$\text{mol}^{-1} \cdot \text{l}$	<input checked="" type="checkbox"/>

8.17 Reaction `binding_Mlc_Mlcsite_ptsIp0`

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

Reaction equation



Reactants

Table 70: Properties of each reactant.

Id	Name	SBO
Mlc		
Mlcsite_ptsIp0		

Modifiers

Table 71: Properties of each modifier.

Id	Name	SBO
Mlc		
Mlcsite_ptsIp0		
Mlc_Mlcsite_ptsIp0		

Product

Table 72: Properties of each product.

Id	Name	SBO
Mlc_Mlcsite_ptsIp0		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{17} = \text{vol}(\text{cyt}) \cdot \text{fast} \cdot (\text{Kb} \cdot [\text{Mlc}] \cdot [\text{Mlcsite_ptsIp0}] - [\text{Mlc_Mlcsite_ptsIp0}]) \quad (53)$$

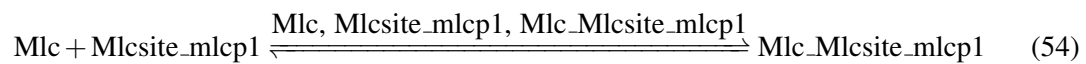
Table 73: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
Kb			$2 \cdot 10^8$	$\text{mol}^{-1} \cdot \text{l}$	<input checked="" type="checkbox"/>

8.18 Reaction binding_Mlc_Mlcsite_mlcp1

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

Reaction equation



Reactants

Table 74: Properties of each reactant.

Id	Name	SBO
Mlc		
Mlcsite_mlcp1		

Modifiers

Table 75: Properties of each modifier.

Id	Name	SBO
Mlc		
Mlcsite_mlcp1		
Mlc_Mlcsite_mlcp1		

Product

Table 76: Properties of each product.

Id	Name	SBO
Mlc_Mlcsite_mlcp1		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{18} = \text{vol}(\text{cyt}) \cdot \text{fast} \cdot (\text{Kb} \cdot [\text{Mlc}] \cdot [\text{Mlcsite_mlcp1}] - [\text{Mlc_Mlcsite_mlcp1}]) \quad (55)$$

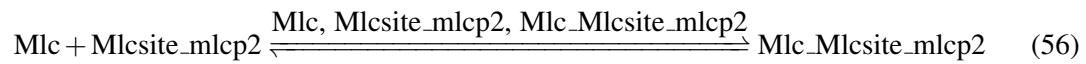
Table 77: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
Kb			2430000.0	$\text{mol}^{-1} \cdot \text{l}$	<input checked="" type="checkbox"/>

8.19 Reaction binding_Mlc_Mlcsite_mlcp2

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

Reaction equation



Reactants

Table 78: Properties of each reactant.

Id	Name	SBO
Mlc		
Mlcsite_mlcp2		

Modifiers

Table 79: Properties of each modifier.

Id	Name	SBO
Mlc		
Mlcsite_mlcp2		
Mlc_Mlcsite_mlcp2		

Product

Table 80: Properties of each product.

Id	Name	SBO
Mlc_Mlcsite_mlc2		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{19} = \text{vol}(\text{cyt}) \cdot \text{fast} \cdot (\text{Kb} \cdot [\text{Mlc}] \cdot [\text{Mlcsite_mlcp2}] - [\text{Mlc_Mlcsite_mlcp2}]) \quad (57)$$

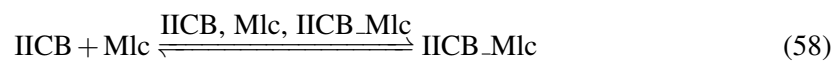
Table 81: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
Kb			1350000.0	$\text{mol}^{-1} \cdot \text{l}$	<input checked="" type="checkbox"/>

8.20 Reaction `binding_IICB_Mlc`

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

Reaction equation



Reactants

Table 82: Properties of each reactant.

Id	Name	SBO
IICB		
Mlc		

Modifiers

Table 83: Properties of each modifier.

Id	Name	SBO
IICB		

Id	Name	SBO
Mlc		
IICB_Mlc		

Product

Table 84: Properties of each product.

Id	Name	SBO
IICB_Mlc		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{20} = \text{vol}(\text{cyt}) \cdot \text{fast} \cdot (\text{Kb} \cdot [\text{IICB}] \cdot [\text{Mlc}] - [\text{IICB_Mlc}]) \quad (59)$$

Table 85: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
Kb			7000000.0	$\text{mol}^{-1} \cdot \text{l}$	<input checked="" type="checkbox"/>

8.21 Reaction [binding_IIA_P_CYA](#)

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

Reaction equation



Reactants

Table 86: Properties of each reactant.

Id	Name	SBO
CYA		
IIA_P		

Modifiers

Table 87: Properties of each modifier.

Id	Name	SBO
CYA		
IIA_P		
IIA_P_CYA		

Product

Table 88: Properties of each product.

Id	Name	SBO
IIA_P_CYA		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{21} = \text{vol}(\text{cyt}) \cdot \text{fast} \cdot (\text{Kb} \cdot [\text{CYA}] \cdot [\text{IIA_P}]^2 - [\text{IIA_P_CYA}]) \quad (61)$$

Table 89: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
Kb			10^8	$\text{mol}^{-2} \cdot \text{l}^2$	<input checked="" type="checkbox"/>

8.22 Reaction transcription_CRP_cAMP_CRPsite_cyaA_cyaA

This is a reversible reaction of no reactant forming one product influenced by four modifiers.

Reaction equation



Modifiers

Table 90: Properties of each modifier.

Id	Name	SBO
CRP_cAMP_CRPsite_cyaA		
cyaA		

Id	Name	SBO
CRP_cAMP_CRPsite_cyaA		
cyaA		

Product

Table 91: Properties of each product.

Id	Name	SBO
mRNA_cyaA		

Kinetic Law

Derived unit contains undeclared units

$$v_{22} = \text{vol}(\text{cyt}) \cdot \text{km} \cdot \left(1 - \frac{[\text{CRP_cAMP_CRPsite_cyaA}]}{\text{TCRPsite_cyaA}} \right) \cdot [\text{cyaA}] \quad (63)$$

Table 92: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
km			45.26	$(60 \text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.23 Reaction [transcription_cyaA_basal](#)

This is a reversible reaction of no reactant forming one product influenced by two modifiers.

Reaction equation



Modifiers

Table 93: Properties of each modifier.

Id	Name	SBO
cyaA_basal		
cyaA_basal		

Product

Table 94: Properties of each product.

Id	Name	SBO
mRNA_cyaA		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{23} = \text{vol}(\text{cyt}) \cdot \text{km} \cdot [\text{cyaA.basal}] \quad (65)$$

Table 95: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
km			1.281	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.24 Reaction

[transcription_CRP_cAMP_CRPsiteI_crp_CRP_cAMP_CRPsiteII_crp_crp](#)

This is a reversible reaction of no reactant forming one product influenced by six modifiers.

Reaction equation

$$\emptyset \xrightarrow{\text{CRP_cAMP_CRPsiteI_crp, CRP_cAMP_CRPsiteII_crp, crp, CRP_cAMP_CRPsiteII_crp, CRP_cAMP_CRPsiteI_crp}} \quad (66)$$

Modifiers

Table 96: Properties of each modifier.

Id	Name	SBO
CRP_cAMP_CRPsiteI_crp		
CRP_cAMP_CRPsiteII_crp		
crp		
CRP_cAMP_CRPsiteII_crp		
CRP_cAMP_CRPsiteI_crp		
crp		

Product

Table 97: Properties of each product.

Id	Name	SBO
mRNA_crp		

Kinetic Law

Derived unit contains undeclared units

$$v_{24} = \text{vol}(\text{cyt}) \cdot \text{km} \cdot \left(1 + \frac{\text{RelativeactivityatTCRPsitell_crp} \cdot [\text{CRP_cAMP_CRPsitell_crp}]}{\text{TCRPsitell_crp}} - \frac{[\text{CRP_cAMP_CRPsitel_crp}]}{\text{TCRPsitel_crp}} \right) \cdot [\text{crp}] \quad (67)$$

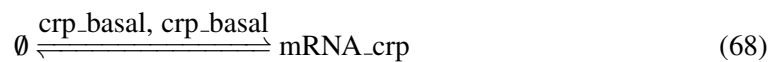
Table 98: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
km			20.0	$(60 \text{ s})^{-1}$	<input checked="" type="checkbox"/>
RelativeactivityatTCRPsitell_crp			5.0	dimensionless	<input checked="" type="checkbox"/>

8.25 Reaction transcription_crp_basal

This is a reversible reaction of no reactant forming one product influenced by two modifiers.

Reaction equation



Modifiers

Table 99: Properties of each modifier.

Id	Name	SBO
crp_basal		
crp_basal		

Product

Table 100: Properties of each product.

Id	Name	SBO
mRNA_crp		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{25} = \text{vol}(\text{cyt}) \cdot \text{km} \cdot [\text{crp_basal}] \quad (69)$$

Table 101: Properties of each parameter.

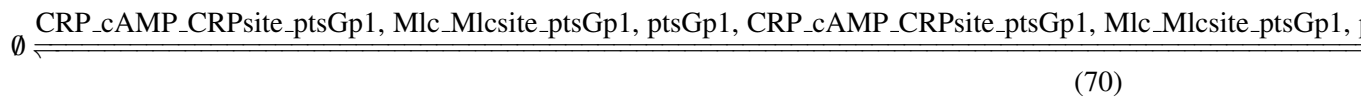
Id	Name	SBO	Value	Unit	Constant
km			1.009	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.26 Reaction

[transcription_CRP_cAMP_CRPsite_ptsGp1_Mlc_Mlcsite_ptsGp1_ptsGp1](#)

This is a reversible reaction of no reactant forming one product influenced by six modifiers.

Reaction equation



Modifiers

Table 102: Properties of each modifier.

Id	Name	SBO
CRP_cAMP_CRPsite_ptsGp1		
Mlc_Mlcsite_ptsGp1		
ptsGp1		
CRP_cAMP_CRPsite_ptsGp1		
Mlc_Mlcsite_ptsGp1		
ptsGp1		

Product

Table 103: Properties of each product.

Id	Name	SBO
mRNA_ptsG		

Kinetic Law

Derived unit contains undeclared units

$$v_{26} = \text{vol}(\text{cyt}) \cdot \text{km} \cdot \frac{[\text{CRP_cAMP_CRPsite_ptsGp1}]}{\text{TCRPsite_ptsGp1}} \cdot \left(1 - \frac{[\text{Mlc_Mlcsite_ptsGp1}]}{\text{TMlcsite_ptsGp1}}\right) \cdot [\text{ptsGp1}] \quad (71)$$

Table 104: Properties of each parameter.

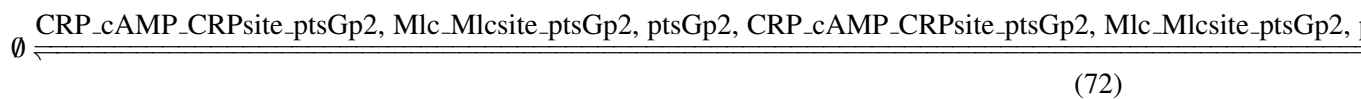
Id	Name	SBO	Value	Unit	Constant
km			892.0	$(60 \text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.27 Reaction

[transcription_CRP_cAMP_CRPsite_ptsGp2_Mlc_Mlcsite_ptsGp2_ptsGp2](#)

This is a reversible reaction of no reactant forming one product influenced by six modifiers.

Reaction equation



Modifiers

Table 105: Properties of each modifier.

Id	Name	SBO
CRP_cAMP_CRPsite_ptsGp2		
Mlc_Mlcsite_ptsGp2		
ptsGp2		
CRP_cAMP_CRPsite_ptsGp2		
Mlc_Mlcsite_ptsGp2		

Id	Name	SBO
ptsGp2		

Product

Table 106: Properties of each product.

Id	Name	SBO
mRNA_ptsG		

Kinetic Law

Derived unit contains undeclared units

$$v_{27} = \text{vol}(\text{cyt}) \cdot \text{km} \cdot \frac{[\text{CRP_cAMP_CRPsite_ptsGp2}]}{\text{TCRPsite_ptsGp2}} \cdot \left(1 - \frac{[\text{Mlc_Mlcsite_ptsGp2}]}{\text{TMlcsite_ptsGp2}}\right) \cdot [\text{ptsGp2}] \quad (73)$$

Table 107: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
km			2.0	$(60 \text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.28 Reaction

[transcription_CRP_cAMP_CRPsite_ptsHp0_Mlc_Mlcsite_ptsHp0_ptsHp0](#)

This is a reversible reaction of no reactant forming one product influenced by six modifiers.

Reaction equation

$$\emptyset \xrightarrow{\text{CRP_cAMP_CRPsite_ptsHp0, Mlc_Mlcsite_ptsHp0, ptsHp0, CRP_cAMP_CRPsite_ptsHp0, Mlc_Mlcsite_ptsHp0, ptsHp0}} \quad (74)$$

Modifiers

Table 108: Properties of each modifier.

Id	Name	SBO
CRP_cAMP_CRPsite_ptsHp0		
Mlc_Mlcsite_ptsHp0		

Id	Name	SBO
ptsHp0		
CRP_cAMP_CRPsite_ptsHp0		
Mlc_Mlcsite_ptsHp0		
ptsHp0		

Product

Table 109: Properties of each product.

Id	Name	SBO
mRNA_ptsH		

Kinetic Law

Derived unit contains undeclared units

$$v_{28} = \text{vol}(\text{cyt}) \cdot \text{km} \cdot \frac{[\text{CRP_cAMP_CRPsite_ptsHp0}]}{\text{TCRPsite_ptsHp0}} \cdot \left(1 - \frac{[\text{Mlc_Mlcsite_ptsHp0}]}{\text{TMlcsite_ptsHp0}} \right) \cdot [\text{ptsHp0}] \quad (75)$$

Table 110: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
km			71.8	$(60 \text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.29 Reaction transcription_CRP_cAMP_CRPsite_ptsHp1_ptsHp1

This is a reversible reaction of no reactant forming one product influenced by four modifiers.

Reaction equation



Modifiers

Table 111: Properties of each modifier.

Id	Name	SBO
CRP_cAMP_CRPsite_ptsHp1		
ptsHp1		
CRP_cAMP_CRPsite_ptsHp1		
ptsHp1		

Product

Table 112: Properties of each product.

Id	Name	SBO
mRNA_ptsH		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{29} = \text{vol}(\text{cyt}) \cdot \text{km} \cdot \frac{[\text{CRP_cAMP_CRPsite_ptsHp1}]}{\text{TCRPsite_ptsHp1}} \cdot [\text{ptsHp1}] \quad (77)$$

Table 113: Properties of each parameter.

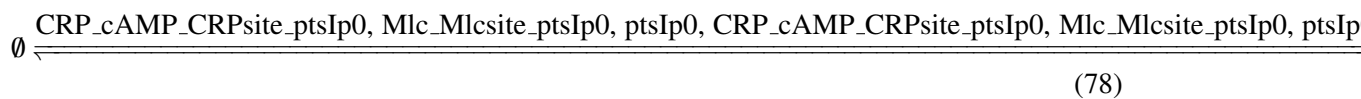
Id	Name	SBO	Value	Unit	Constant
km			17.95	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.30 Reaction

[transcription_CRP_cAMP_CRPsite_ptsIp0_Mlc_Mlcsite_ptsIp0_ptsIp0](#)

This is a reversible reaction of no reactant forming one product influenced by six modifiers.

Reaction equation



Modifiers

Table 114: Properties of each modifier.

Id	Name	SBO
CRP_cAMP_CRPsite_ptsIp0		
Mlc_Mlcsite_ptsIp0		
ptsIp0		
CRP_cAMP_CRPsite_ptsIp0		
Mlc_Mlcsite_ptsIp0		
ptsIp0		

Product

Table 115: Properties of each product.

Id	Name	SBO
mRNA_ptsI		

Kinetic Law

Derived unit contains undeclared units

$$v_{30} = \text{vol}(\text{cyt}) \cdot \text{km} \cdot \frac{[\text{CRP_cAMP_CRPsite_ptsIp0}]}{\text{TCRPsite_ptsIp0}} \cdot \left(1 - \frac{[\text{Mlc_Mlcsite_ptsIp0}]}{\text{TMlcsite_ptsIp0}}\right) \cdot [\text{ptsIp0}] \quad (79)$$

Table 116: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
km			6.244	$(60 \text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.31 Reaction transcription_CRP_cAMP_CRPsite_ptsIp1_ptsIp1

This is a reversible reaction of no reactant forming one product influenced by four modifiers.

Reaction equation



Modifiers

Table 117: Properties of each modifier.

Id	Name	SBO
CRP_cAMP_CRPsite_ptsIp1		
ptsIp1		
CRP_cAMP_CRPsite_ptsIp1		
ptsIp1		

Product

Table 118: Properties of each product.

Id	Name	SBO
mRNA_ptsI		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{31} = \text{vol}(\text{cyt}) \cdot \text{km} \cdot \frac{[\text{CRP_cAMP_CRPsite_ptsIp1}]}{\text{TCRPsite_ptsIp1}} \cdot [\text{ptsIp1}] \quad (81)$$

Table 119: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
km			0.892	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.32 Reaction `transcription_crr`

This is a reversible reaction of no reactant forming one product influenced by two modifiers.

Reaction equation



Modifiers

Table 120: Properties of each modifier.

Id	Name	SBO
crr		
crr		

Product

Table 121: Properties of each product.

Id	Name	SBO
mRNA_crr		

Kinetic Law

Derived unit $(60 \text{ s})^{-1} \cdot \text{mol}$

$$v_{32} = \text{vol}(\text{cyt}) \cdot \text{km} \cdot [\text{crr}] \quad (83)$$

Table 122: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
km			334.5	$(60 \text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.33 Reaction

[transcription_CRP_cAMP_CRPsite_mlcp1_Mlc_Mlcsite_mlcp1_mlcp1](#)

This is a reversible reaction of no reactant forming one product influenced by six modifiers.

Reaction equation

$$\emptyset \xrightarrow{\text{CRP_cAMP_CRPsite_mlcp1, Mlc_Mlcsite_mlcp1, mlcp1, CRP_cAMP_CRPsite_mlcp1, Mlc_Mlcsite_mlcp1, mlcp1}} \quad (84)$$

Modifiers

Table 123: Properties of each modifier.

Id	Name	SBO
CRP_cAMP_CRPsite_mlcp1		

Id	Name	SBO
Mlc_Mlcsite_mlc1		
mlcp1		
CRP_cAMP_CRPsite_mlc1		
Mlc_Mlcsite_mlc1		
mlcp1		

Product

Table 124: Properties of each product.

Id	Name	SBO
mRNA_mlc		

Kinetic Law

Derived unit contains undeclared units

$$v_{33} = \text{vol}(\text{cyt}) \cdot \text{km} \cdot \left(1 - \frac{[\text{CRP_cAMP_CRPsite_mlcp1}]}{\text{TCRPsite_mlcp1}}\right) \cdot \left(1 - \frac{[\text{Mlc_Mlcsite_mlcp1}]}{\text{TMlcsite_mlcp1}}\right) \cdot [\text{mlcp1}] \quad (85)$$

Table 125: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
km			1.875	$(60 \text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.34 Reaction

transcription_CRP_cAMP_CRPsite_mlc2_Mlc_Mlcsite_mlc2_mlc2

This is a reversible reaction of no reactant forming one product influenced by six modifiers.

Reaction equation

$$\emptyset \xrightarrow{\text{CRP_cAMP_CRPsite_mlcp2, Mlc_Mlcsite_mlcp2, mlcp2, CRP_cAMP_CRPsite_mlcp2, Mlc_Mlcsite_mlcp2, mlcp2}} \quad (86)$$

Modifiers

Table 126: Properties of each modifier.

Id	Name	SBO
CRP_cAMP_CRPsite_mlcp2		
Mlc_Mlcsite_mlcp2		
mlcp2		
CRP_cAMP_CRPsite_mlcp2		
Mlc_Mlcsite_mlcp2		
mlcp2		

Product

Table 127: Properties of each product.

Id	Name	SBO
mRNA_mlc		

Kinetic Law

Derived unit contains undeclared units

$$v_{34} = \text{vol}(\text{cyt}) \cdot \text{km} \cdot \frac{[\text{CRP_cAMP_CRPsite_mlcp2}]}{\text{TCRPsite_mlcp2}} \cdot \left(1 - \frac{[\text{Mlc_Mlcsite_mlcp2}]}{\text{TMlcsite_mlcp2}}\right) \cdot [\text{mlcp2}] \quad (87)$$

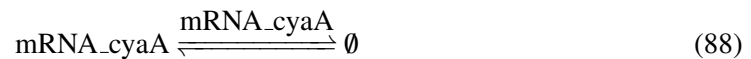
Table 128: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
km			1.875	$(60 \text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.35 Reaction `decomposition_mRNA_cyaA`

This is a reversible reaction of one reactant forming no product influenced by one modifier.

Reaction equation



Reactant

Table 129: Properties of each reactant.

Id	Name	SBO
mRNA_cyaA		

Modifier

Table 130: Properties of each modifier.

Id	Name	SBO
mRNA_cyaA		

Kinetic Law**Derived unit** $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{35} = \text{vol}(\text{cyt}) \cdot \text{kmd} \cdot [\text{mRNA_cyaA}] \quad (89)$$

Table 131: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kmd			0.126	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.36 Reaction [decomposition_mRNA_crp](#)

This is a reversible reaction of one reactant forming no product influenced by one modifier.

Reaction equation**Reactant**

Table 132: Properties of each reactant.

Id	Name	SBO
mRNA_crp		

Modifier

Table 133: Properties of each modifier.

Id	Name	SBO
mRNA_crp		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{36} = \text{vol}(\text{cyt}) \cdot \text{kmd} \cdot [\text{mRNA_crp}] \quad (91)$$

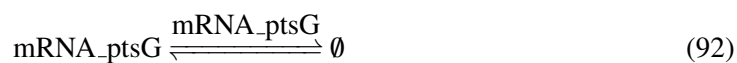
Table 134: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kmd			0.139	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.37 Reaction [decomposition_mRNA_ptsG](#)

This is a reversible reaction of one reactant forming no product influenced by one modifier.

Reaction equation



Reactant

Table 135: Properties of each reactant.

Id	Name	SBO
mRNA_ptsG		

Modifier

Table 136: Properties of each modifier.

Id	Name	SBO
mRNA_ptsG		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{37} = \text{vol}(\text{cyt}) \cdot \text{kmd} \cdot [\text{mRNA_ptsG}] \quad (93)$$

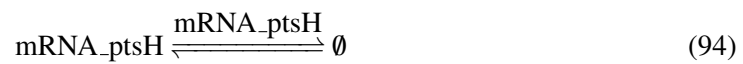
Table 137: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kmd			0.217	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.38 Reaction `decomposition_mRNA_ptsH`

This is a reversible reaction of one reactant forming no product influenced by one modifier.

Reaction equation



Reactant

Table 138: Properties of each reactant.

Id	Name	SBO
mRNA_ptsH		

Modifier

Table 139: Properties of each modifier.

Id	Name	SBO
mRNA_ptsH		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{38} = \text{vol}(\text{cyt}) \cdot \text{kmd} \cdot [\text{mRNA_ptsH}] \quad (95)$$

Table 140: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kmd			0.089	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.39 Reaction `decomposition.mRNA_ptsI`

This is a reversible reaction of one reactant forming no product influenced by one modifier.

Reaction equation



Reactant

Table 141: Properties of each reactant.

Id	Name	SBO
mRNA_ptsI		

Modifier

Table 142: Properties of each modifier.

Id	Name	SBO
mRNA_ptsI		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{39} = \text{vol}(\text{cyt}) \cdot \text{kmd} \cdot [\text{mRNA_ptsI}] \quad (97)$$

Table 143: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kmd			0.080	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.40 Reaction `decomposition_mRNA_crr`

This is a reversible reaction of one reactant forming no product influenced by one modifier.

Reaction equation



Reactant

Table 144: Properties of each reactant.

Id	Name	SBO
mRNA_crr		

Modifier

Table 145: Properties of each modifier.

Id	Name	SBO
mRNA_crr		

Kinetic Law

Derived unit $(60 \text{ s})^{-1} \cdot \text{mol}$

$$v_{40} = \text{vol}(\text{cyt}) \cdot \text{kmd} \cdot [\text{mRNA_crr}] \quad (99)$$

Table 146: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kmd			0.087	$(60 \text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.41 Reaction `decomposition_mRNA_mlc`

This is a reversible reaction of one reactant forming no product influenced by one modifier.

Reaction equation



Reactant

Table 147: Properties of each reactant.

Id	Name	SBO
mRNA_mlc		

Modifier

Table 148: Properties of each modifier.

Id	Name	SBO
mRNA_mlc		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{41} = \text{vol}(\text{cyt}) \cdot \text{kmd} \cdot [\text{mRNA_mlc}] \quad (101)$$

Table 149: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kmd			0.301	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.42 Reaction [translation_mRNA_cyaA](#)

This is a reversible reaction of no reactant forming one product influenced by two modifiers.

Reaction equation



Modifiers

Table 150: Properties of each modifier.

Id	Name	SBO
mRNA_cyaA		

Id	Name	SBO
mRNA_cyaA		

Product

Table 151: Properties of each product.

Id	Name	SBO
CYA		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{42} = \text{vol}(\text{cyt}) \cdot \text{kp} \cdot [\text{mRNA_cyaA}] \quad (103)$$

Table 152: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kp			11.0	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.43 Reaction translation_mRNA_crp

This is a reversible reaction of no reactant forming one product influenced by two modifiers.

Reaction equation



Modifiers

Table 153: Properties of each modifier.

Id	Name	SBO
mRNA_crp		
mRNA_crp		

Product

Table 154: Properties of each product.

Id	Name	SBO
CRP		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{43} = \text{vol}(\text{cyt}) \cdot \text{kp} \cdot [\text{mRNA_crp}] \quad (105)$$

Table 155: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kp			11.0	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.44 Reaction `translation_mRNA_ptsG`

This is a reversible reaction of no reactant forming one product influenced by two modifiers.

Reaction equation



Modifiers

Table 156: Properties of each modifier.

Id	Name	SBO
mRNA_ptsG		
mRNA_ptsG		

Product

Table 157: Properties of each product.

Id	Name	SBO
IICB		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{44} = \text{vol}(\text{cyt}) \cdot \text{kp} \cdot [\text{mRNA_ptsG}] \quad (107)$$

Table 158: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kp			11.0	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.45 Reaction `translation_mRNA_ptsH`

This is a reversible reaction of no reactant forming one product influenced by two modifiers.

Reaction equation



Modifiers

Table 159: Properties of each modifier.

Id	Name	SBO
	mRNA_ptsH	
	mRNA_ptsH	

Product

Table 160: Properties of each product.

Id	Name	SBO
	HPr	

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{45} = \text{vol}(\text{cyt}) \cdot \text{kp} \cdot [\text{mRNA_ptsH}] \quad (109)$$

Table 161: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kp			11.0	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.46 Reaction `translation_mRNA_ptsI`

This is a reversible reaction of no reactant forming one product influenced by two modifiers.

Reaction equation



Modifiers

Table 162: Properties of each modifier.

Id	Name	SBO
mRNA_ptsI		
mRNA_ptsI		

Product

Table 163: Properties of each product.

Id	Name	SBO
EI		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{46} = \text{vol}(\text{cyt}) \cdot \text{kp} \cdot [\text{mRNA_ptsI}] \quad (111)$$

Table 164: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kp			11.0	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.47 Reaction `translation mRNA_crr`

This is a reversible reaction of no reactant forming one product influenced by two modifiers.

Reaction equation



Modifiers

Table 165: Properties of each modifier.

Id	Name	SBO
mRNA_crr		
mRNA_crr		

Product

Table 166: Properties of each product.

Id	Name	SBO
IIA		

Kinetic Law

Derived unit $(60 \text{ s})^{-1} \cdot \text{mol}$

$$v_{47} = \text{vol}(\text{cyt}) \cdot \text{kp} \cdot [\text{mRNA_crr}] \quad (113)$$

Table 167: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kp			11.0	$(60 \text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.48 Reaction `translation_mlc`

This is a reversible reaction of no reactant forming one product influenced by two modifiers.

Reaction equation



Modifiers

Table 168: Properties of each modifier.

Id	Name	SBO
mRNA_ml c		
mRNA_ml c		

Product

Table 169: Properties of each product.

Id	Name	SBO
Mlc		

Kinetic Law

Derived unit $(60 \text{ s})^{-1} \cdot \text{mol}$

$$v_{48} = \text{vol}(\text{cyt}) \cdot \text{kp} \cdot [\text{mRNA_mlc}] \quad (115)$$

Table 170: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kp			11.0	$(60 \text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.49 Reaction `decomposition_CYA`

This is a reversible reaction of one reactant forming no product influenced by one modifier.

Reaction equation



Reactant

Table 171: Properties of each reactant.

Id	Name	SBO
CYA		

Modifier

Table 172: Properties of each modifier.

Id	Name	SBO
CYA		

Kinetic Law**Derived unit** $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{49} = \text{vol}(\text{cyt}) \cdot \text{kpd} \cdot [\text{CYA}] \quad (117)$$

Table 173: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kpd			0.1	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.50 Reaction `decomposition_CRP`

This is a reversible reaction of one reactant forming no product influenced by one modifier.

Reaction equation**Reactant**

Table 174: Properties of each reactant.

Id	Name	SBO
CRP		

Modifier

Table 175: Properties of each modifier.

Id	Name	SBO
CRP		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{50} = \text{vol}(\text{cyt}) \cdot \text{kpd} \cdot [\text{CRP}] \quad (119)$$

Table 176: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kpd			0.1	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.51 Reaction `decomposition_Mlc`

This is a reversible reaction of one reactant forming no product influenced by one modifier.

Reaction equation



Reactant

Table 177: Properties of each reactant.

Id	Name	SBO
Mlc		

Modifier

Table 178: Properties of each modifier.

Id	Name	SBO
Mlc		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{51} = \text{vol}(\text{cyt}) \cdot \text{kpd} \cdot [\text{Mlc}] \quad (121)$$

Table 179: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kpd			0.1	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.52 Reaction `decomposition_cAMP`

This is a reversible reaction of one reactant forming no product influenced by one modifier.

Reaction equation



Reactant

Table 180: Properties of each reactant.

Id	Name	SBO
cAMP		

Modifier

Table 181: Properties of each modifier.

Id	Name	SBO
cAMP		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{52} = \text{vol}(\text{cyt}) \cdot \text{kpd} \cdot [\text{cAMP}] \quad (123)$$

Table 182: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kpd			400.0	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.53 Reaction `decomposition_CRP_cAMP`

This is a reversible reaction of one reactant forming no product influenced by one modifier.

Reaction equation



Reactant

Table 183: Properties of each reactant.

Id	Name	SBO
CRP_cAMP		

Modifier

Table 184: Properties of each modifier.

Id	Name	SBO
CRP_cAMP		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{53} = \text{vol}(\text{cyt}) \cdot \text{kpd} \cdot [\text{CRP_cAMP}] \quad (125)$$

Table 185: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kpd			0.1	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.54 Reaction `decomposition_CRP_cAMP_CRPsite_cyaA`

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

Reaction equation



Reactant

Table 186: Properties of each reactant.

Id	Name	SBO
CRP_cAMP_CRPsite_cyaA		

Modifier

Table 187: Properties of each modifier.

Id	Name	SBO
CRP_cAMP_CRPsite_cyaA		

Product

Table 188: Properties of each product.

Id	Name	SBO
CRPsite_cyaA		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{54} = \text{vol}(\text{cyt}) \cdot \text{kpd} \cdot [\text{CRP_cAMP_CRPsite_cyaA}] \quad (127)$$

Table 189: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kpd			0.1	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.55 Reaction `decomposition_CRP_cAMP_CRPsiteI_crp`

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

Reaction equation



Reactant

Table 190: Properties of each reactant.

Id	Name	SBO
CRP_cAMP_CRPsiteI_crp		

Modifier

Table 191: Properties of each modifier.

Id	Name	SBO
CRP_cAMP_CRPsiteI_crp		

Product

Table 192: Properties of each product.

Id	Name	SBO
CRPsiteI_crp		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{55} = \text{vol}(\text{cyt}) \cdot \text{kpd} \cdot [\text{CRP_cAMP_CRPsiteI_crp}] \quad (129)$$

Table 193: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kpd			0.1	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.56 Reaction `decomposition_CRP_cAMP_CRPsiteII_crp`

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

Reaction equation



Reactant

Table 194: Properties of each reactant.

Id	Name	SBO
CRP_cAMP_CRPsiteII_crp		

Modifier

Table 195: Properties of each modifier.

Id	Name	SBO
CRP_cAMP_CRPsiteII_crp		

Product

Table 196: Properties of each product.

Id	Name	SBO
CRPsiteII_crp		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{56} = \text{vol}(\text{cyt}) \cdot \text{kpd} \cdot [\text{CRP_cAMP_CRPsiteII_crp}] \quad (131)$$

Table 197: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kpd			0.1	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.57 Reaction `decomposition_CRP_cAMP_CRPsite_ptsGp1`

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

Reaction equation



Reactant

Table 198: Properties of each reactant.

Id	Name	SBO
CRP_cAMP_CRPsite_ptsGp1		

Modifier

Table 199: Properties of each modifier.

Id	Name	SBO
CRP_cAMP_CRPsite_ptsGp1		

Product

Table 200: Properties of each product.

Id	Name	SBO
CRPsite_ptsGp1		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{57} = \text{vol}(\text{cyt}) \cdot \text{kpd} \cdot [\text{CRP_cAMP_CRPsite_ptsGp1}] \quad (133)$$

Table 201: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kpd			0.1	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.58 Reaction `decomposition_CRP_cAMP_CRPsite_ptsGp2`

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

Reaction equation



Reactant

Table 202: Properties of each reactant.

Id	Name	SBO
CRP_cAMP_CRPsite_ptsGp2		

Modifier

Table 203: Properties of each modifier.

Id	Name	SBO
CRP_cAMP_CRPsite_ptsGp2		

Product

Table 204: Properties of each product.

Id	Name	SBO
CRPsite_ptsGp2		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{58} = \text{vol}(\text{cyt}) \cdot \text{kpd} \cdot [\text{CRP_cAMP_CRPsite_ptsGp2}] \quad (135)$$

Table 205: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kpd			0.1	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.59 Reaction `decomposition_CRP_cAMP_CRPsite_ptsHp0`

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

Reaction equation



Reactant

Table 206: Properties of each reactant.

Id	Name	SBO
CRP_cAMP_CRPsite_ptsHp0		

Modifier

Table 207: Properties of each modifier.

Id	Name	SBO
CRP_cAMP_CRPsite_ptsHp0		

Product

Table 208: Properties of each product.

Id	Name	SBO
CRPsite_ptsHp0		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{59} = \text{vol}(\text{cyt}) \cdot \text{kpd} \cdot [\text{CRP_cAMP_CRPsite_ptsHp0}] \quad (137)$$

Table 209: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kpd			0.1	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.60 Reaction `decomposition_CRP_cAMP_CRPsite_ptsHp1`

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

Reaction equation



Reactant

Table 210: Properties of each reactant.

Id	Name	SBO
CRP_cAMP_CRPsite_ptsHp1		

Modifier

Table 211: Properties of each modifier.

Id	Name	SBO
CRP_cAMP_CRPsite_ptsHp1		

Product

Table 212: Properties of each product.

Id	Name	SBO
CRPsite_ptsHp1		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{60} = \text{vol}(\text{cyt}) \cdot \text{kpd} \cdot [\text{CRP_cAMP_CRPsite_ptsHp1}] \quad (139)$$

Table 213: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kpd			0.1	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.61 Reaction `decomposition_CRP_cAMP_CRPsite_ptsIp0`

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

Reaction equation



Reactant

Table 214: Properties of each reactant.

Id	Name	SBO
CRP_cAMP_CRPsite_ptsIp0		

Modifier

Table 215: Properties of each modifier.

Id	Name	SBO
CRP_cAMP_CRPsite_ptsIp0		

Product

Table 216: Properties of each product.

Id	Name	SBO
CRPsite_ptsIp0		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{61} = \text{vol}(\text{cyt}) \cdot \text{kpd} \cdot [\text{CRP_cAMP_CRPsite_ptsIp0}] \quad (141)$$

Table 217: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kpd			0.1	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.62 Reaction `decomposition_CRP_cAMP_CRPsite_ptsIp1`

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

Reaction equation



Reactant

Table 218: Properties of each reactant.

Id	Name	SBO
CRP_cAMP_CRPsite_ptsIp1		

Modifier

Table 219: Properties of each modifier.

Id	Name	SBO
CRP_cAMP_CRPsite_ptsIp1		

Product

Table 220: Properties of each product.

Id	Name	SBO
CRPsite_ptsIp1		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{62} = \text{vol}(\text{cyt}) \cdot \text{kpd} \cdot [\text{CRP_cAMP_CRPsite_ptsIp1}] \quad (143)$$

Table 221: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kpd			0.1	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.63 Reaction `decomposition_CRP_cAMP_CRPsite_mlcp1`

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

Reaction equation



Reactant

Table 222: Properties of each reactant.

Id	Name	SBO
CRP_cAMP_CRPsite_mlcp1		

Modifier

Table 223: Properties of each modifier.

Id	Name	SBO
CRP_cAMP_CRPsite_mlcp1		

Product

Table 224: Properties of each product.

Id	Name	SBO
CRPsite_mlcp1		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{63} = \text{vol}(\text{cyt}) \cdot \text{kpd} \cdot [\text{CRP_cAMP_CRPsite_mlcp1}] \quad (145)$$

Table 225: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kpd			0.1	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.64 Reaction `decomposition_CRP_cAMP_CRPsite_mlcp2`

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

Reaction equation



Reactant

Table 226: Properties of each reactant.

Id	Name	SBO
CRP_cAMP_CRPsite_mlcp2		

Modifier

Table 227: Properties of each modifier.

Id	Name	SBO
CRP_cAMP_CRPsite_mlcp2		

Product

Table 228: Properties of each product.

Id	Name	SBO
CRPsite_mlcp2		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{64} = \text{vol}(\text{cyt}) \cdot \text{kpd} \cdot [\text{CRP_cAMP_CRPsite_mlcp2}] \quad (147)$$

Table 229: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kpd			0.1	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.65 Reaction `decomposition_CRP_cAMP_CRPsite_genome`

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

Reaction equation



Reactant

Table 230: Properties of each reactant.

Id	Name	SBO
CRP_cAMP_CRPsite_genome		

Modifier

Table 231: Properties of each modifier.

Id	Name	SBO
CRP_cAMP_CRPsite_genome		

Product

Table 232: Properties of each product.

Id	Name	SBO
CRPsite_genome		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{65} = \text{vol}(\text{cyt}) \cdot \text{kpd} \cdot [\text{CRP_cAMP_CRPsite_genome}] \quad (149)$$

Table 233: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kpd			0.1	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.66 Reaction [decomposition_Mlc_Mlcsite_ptsGp1](#)

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

Reaction equation



Reactant

Table 234: Properties of each reactant.

Id	Name	SBO
Mlc_Mlcsite_ptsGp1		

Modifier

Table 235: Properties of each modifier.

Id	Name	SBO
Mlc_Mlcsite_ptsGp1		

Product

Table 236: Properties of each product.

Id	Name	SBO
Mlcsite_ptsGp1		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{66} = \text{vol}(\text{cyt}) \cdot \text{kpd} \cdot [\text{Mlc_Mlcsite_ptsGp1}] \quad (151)$$

Table 237: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kpd			0.1	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.67 Reaction *decomposition_Mlc_Mlcsite_ptsGp2*

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

Reaction equation



Reactant

Table 238: Properties of each reactant.

Id	Name	SBO
Mlc_Mlcsite_ptsGp2		

Modifier

Table 239: Properties of each modifier.

Id	Name	SBO
Mlc_Mlcsite_ptsGp2		

Product

Table 240: Properties of each product.

Id	Name	SBO
Mlcsite_ptsGp2		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{67} = \text{vol}(\text{cyt}) \cdot \text{kpd} \cdot [\text{Mlc_Mlcsite_ptsGp2}] \quad (153)$$

Table 241: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kpd			0.1	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.68 Reaction *decomposition_Mlc_Mlcsite_ptsHp0*

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

Reaction equation



Reactant

Table 242: Properties of each reactant.

Id	Name	SBO
Mlc_Mlcsite_ptsHp0		

Modifier

Table 243: Properties of each modifier.

Id	Name	SBO
Mlc_Mlcsite_ptsHp0		

Product

Table 244: Properties of each product.

Id	Name	SBO
Mlcsite_ptsHp0		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{68} = \text{vol}(\text{cyt}) \cdot \text{kpd} \cdot [\text{Mlc_Mlcsite_ptsHp0}] \quad (155)$$

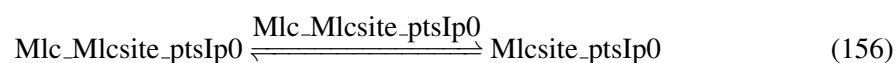
Table 245: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kpd			0.1	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.69 Reaction *decomposition_Mlc_Mlcsite_ptsIp0*

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

Reaction equation



Reactant

Table 246: Properties of each reactant.

Id	Name	SBO
Mlc_Mlcsite_ptsIp0		

Modifier

Table 247: Properties of each modifier.

Id	Name	SBO
Mlc_Mlcsite_ptsIp0		

Product

Table 248: Properties of each product.

Id	Name	SBO
Mlcsite_ptsIp0		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{69} = \text{vol}(\text{cyt}) \cdot \text{kpd} \cdot [\text{Mlc_Mlcsite_ptsIp0}] \quad (157)$$

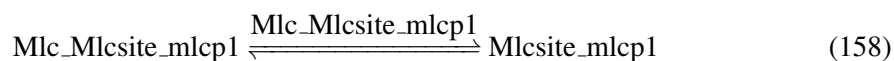
Table 249: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kpd			0.1	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.70 Reaction [decomposition_Mlc_Mlcsite_mlcp1](#)

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

Reaction equation



Reactant

Table 250: Properties of each reactant.

Id	Name	SBO
Mlc_Mlcsite_mlcp1		

Modifier

Table 251: Properties of each modifier.

Id	Name	SBO
Mlc_Mlcsite_mlcp1		

Product

Table 252: Properties of each product.

Id	Name	SBO
Mlcsite_mlcp1		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{70} = \text{vol}(\text{cyt}) \cdot \text{kpd} \cdot [\text{Mlc_Mlcsite_mlcp1}] \quad (159)$$

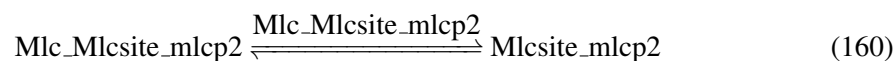
Table 253: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kpd			0.1	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.71 Reaction `decomposition_Mlc_Mlcsite_mlcp2`

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

Reaction equation



Reactant

Table 254: Properties of each reactant.

Id	Name	SBO
Mlc_Mlcsite_mlcp2		

Modifier

Table 255: Properties of each modifier.

Id	Name	SBO
Mlc_Mlcsite_mlcp2		

Product

Table 256: Properties of each product.

Id	Name	SBO
Mlcsite_mlcp2		

Kinetic Law

Derived unit $(60 \text{ s})^{-1} \cdot \text{mol}$

$$v_{71} = \text{vol}(\text{cyt}) \cdot \text{kpd} \cdot [\text{Mlc_Mlcsite_mlcp2}] \quad (161)$$

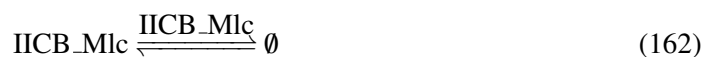
Table 257: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kpd			0.1	$(60 \text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.72 Reaction `decomposition_IICB_Mlc`

This is a reversible reaction of one reactant forming no product influenced by one modifier.

Reaction equation



Reactant

Table 258: Properties of each reactant.

Id	Name	SBO
IICB_Mlc		

Modifier

Table 259: Properties of each modifier.

Id	Name	SBO
IICB_Mlc		

Kinetic Law

Derived unit $(60 \text{ s})^{-1} \cdot \text{mol}$

$$v_{72} = \text{vol}(\text{cyt}) \cdot \text{kpd} \cdot [\text{IICB_Mlc}] \quad (163)$$

Table 260: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kpd			0.1	$(60 \text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.73 Reaction `decomposition_EI_P`

This is a reversible reaction of one reactant forming no product influenced by one modifier.

Reaction equation



Reactant

Table 261: Properties of each reactant.

Id	Name	SBO
EI_P		

Modifier

Table 262: Properties of each modifier.

Id	Name	SBO
EI_P		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{73} = \text{vol}(\text{cyt}) \cdot \text{kpd} \cdot [\text{EI_P}] \quad (165)$$

Table 263: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kpd			0.1	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.74 Reaction [decomposition EI](#)

This is a reversible reaction of one reactant forming no product influenced by one modifier.

Reaction equation



Reactant

Table 264: Properties of each reactant.

Id	Name	SBO
EI		

Modifier

Table 265: Properties of each modifier.

Id	Name	SBO
EI		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{74} = \text{vol}(\text{cyt}) \cdot \text{kpd} \cdot [\text{EI}] \quad (167)$$

Table 266: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kpd			0.1	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.75 Reaction `decomposition_HPr_P`

This is a reversible reaction of one reactant forming no product influenced by one modifier.

Reaction equation



Reactant

Table 267: Properties of each reactant.

Id	Name	SBO
HPr_P		

Modifier

Table 268: Properties of each modifier.

Id	Name	SBO
HPr_P		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{75} = \text{vol}(\text{cyt}) \cdot \text{kpd} \cdot [\text{HPr.P}] \quad (169)$$

Table 269: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kpd			0.1	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.76 Reaction `decomposition_HPr`

This is a reversible reaction of one reactant forming no product influenced by one modifier.

Reaction equation



Reactant

Table 270: Properties of each reactant.

Id	Name	SBO
HPr		

Modifier

Table 271: Properties of each modifier.

Id	Name	SBO
HPr		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{76} = \text{vol}(\text{cyt}) \cdot \text{kpd} \cdot [\text{HPr}] \quad (171)$$

Table 272: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kpd			0.1	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.77 Reaction [decomposition_IIA_P](#)

This is a reversible reaction of one reactant forming no product influenced by one modifier.

Reaction equation



Reactant

Table 273: Properties of each reactant.

Id	Name	SBO
IIA_P		

Modifier

Table 274: Properties of each modifier.

Id	Name	SBO
IIA_P		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{77} = \text{vol}(\text{cyt}) \cdot \text{kpd} \cdot [\text{IIA_P}] \quad (173)$$

Table 275: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kpd			0.1	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.78 Reaction `decomposition_IIA`

This is a reversible reaction of one reactant forming no product influenced by one modifier.

Reaction equation



Reactant

Table 276: Properties of each reactant.

Id	Name	SBO
IIA		

Modifier

Table 277: Properties of each modifier.

Id	Name	SBO
IIA		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{78} = \text{vol}(\text{cyt}) \cdot \text{kpd} \cdot [\text{IIA}] \quad (175)$$

Table 278: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kpd			0.1	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.79 Reaction `decomposition_IICB_P`

This is a reversible reaction of one reactant forming no product influenced by one modifier.

Reaction equation



Reactant

Table 279: Properties of each reactant.

Id	Name	SBO
IICB_P		

Modifier

Table 280: Properties of each modifier.

Id	Name	SBO
IICB_P		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{79} = \text{vol}(\text{cyt}) \cdot \text{kpd} \cdot [\text{IICB_P}] \quad (177)$$

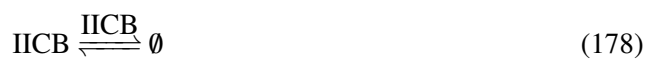
Table 281: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kpd			0.1	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.80 Reaction [decomposition.IICB](#)

This is a reversible reaction of one reactant forming no product influenced by one modifier.

Reaction equation



Reactant

Table 282: Properties of each reactant.

Id	Name	SBO
IICB		

Modifier

Table 283: Properties of each modifier.

Id	Name	SBO
IICB		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{80} = \text{vol}(\text{cyt}) \cdot \text{kpd} \cdot [\text{IICB}] \quad (179)$$

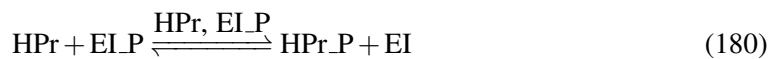
Table 284: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kpd			0.1	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.81 Reaction PTS2for

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

Reaction equation



Reactants

Table 285: Properties of each reactant.

Id	Name	SBO
HPr		
EI_P		

Modifiers

Table 286: Properties of each modifier.

Id	Name	SBO
HPr		

Id	Name	SBO
EI_P		

Products

Table 287: Properties of each product.

Id	Name	SBO
HPr_P		
EI		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{81} = \text{vol}(\text{cyt}) \cdot k_x \cdot [\text{HPr}] \cdot [\text{EI}_P] \quad (181)$$

Table 288: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kx			$1.2 \cdot 10^{10}$	$\text{mol}^{-1} \cdot \text{l} \cdot (60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.82 Reaction PTS2rev

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

Reaction equation



Reactants

Table 289: Properties of each reactant.

Id	Name	SBO
HPr_P		
EI		

Modifiers

Table 290: Properties of each modifier.

Id	Name	SBO
EI		
HPr_P		

Products

Table 291: Properties of each product.

Id	Name	SBO
HPr		
EI_P		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{82} = \text{vol}(\text{cyt}) \cdot kx \cdot [\text{EI}] \cdot [\text{HPr_P}] \quad (183)$$

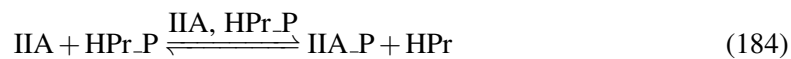
Table 292: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kx			$4.8 \cdot 10^8$	$\text{mol}^{-1} \cdot \text{l} \cdot (60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.83 Reaction PTS3for

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

Reaction equation



Reactants

Table 293: Properties of each reactant.

Id	Name	SBO
IIA		
HPr_P		

Modifiers

Table 294: Properties of each modifier.

Id	Name	SBO
IIA		
HPr_P		

Products

Table 295: Properties of each product.

Id	Name	SBO
IIA_P		
HPr		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{83} = \text{vol}(\text{cyt}) \cdot kx \cdot [\text{IIA}] \cdot [\text{HPr_P}] \quad (185)$$

Table 296: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kx			$3.66 \cdot 10^9$	$\text{mol}^{-1} \cdot \text{l} \cdot (60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.84 Reaction PTS3rev

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

Reaction equation



Reactants

Table 297: Properties of each reactant.

Id	Name	SBO
IIA_P		
HPr		

Modifiers

Table 298: Properties of each modifier.

Id	Name	SBO
HPr		
IIA_P		

Products

Table 299: Properties of each product.

Id	Name	SBO
IIA		
HPr_P		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{84} = \text{vol}(\text{cyt}) \cdot kx \cdot [\text{HPr}] \cdot [\text{IIA_P}] \quad (187)$$

Table 300: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kx			$2.82 \cdot 10^9$	$\text{mol}^{-1} \cdot \text{l} \cdot (60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.85 Reaction PTS4for

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

Reaction equation



Reactants

Table 301: Properties of each reactant.

Id	Name	SBO
IICB		
IIA_P		

Modifiers

Table 302: Properties of each modifier.

Id	Name	SBO
IICB		
IIA_P		

Products

Table 303: Properties of each product.

Id	Name	SBO
IICB_P		
IIA		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{85} = \text{vol}(\text{cyt}) \cdot kx \cdot [\text{IICB}] \cdot [\text{IIA_P}] \quad (189)$$

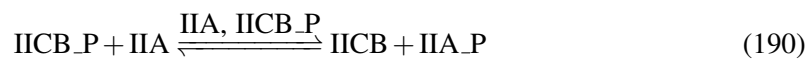
Table 304: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kx			$6.6 \cdot 10^8$	$\text{mol}^{-1} \cdot \text{l} \cdot (60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.86 Reaction PTS4rev

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

Reaction equation



Reactants

Table 305: Properties of each reactant.

Id	Name	SBO
IICB_P		
IIA		

Modifiers

Table 306: Properties of each modifier.

Id	Name	SBO
IIA		
IICB_P		

Products

Table 307: Properties of each product.

Id	Name	SBO
IICB		
IIA_P		

Kinetic Law

Derived unit $(60 \text{ s})^{-1} \cdot \text{mol}$

$$v_{86} = \text{vol}(\text{cyt}) \cdot kx \cdot [\text{IIA}] \cdot [\text{IICB_P}] \quad (191)$$

Table 308: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
kx			$2.4 \cdot 10^8$	$\text{mol}^{-1} \cdot \text{l} \cdot (60 \text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.87 Reaction reaction_CYA_ATP

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

Reaction equation



Reactant

Table 309: Properties of each reactant.

Id	Name	SBO
ATP		

Modifiers

Table 310: Properties of each modifier.

Id	Name	SBO
CYA		
CYA		
ATP		

Product

Table 311: Properties of each product.

Id	Name	SBO
cAMP		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{87} = \text{vol}(\text{cyt}) \cdot \frac{Q \cdot [\text{CYA}] \cdot [\text{ATP}]}{K_{\text{mich}} + [\text{ATP}]}$$

(193)

Table 312: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
Kmich			0.001	$\text{mol} \cdot \text{l}^{-1}$	<input checked="" type="checkbox"/>
Q			100.000	$(60 \text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.88 Reaction `reaction_IIA_P_CYA_ATP`

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

Reaction equation



Reactant

Table 313: Properties of each reactant.

Id	Name	SBO
ATP		

Modifiers

Table 314: Properties of each modifier.

Id	Name	SBO
IIA_P_CYA		
IIA_P_CYA		
ATP		

Product

Table 315: Properties of each product.

Id	Name	SBO
cAMP		

Kinetic Law

Derived unit $(60 \text{ s})^{-1} \cdot \text{mol}$

$$v_{88} = \text{vol}(\text{cyt}) \cdot \frac{Q \cdot [\text{IIA_P_CYA}] \cdot [\text{ATP}]}{K_{\text{mich}} + [\text{ATP}]} \quad (195)$$

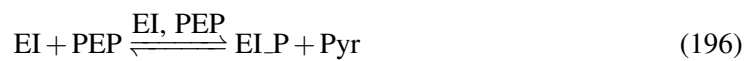
Table 316: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
Kmich			0.001	$\text{mol} \cdot \text{l}^{-1}$	<input checked="" type="checkbox"/>
Q			9000.000	$(60 \text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.89 Reaction `reaction_EI_PEP`

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

Reaction equation



Reactants

Table 317: Properties of each reactant.

Id	Name	SBO
EI		
PEP		

Modifiers

Table 318: Properties of each modifier.

Id	Name	SBO
EI		
PEP		

Products

Table 319: Properties of each product.

Id	Name	SBO
EI_P		
Pyr		

Kinetic Law

Derived unit contains undeclared units

$$v_{89} = \text{vol}(\text{cyt}) \cdot \frac{2 \cdot Q \cdot [\text{EI}] \cdot [\text{PEP}]^2}{K_{\text{mich}}^2 + [\text{PEP}]^2} \quad (197)$$

Table 320: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
Kmich			$3 \cdot 10^{-4}$	$\text{mol} \cdot \text{l}^{-1}$	✓
Q			108000.000	$(60 \text{ s})^{-1}$	✓

8.90 Reaction `reaction_EIP_Pyr`

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

Reaction equation



Reactants

Table 321: Properties of each reactant.

Id	Name	SBO
EI_P		
Pyr		

Modifiers

Table 322: Properties of each modifier.

Id	Name	SBO
EI_P		
Pyr		

Products

Table 323: Properties of each product.

Id	Name	SBO
EI		
PEP		

Kinetic Law

Derived unit contains undeclared units

$$v_{90} = \text{vol}(\text{cyt}) \cdot \frac{2 \cdot Q \cdot [\text{EI_P}] \cdot [\text{Pyr}]^2}{K_{\text{mich}}^2 + [\text{Pyr}]^2} \quad (199)$$

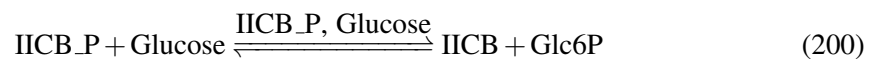
Table 324: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
Kmich			0.002	$\text{mol} \cdot \text{l}^{-1}$	✓
Q			480000.000	$(60 \text{ s})^{-1}$	✓

8.91 Reaction [reaction_IICB_P_Glucose](#)

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

Reaction equation



Reactants

Table 325: Properties of each reactant.

Id	Name	SBO
IICB_P		
Glucose		

Modifiers

Table 326: Properties of each modifier.

Id	Name	SBO
IICB_P		
Glucose		

Products

Table 327: Properties of each product.

Id	Name	SBO
IICB		
Glc6P		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{91} = \text{vol}(\text{cyt}) \cdot \frac{Q \cdot [\text{IICB_P}] \cdot [\text{Glucose}]}{K_{\text{mich}} + [\text{Glucose}]} \quad (201)$$

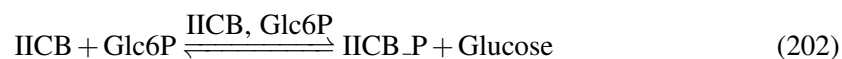
Table 328: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
Kmich			$2 \cdot 10^{-5}$	$\text{mol} \cdot \text{l}^{-1}$	<input checked="" type="checkbox"/>
Q			4800.000	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

8.92 Reaction [reaction_IICB_Glc6P](#)

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

Reaction equation



Reactants

Table 329: Properties of each reactant.

Id	Name	SBO
IICB		
Glc6P		

Modifiers

Table 330: Properties of each modifier.

Id	Name	SBO
IICB		
Glc6P		

Products

Table 331: Properties of each product.

Id	Name	SBO
IICB_P		
Glucose		

Kinetic Law

Derived unit $(60\text{ s})^{-1} \cdot \text{mol}$

$$v_{92} = \text{vol}(\text{cyt}) \cdot \frac{Q \cdot [\text{IICB}] \cdot [\text{Glc6P}]}{\text{Kmich} + [\text{Glc6P}]} \quad (203)$$

Table 332: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
Kmich			9.61	$\text{mol} \cdot \text{l}^{-1}$	<input checked="" type="checkbox"/>
Q			389.00	$(60\text{ s})^{-1}$	<input checked="" type="checkbox"/>

9 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.

9.1 Species CRP

Initial concentration $5.4207 \cdot 10^{-6} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in five reactions (as a reactant in [binding_CRP_cAMP](#), [decomposition_CRP](#) and as a product in [translation_mRNA_crp](#) and as a modifier in [binding_CRP_cAMP](#), [decomposition_CRP](#)).

$$\frac{d}{dt}\text{CRP} = v_{43} - v_1 - v_{50} \quad (204)$$

9.2 Species CRPsiteI_crp

Initial concentration $7.4368 \cdot 10^{-11} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in three reactions (as a reactant in [binding_CRP_cAMP_CRPsiteI_crp](#) and as a product in [decomposition_CRP_cAMP_CRPsiteI_crp](#) and as a modifier in [binding_CRP_cAMP_CRPsiteI_crp](#)).

$$\frac{d}{dt}\text{CRPsiteI_crp} = v_{55} - v_3 \quad (205)$$

9.3 Species CRPsiteII_crp

Initial concentration $1.9047 \cdot 10^{-10} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in three reactions (as a reactant in [binding_CRP_cAMP_CRPsiteII_crp](#) and as a product in [decomposition_CRP_cAMP_CRPsiteII_crp](#) and as a modifier in [binding_CRP_cAMP_CRPsiteII_crp](#)).

$$\frac{d}{dt}\text{CRPsiteII_crp} = v_{56} - v_4 \quad (206)$$

9.4 Species CRPsite_cyaA

Initial concentration $3.1103 \cdot 10^{-11} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in three reactions (as a reactant in [binding_CRP_cAMP_CRPsite_cyaA](#) and as a product in [decomposition_CRP_cAMP_CRPsite_cyaA](#) and as a modifier in [binding_CRP_cAMP_CRPsite_cyaA](#)).

$$\frac{d}{dt}\text{CRPsite_cyaA} = v_{54} - v_2 \quad (207)$$

9.5 Species CRPsite_genome

Initial concentration $3.6756 \cdot 10^{-9} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in three reactions (as a reactant in [binding_CRP_cAMP_CRPsite_genome](#) and as a product in [decomposition_CRP_cAMP_CRPsite_genome](#) and as a modifier in [binding_CRP_cAMP_CRPsite_genome](#)).

$$\frac{d}{dt} \text{CRPsite_genome} = v_{65} - v_{13} \quad (208)$$

9.6 Species CRPsite_ptsGp1

Initial concentration $1.2021 \cdot 10^{-10} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in three reactions (as a reactant in [binding_CRP_cAMP_CRPsite_ptsGp1](#) and as a product in [decomposition_CRP_cAMP_CRPsite_ptsGp1](#) and as a modifier in [binding_CRP_cAMP_CRPsite_ptsGp1](#)).

$$\frac{d}{dt} \text{CRPsite_ptsGp1} = v_{57} - v_5 \quad (209)$$

9.7 Species CRPsite_ptsGp2

Initial concentration $1.2021 \cdot 10^{-10} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in three reactions (as a reactant in [binding_CRP_cAMP_CRPsite_ptsGp2](#) and as a product in [decomposition_CRP_cAMP_CRPsite_ptsGp2](#) and as a modifier in [binding_CRP_cAMP_CRPsite_ptsGp2](#)).

$$\frac{d}{dt} \text{CRPsite_ptsGp2} = v_{58} - v_6 \quad (210)$$

9.8 Species CRPsite_ptsHp0

Initial concentration $1.2021 \cdot 10^{-10} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in three reactions (as a reactant in [binding_CRP_cAMP_CRPsite_ptsHp0](#) and as a product in [decomposition_CRP_cAMP_CRPsite_ptsHp0](#) and as a modifier in [binding_CRP_cAMP_CRPsite_ptsHp0](#)).

$$\frac{d}{dt} \text{CRPsite_ptsHp0} = v_{59} - v_7 \quad (211)$$

9.9 Species CRPsite_ptsHp1

Initial concentration $1.2021 \cdot 10^{-10} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in three reactions (as a reactant in [binding_CRP_cAMP_CRPsite_ptsHp1](#) and as a product in [decomposition_CRP_cAMP_CRPsite_ptsHp1](#) and as a modifier in [binding_CRP_cAMP_CRPsite_ptsHp1](#)).

$$\frac{d}{dt} \text{CRPsite_ptsHp1} = v_{60} - v_8 \quad (212)$$

9.10 Species CRPsite_ptsIp0

Initial concentration $1.2021 \cdot 10^{-10} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in three reactions (as a reactant in [binding_CRP_cAMP_CRPsite_ptsIp0](#) and as a product in [decomposition_CRP_cAMP_CRPsite_ptsIp0](#) and as a modifier in [binding_CRP_cAMP_CRPsite_ptsIp0](#)).

$$\frac{d}{dt} \text{CRPsite_ptsIp0} = v_{61} - v_9 \quad (213)$$

9.11 Species CRPsite_ptsIp1

Initial concentration $1.2021 \cdot 10^{-10} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in three reactions (as a reactant in [binding_CRP_cAMP_CRPsite_ptsIp1](#) and as a product in [decomposition_CRP_cAMP_CRPsite_ptsIp1](#) and as a modifier in [binding_CRP_cAMP_CRPsite_ptsIp1](#)).

$$\frac{d}{dt} \text{CRPsite_ptsIp1} = v_{62} - v_{10} \quad (214)$$

9.12 Species CRPsite_mlcp1

Initial concentration $1.2021 \cdot 10^{-10} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in three reactions (as a reactant in [binding_CRP_cAMP_CRPsite_mlcp1](#) and as a product in [decomposition_CRP_cAMP_CRPsite_mlcp1](#) and as a modifier in [binding_CRP_cAMP_CRPsite_mlcp1](#)).

$$\frac{d}{dt} \text{CRPsite_mlcp1} = v_{63} - v_{11} \quad (215)$$

9.13 Species CRPsite_mlcp2

Initial concentration $1.2021 \cdot 10^{-10} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in three reactions (as a reactant in [binding_CRP_cAMP_CRPsite_mlcp2](#) and as a product in [decomposition_CRP_cAMP_CRPsite_mlcp2](#) and as a modifier in [binding_CRP_cAMP_CRPsite_mlcp2](#)).

$$\frac{d}{dt} \text{CRPsite_mlcp2} = v_{64} - v_{12} \quad (216)$$

9.14 Species Mlc

Initial concentration $5.5172 \cdot 10^{-10} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in 17 reactions (as a reactant in [binding_Mlc_Mlcsite_ptsGp1](#), [binding_Mlc_Mlcsite_ptsGp2](#), [binding_Mlc_Mlcsite_ptsHp0](#), [binding_Mlc_Mlcsite_ptsIp0](#), [binding_Mlc_Mlcsite_mlcp1](#), [binding_Mlc_Mlcsite_mlcp2](#), [binding_IICB_Mlc](#), [decomposition_Mlc](#) and as a product in [translation_mlc](#) and as a modifier in [binding_Mlc_Mlcsite_ptsGp1](#), [binding_Mlc_Mlcsite_ptsGp2](#), [binding_Mlc_Mlcsite_ptsHp0](#), [binding_Mlc_Mlcsite_ptsIp0](#), [binding_Mlc_Mlcsite_mlcp1](#), [binding_Mlc_Mlcsite_mlcp2](#), [binding_IICB_Mlc](#), [decomposition_Mlc](#)).

$$\frac{d}{dt} \text{Mlc} = v_{48} - v_{14} - v_{15} - v_{16} - v_{17} - v_{18} - v_{19} - v_{20} - v_{51} \quad (217)$$

9.15 Species Mlcsite_mlcp1

Initial concentration $2.4267 \cdot 10^{-10} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in three reactions (as a reactant in [binding_Mlc_Mlcsite_mlcp1](#) and as a product in [decomposition_Mlc_Mlcsite_mlcp1](#) and as a modifier in [binding_Mlc_Mlcsite_mlcp1](#)).

$$\frac{d}{dt} \text{Mlcsite_mlcp1} = v_{70} - v_{18} \quad (218)$$

9.16 Species Mlcsite_mlcp2

Initial concentration $2.4282 \cdot 10^{-10} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in three reactions (as a reactant in [binding_Mlc_Mlcsite_mlcp2](#) and as a product in [decomposition_Mlc_Mlcsite_mlcp2](#) and as a modifier in [binding_Mlc_Mlcsite_mlcp2](#)).

$$\frac{d}{dt} \text{Mlcsite_mlcp2} = v_{71} - v_{19} \quad (219)$$

9.17 Species `Mlcsite_ptsGp1`

Initial concentration $2.1885 \cdot 10^{-10} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in three reactions (as a reactant in `binding_Mlc_Mlcsite_ptsGp1` and as a product in `decomposition_Mlc_Mlcsite_ptsGp1` and as a modifier in `binding_Mlc_Mlcsite_ptsGp1`).

$$\frac{d}{dt}\text{Mlcsite_ptsGp1} = v_{66} - v_{14} \quad (220)$$

9.18 Species `Mlcsite_ptsGp2`

Initial concentration $2.1885 \cdot 10^{-10} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in three reactions (as a reactant in `binding_Mlc_Mlcsite_ptsGp2` and as a product in `decomposition_Mlc_Mlcsite_ptsGp2` and as a modifier in `binding_Mlc_Mlcsite_ptsGp2`).

$$\frac{d}{dt}\text{Mlcsite_ptsGp2} = v_{67} - v_{15} \quad (221)$$

9.19 Species `Mlcsite_ptsHp0`

Initial concentration $2.1885 \cdot 10^{-10} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in three reactions (as a reactant in `binding_Mlc_Mlcsite_ptsHp0` and as a product in `decomposition_Mlc_Mlcsite_ptsHp0` and as a modifier in `binding_Mlc_Mlcsite_ptsHp0`).

$$\frac{d}{dt}\text{Mlcsite_ptsHp0} = v_{68} - v_{16} \quad (222)$$

9.20 Species `Mlcsite_ptsIp0`

Initial concentration $2.1885 \cdot 10^{-10} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in three reactions (as a reactant in `binding_Mlc_Mlcsite_ptsIp0` and as a product in `decomposition_Mlc_Mlcsite_ptsIp0` and as a modifier in `binding_Mlc_Mlcsite_ptsIp0`).

$$\frac{d}{dt}\text{Mlcsite_ptsIp0} = v_{69} - v_{17} \quad (223)$$

9.21 Species CRP_cAMP

Initial concentration $1.0214 \cdot 10^{-7} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in 28 reactions (as a reactant in [binding_CRP_cAMP_CRPsite_cyaA](#), [binding_CRP_cAMP_CRPsiteI_crp](#), [binding_CRP_cAMP_CRPsiteII_crp](#), [binding_CRP_cAMP_CRPsite_ptsGp1](#), [binding_CRP_cAMP_CRPsite_ptsGp2](#), [binding_CRP_cAMP_CRPsite_ptsHp0](#), [binding_CRP_cAMP_CRPsite_ptsHp1](#), [binding_CRP_cAMP_CRPsite_ptsIp0](#), [binding_CRP_cAMP_CRPsite_ptsIp1](#), [binding_CRP_cAMP_CRPsite_mlcp1](#), [binding_CRP_cAMP_CRPsite_mlcp2](#), [binding_CRP_cAMP_CRPsite_genome](#), [decomposition_CRP_cAMP](#) and as a product in [binding_CRP_cAMP](#) and as a modifier in [binding_CRP_cAMP](#), [binding_CRP_cAMP_CRPsite_cyaA](#), [binding_CRP_cAMP_CRPsiteI_crp](#), [binding_CRP_cAMP_CRPsiteII_crp](#), [binding_CRP_cAMP_CRPsite_ptsGp1](#), [binding_CRP_cAMP_CRPsite_ptsGp2](#), [binding_CRP_cAMP_CRPsite_ptsHp0](#), [binding_CRP_cAMP_CRPsite_ptsHp1](#), [binding_CRP_cAMP_CRPsite_ptsIp0](#), [binding_CRP_cAMP_CRPsite_ptsIp1](#), [binding_CRP_cAMP_CRPsite_mlcp1](#), [binding_CRP_cAMP_CRPsite_mlcp2](#), [binding_CRP_cAMP_CRPsite_genome](#), [decomposition_CRP_cAMP](#)).

$$\frac{d}{dt}\text{CRP_cAMP} = v_1 - v_2 - v_3 - v_4 - v_5 - v_6 - v_7 - v_8 - v_9 - v_{10} - v_{11} - v_{12} - v_{13} - v_{53} \quad (224)$$

9.22 Species CRP_cAMP_CRPsiteI_crp

Initial concentration $1.6863 \cdot 10^{-10} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in six reactions (as a reactant in [decomposition_CRP_cAMP_CRPsiteI_crp](#) and as a product in [binding_CRP_cAMP_CRPsiteI_crp](#) and as a modifier in [binding_CRP_cAMP_CRPsiteI_crp](#), [transcription_CRP_cAMP_CRPsiteI_crp_CRP_cAMP_CRPsiteII_crp_crp](#), [transcription_CRP_cAMP_CRPsiteI_crp_CRP_cAMP_CRPsiteII_crp_crp](#), [decomposition_CRP_cAMP_CRPsiteI_crp](#)).

$$\frac{d}{dt}\text{CRP_cAMP_CRPsiteI_crp} = v_3 - v_{55} \quad (225)$$

9.23 Species CRP_cAMP_CRPsiteII_crp

Initial concentration $5.2529 \cdot 10^{-11} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in six reactions (as a reactant in [decomposition_CRP_cAMP_CRPsiteII_crp](#) and as a product in [binding_CRP_cAMP_CRPsiteII_crp](#) and as a modifier in [binding_CRP_cAMP_CRPsiteII_crp](#), [transcription_CRP_cAMP_CRPsiteI_crp_CRP_cAMP_CRPsiteII_crp_crp](#), [transcription_CRP_cAMP_CRPsiteI_crp_CRP_cAMP_CRPsiteII_crp_crp](#), [decomposition_CRP_cAMP_CRPsiteII_crp](#)).

$$\frac{d}{dt}\text{CRP_cAMP_CRPsiteII_crp} = v_4 - v_{56} \quad (226)$$

9.24 Species CRP_cAMP_CRPsite_cyaA

Initial concentration $2.119 \cdot 10^{-10} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in six reactions (as a reactant in [decomposition_CRP_cAMP_CRPsite_cyaA](#) and as a product in [binding_CRP_cAMP_CRPsite_cyaA](#) and as a modifier in [binding_CRP_cAMP_CRPsite_cyaA](#), [transcription_CRP_cAMP_CRPsite_cyaA_cyaA](#), [transcription_CRP_cAMP_CRPsite_cyaA_cyaA](#), [decomposition_CRP_cAMP_CRPsite_cyaA](#)).

$$\frac{d}{dt} \text{CRP_cAMP_CRPsite_cyaA} = v_2 - v_{54} \quad (227)$$

9.25 Species CRP_cAMP_CRPsite_genome

Initial concentration $3.7544 \cdot 10^{-9} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in [decomposition_CRP_cAMP_CRPsite_genome](#) and as a product in [binding_CRP_cAMP_CRPsite_genome](#) and as a modifier in [binding_CRP_cAMP_CRPsite_genome](#), [decomposition_CRP_cAMP_CRPsite_genome](#)).

$$\frac{d}{dt} \text{CRP_cAMP_CRPsite_genome} = v_{13} - v_{65} \quad (228)$$

9.26 Species CRP_cAMP_CRPsite_ptsGp1

Initial concentration $1.2279 \cdot 10^{-10} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in six reactions (as a reactant in [decomposition_CRP_cAMP_CRPsite_ptsGp1](#) and as a product in [binding_CRP_cAMP_CRPsite_ptsGp1](#) and as a modifier in [binding_CRP_cAMP_CRPsite_ptsGp1](#), [transcription_CRP_cAMP_CRPsite_ptsGp1_Mlc_Mlcsite_ptsGp1_ptsGp1](#), [transcription_CRP_cAMP_CRPsite_ptsGp1_Mlc_Mlcsite_ptsGp1_ptsGp1](#), [decomposition_CRP_cAMP_CRPsite_ptsGp1](#)).

$$\frac{d}{dt} \text{CRP_cAMP_CRPsite_ptsGp1} = v_5 - v_{57} \quad (229)$$

9.27 Species CRP_cAMP_CRPsite_ptsGp2

Initial concentration $1.2279 \cdot 10^{-10} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in six reactions (as a reactant in [decomposition_CRP_cAMP_CRPsite_ptsGp2](#) and as a product in [binding_CRP_cAMP_CRPsite_ptsGp2](#) and as a modifier in [binding_CRP_cAMP_CRPsite_ptsGp2](#), [transcription_CRP_cAMP_CRPsite_ptsGp2_Mlc_Mlcsite_ptsGp2_ptsGp2](#), [transcription_CRP_cAMP_CRPsite_ptsGp2_Mlc_Mlcsite_ptsGp2_ptsGp2](#), [decomposition_CRP_cAMP_CRPsite_ptsGp2](#)).

$$\frac{d}{dt} \text{CRP_cAMP_CRPsite_ptsGp2} = v_6 - v_{58} \quad (230)$$

9.28 Species CRP_cAMP_CRPsite_ptsHp0

Initial concentration $1.2279 \cdot 10^{-10} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in six reactions (as a reactant in [decomposition_CRP_cAMP_CRPsite_ptsHp0](#) and as a product in [binding_CRP_cAMP_CRPsite_ptsHp0](#) and as a modifier in [binding_CRP_cAMP_CRPsite_ptsHp0](#), [transcription_CRP_cAMP_CRPsite_ptsHp0_Mlc_Mlcsite_ptsHp0](#), [transcription_CRP_cAMP_CRPsite_ptsHp0_Mlc_Mlcsite_ptsHp0_ptsHp0](#), [decomposition_CRP_cAMP_CRPsite_ptsHp0](#)).

$$\frac{d}{dt} \text{CRP_cAMP_CRPsite_ptsHp0} = v_7 - v_{59} \quad (231)$$

9.29 Species CRP_cAMP_CRPsite_ptsHp1

Initial concentration $1.2279 \cdot 10^{-10} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in six reactions (as a reactant in [decomposition_CRP_cAMP_CRPsite_ptsHp1](#) and as a product in [binding_CRP_cAMP_CRPsite_ptsHp1](#) and as a modifier in [binding_CRP_cAMP_CRPsite_ptsHp1](#), [transcription_CRP_cAMP_CRPsite_ptsHp1_ptsHp1](#), [transcription_CRP_cAMP_CRPsite_ptsHp1_ptsHp1](#), [decomposition_CRP_cAMP_CRPsite_ptsHp1](#)).

$$\frac{d}{dt} \text{CRP_cAMP_CRPsite_ptsHp1} = v_8 - v_{60} \quad (232)$$

9.30 Species CRP_cAMP_CRPsite_ptsIp0

Initial concentration $1.2279 \cdot 10^{-10} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in six reactions (as a reactant in [decomposition_CRP_cAMP_CRPsite_ptsIp0](#) and as a product in [binding_CRP_cAMP_CRPsite_ptsIp0](#) and as a modifier in [binding_CRP_cAMP_CRPsite_ptsIp0](#), [transcription_CRP_cAMP_CRPsite_ptsIp0_Mlc_Mlcsite_ptsIp0](#), [transcription_CRP_cAMP_CRPsite_ptsIp0_Mlc_Mlcsite_ptsIp0_ptsIp0](#), [decomposition_CRP_cAMP_CRPsite_ptsIp0](#)).

$$\frac{d}{dt} \text{CRP_cAMP_CRPsite_ptsIp0} = v_9 - v_{61} \quad (233)$$

9.31 Species CRP_cAMP_CRPsite_ptsIp1

Initial concentration $1.2279 \cdot 10^{-10} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in six reactions (as a reactant in [decomposition_CRP_cAMP_CRPsite_ptsIp1](#) and as a product in [binding_CRP_cAMP_CRPsite_ptsIp1](#) and as a modifier in [binding_CRP_cAMP_CRPsite_ptsIp1](#), [transcription_CRP_cAMP_CRPsite_ptsIp1_ptsIp1](#), [transcription_CRP_cAMP_CRPsite_ptsIp1_ptsIp1](#), [decomposition_CRP_cAMP_CRPsite_ptsIp1](#)).

$$\frac{d}{dt} \text{CRP_cAMP_CRPsite_ptsIp1} = v_{10} - v_{62} \quad (234)$$

9.32 Species CRP_cAMP_CRPsite_mlcp1

Initial concentration $1.2279 \cdot 10^{-10} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in six reactions (as a reactant in `decomposition_CRP_cAMP_CRPsite_mlcp1` and as a product in `binding_CRP_cAMP_CRPsite_mlcp1` and as a modifier in `binding_CRP_cAMP_CRPsite_mlcp1`, `transcription_CRP_cAMP_CRPsite_mlcp1_Mlc_Mlcsite_mlcp1_mlcp1`, `transcription_CRP_cAMP_CRPsite_mlcp1_Mlc_Mlcsite_mlcp1_mlcp1`, `decomposition_CRP_cAMP_CRPsite_mlcp1`).

$$\frac{d}{dt} \text{CRP_cAMP_CRPsite_mlcp1} = v_{11} - v_{63} \quad (235)$$

9.33 Species CRP_cAMP_CRPsite_mlcp2

Initial concentration $1.2279 \cdot 10^{-10} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in six reactions (as a reactant in `decomposition_CRP_cAMP_CRPsite_mlcp2` and as a product in `binding_CRP_cAMP_CRPsite_mlcp2` and as a modifier in `binding_CRP_cAMP_CRPsite_mlcp2`, `transcription_CRP_cAMP_CRPsite_mlcp2_Mlc_Mlcsite_mlcp2_mlcp2`, `transcription_CRP_cAMP_CRPsite_mlcp2_Mlc_Mlcsite_mlcp2_mlcp2`, `decomposition_CRP_cAMP_CRPsite_mlcp2`).

$$\frac{d}{dt} \text{CRP_cAMP_CRPsite_mlcp2} = v_{12} - v_{64} \quad (236)$$

9.34 Species Mlc_Mlcsite_ptsGp1

Initial concentration $2.4149 \cdot 10^{-11} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in six reactions (as a reactant in `decomposition_Mlc_Mlcsite_ptsGp1` and as a product in `binding_Mlc_Mlcsite_ptsGp1` and as a modifier in `binding_Mlc_Mlcsite_ptsGp1`, `transcription_CRP_cAMP_CRPsite_ptsGp1_Mlc_Mlcsite_ptsGp1_ptsGp1`, `transcription_CRP_cAMP_CRPsite_ptsGp1_Mlc_Mlcsite_ptsGp1_ptsGp1`, `decomposition_Mlc_Mlcsite_ptsGp1`).

$$\frac{d}{dt} \text{Mlc_Mlcsite_ptsGp1} = v_{14} - v_{66} \quad (237)$$

9.35 Species Mlc_Mlcsite_ptsGp2

Initial concentration $2.4149 \cdot 10^{-11} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in six reactions (as a reactant in `decomposition_Mlc_Mlcsite_ptsGp2` and as a product in `binding_Mlc_Mlcsite_ptsGp2` and as a modifier in `binding_Mlc_Mlcsite_ptsGp2`, `transcription_CRP_cAMP_CRPsite_ptsGp2_Mlc_Mlcsite_ptsGp2_ptsGp2`, `transcription_CRP_cAMP_CRPsite_ptsGp2_Mlc_Mlcsite_ptsGp2_ptsGp2`, `decomposition_Mlc_Mlcsite_ptsGp2`).

$$\frac{d}{dt} \text{Mlc_Mlcsite_ptsGp2} = v_{15} - v_{67} \quad (238)$$

9.36 Species Mlc_Mlcsite_ptsIp0

Initial concentration $2.4149 \cdot 10^{-11} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in six reactions (as a reactant in [decomposition_Mlc_Mlcsite_ptsIp0](#) and as a product in [binding_Mlc_Mlcsite_ptsIp0](#) and as a modifier in [binding_Mlc_Mlcsite_ptsIp0](#), [transcription_CRP_cAMP_CRPsite_ptsIp0_Mlc_Mlcsite_ptsIp0_ptsIp0](#), [transcription_CRP_cAMP_CRPsite_ptsIp0_Mlc_Mlcsite_ptsIp0_ptsIp0](#), [decomposition_Mlc_Mlcsite_ptsIp0](#)).

$$\frac{d}{dt} \text{Mlc_Mlcsite_ptsIp0} = v_{17} - v_{69} \quad (239)$$

9.37 Species Mlc_Mlcsite_ptsHp0

Initial concentration $2.4149 \cdot 10^{-11} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in six reactions (as a reactant in [decomposition_Mlc_Mlcsite_ptsHp0](#) and as a product in [binding_Mlc_Mlcsite_ptsHp0](#) and as a modifier in [binding_Mlc_Mlcsite_ptsHp0](#), [transcription_CRP_cAMP_CRPsite_ptsHp0_Mlc_Mlcsite_ptsHp0_ptsHp0](#), [transcription_CRP_cAMP_CRPsite_ptsHp0_Mlc_Mlcsite_ptsHp0_ptsHp0](#), [decomposition_Mlc_Mlcsite_ptsHp0](#)).

$$\frac{d}{dt} \text{Mlc_Mlcsite_ptsHp0} = v_{16} - v_{68} \quad (240)$$

9.38 Species Mlc_Mlcsite_mlcp1

Initial concentration $3.2535 \cdot 10^{-13} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in six reactions (as a reactant in [decomposition_Mlc_Mlcsite_mlcp1](#) and as a product in [binding_Mlc_Mlcsite_mlcp1](#) and as a modifier in [binding_Mlc_Mlcsite_mlcp1](#), [transcription_CRP_cAMP_CRPsite_mlcp1_Mlc_Mlcsite_mlcp1_mlcp1](#), [transcription_CRP_cAMP_CRPsite_mlcp1_Mlc_Mlcsite_mlcp1_mlcp1](#), [decomposition_Mlc_Mlcsite_mlcp1](#)).

$$\frac{d}{dt} \text{Mlc_Mlcsite_mlcp1} = v_{18} - v_{70} \quad (241)$$

9.39 Species Mlc_Mlcsite_mlcp2

Initial concentration $1.8086 \cdot 10^{-13} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in six reactions (as a reactant in [decomposition_Mlc_Mlcsite_mlcp2](#) and as a product in [binding_Mlc_Mlcsite_mlcp2](#) and as a modifier in [binding_Mlc_Mlcsite_mlcp2](#), [transcription_CRP_cAMP_CRPsite_mlcp2_Mlc_Mlcsite_mlcp2_mlcp2](#), [transcription_CRP_cAMP_CRPsite_mlcp2_Mlc_Mlcsite_mlcp2_mlcp2](#), [decomposition_Mlc_Mlcsite_mlcp2](#)).

$$\frac{d}{dt} \text{Mlc_Mlcsite_mlcp2} = v_{19} - v_{71} \quad (242)$$

9.40 Species IICB

Initial concentration $4.2844 \cdot 10^{-5} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in eleven reactions (as a reactant in [binding_IICB_Mlc](#), [decomposition_IICB](#), [PTS4for](#), [reaction_IICB_Glc6P](#) and as a product in [translation_mRNA_ptsG](#), [PTS4rev](#), [reaction_IICB_P_Glucose](#) and as a modifier in [binding_IICB_Mlc](#), [decomposition_IICB](#), [PTS4for](#), [reaction_IICB_Glc6P](#)).

$$\frac{d}{dt} \text{IICB} = v_{44} + v_{86} + v_{91} - v_{20} - v_{80} - v_{85} - v_{92} \quad (243)$$

9.41 Species IICB_Mlc

Initial concentration $1.6546 \cdot 10^{-7} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a reactant in [decomposition_IICB_Mlc](#) and as a product in [binding_IICB_Mlc](#) and as a modifier in [binding_IICB_Mlc](#), [decomposition_IICB_Mlc](#)).

$$\frac{d}{dt} \text{IICB_Mlc} = v_{20} - v_{72} \quad (244)$$

9.42 Species CYA

Initial concentration $1.4934 \cdot 10^{-6} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in seven reactions (as a reactant in [binding_IIA_P_CYA](#), [decomposition_CYA](#) and as a product in [translation_mRNA_cyaA](#) and as a modifier in [binding_IIA_P_CYA](#), [decomposition_CYA](#), [reaction_CYA_ATP](#), [reaction_CYA_ATP](#)).

$$\frac{d}{dt} \text{CYA} = v_{42} - v_{21} - v_{49} \quad (245)$$

9.43 Species IIA_P

Initial concentration $7.0094 \cdot 10^{-6} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in ten reactions (as a reactant in [binding_IIA_P_CYA](#), [decomposition_IIA_P](#), [PTS3rev](#), [PTS4for](#) and as a product in [PTS3for](#), [PTS4rev](#) and as a modifier in [binding_IIA_P_CYA](#), [decomposition_IIA_P](#), [PTS3rev](#), [PTS4for](#)).

$$\frac{d}{dt} \text{IIA_P} = v_{83} + v_{86} - v_{21} - v_{77} - v_{84} - v_{85} \quad (246)$$

9.44 Species IIA_P_CYA

Initial concentration $7.3371 \cdot 10^{-9} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in four reactions (as a product in [binding_IIA_P_CYA](#) and as a modifier in [binding_IIA_P_CYA](#), [reaction_IIA_P_CYA_ATP](#), [reaction_IIA_P_CYA_ATP](#)).

$$\frac{d}{dt} \text{IIA_P_CYA} = v_{21} \quad (247)$$

9.45 Species mRNA_cyaA

Initial concentration $1.3643 \cdot 10^{-8} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in six reactions (as a reactant in [decomposition_mRNA_cyaA](#) and as a product in [transcription_CRP_cAMP_CRPsite_cyaA_cyaA](#), [transcription_cyaA_basal](#) and as a modifier in [decomposition_mRNA_cyaA](#), [translation_mRNA_cyaA](#), [translation_mRNA_cyaA](#)).

$$\frac{d}{dt} \text{mRNA_cyaA} = v_{22} + v_{23} - v_{35} \quad (248)$$

9.46 Species mRNA_crp

Initial concentration $5.0254 \cdot 10^{-8} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in six reactions (as a reactant in [decomposition_mRNA_crp](#) and as a product in [transcription_CRP_cAMP_CRPsiteI_crp_CRP_cAMP_CRPsiteII_crp_crp](#), [transcription_crp_basal](#) and as a modifier in [decomposition_mRNA_crp](#), [translation_mRNA_crp](#), [translation_mRNA_crp](#)).

$$\frac{d}{dt} \text{mRNA_crp} = v_{24} + v_{25} - v_{36} \quad (249)$$

9.47 Species mRNA_ptsG

Initial concentration $4.5559 \cdot 10^{-7} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in six reactions (as a reactant in [decomposition_mRNA_ptsG](#) and as a product in [transcription_CRP_cAMP_CRPsite_ptsGp1_Mlc_Mlcsite_ptsGp1_ptsGp1](#), [transcription_CRP_cAMP_CRPsite_ptsGp2_Mlc_Mlcsite_ptsGp2_ptsGp2](#) and as a modifier in [decomposition_mRNA_ptsG](#), [translation_mRNA_ptsG](#), [translation_mRNA_ptsG](#)).

$$\frac{d}{dt} \text{mRNA_ptsG} = v_{26} + v_{27} - v_{37} \quad (250)$$

9.48 Species mRNA_ptsH

Initial concentration $1.1411 \cdot 10^{-7} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in six reactions (as a reactant in [decomposition_mRNA_ptsH](#) and as a product in [transcription_CRP_cAMP_CRPsite_ptsHp0_Mlc_Mlcsite_ptsHp0_ptsHp0](#), [transcription_CRP_cAMP_CRPsite_ptsHp1_ptsHp1](#) and as a modifier in [decomposition_mRNA_ptsH](#), [translation_mRNA_ptsH](#), [translation_mRNA_ptsH](#)).

$$\frac{d}{dt} \text{mRNA_ptsH} = v_{28} + v_{29} - v_{38} \quad (251)$$

9.49 Species mRNA_ptsI

Initial concentration $1.0038 \cdot 10^{-8} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in six reactions (as a reactant in [decomposition_mRNA_ptsI](#) and as a product in [transcription_CRP_cAMP_CRPsite_ptsIp0_Mlc_Mlcsite_ptsIp0_ptsIp0](#), [transcription_CRP_cAMP_CRPsite_ptsIp1_ptsIp1](#) and as a modifier in [decomposition_mRNA_ptsI](#), [translation_mRNA_ptsI](#), [translation_mRNA_ptsI](#)).

$$\frac{d}{dt} \text{mRNA_ptsI} = v_{30} + v_{31} - v_{39} \quad (252)$$

9.50 Species mRNA_crr

Initial concentration $9.3861 \cdot 10^{-7} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in five reactions (as a reactant in [decomposition_mRNA_crr](#) and as a product in [transcription_crr](#) and as a modifier in [decomposition_mRNA_crr](#), [translation_mRNA_crr](#), [translation_mRNA_crr](#)).

$$\frac{d}{dt} \text{mRNA_crr} = v_{32} - v_{40} \quad (253)$$

9.51 Species mRNA_mlc

Initial concentration $1.5101 \cdot 10^{-9} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in six reactions (as a reactant in [decomposition_mRNA_mlc](#) and as a product in [transcription_CRP_cAMP_CRPsite_mlcp1_Mlc_Mlcsite_mlcp1_mlcp1](#), [transcription_CRP_cAMP_CRPsite_mlcp2_Mlc_Mlcsite_mlcp2_mlcp2](#) and as a modifier in [decomposition_mRNA_mlc](#), [translation_mlc](#), [translation_mlc](#)).

$$\frac{d}{dt} \text{mRNA_mlc} = v_{33} + v_{34} - v_{41} \quad (254)$$

9.52 Species IICB_P

Initial concentration $7.1055 \cdot 10^{-6} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in eight reactions (as a reactant in [decomposition_IICB_P](#), [PTS4rev](#), [reaction_IICB_P_Glucose](#) and as a product in [PTS4for](#), [reaction_IICB_Glc6P](#) and as a modifier in [decomposition_IICB_P](#), [PTS4rev](#), [reaction_IICB_P_Glucose](#)).

$$\frac{d}{dt} \text{IICB_P} = v_{85} + v_{92} - v_{79} - v_{86} - v_{91} \quad (255)$$

9.53 Species IIA

Initial concentration $9.623 \cdot 10^{-5} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in nine reactions (as a reactant in [decomposition_IIA](#), [PTS3for](#), [PTS4rev](#) and as a product in [translation_mRNA_crr](#), [PTS3rev](#), [PTS4for](#) and as a modifier in [decomposition_IIA](#), [PTS3for](#), [PTS4rev](#)).

$$\frac{d}{dt} \text{IIA} = v_{47} + v_{84} + v_{85} - v_{78} - v_{83} - v_{86} \quad (256)$$

9.54 Species HPr_P

Initial concentration $7.5867 \cdot 10^{-7} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in eight reactions (as a reactant in [decomposition_HPr_P](#), [PTS2rev](#), [PTS3for](#) and as a product in [PTS2for](#), [PTS3rev](#) and as a modifier in [decomposition_HPr_P](#), [PTS2rev](#), [PTS3for](#)).

$$\frac{d}{dt} \text{HPr_P} = v_{81} + v_{84} - v_{75} - v_{82} - v_{83} \quad (257)$$

9.55 Species HPr

Initial concentration $1.1793 \cdot 10^{-5} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in nine reactions (as a reactant in [decomposition_HPr](#), [PTS2for](#), [PTS3rev](#) and as a product in [translation_mRNA_ptsH](#), [PTS2rev](#), [PTS3for](#) and as a modifier in [decomposition_HPr](#), [PTS2for](#), [PTS3rev](#)).

$$\frac{d}{dt} \text{HPr} = v_{45} + v_{82} + v_{83} - v_{76} - v_{81} - v_{84} \quad (258)$$

9.56 Species EI_P

Initial concentration $2.4319 \cdot 10^{-7} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in eight reactions (as a reactant in [decomposition_EI_P](#), [PTS2for](#), [reaction_EIP_Pyr](#) and as a product in [PTS2rev](#), [reaction_EI_PEP](#) and as a modifier in [decomposition_EI_P](#), [PTS2for](#), [reaction_EIP_Pyr](#)).

$$\frac{d}{dt}EI_P = v_{82} + v_{89} - v_{73} - v_{81} - v_{90} \quad (259)$$

9.57 Species EI

Initial concentration $8.6098 \cdot 10^{-7} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in nine reactions (as a reactant in [decomposition_EI](#), [PTS2rev](#), [reaction_EI_PEP](#) and as a product in [translation_mRNA_ptsI](#), [PTS2for](#), [reaction_EIP_Pyr](#) and as a modifier in [decomposition_EI](#), [PTS2rev](#), [reaction_EI_PEP](#)).

$$\frac{d}{dt}EI = v_{46} + v_{81} + v_{90} - v_{74} - v_{82} - v_{89} \quad (260)$$

9.58 Species cAMP

Initial concentration $4.7107 \cdot 10^{-7} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in six reactions (as a reactant in [binding_CRP_cAMP](#), [decomposition_cAMP](#) and as a product in [reaction_CYA_ATP](#), [reaction_IIA_P_CYA_ATP](#) and as a modifier in [binding_CRP_cAMP](#), [decomposition_cAMP](#)).

$$\frac{d}{dt}cAMP = v_{87} + v_{88} - v_1 - v_{52} \quad (261)$$

9.59 Species cyaA

Initial concentration $2.43 \cdot 10^{-10} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in two reactions (as a modifier in [transcription_CRP_cAMP_CRPsite_cyaA_cyaA](#), [transcription_CRP_cAMP_CRPsite_cyaA_cyaA](#)), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{d}{dt}cyaA = 0 \quad (262)$$

9.60 Species `cyaA_basal`

Initial concentration $2.43 \cdot 10^{-10} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in two reactions (as a modifier in [transcription_cyaA_basal](#), [transcription_cyaA_basal](#)), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{d}{dt} \text{cyaA_basal} = 0 \quad (263)$$

9.61 Species `crp`

Initial concentration $2.43 \cdot 10^{-10} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in two reactions (as a modifier in [transcription_CRP_cAMP_CRPsiteI_crp_CRP_cAMP_CRPsiteII_crp_crp](#), [transcription_CRP_cAMP_CRPsiteI_crp_CRP_cAMP_CRPsiteII_crp_crp](#)), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{d}{dt} \text{crp} = 0 \quad (264)$$

9.62 Species `crp_basal`

Initial concentration $2.43 \cdot 10^{-10} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in two reactions (as a modifier in [transcription_crp_basal](#), [transcription_crp_basal](#)), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{d}{dt} \text{crp_basal} = 0 \quad (265)$$

9.63 Species `ptsGp1`

Initial concentration $2.43 \cdot 10^{-10} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in two reactions (as a modifier in [transcription_CRP_cAMP_CRPsite_ptsGp1_Mlc_Mlcsite_ptsGp1_ptsGp1](#), [transcription_CRP_cAMP_CRPsite_ptsGp1_Mlc_Mlcsite_ptsGp1_ptsGp1](#)), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{d}{dt} \text{ptsGp1} = 0 \quad (266)$$

9.64 Species ptsGp2

Initial concentration $2.43 \cdot 10^{-10} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in two reactions (as a modifier in [transcription_CRP_cAMP_CRPsite_ptsGp2_Mlc_Mlcsite_ptsGp2_ptsGp2](#), [transcription_CRP_cAMP_CRPsite_ptsGp2_Mlc_Mlcsite_ptsGp2_ptsGp2](#)), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{d}{dt} \text{ptsGp2} = 0 \quad (267)$$

9.65 Species ptsHp0

Initial concentration $2.43 \cdot 10^{-10} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in two reactions (as a modifier in [transcription_CRP_cAMP_CRPsite_ptsHp0_Mlc_Mlcsite_ptsHp0_ptsHp0](#), [transcription_CRP_cAMP_CRPsite_ptsHp0_Mlc_Mlcsite_ptsHp0_ptsHp0](#)), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{d}{dt} \text{ptsHp0} = 0 \quad (268)$$

9.66 Species ptsHp1

Initial concentration $2.43 \cdot 10^{-10} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in two reactions (as a modifier in [transcription_CRP_cAMP_CRPsite_ptsHp1_ptsHp1](#), [transcription_CRP_cAMP_CRPsite_ptsHp1_ptsHp1](#)), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{d}{dt} \text{ptsHp1} = 0 \quad (269)$$

9.67 Species ptsIp0

Initial concentration $2.43 \cdot 10^{-10} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in two reactions (as a modifier in [transcription_CRP_cAMP_CRPsite_ptsIp0_Mlc_Mlcsite_ptsIp0_ptsIp0](#), [transcription_CRP_cAMP_CRPsite_ptsIp0_Mlc_Mlcsite_ptsIp0_ptsIp0](#)), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{d}{dt} \text{ptsIp0} = 0 \quad (270)$$

9.68 Species `ptsIp1`

Initial concentration $2.43 \cdot 10^{-10} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in two reactions (as a modifier in [transcription_CRP_cAMP_CRPsite_ptsIp1_ptsIp1](#), [transcription_CRP_cAMP_CRPsite_ptsIp1_ptsIp1](#)), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{d}{dt}\text{ptsIp1} = 0 \quad (271)$$

9.69 Species `crr`

Initial concentration $2.43 \cdot 10^{-10} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in two reactions (as a modifier in [transcription_crr](#), [transcription_crr](#)), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{d}{dt}\text{crr} = 0 \quad (272)$$

9.70 Species `mlcp1`

Initial concentration $2.43 \cdot 10^{-10} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in two reactions (as a modifier in [transcription_CRP_cAMP_CRPsite_mlcp1_Mlc_Mlcsite_mlcp1_mlcp1](#), [transcription_CRP_cAMP_CRPsite_mlcp1_Mlc_Mlcsite_mlcp1_mlcp1](#)), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{d}{dt}\text{mlcp1} = 0 \quad (273)$$

9.71 Species `mlcp2`

Initial concentration $2.43 \cdot 10^{-10} \text{ mol} \cdot \text{l}^{-1}$

This species takes part in two reactions (as a modifier in [transcription_CRP_cAMP_CRPsite_mlcp2_Mlc_Mlcsite_mlcp2_mlcp2](#), [transcription_CRP_cAMP_CRPsite_mlcp2_Mlc_Mlcsite_mlcp2_mlcp2](#)), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{d}{dt}\text{mlcp2} = 0 \quad (274)$$

9.72 Species Pyr

Initial concentration $0.00267 \text{ mol} \cdot \text{l}^{-1}$

This species takes part in three reactions (as a reactant in [reaction_EIP_Pyr](#) and as a product in [reaction_EI_PEP](#) and as a modifier in [reaction_EIP_Pyr](#)), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{d}{dt}\text{Pyr} = 0 \quad (275)$$

9.73 Species PEP

Initial concentration $0.00267 \text{ mol} \cdot \text{l}^{-1}$

This species takes part in three reactions (as a reactant in [reaction_EI_PEP](#) and as a product in [reaction_EIP_Pyr](#) and as a modifier in [reaction_EI_PEP](#)), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{d}{dt}\text{PEP} = 0 \quad (276)$$

9.74 Species Glc6P

Initial concentration $0.00148 \text{ mol} \cdot \text{l}^{-1}$

This species takes part in three reactions (as a reactant in [reaction_IICB_Glc6P](#) and as a product in [reaction_IICB_P_Glucose](#) and as a modifier in [reaction_IICB_Glc6P](#)), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{d}{dt}\text{Glc6P} = 0 \quad (277)$$

9.75 Species Glucose

Initial concentration $0.2 \text{ mol} \cdot \text{l}^{-1}$

Involved in event [event_0](#)

This species takes part in three reactions (as a reactant in [reaction_IICB_P_Glucose](#) and as a product in [reaction_IICB_Glc6P](#) and as a modifier in [reaction_IICB_P_Glucose](#)). Not these but one event influences the species' quantity because this species is on the boundary of the reaction system.

9.76 Species ATP

Initial concentration 0.0069942 mol · l⁻¹

This species takes part in four reactions (as a reactant in [reaction_CYA_ATP](#), [reaction_IIA_P_CYA_ATP](#) and as a modifier in [reaction_CYA_ATP](#), [reaction_IIA_P_CYA_ATP](#)), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{d}{dt} \text{ATP} = 0 \quad (278)$$

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