SBML Model Report

Model name: “Schilling2002 - Genome-scale metabolic network of Helicobacter pylori (iCS291)”

July 27, 2015

1 General Overview

This is a document in SBML Level 3 Version 1 format. Table 1 gives an overview of the quantities of all components of this model.

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

Element	Quantity	Element	Quantity
compartment types	0	compartments	2
species types	0	species	396
events	0	constraints	0
reactions	493	function definitions	0
global parameters	131	unit definitions	1
rules	0	initial assignments	0

Model Notes

Schilling2002 - Genome-scale metabolicnetwork of Helicobacter pylori (iCS291)

This model is described in the article:Genome-scale metabolic model of Helicobacter pylori 26695.Schilling CH, Covert MW, Famili I, Church GM, Edwards JS, Palsson BO.J. Bacteriol. 2002 Aug; 184(16): 4582-4593

Abstract:

A genome-scale metabolic model of Helicobacter pylori 26695 was constructed from genome sequence annotation, biochemical, and physiological data. This represents an in silico model largely derived from genomic information for an organism for which there is substantially less biochemical information available relative to previously modeled organisms such as Escherichia coli. The reconstructed metabolic network contains 388 enzymatic and transport reactions and accounts for 291 open reading frames. Within the paradigm of constraint-based modeling, extreme-pathway analysis and flux balance analysis were used to explore the metabolic capabilities of the in silico model. General network properties were analyzed and compared to similar results previously generated for Haemophilus influenzae. A minimal medium required by the model to generate required biomass constituents was calculated, indicating the requirement of eight amino acids, six of which correspond to essential human amino acids. In addition a list of potential substrates capable of fulfilling the bulk carbon requirements of H. pylori were identified. A deletion study was performed wherein reactions and associated genes in central metabolism were deleted and their effects were simulated under a variety of substrate availability conditions, yielding a number of reactions that are deemed essential. Deletion results were compared to recently published in vitro essentiality determinations for 17 genes. The in silico model accurately predicted 10 of 17 deletion cases, with partial support for additional cases. Collectively, the results presented herein suggest an effective strategy of combining in silico modeling with experimental technologies to enhance biological discovery for less characterized organisms and their genomes.

This model is hosted on BioModels Database and identified by: MODEL1507180037.

To cite BioModels Database, please use: BioModels Database: An enhanced, curated and annotated resource for published quantitative kinetic models.

2 Unit Definitions

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

2.1 Unit `mmol_per_gDW_per_hr`

Definition $\mathrm{mmol} \cdot \mathrm{g}^{-1} \cdot (3600\ \mathrm{s})^{-1}$

2.2 Unit `substance`

Notes Mole is the predefined SBML unit for `substance`.

Definition mol

2.3 Unit volume

Notes Litre is the predefined SBML unit for volume.

Definition l

2.4 Unit area

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

Definition m^2

2.5 Unit length

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

Definition m

2.6 Unit time

Notes Second is the predefined SBML unit for time.

Definition s

3 Compartments

This model contains two compartments.

Table 2: Properties of all compartments.

Id	Name	SBO	Spatial Dimensions	Size	Unit	Constant	Outside
c	Cytoplasm		3	1	litre	☑	
e	Extracellular		3	1	litre	☑	

3.1 Compartment c

This is a three dimensional compartment with a constant size given in litre.

Name Cytoplasm

3.2 Compartment e

This is a three dimensional compartment with a constant size given in litre.

Name Extracellular

4 Species

This model contains 396 species. Section 7 provides further details and the derived rates of change of each species.

Table 3: Properties of each species.

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
M_G6P_c	G6P	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_F6P_c	F6P	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_FDP_c	FDP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_PI_c	PI	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_T3P1_c	T3P1	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_T3P2_c	T3P2	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_NAD_c	NAD	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_NADH_c	NADH	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_13DPG_c	13DPG	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_ADP_c	ADP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_3PG_c	3PG	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_ATP_c	ATP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_2PG_c	2PG	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_PEP_c	PEP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_D6PGL_c	D6PGL	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_NADP_c	NADP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_NADPH_c	NADPH	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_D6PGC_c	D6PGC	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_CO2_c	CO2	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_RL5P_c	RL5P	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_R5P_c	R5P	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_X5P_c	X5P	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
M_S7P_c	S7P	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_E4P_c	E4P	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_2KD6PG_c	2KD6PG	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_PYR_c	PYR	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_MAL_c	MAL	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_ACCOA_c	ACCOA	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_OA_c	OA	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_COA_c	COA	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_CIT_c	CIT	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_ICIT_c	ICIT	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_AKG_c	AKG	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_FAD_c	FAD	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_SUCC_c	SUCC	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_FADH_c	FADH	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_FUM_c	FUM	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_GLX_c	GLX	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_FERDX_c	FERDX	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_FERDXH_c	FERDXH	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_SUCCOA_c	SUCCOA	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_AAC_c	AAC	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_AACCOA_c	AACCOA	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_PPI_c	PPI	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_PRPP_c	PRPP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_AMP_c	AMP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_FLVDX_c	FLVDX	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_FLVDXH_c	FLVDXH	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_GLN_c	GLN	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
M_GLU_c	GLU	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_NH3_c	NH3	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_SER_c	SER	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_3DDAH7P_c	3DDAH7P	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DQT_c	DQT	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DHSK_c	DHSK	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_SME_c	SME	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_SME5P_c	SME5P	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_3PSME_c	3PSME	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_CHOR_c	CHOR	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_AN_c	AN	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_NPRAN_c	NPRAN	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_CPAD5P_c	CPAD5P	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_IGP_c	IGP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_TRP_c	TRP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_PHEN_c	PHEN	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_HPHPYR_c	HPHPYR	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_ASP_c	ASP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_TYR_c	TYR	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_BASP_c	BASP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_ASPSA_c	ASPSA	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_HSER_c	HSER	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_PHSER_c	PHSER	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_THR_c	THR	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_D23PIC_c	D23PIC	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_PIP26DX_c	PIP26DX	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_NS2A6O_c	NS2A6O	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
M_NS26DP_c	NS26DP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_D26PIM_c	D26PIM	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_MDAP_c	MDAP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_LYS_c	LYS	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_OAHSER_c	OAHSER	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_CYS_c	CYS	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_AC_c	AC	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_LLCT_c	LLCT	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_OSLHSER_c	OSLHSER	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_MET_c	MET	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_SAM_c	SAM	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_HCYS_c	HCYS	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_ADN_c	ADN	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_SAH_c	SAH	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_MTHF_c	MTHF	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_THF_c	THF	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_PHP_c	PHP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_3PSER_c	3PSER	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_GLY_c	GLY	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_METTHF_c	METTHF	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_ABUT_c	ABUT	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DHMVA_c	DHMVA	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_ACLAC_c	ACLAC	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DHVAL_c	DHVAL	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_OMVAL_c	OMVAL	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_ILE_c	ILE	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_OIVAL_c	OIVAL	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
M_VAL_c	VAL	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_OICAP_c	OICAP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_LEU_c	LEU	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_PRO_c	PRO	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_GLUGSAL_c	GLUGSAL	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_ORN_c	ORN	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_ARG_c	ARG	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_AGM_c	AGM	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_UREA_c	UREA	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_PTRC_c	PTRC	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DSAM_c	DSAM	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_SPMD_c	SPMD	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_5MTA_c	5MTA	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_AD_c	AD	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_5MTR_c	5MTR	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_5MTRP_c	5MTRP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_5MTR1P_c	5MTR1P	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DKMPP_c	DKMPP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_FOR_c	FOR	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_KMB_c	KMB	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_SLF_c	SLF	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_GTP_c	GTP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_APS_c	APS	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_GDP_c	GDP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_PAPS_c	PAPS	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_RTHIO_c	RTHIO	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_OTHIO_c	OTHIO	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
M_H2SO3_c	H2SO3	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_PAP_c	PAP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_H2S_c	H2S	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_ASER_c	ASER	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DALA_c	DALA	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_ALA_c	ALA	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_ASN_c	ASN	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_CAP_c	CAP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_CAASP_c	CAASP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DOROA_c	DOROA	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_MK_c	MK	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_MKH2_c	MKH2	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_OROA_c	OROA	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_OMP_c	OMP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_UMP_c	UMP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_UDP_c	UDP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_CMP_c	CMP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_CDP_c	CDP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_UTP_c	UTP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_CTP_c	CTP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_URA_c	URA	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_IMP_c	IMP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_ASUC_c	ASUC	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_XMP_c	XMP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_GMP_c	GMP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_PRAM_c	PRAM	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_GAR_c	GAR	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
M_DGDP_c	DGDP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DGTP_c	DGTP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DUDP_c	DUDP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DUTP_c	DUTP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DCDP_c	DCDP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DCTP_c	DCTP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DADP_c	DADP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DATP_c	DATP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DTDP_c	DTDP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DTTP_c	DTTP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DUMP_c	DUMP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DHF_c	DHF	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DTMP_c	DTMP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DT_c	DT	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DU_c	DU	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DAMP_c	DAMP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DGMP_c	DGMP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DIN_c	DIN	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_HYXN_c	HYXN	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DR1P_c	DR1P	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DA_c	DA	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DG_c	DG	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_GN_c	GN	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_R1P_c	R1P	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_INS_c	INS	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_GSN_c	GSN	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_XAN_c	XAN	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
M_XTSN_c	XTSN	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DR5P_c	DR5P	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_RIB_c	RIB	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_MALCOA_c	MALCOA	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_ACP_c	ACP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_MALACP_c	MALACP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_ACACP_c	ACACP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_ACTACP_c	ACTACP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_C120ACP_c	C120ACP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_C140ACP_c	C140ACP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_C141ACP_c	C141ACP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_C160ACP_c	C160ACP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_C161ACP_c	C161ACP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_C181ACP_c	C181ACP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_GL3P_c	GL3P	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_PA_c	PA	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_CDPDG_c	CDPDG	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_PS_c	PS	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_PE_c	PE	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_PGP_c	PGP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_PG_c	PG	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DGR_c	DGR	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_GA6P_c	GA6P	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_GA1P_c	GA1P	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_UDPNAG_c	UDPNAG	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_UDPNAGEP_c	UDPNAGEP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_UDPNAM_c	UDPNAM	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
M_UDPNAMA_c	UDPNAMA	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DGLU_c	DGLU	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_UDPNAMAG_c	UDPNAMAG	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_UNAGD_c	UNAGD	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_AA_c	AA	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_UNAGDA_c	UNAGDA	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_UNPTDO_c	UNPTDO	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_PEPTIDO_c	PEPTIDO	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_UDPG2AA_c	UDPG2AA	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_UDPG2A_c	UDPG2A	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_UDPG23A_c	UDPG23A	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_LIPX_c	LIPX	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DISAC1P_c	DISAC1P	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_LIPIV_c	LIPIV	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_CMPKDO_c	CMPKDO	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_KDOLIPIV_c	KDOLIPIV	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_KDOLIPVP_c	KDOLIPVP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_LIPA_c	LIPA	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_A5P_c	A5P	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_KDOP_c	KDOP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_KDO_c	KDO	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_CDPETN_c	CDPETN	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_ADPHEP_c	ADPHEP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_UDPG_c	UDPG	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_LPS_c	LPS	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_CHCOA_c	CHCOA	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_AONA_c	AONA	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
M_SAMOB_c	SAMOB	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DANNA_c	DANNA	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DTB_c	DTB	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_BT_c	BT	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_AHTD_c	AHTD	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DHPP_c	DHPP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DHP_c	DHP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_AHHMP_c	AHHMP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_GLAL_c	GLAL	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_AHHMD_c	AHHMD	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_ADCHOR_c	ADCHOR	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_PABA_c	PABA	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DHPT_c	DHPT	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_FTHF_c	FTHF	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_METHF_c	METHF	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_GTRNA_c	GTRNA	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_GSA_c	GSA	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_ALAV_c	ALAV	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_PBG_c	PBG	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_HMB_c	HMB	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_UPRG_c	UPRG	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_CPP_c	CPP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_O2_c	O2	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_PPHG_c	PPHG	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_PPIX_c	PPIX	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_PTH_c	PTH	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_4HBZ_c	4HBZ	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
M_OPP_c	OPP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_O4HBZ_c	O4HBZ	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_D6RP5P_c	D6RP5P	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_A6RP5P_c	A6RP5P	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_A6RP5P2_c	A6RP5P2	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_A6RP_c	A6RP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DB4P_c	DB4P	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_D8RL_c	D8RL	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_RIBFLV_c	RIBFLV	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_FMN_c	FMN	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_AKP_c	AKP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_PANT_c	PANT	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_bALA_c	bALA	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_PNTO_c	PNTO	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_4PPNTO_c	4PPNTO	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_4PPNCYS_c	4PPNCYS	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_4PPNTE_c	4PPNTE	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DPCOA_c	DPCOA	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_IPPP_c	IPPP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DMPP_c	DMPP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_GPP_c	GPP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_FPP_c	FPP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_UDPP_c	UDPP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_ISUCC_c	ISUCC	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_QA_c	QA	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_NAMN_c	NAMN	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_NAAD_c	NAAD	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
M_THZ_c	THZ	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_THZP_c	THZP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DTP_c	DTP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_AHMP_c	AHMP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_AHMPP_c	AHMPP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_THMP_c	THMP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_HBA_c	HBA	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_ICHOR_c	ICHOR	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_TPP_c	TPP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_SSALTPP_c	SSALTPP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_SHCHC_c	SHCHC	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_OSB_c	OSB	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_OSBCOA_c	OSBCOA	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DHNA_c	DHNA	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DMK_c	DMK	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DIPEP_e	DIPEPxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DIPEP_c	DIPEP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_OPEP_e	OPEPxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_OPEP_c	OPEP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_SER_e	SERxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_HEXT_c	HEXT	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_ETH_c	ETH	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_ETH_e	ETHxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_ACTP_c	ACTP	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_AC_e	ACxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_UDPGAL_c	UDPGAL	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_G1P_c	G1P	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
M_GLAC_e	GLACxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_GLAC_c	GLAC	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_GLC_e	GLCxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_GLC_c	GLC	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_MAN_c	MAN	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_MAN6P_c	MAN6P	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_PRO_e	PROxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_NA_e	NAxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_NA_c	NA	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_LAC_e	LACxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_LAC_c	LAC	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_GLN_e	GLNxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_GLU_e	GLUxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_ALA_e	ALAxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DALA_e	DALAxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_GLY_e	GLYxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DSER_e	DSERxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DSER_c	DSER	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_ORN_e	ORNxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_ARG_e	ARGxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_SUCC_e	SUCCxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_FUM_e	FUMxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_MAL_e	MALxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_ASP_e	ASPxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_ADN_e	ADNxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_URI_e	URIxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_URI_c	URI	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
M_CYTD_e	CYTDxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_CYTD_c	CYTD	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DT_e	DTxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DA_e	DAxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DC_e	DCxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DC_c	DC	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_DU_e	DUxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_H2_e	H2xt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_AKG_e	AKGxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_NO2_c	NO2	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_NO2_e	NO2xt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_NMN_e	NMNxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_NMN_c	NMN	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_VAL_e	VALxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_ILE_e	ILExt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_LEU_e	LEUxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_ASN_e	ASNxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_THIAM_e	THIAMxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_THIAMIN_c	THIAMIN	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_PI_e	PIxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_O2_e	O2xt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_CO2_e	CO2xt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_UREA_e	UREAxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_AD_e	ADxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_FOR_e	FORxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_GN_e	GNxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_GSN_e	GSNxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
M_HYXN_e	HYXNxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_OROA_e	OROAxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_URA_e	URAxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_NH3_e	NH3xt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_PYR_e	PYRxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_SLF_e	SLFxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_CYS_e	CYSxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_HIS_e	HISxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_HIS_c	HIS	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_LYS_e	LYSxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_MET_e	METxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_PHE_e	PHExt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_PHE_c	PHE	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_THR_e	THRxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_TRP_e	TRPxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_TYR_e	TYRxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_AAC_e	AACxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_H2CO3_e	H2CO3xt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_H2CO3_c	H2CO3	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_GLYCL_e	GLYCLxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_GLYCL_c	GLYCL	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_H2O2_c	H2O2	c	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟
M_GLAL_e	GLALxt	e	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	⊟

5 Parameters

This model contains 131 global parameters.

Table 4: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
cobra_default_lb		0000626	−1000.0	mmol · g^{-1} · (3600 s)$^{-1}$	☑
cobra_default_ub		0000626	1000.0	mmol · g^{-1} · (3600 s)$^{-1}$	☑
cobra_0_bound		0000626	0.0	mmol · g^{-1} · (3600 s)$^{-1}$	☑
R_EX_DIPEPxt_upper_bound		0000625	10.0	mmol · g^{-1} · (3600 s)$^{-1}$	☑
R_EX_DIPEPxt_lower_bound		0000625	−10.0	mmol · g^{-1} · (3600 s)$^{-1}$	☑
R_EX_OPEPxt_upper_bound		0000625	10.0	mmol · g^{-1} · (3600 s)$^{-1}$	☑
R_EX_OPEPxt_lower_bound		0000625	−10.0	mmol · g^{-1} · (3600 s)$^{-1}$	☑
R_EX_SERxt_upper_bound		0000625	10.0	mmol · g^{-1} · (3600 s)$^{-1}$	☑
R_EX_SERxt_lower_bound		0000625	−10.0	mmol · g^{-1} · (3600 s)$^{-1}$	☑
R_EX_ETHxt_upper_bound		0000625	10.0	mmol · g^{-1} · (3600 s)$^{-1}$	☑
R_EX_ETHxt_lower_bound		0000625	−10.0	mmol · g^{-1} · (3600 s)$^{-1}$	☑
R_EX_ACxt_upper_bound		0000625	10.0	mmol · g^{-1} · (3600 s)$^{-1}$	☑
R_EX_ACxt_lower_bound		0000625	−10.0	mmol · g^{-1} · (3600 s)$^{-1}$	☑
R_EX_GLACxt_upper_bound		0000625	10.0	mmol · g^{-1} · (3600 s)$^{-1}$	☑
R_EX_GLACxt_lower_bound		0000625	−10.0	mmol · g^{-1} · (3600 s)$^{-1}$	☑
R_EX_GLCxt_upper_bound		0000625	10.0	mmol · g^{-1} · (3600 s)$^{-1}$	☑
R_EX_GLCxt_lower_bound		0000625	−10.0	mmol · g^{-1} · (3600 s)$^{-1}$	☑

Id	Name	SBO	Value	Unit	Constant
R_EX_PROxt_upper_bound		0000625	10.0	$\text{mmol} \cdot \text{g}^{-1} \cdot (3600\,\text{s})^{-1}$	☑
R_EX_PROxt_lower_bound		0000625	−10.0	$\text{mmol} \cdot \text{g}^{-1} \cdot (3600\,\text{s})^{-1}$	☑
R_EX_NAxt_upper_bound		0000625	10.0	$\text{mmol} \cdot \text{g}^{-1} \cdot (3600\,\text{s})^{-1}$	☑
R_EX_NAxt_lower_bound		0000625	−10.0	$\text{mmol} \cdot \text{g}^{-1} \cdot (3600\,\text{s})^{-1}$	☑
R_EX_LACxt_upper_bound		0000625	10.0	$\text{mmol} \cdot \text{g}^{-1} \cdot (3600\,\text{s})^{-1}$	☑
R_EX_LACxt_lower_bound		0000625	−10.0	$\text{mmol} \cdot \text{g}^{-1} \cdot (3600\,\text{s})^{-1}$	☑
R_EX_GLNxt_upper_bound		0000625	10.0	$\text{mmol} \cdot \text{g}^{-1} \cdot (3600\,\text{s})^{-1}$	☑
R_EX_GLNxt_lower_bound		0000625	−10.0	$\text{mmol} \cdot \text{g}^{-1} \cdot (3600\,\text{s})^{-1}$	☑
R_EX_GLUxt_upper_bound		0000625	10.0	$\text{mmol} \cdot \text{g}^{-1} \cdot (3600\,\text{s})^{-1}$	☑
R_EX_GLUxt_lower_bound		0000625	−10.0	$\text{mmol} \cdot \text{g}^{-1} \cdot (3600\,\text{s})^{-1}$	☑
R_EX_ALAxt_upper_bound		0000625	10.0	$\text{mmol} \cdot \text{g}^{-1} \cdot (3600\,\text{s})^{-1}$	☑
R_EX_ALAxt_lower_bound		0000625	−10.0	$\text{mmol} \cdot \text{g}^{-1} \cdot (3600\,\text{s})^{-1}$	☑
R_EX_DALAxt_upper_bound		0000625	10.0	$\text{mmol} \cdot \text{g}^{-1} \cdot (3600\,\text{s})^{-1}$	☑
R_EX_DALAxt_lower_bound		0000625	−10.0	$\text{mmol} \cdot \text{g}^{-1} \cdot (3600\,\text{s})^{-1}$	☑
R_EX_GLYxt_upper_bound		0000625	10.0	$\text{mmol} \cdot \text{g}^{-1} \cdot (3600\,\text{s})^{-1}$	☑
R_EX_GLYxt_lower_bound		0000625	−10.0	$\text{mmol} \cdot \text{g}^{-1} \cdot (3600\,\text{s})^{-1}$	☑
R_EX_DSERxt_upper_bound		0000625	10.0	$\text{mmol} \cdot \text{g}^{-1} \cdot (3600\,\text{s})^{-1}$	☑
R_EX_DSERxt_lower_bound		0000625	−10.0	$\text{mmol} \cdot \text{g}^{-1} \cdot (3600\,\text{s})^{-1}$	☑
R_EX_ORNxt_upper_bound		0000625	10.0	$\text{mmol} \cdot \text{g}^{-1} \cdot (3600\,\text{s})^{-1}$	☑
R_EX_ORNxt_lower_bound		0000625	−10.0	$\text{mmol} \cdot \text{g}^{-1} \cdot (3600\,\text{s})^{-1}$	☑
R_EX_ARGxt_upper_bound		0000625	10.0	$\text{mmol} \cdot \text{g}^{-1} \cdot (3600\,\text{s})^{-1}$	☑

Id	Name	SBO	Value	Unit	Constant
R_EX_ARGxt-_lower_bound		0000625	−10.0	mmol · g^{-1} · (3600 s)$^{-1}$	☑
R_EX_SUCCxt-_upper_bound		0000625	10.0	mmol · g^{-1} · (3600 s)$^{-1}$	☑
R_EX_SUCCxt-_lower_bound		0000625	−10.0	mmol · g^{-1} · (3600 s)$^{-1}$	☑
R_EX_FUMxt-_upper_bound		0000625	10.0	mmol · g^{-1} · (3600 s)$^{-1}$	☑
R_EX_FUMxt-_lower_bound		0000625	−10.0	mmol · g^{-1} · (3600 s)$^{-1}$	☑
R_EX_MALxt-_upper_bound		0000625	10.0	mmol · g^{-1} · (3600 s)$^{-1}$	☑
R_EX_MALxt-_lower_bound		0000625	−10.0	mmol · g^{-1} · (3600 s)$^{-1}$	☑
R_EX_ASPxt-_upper_bound		0000625	10.0	mmol · g^{-1} · (3600 s)$^{-1}$	☑
R_EX_ASPxt-_lower_bound		0000625	−10.0	mmol · g^{-1} · (3600 s)$^{-1}$	☑
R_EX_ADNxt-_upper_bound		0000625	10.0	mmol · g^{-1} · (3600 s)$^{-1}$	☑
R_EX_ADNxt-_lower_bound		0000625	−10.0	mmol · g^{-1} · (3600 s)$^{-1}$	☑
R_EX_URIxt-_upper_bound		0000625	10.0	mmol · g^{-1} · (3600 s)$^{-1}$	☑
R_EX_URIxt-_lower_bound		0000625	−10.0	mmol · g^{-1} · (3600 s)$^{-1}$	☑
R_EX_CYTDxt-_upper_bound		0000625	10.0	mmol · g^{-1} · (3600 s)$^{-1}$	☑
R_EX_CYTDxt-_lower_bound		0000625	−10.0	mmol · g^{-1} · (3600 s)$^{-1}$	☑
R_EX_DTxt-_upper_bound		0000625	10.0	mmol · g^{-1} · (3600 s)$^{-1}$	☑
R_EX_DTxt-_lower_bound		0000625	−10.0	mmol · g^{-1} · (3600 s)$^{-1}$	☑
R_EX_DAxt-_upper_bound		0000625	10.0	mmol · g^{-1} · (3600 s)$^{-1}$	☑
R_EX_DAxt-_lower_bound		0000625	−10.0	mmol · g^{-1} · (3600 s)$^{-1}$	☑
R_EX_DCxt-_upper_bound		0000625	10.0	mmol · g^{-1} · (3600 s)$^{-1}$	☑
R_EX_DCxt-_lower_bound		0000625	−10.0	mmol · g^{-1} · (3600 s)$^{-1}$	☑

Id	Name	SBO	Value	Unit	Constant
R_EX_DUxt-_upper_bound		0000625	10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX_DUxt-_lower_bound		0000625	−10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX_H2xt-_upper_bound		0000625	10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX_H2xt-_lower_bound		0000625	−10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX_AKGxt-_upper_bound		0000625	10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX_AKGxt-_lower_bound		0000625	−10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX_NO2xt-_upper_bound		0000625	10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX_NO2xt-_lower_bound		0000625	−10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX_NMNxt-_upper_bound		0000625	10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX_NMNxt-_lower_bound		0000625	−10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX_VALxt-_upper_bound		0000625	10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX_VALxt-_lower_bound		0000625	−10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX_ILExt-_upper_bound		0000625	10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX_ILExt-_lower_bound		0000625	−10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX_LEUxt-_upper_bound		0000625	10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX_LEUxt-_lower_bound		0000625	−10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX_ASNxt-_upper_bound		0000625	10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX_ASNxt-_lower_bound		0000625	−10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX-_THIAMxt-_upper_bound		0000625	10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX-_THIAMxt-_lower_bound		0000625	−10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑

Id	Name	SBO	Value	Unit	Constant
R_EX_PIxt-_upper_bound		0000625	10.0	$\text{mmol} \cdot \text{g}^{-1} \cdot (3600\,\text{s})^{-1}$	☑
R_EX_PIxt-_lower_bound		0000625	−10.0	$\text{mmol} \cdot \text{g}^{-1} \cdot (3600\,\text{s})^{-1}$	☑
R_EX_O2xt-_upper_bound		0000625	10.0	$\text{mmol} \cdot \text{g}^{-1} \cdot (3600\,\text{s})^{-1}$	☑
R_EX_O2xt-_lower_bound		0000625	−10.0	$\text{mmol} \cdot \text{g}^{-1} \cdot (3600\,\text{s})^{-1}$	☑
R_EX_CO2xt-_upper_bound		0000625	10.0	$\text{mmol} \cdot \text{g}^{-1} \cdot (3600\,\text{s})^{-1}$	☑
R_EX_CO2xt-_lower_bound		0000625	−10.0	$\text{mmol} \cdot \text{g}^{-1} \cdot (3600\,\text{s})^{-1}$	☑
R_EX_UREAxt-_upper_bound		0000625	10.0	$\text{mmol} \cdot \text{g}^{-1} \cdot (3600\,\text{s})^{-1}$	☑
R_EX_UREAxt-_lower_bound		0000625	−10.0	$\text{mmol} \cdot \text{g}^{-1} \cdot (3600\,\text{s})^{-1}$	☑
R_EX_ADxt-_upper_bound		0000625	10.0	$\text{mmol} \cdot \text{g}^{-1} \cdot (3600\,\text{s})^{-1}$	☑
R_EX_ADxt-_lower_bound		0000625	−10.0	$\text{mmol} \cdot \text{g}^{-1} \cdot (3600\,\text{s})^{-1}$	☑
R_EX_FORxt-_upper_bound		0000625	10.0	$\text{mmol} \cdot \text{g}^{-1} \cdot (3600\,\text{s})^{-1}$	☑
R_EX_FORxt-_lower_bound		0000625	−10.0	$\text{mmol} \cdot \text{g}^{-1} \cdot (3600\,\text{s})^{-1}$	☑
R_EX_GNxt-_upper_bound		0000625	10.0	$\text{mmol} \cdot \text{g}^{-1} \cdot (3600\,\text{s})^{-1}$	☑
R_EX_GNxt-_lower_bound		0000625	−10.0	$\text{mmol} \cdot \text{g}^{-1} \cdot (3600\,\text{s})^{-1}$	☑
R_EX_GSNxt-_upper_bound		0000625	10.0	$\text{mmol} \cdot \text{g}^{-1} \cdot (3600\,\text{s})^{-1}$	☑
R_EX_GSNxt-_lower_bound		0000625	−10.0	$\text{mmol} \cdot \text{g}^{-1} \cdot (3600\,\text{s})^{-1}$	☑
R_EX_HYXNxt-_upper_bound		0000625	10.0	$\text{mmol} \cdot \text{g}^{-1} \cdot (3600\,\text{s})^{-1}$	☑
R_EX_HYXNxt-_lower_bound		0000625	−10.0	$\text{mmol} \cdot \text{g}^{-1} \cdot (3600\,\text{s})^{-1}$	☑
R_EX_OROAxt-_upper_bound		0000625	10.0	$\text{mmol} \cdot \text{g}^{-1} \cdot (3600\,\text{s})^{-1}$	☑
R_EX_OROAxt-_lower_bound		0000625	−10.0	$\text{mmol} \cdot \text{g}^{-1} \cdot (3600\,\text{s})^{-1}$	☑
R_EX_URAxt-_upper_bound		0000625	10.0	$\text{mmol} \cdot \text{g}^{-1} \cdot (3600\,\text{s})^{-1}$	☑

Id	Name	SBO	Value	Unit	Constant
R_EX_URAxt-_lower_bound		0000625	−10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX_NH3xt-_upper_bound		0000625	10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX_NH3xt-_lower_bound		0000625	−10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX_PYRxt-_upper_bound		0000625	10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX_PYRxt-_lower_bound		0000625	−10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX_SLFxt-_upper_bound		0000625	10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX_SLFxt-_lower_bound		0000625	−10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX_CYSxt-_upper_bound		0000625	10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX_CYSxt-_lower_bound		0000625	−10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX_HISxt-_upper_bound		0000625	10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX_HISxt-_lower_bound		0000625	−10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX_LYSxt-_upper_bound		0000625	10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX_LYSxt-_lower_bound		0000625	−10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX_METxt-_upper_bound		0000625	10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX_METxt-_lower_bound		0000625	−10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX_PHExt-_upper_bound		0000625	10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX_PHExt-_lower_bound		0000625	−10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX_THRxt-_upper_bound		0000625	10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX_THRxt-_lower_bound		0000625	−10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX_TRPxt-_upper_bound		0000625	10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX_TRPxt-_lower_bound		0000625	−10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑

Id	Name	SBO	Value	Unit	Constant
R_EX_TYRxt-_upper_bound		0000625	10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX_TYRxt-_lower_bound		0000625	−10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX_AACxt-_upper_bound		0000625	10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX_AACxt-_lower_bound		0000625	−10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX-_H2CO3xt-_upper_bound		0000625	10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX-_H2CO3xt-_lower_bound		0000625	−10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX-_GLYCLxt-_upper_bound		0000625	10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX-_GLYCLxt-_lower_bound		0000625	−10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX_GLALxt-_upper_bound		0000625	10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑
R_EX_GLALxt-_lower_bound		0000625	−10.0	mmol · g^{-1} · $(3600\,s)^{-1}$	☑

6 Reactions

This model contains 493 reactions. All reactions are listed in the following table and are subsequently described in detail. If a reaction is affected by a modifier, the identifier of this species is written above the reaction arrow.

Table 5: Overview of all reactions

№	Id	Name	Reaction Equation	SBO
1	R_PGI	PGI	M_G6P_c $\rightleftharpoons$ M_F6P_c	
2	R_FBP	FBP	M_FDP_c $\longrightarrow$ M_F6P_c + M_PI_c	
3	R_FBA	FBA	M_FDP_c $\rightleftharpoons$ M_T3P1_c + M_T3P2_c	
4	R_TPI	TPI	M_T3P2_c $\rightleftharpoons$ M_T3P1_c	
5	R_GAP	GAP	M_NAD_c + M_PI_c + M_T3P1_c $\rightleftharpoons$ M_13DPG_c + M_NADH_c	
6	R_PGK	PGK	M_13DPG_c + M_ADP_c $\rightleftharpoons$ M_3PG_c + M_ATP_c	
7	R_PGM	PGM	M_3PG_c $\rightleftharpoons$ M_2PG_c	
8	R_ENO	ENO	M_2PG_c $\rightleftharpoons$ M_PEP_c	
9	R_G6PDH1	G6PDH1	M_G6P_c + M_NAD_c $\longrightarrow$ M_D6PGL_c + M_NADH_c	
10	R_G6PDH2	G6PDH2	M_G6P_c + M_NADP_c $\longrightarrow$ M_D6PGL_c + M_NADPH_c	
11	R_PGL	PGL	M_D6PGL_c $\longrightarrow$ M_D6PGC_c	
12	R_GND	GND	M_D6PGC_c + M_NADP_c $\longrightarrow$ M_CO2_c + M_NADPH_c + M_RL5P_c	
13	R_RPI	RPI	M_RL5P_c $\rightleftharpoons$ M_R5P_c	
14	R_RPE	RPE	M_RL5P_c $\rightleftharpoons$ M_X5P_c	
15	R_TAL	TAL	M_S7P_c + M_T3P1_c $\rightleftharpoons$ M_E4P_c + M_F6P_c	
16	R_TKTA1	TKTA1	M_R5P_c + M_X5P_c $\rightleftharpoons$ M_S7P_c + M_T3P1_c	
17	R_TKTA2	TKTA2	M_E4P_c + M_X5P_c $\rightleftharpoons$ M_F6P_c + M_T3P1_c	
18	R_EDD	EDD	M_D6PGC_c $\longrightarrow$ M_2KD6PG_c	

№	Id	Name	Reaction Equation	SBO
19	R_EDA	EDA	M_2KD6PG_c $\longrightarrow$ M_PYR_c + M_T3P1_c	
20	R_MAEB	MAEB	M_MAL_c + M_NAD_c $\rightleftharpoons$ M_CO2_c + M_NADH_c + M_PYR_c	
21	R_GLTA	GLTA	M_ACCOA_c + M_OA_c $\longrightarrow$ M_CIT_c + M_COA_c	
22	R_ACNB	ACNB	M_CIT_c $\rightleftharpoons$ M_ICIT_c	
23	R_ICD	ICD	M_ICIT_c + M_NADP_c $\rightleftharpoons$ M_AKG_c + M_CO2_c + M_NADPH_c	
24	R_AKO	AKO	M_AKG_c + M_FAD_c $\longrightarrow$ M_FADH_c + M_SUCC_c	
25	R_FRD	FRD	M_FUM_c + M_NADH_c $\longrightarrow$ M_NAD_c + M_SUCC_c	
26	R_FUMC	FUMC	M_FUM_c $\rightleftharpoons$ M_MAL_c	
27	R_MDH	MDH	M_MAL_c + M_NAD_c $\rightleftharpoons$ M_NADH_c + M_OA_c	
28	R_ACEB	ACEB	M_ACCOA_c + M_GLX_c $\longrightarrow$ M_COA_c + M_MAL_c	
29	R_OOR_	OOR_	M_AKG_c + M_COA_c + M_FERDX_c $\longrightarrow$ M_CO2_c + M_FERDXH_c + M_SUCCOA_c	
30	R_SCOT	SCOT	M_AAC_c + M_SUCCOA_c $\rightleftharpoons$ M_AACCOA_c + M_SUCC_c	
31	R_ATOB	ATOB	M_AACCOA_c + M_COA_c $\rightleftharpoons$ 2 M_ACCOA_c	
32	R_PPA	PPA	M_PPI_c $\longrightarrow$ 2 M_PI_c	
33	R_PRSA	PRSA	M_ATP_c + M_R5P_c $\rightleftharpoons$ M_AMP_c + M_PRPP_c	
34	R_PPSA	PPSA	M_ATP_c + M_PYR_c $\longrightarrow$ M_AMP_c + M_PEP_c + M_PI_c	
35	R_POR_	POR_	M_COA_c + M_FLVDX_c + M_PYR_c $\longrightarrow$ M_ACCOA_c + M_CO2_c + M_FLVDXH_c	

№	Id	Name	Reaction Equation	SBO
36	R_GLTMNS	GLTMNS	M_GLN_c ⟶ M_GLU_c + M_NH3_c	
37	R_SDAA	SDAA	M_SER_c ⟶ M_NH3_c + M_PYR_c	
38	R_DHS1	DHS1	M_E4P_c + M_PEP_c ⟶ M_3DDAH7P_c + M_PI_c	
39	R_AROB	AROB	M_3DDAH7P_c ⟶ M_DQT_c + M_PI_c	
40	R_AROQ	AROQ	M_DQT_c ⇌ M_DHSK_c	
41	R_AROE	AROE	M_DHSK_c + M_NADPH_c ⇌ M_NADP_c + M_SME_c	
42	R_AROK	AROK	M_ATP_c + M_SME_c ⟶ M_ADP_c + M_SME5P_c	
43	R_AROA	AROA	M_PEP_c + M_SME5P_c ⇌ M_3PSME_c + M_PI_c	
44	R_AROC	AROC	M_3PSME_c ⟶ M_CHOR_c + M_PI_c	
45	R_TRPE	TRPE	M_CHOR_c + M_NH3_c ⟶ M_AN_c + M_PYR_c	
46	R_TRPDE	TRPDE	M_CHOR_c + M_GLN_c ⟶ M_AN_c + M_GLU_c + M_PYR_c	
47	R_TRPD	TRPD	M_AN_c + M_PRPP_c ⟶ M_NPRAN_c + M_PPI_c	
48	R_TRPC1	TRPC1	M_NPRAN_c ⟶ M_CPAD5P_c	
49	R_TRPC2	TRPC2	M_CPAD5P_c ⟶ M_CO2_c + M_IGP_c	
50	R_TRPAB	TRPAB	M_IGP_c + M_SER_c ⟶ M_T3P1_c + M_TRP_c	
51	R_TYRA1	TYRA1	M_CHOR_c ⟶ M_PHEN_c	
52	R_TYRA2	TYRA2	M_NAD_c + M_PHEN_c ⟶ M_CO2_c + M_HPHPYR_c + M_NADH_c	
53	R_ASPA	ASPA	M_ASP_c ⟶ M_FUM_c + M_NH3_c	
54	R_ASPB1	ASPB1	M_GLU_c + M_OA_c ⇌ M_AKG_c + M_ASP_c	
55	R_ASPB2	ASPB2	M_GLU_c + M_HPHPYR_c ⇌ M_AKG_c + M_TYR_c	
56	R_METL1	METL1	M_ASP_c + M_ATP_c ⇌ M_ADP_c + M_BASP_c	
57	R_LYSC	LYSC	M_ASP_c + M_ATP_c ⇌ M_ADP_c + M_BASP_c	

№	Id	Name	Reaction Equation	SBO
58	R_ASD	ASD	M_BASP_c + M_NADPH_c ⇌ M_ASPSA_c + M_NADP_c + M_PI_c	
59	R_METL2	METL2	M_ASPSA_c + M_NADPH_c ⇌ M_HSER_c + M_NADP_c	
60	R_THRB	THRB	M_ATP_c + M_HSER_c ⟶ M_ADP_c + M_PHSER_c	
61	R_THRC	THRC	M_PHSER_c ⟶ M_PI_c + M_THR_c	
62	R_DAPA	DAPA	M_ASPSA_c + M_PYR_c ⟶ M_D23PIC_c	
63	R_DAPB	DAPB	M_D23PIC_c + M_NADPH_c ⟶ M_NADP_c + M_PIP26DX_c	
64	R_DAPD	DAPD	M_PIP26DX_c + M_SUCCOA_c ⟶ M_COA_c + M_NS2A6O_c	
65	R_DAPC	DAPC	M_GLU_c + M_NS2A6O_c ⇌ M_AKG_c + M_NS26DP_c	
66	R_DAPE	DAPE	M_NS26DP_c ⟶ M_D26PIM_c + M_SUCC_c	
67	R_DAPF	DAPF	M_D26PIM_c ⇌ M_MDAP_c	
68	R_LYSA	LYSA	M_MDAP_c ⟶ M_CO2_c + M_LYS_c	
69	R_METB1	METB1	M_CYS_c + M_OAHSER_c ⟶ M_AC_c + M_LLCT_c	
70	R_METB2	METB2	M_CYS_c + M_OSLHSER_c ⟶ M_LLCT_c + M_SUCC_c	
71	R_METX	METX	M_ATP_c + M_MET_c ⟶ M_PI_c + M_PPI_c + M_SAM_c	
72	R_ADCSASE	ADCSASE	M_ADN_c + M_HCYS_c ⇌ M_SAH_c	
73	R_METH	METH	M_HCYS_c + M_MTHF_c ⟶ M_MET_c + M_THF_c	
74	R_SERA	SERA	M_3PG_c + M_NAD_c ⟶ M_NADH_c + M_PHP_c	
75	R_SERC	SERC	M_GLU_c + M_PHP_c ⟶ M_3PSER_c + M_AKG_c	

№	Id	Name	Reaction Equation	SBO
76	R_SERB	SERB	M_3PSER_c ⟶ M_PI_c + M_SER_c	
77	R_GLYA	GLYA	M_SER_c + M_THF_c ⇌ M_GLY_c + M_METTHF_c	
78	R_ILVC1	ILVC1	M_ABUT_c + M_NADPH_c ⟶ M_DHMVA_c + M_NADP_c	
79	R_ILVC2	ILVC2	M_ACLAC_c + M_NADPH_c ⟶ M_DHVAL_c + M_NADP_c	
80	R_ILVE1	ILVE1	M_GLU_c + M_OMVAL_c ⇌ M_AKG_c + M_ILE_c	
81	R_ILVE2	ILVE2	M_GLU_c + M_OIVAL_c ⇌ M_AKG_c + M_VAL_c	
82	R_ILVE3	ILVE3	M_GLU_c + M_OICAP_c ⇌ M_AKG_c + M_LEU_c	
83	R_PUTA1	PUTA1	M_FAD_c + M_PRO_c ⟶ M_FADH_c + M_GLUGSAL_c	
84	R_PUTA2	PUTA2	M_GLUGSAL_c + M_NAD_c ⟶ M_GLU_c + M_NADH_c	
85	R_PROC	PROC	M_GLUGSAL_c + M_NADPH_c ⟶ M_NADP_c + M_PRO_c	
86	R_ORNTRSN	ORNTRSN	M_AKG_c + M_ORN_c ⟶ M_GLUGSAL_c + M_GLU_c	
87	R_SPEA	SPEA	M_ARG_c ⟶ M_AGM_c + M_CO2_c	
88	R_SPEB	SPEB	M_AGM_c ⟶ M_PTRC_c + M_UREA_c	
89	R_SPED	SPED	M_SAM_c ⇌ M_CO2_c + M_DSAM_c	
90	R_SPEE	SPEE	M_DSAM_c + M_PTRC_c ⟶ M_5MTA_c + M_SPMD_c	
91	R_MTHAKN	MTHAKN	M_5MTA_c ⟶ M_5MTR_c + M_AD_c	
92	R_MTHRKN	MTHRKN	M_5MTR_c + M_ATP_c ⟶ M_5MTRP_c + M_ADP_c	

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93	R_MTHIPIS	MTHIPIS	M_5MTRP_c $\rightleftharpoons$ M_5MTR1P_c	
94	R_NE1PH	NE1PH	M_5MTR1P_c $\longrightarrow$ M_DKMPP_c	
95	R_NE3UNK	NE3UNK	M_DKMPP_c $\longrightarrow$ M_FOR_c + M_KMB_c	
96	R_TNSUNK	TNSUNK	M_GLN_c + M_KMB_c $\longrightarrow$ M_GLU_c + M_MET_c	
97	R_GDHA	GDHA	M_AKG_c + M_NADPH_c + M_NH3_c $\rightleftharpoons$ M_GLU_c + M_NADP_c	
98	R_GLNA	GLNA	M_ATP_c + M_GLU_c + M_NH3_c $\longrightarrow$ M_ADP_c + M_GLN_c + M_PI_c	
99	R_CYSDN	CYSDN	M_ATP_c + M_GTP_c + M_SLF_c $\longrightarrow$ M_APS_c + M_GDP_c + M_PI_c + M_PPI_c	
100	R_CYSC	CYSC	M_APS_c + M_ATP_c $\longrightarrow$ M_ADP_c + M_PAPS_c	
101	R_CYSH	CYSH	M_PAPS_c + M_RTHIO_c $\longrightarrow$ M_H2SO3_c + M_OTHIO_c + M_PAP_c	
102	R_CYSIJ	CYSIJ	M_H2SO3_c + 3 M_NADPH_c $\rightleftharpoons$ M_H2S_c + 3 M_NADP_c	
103	R_CYSE	CYSE	M_ACCOA_c + M_SER_c $\rightleftharpoons$ M_ASER_c + M_COA_c	
104	R_CYSK	CYSK	M_ASER_c + M_H2S_c $\longrightarrow$ M_AC_c + M_CYS_c	
105	R_ROCF	ROCF	M_ARG_c $\longrightarrow$ M_ORN_c + M_UREA_c	
106	R_DADA	DADA	M_DALA_c + M_FAD_c $\longrightarrow$ M_FADH_c + M_NH3_c + M_PYR_c	
107	R_ALR	ALR	M_ALA_c $\rightleftharpoons$ M_DALA_c	
108	R_ALD	ALD	M_ALA_c + M_NAD_c $\longrightarrow$ M_NADH_c + M_NH3_c + M_PYR_c	
109	R_ASNA	ASNA	M_ASP_c + M_ATP_c + M_NH3_c $\longrightarrow$ M_AMP_c + M_ASN_c + M_PPI_c	
110	R_ANSB	ANSB	M_ASN_c $\longrightarrow$ M_ASP_c + M_NH3_c	

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111	R_PYRA	PYRA	2 M_ATP_c + M_CO2_c + M_GLN_c ⟶ 2 M_ADP_c + M_CAP_c + M_GLU_c + M_PI_c	
112	R_PYRB	PYRB	M_ASP_c + M_CAP_c ⟶ M_CAASP_c + M_PI_c	
113	R_PYRC	PYRC	M_CAASP_c ⇌ M_DOROA_c	
114	R_PYRD	PYRD	M_DOROA_c + M_MK_c ⇌ M_MKH2_c + M_OROA_c	
115	R_PYRE	PYRE	M_OROA_c + M_PRPP_c ⇌ M_OMP_c + M_PPI_c	
116	R_PYRF	PYRF	M_OMP_c ⟶ M_CO2_c + M_UMP_c	
117	R_PYRH	PYRH	M_ATP_c + M_UMP_c ⇌ M_ADP_c + M_UDP_c	
118	R_CMKA	CMKA	M_ATP_c + M_CMP_c ⇌ M_ADP_c + M_CDP_c	
119	R_PYRG	PYRG	M_ATP_c + M_GLN_c + M_UTP_c ⟶ M_ADP_c + M_CTP_c + M_GLU_c + M_PI_c	
120	R_UPP	UPP	M_PRPP_c + M_URA_c ⟶ M_PPI_c + M_UMP_c	
121	R_PURA	PURA	M_ASP_c + M_GTP_c + M_IMP_c ⟶ M_ASUC_c + M_GDP_c + M_PI_c	
122	R_PURB	PURB	M_ASUC_c ⇌ M_AMP_c + M_FUM_c	
123	R_GUAB	GUAB	M_IMP_c + M_NAD_c ⟶ M_NADH_c + M_XMP_c	
124	R_GUAA	GUAA	M_ATP_c + M_GLN_c + M_XMP_c ⟶ M_AMP_c + M_GLU_c + M_GMP_c + M_PPI_c	
125	R_GUAC	GUAC	M_GMP_c + M_NADPH_c ⟶ M_IMP_c + M_NADP_c + M_NH3_c	
126	R_PURD	PURD	M_ATP_c + M_GLY_c + M_PRAM_c ⇌ M_ADP_c + M_GAR_c + M_PI_c	
127	R_NDK1	NDK1	M_ATP_c + M_GDP_c ⇌ M_ADP_c + M_GTP_c	
128	R_NDK2	NDK2	M_ATP_c + M_UDP_c ⇌ M_ADP_c + M_UTP_c	

№	Id	Name	Reaction Equation	SBO
129	R_NDK3	NDK3	M_ATP_c + M_CDP_c $\rightleftharpoons$ M_ADP_c + M_CTP_c	
130	R_NDK4	NDK4	M_ATP_c + M_DGDP_c $\rightleftharpoons$ M_ADP_c + M_DGTP_c	
131	R_NDK5	NDK5	M_ATP_c + M_DUDP_c $\rightleftharpoons$ M_ADP_c + M_DUTP_c	
132	R_NDK6	NDK6	M_ATP_c + M_DCDP_c $\rightleftharpoons$ M_ADP_c + M_DCTP_c	
133	R_NDK7	NDK7	M_ATP_c + M_DADP_c $\rightleftharpoons$ M_ADP_c + M_DATP_c	
134	R_NDK8	NDK8	M_ATP_c + M_DTDP_c $\rightleftharpoons$ M_ADP_c + M_DTTP_c	
135	R_THYA	THYA	M_DUMP_c + M_METTHF_c $\longrightarrow$ M_DHF_c + M_DTMP_c	
136	R_TDK1	TDK1	M_ATP_c + M_DT_c $\longrightarrow$ M_ADP_c + M_DTMP_c	
137	R_TDK2	TDK2	M_ATP_c + M_DU_c $\longrightarrow$ M_ADP_c + M_DUMP_c	
138	R_TMK1	TMK1	M_ATP_c + M_DTMP_c $\rightleftharpoons$ M_ADP_c + M_DTDP_c	
139	R_TMK2	TMK2	M_ATP_c + M_DUMP_c $\rightleftharpoons$ M_ADP_c + M_DUDP_c	
140	R_DCD	DCD	M_DCTP_c $\longrightarrow$ M_DUTP_c + M_NH3_c	
141	R_DUT	DUT	M_DUTP_c $\longrightarrow$ M_DUMP_c + M_PPI_c	
142	R_ADK1	ADK1	M_AMP_c + M_ATP_c $\rightleftharpoons$ 2 M_ADP_c	
143	R_ADK2	ADK2	M_ATP_c + M_DAMP_c $\rightleftharpoons$ M_ADP_c + M_DADP_c	
144	R_GMK1	GMK1	M_ATP_c + M_GMP_c $\rightleftharpoons$ M_ADP_c + M_GDP_c	
145	R_GMK2	GMK2	M_ATP_c + M_DGMP_c $\rightleftharpoons$ M_ADP_c + M_DGDP_c	
146	R_APT	APT	M_AD_c + M_PRPP_c $\longrightarrow$ M_AMP_c + M_PPI_c	

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147	R_NRDAB1	NRDAB1	M_CDP_c + M_RTHIO_c ⟶ M_DCDP_c + M_OTHIO_c	
148	R_NRDAB2	NRDAB2	M_RTHIO_c + M_UDP_c ⟶ M_DUDP_c + M_OTHIO_c	
149	R_NRDAB3	NRDAB3	M_ADP_c + M_RTHIO_c ⟶ M_DADP_c + M_OTHIO_c	
150	R_NRDAB4	NRDAB4	M_GDP_c + M_RTHIO_c ⟶ M_DGDP_c + M_OTHIO_c	
151	R_TRXB	TRXB	M_NADPH_c + M_OTHIO_c ⟶ M_NADP_c + M_RTHIO_c	
152	R_DEOD1	DEOD1	M_DIN_c + M_PI_c ⇌ M_DR1P_c + M_HYXN_c	
153	R_DEOD2	DEOD2	M_DA_c + M_PI_c ⇌ M_AD_c + M_DR1P_c	
154	R_DEOD3	DEOD3	M_DG_c + M_PI_c ⇌ M_DR1P_c + M_GN_c	
155	R_DEOD4	DEOD4	M_HYXN_c + M_R1P_c ⇌ M_INS_c + M_PI_c	
156	R_DEOD5	DEOD5	M_AD_c + M_R1P_c ⇌ M_ADN_c + M_PI_c	
157	R_DEOD6	DEOD6	M_GN_c + M_R1P_c ⇌ M_GSN_c + M_PI_c	
158	R_DEOD7	DEOD7	M_R1P_c + M_XAN_c ⇌ M_PI_c + M_XTSN_c	
159	R_DEOD8	DEOD8	M_DU_c + M_PI_c ⇌ M_DR1P_c + M_URA_c	
160	R_GPT1	GPT1	M_PRPP_c + M_XAN_c ⟶ M_PPI_c + M_XMP_c	
161	R_GPT2	GPT2	M_HYXN_c + M_PRPP_c ⟶ M_IMP_c + M_PPI_c	
162	R_GPT3	GPT3	M_GN_c + M_PRPP_c ⟶ M_GMP_c + M_PPI_c	
163	R_DEOB1	DEOB1	M_DR1P_c ⇌ M_DR5P_c	
164	R_DEOB2	DEOB2	M_R1P_c ⇌ M_R5P_c	
165	R_ADNUC	ADNUC	M_ADN_c ⟶ M_AD_c + M_RIB_c	
166	R_GNNUC	GNNUC	M_GSN_c ⟶ M_GN_c + M_RIB_c	
167	R_ADDM	ADDM	M_AD_c ⟶ M_HYXN_c + M_NH3_c	
168	R_ACCABCD	ACCABCD	M_ACCOA_c + M_ATP_c + M_CO2_c ⇌ M_ADP_c + M_MALCOA_c + M_PI_c	

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169	R_FABD	FABD	M_ACP_c + M_MALCOA_c $\rightleftharpoons$ M_COA_c + M_MALACP_c	
170	R_FABH1	FABH1	M_ACCOA_c + M_ACP_c $\rightleftharpoons$ M_ACACP_c + M_COA_c	
171	R_FABH2	FABH2	M_ACCOA_c + M_MALACP_c $\longrightarrow$ M_ACTACP_c + M_CO2_c + M_COA_c	
172	R_FABF	FABF	M_ACACP_c + M_MALACP_c $\longrightarrow$ M_ACP_c + M_ACTACP_c + M_CO2_c	
173	R_C120SN	C120SN	M_ACTACP_c + 4 M_MALACP_c + 8 M_NADPH_c $\longrightarrow$ 4 M_ACP_c + M_C120ACP_c + 4 M_CO2_c + 8 M_NADP_c	
174	R_C140SN	C140SN	M_ACTACP_c + 5 M_MALACP_c + 10 M_NADPH_c $\longrightarrow$ 5 M_ACP_c + M_C140ACP_c + 5 M_CO2_c + 10 M_NADP_c	
175	R_C141SY	C141SY	M_ACTACP_c + 5 M_MALACP_c + 9 M_NADPH_c $\longrightarrow$ 5 M_ACP_c + M_C141ACP_c + 5 M_CO2_c + 9 M_NADP_c	
176	R_C160SN	C160SN	M_ACTACP_c + 6 M_MALACP_c + 12 M_NADPH_c $\longrightarrow$ 6 M_ACP_c + M_C160ACP_c + 6 M_CO2_c + 12 M_NADP_c	
177	R_C161SY	C161SY	M_ACTACP_c + 6 M_MALACP_c + 11 M_NADPH_c $\longrightarrow$ 6 M_ACP_c + M_C161ACP_c + 6 M_CO2_c + 11 M_NADP_c	
178	R_C181SY	C181SY	M_ACTACP_c + 7 M_MALACP_c + 13 M_NADPH_c $\longrightarrow$ 7 M_ACP_c + M_C181ACP_c + 7 M_CO2_c + 13 M_NADP_c	
179	R_GPSA	GPSA	M_GL3P_c + M_NADP_c $\rightleftharpoons$ M_NADPH_c + M_T3P2_c	

№	Id	Name	Reaction Equation	SBO
180	R_PLS	PLS	$0 \cdot 035$ M_C140ACP_c + $0 \cdot 102$ M_C141ACP_c + $0 \cdot 717$ M_C160ACP_c + $0 \cdot 142$ M_C161ACP_c + $1 \cdot 004$ M_C181ACP_c + M_GL3P_c $\longrightarrow$ 2 M_ACP_c + M_PA_c	
181	R_CDSA	CDSA	M_CTP_c + M_PA_c $\rightleftharpoons$ M_CDPDG_c + M_PPI_c	
182	R_CDH	CDH	M_CDPDG_c $\longrightarrow$ M_CMP_c + M_PA_c	
183	R_PSSA	PSSA	M_CDPDG_c + M_SER_c $\rightleftharpoons$ M_CMP_c + M_PS_c	
184	R_PSD	PSD	M_PS_c $\longrightarrow$ M_CO2_c + M_PE_c	
185	R_PGSA2	PGSA2	M_CDPDG_c + M_GL3P_c $\rightleftharpoons$ M_CMP_c + M_PGP_c	
186	R_PGPP	PGPP	M_PGP_c $\longrightarrow$ M_PG_c + M_PI_c	
187	R_DGKA	DGKA	M_ATP_c + M_DGR_c $\longrightarrow$ M_ADP_c + M_PA_c	
188	R_GLMS	GLMS	M_F6P_c + M_GLN_c $\longrightarrow$ M_GA6P_c + M_GLU_c	
189	R_GLMM	GLMM	M_GA6P_c $\rightleftharpoons$ M_GA1P_c	
190	R_GLMU	GLMU	M_ACCOA_c + M_GA1P_c + M_UTP_c $\longrightarrow$ M_COA_c + M_PPI_c + M_UDPNAG_c	
191	R_MURZ	MURZ	M_PEP_c + M_UDPNAG_c $\longrightarrow$ M_PI_c + M_UDPNAGEP_c	
192	R_MURB	MURB	M_NADPH_c + M_UDPNAGEP_c $\longrightarrow$ M_NADP_c + M_UDPNAM_c	
193	R_MURC	MURC	M_ALA_c + M_ATP_c + M_UDPNAM_c $\longrightarrow$ M_ADP_c + M_PI_c + M_UDPNAMA_c	
194	R_MURD	MURD	M_ATP_c + M_DGLU_c + M_UDPNAMA_c $\longrightarrow$ M_ADP_c + M_PI_c + M_UDPNAMAG_c	

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195	R_MURE	MURE	M_ATP_c + M_MDAP_c + M_UDPNAMAG_c ⟶ M_ADP_c + M_PI_c + M_UNAGD_c	
196	R_MURF	MURF	M_AA_c + M_ATP_c + M_UNAGD_c ⟶ M_ADP_c + M_PI_c + M_UNAGDA_c	
197	R_GLR	GLR	M_GLU_c ⇌ M_DGLU_c	
198	R_DDLA	DDLA	2 M_DALA_c ⇌ M_AA_c	
199	R_MRAY	MRAY	M_UNAGDA_c ⟶ M_PI_c + M_UMP_c + M_UNPTDO_c	
200	R_MURG	MURG	M_UDPNAG_c + M_UNPTDO_c ⟶ M_PEPTIDO_c + M_UDP_c	
201	R_LPXA	LPXA	M_C140ACP_c + M_UDPNAG_c ⟶ M_ACP_c + M_UDPG2AA_c	
202	R_ENVA	ENVA	M_UDPG2AA_c ⟶ M_AC_c + M_UDPG2A_c	
203	R_LPXD	LPXD	M_C140ACP_c + M_UDPG2A_c ⟶ M_ACP_c + M_UDPG23A_c	
204	R_USHA12	USHA12	M_UDPG23A_c ⟶ M_LIPX_c + M_UMP_c	
205	R_LPXB	LPXB	M_LIPX_c + M_UDPG23A_c ⟶ M_DISAC1P_c + M_UDP_c	
206	R_LPXK	LPXK	M_ATP_c + M_DISAC1P_c ⟶ M_ADP_c + M_LIPIV_c	
207	R_KDTA1	KDTA1	M_CMPKDO_c + M_LIPIV_c ⟶ M_CMP_c + M_KDOLIPIV_c	
208	R_KDOLIPH	KDOLIPH	M_ATP_c + M_KDOLIPIV_c ⟶ M_ADP_c + M_KDOLIPVP_c	
209	R_HTRB	HTRB	M_C120ACP_c + M_C140ACP_c + M_KDOLIPVP_c ⟶ 2 M_ACP_c + M_LIPA_c	

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210	R_MSBB	MSBB	M_C120ACP_c + M_C140ACP_c + M_KDOLIPVP_c $\longrightarrow$ 2 M_ACP_c + M_LIPA_c	
211	R_A5PISO	A5PISO	M_RL5P_c $\rightleftharpoons$ M_A5P_c	
212	R_KDSA	KDSA	M_A5P_c + M_PEP_c $\longrightarrow$ M_KDOP_c + M_PI_c	
213	R_KDOPH	KDOPH	M_KDOP_c $\longrightarrow$ M_KDO_c + M_PI_c	
214	R_KDSB	KDSB	M_CTP_c + M_KDO_c $\longrightarrow$ M_CMPKDO_c + M_PPI_c	
215	R_PAPHTSE	PAPHTSE	M_CMP_c + M_PE_c $\rightleftharpoons$ M_CDPETN_c + M_DGR_c	
216	R_GMHA	GMHA	M_ATP_c + M_S7P_c $\longrightarrow$ M_ADPHEP_c + M_PPI_c	
217	R_LPSSYN	LPSSYN	3 M_ADPHEP_c + 2 M_CDPETN_c + 3 M_CMPKDO_c + M_LIPA_c + 2 M_UDPG_c $\longrightarrow$ 3 M_ADP_c + 2 M_CDP_c + 3 M_CMP_c + M_LPS_c + 2 M_UDP_c	
218	R_BIOF	BIOF	M_ALA_c + M_CHCOA_c $\rightleftharpoons$ M_AONA_c + M_CO2_c + M_COA_c	
219	R_BIOA	BIOA	M_AONA_c + M_SAM_c $\rightleftharpoons$ M_DANNA_c + M_SAMOB_c	
220	R_BIOD	BIOD	M_ATP_c + M_CO2_c + M_DANNA_c $\rightleftharpoons$ M_ADP_c + M_DTB_c + M_PI_c	
221	R_BIOB	BIOB	M_DTB_c + 2 M_NADPH_c + 2 M_SAM_c $\longrightarrow$ M_BT_c + 2 M_DA_c + 2 M_MET_c + 2 M_NADP_c	
222	R_FOLE	FOLE	M_GTP_c $\longrightarrow$ M_AHTD_c + M_FOR_c	
223	R_DNTPH	DNTPH	M_AHTD_c $\longrightarrow$ M_DHPP_c + M_PPI_c	
224	R_DHPPH	DHPPH	M_DHPP_c $\longrightarrow$ M_DHP_c + M_PI_c	
225	R_FOLB	FOLB	M_DHP_c $\longrightarrow$ M_AHHMP_c + M_GLAL_c	

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226	R_FOLK	FOLK	M_AHHMP_c + M_ATP_c ⟶ M_AHHMD_c + M_AMP_c	
227	R_PABB	PABB	M_CHOR_c + M_NH3_c ⟶ M_ADCHOR_c	
228	R_PABC	PABC	M_ADCHOR_c ⟶ M_PABA_c + M_PYR_c	
229	R_FOLP	FOLP	M_AHHMD_c + M_PABA_c ⟶ M_DHPT_c + M_PPI_c	
230	R_FOLC	FOLC	M_ATP_c + M_DHPT_c + M_GLU_c ⟶ M_ADP_c + M_DHF_c + M_PI_c	
231	R_FOLA	FOLA	M_DHF_c + M_NADPH_c ⟶ M_NADP_c + M_THF_c	
232	R_PURU	PURU	M_FTHF_c ⟶ M_FOR_c + M_THF_c	
233	R_FMT	FMT	M_FTHF_c ⟶ M_FOR_c + M_THF_c	
234	R_FOLD1	FOLD1	M_METTHF_c + M_NADP_c ⇌ M_METHF_c + M_NADPH_c	
235	R_FOLD2	FOLD2	M_METHF_c ⇌ M_FTHF_c	
236	R_METF	METF	M_METTHF_c + M_NADH_c ⟶ M_MTHF_c + M_NAD_c	
237	R_GLTX	GLTX	M_ATP_c + M_GLU_c ⟶ M_AMP_c + M_GTRNA_c + M_PPI_c	
238	R_HEMA	HEMA	M_GTRNA_c + M_NADPH_c ⟶ M_GSA_c + M_NADP_c	
239	R_HEML	HEML	M_GSA_c ⟶ M_ALAV_c	
240	R_HEMB	HEMB	8 M_ALAV_c ⟶ 4 M_PBG_c	
241	R_HEMC	HEMC	4 M_PBG_c ⟶ M_HMB_c + 4 M_NH3_c	
242	R_HEMD	HEMD	M_HMB_c ⟶ M_UPRG_c	
243	R_HEME	HEME	M_UPRG_c ⟶ 4 M_CO2_c + M_CPP_c	
244	R_HEMF	HEMF	M_CPP_c + M_O2_c ⟶ 2 M_CO2_c + M_PPHG_c	
245	R_HEMG	HEMG	M_O2_c + M_PPHG_c ⟶ M_PPIX_c	
246	R_HEMH	HEMH	M_PPIX_c ⟶ M_PTH_c	

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247	R_UBIA	UBIA	M_4HBZ_c + M_OPP_c ⟶ M_O4HBZ_c + M_PPI_c	
248	R_RIBA	RIBA	M_GTP_c ⟶ M_D6RP5P_c + M_FOR_c + M_PPI_c	
249	R_RIBD1	RIBD1	M_D6RP5P_c ⟶ M_A6RP5P_c + M_NH3_c	
250	R_RIBD2	RIBD2	M_A6RP5P_c + M_NADPH_c ⟶ M_A6RP5P2_c + M_NADP_c	
251	R_PMDPHT	PMDPHT	M_A6RP5P2_c ⟶ M_A6RP_c + M_PI_c	
252	R_RIBB	RIBB	M_RL5P_c ⟶ M_DB4P_c + M_FOR_c	
253	R_RIBE	RIBE	M_A6RP_c + M_DB4P_c ⟶ M_D8RL_c + M_PI_c	
254	R_RIBC	RIBC	2 M_D8RL_c ⟶ M_A6RP_c + M_RIBFLV_c	
255	R_RIBF1	RIBF1	M_ATP_c + M_RIBFLV_c ⟶ M_ADP_c + M_FMN_c	
256	R_RIBF2	RIBF2	M_ATP_c + M_FMN_c ⟶ M_FAD_c + M_PPI_c	
257	R_PANB	PANB	M_METTHF_c + M_OIVAL_c ⟶ M_AKP_c + M_THF_c	
258	R_ILVC3	ILVC3	M_AKP_c + M_NADPH_c ⟶ M_NADP_c + M_PANT_c	
259	R_PAND	PAND	M_ASP_c ⟶ M_CO2_c + M_bALA_c	
260	R_PANC	PANC	M_ATP_c + M_PANT_c + M_bALA_c ⟶ M_AMP_c + M_PNTO_c + M_PPI_c	
261	R_COAA	COAA	M_ATP_c + M_PNTO_c ⟶ M_4PPNTO_c + M_ADP_c	
262	R_PCLIG	PCLIG	M_4PPNTO_c + M_CTP_c + M_CYS_c ⟶ M_4PPNCYS_c + M_CMP_c + M_PPI_c	
263	R_PCDCL	PCDCL	M_4PPNCYS_c ⟶ M_4PPNTE_c + M_CO2_c	

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264	R_PATRAN	PATRAN	M_4PPNTE_c + M_ATP_c ⟶ M_DPCOA_c + M_PPI_c	
265	R_DPHCOAK	DPHCOAK	M_ATP_c + M_DPCOA_c ⟶ M_ADP_c + M_COA_c	
266	R_ACPS	ACPS	M_COA_c ⟶ M_ACP_c + M_PAP_c	
267	R_BISPHDS	BISPHDS	M_PAP_c ⟶ M_AMP_c + M_PI_c	
268	R_IPPPSYN	IPPPSYN	M_ATP_c + 2 M_NADPH_c + M_PYR_c + M_T3P1_c ⟶ M_ADP_c + M_CO2_c + M_IPPP_c + 2 M_NADP_c	
269	R_IPPPISO	IPPPISO	M_IPPP_c ⟶ M_DMPP_c	
270	R_ISPA1	ISPA1	M_DMPP_c + M_IPPP_c ⟶ M_GPP_c + M_PPI_c	
271	R_ISPA2	ISPA2	M_GPP_c + M_IPPP_c ⟶ M_FPP_c + M_PPI_c	
272	R_ISPB	ISPB	M_FPP_c + 5 M_IPPP_c ⟶ M_OPP_c + 5 M_PPI_c	
273	R_UPPS	UPPS	M_FPP_c + 8 M_IPPP_c ⟶ 8 M_PPI_c + M_UDPP_c	
274	R_NADB	NADB	M_ASP_c + M_FAD_c ⟶ M_FADH_c + M_ISUCC_c	
275	R_NADA	NADA	M_ISUCC_c + M_T3P2_c ⟶ M_PI_c + M_QA_c	
276	R_NADC	NADC	M_PRPP_c + M_QA_c ⟶ M_CO2_c + M_NAMN_c + M_PPI_c	
277	R_NADD	NADD	M_ATP_c + M_NAMN_c ⟶ M_NAAD_c + M_PPI_c	
278	R_NADE	NADE	M_ATP_c + M_NAAD_c + M_NH3_c ⟶ M_AMP_c + M_NAD_c + M_PPI_c	
279	R_NADFG	NADFG	M_ATP_c + M_NAD_c ⟶ M_ADP_c + M_NADP_c	
280	R_THIM	THIM	M_ATP_c + M_THZ_c ⟶ M_ADP_c + M_THZP_c	
281	R_UNKRXN1	UNKRXN1	M_PYR_c + M_T3P1_c ⟶ M_DTP_c	
282	R_THID	THID	M_AHMP_c + M_ATP_c ⟶ M_ADP_c + M_AHMPP_c	

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283	R_THIB	THIB	M_AHMPP_c + M_THZP_c ⟶ M_PPI_c + M_THMP_c	
284	R_THIF	THIF	M_CYS_c + M_DTP_c + M_TYR_c ⟶ M_CO2_c + M_HBA_c + M_THZ_c	
285	R_MENF	MENF	M_CHOR_c ⟶ M_ICHOR_c	
286	R_MEND1	MEND1	M_AKG_c + M_TPP_c ⟶ M_CO2_c + M_SSALTPP_c	
287	R_MEND2	MEND2	M_ICHOR_c + M_SSALTPP_c ⟶ M_PYR_c + M_SHCHC_c + M_TPP_c	
288	R_MENC	MENC	M_SHCHC_c ⟶ M_OSB_c	
289	R_MENE	MENE	M_ATP_c + M_COA_c + M_OSB_c ⟶ M_AMP_c + M_OSBCOA_c + M_PPI_c	
290	R_MENB	MENB	M_OSBCOA_c ⟶ M_COA_c + M_DHNA_c	
291	R_MENA	MENA	M_DHNA_c + M_OPP_c ⟶ M_CO2_c + M_DMK_c + M_PPI_c	
292	R_MENG	MENG	M_DMK_c + M_SAM_c ⟶ M_MK_c + M_SAH_c	
293	R_DPEPTP	DPEPTP	M_ATP_c + M_DIPEP_e ⟶ M_ADP_c + M_DIPEP_c + M_PI_c	
294	R_OPEPTP	OPEPTP	M_ATP_c + M_OPEP_e ⟶ M_ADP_c + M_OPEP_c + M_PI_c	
295	R_SERTP	SERTP	M_HEXT_c + M_SER_e ⟷ M_SER_c	
296	R_ADHE2	ADHE2	M_ACCOA_c + 2 M_NADH_c ⟷ M_COA_c + M_ETH_c + 2 M_NAD_c	
297	R_ETHTP	ETHTP	M_ETH_e + M_HEXT_c ⟷ M_ETH_c	
298	R_PTA	PTA	M_ACCOA_c + M_PI_c ⟷ M_ACTP_c + M_COA_c	
299	R_ACKA	ACKA	M_ACTP_c + M_ADP_c ⟷ M_AC_c + M_ATP_c	

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300	R_ACOE	ACOE	M_AC_c + M_ATP_c + M_COA_c ⟶ M_ACCOA_c + M_AMP_c + M_PPI_c	
301	R_ACTP	ACTP	M_AC_e + M_HEXT_c ⇌ M_AC_c	
302	R_GALE	GALE	M_UDPGAL_c ⇌ M_UDPG_c	
303	R_GALU	GALU	M_G1P_c + M_UTP_c ⇌ M_PPI_c + M_UDPG_c	
304	R_ALGC1	ALGC1	M_G6P_c ⇌ M_G1P_c	
305	R_GLACTP	GLACTP	M_GLAC_e + M_HEXT_c ⟶ M_GLAC_c	
306	R_GLCTP	GLCTP	M_GLC_e + M_HEXT_c ⟶ M_GLC_c	
307	R_GLK1	GLK1	M_ATP_c + M_GLC_c ⟶ M_ADP_c + M_G6P_c	
308	R_GLK2	GLK2	M_ATP_c + M_MAN_c ⟶ M_ADP_c + M_MAN6P_c	
309	R_PMI	PMI	M_MAN6P_c ⇌ M_F6P_c	
310	R_PROTP1	PROTP1	M_NA_e + M_PRO_e ⇌ M_NA_c + M_PRO_c	
311	R_PROTP2	PROTP2	M_ATP_c + M_PRO_e ⟶ M_ADP_c + M_PI_c + M_PRO_c	
312	R_PROTP3	PROTP3	M_HEXT_c + M_PRO_e ⇌ M_PRO_c	
313	R_LACTP	LACTP	M_HEXT_c + M_LAC_e ⇌ M_LAC_c	
314	R_DLD	DLD	M_LAC_c + M_MK_c ⇌ M_MKH2_c + M_PYR_c	
315	R_GLNTP	GLNTP	M_ATP_c + M_GLN_e ⟶ M_ADP_c + M_GLN_c + M_PI_c	
316	R_GLTTP	GLTTP	M_GLU_e + M_HEXT_c ⇌ M_GLU_c	
317	R_ALATP	ALATP	M_ALA_e + M_HEXT_c ⟶ M_ALA_c	
318	R_DALATP	DALATP	M_DALA_e + M_HEXT_c ⟶ M_DALA_c	
319	R_GLYTP2	GLYTP2	M_GLY_e + M_HEXT_c ⟶ M_GLY_c	
320	R_DSERTP	DSERTP	M_DSER_e + M_HEXT_c ⟶ M_DSER_c	
321	R_ORNTP	ORNTP	M_HEXT_c + M_ORN_e ⇌ M_ORN_c	
322	R_ARGTP	ARGTP	M_ARG_e + M_HEXT_c ⇌ M_ARG_c	
323	R_NATP	NATP	M_NA_e ⇌ M_HEXT_c + M_NA_c	

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324	R_SUCTP	SUCTP	M_HEXT_c + M_SUCC_e $\rightleftharpoons$ M_SUCC_c	
325	R_FUMTP	FUMTP	M_FUM_e + M_HEXT_c $\rightleftharpoons$ M_FUM_c	
326	R_MALTP	MALTP	M_HEXT_c + M_MAL_e $\rightleftharpoons$ M_MAL_c	
327	R_ASPTP	ASPTP	M_ASP_e + M_HEXT_c $\rightleftharpoons$ M_ASP_c	
328	R_NUPCTP1	NUPCTP1	M_ADN_e + M_HEXT_c $\longrightarrow$ M_ADN_c	
329	R_NUPCTP2	NUPCTP2	M_HEXT_c + M_URI_e $\longrightarrow$ M_URI_c	
330	R_NUPCTP3	NUPCTP3	M_CYTD_e + M_HEXT_c $\longrightarrow$ M_CYTD_c	
331	R_NUPCTP4	NUPCTP4	M_DT_e + M_HEXT_c $\longrightarrow$ M_DT_c	
332	R_NUPCTP5	NUPCTP5	M_DA_e + M_HEXT_c $\longrightarrow$ M_DA_c	
333	R_NUPCTP6	NUPCTP6	M_DC_e + M_HEXT_c $\longrightarrow$ M_DC_c	
334	R_NUPCTP7	NUPCTP7	M_DU_e + M_HEXT_c $\longrightarrow$ M_DU_c	
335	R_FRDO	FRDO	M_FERDXH_c + M_NADP_c $\longrightarrow$ M_FERDX_c + M_NADPH_c	
336	R_FLDO	FLDO	M_FLVDXH_c + M_NADP_c $\longrightarrow$ M_FLVDX_c + M_NADPH_c	
337	R_NDH__1	NDH-1	M_MK_c + M_NADPH_c $\longrightarrow$ 2 M_HEXT_c + M_MKH2_c + M_NADP_c	
338	R_FADOX	FADOX	M_FADH_c + M_MK_c $\longrightarrow$ M_FAD_c + M_MKH2_c	
339	R_CBB3O	CBB3O	M_MKH2_c + 0 · 5 M_O2_c $\longrightarrow$ 2 M_HEXT_c + M_MK_c	
340	R_BC1O	BC1O	M_MKH2_c + 0 · 5 M_O2_c $\longrightarrow$ 2 M_HEXT_c + M_MK_c	
341	R_HYDA	HYDA	M_H2_e + M_MK_c $\longrightarrow$ 2 M_HEXT_c + M_MKH2_c	
342	R_ATPA	ATPA	M_ADP_c + 4 M_HEXT_c + M_PI_c $\rightleftharpoons$ M_ATP_c	
343	R_KGTP	KGTP	M_AKG_e + M_HEXT_c $\rightleftharpoons$ M_AKG_c	
344	R_NARK	NARK	M_NO2_c $\longrightarrow$ M_NO2_e	
345	R_NMNTP	NMNTP	M_HEXT_c + M_NMN_e $\longrightarrow$ M_NMN_c	

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346	R_VALTP	VALTP	M_ATP_c + M_VAL_e ⟶ M_ADP_c + M_PI_c + M_VAL_c	
347	R_ILETP	ILETP	M_ATP_c + M_ILE_e ⟶ M_ADP_c + M_ILE_c + M_PI_c	
348	R_LEUTP	LEUTP	M_ATP_c + M_LEU_e ⟶ M_ADP_c + M_LEU_c + M_PI_c	
349	R_ASNTP	ASNTP	M_ASN_e + M_ATP_c ⟶ M_ADP_c + M_ASN_c + M_PI_c	
350	R_THIAMTP	THIAMTP	M_ATP_c + M_THIAM_e ⟶ M_ADP_c + M_PI_c + M_THIAMIN_c	
351	R_PITTP	PITTP	M_HEXT_c + M_PI_e ⟷ M_PI_c	
352	R_O2TP	O2TP	M_O2_e ⟷ M_O2_c	
353	R_CO2TP	CO2TP	M_CO2_e ⟷ M_CO2_c	
354	R_UREATP	UREATP	M_UREA_e ⟷ M_UREA_c	
355	R_ADTP	ADTP	M_AD_e + M_HEXT_c ⟶ M_AD_c	
356	R_FORTR	FORTR	M_FOR_e ⟷ M_FOR_c	
357	R_GNTP	GNTP	M_GN_e ⟷ M_GN_c	
358	R_GSNTP	GSNTP	M_GSN_e + M_HEXT_c ⟶ M_GSN_c	
359	R_HYXNTP	HYXNTP	M_HYXN_e ⟷ M_HYXN_c	
360	R_OROATP	OROATP	M_HEXT_c + M_OROA_e ⟶ M_OROA_c	
361	R_URATP	URATP	M_HEXT_c + M_URA_e ⟶ M_URA_c	
362	R_NH3TP	NH3TP	M_HEXT_c + M_NH3_e ⟷ M_NH3_c	
363	R_PYRT	PYRT	M_HEXT_c + M_PYR_e ⟷ M_PYR_c	
364	R_UREASE	UREASE	M_UREA_c ⟶ M_CO2_c + 2 M_NH3_c	
365	R_SLFTP	SLFTP	M_ATP_c + M_SLF_e ⟶ M_ADP_c + M_PI_c + M_SLF_c	
366	R_CYSTP	CYSTP	M_ATP_c + M_CYS_e ⟶ M_ADP_c + M_CYS_c + M_PI_c	

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367	R_HISTP	HISTP	M_ATP_c + M_HIS_e ⟶ M_ADP_c + M_HIS_c + M_PI_c	
368	R_LYSTP	LYSTP	M_HEXT_c + M_LYS_e ⇌ M_LYS_c	
369	R_METTP	METTP	M_ATP_c + M_MET_e ⟶ M_ADP_c + M_MET_c + M_PI_c	
370	R_PHETP	PHETP	M_HEXT_c + M_PHE_e ⇌ M_PHE_c	
371	R_THRTP	THRTP	M_HEXT_c + M_THR_e ⇌ M_THR_c	
372	R_TRPTP	TRPTP	M_HEXT_c + M_TRP_e ⇌ M_TRP_c	
373	R_TYRTP	TYRTP	M_HEXT_c + M_TYR_e ⇌ M_TYR_c	
374	R_AACTP	AACTP	M_AAC_e + M_HEXT_c ⇌ M_AAC_c	
375	R_BCRBTP	BCRBTP	M_H2CO3_e ⇌ M_H2CO3_c	
376	R_ICFA	ICFA	M_CO2_c ⇌ M_H2CO3_c	
377	R_GLYCLTP	GLYCLTP	M_GLYCL_e ⇌ M_GLYCL_c	
378	R_GLCD	GLCD	M_GLYCL_c + M_O2_c ⟶ M_GLX_c + M_H2O2_c	
379	R_GLLDH	GLLDH	M_GLAL_c + M_NAD_c ⇌ M_GLYCL_c + M_NADH_c	
380	R_GLALTP	GLALTP	M_GLAL_c ⇌ M_GLAL_e	
381	R_KATA	KATA	M_H2O2_c ⟶ M_O2_c	
382	R_EX_DIPEPxt	EX_DIPEPxt	∅ ⇌ M_DIPEP_e	
383	R_EX_OPEPxt	EX_OPEPxt	∅ ⇌ M_OPEP_e	
384	R_EX_SERxt	EX_SERxt	∅ ⇌ M_SER_e	
385	R_EX_ETHxt	EX_ETHxt	∅ ⇌ M_ETH_e	
386	R_EX_ACxt	EX_ACxt	∅ ⇌ M_AC_e	
387	R_EX_GLACxt	EX_GLACxt	∅ ⇌ M_GLAC_e	
388	R_EX_GLCxt	EX_GLCxt	∅ ⇌ M_GLC_e	
389	R_EX_PROxt	EX_PROxt	∅ ⇌ M_PRO_e	
390	R_EX_NAxt	EX_NAxt	∅ ⇌ M_NA_e	
391	R_EX_LACxt	EX_LACxt	∅ ⇌ M_LAC_e	

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392	R_EX_GLNxt	EX_GLNxt	$\emptyset \rightleftharpoons$ M_GLN_e	
393	R_EX_GLUxt	EX_GLUxt	$\emptyset \rightleftharpoons$ M_GLU_e	
394	R_EX_ALAxt	EX_ALAxt	$\emptyset \rightleftharpoons$ M_ALA_e	
395	R_EX_DALAxt	EX_DALAxt	$\emptyset \rightleftharpoons$ M_DALA_e	
396	R_EX_GLYxt	EX_GLYxt	$\emptyset \rightleftharpoons$ M_GLY_e	
397	R_EX_DSERxt	EX_DSERxt	$\emptyset \rightleftharpoons$ M_DSER_e	
398	R_EX_ORNxt	EX_ORNxt	$\emptyset \rightleftharpoons$ M_ORN_e	
399	R_EX_ARGxt	EX_ARGxt	$\emptyset \rightleftharpoons$ M_ARG_e	
400	R_EX_SUCCxt	EX_SUCCxt	$\emptyset \rightleftharpoons$ M_SUCC_e	
401	R_EX_FUMxt	EX_FUMxt	$\emptyset \rightleftharpoons$ M_FUM_e	
402	R_EX_MALxt	EX_MALxt	$\emptyset \rightleftharpoons$ M_MAL_e	
403	R_EX_ASPxt	EX_ASPxt	$\emptyset \rightleftharpoons$ M_ASP_e	
404	R_EX_ADNxt	EX_ADNxt	$\emptyset \rightleftharpoons$ M_ADN_e	
405	R_EX_URIxt	EX_URIxt	$\emptyset \rightleftharpoons$ M_URI_e	
406	R_EX_CYTDxt	EX_CYTDxt	$\emptyset \rightleftharpoons$ M_CYTD_e	
407	R_EX_DTxt	EX_DTxt	$\emptyset \rightleftharpoons$ M_DT_e	
408	R_EX_DAxt	EX_DAxt	$\emptyset \rightleftharpoons$ M_DA_e	
409	R_EX_DCxt	EX_DCxt	$\emptyset \rightleftharpoons$ M_DC_e	
410	R_EX_DUxt	EX_DUxt	$\emptyset \rightleftharpoons$ M_DU_e	
411	R_EX_H2xt	EX_H2xt	$\emptyset \rightleftharpoons$ M_H2_e	
412	R_EX_AKGxt	EX_AKGxt	$\emptyset \rightleftharpoons$ M_AKG_e	
413	R_EX_NO2xt	EX_NO2xt	$\emptyset \rightleftharpoons$ M_NO2_e	
414	R_EX_NMNxt	EX_NMNxt	$\emptyset \rightleftharpoons$ M_NMN_e	
415	R_EX_VALxt	EX_VALxt	$\emptyset \rightleftharpoons$ M_VAL_e	
416	R_EX_ILExt	EX_ILExt	$\emptyset \rightleftharpoons$ M_ILE_e	
417	R_EX_LEUxt	EX_LEUxt	$\emptyset \rightleftharpoons$ M_LEU_e	
418	R_EX_ASNxt	EX_ASNxt	$\emptyset \rightleftharpoons$ M_ASN_e	
419	R_EX_THIAMxt	EX_THIAMxt	$\emptyset \rightleftharpoons$ M_THIAM_e	
420	R_EX_PIxt	EX_PIxt	$\emptyset \rightleftharpoons$ M_PI_e	

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421	R_EX_O2xt	EX_O2xt	$\emptyset \rightleftharpoons$ M_O2_e	
422	R_EX_CO2xt	EX_CO2xt	$\emptyset \rightleftharpoons$ M_CO2_e	
423	R_EX_UREAxt	EX_UREAxt	$\emptyset \rightleftharpoons$ M_UREA_e	
424	R_EX_ADxt	EX_ADxt	$\emptyset \rightleftharpoons$ M_AD_e	
425	R_EX_FORxt	EX_FORxt	$\emptyset \rightleftharpoons$ M_FOR_e	
426	R_EX_GNxt	EX_GNxt	$\emptyset \rightleftharpoons$ M_GN_e	
427	R_EX_GSNxt	EX_GSNxt	$\emptyset \rightleftharpoons$ M_GSN_e	
428	R_EX_HYXNxt	EX_HYXNxt	$\emptyset \rightleftharpoons$ M_HYXN_e	
429	R_EX_OROAxt	EX_OROAxt	$\emptyset \rightleftharpoons$ M_OROA_e	
430	R_EX_URAxt	EX_URAxt	$\emptyset \rightleftharpoons$ M_URA_e	
431	R_EX_NH3xt	EX_NH3xt	$\emptyset \rightleftharpoons$ M_NH3_e	
432	R_EX_PYRxt	EX_PYRxt	$\emptyset \rightleftharpoons$ M_PYR_e	
433	R_EX_SLFxt	EX_SLFxt	$\emptyset \rightleftharpoons$ M_SLF_e	
434	R_EX_CYSxt	EX_CYSxt	$\emptyset \rightleftharpoons$ M_CYS_e	
435	R_EX_HISxt	EX_HISxt	$\emptyset \rightleftharpoons$ M_HIS_e	
436	R_EX_LYSxt	EX_LYSxt	$\emptyset \rightleftharpoons$ M_LYS_e	
437	R_EX_METxt	EX_METxt	$\emptyset \rightleftharpoons$ M_MET_e	
438	R_EX_PHExt	EX_PHExt	$\emptyset \rightleftharpoons$ M_PHE_e	
439	R_EX_THRxt	EX_THRxt	$\emptyset \rightleftharpoons$ M_THR_e	
440	R_EX_TRPxt	EX_TRPxt	$\emptyset \rightleftharpoons$ M_TRP_e	
441	R_EX_TYRxt	EX_TYRxt	$\emptyset \rightleftharpoons$ M_TYR_e	
442	R_EX_AACxt	EX_AACxt	$\emptyset \rightleftharpoons$ M_AAC_e	
443	R_EX_H2CO3xt	EX_H2CO3xt	$\emptyset \rightleftharpoons$ M_H2CO3_e	
444	R_EX_GLYCLxt	EX_GLYCLxt	$\emptyset \rightleftharpoons$ M_GLYCL_e	
445	R_EX_GLALxt	EX_GLALxt	$\emptyset \rightleftharpoons$ M_GLAL_e	

№	Id	Name	Reaction Equation	SBO
446	R_BIOMASS	BIOMASS	M_ACP_c + M_ALA_c + M_ARG_c + M_ASN_c + M_ASP_c + M_ATP_c + M_COA_c + M_CTP_c + M_CYS_c + M_DATP_c + M_DCTP_c + M_DGTP_c + M_DMK_c + M_DTTP_c + M_FAD_c + M_GLN_c + M_GLU_c + M_GLY_c + M_GTP_c + M_HIS_c + M_ILE_c + M_LEU_c + M_LPS_c + M_LYS_c + M_MET_c + M_MK_c + M_MTHF_c + M_NADP_c + M_NAD_c + M_OPP_c + M_PEPTIDO_c + M_PE_c + M_PG_c + M_PHE_c + M_PRO_c + M_PS_c + M_PTH_c + M_PTRC_c + M_SER_c + M_SPMD_c + M_THIAMIN_c + M_THR_c + M_TRP_c + M_TYR_c + M_UDPP_c + M_UTP_c + M_VAL_c $\longrightarrow \emptyset$	
447	R_DM_DTTP	DM_DTTP	M_DTTP_c $\longrightarrow \emptyset$	
448	R_DM_GLN	DM_GLN	M_GLN_c $\longrightarrow \emptyset$	
449	R_DM_ILE	DM_ILE	M_ILE_c $\longrightarrow \emptyset$	
450	R_DM_CTP	DM_CTP	M_CTP_c $\longrightarrow \emptyset$	
451	R_DM_NAD	DM_NAD	M_NAD_c $\longrightarrow \emptyset$	
452	R_DM_DGTP	DM_DGTP	M_DGTP_c $\longrightarrow \emptyset$	
453	R_DM_DATP	DM_DATP	M_DATP_c $\longrightarrow \emptyset$	
454	R_DM_COA	DM_COA	M_COA_c $\longrightarrow \emptyset$	
455	R_DM_GLY	DM_GLY	M_GLY_c $\longrightarrow \emptyset$	
456	R_DM_ACP	DM_ACP	M_ACP_c $\longrightarrow \emptyset$	
457	R_DM_PHE	DM_PHE	M_PHE_c $\longrightarrow \emptyset$	
458	R_DM_ATP	DM_ATP	M_ATP_c $\longrightarrow \emptyset$	
459	R_DM_NADP	DM_NADP	M_NADP_c $\longrightarrow \emptyset$	
460	R_DM_GLU	DM_GLU	M_GLU_c $\longrightarrow \emptyset$	
461	R_DM_CYS	DM_CYS	M_CYS_c $\longrightarrow \emptyset$	

№	Id	Name	Reaction Equation	SBO
462	R_DM_PS	DM_PS	M_PS_c ⟶ ∅	
463	R_DM_HIS	DM_HIS	M_HIS_c ⟶ ∅	
464	R_DM_SER	DM_SER	M_SER_c ⟶ ∅	
465	R_DM_PTH	DM_PTH	M_PTH_c ⟶ ∅	
466	R_DM_PRO	DM_PRO	M_PRO_c ⟶ ∅	
467	R_DM_PEPTIDO	DM_PEPTIDO	M_PEPTIDO_c ⟶ ∅	
468	R_DM_PG	DM_PG	M_PG_c ⟶ ∅	
469	R_DM_UDPP	DM_UDPP	M_UDPP_c ⟶ ∅	
470	R_DM_ASN	DM_ASN	M_ASN_c ⟶ ∅	
471	R_DM_FAD	DM_FAD	M_FAD_c ⟶ ∅	
472	R_DM_DCTP	DM_DCTP	M_DCTP_c ⟶ ∅	
473	R_DM_DMK	DM_DMK	M_DMK_c ⟶ ∅	
474	R_DM_VAL	DM_VAL	M_VAL_c ⟶ ∅	
475	R_DM_PE	DM_PE	M_PE_c ⟶ ∅	
476	R_DM_LPS	DM_LPS	M_LPS_c ⟶ ∅	
477	R_DM_THIAMIN	DM_THIAMIN	M_THIAMIN_c ⟶ ∅	
478	R_DM_THR	DM_THR	M_THR_c ⟶ ∅	
479	R_DM_GTP	DM_GTP	M_GTP_c ⟶ ∅	
480	R_DM_UTP	DM_UTP	M_UTP_c ⟶ ∅	
481	R_DM_ASP	DM_ASP	M_ASP_c ⟶ ∅	
482	R_DM_TRP	DM_TRP	M_TRP_c ⟶ ∅	
483	R_DM_SPMD	DM_SPMD	M_SPMD_c ⟶ ∅	
484	R_DM_OPP	DM_OPP	M_OPP_c ⟶ ∅	
485	R_DM_LYS	DM_LYS	M_LYS_c ⟶ ∅	
486	R_DM_MK	DM_MK	M_MK_c ⟶ ∅	
487	R_DM_ALA	DM_ALA	M_ALA_c ⟶ ∅	
488	R_DM_MTHF	DM_MTHF	M_MTHF_c ⟶ ∅	
489	R_DM_LEU	DM_LEU	M_LEU_c ⟶ ∅	
490	R_DM_ARG	DM_ARG	M_ARG_c ⟶ ∅	

№	Id	Name	Reaction Equation	SBO
491	R_DM_PTRC	DM_PTRC	M_PTRC_c $\longrightarrow \emptyset$	
492	R_DM_TYR	DM_TYR	M_TYR_c $\longrightarrow \emptyset$	
493	R_DM_MET	DM_MET	M_MET_c $\longrightarrow \emptyset$	

6.1 Reaction R_PGI

This is a reversible reaction of one reactant forming one product.

Name PGI

Reaction equation

$$\text{M\_G6P\_c} \rightleftharpoons \text{M\_F6P\_c} \tag{1}$$

Reactant

Table 6: Properties of each reactant.

Id	Name	SBO
M_G6P_c	G6P	

Product

Table 7: Properties of each product.

Id	Name	SBO
M_F6P_c	F6P	

Kinetic Law

$$v_1 = \text{not specified} \tag{2}$$

6.2 Reaction R_FBP

This is an irreversible reaction of one reactant forming two products.

Name FBP

Reaction equation

$$\text{M\_FDP\_c} \longrightarrow \text{M\_F6P\_c} + \text{M\_PI\_c} \tag{3}$$

Reactant

Table 8: Properties of each reactant.

Id	Name	SBO
M_FDP_c	FDP	

Products

Table 9: Properties of each product.

Id	Name	SBO
M_F6P_c	F6P	
M_PI_c	PI	

Kinetic Law

$$v_2 = \text{not specified} \tag{4}$$

6.3 Reaction R_FBA

This is a reversible reaction of one reactant forming two products.

Name FBA

Reaction equation

$$\text{M\_FDP\_c} \rightleftharpoons \text{M\_T3P1\_c} + \text{M\_T3P2\_c} \tag{5}$$

Reactant

Table 10: Properties of each reactant.

Id	Name	SBO
M_FDP_c	FDP	

Products

Table 11: Properties of each product.

Id	Name	SBO
M_T3P1_c	T3P1	
M_T3P2_c	T3P2	

Kinetic Law

$$v_3 = \text{not specified} \tag{6}$$

6.4 Reaction R_TPI

This is a reversible reaction of one reactant forming one product.

Name TPI

Reaction equation

$$\text{M\_T3P2\_c} \rightleftharpoons \text{M\_T3P1\_c} \tag{7}$$

Reactant

Table 12: Properties of each reactant.

Id	Name	SBO
M_T3P2_c	T3P2	

Product

Table 13: Properties of each product.

Id	Name	SBO
M_T3P1_c	T3P1	

Kinetic Law

$$v_4 = \text{not specified} \tag{8}$$

6.5 Reaction R_GAP

This is a reversible reaction of three reactants forming two products.

Name GAP

Reaction equation

$$\text{M\_NAD\_c} + \text{M\_PI\_c} + \text{M\_T3P1\_c} \rightleftharpoons \text{M\_13DPG\_c} + \text{M\_NADH\_c} \tag{9}$$

Reactants

Table 14: Properties of each reactant.

Id	Name	SBO
M_NAD_c	NAD	
M_PI_c	PI	
M_T3P1_c	T3P1	

Products

Table 15: Properties of each product.

Id	Name	SBO
M_13DPG_c	13DPG	
M_NADH_c	NADH	

Kinetic Law

$$v_5 = \text{not specified} \tag{10}$$

6.6 Reaction R_PGK

This is a reversible reaction of two reactants forming two products.

Name PGK

Reaction equation

$$\text{M\_13DPG\_c} + \text{M\_ADP\_c} \rightleftharpoons \text{M\_3PG\_c} + \text{M\_ATP\_c} \tag{11}$$

Reactants

Table 16: Properties of each reactant.

Id	Name	SBO
M_13DPG_c	13DPG	
M_ADP_c	ADP	

Products

Table 17: Properties of each product.

Id	Name	SBO
M_3PG_c	3PG	
M_ATP_c	ATP	

Kinetic Law

$$v_6 = \text{not specified} \tag{12}$$

6.7 Reaction R_PGM

This is a reversible reaction of one reactant forming one product.

Name PGM

Reaction equation

$$\text{M\_3PG\_c} \rightleftharpoons \text{M\_2PG\_c} \tag{13}$$

Reactant

Table 18: Properties of each reactant.

Id	Name	SBO
M_3PG_c	3PG	

Product

Table 19: Properties of each product.

Id	Name	SBO
M_2PG_c	2PG	

Kinetic Law

$$v_7 = \text{not specified} \tag{14}$$

6.8 Reaction R_ENO

This is a reversible reaction of one reactant forming one product.

Name ENO

Reaction equation

$$\mathrm{M\_2PG\_c} \rightleftharpoons \mathrm{M\_PEP\_c} \tag{15}$$

Reactant

Table 20: Properties of each reactant.

Id	Name	SBO
M_2PG_c	2PG	

Product

Table 21: Properties of each product.

Id	Name	SBO
M_PEP_c	PEP	

Kinetic Law

$$v_8 = \text{not specified} \tag{16}$$

6.9 Reaction R_G6PDH1

This is an irreversible reaction of two reactants forming two products.

Name G6PDH1

Reaction equation

$$\mathrm{M\_G6P\_c} + \mathrm{M\_NAD\_c} \longrightarrow \mathrm{M\_D6PGL\_c} + \mathrm{M\_NADH\_c} \tag{17}$$

Reactants

Table 22: Properties of each reactant.

Id	Name	SBO
M_G6P_c	G6P	
M_NAD_c	NAD	

Products

Table 23: Properties of each product.

Id	Name	SBO
M_D6PGL_c	D6PGL	
M_NADH_c	NADH	

Kinetic Law

$$v_9 = \text{not specified} \tag{18}$$

6.10 Reaction R_G6PDH2

This is an irreversible reaction of two reactants forming two products.

Name G6PDH2

Reaction equation

$$\text{M\_G6P\_c} + \text{M\_NADP\_c} \longrightarrow \text{M\_D6PGL\_c} + \text{M\_NADPH\_c} \tag{19}$$

Reactants

Table 24: Properties of each reactant.

Id	Name	SBO
M_G6P_c	G6P	
M_NADP_c	NADP	

Products

Table 25: Properties of each product.

Id	Name	SBO
M_D6PGL_c	D6PGL	
M_NADPH_c	NADPH	

Kinetic Law

$$v_{10} = \text{not specified} \tag{20}$$

6.11 Reaction R_PGL

This is an irreversible reaction of one reactant forming one product.

Name PGL

Reaction equation

$$\text{M\_D6PGL\_c} \longrightarrow \text{M\_D6PGC\_c} \tag{21}$$

Reactant

Table 26: Properties of each reactant.

Id	Name	SBO
M_D6PGL_c	D6PGL	

Product

Table 27: Properties of each product.

Id	Name	SBO
M_D6PGC_c	D6PGC	

Kinetic Law

$$v_{11} = \text{not specified} \tag{22}$$

6.12 Reaction R_GND

This is an irreversible reaction of two reactants forming three products.

Name GND

Reaction equation

$$\text{M\_D6PGC\_c} + \text{M\_NADP\_c} \longrightarrow \text{M\_CO2\_c} + \text{M\_NADPH\_c} + \text{M\_RL5P\_c} \tag{23}$$

Reactants

Table 28: Properties of each reactant.

Id	Name	SBO
M_D6PGC_c	D6PGC	
M_NADP_c	NADP	

Products

Table 29: Properties of each product.

Id	Name	SBO
M_CO2_c	CO2	
M_NADPH_c	NADPH	
M_RL5P_c	RL5P	

Kinetic Law

$$v_{12} = \text{not specified} \tag{24}$$

6.13 Reaction R_RPI

This is a reversible reaction of one reactant forming one product.

Name RPI

Reaction equation

$$\text{M\_RL5P\_c} \rightleftharpoons \text{M\_R5P\_c} \tag{25}$$

Reactant

Table 30: Properties of each reactant.

Id	Name	SBO
M_RL5P_c	RL5P	

Product

Table 31: Properties of each product.

Id	Name	SBO
M_R5P_c	R5P	

Kinetic Law

$$v_{13} = \text{not specified} \tag{26}$$

6.14 Reaction R_RPE

This is a reversible reaction of one reactant forming one product.

Name RPE

Reaction equation

$$\text{M\_RL5P\_c} \rightleftharpoons \text{M\_X5P\_c} \tag{27}$$

Reactant

Table 32: Properties of each reactant.

Id	Name	SBO
M_RL5P_c	RL5P	

Product

Table 33: Properties of each product.

Id	Name	SBO
M_X5P_c	X5P	

Kinetic Law

$$v_{14} = \text{not specified} \tag{28}$$

6.15 Reaction R_TAL

This is a reversible reaction of two reactants forming two products.

Name TAL

Reaction equation

$$\text{M\_S7P\_c} + \text{M\_T3P1\_c} \rightleftharpoons \text{M\_E4P\_c} + \text{M\_F6P\_c} \tag{29}$$

Reactants

Table 34: Properties of each reactant.

Id	Name	SBO
M_S7P_c	S7P	
M_T3P1_c	T3P1	

Products

Table 35: Properties of each product.

Id	Name	SBO
M_E4P_c	E4P	
M_F6P_c	F6P	

Kinetic Law

$$v_{15} = \text{not specified} \tag{30}$$

6.16 Reaction R_TKTA1

This is a reversible reaction of two reactants forming two products.

Name TKTA1

Reaction equation

$$\text{M\_R5P\_c} + \text{M\_X5P\_c} \rightleftharpoons \text{M\_S7P\_c} + \text{M\_T3P1\_c} \tag{31}$$

Reactants

Table 36: Properties of each reactant.

Id	Name	SBO
M_R5P_c	R5P	
M_X5P_c	X5P	

Products

Table 37: Properties of each product.

Id	Name	SBO
M_S7P_c	S7P	

Id	Name	SBO
M_T3P1_c	T3P1	

Kinetic Law

$$v_{16} = \text{not specified} \tag{32}$$

6.17 Reaction R_TKTA2

This is a reversible reaction of two reactants forming two products.

Name TKTA2

Reaction equation

$$\text{M\_E4P\_c} + \text{M\_X5P\_c} \rightleftharpoons \text{M\_F6P\_c} + \text{M\_T3P1\_c} \tag{33}$$

Reactants

Table 38: Properties of each reactant.

Id	Name	SBO
M_E4P_c	E4P	
M_X5P_c	X5P	

Products

Table 39: Properties of each product.

Id	Name	SBO
M_F6P_c	F6P	
M_T3P1_c	T3P1	

Kinetic Law

$$v_{17} = \text{not specified} \tag{34}$$

6.18 Reaction R_EDD

This is an irreversible reaction of one reactant forming one product.

Name EDD

Reaction equation

$$\text{M\_D6PGC\_c} \longrightarrow \text{M\_2KD6PG\_c} \tag{35}$$

Reactant

Table 40: Properties of each reactant.

Id	Name	SBO
M_D6PGC_c	D6PGC	

Product

Table 41: Properties of each product.

Id	Name	SBO
M_2KD6PG_c	2KD6PG	

Kinetic Law

$$v_{18} = \text{not specified} \tag{36}$$

6.19 Reaction R_EDA

This is an irreversible reaction of one reactant forming two products.

Name EDA

Reaction equation

$$\text{M\_2KD6PG\_c} \longrightarrow \text{M\_PYR\_c} + \text{M\_T3P1\_c} \tag{37}$$

Reactant

Table 42: Properties of each reactant.

Id	Name	SBO
M_2KD6PG_c	2KD6PG	

Products

Table 43: Properties of each product.

Id	Name	SBO
M_PYR_c	PYR	
M_T3P1_c	T3P1	

Kinetic Law

$$v_{19} = \text{not specified} \tag{38}$$

6.20 Reaction R_MAEB

This is a reversible reaction of two reactants forming three products.

Name MAEB

Reaction equation

$$\text{M\_MAL\_c} + \text{M\_NAD\_c} \rightleftharpoons \text{M\_CO2\_c} + \text{M\_NADH\_c} + \text{M\_PYR\_c} \tag{39}$$

Reactants

Table 44: Properties of each reactant.

Id	Name	SBO
M_MAL_c	MAL	
M_NAD_c	NAD	

Products

Table 45: Properties of each product.

Id	Name	SBO
M_CO2_c	CO2	
M_NADH_c	NADH	
M_PYR_c	PYR	

Kinetic Law

$$v_{20} = \text{not specified} \tag{40}$$

6.21 Reaction R_GLTA

This is an irreversible reaction of two reactants forming two products.

Name GLTA

Reaction equation

$$\text{M\_ACCOA\_c} + \text{M\_OA\_c} \longrightarrow \text{M\_CIT\_c} + \text{M\_COA\_c} \tag{41}$$

Reactants

Table 46: Properties of each reactant.

Id	Name	SBO
M_ACCOA_c	ACCOA	
M_OA_c	OA	

Products

Table 47: Properties of each product.

Id	Name	SBO
M_CIT_c	CIT	
M_COA_c	COA	

Kinetic Law

$$v_{21} = \text{not specified} \tag{42}$$

6.22 Reaction R_ACNB

This is a reversible reaction of one reactant forming one product.

Name ACNB

Reaction equation

$$\text{M\_CIT\_c} \rightleftharpoons \text{M\_ICIT\_c} \tag{43}$$

Reactant

Table 48: Properties of each reactant.

Id	Name	SBO
M_CIT_c	CIT	

Product

Table 49: Properties of each product.

Id	Name	SBO
M_ICIT_c	ICIT	

Kinetic Law

$$v_{22} = \text{not specified} \tag{44}$$

6.23 Reaction R_ICD

This is a reversible reaction of two reactants forming three products.

Name ICD

Reaction equation

$$\text{M\_ICIT\_c} + \text{M\_NADP\_c} \rightleftharpoons \text{M\_AKG\_c} + \text{M\_CO2\_c} + \text{M\_NADPH\_c} \tag{45}$$

Reactants

Table 50: Properties of each reactant.

Id	Name	SBO
M_ICIT_c	ICIT	
M_NADP_c	NADP	

Products

Table 51: Properties of each product.

Id	Name	SBO
M_AKG_c	AKG	
M_CO2_c	CO2	
M_NADPH_c	NADPH	

Id	Name	SBO

Kinetic Law

$$v_{23} = \text{not specified} \tag{46}$$

6.24 Reaction R_AKO

This is an irreversible reaction of two reactants forming two products.

Name AKO

Reaction equation

$$\text{M\_AKG\_c} + \text{M\_FAD\_c} \longrightarrow \text{M\_FADH\_c} + \text{M\_SUCC\_c} \tag{47}$$

Reactants

Table 52: Properties of each reactant.

Id	Name	SBO
M_AKG_c	AKG	
M_FAD_c	FAD	

Products

Table 53: Properties of each product.

Id	Name	SBO
M_FADH_c	FADH	
M_SUCC_c	SUCC	

Kinetic Law

$$v_{24} = \text{not specified} \tag{48}$$

6.25 Reaction R_FRD

This is an irreversible reaction of two reactants forming two products.

Name FRD

Reaction equation

$$\text{M\_FUM\_c} + \text{M\_NADH\_c} \longrightarrow \text{M\_NAD\_c} + \text{M\_SUCC\_c} \tag{49}$$

Reactants

Table 54: Properties of each reactant.

Id	Name	SBO
M_FUM_c	FUM	
M_NADH_c	NADH	

Products

Table 55: Properties of each product.

Id	Name	SBO
M_NAD_c	NAD	
M_SUCC_c	SUCC	

Kinetic Law

$$v_{25} = \text{not specified} \tag{50}$$

6.26 Reaction R_FUMC

This is a reversible reaction of one reactant forming one product.

Name FUMC

Reaction equation

$$\text{M\_FUM\_c} \rightleftharpoons \text{M\_MAL\_c} \tag{51}$$

Reactant

Table 56: Properties of each reactant.

Id	Name	SBO
M_FUM_c	FUM	

Product

Table 57: Properties of each product.

Id	Name	SBO
M_MAL_c	MAL	

Kinetic Law

$$v_{26} = \text{not specified} \tag{52}$$

6.27 Reaction R_MDH

This is a reversible reaction of two reactants forming two products.

Name MDH

Reaction equation

$$\text{M\_MAL\_c} + \text{M\_NAD\_c} \rightleftharpoons \text{M\_NADH\_c} + \text{M\_OA\_c} \tag{53}$$

Reactants

Table 58: Properties of each reactant.

Id	Name	SBO
M_MAL_c	MAL	
M_NAD_c	NAD	

Products

Table 59: Properties of each product.

Id	Name	SBO
M_NADH_c	NADH	
M_OA_c	OA	

Kinetic Law

$$v_{27} = \text{not specified} \tag{54}$$

6.28 Reaction R_ACEB

This is an irreversible reaction of two reactants forming two products.

Name ACEB

Reaction equation

$$\text{M\_ACCOA\_c} + \text{M\_GLX\_c} \longrightarrow \text{M\_COA\_c} + \text{M\_MAL\_c} \tag{55}$$

Reactants

Table 60: Properties of each reactant.

Id	Name	SBO
M_ACCOA_c	ACCOA	
M_GLX_c	GLX	

Products

Table 61: Properties of each product.

Id	Name	SBO
M_COA_c	COA	
M_MAL_c	MAL	

Kinetic Law

$$v_{28} = \text{not specified} \tag{56}$$

6.29 Reaction R_OOR_

This is an irreversible reaction of three reactants forming three products.

Name OOR_

Reaction equation

$$\text{M\_AKG\_c} + \text{M\_COA\_c} + \text{M\_FERDX\_c} \longrightarrow \text{M\_CO2\_c} + \text{M\_FERDXH\_c} + \text{M\_SUCCOA\_c} \tag{57}$$

Reactants

Table 62: Properties of each reactant.

Id	Name	SBO
M_AKG_c	AKG	
M_COA_c	COA	
M_FERDX_c	FERDX	

Products

Table 63: Properties of each product.

Id	Name	SBO
M_CO2_c	CO2	
M_FERDXH_c	FERDXH	
M_SUCCOA_c	SUCCOA	

Kinetic Law

$$v_{29} = \text{not specified} \tag{58}$$

6.30 Reaction R_SCOT

This is a reversible reaction of two reactants forming two products.

Name SCOT

Reaction equation

$$\text{M\_AAC\_c} + \text{M\_SUCCOA\_c} \rightleftharpoons \text{M\_AACCOA\_c} + \text{M\_SUCC\_c} \tag{59}$$

Reactants

Table 64: Properties of each reactant.

Id	Name	SBO
M_AAC_c	AAC	
M_SUCCOA_c	SUCCOA	

Products

Table 65: Properties of each product.

Id	Name	SBO
M_AACCOA_c	AACCOA	
M_SUCC_c	SUCC	

Kinetic Law

$$v_{30} = \text{not specified} \tag{60}$$

6.31 Reaction R_ATOB

This is a reversible reaction of two reactants forming one product.

Name ATOB

Reaction equation

$$\text{M\_AACCOA\_c} + \text{M\_COA\_c} \rightleftharpoons 2\,\text{M\_ACCOA\_c} \tag{61}$$

Reactants

Table 66: Properties of each reactant.

Id	Name	SBO
M_AACCOA_c	AACCOA	
M_COA_c	COA	

Product

Table 67: Properties of each product.

Id	Name	SBO
M_ACCOA_c	ACCOA	

Kinetic Law

$$v_{31} = \text{not specified} \tag{62}$$

6.32 Reaction R_PPA

This is an irreversible reaction of one reactant forming one product.

Name PPA

Reaction equation

$$\mathrm{M\_PPI\_c} \longrightarrow 2\,\mathrm{M\_PI\_c} \tag{63}$$

Reactant

Table 68: Properties of each reactant.

Id	Name	SBO
M_PPI_c	PPI	

Product

Table 69: Properties of each product.

Id	Name	SBO
M_PI_c	PI	

Kinetic Law

$$v_{32} = \text{not specified} \tag{64}$$

6.33 Reaction R_PRSA

This is a reversible reaction of two reactants forming two products.

Name PRSA

Reaction equation

$$\mathrm{M\_ATP\_c} + \mathrm{M\_R5P\_c} \rightleftharpoons \mathrm{M\_AMP\_c} + \mathrm{M\_PRPP\_c} \tag{65}$$

Reactants

Table 70: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_R5P_c	R5P	

Products

Table 71: Properties of each product.

Id	Name	SBO
M_AMP_c	AMP	
M_PRPP_c	PRPP	

Kinetic Law

$$v_{33} = \text{not specified} \tag{66}$$

6.34 Reaction R_PPSA

This is an irreversible reaction of two reactants forming three products.

Name PPSA

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_PYR\_c} \longrightarrow \text{M\_AMP\_c} + \text{M\_PEP\_c} + \text{M\_PI\_c} \tag{67}$$

Reactants

Table 72: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_PYR_c	PYR	

Products

Table 73: Properties of each product.

Id	Name	SBO
M_AMP_c	AMP	
M_PEP_c	PEP	
M_PI_c	PI	

Kinetic Law

$$v_{34} = \text{not specified} \tag{68}$$

6.35 Reaction R_POR_

This is an irreversible reaction of three reactants forming three products.

Name POR_

Reaction equation

$$\text{M\_COA\_c} + \text{M\_FLVDX\_c} + \text{M\_PYR\_c} \longrightarrow \text{M\_ACCOA\_c} + \text{M\_CO2\_c} + \text{M\_FLVDXH\_c} \quad (69)$$

Reactants

Table 74: Properties of each reactant.

Id	Name	SBO
M_COA_c	COA	
M_FLVDX_c	FLVDX	
M_PYR_c	PYR	

Products

Table 75: Properties of each product.

Id	Name	SBO
M_ACCOA_c	ACCOA	
M_CO2_c	CO2	
M_FLVDXH_c	FLVDXH	

Kinetic Law

$$v_{35} = \text{not specified} \quad (70)$$

6.36 Reaction R_GLTMNS

This is an irreversible reaction of one reactant forming two products.

Name GLTMNS

Reaction equation

$$\text{M\_GLN\_c} \longrightarrow \text{M\_GLU\_c} + \text{M\_NH3\_c} \quad (71)$$

Reactant

Table 76: Properties of each reactant.

Id	Name	SBO
M_GLN_c	GLN	

Products

Table 77: Properties of each product.

Id	Name	SBO
M_GLU_c	GLU	
M_NH3_c	NH3	

Kinetic Law

$$v_{36} = \text{not specified} \tag{72}$$

6.37 Reaction R_SDAA

This is an irreversible reaction of one reactant forming two products.

Name SDAA

Reaction equation

$$\text{M\_SER\_c} \longrightarrow \text{M\_NH3\_c} + \text{M\_PYR\_c} \tag{73}$$

Reactant

Table 78: Properties of each reactant.

Id	Name	SBO
M_SER_c	SER	

Products

Table 79: Properties of each product.

Id	Name	SBO
M_NH3_c	NH3	
M_PYR_c	PYR	

Kinetic Law

$$v_{37} = \text{not specified} \tag{74}$$

6.38 Reaction R_DHS1

This is an irreversible reaction of two reactants forming two products.

Name DHS1

Reaction equation

$$\text{M\_E4P\_c} + \text{M\_PEP\_c} \longrightarrow \text{M\_3DDAH7P\_c} + \text{M\_PI\_c} \tag{75}$$

Reactants

Table 80: Properties of each reactant.

Id	Name	SBO
M_E4P_c	E4P	
M_PEP_c	PEP	

Products

Table 81: Properties of each product.

Id	Name	SBO
M_3DDAH7P_c	3DDAH7P	
M_PI_c	PI	

Kinetic Law

$$v_{38} = \text{not specified} \tag{76}$$

6.39 Reaction R_AROB

This is an irreversible reaction of one reactant forming two products.

Name AROB

Reaction equation

$$\text{M\_3DDAH7P\_c} \longrightarrow \text{M\_DQT\_c} + \text{M\_PI\_c} \tag{77}$$

Reactant

Table 82: Properties of each reactant.

Id	Name	SBO
M_3DDAH7P_c	3DDAH7P	

Products

Table 83: Properties of each product.

Id	Name	SBO
M_DQT_c	DQT	
M_PI_c	PI	

Kinetic Law

$$v_{39} = \text{not specified} \tag{78}$$

6.40 Reaction R_AROQ

This is a reversible reaction of one reactant forming one product.

Name AROQ

Reaction equation

$$\text{M\_DQT\_c} \rightleftharpoons \text{M\_DHSK\_c} \tag{79}$$

Reactant

Table 84: Properties of each reactant.

Id	Name	SBO
M_DQT_c	DQT	

Product

Table 85: Properties of each product.

Id	Name	SBO
M_DHSK_c	DHSK	

Kinetic Law

$$v_{40} = \text{not specified} \tag{80}$$

6.41 Reaction R_AROE

This is a reversible reaction of two reactants forming two products.

Name AROE

Reaction equation

$$\text{M\_DHSK\_c} + \text{M\_NADPH\_c} \rightleftharpoons \text{M\_NADP\_c} + \text{M\_SME\_c} \tag{81}$$

Reactants

Table 86: Properties of each reactant.

Id	Name	SBO
M_DHSK_c	DHSK	
M_NADPH_c	NADPH	

Products

Table 87: Properties of each product.

Id	Name	SBO
M_NADP_c	NADP	
M_SME_c	SME	

Kinetic Law

$$v_{41} = \text{not specified} \tag{82}$$

6.42 Reaction R_AROK

This is an irreversible reaction of two reactants forming two products.

Name AROK

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_SME\_c} \longrightarrow \text{M\_ADP\_c} + \text{M\_SME5P\_c} \tag{83}$$

Reactants

Table 88: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_SME_c	SME	

Products

Table 89: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_SME5P_c	SME5P	

Kinetic Law

$$v_{42} = \text{not specified} \tag{84}$$

6.43 Reaction R_AROA

This is a reversible reaction of two reactants forming two products.

Name AROA

Reaction equation

$$\text{M\_PEP\_c} + \text{M\_SME5P\_c} \rightleftharpoons \text{M\_3PSME\_c} + \text{M\_PI\_c} \tag{85}$$

Reactants

Table 90: Properties of each reactant.

Id	Name	SBO
M_PEP_c	PEP	
M_SME5P_c	SME5P	

Products

Table 91: Properties of each product.

Id	Name	SBO
M_3PSME_c	3PSME	
M_PI_c	PI	

Kinetic Law

$$v_{43} = \text{not specified} \tag{86}$$

6.44 Reaction R_AROC

This is an irreversible reaction of one reactant forming two products.

Name AROC

Reaction equation

$$\text{M\_3PSME\_c} \longrightarrow \text{M\_CHOR\_c} + \text{M\_PI\_c} \tag{87}$$

Reactant

Table 92: Properties of each reactant.

Id	Name	SBO
M_3PSME_c	3PSME	

Products

Table 93: Properties of each product.

Id	Name	SBO
M_CHOR_c	CHOR	
M_PI_c	PI	

Kinetic Law

$$v_{44} = \text{not specified} \tag{88}$$

6.45 Reaction R_TRPE

This is an irreversible reaction of two reactants forming two products.

Name TRPE

Reaction equation

$$\text{M\_CHOR\_c} + \text{M\_NH3\_c} \longrightarrow \text{M\_AN\_c} + \text{M\_PYR\_c} \tag{89}$$

Reactants

Table 94: Properties of each reactant.

Id	Name	SBO
M_CHOR_c	CHOR	
M_NH3_c	NH3	

Products

Table 95: Properties of each product.

Id	Name	SBO
M_AN_c	AN	
M_PYR_c	PYR	

Kinetic Law

$$v_{45} = \text{not specified} \tag{90}$$

6.46 Reaction R_TRPDE

This is an irreversible reaction of two reactants forming three products.

Name TRPDE

Reaction equation

$$\text{M\_CHOR\_c} + \text{M\_GLN\_c} \longrightarrow \text{M\_AN\_c} + \text{M\_GLU\_c} + \text{M\_PYR\_c} \tag{91}$$

Reactants

Table 96: Properties of each reactant.

Id	Name	SBO
M_CHOR_c	CHOR	
M_GLN_c	GLN	

Products

Table 97: Properties of each product.

Id	Name	SBO
M_AN_c	AN	
M_GLU_c	GLU	
M_PYR_c	PYR	

Kinetic Law

$$v_{46} = \text{not specified} \tag{92}$$

6.47 Reaction R_TRPD

This is an irreversible reaction of two reactants forming two products.

Name TRPD

Reaction equation

$$\text{M\_AN\_c} + \text{M\_PRPP\_c} \longrightarrow \text{M\_NPRAN\_c} + \text{M\_PPI\_c} \tag{93}$$

Reactants

Table 98: Properties of each reactant.

Id	Name	SBO
M_AN_c	AN	
M_PRPP_c	PRPP	

Products

Table 99: Properties of each product.

Id	Name	SBO
M_NPRAN_c	NPRAN	
M_PPI_c	PPI	

Kinetic Law

$$v_{47} = \text{not specified} \tag{94}$$

6.48 Reaction R_TRPC1

This is an irreversible reaction of one reactant forming one product.

Name TRPC1

Reaction equation

$$\text{M\_NPRAN\_c} \longrightarrow \text{M\_CPAD5P\_c} \tag{95}$$

Reactant

Table 100: Properties of each reactant.

Id	Name	SBO
M_NPRAN_c	NPRAN	

Product

Table 101: Properties of each product.

Id	Name	SBO
M_CPAD5P_c	CPAD5P	

Kinetic Law

$$v_{48} = \text{not specified} \tag{96}$$

6.49 Reaction R_TRPC2

This is an irreversible reaction of one reactant forming two products.

Name TRPC2

Reaction equation

$$\text{M\_CPAD5P\_c} \longrightarrow \text{M\_CO2\_c} + \text{M\_IGP\_c} \tag{97}$$

Reactant

Table 102: Properties of each reactant.

Id	Name	SBO
M_CPAD5P_c	CPAD5P	

Products

Table 103: Properties of each product.

Id	Name	SBO
M_CO2_c	CO2	
M_IGP_c	IGP	

Kinetic Law

$$v_{49} = \text{not specified} \tag{98}$$

6.50 Reaction R_TRPAB

This is an irreversible reaction of two reactants forming two products.

Name TRPAB

Reaction equation

$$\text{M\_IGP\_c} + \text{M\_SER\_c} \longrightarrow \text{M\_T3P1\_c} + \text{M\_TRP\_c} \tag{99}$$

Reactants

Table 104: Properties of each reactant.

Id	Name	SBO
M_IGP_c	IGP	
M_SER_c	SER	

Products

Table 105: Properties of each product.

Id	Name	SBO
M_T3P1_c	T3P1	
M_TRP_c	TRP	

Kinetic Law

$$v_{50} = \text{not specified} \tag{100}$$

6.51 Reaction R_TYRA1

This is an irreversible reaction of one reactant forming one product.

Name TYRA1

Reaction equation

$$\text{M\_CHOR\_c} \longrightarrow \text{M\_PHEN\_c} \tag{101}$$

Reactant

Table 106: Properties of each reactant.

Id	Name	SBO
M_CHOR_c	CHOR	

Product

Table 107: Properties of each product.

Id	Name	SBO
M_PHEN_c	PHEN	

Kinetic Law

$$v_{51} = \text{not specified} \tag{102}$$

6.52 Reaction R_TYRA2

This is an irreversible reaction of two reactants forming three products.

Name TYRA2

Reaction equation

$$\text{M\_NAD\_c} + \text{M\_PHEN\_c} \longrightarrow \text{M\_CO2\_c} + \text{M\_HPHPYR\_c} + \text{M\_NADH\_c} \quad (103)$$

Reactants

Table 108: Properties of each reactant.

Id	Name	SBO
M_NAD_c	NAD	
M_PHEN_c	PHEN	

Products

Table 109: Properties of each product.

Id	Name	SBO
M_CO2_c	CO2	
M_HPHPYR_c	HPHPYR	
M_NADH_c	NADH	

Kinetic Law

$$v_{52} = \text{not specified} \quad (104)$$

6.53 Reaction R_ASPA

This is an irreversible reaction of one reactant forming two products.

Name ASPA

Reaction equation

$$\text{M\_ASP\_c} \longrightarrow \text{M\_FUM\_c} + \text{M\_NH3\_c} \quad (105)$$

Reactant

Table 110: Properties of each reactant.

Id	Name	SBO
M_ASP_c	ASP	

Products

Table 111: Properties of each product.

Id	Name	SBO
M_FUM_c	FUM	
M_NH3_c	NH3	

Kinetic Law

$$v_{53} = \text{not specified} \tag{106}$$

6.54 Reaction R_ASPB1

This is a reversible reaction of two reactants forming two products.

Name ASPB1

Reaction equation

$$\text{M\_GLU\_c} + \text{M\_OA\_c} \rightleftharpoons \text{M\_AKG\_c} + \text{M\_ASP\_c} \tag{107}$$

Reactants

Table 112: Properties of each reactant.

Id	Name	SBO
M_GLU_c	GLU	
M_OA_c	OA	

Products

Table 113: Properties of each product.

Id	Name	SBO
M_AKG_c	AKG	
M_ASP_c	ASP	

Id	Name	SBO

Kinetic Law

$$v_{54} = \text{not specified} \tag{108}$$

6.55 Reaction R_ASPB2

This is a reversible reaction of two reactants forming two products.

Name ASPB2

Reaction equation

$$\text{M\_GLU\_c} + \text{M\_HPHPYR\_c} \rightleftharpoons \text{M\_AKG\_c} + \text{M\_TYR\_c} \tag{109}$$

Reactants

Table 114: Properties of each reactant.

Id	Name	SBO
M_GLU_c	GLU	
M_HPHPYR_c	HPHPYR	

Products

Table 115: Properties of each product.

Id	Name	SBO
M_AKG_c	AKG	
M_TYR_c	TYR	

Kinetic Law

$$v_{55} = \text{not specified} \tag{110}$$

6.56 Reaction R_METL1

This is a reversible reaction of two reactants forming two products.

Name METL1

Reaction equation

$$\text{M\_ASP\_c} + \text{M\_ATP\_c} \rightleftharpoons \text{M\_ADP\_c} + \text{M\_BASP\_c} \tag{111}$$

Reactants

Table 116: Properties of each reactant.

Id	Name	SBO
M_ASP_c	ASP	
M_ATP_c	ATP	

Products

Table 117: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_BASP_c	BASP	

Kinetic Law

$$v_{56} = \text{not specified} \tag{112}$$

6.57 Reaction R_LYSC

This is a reversible reaction of two reactants forming two products.

Name LYSC

Reaction equation

$$\text{M\_ASP\_c} + \text{M\_ATP\_c} \rightleftharpoons \text{M\_ADP\_c} + \text{M\_BASP\_c} \tag{113}$$

Reactants

Table 118: Properties of each reactant.

Id	Name	SBO
M_ASP_c	ASP	
M_ATP_c	ATP	

Products

Table 119: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_BASP_c	BASP	

Kinetic Law

$$v_{57} = \text{not specified} \tag{114}$$

6.58 Reaction R_ASD

This is a reversible reaction of two reactants forming three products.

Name ASD

Reaction equation

$$\text{M\_BASP\_c} + \text{M\_NADPH\_c} \rightleftharpoons \text{M\_ASPSA\_c} + \text{M\_NADP\_c} + \text{M\_PI\_c} \tag{115}$$

Reactants

Table 120: Properties of each reactant.

Id	Name	SBO
M_BASP_c	BASP	
M_NADPH_c	NADPH	

Products

Table 121: Properties of each product.

Id	Name	SBO
M_ASPSA_c	ASPSA	
M_NADP_c	NADP	
M_PI_c	PI	

Kinetic Law

$$v_{58} = \text{not specified} \tag{116}$$

6.59 Reaction R_METL2

This is a reversible reaction of two reactants forming two products.

Name METL2

Reaction equation

$$\text{M\_ASPSA\_c} + \text{M\_NADPH\_c} \rightleftharpoons \text{M\_HSER\_c} + \text{M\_NADP\_c} \tag{117}$$

Reactants

Table 122: Properties of each reactant.

Id	Name	SBO
M_ASPSA_c	ASPSA	
M_NADPH_c	NADPH	

Products

Table 123: Properties of each product.

Id	Name	SBO
M_HSER_c	HSER	
M_NADP_c	NADP	

Kinetic Law

$$v_{59} = \text{not specified} \tag{118}$$

6.60 Reaction R_THRB

This is an irreversible reaction of two reactants forming two products.

Name THRB

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_HSER\_c} \longrightarrow \text{M\_ADP\_c} + \text{M\_PHSER\_c} \tag{119}$$

Reactants

Table 124: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_HSER_c	HSER	

Products

Table 125: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_PHSER_c	PHSER	

Kinetic Law

$$v_{60} = \text{not specified} \tag{120}$$

6.61 Reaction R_THRC

This is an irreversible reaction of one reactant forming two products.

Name THRC

Reaction equation

$$\text{M\_PHSER\_c} \longrightarrow \text{M\_PI\_c} + \text{M\_THR\_c} \tag{121}$$

Reactant

Table 126: Properties of each reactant.

Id	Name	SBO
M_PHSER_c	PHSER	

Products

Table 127: Properties of each product.

Id	Name	SBO
M_PI_c	PI	
M_THR_c	THR	

Id	Name	SBO

Kinetic Law

$$v_{61} = \text{not specified} \tag{122}$$

6.62 Reaction R_DAPA

This is an irreversible reaction of two reactants forming one product.

Name DAPA

Reaction equation

$$\text{M\_ASPSA\_c} + \text{M\_PYR\_c} \longrightarrow \text{M\_D23PIC\_c} \tag{123}$$

Reactants

Table 128: Properties of each reactant.

Id	Name	SBO
M_ASPSA_c	ASPSA	
M_PYR_c	PYR	

Product

Table 129: Properties of each product.

Id	Name	SBO
M_D23PIC_c	D23PIC	

Kinetic Law

$$v_{62} = \text{not specified} \tag{124}$$

6.63 Reaction R_DAPB

This is an irreversible reaction of two reactants forming two products.

Name DAPB

Reaction equation

$$\text{M\_D23PIC\_c} + \text{M\_NADPH\_c} \longrightarrow \text{M\_NADP\_c} + \text{M\_PIP26DX\_c} \tag{125}$$

Reactants

Table 130: Properties of each reactant.

Id	Name	SBO
M_D23PIC_c	D23PIC	
M_NADPH_c	NADPH	

Products

Table 131: Properties of each product.

Id	Name	SBO
M_NADP_c	NADP	
M_PIP26DX_c	PIP26DX	

Kinetic Law

$$v_{63} = \text{not specified} \tag{126}$$

6.64 Reaction R_DAPD

This is an irreversible reaction of two reactants forming two products.

Name DAPD

Reaction equation

$$\text{M\_PIP26DX\_c} + \text{M\_SUCCOA\_c} \longrightarrow \text{M\_COA\_c} + \text{M\_NS2A6O\_c} \tag{127}$$

Reactants

Table 132: Properties of each reactant.

Id	Name	SBO
M_PIP26DX_c	PIP26DX	
M_SUCCOA_c	SUCCOA	

Products

Table 133: Properties of each product.

Id	Name	SBO
M_COA_c	COA	
M_NS2A6O_c	NS2A6O	

Kinetic Law

$$v_{64} = \text{not specified} \tag{128}$$

6.65 Reaction R_DAPC

This is a reversible reaction of two reactants forming two products.

Name DAPC

Reaction equation

$$\text{M\_GLU\_c} + \text{M\_NS2A6O\_c} \rightleftharpoons \text{M\_AKG\_c} + \text{M\_NS26DP\_c} \tag{129}$$

Reactants

Table 134: Properties of each reactant.

Id	Name	SBO
M_GLU_c	GLU	
M_NS2A6O_c	NS2A6O	

Products

Table 135: Properties of each product.

Id	Name	SBO
M_AKG_c	AKG	
M_NS26DP_c	NS26DP	

Kinetic Law

$$v_{65} = \text{not specified} \tag{130}$$

6.66 Reaction R_DAPE

This is an irreversible reaction of one reactant forming two products.

Name DAPE

Reaction equation

$$\text{M\_NS26DP\_c} \longrightarrow \text{M\_D26PIM\_c} + \text{M\_SUCC\_c} \tag{131}$$

Reactant

Table 136: Properties of each reactant.

Id	Name	SBO
M_NS26DP_c	NS26DP	

Products

Table 137: Properties of each product.

Id	Name	SBO
M_D26PIM_c	D26PIM	
M_SUCC_c	SUCC	

Kinetic Law

$$v_{66} = \text{not specified} \tag{132}$$

6.67 Reaction R_DAPF

This is a reversible reaction of one reactant forming one product.

Name DAPF

Reaction equation

$$\text{M\_D26PIM\_c} \rightleftharpoons \text{M\_MDAP\_c} \tag{133}$$

Reactant

Table 138: Properties of each reactant.

Id	Name	SBO
M_D26PIM_c	D26PIM	

Product

Table 139: Properties of each product.

Id	Name	SBO
M_MDAP_c	MDAP	

Kinetic Law

$$v_{67} = \text{not specified} \tag{134}$$

6.68 Reaction R_LYSA

This is an irreversible reaction of one reactant forming two products.

Name LYSA

Reaction equation

$$\text{M\_MDAP\_c} \longrightarrow \text{M\_CO2\_c} + \text{M\_LYS\_c} \tag{135}$$

Reactant

Table 140: Properties of each reactant.

Id	Name	SBO
M_MDAP_c	MDAP	

Products

Table 141: Properties of each product.

Id	Name	SBO
M_CO2_c	CO2	
M_LYS_c	LYS	

Kinetic Law

$$v_{68} = \text{not specified} \tag{136}$$

6.69 Reaction R_METB1

This is an irreversible reaction of two reactants forming two products.

Name METB1

Reaction equation

$$\text{M\_CYS\_c} + \text{M\_OAHSER\_c} \longrightarrow \text{M\_AC\_c} + \text{M\_LLCT\_c} \tag{137}$$

Reactants

Table 142: Properties of each reactant.

Id	Name	SBO
M_CYS_c	CYS	
M_OAHSER_c	OAHSER	

Products

Table 143: Properties of each product.

Id	Name	SBO
M_AC_c	AC	
M_LLCT_c	LLCT	

Kinetic Law

$$v_{69} = \text{not specified} \tag{138}$$

6.70 Reaction R_METB2

This is an irreversible reaction of two reactants forming two products.

Name METB2

Reaction equation

$$\text{M\_CYS\_c} + \text{M\_OSLHSER\_c} \longrightarrow \text{M\_LLCT\_c} + \text{M\_SUCC\_c} \tag{139}$$

Reactants

Table 144: Properties of each reactant.

Id	Name	SBO
M_CYS_c	CYS	
M_OSLHSER_c	OSLHSER	

Products

Table 145: Properties of each product.

Id	Name	SBO
M_LLCT_c	LLCT	
M_SUCC_c	SUCC	

Kinetic Law

$$v_{70} = \text{not specified} \tag{140}$$

6.71 Reaction R_METX

This is an irreversible reaction of two reactants forming three products.

Name METX

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_MET\_c} \longrightarrow \text{M\_PI\_c} + \text{M\_PPI\_c} + \text{M\_SAM\_c} \tag{141}$$

Reactants

Table 146: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_MET_c	MET	

Products

Table 147: Properties of each product.

Id	Name	SBO
M_PI_c	PI	
M_PPI_c	PPI	
M_SAM_c	SAM	

Kinetic Law

$$v_{71} = \text{not specified} \tag{142}$$

6.72 Reaction R_ADCSASE

This is a reversible reaction of two reactants forming one product.

Name ADCSASE

Reaction equation

$$\text{M\_ADN\_c} + \text{M\_HCYS\_c} \rightleftharpoons \text{M\_SAH\_c} \tag{143}$$

Reactants

Table 148: Properties of each reactant.

Id	Name	SBO
M_ADN_c	ADN	
M_HCYS_c	HCYS	

Product

Table 149: Properties of each product.

Id	Name	SBO
M_SAH_c	SAH	

Kinetic Law

$$v_{72} = \text{not specified} \tag{144}$$

6.73 Reaction R_METH

This is an irreversible reaction of two reactants forming two products.

Name METH

Reaction equation

$$\text{M\_HCYS\_c} + \text{M\_MTHF\_c} \longrightarrow \text{M\_MET\_c} + \text{M\_THF\_c} \tag{145}$$

Reactants

Table 150: Properties of each reactant.

Id	Name	SBO
M_HCYS_c	HCYS	
M_MTHF_c	MTHF	

Products

Table 151: Properties of each product.

Id	Name	SBO
M_MET_c	MET	
M_THF_c	THF	

Kinetic Law

$$v_{73} = \text{not specified} \tag{146}$$

6.74 Reaction R_SERA

This is an irreversible reaction of two reactants forming two products.

Name SERA

Reaction equation

$$\text{M\_3PG\_c} + \text{M\_NAD\_c} \longrightarrow \text{M\_NADH\_c} + \text{M\_PHP\_c} \tag{147}$$

Reactants

Table 152: Properties of each reactant.

Id	Name	SBO
M_3PG_c	3PG	
M_NAD_c	NAD	

Products

Table 153: Properties of each product.

Id	Name	SBO
M_NADH_c	NADH	
M_PHP_c	PHP	

Kinetic Law

$$v_{74} = \text{not specified} \tag{148}$$

6.75 Reaction R_SERC

This is an irreversible reaction of two reactants forming two products.

Name SERC

Reaction equation

$$\text{M\_GLU\_c} + \text{M\_PHP\_c} \longrightarrow \text{M\_3PSER\_c} + \text{M\_AKG\_c} \tag{149}$$

Reactants

Table 154: Properties of each reactant.

Id	Name	SBO
M_GLU_c	GLU	
M_PHP_c	PHP	

Products

Table 155: Properties of each product.

Id	Name	SBO
M_3PSER_c	3PSER	
M_AKG_c	AKG	

Kinetic Law

$$v_{75} = \text{not specified} \tag{150}$$

6.76 Reaction R_SERB

This is an irreversible reaction of one reactant forming two products.

Name SERB

Reaction equation

$$\text{M\_3PSER\_c} \longrightarrow \text{M\_PI\_c} + \text{M\_SER\_c} \tag{151}$$

Reactant

Table 156: Properties of each reactant.

Id	Name	SBO
M_3PSER_c	3PSER	

Products

Table 157: Properties of each product.

Id	Name	SBO
M_PI_c	PI	
M_SER_c	SER	

Kinetic Law

$$v_{76} = \text{not specified} \tag{152}$$

6.77 Reaction R_GLYA

This is a reversible reaction of two reactants forming two products.

Name GLYA

Reaction equation

$$\text{M\_SER\_c} + \text{M\_THF\_c} \rightleftharpoons \text{M\_GLY\_c} + \text{M\_METTHF\_c} \tag{153}$$

Reactants

Table 158: Properties of each reactant.

Id	Name	SBO
M_SER_c	SER	
M_THF_c	THF	

Products

Table 159: Properties of each product.

Id	Name	SBO
M_GLY_c	GLY	
M_METTHF_c	METTHF	

Kinetic Law

$$v_{77} = \text{not specified} \tag{154}$$

6.78 Reaction R_ILVC1

This is an irreversible reaction of two reactants forming two products.

Name ILVC1

Reaction equation

$$\text{M\_ABUT\_c} + \text{M\_NADPH\_c} \longrightarrow \text{M\_DHMVA\_c} + \text{M\_NADP\_c} \tag{155}$$

Reactants

Table 160: Properties of each reactant.

Id	Name	SBO
M_ABUT_c	ABUT	
M_NADPH_c	NADPH	

Products

Table 161: Properties of each product.

Id	Name	SBO
M_DHMVA_c	DHMVA	

Id	Name	SBO
M_NADP_c	NADP	

Kinetic Law

$$v_{78} = \text{not specified} \tag{156}$$

6.79 Reaction R_ILVC2

This is an irreversible reaction of two reactants forming two products.

Name ILVC2

Reaction equation

$$\text{M\_ACLAC\_c} + \text{M\_NADPH\_c} \longrightarrow \text{M\_DHVAL\_c} + \text{M\_NADP\_c} \tag{157}$$

Reactants

Table 162: Properties of each reactant.

Id	Name	SBO
M_ACLAC_c	ACLAC	
M_NADPH_c	NADPH	

Products

Table 163: Properties of each product.

Id	Name	SBO
M_DHVAL_c	DHVAL	
M_NADP_c	NADP	

Kinetic Law

$$v_{79} = \text{not specified} \tag{158}$$

6.80 Reaction R_ILVE1

This is a reversible reaction of two reactants forming two products.

Name ILVE1

Reaction equation

$$\text{M\_GLU\_c} + \text{M\_OMVAL\_c} \rightleftharpoons \text{M\_AKG\_c} + \text{M\_ILE\_c} \tag{159}$$

Reactants

Table 164: Properties of each reactant.

Id	Name	SBO
M_GLU_c	GLU	
M_OMVAL_c	OMVAL	

Products

Table 165: Properties of each product.

Id	Name	SBO
M_AKG_c	AKG	
M_ILE_c	ILE	

Kinetic Law

$$v_{80} = \text{not specified} \tag{160}$$

6.81 Reaction R_ILVE2

This is a reversible reaction of two reactants forming two products.

Name ILVE2

Reaction equation

$$\text{M\_GLU\_c} + \text{M\_OIVAL\_c} \rightleftharpoons \text{M\_AKG\_c} + \text{M\_VAL\_c} \tag{161}$$

Reactants

Table 166: Properties of each reactant.

Id	Name	SBO
M_GLU_c	GLU	
M_OIVAL_c	OIVAL	

Products

Table 167: Properties of each product.

Id	Name	SBO
M_AKG_c	AKG	
M_VAL_c	VAL	

Kinetic Law

$$v_{81} = \text{not specified} \tag{162}$$

6.82 Reaction R_ILVE3

This is a reversible reaction of two reactants forming two products.

Name ILVE3

Reaction equation

$$\text{M\_GLU\_c} + \text{M\_OICAP\_c} \rightleftharpoons \text{M\_AKG\_c} + \text{M\_LEU\_c} \tag{163}$$

Reactants

Table 168: Properties of each reactant.

Id	Name	SBO
M_GLU_c	GLU	
M_OICAP_c	OICAP	

Products

Table 169: Properties of each product.

Id	Name	SBO
M_AKG_c	AKG	
M_LEU_c	LEU	

Kinetic Law

$$v_{82} = \text{not specified} \tag{164}$$

6.83 Reaction R_PUTA1

This is an irreversible reaction of two reactants forming two products.

Name PUTA1

Reaction equation

$$\text{M\_FAD\_c} + \text{M\_PRO\_c} \longrightarrow \text{M\_FADH\_c} + \text{M\_GLUGSAL\_c} \tag{165}$$

Reactants

Table 170: Properties of each reactant.

Id	Name	SBO
M_FAD_c	FAD	
M_PRO_c	PRO	

Products

Table 171: Properties of each product.

Id	Name	SBO
M_FADH_c	FADH	
M_GLUGSAL_c	GLUGSAL	

Kinetic Law

$$v_{83} = \text{not specified} \tag{166}$$

6.84 Reaction R_PUTA2

This is an irreversible reaction of two reactants forming two products.

Name PUTA2

Reaction equation

$$\text{M\_GLUGSAL\_c} + \text{M\_NAD\_c} \longrightarrow \text{M\_GLU\_c} + \text{M\_NADH\_c} \tag{167}$$

Reactants

Table 172: Properties of each reactant.

Id	Name	SBO
M_GLUGSAL_c	GLUGSAL	
M_NAD_c	NAD	

Products

Table 173: Properties of each product.

Id	Name	SBO
M_GLU_c	GLU	
M_NADH_c	NADH	

Kinetic Law

$$v_{84} = \text{not specified} \tag{168}$$

6.85 Reaction R_PROC

This is an irreversible reaction of two reactants forming two products.

Name PROC

Reaction equation

$$\text{M\_GLUGSAL\_c} + \text{M\_NADPH\_c} \longrightarrow \text{M\_NADP\_c} + \text{M\_PRO\_c} \tag{169}$$

Reactants

Table 174: Properties of each reactant.

Id	Name	SBO
M_GLUGSAL_c	GLUGSAL	
M_NADPH_c	NADPH	

Products

Table 175: Properties of each product.

Id	Name	SBO
M_NADP_c	NADP	

Id	Name	SBO
M_PRO_c	PRO	

Kinetic Law

$$v_{85} = \text{not specified} \tag{170}$$

6.86 Reaction R_ORNTRSN

This is an irreversible reaction of two reactants forming two products.

Name ORNTRSN

Reaction equation

$$\text{M\_AKG\_c} + \text{M\_ORN\_c} \longrightarrow \text{M\_GLUGSAL\_c} + \text{M\_GLU\_c} \tag{171}$$

Reactants

Table 176: Properties of each reactant.

Id	Name	SBO
M_AKG_c	AKG	
M_ORN_c	ORN	

Products

Table 177: Properties of each product.

Id	Name	SBO
M_GLUGSAL_c	GLUGSAL	
M_GLU_c	GLU	

Kinetic Law

$$v_{86} = \text{not specified} \tag{172}$$

6.87 Reaction R_SPEA

This is an irreversible reaction of one reactant forming two products.

Name SPEA

Reaction equation

$$\text{M\_ARG\_c} \longrightarrow \text{M\_AGM\_c} + \text{M\_CO2\_c} \tag{173}$$

Reactant

Table 178: Properties of each reactant.

Id	Name	SBO
M_ARG_c	ARG	

Products

Table 179: Properties of each product.

Id	Name	SBO
M_AGM_c	AGM	
M_CO2_c	CO2	

Kinetic Law

$$v_{87} = \text{not specified} \tag{174}$$

6.88 Reaction R_SPEB

This is an irreversible reaction of one reactant forming two products.

Name SPEB

Reaction equation

$$\text{M\_AGM\_c} \longrightarrow \text{M\_PTRC\_c} + \text{M\_UREA\_c} \tag{175}$$

Reactant

Table 180: Properties of each reactant.

Id	Name	SBO
M_AGM_c	AGM	

Products

Table 181: Properties of each product.

Id	Name	SBO
M_PTRC_c	PTRC	
M_UREA_c	UREA	

Kinetic Law

$$v_{88} = \text{not specified} \tag{176}$$

6.89 Reaction R_SPED

This is a reversible reaction of one reactant forming two products.

Name SPED

Reaction equation

$$\text{M\_SAM\_c} \rightleftharpoons \text{M\_CO2\_c} + \text{M\_DSAM\_c} \tag{177}$$

Reactant

Table 182: Properties of each reactant.

Id	Name	SBO
M_SAM_c	SAM	

Products

Table 183: Properties of each product.

Id	Name	SBO
M_CO2_c	CO2	
M_DSAM_c	DSAM	

Kinetic Law

$$v_{89} = \text{not specified} \tag{178}$$

6.90 Reaction R_SPEE

This is an irreversible reaction of two reactants forming two products.

Name SPEE

Reaction equation

$$\text{M\_DSAM\_c} + \text{M\_PTRC\_c} \longrightarrow \text{M\_5MTA\_c} + \text{M\_SPMD\_c} \tag{179}$$

Reactants

Table 184: Properties of each reactant.

Id	Name	SBO
M_DSAM_c	DSAM	
M_PTRC_c	PTRC	

Products

Table 185: Properties of each product.

Id	Name	SBO
M_5MTA_c	5MTA	
M_SPMD_c	SPMD	

Kinetic Law

$$v_{90} = \text{not specified} \tag{180}$$

6.91 Reaction R_MTHAKN

This is an irreversible reaction of one reactant forming two products.

Name MTHAKN

Reaction equation

$$\text{M\_5MTA\_c} \longrightarrow \text{M\_5MTR\_c} + \text{M\_AD\_c} \tag{181}$$

Reactant

Table 186: Properties of each reactant.

Id	Name	SBO
M_5MTA_c	5MTA	

Products

Table 187: Properties of each product.

Id	Name	SBO
M_5MTR_c	5MTR	
M_AD_c	AD	

Kinetic Law

$$v_{91} = \text{not specified} \tag{182}$$

6.92 Reaction R_MTHRKN

This is an irreversible reaction of two reactants forming two products.

Name MTHRKN

Reaction equation

$$\text{M\_5MTR\_c} + \text{M\_ATP\_c} \longrightarrow \text{M\_5MTRP\_c} + \text{M\_ADP\_c} \tag{183}$$

Reactants

Table 188: Properties of each reactant.

Id	Name	SBO
M_5MTR_c	5MTR	
M_ATP_c	ATP	

Products

Table 189: Properties of each product.

Id	Name	SBO
M_5MTRP_c	5MTRP	
M_ADP_c	ADP	

Kinetic Law

$$v_{92} = \text{not specified} \tag{184}$$

6.93 Reaction R_MTHIPIS

This is a reversible reaction of one reactant forming one product.

Name MTHIPIS

Reaction equation

$$\text{M\_5MTRP\_c} \rightleftharpoons \text{M\_5MTR1P\_c} \tag{185}$$

Reactant

Table 190: Properties of each reactant.

Id	Name	SBO
M_5MTRP_c	5MTRP	

Product

Table 191: Properties of each product.

Id	Name	SBO
M_5MTR1P_c	5MTR1P	

Kinetic Law

$$v_{93} = \text{not specified} \tag{186}$$

6.94 Reaction R_NE1PH

This is an irreversible reaction of one reactant forming one product.

Name NE1PH

Reaction equation

$$\text{M\_5MTR1P\_c} \longrightarrow \text{M\_DKMPP\_c} \tag{187}$$

Reactant

Table 192: Properties of each reactant.

Id	Name	SBO
M_5MTR1P_c	5MTR1P	

Product

Table 193: Properties of each product.

Id	Name	SBO
M_DKMPP_c	DKMPP	

Kinetic Law

$$v_{94} = \text{not specified} \tag{188}$$

6.95 Reaction R_NE3UNK

This is an irreversible reaction of one reactant forming two products.

Name NE3UNK

Reaction equation

$$\text{M\_DKMPP\_c} \longrightarrow \text{M\_FOR\_c} + \text{M\_KMB\_c} \tag{189}$$

Reactant

Table 194: Properties of each reactant.

Id	Name	SBO
M_DKMPP_c	DKMPP	

Products

Table 195: Properties of each product.

Id	Name	SBO
M_FOR_c	FOR	
M_KMB_c	KMB	

Kinetic Law

$$v_{95} = \text{not specified} \tag{190}$$

6.96 Reaction R_TNSUNK

This is an irreversible reaction of two reactants forming two products.

Name TNSUNK

Reaction equation

$$\text{M\_GLN\_c} + \text{M\_KMB\_c} \longrightarrow \text{M\_GLU\_c} + \text{M\_MET\_c} \tag{191}$$

Reactants

Table 196: Properties of each reactant.

Id	Name	SBO
M_GLN_c	GLN	
M_KMB_c	KMB	

Products

Table 197: Properties of each product.

Id	Name	SBO
M_GLU_c	GLU	
M_MET_c	MET	

Kinetic Law

$$v_{96} = \text{not specified} \tag{192}$$

6.97 Reaction R_GDHA

This is a reversible reaction of three reactants forming two products.

Name GDHA

Reaction equation

$$\text{M\_AKG\_c} + \text{M\_NADPH\_c} + \text{M\_NH3\_c} \rightleftharpoons \text{M\_GLU\_c} + \text{M\_NADP\_c} \tag{193}$$

Reactants

Table 198: Properties of each reactant.

Id	Name	SBO
M_AKG_c	AKG	
M_NADPH_c	NADPH	
M_NH3_c	NH3	

Products

Table 199: Properties of each product.

Id	Name	SBO
M_GLU_c	GLU	
M_NADP_c	NADP	

Kinetic Law

$$v_{97} = \text{not specified} \tag{194}$$

6.98 Reaction R_GLNA

This is an irreversible reaction of three reactants forming three products.

Name GLNA

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_GLU\_c} + \text{M\_NH3\_c} \longrightarrow \text{M\_ADP\_c} + \text{M\_GLN\_c} + \text{M\_PI\_c} \tag{195}$$

Reactants

Table 200: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_GLU_c	GLU	
M_NH3_c	NH3	

Products

Table 201: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_GLN_c	GLN	
M_PI_c	PI	

Kinetic Law

$$v_{98} = \text{not specified} \tag{196}$$

6.99 Reaction R_CYSDN

This is an irreversible reaction of three reactants forming four products.

Name CYSDN

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_GTP\_c} + \text{M\_SLF\_c} \longrightarrow \text{M\_APS\_c} + \text{M\_GDP\_c} + \text{M\_PI\_c} + \text{M\_PPI\_c} \tag{197}$$

Reactants

Table 202: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_GTP_c	GTP	
M_SLF_c	SLF	

Products

Table 203: Properties of each product.

Id	Name	SBO
M_APS_c	APS	
M_GDP_c	GDP	
M_PI_c	PI	
M_PPI_c	PPI	

Kinetic Law

$$v_{99} = \text{not specified} \tag{198}$$

6.100 Reaction R_CYSC

This is an irreversible reaction of two reactants forming two products.

Name CYSC

Reaction equation

$$\text{M\_APS\_c} + \text{M\_ATP\_c} \longrightarrow \text{M\_ADP\_c} + \text{M\_PAPS\_c} \tag{199}$$

Reactants

Table 204: Properties of each reactant.

Id	Name	SBO
M_APS_c	APS	
M_ATP_c	ATP	

Products

Table 205: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_PAPS_c	PAPS	

Kinetic Law

$$v_{100} = \text{not specified} \tag{200}$$

6.101 Reaction R_CYSH

This is an irreversible reaction of two reactants forming three products.

Name CYSH

Reaction equation

$$\text{M\_PAPS\_c} + \text{M\_RTHIO\_c} \longrightarrow \text{M\_H2SO3\_c} + \text{M\_OTHIO\_c} + \text{M\_PAP\_c} \tag{201}$$

Reactants

Table 206: Properties of each reactant.

Id	Name	SBO
M_PAPS_c	PAPS	
M_RTHIO_c	RTHIO	

Products

Table 207: Properties of each product.

Id	Name	SBO
M_H2SO3_c	H2SO3	
M_OTHIO_c	OTHIO	
M_PAP_c	PAP	

Kinetic Law

$$v_{101} = \text{not specified} \tag{202}$$

6.102 Reaction R_CYSIJ

This is a reversible reaction of two reactants forming two products.

Name CYSIJ

Reaction equation

$$\text{M\_H2SO3\_c} + 3\,\text{M\_NADPH\_c} \rightleftharpoons \text{M\_H2S\_c} + 3\,\text{M\_NADP\_c} \tag{203}$$

Reactants

Table 208: Properties of each reactant.

Id	Name	SBO
M_H2SO3_c	H2SO3	
M_NADPH_c	NADPH	

Products

Table 209: Properties of each product.

Id	Name	SBO
M_H2S_c	H2S	
M_NADP_c	NADP	

Kinetic Law

$$v_{102} = \text{not specified} \tag{204}$$

6.103 Reaction R_CYSE

This is a reversible reaction of two reactants forming two products.

Name CYSE

Reaction equation

$$\text{M\_ACCOA\_c} + \text{M\_SER\_c} \rightleftharpoons \text{M\_ASER\_c} + \text{M\_COA\_c} \tag{205}$$

Reactants

Table 210: Properties of each reactant.

Id	Name	SBO
M_ACCOA_c	ACCOA	
M_SER_c	SER	

Products

Table 211: Properties of each product.

Id	Name	SBO
M_ASER_c	ASER	
M_COA_c	COA	

Kinetic Law

$$v_{103} = \text{not specified} \tag{206}$$

6.104 Reaction R_CYSK

This is an irreversible reaction of two reactants forming two products.

Name CYSK

Reaction equation

$$\text{M\_ASER\_c} + \text{M\_H2S\_c} \longrightarrow \text{M\_AC\_c} + \text{M\_CYS\_c} \tag{207}$$

Reactants

Table 212: Properties of each reactant.

Id	Name	SBO
M_ASER_c	ASER	
M_H2S_c	H2S	

Products

Table 213: Properties of each product.

Id	Name	SBO
M_AC_c	AC	
M_CYS_c	CYS	

Kinetic Law

$$v_{104} = \text{not specified} \tag{208}$$

6.105 Reaction R_ROCF

This is an irreversible reaction of one reactant forming two products.

Name ROCF

Reaction equation

$$\text{M\_ARG\_c} \longrightarrow \text{M\_ORN\_c} + \text{M\_UREA\_c} \tag{209}$$

Reactant

Table 214: Properties of each reactant.

Id	Name	SBO
M_ARG_c	ARG	

Products

Table 215: Properties of each product.

Id	Name	SBO
M_ORN_c	ORN	
M_UREA_c	UREA	

Kinetic Law

$$v_{105} = \text{not specified} \tag{210}$$

6.106 Reaction R_DADA

This is an irreversible reaction of two reactants forming three products.

Name DADA

Reaction equation

$$\text{M\_DALA\_c} + \text{M\_FAD\_c} \longrightarrow \text{M\_FADH\_c} + \text{M\_NH3\_c} + \text{M\_PYR\_c} \tag{211}$$

Reactants

Table 216: Properties of each reactant.

Id	Name	SBO
M_DALA_c	DALA	
M_FAD_c	FAD	

Products

Table 217: Properties of each product.

Id	Name	SBO
M_FADH_c	FADH	
M_NH3_c	NH3	
M_PYR_c	PYR	

Kinetic Law

$$v_{106} = \text{not specified} \tag{212}$$

6.107 Reaction R_ALR

This is a reversible reaction of one reactant forming one product.

Name ALR

Reaction equation

$$\mathrm{M\_ALA\_c} \rightleftharpoons \mathrm{M\_DALA\_c} \tag{213}$$

Reactant

Table 218: Properties of each reactant.

Id	Name	SBO
M_ALA_c	ALA	

Product

Table 219: Properties of each product.

Id	Name	SBO
M_DALA_c	DALA	

Kinetic Law

$$v_{107} = \text{not specified} \tag{214}$$

6.108 Reaction R_ALD

This is an irreversible reaction of two reactants forming three products.

Name ALD

Reaction equation

$$\mathrm{M\_ALA\_c} + \mathrm{M\_NAD\_c} \longrightarrow \mathrm{M\_NADH\_c} + \mathrm{M\_NH3\_c} + \mathrm{M\_PYR\_c} \tag{215}$$

Reactants

Table 220: Properties of each reactant.

Id	Name	SBO
M_ALA_c	ALA	
M_NAD_c	NAD	

Products

Table 221: Properties of each product.

Id	Name	SBO
M_NADH_c	NADH	
M_NH3_c	NH3	
M_PYR_c	PYR	

Kinetic Law

$$v_{108} = \text{not specified} \tag{216}$$

6.109 Reaction R_ASNA

This is an irreversible reaction of three reactants forming three products.

Name ASNA

Reaction equation

$$\text{M\_ASP\_c} + \text{M\_ATP\_c} + \text{M\_NH3\_c} \longrightarrow \text{M\_AMP\_c} + \text{M\_ASN\_c} + \text{M\_PPI\_c} \tag{217}$$

Reactants

Table 222: Properties of each reactant.

Id	Name	SBO
M_ASP_c	ASP	
M_ATP_c	ATP	
M_NH3_c	NH3	

Products

Table 223: Properties of each product.

Id	Name	SBO
M_AMP_c	AMP	
M_ASN_c	ASN	
M_PPI_c	PPI	

Kinetic Law

$$v_{109} = \text{not specified} \tag{218}$$

6.110 Reaction R_ANSB

This is an irreversible reaction of one reactant forming two products.

Name ANSB

Reaction equation

$$\text{M\_ASN\_c} \longrightarrow \text{M\_ASP\_c} + \text{M\_NH3\_c} \tag{219}$$

Reactant

Table 224: Properties of each reactant.

Id	Name	SBO
M_ASN_c	ASN	

Products

Table 225: Properties of each product.

Id	Name	SBO
M_ASP_c	ASP	
M_NH3_c	NH3	

Kinetic Law

$$v_{110} = \text{not specified} \tag{220}$$

6.111 Reaction R_PYRA

This is an irreversible reaction of three reactants forming four products.

Name PYRA

Reaction equation

$$2\,\text{M\_ATP\_c} + \text{M\_CO2\_c} + \text{M\_GLN\_c} \longrightarrow 2\,\text{M\_ADP\_c} + \text{M\_CAP\_c} + \text{M\_GLU\_c} + \text{M\_PI\_c} \tag{221}$$

Reactants

Table 226: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_CO2_c	CO2	
M_GLN_c	GLN	

Products

Table 227: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_CAP_c	CAP	
M_GLU_c	GLU	
M_PI_c	PI	

Kinetic Law

$$v_{111} = \text{not specified} \tag{222}$$

6.112 Reaction R_PYRB

This is an irreversible reaction of two reactants forming two products.

Name PYRB

Reaction equation

$$\text{M\_ASP\_c} + \text{M\_CAP\_c} \longrightarrow \text{M\_CAASP\_c} + \text{M\_PI\_c} \tag{223}$$

Reactants

Table 228: Properties of each reactant.

Id	Name	SBO
M_ASP_c	ASP	
M_CAP_c	CAP	

Products

Table 229: Properties of each product.

Id	Name	SBO
M_CAASP_c	CAASP	
M_PI_c	PI	

Kinetic Law

$$v_{112} = \text{not specified} \tag{224}$$

6.113 Reaction R_PYRC

This is a reversible reaction of one reactant forming one product.

Name PYRC

Reaction equation

$$\text{M\_CAASP\_c} \rightleftharpoons \text{M\_DOROA\_c} \tag{225}$$

Reactant

Table 230: Properties of each reactant.

Id	Name	SBO
M_CAASP_c	CAASP	

Product

Table 231: Properties of each product.

Id	Name	SBO
M_DOROA_c	DOROA	

Kinetic Law

$$v_{113} = \text{not specified} \tag{226}$$

6.114 Reaction R_PYRD

This is a reversible reaction of two reactants forming two products.

Name PYRD

Reaction equation

$$\text{M\_DOROA\_c} + \text{M\_MK\_c} \rightleftharpoons \text{M\_MKH2\_c} + \text{M\_OROA\_c} \tag{227}$$

Reactants

Table 232: Properties of each reactant.

Id	Name	SBO
M_DOROA_c	DOROA	
M_MK_c	MK	

Products

Table 233: Properties of each product.

Id	Name	SBO
M_MKH2_c	MKH2	
M_OROA_c	OROA	

Kinetic Law

$$v_{114} = \text{not specified} \tag{228}$$

6.115 Reaction R_PYRE

This is a reversible reaction of two reactants forming two products.

Name PYRE

Reaction equation

$$\text{M\_OROA\_c} + \text{M\_PRPP\_c} \rightleftharpoons \text{M\_OMP\_c} + \text{M\_PPI\_c} \tag{229}$$

Reactants

Table 234: Properties of each reactant.

Id	Name	SBO
M_OROA_c	OROA	
M_PRPP_c	PRPP	

Products

Table 235: Properties of each product.

Id	Name	SBO
M_OMP_c	OMP	
M_PPI_c	PPI	

Kinetic Law

$$v_{115} = \text{not specified} \tag{230}$$

6.116 Reaction R_PYRF

This is an irreversible reaction of one reactant forming two products.

Name PYRF

Reaction equation

$$\text{M\_OMP\_c} \longrightarrow \text{M\_CO2\_c} + \text{M\_UMP\_c} \tag{231}$$

Reactant

Table 236: Properties of each reactant.

Id	Name	SBO
M_OMP_c	OMP	

Products

Table 237: Properties of each product.

Id	Name	SBO
M_CO2_c	CO2	
M_UMP_c	UMP	

Kinetic Law

$$v_{116} = \text{not specified} \tag{232}$$

6.117 Reaction R_PYRH

This is a reversible reaction of two reactants forming two products.

Name PYRH

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_UMP\_c} \rightleftharpoons \text{M\_ADP\_c} + \text{M\_UDP\_c} \tag{233}$$

Reactants

Table 238: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_UMP_c	UMP	

Products

Table 239: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_UDP_c	UDP	

Kinetic Law

$$v_{117} = \text{not specified} \tag{234}$$

6.118 Reaction R_CMKA

This is a reversible reaction of two reactants forming two products.

Name CMKA

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_CMP\_c} \rightleftharpoons \text{M\_ADP\_c} + \text{M\_CDP\_c} \tag{235}$$

Reactants

Table 240: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_CMP_c	CMP	

Products

Table 241: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_CDP_c	CDP	

Kinetic Law

$$v_{118} = \text{not specified} \tag{236}$$

6.119 Reaction R_PYRG

This is an irreversible reaction of three reactants forming four products.

Name PYRG

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_GLN\_c} + \text{M\_UTP\_c} \longrightarrow \text{M\_ADP\_c} + \text{M\_CTP\_c} + \text{M\_GLU\_c} + \text{M\_PI\_c} \tag{237}$$

Reactants

Table 242: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	

Id	Name	SBO
M_GLN_c	GLN	
M_UTP_c	UTP	

Products

Table 243: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_CTP_c	CTP	
M_GLU_c	GLU	
M_PI_c	PI	

Kinetic Law

$$v_{119} = \text{not specified} \tag{238}$$

6.120 Reaction R_UPP

This is an irreversible reaction of two reactants forming two products.

Name UPP

Reaction equation

$$\text{M\_PRPP\_c} + \text{M\_URA\_c} \longrightarrow \text{M\_PPI\_c} + \text{M\_UMP\_c} \tag{239}$$

Reactants

Table 244: Properties of each reactant.

Id	Name	SBO
M_PRPP_c	PRPP	
M_URA_c	URA	

Products

Table 245: Properties of each product.

Id	Name	SBO
M_PPI_c	PPI	
M_UMP_c	UMP	

Kinetic Law

$$v_{120} = \text{not specified} \tag{240}$$

6.121 Reaction R_PURA

This is an irreversible reaction of three reactants forming three products.

Name PURA

Reaction equation

$$\text{M\_ASP\_c} + \text{M\_GTP\_c} + \text{M\_IMP\_c} \longrightarrow \text{M\_ASUC\_c} + \text{M\_GDP\_c} + \text{M\_PI\_c} \tag{241}$$

Reactants

Table 246: Properties of each reactant.

Id	Name	SBO
M_ASP_c	ASP	
M_GTP_c	GTP	
M_IMP_c	IMP	

Products

Table 247: Properties of each product.

Id	Name	SBO
M_ASUC_c	ASUC	
M_GDP_c	GDP	
M_PI_c	PI	

Kinetic Law

$$v_{121} = \text{not specified} \tag{242}$$

6.122 Reaction R_PURB

This is a reversible reaction of one reactant forming two products.

Name PURB

Reaction equation

$$\text{M\_ASUC\_c} \rightleftharpoons \text{M\_AMP\_c} + \text{M\_FUM\_c} \tag{243}$$

Reactant

Table 248: Properties of each reactant.

Id	Name	SBO
M_ASUC_c	ASUC	

Products

Table 249: Properties of each product.

Id	Name	SBO
M_AMP_c	AMP	
M_FUM_c	FUM	

Kinetic Law

$$v_{122} = \text{not specified} \tag{244}$$

6.123 Reaction R_GUAB

This is an irreversible reaction of two reactants forming two products.

Name GUAB

Reaction equation

$$\text{M\_IMP\_c} + \text{M\_NAD\_c} \longrightarrow \text{M\_NADH\_c} + \text{M\_XMP\_c} \tag{245}$$

Reactants

Table 250: Properties of each reactant.

Id	Name	SBO
M_IMP_c	IMP	
M_NAD_c	NAD	

Products

Table 251: Properties of each product.

Id	Name	SBO
M_NADH_c	NADH	
M_XMP_c	XMP	

Kinetic Law

$$v_{123} = \text{not specified} \tag{246}$$

6.124 Reaction R_GUAA

This is an irreversible reaction of three reactants forming four products.

Name GUAA

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_GLN\_c} + \text{M\_XMP\_c} \longrightarrow \text{M\_AMP\_c} + \text{M\_GLU\_c} + \text{M\_GMP\_c} + \text{M\_PPI\_c} \tag{247}$$

Reactants

Table 252: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_GLN_c	GLN	
M_XMP_c	XMP	

Products

Table 253: Properties of each product.

Id	Name	SBO
M_AMP_c	AMP	
M_GLU_c	GLU	
M_GMP_c	GMP	
M_PPI_c	PPI	

Kinetic Law

$$v_{124} = \text{not specified} \tag{248}$$

6.125 Reaction R_GUAC

This is an irreversible reaction of two reactants forming three products.

Name GUAC

Reaction equation

$$\text{M\_GMP\_c} + \text{M\_NADPH\_c} \longrightarrow \text{M\_IMP\_c} + \text{M\_NADP\_c} + \text{M\_NH3\_c} \tag{249}$$

Reactants

Table 254: Properties of each reactant.

Id	Name	SBO
M_GMP_c	GMP	
M_NADPH_c	NADPH	

Products

Table 255: Properties of each product.

Id	Name	SBO
M_IMP_c	IMP	
M_NADP_c	NADP	
M_NH3_c	NH3	

Kinetic Law

$$v_{125} = \text{not specified} \tag{250}$$

6.126 Reaction R_PURD

This is a reversible reaction of three reactants forming three products.

Name PURD

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_GLY\_c} + \text{M\_PRAM\_c} \rightleftharpoons \text{M\_ADP\_c} + \text{M\_GAR\_c} + \text{M\_PI\_c} \tag{251}$$

Reactants

Table 256: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_GLY_c	GLY	
M_PRAM_c	PRAM	

Products

Table 257: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_GAR_c	GAR	
M_PI_c	PI	

Kinetic Law

$$v_{126} = \text{not specified} \tag{252}$$

6.127 Reaction R_NDK1

This is a reversible reaction of two reactants forming two products.

Name NDK1

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_GDP\_c} \rightleftharpoons \text{M\_ADP\_c} + \text{M\_GTP\_c} \tag{253}$$

Reactants

Table 258: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_GDP_c	GDP	

Products

Table 259: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_GTP_c	GTP	

Kinetic Law

$$v_{127} = \text{not specified} \tag{254}$$

6.128 Reaction R_NDK2

This is a reversible reaction of two reactants forming two products.

Name NDK2

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_UDP\_c} \rightleftharpoons \text{M\_ADP\_c} + \text{M\_UTP\_c} \tag{255}$$

Reactants

Table 260: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_UDP_c	UDP	

Products

Table 261: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	

Id	Name	SBO
M_UTP_c	UTP	

Kinetic Law

$$v_{128} = \text{not specified} \tag{256}$$

6.129 Reaction R_NDK3

This is a reversible reaction of two reactants forming two products.

Name NDK3

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_CDP\_c} \rightleftharpoons \text{M\_ADP\_c} + \text{M\_CTP\_c} \tag{257}$$

Reactants

Table 262: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_CDP_c	CDP	

Products

Table 263: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_CTP_c	CTP	

Kinetic Law

$$v_{129} = \text{not specified} \tag{258}$$

6.130 Reaction R_NDK4

This is a reversible reaction of two reactants forming two products.

Name NDK4

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_DGDP\_c} \rightleftharpoons \text{M\_ADP\_c} + \text{M\_DGTP\_c} \tag{259}$$

Reactants

Table 264: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_DGDP_c	DGDP	

Products

Table 265: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_DGTP_c	DGTP	

Kinetic Law

$$v_{130} = \text{not specified} \tag{260}$$

6.131 Reaction R_NDK5

This is a reversible reaction of two reactants forming two products.

Name NDK5

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_DUDP\_c} \rightleftharpoons \text{M\_ADP\_c} + \text{M\_DUTP\_c} \tag{261}$$

Reactants

Table 266: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_DUDP_c	DUDP	

Products

Table 267: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_DUTP_c	DUTP	

Kinetic Law

$$v_{131} = \text{not specified} \tag{262}$$

6.132 Reaction R_NDK6

This is a reversible reaction of two reactants forming two products.

Name NDK6

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_DCDP\_c} \rightleftharpoons \text{M\_ADP\_c} + \text{M\_DCTP\_c} \tag{263}$$

Reactants

Table 268: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_DCDP_c	DCDP	

Products

Table 269: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_DCTP_c	DCTP	

Kinetic Law

$$v_{132} = \text{not specified} \tag{264}$$

6.133 Reaction R_NDK7

This is a reversible reaction of two reactants forming two products.

Name NDK7

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_DADP\_c} \rightleftharpoons \text{M\_ADP\_c} + \text{M\_DATP\_c} \tag{265}$$

Reactants

Table 270: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_DADP_c	DADP	

Products

Table 271: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_DATP_c	DATP	

Kinetic Law

$$v_{133} = \text{not specified} \tag{266}$$

6.134 Reaction R_NDK8

This is a reversible reaction of two reactants forming two products.

Name NDK8

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_DTDP\_c} \rightleftharpoons \text{M\_ADP\_c} + \text{M\_DTTP\_c} \tag{267}$$

Reactants

Table 272: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_DTDP_c	DTDP	

Products

Table 273: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_DTTP_c	DTTP	

Kinetic Law

$$v_{134} = \text{not specified} \tag{268}$$

6.135 Reaction R_THYA

This is an irreversible reaction of two reactants forming two products.

Name THYA

Reaction equation

$$\text{M\_DUMP\_c} + \text{M\_METTHF\_c} \longrightarrow \text{M\_DHF\_c} + \text{M\_DTMP\_c} \tag{269}$$

Reactants

Table 274: Properties of each reactant.

Id	Name	SBO
M_DUMP_c	DUMP	
M_METTHF_c	METTHF	

Products

Table 275: Properties of each product.

Id	Name	SBO
M_DHF_c	DHF	

Id	Name	SBO
M_DTMP_c	DTMP	

Kinetic Law

$$v_{135} = \text{not specified} \tag{270}$$

6.136 Reaction R_TDK1

This is an irreversible reaction of two reactants forming two products.

Name TDK1

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_DT\_c} \longrightarrow \text{M\_ADP\_c} + \text{M\_DTMP\_c} \tag{271}$$

Reactants

Table 276: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_DT_c	DT	

Products

Table 277: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_DTMP_c	DTMP	

Kinetic Law

$$v_{136} = \text{not specified} \tag{272}$$

6.137 Reaction R_TDK2

This is an irreversible reaction of two reactants forming two products.

Name TDK2

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_DU\_c} \longrightarrow \text{M\_ADP\_c} + \text{M\_DUMP\_c} \tag{273}$$

Reactants

Table 278: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_DU_c	DU	

Products

Table 279: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_DUMP_c	DUMP	

Kinetic Law

$$v_{137} = \text{not specified} \tag{274}$$

6.138 Reaction R_TMK1

This is a reversible reaction of two reactants forming two products.

Name TMK1

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_DTMP\_c} \rightleftharpoons \text{M\_ADP\_c} + \text{M\_DTDP\_c} \tag{275}$$

Reactants

Table 280: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_DTMP_c	DTMP	

Products

Table 281: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_DTDP_c	DTDP	

Kinetic Law

$$v_{138} = \text{not specified} \tag{276}$$

6.139 Reaction R_TMK2

This is a reversible reaction of two reactants forming two products.

Name TMK2

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_DUMP\_c} \rightleftharpoons \text{M\_ADP\_c} + \text{M\_DUDP\_c} \tag{277}$$

Reactants

Table 282: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_DUMP_c	DUMP	

Products

Table 283: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_DUDP_c	DUDP	

Kinetic Law

$$v_{139} = \text{not specified} \tag{278}$$

6.140 Reaction R_DCD

This is an irreversible reaction of one reactant forming two products.

Name DCD

Reaction equation

$$\text{M\_DCTP\_c} \longrightarrow \text{M\_DUTP\_c} + \text{M\_NH3\_c} \tag{279}$$

Reactant

Table 284: Properties of each reactant.

Id	Name	SBO
M_DCTP_c	DCTP	

Products

Table 285: Properties of each product.

Id	Name	SBO
M_DUTP_c	DUTP	
M_NH3_c	NH3	

Kinetic Law

$$v_{140} = \text{not specified} \tag{280}$$

6.141 Reaction R_DUT

This is an irreversible reaction of one reactant forming two products.

Name DUT

Reaction equation

$$\text{M\_DUTP\_c} \longrightarrow \text{M\_DUMP\_c} + \text{M\_PPI\_c} \tag{281}$$

Reactant

Table 286: Properties of each reactant.

Id	Name	SBO
M_DUTP_c	DUTP	

Products

Table 287: Properties of each product.

Id	Name	SBO
M_DUMP_c	DUMP	
M_PPI_c	PPI	

Kinetic Law

$$v_{141} = \text{not specified} \tag{282}$$

6.142 Reaction R_ADK1

This is a reversible reaction of two reactants forming one product.

Name ADK1

Reaction equation

$$\text{M\_AMP\_c} + \text{M\_ATP\_c} \rightleftharpoons 2\,\text{M\_ADP\_c} \tag{283}$$

Reactants

Table 288: Properties of each reactant.

Id	Name	SBO
M_AMP_c	AMP	
M_ATP_c	ATP	

Product

Table 289: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	

Kinetic Law

$$v_{142} = \text{not specified} \tag{284}$$

6.143 Reaction R_ADK2

This is a reversible reaction of two reactants forming two products.

Name ADK2

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_DAMP\_c} \rightleftharpoons \text{M\_ADP\_c} + \text{M\_DADP\_c} \tag{285}$$

Reactants

Table 290: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_DAMP_c	DAMP	

Products

Table 291: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_DADP_c	DADP	

Kinetic Law

$$v_{143} = \text{not specified} \tag{286}$$

6.144 Reaction R_GMK1

This is a reversible reaction of two reactants forming two products.

Name GMK1

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_GMP\_c} \rightleftharpoons \text{M\_ADP\_c} + \text{M\_GDP\_c} \tag{287}$$

Reactants

Table 292: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_GMP_c	GMP	

Products

Table 293: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_GDP_c	GDP	

Kinetic Law

$$v_{144} = \text{not specified} \tag{288}$$

6.145 Reaction R_GMK2

This is a reversible reaction of two reactants forming two products.

Name GMK2

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_DGMP\_c} \rightleftharpoons \text{M\_ADP\_c} + \text{M\_DGDP\_c} \tag{289}$$

Reactants

Table 294: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_DGMP_c	DGMP	

Products

Table 295: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_DGDP_c	DGDP	

Kinetic Law

$$v_{145} = \text{not specified} \tag{290}$$

6.146 Reaction R_APT

This is an irreversible reaction of two reactants forming two products.

Name APT

Reaction equation

$$\text{M\_AD\_c} + \text{M\_PRPP\_c} \longrightarrow \text{M\_AMP\_c} + \text{M\_PPI\_c} \tag{291}$$

Reactants

Table 296: Properties of each reactant.

Id	Name	SBO
M_AD_c	AD	
M_PRPP_c	PRPP	

Products

Table 297: Properties of each product.

Id	Name	SBO
M_AMP_c	AMP	
M_PPI_c	PPI	

Kinetic Law

$$v_{146} = \text{not specified} \tag{292}$$

6.147 Reaction R_NRDAB1

This is an irreversible reaction of two reactants forming two products.

Name NRDAB1

Reaction equation

$$\text{M\_CDP\_c} + \text{M\_RTHIO\_c} \longrightarrow \text{M\_DCDP\_c} + \text{M\_OTHIO\_c} \tag{293}$$

Reactants

Table 298: Properties of each reactant.

Id	Name	SBO
M_CDP_c	CDP	
M_RTHIO_c	RTHIO	

Products

Table 299: Properties of each product.

Id	Name	SBO
M_DCDP_c	DCDP	
M_OTHIO_c	OTHIO	

Kinetic Law

$$v_{147} = \text{not specified} \tag{294}$$

6.148 Reaction R_NRDAB2

This is an irreversible reaction of two reactants forming two products.

Name NRDAB2

Reaction equation

$$\text{M\_RTHIO\_c} + \text{M\_UDP\_c} \longrightarrow \text{M\_DUDP\_c} + \text{M\_OTHIO\_c} \tag{295}$$

Reactants

Table 300: Properties of each reactant.

Id	Name	SBO
M_RTHIO_c	RTHIO	
M_UDP_c	UDP	

Products

Table 301: Properties of each product.

Id	Name	SBO
M_DUDP_c	DUDP	
M_OTHIO_c	OTHIO	

Kinetic Law

$$v_{148} = \text{not specified} \tag{296}$$

6.149 Reaction R_NRDAB3

This is an irreversible reaction of two reactants forming two products.

Name NRDAB3

Reaction equation

$$\text{M\_ADP\_c} + \text{M\_RTHIO\_c} \longrightarrow \text{M\_DADP\_c} + \text{M\_OTHIO\_c} \tag{297}$$

Reactants

Table 302: Properties of each reactant.

Id	Name	SBO
M_ADP_c	ADP	
M_RTHIO_c	RTHIO	

Products

Table 303: Properties of each product.

Id	Name	SBO
M_DADP_c	DADP	
M_OTHIO_c	OTHIO	

Kinetic Law

$$v_{149} = \text{not specified} \tag{298}$$

6.150 Reaction R_NRDAB4

This is an irreversible reaction of two reactants forming two products.

Name NRDAB4

Reaction equation

$$\text{M\_GDP\_c} + \text{M\_RTHIO\_c} \longrightarrow \text{M\_DGDP\_c} + \text{M\_OTHIO\_c} \tag{299}$$

Reactants

Table 304: Properties of each reactant.

Id	Name	SBO
M_GDP_c	GDP	
M_RTHIO_c	RTHIO	

Products

Table 305: Properties of each product.

Id	Name	SBO
M_DGDP_c	DGDP	
M_OTHIO_c	OTHIO	

Kinetic Law

$$v_{150} = \text{not specified} \tag{300}$$

6.151 Reaction R_TRXB

This is an irreversible reaction of two reactants forming two products.

Name TRXB

Reaction equation

$$\text{M\_NADPH\_c} + \text{M\_OTHIO\_c} \longrightarrow \text{M\_NADP\_c} + \text{M\_RTHIO\_c} \tag{301}$$

Reactants

Table 306: Properties of each reactant.

Id	Name	SBO
M_NADPH_c	NADPH	
M_OTHIO_c	OTHIO	

Products

Table 307: Properties of each product.

Id	Name	SBO
M_NADP_c	NADP	
M_RTHIO_c	RTHIO	

Kinetic Law

$$v_{151} = \text{not specified} \tag{302}$$

6.152 Reaction R_DEOD1

This is a reversible reaction of two reactants forming two products.

Name DEOD1

Reaction equation

$$\text{M\_DIN\_c} + \text{M\_PI\_c} \rightleftharpoons \text{M\_DR1P\_c} + \text{M\_HYXN\_c} \tag{303}$$

Reactants

Table 308: Properties of each reactant.

Id	Name	SBO
M_DIN_c	DIN	
M_PI_c	PI	

Products

Table 309: Properties of each product.

Id	Name	SBO
M_DR1P_c	DR1P	

Id	Name	SBO
M_HYXN_c	HYXN	

Kinetic Law

$$v_{152} = \text{not specified} \tag{304}$$

6.153 Reaction R_DEOD2

This is a reversible reaction of two reactants forming two products.

Name DEOD2

Reaction equation

$$\text{M\_DA\_c} + \text{M\_PI\_c} \rightleftharpoons \text{M\_AD\_c} + \text{M\_DR1P\_c} \tag{305}$$

Reactants

Table 310: Properties of each reactant.

Id	Name	SBO
M_DA_c	DA	
M_PI_c	PI	

Products

Table 311: Properties of each product.

Id	Name	SBO
M_AD_c	AD	
M_DR1P_c	DR1P	

Kinetic Law

$$v_{153} = \text{not specified} \tag{306}$$

6.154 Reaction R_DEOD3

This is a reversible reaction of two reactants forming two products.

Name DEOD3

Reaction equation

$$\text{M\_DG\_c} + \text{M\_PI\_c} \rightleftharpoons \text{M\_DR1P\_c} + \text{M\_GN\_c} \tag{307}$$

Reactants

Table 312: Properties of each reactant.

Id	Name	SBO
M_DG_c	DG	
M_PI_c	PI	

Products

Table 313: Properties of each product.

Id	Name	SBO
M_DR1P_c	DR1P	
M_GN_c	GN	

Kinetic Law

$$v_{154} = \text{not specified} \tag{308}$$

6.155 Reaction R_DEOD4

This is a reversible reaction of two reactants forming two products.

Name DEOD4

Reaction equation

$$\text{M\_HYXN\_c} + \text{M\_R1P\_c} \rightleftharpoons \text{M\_INS\_c} + \text{M\_PI\_c} \tag{309}$$

Reactants

Table 314: Properties of each reactant.

Id	Name	SBO
M_HYXN_c	HYXN	
M_R1P_c	R1P	

Products

Table 315: Properties of each product.

Id	Name	SBO
M_INS_c	INS	
M_PI_c	PI	

Kinetic Law

$$v_{155} = \text{not specified} \tag{310}$$

6.156 Reaction R_DEOD5

This is a reversible reaction of two reactants forming two products.

Name DEOD5

Reaction equation

$$\text{M\_AD\_c} + \text{M\_R1P\_c} \rightleftharpoons \text{M\_ADN\_c} + \text{M\_PI\_c} \tag{311}$$

Reactants

Table 316: Properties of each reactant.

Id	Name	SBO
M_AD_c	AD	
M_R1P_c	R1P	

Products

Table 317: Properties of each product.

Id	Name	SBO
M_ADN_c	ADN	
M_PI_c	PI	

Kinetic Law

$$v_{156} = \text{not specified} \tag{312}$$

6.157 Reaction R_DEOD6

This is a reversible reaction of two reactants forming two products.

Name DEOD6

Reaction equation

$$\text{M\_GN\_c} + \text{M\_R1P\_c} \rightleftharpoons \text{M\_GSN\_c} + \text{M\_PI\_c} \tag{313}$$

Reactants

Table 318: Properties of each reactant.

Id	Name	SBO
M_GN_c	GN	
M_R1P_c	R1P	

Products

Table 319: Properties of each product.

Id	Name	SBO
M_GSN_c	GSN	
M_PI_c	PI	

Kinetic Law

$$v_{157} = \text{not specified} \tag{314}$$

6.158 Reaction R_DEOD7

This is a reversible reaction of two reactants forming two products.

Name DEOD7

Reaction equation

$$\text{M\_R1P\_c} + \text{M\_XAN\_c} \rightleftharpoons \text{M\_PI\_c} + \text{M\_XTSN\_c} \tag{315}$$

Reactants

Table 320: Properties of each reactant.

Id	Name	SBO
M_R1P_c	R1P	
M_XAN_c	XAN	

Products

Table 321: Properties of each product.

Id	Name	SBO
M_PI_c	PI	
M_XTSN_c	XTSN	

Kinetic Law

$$v_{158} = \text{not specified} \tag{316}$$

6.159 Reaction R_DEOD8

This is a reversible reaction of two reactants forming two products.

Name DEOD8

Reaction equation

$$\text{M\_DU\_c} + \text{M\_PI\_c} \rightleftharpoons \text{M\_DR1P\_c} + \text{M\_URA\_c} \tag{317}$$

Reactants

Table 322: Properties of each reactant.

Id	Name	SBO
M_DU_c	DU	
M_PI_c	PI	

Products

Table 323: Properties of each product.

Id	Name	SBO
M_DR1P_c	DR1P	

Id	Name	SBO
M_URA_c	URA	

Kinetic Law

$$v_{159} = \text{not specified} \tag{318}$$

6.160 Reaction R_GPT1

This is an irreversible reaction of two reactants forming two products.

Name GPT1

Reaction equation

$$\text{M\_PRPP\_c} + \text{M\_XAN\_c} \longrightarrow \text{M\_PPI\_c} + \text{M\_XMP\_c} \tag{319}$$

Reactants

Table 324: Properties of each reactant.

Id	Name	SBO
M_PRPP_c	PRPP	
M_XAN_c	XAN	

Products

Table 325: Properties of each product.

Id	Name	SBO
M_PPI_c	PPI	
M_XMP_c	XMP	

Kinetic Law

$$v_{160} = \text{not specified} \tag{320}$$

6.161 Reaction R_GPT2

This is an irreversible reaction of two reactants forming two products.

Name GPT2

Reaction equation

$$\text{M\_HYXN\_c} + \text{M\_PRPP\_c} \longrightarrow \text{M\_IMP\_c} + \text{M\_PPI\_c} \tag{321}$$

Reactants

Table 326: Properties of each reactant.

Id	Name	SBO
M_HYXN_c	HYXN	
M_PRPP_c	PRPP	

Products

Table 327: Properties of each product.

Id	Name	SBO
M_IMP_c	IMP	
M_PPI_c	PPI	

Kinetic Law

$$v_{161} = \text{not specified} \tag{322}$$

6.162 Reaction R_GPT3

This is an irreversible reaction of two reactants forming two products.

Name GPT3

Reaction equation

$$\text{M\_GN\_c} + \text{M\_PRPP\_c} \longrightarrow \text{M\_GMP\_c} + \text{M\_PPI\_c} \tag{323}$$

Reactants

Table 328: Properties of each reactant.

Id	Name	SBO
M_GN_c	GN	
M_PRPP_c	PRPP	

Products

Table 329: Properties of each product.

Id	Name	SBO
M_GMP_c	GMP	
M_PPI_c	PPI	

Kinetic Law

$$v_{162} = \text{not specified} \tag{324}$$

6.163 Reaction R_DEOB1

This is a reversible reaction of one reactant forming one product.

Name DEOB1

Reaction equation

$$\text{M\_DR1P\_c} \rightleftharpoons \text{M\_DR5P\_c} \tag{325}$$

Reactant

Table 330: Properties of each reactant.

Id	Name	SBO
M_DR1P_c	DR1P	

Product

Table 331: Properties of each product.

Id	Name	SBO
M_DR5P_c	DR5P	

Kinetic Law

$$v_{163} = \text{not specified} \tag{326}$$

6.164 Reaction R_DEOB2

This is a reversible reaction of one reactant forming one product.

Name DEOB2

Reaction equation

$$\text{M\_R1P\_c} \rightleftharpoons \text{M\_R5P\_c} \tag{327}$$

Reactant

Table 332: Properties of each reactant.

Id	Name	SBO
M_R1P_c	R1P	

Product

Table 333: Properties of each product.

Id	Name	SBO
M_R5P_c	R5P	

Kinetic Law

$$v_{164} = \text{not specified} \tag{328}$$

6.165 Reaction R_ADNUC

This is an irreversible reaction of one reactant forming two products.

Name ADNUC

Reaction equation

$$\text{M\_ADN\_c} \longrightarrow \text{M\_AD\_c} + \text{M\_RIB\_c} \tag{329}$$

Reactant

Table 334: Properties of each reactant.

Id	Name	SBO
M_ADN_c	ADN	

Products

Table 335: Properties of each product.

Id	Name	SBO
M_AD_c	AD	
M_RIB_c	RIB	

Kinetic Law

$$v_{165} = \text{not specified} \tag{330}$$

6.166 Reaction R_GNNUC

This is an irreversible reaction of one reactant forming two products.

Name GNNUC

Reaction equation

$$\text{M\_GSN\_c} \longrightarrow \text{M\_GN\_c} + \text{M\_RIB\_c} \tag{331}$$

Reactant

Table 336: Properties of each reactant.

Id	Name	SBO
M_GSN_c	GSN	

Products

Table 337: Properties of each product.

Id	Name	SBO
M_GN_c	GN	
M_RIB_c	RIB	

Kinetic Law

$$v_{166} = \text{not specified} \tag{332}$$

6.167 Reaction R_ADDM

This is an irreversible reaction of one reactant forming two products.

Name ADDM

Reaction equation

$$\text{M\_AD\_c} \longrightarrow \text{M\_HYXN\_c} + \text{M\_NH3\_c} \tag{333}$$

Reactant

Table 338: Properties of each reactant.

Id	Name	SBO
M_AD_c	AD	

Products

Table 339: Properties of each product.

Id	Name	SBO
M_HYXN_c	HYXN	
M_NH3_c	NH3	

Kinetic Law

$$v_{167} = \text{not specified} \tag{334}$$

6.168 Reaction R_ACCABCD

This is a reversible reaction of three reactants forming three products.

Name ACCABCD

Reaction equation

$$\text{M\_ACCOA\_c} + \text{M\_ATP\_c} + \text{M\_CO2\_c} \rightleftharpoons \text{M\_ADP\_c} + \text{M\_MALCOA\_c} + \text{M\_PI\_c} \tag{335}$$

Reactants

Table 340: Properties of each reactant.

Id	Name	SBO
M_ACCOA_c	ACCOA	
M_ATP_c	ATP	
M_CO2_c	CO2	

Products

Table 341: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_MALCOA_c	MALCOA	
M_PI_c	PI	

Kinetic Law

$$v_{168} = \text{not specified} \tag{336}$$

6.169 Reaction R_FABD

This is a reversible reaction of two reactants forming two products.

Name FABD

Reaction equation

$$\text{M\_ACP\_c} + \text{M\_MALCOA\_c} \rightleftharpoons \text{M\_COA\_c} + \text{M\_MALACP\_c} \tag{337}$$

Reactants

Table 342: Properties of each reactant.

Id	Name	SBO
M_ACP_c	ACP	
M_MALCOA_c	MALCOA	

Products

Table 343: Properties of each product.

Id	Name	SBO
M_COA_c	COA	
M_MALACP_c	MALACP	

Kinetic Law

$$v_{169} = \text{not specified} \tag{338}$$

6.170 Reaction R_FABH1

This is a reversible reaction of two reactants forming two products.

Name FABH1

Reaction equation

$$\text{M\_ACCOA\_c} + \text{M\_ACP\_c} \rightleftharpoons \text{M\_ACACP\_c} + \text{M\_COA\_c} \tag{339}$$

Reactants

Table 344: Properties of each reactant.

Id	Name	SBO
M_ACCOA_c	ACCOA	
M_ACP_c	ACP	

Products

Table 345: Properties of each product.

Id	Name	SBO
M_ACACP_c	ACACP	
M_COA_c	COA	

Kinetic Law

$$v_{170} = \text{not specified} \tag{340}$$

6.171 Reaction R_FABH2

This is an irreversible reaction of two reactants forming three products.

Name FABH2

Reaction equation

$$\text{M\_ACCOA\_c} + \text{M\_MALACP\_c} \longrightarrow \text{M\_ACTACP\_c} + \text{M\_CO2\_c} + \text{M\_COA\_c} \quad (341)$$

Reactants

Table 346: Properties of each reactant.

Id	Name	SBO
M_ACCOA_c	ACCOA	
M_MALACP_c	MALACP	

Products

Table 347: Properties of each product.

Id	Name	SBO
M_ACTACP_c	ACTACP	
M_CO2_c	CO2	
M_COA_c	COA	

Kinetic Law

$$v_{171} = \text{not specified} \quad (342)$$

6.172 Reaction R_FABF

This is an irreversible reaction of two reactants forming three products.

Name FABF

Reaction equation

$$\text{M\_ACACP\_c} + \text{M\_MALACP\_c} \longrightarrow \text{M\_ACP\_c} + \text{M\_ACTACP\_c} + \text{M\_CO2\_c} \quad (343)$$

Reactants

Table 348: Properties of each reactant.

Id	Name	SBO
M_ACACP_c	ACACP	
M_MALACP_c	MALACP	

Products

Table 349: Properties of each product.

Id	Name	SBO
M_ACP_c	ACP	
M_ACTACP_c	ACTACP	
M_CO2_c	CO2	

Kinetic Law

$$v_{172} = \text{not specified} \tag{344}$$

6.173 Reaction R_C120SN

This is an irreversible reaction of three reactants forming four products.

Name C120SN

Reaction equation

$$\text{M\_ACTACP\_c} + 4\,\text{M\_MALACP\_c} + 8\,\text{M\_NADPH\_c} \longrightarrow 4\,\text{M\_ACP\_c} + \text{M\_C120ACP\_c} + 4\,\text{M\_CO2\_c} + 8\,\text{M\_NADP\_c} \tag{345}$$

Reactants

Table 350: Properties of each reactant.

Id	Name	SBO
M_ACTACP_c	ACTACP	
M_MALACP_c	MALACP	
M_NADPH_c	NADPH	

Products

Table 351: Properties of each product.

Id	Name	SBO
M_ACP_c	ACP	
M_C120ACP_c	C120ACP	
M_CO2_c	CO2	
M_NADP_c	NADP	

Kinetic Law

$$v_{173} = \text{not specified} \tag{346}$$

6.174 Reaction R_C140SN

This is an irreversible reaction of three reactants forming four products.

Name C140SN

Reaction equation

$$\text{M\_ACTACP\_c} + 5\,\text{M\_MALACP\_c} + 10\,\text{M\_NADPH\_c} \longrightarrow 5\,\text{M\_ACP\_c} + \text{M\_C140ACP\_c} + 5\,\text{M\_CO2\_c} + 10\,\text{M\_NADI} \tag{347}$$

Reactants

Table 352: Properties of each reactant.

Id	Name	SBO
M_ACTACP_c	ACTACP	
M_MALACP_c	MALACP	
M_NADPH_c	NADPH	

Products

Table 353: Properties of each product.

Id	Name	SBO
M_ACP_c	ACP	
M_C140ACP_c	C140ACP	
M_CO2_c	CO2	
M_NADP_c	NADP	

Kinetic Law

$$v_{174} = \text{not specified} \tag{348}$$

6.175 Reaction R_C141SY

This is an irreversible reaction of three reactants forming four products.

Name C141SY

Reaction equation

$$\text{M\_ACTACP\_c} + 5\,\text{M\_MALACP\_c} + 9\,\text{M\_NADPH\_c} \longrightarrow 5\,\text{M\_ACP\_c} + \text{M\_C141ACP\_c} + 5\,\text{M\_CO2\_c} + 9\,\text{M\_NADP\_c} \tag{349}$$

Reactants

Table 354: Properties of each reactant.

Id	Name	SBO
M_ACTACP_c	ACTACP	
M_MALACP_c	MALACP	
M_NADPH_c	NADPH	

Products

Table 355: Properties of each product.

Id	Name	SBO
M_ACP_c	ACP	
M_C141ACP_c	C141ACP	
M_CO2_c	CO2	
M_NADP_c	NADP	

Kinetic Law

$$v_{175} = \text{not specified} \tag{350}$$

6.176 Reaction R_C160SN

This is an irreversible reaction of three reactants forming four products.

Name C160SN

Reaction equation

$$\text{M\_ACTACP\_c} + 6\,\text{M\_MALACP\_c} + 12\,\text{M\_NADPH\_c} \longrightarrow 6\,\text{M\_ACP\_c} + \text{M\_C160ACP\_c} + 6\,\text{M\_CO2\_c} + 12\,\text{M\_NADP} \quad (351)$$

Reactants

Table 356: Properties of each reactant.

Id	Name	SBO
M_ACTACP_c	ACTACP	
M_MALACP_c	MALACP	
M_NADPH_c	NADPH	

Products

Table 357: Properties of each product.

Id	Name	SBO
M_ACP_c	ACP	
M_C160ACP_c	C160ACP	
M_CO2_c	CO2	
M_NADP_c	NADP	

Kinetic Law

$$v_{176} = \text{not specified} \quad (352)$$

6.177 Reaction R_C161SY

This is an irreversible reaction of three reactants forming four products.

Name C161SY

Reaction equation

$$\text{M\_ACTACP\_c} + 6\,\text{M\_MALACP\_c} + 11\,\text{M\_NADPH\_c} \longrightarrow 6\,\text{M\_ACP\_c} + \text{M\_C161ACP\_c} + 6\,\text{M\_CO2\_c} + 11\,\text{M\_NADP} \quad (353)$$

Reactants

Table 358: Properties of each reactant.

Id	Name	SBO
M_ACTACP_c	ACTACP	
M_MALACP_c	MALACP	
M_NADPH_c	NADPH	

Products

Table 359: Properties of each product.

Id	Name	SBO
M_ACP_c	ACP	
M_C161ACP_c	C161ACP	
M_CO2_c	CO2	
M_NADP_c	NADP	

Kinetic Law

$$v_{177} = \text{not specified} \tag{354}$$

6.178 Reaction R_C181SY

This is an irreversible reaction of three reactants forming four products.

Name C181SY

Reaction equation

$$\text{M\_ACTACP\_c} + 7\,\text{M\_MALACP\_c} + 13\,\text{M\_NADPH\_c} \longrightarrow 7\,\text{M\_ACP\_c} + \text{M\_C181ACP\_c} + 7\,\text{M\_CO2\_c} + 13\,\text{M\_NADI} \tag{355}$$

Reactants

Table 360: Properties of each reactant.

Id	Name	SBO
M_ACTACP_c	ACTACP	
M_MALACP_c	MALACP	
M_NADPH_c	NADPH	

Products

Table 361: Properties of each product.

Id	Name	SBO
M_ACP_c	ACP	
M_C181ACP_c	C181ACP	
M_CO2_c	CO2	
M_NADP_c	NADP	

Kinetic Law

$$v_{178} = \text{not specified} \tag{356}$$

6.179 Reaction R_GPSA

This is a reversible reaction of two reactants forming two products.

Name GPSA

Reaction equation

$$\text{M\_GL3P\_c} + \text{M\_NADP\_c} \rightleftharpoons \text{M\_NADPH\_c} + \text{M\_T3P2\_c} \tag{357}$$

Reactants

Table 362: Properties of each reactant.

Id	Name	SBO
M_GL3P_c	GL3P	
M_NADP_c	NADP	

Products

Table 363: Properties of each product.

Id	Name	SBO
M_NADPH_c	NADPH	
M_T3P2_c	T3P2	

Kinetic Law

$$v_{179} = \text{not specified} \tag{358}$$

6.180 Reaction R_PLS

This is an irreversible reaction of six reactants forming two products.

Name PLS

Reaction equation

$$0{\cdot}035\,\text{M\_C140ACP\_c} + 0{\cdot}102\,\text{M\_C141ACP\_c} + 0{\cdot}717\,\text{M\_C160ACP\_c} + 0{\cdot}142\,\text{M\_C161ACP\_c} + 1{\cdot}004\,\text{M\_C181ACP} \tag{359}$$

Reactants

Table 364: Properties of each reactant.

Id	Name	SBO
M_C140ACP_c	C140ACP	
M_C141ACP_c	C141ACP	
M_C160ACP_c	C160ACP	
M_C161ACP_c	C161ACP	
M_C181ACP_c	C181ACP	
M_GL3P_c	GL3P	

Products

Table 365: Properties of each product.

Id	Name	SBO
M_ACP_c	ACP	
M_PA_c	PA	

Kinetic Law

$$v_{180} = \text{not specified} \tag{360}$$

6.181 Reaction R_CDSA

This is a reversible reaction of two reactants forming two products.

Name CDSA

Reaction equation

$$\text{M\_CTP\_c} + \text{M\_PA\_c} \rightleftharpoons \text{M\_CDPDG\_c} + \text{M\_PPI\_c} \tag{361}$$

Reactants

Table 366: Properties of each reactant.

Id	Name	SBO
M_CTP_c	CTP	
M_PA_c	PA	

Products

Table 367: Properties of each product.

Id	Name	SBO
M_CDPDG_c	CDPDG	
M_PPI_c	PPI	

Kinetic Law

$$v_{181} = \text{not specified} \tag{362}$$

6.182 Reaction R_CDH

This is an irreversible reaction of one reactant forming two products.

Name CDH

Reaction equation

$$\text{M\_CDPDG\_c} \longrightarrow \text{M\_CMP\_c} + \text{M\_PA\_c} \tag{363}$$

Reactant

Table 368: Properties of each reactant.

Id	Name	SBO
M_CDPDG_c	CDPDG	

Products

Table 369: Properties of each product.

Id	Name	SBO
M_CMP_c	CMP	
M_PA_c	PA	

Kinetic Law

$$v_{182} = \text{not specified} \tag{364}$$

6.183 Reaction R_PSSA

This is a reversible reaction of two reactants forming two products.

Name PSSA

Reaction equation

$$\text{M\_CDPDG\_c} + \text{M\_SER\_c} \rightleftharpoons \text{M\_CMP\_c} + \text{M\_PS\_c} \tag{365}$$

Reactants

Table 370: Properties of each reactant.

Id	Name	SBO
M_CDPDG_c	CDPDG	
M_SER_c	SER	

Products

Table 371: Properties of each product.

Id	Name	SBO
M_CMP_c	CMP	
M_PS_c	PS	

Kinetic Law

$$v_{183} = \text{not specified} \tag{366}$$

6.184 Reaction R_PSD

This is an irreversible reaction of one reactant forming two products.

Name PSD

Reaction equation

$$\text{M\_PS\_c} \longrightarrow \text{M\_CO2\_c} + \text{M\_PE\_c} \tag{367}$$

Reactant

Table 372: Properties of each reactant.

Id	Name	SBO
M_PS_c	PS	

Products

Table 373: Properties of each product.

Id	Name	SBO
M_CO2_c	CO2	
M_PE_c	PE	

Kinetic Law

$$v_{184} = \text{not specified} \tag{368}$$

6.185 Reaction R_PGSA2

This is a reversible reaction of two reactants forming two products.

Name PGSA2

Reaction equation

$$\text{M\_CDPDG\_c} + \text{M\_GL3P\_c} \rightleftharpoons \text{M\_CMP\_c} + \text{M\_PGP\_c} \tag{369}$$

Reactants

Table 374: Properties of each reactant.

Id	Name	SBO
M_CDPDG_c	CDPDG	
M_GL3P_c	GL3P	

Products

Table 375: Properties of each product.

Id	Name	SBO
M_CMP_c	CMP	
M_PGP_c	PGP	

Kinetic Law

$$v_{185} = \text{not specified} \tag{370}$$

6.186 Reaction R_PGPP

This is an irreversible reaction of one reactant forming two products.

Name PGPP

Reaction equation

$$\text{M\_PGP\_c} \longrightarrow \text{M\_PG\_c} + \text{M\_PI\_c} \tag{371}$$

Reactant

Table 376: Properties of each reactant.

Id	Name	SBO
M_PGP_c	PGP	

Products

Table 377: Properties of each product.

Id	Name	SBO
M_PG_c	PG	
M_PI_c	PI	

Id	Name	SBO

Kinetic Law

$$v_{186} = \text{not specified} \tag{372}$$

6.187 Reaction R_DGKA

This is an irreversible reaction of two reactants forming two products.

Name DGKA

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_DGR\_c} \longrightarrow \text{M\_ADP\_c} + \text{M\_PA\_c} \tag{373}$$

Reactants

Table 378: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_DGR_c	DGR	

Products

Table 379: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_PA_c	PA	

Kinetic Law

$$v_{187} = \text{not specified} \tag{374}$$

6.188 Reaction R_GLMS

This is an irreversible reaction of two reactants forming two products.

Name GLMS

Reaction equation

$$\text{M\_F6P\_c} + \text{M\_GLN\_c} \longrightarrow \text{M\_GA6P\_c} + \text{M\_GLU\_c} \tag{375}$$

Reactants

Table 380: Properties of each reactant.

Id	Name	SBO
M_F6P_c	F6P	
M_GLN_c	GLN	

Products

Table 381: Properties of each product.

Id	Name	SBO
M_GA6P_c	GA6P	
M_GLU_c	GLU	

Kinetic Law

$$v_{188} = \text{not specified} \tag{376}$$

6.189 Reaction R_GLMM

This is a reversible reaction of one reactant forming one product.

Name GLMM

Reaction equation

$$\text{M\_GA6P\_c} \rightleftharpoons \text{M\_GA1P\_c} \tag{377}$$

Reactant

Table 382: Properties of each reactant.

Id	Name	SBO
M_GA6P_c	GA6P	

Product

Table 383: Properties of each product.

Id	Name	SBO
M_GA1P_c	GA1P	

Kinetic Law

$$v_{189} = \text{not specified} \tag{378}$$

6.190 Reaction R_GLMU

This is an irreversible reaction of three reactants forming three products.

Name GLMU

Reaction equation

$$\text{M\_ACCOA\_c} + \text{M\_GA1P\_c} + \text{M\_UTP\_c} \longrightarrow \text{M\_COA\_c} + \text{M\_PPI\_c} + \text{M\_UDPNAG\_c} \tag{379}$$

Reactants

Table 384: Properties of each reactant.

Id	Name	SBO
M_ACCOA_c	ACCOA	
M_GA1P_c	GA1P	
M_UTP_c	UTP	

Products

Table 385: Properties of each product.

Id	Name	SBO
M_COA_c	COA	
M_PPI_c	PPI	
M_UDPNAG_c	UDPNAG	

Kinetic Law

$$v_{190} = \text{not specified} \tag{380}$$

6.191 Reaction R_MURZ

This is an irreversible reaction of two reactants forming two products.

Name MURZ

Reaction equation

$$\text{M\_PEP\_c} + \text{M\_UDPNAG\_c} \longrightarrow \text{M\_PI\_c} + \text{M\_UDPNAGEP\_c} \tag{381}$$

Reactants

Table 386: Properties of each reactant.

Id	Name	SBO
M_PEP_c	PEP	
M_UDPNAG_c	UDPNAG	

Products

Table 387: Properties of each product.

Id	Name	SBO
M_PI_c	PI	
M_UDPNAGEP_c	UDPNAGEP	

Kinetic Law

$$v_{191} = \text{not specified} \tag{382}$$

6.192 Reaction R_MURB

This is an irreversible reaction of two reactants forming two products.

Name MURB

Reaction equation

$$\text{M\_NADPH\_c} + \text{M\_UDPNAGEP\_c} \longrightarrow \text{M\_NADP\_c} + \text{M\_UDPNAM\_c} \tag{383}$$

Reactants

Table 388: Properties of each reactant.

Id	Name	SBO
M_NADPH_c	NADPH	
M_UDPNAGEP_c	UDPNAGEP	

Products

Table 389: Properties of each product.

Id	Name	SBO
M_NADP_c	NADP	
M_UDPNAM_c	UDPNAM	

Kinetic Law

$$v_{192} = \text{not specified} \tag{384}$$

6.193 Reaction R_MURC

This is an irreversible reaction of three reactants forming three products.

Name MURC

Reaction equation

$$\text{M\_ALA\_c} + \text{M\_ATP\_c} + \text{M\_UDPNAM\_c} \longrightarrow \text{M\_ADP\_c} + \text{M\_PI\_c} + \text{M\_UDPNAMA\_c} \tag{385}$$

Reactants

Table 390: Properties of each reactant.

Id	Name	SBO
M_ALA_c	ALA	
M_ATP_c	ATP	
M_UDPNAM_c	UDPNAM	

Products

Table 391: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_PI_c	PI	
M_UDPNAMA_c	UDPNAMA	

Kinetic Law

$$v_{193} = \text{not specified} \tag{386}$$

6.194 Reaction R_MURD

This is an irreversible reaction of three reactants forming three products.

Name MURD

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_DGLU\_c} + \text{M\_UDPNAMA\_c} \longrightarrow \text{M\_ADP\_c} + \text{M\_PI\_c} + \text{M\_UDPNAMAG\_c} \tag{387}$$

Reactants

Table 392: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_DGLU_c	DGLU	
M_UDPNAMA_c	UDPNAMA	

Products

Table 393: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_PI_c	PI	
M_UDPNAMAG_c	UDPNAMAG	

Kinetic Law

$$v_{194} = \text{not specified} \tag{388}$$

6.195 Reaction R_MURE

This is an irreversible reaction of three reactants forming three products.

Name MURE

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_MDAP\_c} + \text{M\_UDPNAMAG\_c} \longrightarrow \text{M\_ADP\_c} + \text{M\_PI\_c} + \text{M\_UNAGD\_c} \tag{389}$$

Reactants

Table 394: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_MDAP_c	MDAP	
M_UDPNAMAG_c	UDPNAMAG	

Products

Table 395: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_PI_c	PI	
M_UNAGD_c	UNAGD	

Kinetic Law

$$v_{195} = \text{not specified} \tag{390}$$

6.196 Reaction R_MURF

This is an irreversible reaction of three reactants forming three products.

Name MURF

Reaction equation

$$\text{M\_AA\_c} + \text{M\_ATP\_c} + \text{M\_UNAGD\_c} \longrightarrow \text{M\_ADP\_c} + \text{M\_PI\_c} + \text{M\_UNAGDA\_c} \quad (391)$$

Reactants

Table 396: Properties of each reactant.

Id	Name	SBO
M_AA_c	AA	
M_ATP_c	ATP	
M_UNAGD_c	UNAGD	

Products

Table 397: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_PI_c	PI	
M_UNAGDA_c	UNAGDA	

Kinetic Law

$$v_{196} = \text{not specified} \quad (392)$$

6.197 Reaction R_GLR

This is a reversible reaction of one reactant forming one product.

Name GLR

Reaction equation

$$\text{M\_GLU\_c} \rightleftharpoons \text{M\_DGLU\_c} \quad (393)$$

Reactant

Table 398: Properties of each reactant.

Id	Name	SBO
M_GLU_c	GLU	

Product

Table 399: Properties of each product.

Id	Name	SBO
M_DGLU_c	DGLU	

Kinetic Law

$$v_{197} = \text{not specified} \tag{394}$$

6.198 Reaction R_DDLA

This is a reversible reaction of one reactant forming one product.

Name DDLA

Reaction equation

$$2\,\text{M\_DALA\_c} \rightleftharpoons \text{M\_AA\_c} \tag{395}$$

Reactant

Table 400: Properties of each reactant.

Id	Name	SBO
M_DALA_c	DALA	

Product

Table 401: Properties of each product.

Id	Name	SBO
M_AA_c	AA	

Kinetic Law

$$v_{198} = \text{not specified} \tag{396}$$

6.199 Reaction R_MRAY

This is an irreversible reaction of one reactant forming three products.

Name MRAY

Reaction equation

$$\text{M\_UNAGDA\_c} \longrightarrow \text{M\_PI\_c} + \text{M\_UMP\_c} + \text{M\_UNPTDO\_c} \tag{397}$$

Reactant

Table 402: Properties of each reactant.

Id	Name	SBO
M_UNAGDA_c	UNAGDA	

Products

Table 403: Properties of each product.

Id	Name	SBO
M_PI_c	PI	
M_UMP_c	UMP	
M_UNPTDO_c	UNPTDO	

Kinetic Law

$$v_{199} = \text{not specified} \tag{398}$$

6.200 Reaction R_MURG

This is an irreversible reaction of two reactants forming two products.

Name MURG

Reaction equation

$$\text{M\_UDPNAG\_c} + \text{M\_UNPTDO\_c} \longrightarrow \text{M\_PEPTIDO\_c} + \text{M\_UDP\_c} \tag{399}$$

Reactants

Table 404: Properties of each reactant.

Id	Name	SBO
M_UDPNAG_c	UDPNAG	
M_UNPTDO_c	UNPTDO	

Products

Table 405: Properties of each product.

Id	Name	SBO
M_PEPTIDO_c	PEPTIDO	
M_UDP_c	UDP	

Kinetic Law

$$v_{200} = \text{not specified} \tag{400}$$

6.201 Reaction R_LPXA

This is an irreversible reaction of two reactants forming two products.

Name LPXA

Reaction equation

$$\text{M\_C140ACP\_c} + \text{M\_UDPNAG\_c} \longrightarrow \text{M\_ACP\_c} + \text{M\_UDPG2AA\_c} \tag{401}$$

Reactants

Table 406: Properties of each reactant.

Id	Name	SBO
M_C140ACP_c	C140ACP	
M_UDPNAG_c	UDPNAG	

Products

Table 407: Properties of each product.

Id	Name	SBO
M_ACP_c	ACP	
M_UDPG2AA_c	UDPG2AA	

Kinetic Law

$$v_{201} = \text{not specified} \tag{402}$$

6.202 Reaction R_ENVA

This is an irreversible reaction of one reactant forming two products.

Name ENVA

Reaction equation

$$\text{M\_UDPG2AA\_c} \longrightarrow \text{M\_AC\_c} + \text{M\_UDPG2A\_c} \tag{403}$$

Reactant

Table 408: Properties of each reactant.

Id	Name	SBO
M_UDPG2AA_c	UDPG2AA	

Products

Table 409: Properties of each product.

Id	Name	SBO
M_AC_c	AC	
M_UDPG2A_c	UDPG2A	

Kinetic Law

$$v_{202} = \text{not specified} \tag{404}$$

6.203 Reaction R_LPXD

This is an irreversible reaction of two reactants forming two products.

Name LPXD

Reaction equation

$$\text{M\_C140ACP\_c} + \text{M\_UDPG2A\_c} \longrightarrow \text{M\_ACP\_c} + \text{M\_UDPG23A\_c} \tag{405}$$

Reactants

Table 410: Properties of each reactant.

Id	Name	SBO
M_C140ACP_c	C140ACP	
M_UDPG2A_c	UDPG2A	

Products

Table 411: Properties of each product.

Id	Name	SBO
M_ACP_c	ACP	
M_UDPG23A_c	UDPG23A	

Kinetic Law

$$v_{203} = \text{not specified} \tag{406}$$

6.204 Reaction R_USHA12

This is an irreversible reaction of one reactant forming two products.

Name USHA12

Reaction equation

$$\text{M\_UDPG23A\_c} \longrightarrow \text{M\_LIPX\_c} + \text{M\_UMP\_c} \tag{407}$$

Reactant

Table 412: Properties of each reactant.

Id	Name	SBO
M_UDPG23A_c	UDPG23A	

Products

Table 413: Properties of each product.

Id	Name	SBO
M_LIPX_c	LIPX	
M_UMP_c	UMP	

Id	Name	SBO

Kinetic Law

$$v_{204} = \text{not specified} \tag{408}$$

6.205 Reaction R_LPXB

This is an irreversible reaction of two reactants forming two products.

Name LPXB

Reaction equation

$$\text{M\_LIPX\_c} + \text{M\_UDPG23A\_c} \longrightarrow \text{M\_DISAC1P\_c} + \text{M\_UDP\_c} \tag{409}$$

Reactants

Table 414: Properties of each reactant.

Id	Name	SBO
M_LIPX_c	LIPX	
M_UDPG23A_c	UDPG23A	

Products

Table 415: Properties of each product.

Id	Name	SBO
M_DISAC1P_c	DISAC1P	
M_UDP_c	UDP	

Kinetic Law

$$v_{205} = \text{not specified} \tag{410}$$

6.206 Reaction R_LPXK

This is an irreversible reaction of two reactants forming two products.

Name LPXK

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_DISAC1P\_c} \longrightarrow \text{M\_ADP\_c} + \text{M\_LIPIV\_c} \tag{411}$$

Reactants

Table 416: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_DISAC1P_c	DISAC1P	

Products

Table 417: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_LIPIV_c	LIPIV	

Kinetic Law

$$v_{206} = \text{not specified} \tag{412}$$

6.207 Reaction R_KDTA1

This is an irreversible reaction of two reactants forming two products.

Name KDTA1

Reaction equation

$$\text{M\_CMPKDO\_c} + \text{M\_LIPIV\_c} \longrightarrow \text{M\_CMP\_c} + \text{M\_KDOLIPIV\_c} \tag{413}$$

Reactants

Table 418: Properties of each reactant.

Id	Name	SBO
M_CMPKDO_c	CMPKDO	
M_LIPIV_c	LIPIV	

Products

Table 419: Properties of each product.

Id	Name	SBO
M_CMP_c	CMP	
M_KDOLIPIV_c	KDOLIPIV	

Kinetic Law

$$v_{207} = \text{not specified} \tag{414}$$

6.208 Reaction R_KDOLIPH

This is an irreversible reaction of two reactants forming two products.

Name KDOLIPH

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_KDOLIPIV\_c} \longrightarrow \text{M\_ADP\_c} + \text{M\_KDOLIPVP\_c} \tag{415}$$

Reactants

Table 420: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_KDOLIPIV_c	KDOLIPIV	

Products

Table 421: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_KDOLIPVP_c	KDOLIPVP	

Kinetic Law

$$v_{208} = \text{not specified} \tag{416}$$

6.209 Reaction R_HTRB

This is an irreversible reaction of three reactants forming two products.

Name HTRB

Reaction equation

$$\text{M\_C120ACP\_c} + \text{M\_C140ACP\_c} + \text{M\_KDOLIPVP\_c} \longrightarrow 2\,\text{M\_ACP\_c} + \text{M\_LIPA\_c} \quad (417)$$

Reactants

Table 422: Properties of each reactant.

Id	Name	SBO
M_C120ACP_c	C120ACP	
M_C140ACP_c	C140ACP	
M_KDOLIPVP_c	KDOLIPVP	

Products

Table 423: Properties of each product.

Id	Name	SBO
M_ACP_c	ACP	
M_LIPA_c	LIPA	

Kinetic Law

$$v_{209} = \text{not specified} \quad (418)$$

6.210 Reaction R_MSBB

This is an irreversible reaction of three reactants forming two products.

Name MSBB

Reaction equation

$$\text{M\_C120ACP\_c} + \text{M\_C140ACP\_c} + \text{M\_KDOLIPVP\_c} \longrightarrow 2\,\text{M\_ACP\_c} + \text{M\_LIPA\_c} \quad (419)$$

Reactants

Table 424: Properties of each reactant.

Id	Name	SBO
M_C120ACP_c	C120ACP	
M_C140ACP_c	C140ACP	
M_KDOLIPVP_c	KDOLIPVP	

Products

Table 425: Properties of each product.

Id	Name	SBO
M_ACP_c	ACP	
M_LIPA_c	LIPA	

Kinetic Law

$$v_{210} = \text{not specified} \tag{420}$$

6.211 Reaction R_A5PISO

This is a reversible reaction of one reactant forming one product.

Name A5PISO

Reaction equation

$$\text{M\_RL5P\_c} \rightleftharpoons \text{M\_A5P\_c} \tag{421}$$

Reactant

Table 426: Properties of each reactant.

Id	Name	SBO
M_RL5P_c	RL5P	

Product

Table 427: Properties of each product.

Id	Name	SBO
M_A5P_c	A5P	

Id	Name	SBO

Kinetic Law

$$v_{211} = \text{not specified} \tag{422}$$

6.212 Reaction R_KDSA

This is an irreversible reaction of two reactants forming two products.

Name KDSA

Reaction equation

$$\text{M\_A5P\_c} + \text{M\_PEP\_c} \longrightarrow \text{M\_KDOP\_c} + \text{M\_PI\_c} \tag{423}$$

Reactants

Table 428: Properties of each reactant.

Id	Name	SBO
M_A5P_c	A5P	
M_PEP_c	PEP	

Products

Table 429: Properties of each product.

Id	Name	SBO
M_KDOP_c	KDOP	
M_PI_c	PI	

Kinetic Law

$$v_{212} = \text{not specified} \tag{424}$$

6.213 Reaction R_KDOPH

This is an irreversible reaction of one reactant forming two products.

Name KDOPH

Reaction equation

$$\text{M\_KDOP\_c} \longrightarrow \text{M\_KDO\_c} + \text{M\_PI\_c} \tag{425}$$

Reactant

Table 430: Properties of each reactant.

Id	Name	SBO
M_KDOP_c	KDOP	

Products

Table 431: Properties of each product.

Id	Name	SBO
M_KDO_c	KDO	
M_PI_c	PI	

Kinetic Law

$$v_{213} = \text{not specified} \tag{426}$$

6.214 Reaction R_KDSB

This is an irreversible reaction of two reactants forming two products.

Name KDSB

Reaction equation

$$\text{M\_CTP\_c} + \text{M\_KDO\_c} \longrightarrow \text{M\_CMPKDO\_c} + \text{M\_PPI\_c} \tag{427}$$

Reactants

Table 432: Properties of each reactant.

Id	Name	SBO
M_CTP_c	CTP	
M_KDO_c	KDO	

Products

Table 433: Properties of each product.

Id	Name	SBO
M_CMPKDO_c	CMPKDO	
M_PPI_c	PPI	

Kinetic Law

$$v_{214} = \text{not specified} \tag{428}$$

6.215 Reaction R_PAPHTSE

This is a reversible reaction of two reactants forming two products.

Name PAPHTSE

Reaction equation

$$\text{M\_CMP\_c} + \text{M\_PE\_c} \rightleftharpoons \text{M\_CDPETN\_c} + \text{M\_DGR\_c} \tag{429}$$

Reactants

Table 434: Properties of each reactant.

Id	Name	SBO
M_CMP_c	CMP	
M_PE_c	PE	

Products

Table 435: Properties of each product.

Id	Name	SBO
M_CDPETN_c	CDPETN	
M_DGR_c	DGR	

Kinetic Law

$$v_{215} = \text{not specified} \tag{430}$$

6.216 Reaction R_GMHA

This is an irreversible reaction of two reactants forming two products.

Name GMHA

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_S7P\_c} \longrightarrow \text{M\_ADPHEP\_c} + \text{M\_PPI\_c} \tag{431}$$

Reactants

Table 436: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_S7P_c	S7P	

Products

Table 437: Properties of each product.

Id	Name	SBO
M_ADPHEP_c	ADPHEP	
M_PPI_c	PPI	

Kinetic Law

$$v_{216} = \text{not specified} \tag{432}$$

6.217 Reaction R_LPSSYN

This is an irreversible reaction of five reactants forming five products.

Name LPSSYN

Reaction equation

$$3\,\text{M\_ADPHEP\_c} + 2\,\text{M\_CDPETN\_c} + 3\,\text{M\_CMPKDO\_c} + \text{M\_LIPA\_c} + 2\,\text{M\_UDPG\_c} \longrightarrow 3\,\text{M\_ADP\_c} + 2\,\text{M\_CDP\_c} \tag{433}$$

Reactants

Table 438: Properties of each reactant.

Id	Name	SBO
M_ADPHEP_c	ADPHEP	
M_CDPETN_c	CDPETN	
M_CMPKDO_c	CMPKDO	
M_LIPA_c	LIPA	
M_UDPG_c	UDPG	

Products

Table 439: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_CDP_c	CDP	
M_CMP_c	CMP	
M_LPS_c	LPS	
M_UDP_c	UDP	

Kinetic Law

$$v_{217} = \text{not specified} \tag{434}$$

6.218 Reaction R_BIOF

This is a reversible reaction of two reactants forming three products.

Name BIOF

Reaction equation

$$\text{M\_ALA\_c} + \text{M\_CHCOA\_c} \rightleftharpoons \text{M\_AONA\_c} + \text{M\_CO2\_c} + \text{M\_COA\_c} \tag{435}$$

Reactants

Table 440: Properties of each reactant.

Id	Name	SBO
M_ALA_c	ALA	
M_CHCOA_c	CHCOA	

Products

Table 441: Properties of each product.

Id	Name	SBO
M_AONA_c	AONA	
M_CO2_c	CO2	
M_COA_c	COA	

Kinetic Law

$$v_{218} = \text{not specified} \tag{436}$$

6.219 Reaction R_BIOA

This is a reversible reaction of two reactants forming two products.

Name BIOA

Reaction equation

$$\text{M\_AONA\_c} + \text{M\_SAM\_c} \rightleftharpoons \text{M\_DANNA\_c} + \text{M\_SAMOB\_c} \tag{437}$$

Reactants

Table 442: Properties of each reactant.

Id	Name	SBO
M_AONA_c	AONA	
M_SAM_c	SAM	

Products

Table 443: Properties of each product.

Id	Name	SBO
M_DANNA_c	DANNA	
M_SAMOB_c	SAMOB	

Kinetic Law

$$v_{219} = \text{not specified} \tag{438}$$

6.220 Reaction R_BIOD

This is a reversible reaction of three reactants forming three products.

Name BIOD

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_CO2\_c} + \text{M\_DANNA\_c} \rightleftharpoons \text{M\_ADP\_c} + \text{M\_DTB\_c} + \text{M\_PI\_c} \quad (439)$$

Reactants

Table 444: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_CO2_c	CO2	
M_DANNA_c	DANNA	

Products

Table 445: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_DTB_c	DTB	
M_PI_c	PI	

Kinetic Law

$$v_{220} = \text{not specified} \quad (440)$$

6.221 Reaction R_BIOB

This is an irreversible reaction of three reactants forming four products.

Name BIOB

Reaction equation

$$\text{M\_DTB\_c} + 2\,\text{M\_NADPH\_c} + 2\,\text{M\_SAM\_c} \longrightarrow \text{M\_BT\_c} + 2\,\text{M\_DA\_c} + 2\,\text{M\_MET\_c} + 2\,\text{M\_NADP\_c} \quad (441)$$

Reactants

Table 446: Properties of each reactant.

Id	Name	SBO
M_DTB_c	DTB	
M_NADPH_c	NADPH	
M_SAM_c	SAM	

Products

Table 447: Properties of each product.

Id	Name	SBO
M_BT_c	BT	
M_DA_c	DA	
M_MET_c	MET	
M_NADP_c	NADP	

Kinetic Law

$$v_{221} = \text{not specified} \tag{442}$$

6.222 Reaction R_FOLE

This is an irreversible reaction of one reactant forming two products.

Name FOLE

Reaction equation

$$\text{M\_GTP\_c} \longrightarrow \text{M\_AHTD\_c} + \text{M\_FOR\_c} \tag{443}$$

Reactant

Table 448: Properties of each reactant.

Id	Name	SBO
M_GTP_c	GTP	

Products

Table 449: Properties of each product.

Id	Name	SBO
M_AHTD_c	AHTD	
M_FOR_c	FOR	

Kinetic Law

$$v_{222} = \text{not specified} \tag{444}$$

6.223 Reaction R_DNTPH

This is an irreversible reaction of one reactant forming two products.

Name DNTPH

Reaction equation

$$\text{M\_AHTD\_c} \longrightarrow \text{M\_DHPP\_c} + \text{M\_PPI\_c} \tag{445}$$

Reactant

Table 450: Properties of each reactant.

Id	Name	SBO
M_AHTD_c	AHTD	

Products

Table 451: Properties of each product.

Id	Name	SBO
M_DHPP_c	DHPP	
M_PPI_c	PPI	

Kinetic Law

$$v_{223} = \text{not specified} \tag{446}$$

6.224 Reaction R_DHPPH

This is an irreversible reaction of one reactant forming two products.

Name DHPPH

Reaction equation

$$\text{M\_DHPP\_c} \longrightarrow \text{M\_DHP\_c} + \text{M\_PI\_c} \tag{447}$$

Reactant

Table 452: Properties of each reactant.

Id	Name	SBO
M_DHPP_c	DHPP	

Products

Table 453: Properties of each product.

Id	Name	SBO
M_DHP_c	DHP	
M_PI_c	PI	

Kinetic Law

$$v_{224} = \text{not specified} \tag{448}$$

6.225 Reaction R_FOLB

This is an irreversible reaction of one reactant forming two products.

Name FOLB

Reaction equation

$$\text{M\_DHP\_c} \longrightarrow \text{M\_AHHMP\_c} + \text{M\_GLAL\_c} \tag{449}$$

Reactant

Table 454: Properties of each reactant.

Id	Name	SBO
M_DHP_c	DHP	

Products

Table 455: Properties of each product.

Id	Name	SBO
M_AHHMP_c	AHHMP	
M_GLAL_c	GLAL	

Kinetic Law

$$v_{225} = \text{not specified} \tag{450}$$

6.226 Reaction R_FOLK

This is an irreversible reaction of two reactants forming two products.

Name FOLK

Reaction equation

$$\text{M\_AHHMP\_c} + \text{M\_ATP\_c} \longrightarrow \text{M\_AHHMD\_c} + \text{M\_AMP\_c} \tag{451}$$

Reactants

Table 456: Properties of each reactant.

Id	Name	SBO
M_AHHMP_c	AHHMP	
M_ATP_c	ATP	

Products

Table 457: Properties of each product.

Id	Name	SBO
M_AHHMD_c	AHHMD	
M_AMP_c	AMP	

Kinetic Law

$$v_{226} = \text{not specified} \tag{452}$$

6.227 Reaction R_PABB

This is an irreversible reaction of two reactants forming one product.

Name PABB

Reaction equation

$$\text{M\_CHOR\_c} + \text{M\_NH3\_c} \longrightarrow \text{M\_ADCHOR\_c} \tag{453}$$

Reactants

Table 458: Properties of each reactant.

Id	Name	SBO
M_CHOR_c	CHOR	
M_NH3_c	NH3	

Product

Table 459: Properties of each product.

Id	Name	SBO
M_ADCHOR_c	ADCHOR	

Kinetic Law

$$v_{227} = \text{not specified} \tag{454}$$

6.228 Reaction R_PABC

This is an irreversible reaction of one reactant forming two products.

Name PABC

Reaction equation

$$\text{M\_ADCHOR\_c} \longrightarrow \text{M\_PABA\_c} + \text{M\_PYR\_c} \tag{455}$$

Reactant

Table 460: Properties of each reactant.

Id	Name	SBO
M_ADCHOR_c	ADCHOR	

Products

Table 461: Properties of each product.

Id	Name	SBO
M_PABA_c	PABA	
M_PYR_c	PYR	

Kinetic Law

$$v_{228} = \text{not specified} \tag{456}$$

6.229 Reaction R_FOLP

This is an irreversible reaction of two reactants forming two products.

Name FOLP

Reaction equation

$$\text{M\_AHHMD\_c} + \text{M\_PABA\_c} \longrightarrow \text{M\_DHPT\_c} + \text{M\_PPI\_c} \tag{457}$$

Reactants

Table 462: Properties of each reactant.

Id	Name	SBO
M_AHHMD_c	AHHMD	
M_PABA_c	PABA	

Products

Table 463: Properties of each product.

Id	Name	SBO
M_DHPT_c	DHPT	
M_PPI_c	PPI	

Id	Name	SBO

Kinetic Law

$$v_{229} = \text{not specified} \tag{458}$$

6.230 Reaction R_FOLC

This is an irreversible reaction of three reactants forming three products.

Name FOLC

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_DHPT\_c} + \text{M\_GLU\_c} \longrightarrow \text{M\_ADP\_c} + \text{M\_DHF\_c} + \text{M\_PI\_c} \tag{459}$$

Reactants

Table 464: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_DHPT_c	DHPT	
M_GLU_c	GLU	

Products

Table 465: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_DHF_c	DHF	
M_PI_c	PI	

Kinetic Law

$$v_{230} = \text{not specified} \tag{460}$$

6.231 Reaction R_FOLA

This is an irreversible reaction of two reactants forming two products.

Name FOLA

Reaction equation

$$\text{M\_DHF\_c} + \text{M\_NADPH\_c} \longrightarrow \text{M\_NADP\_c} + \text{M\_THF\_c} \tag{461}$$

Reactants

Table 466: Properties of each reactant.

Id	Name	SBO
M_DHF_c	DHF	
M_NADPH_c	NADPH	

Products

Table 467: Properties of each product.

Id	Name	SBO
M_NADP_c	NADP	
M_THF_c	THF	

Kinetic Law

$$v_{231} = \text{not specified} \tag{462}$$

6.232 Reaction R_PURU

This is an irreversible reaction of one reactant forming two products.

Name PURU

Reaction equation

$$\text{M\_FTHF\_c} \longrightarrow \text{M\_FOR\_c} + \text{M\_THF\_c} \tag{463}$$

Reactant

Table 468: Properties of each reactant.

Id	Name	SBO
M_FTHF_c	FTHF	

Products

Table 469: Properties of each product.

Id	Name	SBO
M_FOR_c	FOR	
M_THF_c	THF	

Kinetic Law

$$v_{232} = \text{not specified} \tag{464}$$

6.233 Reaction R_FMT

This is an irreversible reaction of one reactant forming two products.

Name FMT

Reaction equation

$$\text{M\_FTHF\_c} \longrightarrow \text{M\_FOR\_c} + \text{M\_THF\_c} \tag{465}$$

Reactant

Table 470: Properties of each reactant.

Id	Name	SBO
M_FTHF_c	FTHF	

Products

Table 471: Properties of each product.

Id	Name	SBO
M_FOR_c	FOR	
M_THF_c	THF	

Kinetic Law

$$v_{233} = \text{not specified} \tag{466}$$

6.234 Reaction R_FOLD1

This is a reversible reaction of two reactants forming two products.

Name FOLD1

Reaction equation

$$\text{M\_METTHF\_c} + \text{M\_NADP\_c} \rightleftharpoons \text{M\_METHF\_c} + \text{M\_NADPH\_c} \tag{467}$$

Reactants

Table 472: Properties of each reactant.

Id	Name	SBO
M_METTHF_c	METTHF	
M_NADP_c	NADP	

Products

Table 473: Properties of each product.

Id	Name	SBO
M_METHF_c	METHF	
M_NADPH_c	NADPH	

Kinetic Law

$$v_{234} = \text{not specified} \tag{468}$$

6.235 Reaction R_FOLD2

This is a reversible reaction of one reactant forming one product.

Name FOLD2

Reaction equation

$$\text{M\_METHF\_c} \rightleftharpoons \text{M\_FTHF\_c} \tag{469}$$

Reactant

Table 474: Properties of each reactant.

Id	Name	SBO
M_METHF_c	METHF	

Product

Table 475: Properties of each product.

Id	Name	SBO
M_FTHF_c	FTHF	

Kinetic Law

$$v_{235} = \text{not specified} \tag{470}$$

6.236 Reaction R_METF

This is an irreversible reaction of two reactants forming two products.

Name METF

Reaction equation

$$\text{M\_METTHF\_c} + \text{M\_NADH\_c} \longrightarrow \text{M\_MTHF\_c} + \text{M\_NAD\_c} \tag{471}$$

Reactants

Table 476: Properties of each reactant.

Id	Name	SBO
M_METTHF_c	METTHF	
M_NADH_c	NADH	

Products

Table 477: Properties of each product.

Id	Name	SBO
M_MTHF_c	MTHF	
M_NAD_c	NAD	

Kinetic Law

$$v_{236} = \text{not specified} \tag{472}$$

6.237 Reaction R_GLTX

This is an irreversible reaction of two reactants forming three products.

Name GLTX

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_GLU\_c} \longrightarrow \text{M\_AMP\_c} + \text{M\_GTRNA\_c} + \text{M\_PPI\_c} \tag{473}$$

Reactants

Table 478: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_GLU_c	GLU	

Products

Table 479: Properties of each product.

Id	Name	SBO
M_AMP_c	AMP	
M_GTRNA_c	GTRNA	
M_PPI_c	PPI	

Kinetic Law

$$v_{237} = \text{not specified} \tag{474}$$

6.238 Reaction R_HEMA

This is an irreversible reaction of two reactants forming two products.

Name HEMA

Reaction equation

$$\text{M\_GTRNA\_c} + \text{M\_NADPH\_c} \longrightarrow \text{M\_GSA\_c} + \text{M\_NADP\_c} \tag{475}$$

Reactants

Table 480: Properties of each reactant.

Id	Name	SBO
M_GTRNA_c	GTRNA	
M_NADPH_c	NADPH	

Products

Table 481: Properties of each product.

Id	Name	SBO
M_GSA_c	GSA	
M_NADP_c	NADP	

Kinetic Law

$$v_{238} = \text{not specified} \tag{476}$$

6.239 Reaction R_HEML

This is an irreversible reaction of one reactant forming one product.

Name HEML

Reaction equation

$$\text{M\_GSA\_c} \longrightarrow \text{M\_ALAV\_c} \tag{477}$$

Reactant

Table 482: Properties of each reactant.

Id	Name	SBO
M_GSA_c	GSA	

Product

Table 483: Properties of each product.

Id	Name	SBO
M_ALAV_c	ALAV	

Kinetic Law

$$v_{239} = \text{not specified} \tag{478}$$

6.240 Reaction R_HEMB

This is an irreversible reaction of one reactant forming one product.

Name HEMB

Reaction equation

$$8\,\text{M\_ALAV\_c} \longrightarrow 4\,\text{M\_PBG\_c} \tag{479}$$

Reactant

Table 484: Properties of each reactant.

Id	Name	SBO
M_ALAV_c	ALAV	

Product

Table 485: Properties of each product.

Id	Name	SBO
M_PBG_c	PBG	

Kinetic Law

$$v_{240} = \text{not specified} \tag{480}$$

6.241 Reaction R_HEMC

This is an irreversible reaction of one reactant forming two products.

Name HEMC

Reaction equation

$$4\,\text{M\_PBG\_c} \longrightarrow \text{M\_HMB\_c} + 4\,\text{M\_NH3\_c} \tag{481}$$

Reactant

Table 486: Properties of each reactant.

Id	Name	SBO
M_PBG_c	PBG	

Products

Table 487: Properties of each product.

Id	Name	SBO
M_HMB_c	HMB	
M_NH3_c	NH3	

Kinetic Law

$$v_{241} = \text{not specified} \tag{482}$$

6.242 Reaction R_HEMD

This is an irreversible reaction of one reactant forming one product.

Name HEMD

Reaction equation

$$\text{M\_HMB\_c} \longrightarrow \text{M\_UPRG\_c} \tag{483}$$

Reactant

Table 488: Properties of each reactant.

Id	Name	SBO
M_HMB_c	HMB	

Product

Table 489: Properties of each product.

Id	Name	SBO
M_UPRG_c	UPRG	

Kinetic Law

$$v_{242} = \text{not specified} \tag{484}$$

6.243 Reaction R_HEME

This is an irreversible reaction of one reactant forming two products.

Name HEME

Reaction equation

$$\text{M\_UPRG\_c} \longrightarrow 4\,\text{M\_CO2\_c} + \text{M\_CPP\_c} \tag{485}$$

Reactant

Table 490: Properties of each reactant.

Id	Name	SBO
M_UPRG_c	UPRG	

Products

Table 491: Properties of each product.

Id	Name	SBO
M_CO2_c	CO2	
M_CPP_c	CPP	

Kinetic Law

$$v_{243} = \text{not specified} \tag{486}$$

6.244 Reaction R_HEMF

This is an irreversible reaction of two reactants forming two products.

Name HEMF

Reaction equation

$$\text{M\_CPP\_c} + \text{M\_O2\_c} \longrightarrow 2\,\text{M\_CO2\_c} + \text{M\_PPHG\_c} \tag{487}$$

Reactants

Table 492: Properties of each reactant.

Id	Name	SBO
M_CPP_c	CPP	
M_O2_c	O2	

Products

Table 493: Properties of each product.

Id	Name	SBO
M_CO2_c	CO2	
M_PPHG_c	PPHG	

Kinetic Law

$$v_{244} = \text{not specified} \tag{488}$$

6.245 Reaction R_HEMG

This is an irreversible reaction of two reactants forming one product.

Name HEMG

Reaction equation

$$\text{M\_O2\_c} + \text{M\_PPHG\_c} \longrightarrow \text{M\_PPIX\_c} \tag{489}$$

Reactants

Table 494: Properties of each reactant.

Id	Name	SBO
M_O2_c	O2	
M_PPHG_c	PPHG	

Product

Table 495: Properties of each product.

Id	Name	SBO
M_PPIX_c	PPIX	

Kinetic Law

$$v_{245} = \text{not specified} \tag{490}$$

6.246 Reaction R_HEMH

This is an irreversible reaction of one reactant forming one product.

Name HEMH

Reaction equation

$$\text{M\_PPIX\_c} \longrightarrow \text{M\_PTH\_c} \tag{491}$$

Reactant

Table 496: Properties of each reactant.

Id	Name	SBO
M_PPIX_c	PPIX	

Product

Table 497: Properties of each product.

Id	Name	SBO
M_PTH_c	PTH	

Kinetic Law

$$v_{246} = \text{not specified} \tag{492}$$

6.247 Reaction R_UBIA

This is an irreversible reaction of two reactants forming two products.

Name UBIA

Reaction equation

$$\text{M\_4HBZ\_c} + \text{M\_OPP\_c} \longrightarrow \text{M\_O4HBZ\_c} + \text{M\_PPI\_c} \tag{493}$$

Reactants

Table 498: Properties of each reactant.

Id	Name	SBO
M_4HBZ_c	4HBZ	
M_OPP_c	OPP	

Products

Table 499: Properties of each product.

Id	Name	SBO
M_O4HBZ_c	O4HBZ	
M_PPI_c	PPI	

Kinetic Law

$$v_{247} = \text{not specified} \tag{494}$$

6.248 Reaction R_RIBA

This is an irreversible reaction of one reactant forming three products.

Name RIBA

Reaction equation

$$\text{M\_GTP\_c} \longrightarrow \text{M\_D6RP5P\_c} + \text{M\_FOR\_c} + \text{M\_PPI\_c} \tag{495}$$

Reactant

Table 500: Properties of each reactant.

Id	Name	SBO
M_GTP_c	GTP	

Products

Table 501: Properties of each product.

Id	Name	SBO
M_D6RP5P_c	D6RP5P	
M_FOR_c	FOR	
M_PPI_c	PPI	

Kinetic Law

$$v_{248} = \text{not specified} \tag{496}$$

6.249 Reaction R_RIBD1

This is an irreversible reaction of one reactant forming two products.

Name RIBD1

Reaction equation

$$\text{M\_D6RP5P\_c} \longrightarrow \text{M\_A6RP5P\_c} + \text{M\_NH3\_c} \tag{497}$$

Reactant

Table 502: Properties of each reactant.

Id	Name	SBO
M_D6RP5P_c	D6RP5P	

Products

Table 503: Properties of each product.

Id	Name	SBO
M_A6RP5P_c	A6RP5P	
M_NH3_c	NH3	

Kinetic Law

$$v_{249} = \text{not specified} \tag{498}$$

6.250 Reaction R_RIBD2

This is an irreversible reaction of two reactants forming two products.

Name RIBD2

Reaction equation

$$\text{M\_A6RP5P\_c} + \text{M\_NADPH\_c} \longrightarrow \text{M\_A6RP5P2\_c} + \text{M\_NADP\_c} \tag{499}$$

Reactants

Table 504: Properties of each reactant.

Id	Name	SBO
M_A6RP5P_c	A6RP5P	
M_NADPH_c	NADPH	

Products

Table 505: Properties of each product.

Id	Name	SBO
M_A6RP5P2_c	A6RP5P2	
M_NADP_c	NADP	

Kinetic Law

$$v_{250} = \text{not specified} \tag{500}$$

6.251 Reaction R_PMDPHT

This is an irreversible reaction of one reactant forming two products.

Name PMDPHT

Reaction equation

$$\text{M\_A6RP5P2\_c} \longrightarrow \text{M\_A6RP\_c} + \text{M\_PI\_c} \tag{501}$$

Reactant

Table 506: Properties of each reactant.

Id	Name	SBO
M_A6RP5P2_c	A6RP5P2	

Products

Table 507: Properties of each product.

Id	Name	SBO
M_A6RP_c	A6RP	
M_PI_c	PI	

Kinetic Law

$$v_{251} = \text{not specified} \tag{502}$$

6.252 Reaction R_RIBB

This is an irreversible reaction of one reactant forming two products.

Name RIBB

Reaction equation

$$\text{M\_RL5P\_c} \longrightarrow \text{M\_DB4P\_c} + \text{M\_FOR\_c} \tag{503}$$

Reactant

Table 508: Properties of each reactant.

Id	Name	SBO
M_RL5P_c	RL5P	

Products

Table 509: Properties of each product.

Id	Name	SBO
M_DB4P_c	DB4P	
M_FOR_c	FOR	

Kinetic Law

$$v_{252} = \text{not specified} \tag{504}$$

6.253 Reaction R_RIBE

This is an irreversible reaction of two reactants forming two products.

Name RIBE

Reaction equation

$$\text{M\_A6RP\_c} + \text{M\_DB4P\_c} \longrightarrow \text{M\_D8RL\_c} + \text{M\_PI\_c} \tag{505}$$

Reactants

Table 510: Properties of each reactant.

Id	Name	SBO
M_A6RP_c	A6RP	
M_DB4P_c	DB4P	

Products

Table 511: Properties of each product.

Id	Name	SBO
M_D8RL_c	D8RL	
M_PI_c	PI	

Kinetic Law

$$v_{253} = \text{not specified} \tag{506}$$

6.254 Reaction R_RIBC

This is an irreversible reaction of one reactant forming two products.

Name RIBC

Reaction equation

$$2\,\text{M\_D8RL\_c} \longrightarrow \text{M\_A6RP\_c} + \text{M\_RIBFLV\_c} \tag{507}$$

Reactant

Table 512: Properties of each reactant.

Id	Name	SBO
M_D8RL_c	D8RL	

Products

Table 513: Properties of each product.

Id	Name	SBO
M_A6RP_c	A6RP	
M_RIBFLV_c	RIBFLV	

Kinetic Law

$$v_{254} = \text{not specified} \tag{508}$$

6.255 Reaction R_RIBF1

This is an irreversible reaction of two reactants forming two products.

Name RIBF1

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_RIBFLV\_c} \longrightarrow \text{M\_ADP\_c} + \text{M\_FMN\_c} \tag{509}$$

Reactants

Table 514: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_RIBFLV_c	RIBFLV	

Products

Table 515: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_FMN_c	FMN	

Kinetic Law

$$v_{255} = \text{not specified} \tag{510}$$

6.256 Reaction R_RIBF2

This is an irreversible reaction of two reactants forming two products.

Name RIBF2

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_FMN\_c} \longrightarrow \text{M\_FAD\_c} + \text{M\_PPI\_c} \tag{511}$$

Reactants

Table 516: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_FMN_c	FMN	

Products

Table 517: Properties of each product.

Id	Name	SBO
M_FAD_c	FAD	
M_PPI_c	PPI	

Kinetic Law

$$v_{256} = \text{not specified} \tag{512}$$

6.257 Reaction R_PANB

This is an irreversible reaction of two reactants forming two products.

Name PANB

Reaction equation

$$\text{M\_METTHF\_c} + \text{M\_OIVAL\_c} \longrightarrow \text{M\_AKP\_c} + \text{M\_THF\_c} \tag{513}$$

Reactants

Table 518: Properties of each reactant.

Id	Name	SBO
M_METTHF_c	METTHF	
M_OIVAL_c	OIVAL	

Products

Table 519: Properties of each product.

Id	Name	SBO
M_AKP_c	AKP	
M_THF_c	THF	

Kinetic Law

$$v_{257} = \text{not specified} \tag{514}$$

6.258 Reaction R_ILVC3

This is an irreversible reaction of two reactants forming two products.

Name ILVC3

Reaction equation

$$\text{M\_AKP\_c} + \text{M\_NADPH\_c} \longrightarrow \text{M\_NADP\_c} + \text{M\_PANT\_c} \tag{515}$$

Reactants

Table 520: Properties of each reactant.

Id	Name	SBO
M_AKP_c	AKP	
M_NADPH_c	NADPH	

Products

Table 521: Properties of each product.

Id	Name	SBO
M_NADP_c	NADP	
M_PANT_c	PANT	

Kinetic Law

$$v_{258} = \text{not specified} \tag{516}$$

6.259 Reaction R_PAND

This is an irreversible reaction of one reactant forming two products.

Name PAND

Reaction equation

$$\text{M\_ASP\_c} \longrightarrow \text{M\_CO2\_c} + \text{M\_bALA\_c} \tag{517}$$

Reactant

Table 522: Properties of each reactant.

Id	Name	SBO
M_ASP_c	ASP	

Products

Table 523: Properties of each product.

Id	Name	SBO
M_CO2_c	CO2	
M_bALA_c	bALA	

Kinetic Law

$$v_{259} = \text{not specified} \tag{518}$$

6.260 Reaction R_PANC

This is an irreversible reaction of three reactants forming three products.

Name PANC

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_PANT\_c} + \text{M\_bALA\_c} \longrightarrow \text{M\_AMP\_c} + \text{M\_PNTO\_c} + \text{M\_PPI\_c} \tag{519}$$

Reactants

Table 524: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_PANT_c	PANT	
M_bALA_c	bALA	

Products

Table 525: Properties of each product.

Id	Name	SBO
M_AMP_c	AMP	
M_PNTO_c	PNTO	
M_PPI_c	PPI	

Kinetic Law

$$v_{260} = \text{not specified} \tag{520}$$

6.261 Reaction R_COAA

This is an irreversible reaction of two reactants forming two products.

Name COAA

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_PNTO\_c} \longrightarrow \text{M\_4PPNTO\_c} + \text{M\_ADP\_c} \tag{521}$$

Reactants

Table 526: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_PNTO_c	PNTO	

Products

Table 527: Properties of each product.

Id	Name	SBO
M_4PPNTO_c	4PPNTO	
M_ADP_c	ADP	

Kinetic Law

$$v_{261} = \text{not specified} \tag{522}$$

6.262 Reaction R_PCLIG

This is an irreversible reaction of three reactants forming three products.

Name PCLIG

Reaction equation

$$\text{M\_4PPNTO\_c} + \text{M\_CTP\_c} + \text{M\_CYS\_c} \longrightarrow \text{M\_4PPNCYS\_c} + \text{M\_CMP\_c} + \text{M\_PPI\_c} \tag{523}$$

Reactants

Table 528: Properties of each reactant.

Id	Name	SBO
M_4PPNTO_c	4PPNTO	
M_CTP_c	CTP	
M_CYS_c	CYS	

Products

Table 529: Properties of each product.

Id	Name	SBO
M_4PPNCYS_c	4PPNCYS	
M_CMP_c	CMP	
M_PPI_c	PPI	

Kinetic Law

$$v_{262} = \text{not specified} \tag{524}$$

6.263 Reaction R_PCDCL

This is an irreversible reaction of one reactant forming two products.

Name PCDCL

Reaction equation

$$\text{M\_4PPNCYS\_c} \longrightarrow \text{M\_4PPNTE\_c} + \text{M\_CO2\_c} \tag{525}$$

Reactant

Table 530: Properties of each reactant.

Id	Name	SBO
M_4PPNCYS_c	4PPNCYS	

Products

Table 531: Properties of each product.

Id	Name	SBO
M_4PPNTE_c	4PPNTE	
M_CO2_c	CO2	

Kinetic Law

$$v_{263} = \text{not specified} \tag{526}$$

6.264 Reaction R_PATRAN

This is an irreversible reaction of two reactants forming two products.

Name PATRAN

Reaction equation

$$\text{M\_4PPNTE\_c} + \text{M\_ATP\_c} \longrightarrow \text{M\_DPCOA\_c} + \text{M\_PPI\_c} \tag{527}$$

Reactants

Table 532: Properties of each reactant.

Id	Name	SBO
M_4PPNTE_c	4PPNTE	
M_ATP_c	ATP	

Products

Table 533: Properties of each product.

Id	Name	SBO
M_DPCOA_c	DPCOA	
M_PPI_c	PPI	

Kinetic Law

$$v_{264} = \text{not specified} \tag{528}$$

6.265 Reaction R_DPHCOAK

This is an irreversible reaction of two reactants forming two products.

Name DPHCOAK

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_DPCOA\_c} \longrightarrow \text{M\_ADP\_c} + \text{M\_COA\_c} \tag{529}$$

Reactants

Table 534: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_DPCOA_c	DPCOA	

Products

Table 535: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_COA_c	COA	

Kinetic Law

$$v_{265} = \text{not specified} \tag{530}$$

6.266 Reaction R_ACPS

This is an irreversible reaction of one reactant forming two products.

Name ACPS

Reaction equation

$$\text{M\_COA\_c} \longrightarrow \text{M\_ACP\_c} + \text{M\_PAP\_c} \tag{531}$$

Reactant

Table 536: Properties of each reactant.

Id	Name	SBO
M_COA_c	COA	

Products

Table 537: Properties of each product.

Id	Name	SBO
M_ACP_c	ACP	
M_PAP_c	PAP	

Kinetic Law

$$v_{266} = \text{not specified} \tag{532}$$

6.267 Reaction R_BISPHDS

This is an irreversible reaction of one reactant forming two products.

Name BISPHDS

Reaction equation

$$\text{M\_PAP\_c} \longrightarrow \text{M\_AMP\_c} + \text{M\_PI\_c} \tag{533}$$

Reactant

Table 538: Properties of each reactant.

Id	Name	SBO
M_PAP_c	PAP	

Products

Table 539: Properties of each product.

Id	Name	SBO
M_AMP_c	AMP	
M_PI_c	PI	

Kinetic Law

$$v_{267} = \text{not specified} \tag{534}$$

6.268 Reaction R_IPPPSYN

This is an irreversible reaction of four reactants forming four products.

Name IPPPSYN

Reaction equation

$$\text{M\_ATP\_c} + 2\,\text{M\_NADPH\_c} + \text{M\_PYR\_c} + \text{M\_T3P1\_c} \longrightarrow \text{M\_ADP\_c} + \text{M\_CO2\_c} + \text{M\_IPPP\_c} + 2\,\text{M\_NADP\_c} \tag{535}$$

Reactants

Table 540: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_NADPH_c	NADPH	
M_PYR_c	PYR	
M_T3P1_c	T3P1	

Products

Table 541: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_CO2_c	CO2	
M_IPPP_c	IPPP	
M_NADP_c	NADP	

Kinetic Law

$$v_{268} = \text{not specified} \tag{536}$$

6.269 Reaction R_IPPPISO

This is an irreversible reaction of one reactant forming one product.

Name IPPPISO

Reaction equation

$$\text{M\_IPPP\_c} \longrightarrow \text{M\_DMPP\_c} \tag{537}$$

Reactant

Table 542: Properties of each reactant.

Id	Name	SBO
M_IPPP_c	IPPP	

Product

Table 543: Properties of each product.

Id	Name	SBO
M_DMPP_c	DMPP	

Kinetic Law

$$v_{269} = \text{not specified} \tag{538}$$

6.270 Reaction R_ISPA1

This is an irreversible reaction of two reactants forming two products.

Name ISPA1

Reaction equation

$$\text{M\_DMPP\_c} + \text{M\_IPPP\_c} \longrightarrow \text{M\_GPP\_c} + \text{M\_PPI\_c} \tag{539}$$

Reactants

Table 544: Properties of each reactant.

Id	Name	SBO
M_DMPP_c	DMPP	
M_IPPP_c	IPPP	

Products

Table 545: Properties of each product.

Id	Name	SBO
M_GPP_c	GPP	
M_PPI_c	PPI	

Kinetic Law

$$v_{270} = \text{not specified} \tag{540}$$

6.271 Reaction R_ISPA2

This is an irreversible reaction of two reactants forming two products.

Name ISPA2

Reaction equation

$$\text{M\_GPP\_c} + \text{M\_IPPP\_c} \longrightarrow \text{M\_FPP\_c} + \text{M\_PPI\_c} \tag{541}$$

Reactants

Table 546: Properties of each reactant.

Id	Name	SBO
M_GPP_c	GPP	
M_IPPP_c	IPPP	

Products

Table 547: Properties of each product.

Id	Name	SBO
M_FPP_c	FPP	
M_PPI_c	PPI	

Kinetic Law

$$v_{271} = \text{not specified} \tag{542}$$

6.272 Reaction R_ISPB

This is an irreversible reaction of two reactants forming two products.

Name ISPB

Reaction equation

$$\text{M\_FPP\_c} + 5\,\text{M\_IPPP\_c} \longrightarrow \text{M\_OPP\_c} + 5\,\text{M\_PPI\_c} \tag{543}$$

Reactants

Table 548: Properties of each reactant.

Id	Name	SBO
M_FPP_c	FPP	
M_IPPP_c	IPPP	

Products

Table 549: Properties of each product.

Id	Name	SBO
M_OPP_c	OPP	
M_PPI_c	PPI	

Kinetic Law

$$v_{272} = \text{not specified} \tag{544}$$

6.273 Reaction R_UPPS

This is an irreversible reaction of two reactants forming two products.

Name UPPS

Reaction equation

$$\text{M\_FPP\_c} + 8\,\text{M\_IPPP\_c} \longrightarrow 8\,\text{M\_PPI\_c} + \text{M\_UDPP\_c} \tag{545}$$

Reactants

Table 550: Properties of each reactant.

Id	Name	SBO
M_FPP_c	FPP	
M_IPPP_c	IPPP	

Products

Table 551: Properties of each product.

Id	Name	SBO
M_PPI_c	PPI	
M_UDPP_c	UDPP	

Kinetic Law

$$v_{273} = \text{not specified} \tag{546}$$

6.274 Reaction R_NADB

This is an irreversible reaction of two reactants forming two products.

Name NADB

Reaction equation

$$\text{M\_ASP\_c} + \text{M\_FAD\_c} \longrightarrow \text{M\_FADH\_c} + \text{M\_ISUCC\_c} \tag{547}$$

Reactants

Table 552: Properties of each reactant.

Id	Name	SBO
M_ASP_c	ASP	
M_FAD_c	FAD	

Products

Table 553: Properties of each product.

Id	Name	SBO
M_FADH_c	FADH	
M_ISUCC_c	ISUCC	

Kinetic Law

$$v_{274} = \text{not specified} \tag{548}$$

6.275 Reaction R_NADA

This is an irreversible reaction of two reactants forming two products.

Name NADA

Reaction equation

$$\text{M\_ISUCC\_c} + \text{M\_T3P2\_c} \longrightarrow \text{M\_PI\_c} + \text{M\_QA\_c} \tag{549}$$

Reactants

Table 554: Properties of each reactant.

Id	Name	SBO
M_ISUCC_c	ISUCC	
M_T3P2_c	T3P2	

Products

Table 555: Properties of each product.

Id	Name	SBO
M_PI_c	PI	
M_QA_c	QA	

Kinetic Law

$$v_{275} = \text{not specified} \tag{550}$$

6.276 Reaction R_NADC

This is an irreversible reaction of two reactants forming three products.

Name NADC

Reaction equation

$$\text{M\_PRPP\_c} + \text{M\_QA\_c} \longrightarrow \text{M\_CO2\_c} + \text{M\_NAMN\_c} + \text{M\_PPI\_c} \tag{551}$$

Reactants

Table 556: Properties of each reactant.

Id	Name	SBO
M_PRPP_c	PRPP	
M_QA_c	QA	

Products

Table 557: Properties of each product.

Id	Name	SBO
M_CO2_c	CO2	

Id	Name	SBO
M_NAMN_c	NAMN	
M_PPI_c	PPI	

Kinetic Law

$$v_{276} = \text{not specified} \tag{552}$$

6.277 Reaction R_NADD

This is an irreversible reaction of two reactants forming two products.

Name NADD

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_NAMN\_c} \longrightarrow \text{M\_NAAD\_c} + \text{M\_PPI\_c} \tag{553}$$

Reactants

Table 558: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_NAMN_c	NAMN	

Products

Table 559: Properties of each product.

Id	Name	SBO
M_NAAD_c	NAAD	
M_PPI_c	PPI	

Kinetic Law

$$v_{277} = \text{not specified} \tag{554}$$

6.278 Reaction R_NADE

This is an irreversible reaction of three reactants forming three products.

Name NADE

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_NAAD\_c} + \text{M\_NH3\_c} \longrightarrow \text{M\_AMP\_c} + \text{M\_NAD\_c} + \text{M\_PPI\_c} \quad (555)$$

Reactants

Table 560: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_NAAD_c	NAAD	
M_NH3_c	NH3	

Products

Table 561: Properties of each product.

Id	Name	SBO
M_AMP_c	AMP	
M_NAD_c	NAD	
M_PPI_c	PPI	

Kinetic Law

$$v_{278} = \text{not specified} \quad (556)$$

6.279 Reaction R_NADFG

This is an irreversible reaction of two reactants forming two products.

Name NADFG

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_NAD\_c} \longrightarrow \text{M\_ADP\_c} + \text{M\_NADP\_c} \quad (557)$$

Reactants

Table 562: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_NAD_c	NAD	

Products

Table 563: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_NADP_c	NADP	

Kinetic Law

$$v_{279} = \text{not specified} \tag{558}$$

6.280 Reaction R_THIM

This is an irreversible reaction of two reactants forming two products.

Name THIM

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_THZ\_c} \longrightarrow \text{M\_ADP\_c} + \text{M\_THZP\_c} \tag{559}$$

Reactants

Table 564: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_THZ_c	THZ	

Products

Table 565: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_THZP_c	THZP	

Kinetic Law

$$v_{280} = \text{not specified} \tag{560}$$

6.281 Reaction R_UNKRXN1

This is an irreversible reaction of two reactants forming one product.

Name UNKRXN1

Reaction equation

$$\text{M\_PYR\_c} + \text{M\_T3P1\_c} \longrightarrow \text{M\_DTP\_c} \tag{561}$$

Reactants

Table 566: Properties of each reactant.

Id	Name	SBO
M_PYR_c	PYR	
M_T3P1_c	T3P1	

Product

Table 567: Properties of each product.

Id	Name	SBO
M_DTP_c	DTP	

Kinetic Law

$$v_{281} = \text{not specified} \tag{562}$$

6.282 Reaction R_THID

This is an irreversible reaction of two reactants forming two products.

Name THID

Reaction equation

$$\text{M\_AHMP\_c} + \text{M\_ATP\_c} \longrightarrow \text{M\_ADP\_c} + \text{M\_AHMPP\_c} \tag{563}$$

Reactants

Table 568: Properties of each reactant.

Id	Name	SBO
M_AHMP_c	AHMP	
M_ATP_c	ATP	

Products

Table 569: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_AHMPP_c	AHMPP	

Kinetic Law

$$v_{282} = \text{not specified} \tag{564}$$

6.283 Reaction R_THIB

This is an irreversible reaction of two reactants forming two products.

Name THIB

Reaction equation

$$\text{M\_AHMPP\_c} + \text{M\_THZP\_c} \longrightarrow \text{M\_PPI\_c} + \text{M\_THMP\_c} \tag{565}$$

Reactants

Table 570: Properties of each reactant.

Id	Name	SBO
M_AHMPP_c	AHMPP	
M_THZP_c	THZP	

Products

Table 571: Properties of each product.

Id	Name	SBO
M_PPI_c	PPI	

Id	Name	SBO
M_THMP_c	THMP	

Kinetic Law

$$v_{283} = \text{not specified} \tag{566}$$

6.284 Reaction R_THIF

This is an irreversible reaction of three reactants forming three products.

Name THIF

Reaction equation

$$\text{M\_CYS\_c} + \text{M\_DTP\_c} + \text{M\_TYR\_c} \longrightarrow \text{M\_CO2\_c} + \text{M\_HBA\_c} + \text{M\_THZ\_c} \tag{567}$$

Reactants

Table 572: Properties of each reactant.

Id	Name	SBO
M_CYS_c	CYS	
M_DTP_c	DTP	
M_TYR_c	TYR	

Products

Table 573: Properties of each product.

Id	Name	SBO
M_CO2_c	CO2	
M_HBA_c	HBA	
M_THZ_c	THZ	

Kinetic Law

$$v_{284} = \text{not specified} \tag{568}$$

6.285 Reaction R_MENF

This is an irreversible reaction of one reactant forming one product.

Name MENF

Reaction equation

$$\text{M\_CHOR\_c} \longrightarrow \text{M\_ICHOR\_c} \tag{569}$$

Reactant

Table 574: Properties of each reactant.

Id	Name	SBO
M_CHOR_c	CHOR	

Product

Table 575: Properties of each product.

Id	Name	SBO
M_ICHOR_c	ICHOR	

Kinetic Law

$$v_{285} = \text{not specified} \tag{570}$$

6.286 Reaction R_MEND1

This is an irreversible reaction of two reactants forming two products.

Name MEND1

Reaction equation

$$\text{M\_AKG\_c} + \text{M\_TPP\_c} \longrightarrow \text{M\_CO2\_c} + \text{M\_SSALTPP\_c} \tag{571}$$

Reactants

Table 576: Properties of each reactant.

Id	Name	SBO
M_AKG_c	AKG	
M_TPP_c	TPP	

Products

Table 577: Properties of each product.

Id	Name	SBO
M_CO2_c	CO2	
M_SSALTPP_c	SSALTPP	

Kinetic Law

$$v_{286} = \text{not specified} \tag{572}$$

6.287 Reaction R_MEND2

This is an irreversible reaction of two reactants forming three products.

Name MEND2

Reaction equation

$$\text{M\_ICHOR\_c} + \text{M\_SSALTPP\_c} \longrightarrow \text{M\_PYR\_c} + \text{M\_SHCHC\_c} + \text{M\_TPP\_c} \tag{573}$$

Reactants

Table 578: Properties of each reactant.

Id	Name	SBO
M_ICHOR_c	ICHOR	
M_SSALTPP_c	SSALTPP	

Products

Table 579: Properties of each product.

Id	Name	SBO
M_PYR_c	PYR	
M_SHCHC_c	SHCHC	
M_TPP_c	TPP	

Kinetic Law

$$v_{287} = \text{not specified} \tag{574}$$

6.288 Reaction R_MENC

This is an irreversible reaction of one reactant forming one product.

Name MENC

Reaction equation

$$\text{M\_SHCHC\_c} \longrightarrow \text{M\_OSB\_c} \tag{575}$$

Reactant

Table 580: Properties of each reactant.

Id	Name	SBO
M_SHCHC_c	SHCHC	

Product

Table 581: Properties of each product.

Id	Name	SBO
M_OSB_c	OSB	

Kinetic Law

$$v_{288} = \text{not specified} \tag{576}$$

6.289 Reaction R_MENE

This is an irreversible reaction of three reactants forming three products.

Name MENE

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_COA\_c} + \text{M\_OSB\_c} \longrightarrow \text{M\_AMP\_c} + \text{M\_OSBCOA\_c} + \text{M\_PPI\_c} \tag{577}$$

Reactants

Table 582: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_COA_c	COA	
M_OSB_c	OSB	

Products

Table 583: Properties of each product.

Id	Name	SBO
M_AMP_c	AMP	
M_OSBCOA_c	OSBCOA	
M_PPI_c	PPI	

Kinetic Law

$$v_{289} = \text{not specified} \tag{578}$$

6.290 Reaction R_MENB

This is an irreversible reaction of one reactant forming two products.

Name MENB

Reaction equation

$$\text{M\_OSBCOA\_c} \longrightarrow \text{M\_COA\_c} + \text{M\_DHNA\_c} \tag{579}$$

Reactant

Table 584: Properties of each reactant.

Id	Name	SBO
M_OSBCOA_c	OSBCOA	

Products

Table 585: Properties of each product.

Id	Name	SBO
M_COA_c	COA	
M_DHNA_c	DHNA	

Kinetic Law

$$v_{290} = \text{not specified} \tag{580}$$

6.291 Reaction R_MENA

This is an irreversible reaction of two reactants forming three products.

Name MENA

Reaction equation

$$\text{M\_DHNA\_c} + \text{M\_OPP\_c} \longrightarrow \text{M\_CO2\_c} + \text{M\_DMK\_c} + \text{M\_PPI\_c} \tag{581}$$

Reactants

Table 586: Properties of each reactant.

Id	Name	SBO
M_DHNA_c	DHNA	
M_OPP_c	OPP	

Products

Table 587: Properties of each product.

Id	Name	SBO
M_CO2_c	CO2	
M_DMK_c	DMK	
M_PPI_c	PPI	

Kinetic Law

$$v_{291} = \text{not specified} \tag{582}$$

6.292 Reaction R_MENG

This is an irreversible reaction of two reactants forming two products.

Name MENG

Reaction equation

$$\text{M\_DMK\_c} + \text{M\_SAM\_c} \longrightarrow \text{M\_MK\_c} + \text{M\_SAH\_c} \tag{583}$$

Reactants

Table 588: Properties of each reactant.

Id	Name	SBO
M_DMK_c	DMK	
M_SAM_c	SAM	

Products

Table 589: Properties of each product.

Id	Name	SBO
M_MK_c	MK	
M_SAH_c	SAH	

Kinetic Law

$$v_{292} = \text{not specified} \tag{584}$$

6.293 Reaction R_DPEPTP

This is an irreversible reaction of two reactants forming three products.

Name DPEPTP

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_DIPEP\_e} \longrightarrow \text{M\_ADP\_c} + \text{M\_DIPEP\_c} + \text{M\_PI\_c} \tag{585}$$

Reactants

Table 590: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_DIPEP_e	DIPEPxt	

Products

Table 591: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_DIPEP_c	DIPEP	
M_PI_c	PI	

Kinetic Law

$$v_{293} = \text{not specified} \tag{586}$$

6.294 Reaction R_OPEPTP

This is an irreversible reaction of two reactants forming three products.

Name OPEPTP

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_OPEP\_e} \longrightarrow \text{M\_ADP\_c} + \text{M\_OPEP\_c} + \text{M\_PI\_c} \tag{587}$$

Reactants

Table 592: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_OPEP_e	OPEPxt	

Products

Table 593: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_OPEP_c	OPEP	
M_PI_c	PI	

Kinetic Law

$$v_{294} = \text{not specified} \tag{588}$$

6.295 Reaction R_SERTP

This is a reversible reaction of two reactants forming one product.

Name SERTP

Reaction equation

$$\text{M\_HEXT\_c} + \text{M\_SER\_e} \rightleftharpoons \text{M\_SER\_c} \tag{589}$$

Reactants

Table 594: Properties of each reactant.

Id	Name	SBO
M_HEXT_c	HEXT	
M_SER_e	SERxt	

Product

Table 595: Properties of each product.

Id	Name	SBO
M_SER_c	SER	

Kinetic Law

$$v_{295} = \text{not specified} \tag{590}$$

6.296 Reaction R_ADHE2

This is a reversible reaction of two reactants forming three products.

Name ADHE2

Reaction equation

$$\mathrm{M\_ACCOA\_c} + 2\,\mathrm{M\_NADH\_c} \rightleftharpoons \mathrm{M\_COA\_c} + \mathrm{M\_ETH\_c} + 2\,\mathrm{M\_NAD\_c} \tag{591}$$

Reactants

Table 596: Properties of each reactant.

Id	Name	SBO
M_ACCOA_c	ACCOA	
M_NADH_c	NADH	

Products

Table 597: Properties of each product.

Id	Name	SBO
M_COA_c	COA	
M_ETH_c	ETH	
M_NAD_c	NAD	

Kinetic Law

$$v_{296} = \text{not specified} \tag{592}$$

6.297 Reaction R_ETHTP

This is a reversible reaction of two reactants forming one product.

Name ETHTP

Reaction equation

$$\mathrm{M\_ETH\_e} + \mathrm{M\_HEXT\_c} \rightleftharpoons \mathrm{M\_ETH\_c} \tag{593}$$

Reactants

Table 598: Properties of each reactant.

Id	Name	SBO
M_ETH_e	ETHxt	
M_HEXT_c	HEXT	

Product

Table 599: Properties of each product.

Id	Name	SBO
M_ETH_c	ETH	

Kinetic Law

$$v_{297} = \text{not specified} \tag{594}$$

6.298 Reaction R_PTA

This is a reversible reaction of two reactants forming two products.

Name PTA

Reaction equation

$$\text{M\_ACCOA\_c} + \text{M\_PI\_c} \rightleftharpoons \text{M\_ACTP\_c} + \text{M\_COA\_c} \tag{595}$$

Reactants

Table 600: Properties of each reactant.

Id	Name	SBO
M_ACCOA_c	ACCOA	
M_PI_c	PI	

Products

Table 601: Properties of each product.

Id	Name	SBO
M_ACTP_c	ACTP	
M_COA_c	COA	

Id	Name	SBO

Kinetic Law

$$v_{298} = \text{not specified} \tag{596}$$

6.299 Reaction R_ACKA

This is a reversible reaction of two reactants forming two products.

Name ACKA

Reaction equation

$$\text{M\_ACTP\_c} + \text{M\_ADP\_c} \rightleftharpoons \text{M\_AC\_c} + \text{M\_ATP\_c} \tag{597}$$

Reactants

Table 602: Properties of each reactant.

Id	Name	SBO
M_ACTP_c	ACTP	
M_ADP_c	ADP	

Products

Table 603: Properties of each product.

Id	Name	SBO
M_AC_c	AC	
M_ATP_c	ATP	

Kinetic Law

$$v_{299} = \text{not specified} \tag{598}$$

6.300 Reaction R_ACOE

This is an irreversible reaction of three reactants forming three products.

Name ACOE

Reaction equation

$$\text{M\_AC\_c} + \text{M\_ATP\_c} + \text{M\_COA\_c} \longrightarrow \text{M\_ACCOA\_c} + \text{M\_AMP\_c} + \text{M\_PPI\_c} \quad (599)$$

Reactants

Table 604: Properties of each reactant.

Id	Name	SBO
M_AC_c	AC	
M_ATP_c	ATP	
M_COA_c	COA	

Products

Table 605: Properties of each product.

Id	Name	SBO
M_ACCOA_c	ACCOA	
M_AMP_c	AMP	
M_PPI_c	PPI	

Kinetic Law

$$v_{300} = \text{not specified} \quad (600)$$

6.301 Reaction R_ACTP

This is a reversible reaction of two reactants forming one product.

Name ACTP

Reaction equation

$$\text{M\_AC\_e} + \text{M\_HEXT\_c} \rightleftharpoons \text{M\_AC\_c} \quad (601)$$

Reactants

Table 606: Properties of each reactant.

Id	Name	SBO
M_AC_e	ACxt	
M_HEXT_c	HEXT	

Product

Table 607: Properties of each product.

Id	Name	SBO
M_AC_c	AC	

Kinetic Law

$$v_{301} = \text{not specified} \tag{602}$$

6.302 Reaction R_GALE

This is a reversible reaction of one reactant forming one product.

Name GALE

Reaction equation

$$\text{M\_UDPGAL\_c} \rightleftharpoons \text{M\_UDPG\_c} \tag{603}$$

Reactant

Table 608: Properties of each reactant.

Id	Name	SBO
M_UDPGAL_c	UDPGAL	

Product

Table 609: Properties of each product.

Id	Name	SBO
M_UDPG_c	UDPG	

Kinetic Law

$$v_{302} = \text{not specified} \tag{604}$$

6.303 Reaction R_GALU

This is a reversible reaction of two reactants forming two products.

Name GALU

Reaction equation

$$\text{M\_G1P\_c} + \text{M\_UTP\_c} \rightleftharpoons \text{M\_PPI\_c} + \text{M\_UDPG\_c} \tag{605}$$

Reactants

Table 610: Properties of each reactant.

Id	Name	SBO
M_G1P_c	G1P	
M_UTP_c	UTP	

Products

Table 611: Properties of each product.

Id	Name	SBO
M_PPI_c	PPI	
M_UDPG_c	UDPG	

Kinetic Law

$$v_{303} = \text{not specified} \tag{606}$$

6.304 Reaction R_ALGC1

This is a reversible reaction of one reactant forming one product.

Name ALGC1

Reaction equation

$$\text{M\_G6P\_c} \rightleftharpoons \text{M\_G1P\_c} \tag{607}$$

Reactant

Table 612: Properties of each reactant.

Id	Name	SBO
M_G6P_c	G6P	

Product

Table 613: Properties of each product.

Id	Name	SBO
M_G1P_c	G1P	

Kinetic Law

$$v_{304} = \text{not specified} \tag{608}$$

6.305 Reaction R_GLACTP

This is an irreversible reaction of two reactants forming one product.

Name GLACTP

Reaction equation

$$\text{M\_GLAC\_e} + \text{M\_HEXT\_c} \longrightarrow \text{M\_GLAC\_c} \tag{609}$$

Reactants

Table 614: Properties of each reactant.

Id	Name	SBO
M_GLAC_e	GLACxt	
M_HEXT_c	HEXT	

Product

Table 615: Properties of each product.

Id	Name	SBO
M_GLAC_c	GLAC	

Kinetic Law

$$v_{305} = \text{not specified} \tag{610}$$

6.306 Reaction R_GLCTP

This is an irreversible reaction of two reactants forming one product.

Name GLCTP

Reaction equation

$$\text{M\_GLC\_e} + \text{M\_HEXT\_c} \longrightarrow \text{M\_GLC\_c} \tag{611}$$

Reactants

Table 616: Properties of each reactant.

Id	Name	SBO
M_GLC_e	GLCxt	
M_HEXT_c	HEXT	

Product

Table 617: Properties of each product.

Id	Name	SBO
M_GLC_c	GLC	

Kinetic Law

$$v_{306} = \text{not specified} \tag{612}$$

6.307 Reaction R_GLK1

This is an irreversible reaction of two reactants forming two products.

Name GLK1

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_GLC\_c} \longrightarrow \text{M\_ADP\_c} + \text{M\_G6P\_c} \tag{613}$$

Reactants

Table 618: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_GLC_c	GLC	

Products

Table 619: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_G6P_c	G6P	

Kinetic Law

$$v_{307} = \text{not specified} \tag{614}$$

6.308 Reaction R_GLK2

This is an irreversible reaction of two reactants forming two products.

Name GLK2

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_MAN\_c} \longrightarrow \text{M\_ADP\_c} + \text{M\_MAN6P\_c} \tag{615}$$

Reactants

Table 620: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_MAN_c	MAN	

Products

Table 621: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_MAN6P_c	MAN6P	

Kinetic Law

$$v_{308} = \text{not specified} \tag{616}$$

6.309 Reaction R_PMI

This is a reversible reaction of one reactant forming one product.

Name PMI

Reaction equation

$$\text{M\_MAN6P\_c} \rightleftharpoons \text{M\_F6P\_c} \tag{617}$$

Reactant

Table 622: Properties of each reactant.

Id	Name	SBO
M_MAN6P_c	MAN6P	

Product

Table 623: Properties of each product.

Id	Name	SBO
M_F6P_c	F6P	

Kinetic Law

$$v_{309} = \text{not specified} \tag{618}$$

6.310 Reaction R_PROTP1

This is a reversible reaction of two reactants forming two products.

Name PROTP1

Reaction equation

$$\text{M\_NA\_e} + \text{M\_PRO\_e} \rightleftharpoons \text{M\_NA\_c} + \text{M\_PRO\_c} \tag{619}$$

Reactants

Table 624: Properties of each reactant.

Id	Name	SBO
M_NA_e	NAxt	
M_PRO_e	PROxt	

Products

Table 625: Properties of each product.

Id	Name	SBO
M_NA_c	NA	
M_PRO_c	PRO	

Kinetic Law

$$v_{310} = \text{not specified} \tag{620}$$

6.311 Reaction R_PROTP2

This is an irreversible reaction of two reactants forming three products.

Name PROTP2

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_PRO\_e} \longrightarrow \text{M\_ADP\_c} + \text{M\_PI\_c} + \text{M\_PRO\_c} \tag{621}$$

Reactants

Table 626: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_PRO_e	PROxt	

Products

Table 627: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	

Id	Name	SBO
M_PI_c	PI	
M_PRO_c	PRO	

Kinetic Law

$$v_{311} = \text{not specified} \tag{622}$$

6.312 Reaction R_PROTP3

This is a reversible reaction of two reactants forming one product.

Name PROTP3

Reaction equation

$$\text{M\_HEXT\_c} + \text{M\_PRO\_e} \rightleftharpoons \text{M\_PRO\_c} \tag{623}$$

Reactants

Table 628: Properties of each reactant.

Id	Name	SBO
M_HEXT_c	HEXT	
M_PRO_e	PROxt	

Product

Table 629: Properties of each product.

Id	Name	SBO
M_PRO_c	PRO	

Kinetic Law

$$v_{312} = \text{not specified} \tag{624}$$

6.313 Reaction R_LACTP

This is a reversible reaction of two reactants forming one product.

Name LACTP

Reaction equation

$$\text{M\_HEXT\_c} + \text{M\_LAC\_e} \rightleftharpoons \text{M\_LAC\_c} \tag{625}$$

Reactants

Table 630: Properties of each reactant.

Id	Name	SBO
M_HEXT_c	HEXT	
M_LAC_e	LACxt	

Product

Table 631: Properties of each product.

Id	Name	SBO
M_LAC_c	LAC	

Kinetic Law

$$v_{313} = \text{not specified} \tag{626}$$

6.314 Reaction R_DLD

This is a reversible reaction of two reactants forming two products.

Name DLD

Reaction equation

$$\text{M\_LAC\_c} + \text{M\_MK\_c} \rightleftharpoons \text{M\_MKH2\_c} + \text{M\_PYR\_c} \tag{627}$$

Reactants

Table 632: Properties of each reactant.

Id	Name	SBO
M_LAC_c	LAC	
M_MK_c	MK	

Products

Table 633: Properties of each product.

Id	Name	SBO
M_MKH2_c	MKH2	
M_PYR_c	PYR	

Kinetic Law

$$v_{314} = \text{not specified} \tag{628}$$

6.315 Reaction R_GLNTP

This is an irreversible reaction of two reactants forming three products.

Name GLNTP

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_GLN\_e} \longrightarrow \text{M\_ADP\_c} + \text{M\_GLN\_c} + \text{M\_PI\_c} \tag{629}$$

Reactants

Table 634: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_GLN_e	GLNxt	

Products

Table 635: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_GLN_c	GLN	
M_PI_c	PI	

Kinetic Law

$$v_{315} = \text{not specified} \tag{630}$$

6.316 Reaction R_GLTTP

This is a reversible reaction of two reactants forming one product.

Name GLTTP

Reaction equation

$$\text{M\_GLU\_e} + \text{M\_HEXT\_c} \rightleftharpoons \text{M\_GLU\_c} \tag{631}$$

Reactants

Table 636: Properties of each reactant.

Id	Name	SBO
M_GLU_e	GLUxt	
M_HEXT_c	HEXT	

Product

Table 637: Properties of each product.

Id	Name	SBO
M_GLU_c	GLU	

Kinetic Law

$$v_{316} = \text{not specified} \tag{632}$$

6.317 Reaction R_ALATP

This is an irreversible reaction of two reactants forming one product.

Name ALATP

Reaction equation

$$\text{M\_ALA\_e} + \text{M\_HEXT\_c} \longrightarrow \text{M\_ALA\_c} \tag{633}$$

Reactants

Table 638: Properties of each reactant.

Id	Name	SBO
M_ALA_e	ALAxt	
M_HEXT_c	HEXT	

Product

Table 639: Properties of each product.

Id	Name	SBO
M_ALA_c	ALA	

Kinetic Law

$$v_{317} = \text{not specified} \tag{634}$$

6.318 Reaction R_DALATP

This is an irreversible reaction of two reactants forming one product.

Name DALATP

Reaction equation

$$\text{M\_DALA\_e} + \text{M\_HEXT\_c} \longrightarrow \text{M\_DALA\_c} \tag{635}$$

Reactants

Table 640: Properties of each reactant.

Id	Name	SBO
M_DALA_e	DALAxt	
M_HEXT_c	HEXT	

Product

Table 641: Properties of each product.

Id	Name	SBO
M_DALA_c	DALA	

Kinetic Law

$$v_{318} = \text{not specified} \tag{636}$$

6.319 Reaction R_GLYTP2

This is an irreversible reaction of two reactants forming one product.

Name GLYTP2

Reaction equation

$$\text{M\_GLY\_e} + \text{M\_HEXT\_c} \longrightarrow \text{M\_GLY\_c} \tag{637}$$

Reactants

Table 642: Properties of each reactant.

Id	Name	SBO
M_GLY_e	GLYxt	
M_HEXT_c	HEXT	

Product

Table 643: Properties of each product.

Id	Name	SBO
M_GLY_c	GLY	

Kinetic Law

$$v_{319} = \text{not specified} \tag{638}$$

6.320 Reaction R_DSERTP

This is an irreversible reaction of two reactants forming one product.

Name DSERTP

Reaction equation

$$\text{M\_DSER\_e} + \text{M\_HEXT\_c} \longrightarrow \text{M\_DSER\_c} \tag{639}$$

Reactants

Table 644: Properties of each reactant.

Id	Name	SBO
M_DSER_e	DSERxt	
M_HEXT_c	HEXT	

Product

Table 645: Properties of each product.

Id	Name	SBO
M_DSER_c	DSER	

Kinetic Law

$$v_{320} = \text{not specified} \tag{640}$$

6.321 Reaction R_ORNTP

This is a reversible reaction of two reactants forming one product.

Name ORNTP

Reaction equation

$$\text{M\_HEXT\_c} + \text{M\_ORN\_e} \rightleftharpoons \text{M\_ORN\_c} \tag{641}$$

Reactants

Table 646: Properties of each reactant.

Id	Name	SBO
M_HEXT_c	HEXT	
M_ORN_e	ORNxt	

Product

Table 647: Properties of each product.

Id	Name	SBO
M_ORN_c	ORN	

Kinetic Law

$$v_{321} = \text{not specified} \tag{642}$$

6.322 Reaction R_ARGTP

This is a reversible reaction of two reactants forming one product.

Name ARGTP

Reaction equation

$$\text{M\_ARG\_e} + \text{M\_HEXT\_c} \rightleftharpoons \text{M\_ARG\_c} \tag{643}$$

Reactants

Table 648: Properties of each reactant.

Id	Name	SBO
M_ARG_e	ARGxt	
M_HEXT_c	HEXT	

Product

Table 649: Properties of each product.

Id	Name	SBO
M_ARG_c	ARG	

Kinetic Law

$$v_{322} = \text{not specified} \tag{644}$$

6.323 Reaction R_NATP

This is a reversible reaction of one reactant forming two products.

Name NATP

Reaction equation

$$\text{M\_NA\_e} \rightleftharpoons \text{M\_HEXT\_c} + \text{M\_NA\_c} \tag{645}$$

Reactant

Table 650: Properties of each reactant.

Id	Name	SBO
M_NA_e	NAxt	

Products

Table 651: Properties of each product.

Id	Name	SBO
M_HEXT_c	HEXT	
M_NA_c	NA	

Kinetic Law

$$v_{323} = \text{not specified} \tag{646}$$

6.324 Reaction R_SUCTP

This is a reversible reaction of two reactants forming one product.

Name SUCTP

Reaction equation

$$\text{M\_HEXT\_c} + \text{M\_SUCC\_e} \rightleftharpoons \text{M\_SUCC\_c} \tag{647}$$

Reactants

Table 652: Properties of each reactant.

Id	Name	SBO
M_HEXT_c	HEXT	
M_SUCC_e	SUCCxt	

Product

Table 653: Properties of each product.

Id	Name	SBO
M_SUCC_c	SUCC	

Kinetic Law

$$v_{324} = \text{not specified} \tag{648}$$

6.325 Reaction R_FUMTP

This is a reversible reaction of two reactants forming one product.

Name FUMTP

Reaction equation

$$\text{M\_FUM\_e} + \text{M\_HEXT\_c} \rightleftharpoons \text{M\_FUM\_c} \tag{649}$$

Reactants

Table 654: Properties of each reactant.

Id	Name	SBO
M_FUM_e	FUMxt	
M_HEXT_c	HEXT	

Product

Table 655: Properties of each product.

Id	Name	SBO
M_FUM_c	FUM	

Kinetic Law

$$v_{325} = \text{not specified} \tag{650}$$

6.326 Reaction R_MALTP

This is a reversible reaction of two reactants forming one product.

Name MALTP

Reaction equation

$$\text{M\_HEXT\_c} + \text{M\_MAL\_e} \rightleftharpoons \text{M\_MAL\_c} \tag{651}$$

Reactants

Table 656: Properties of each reactant.

Id	Name	SBO
M_HEXT_c	HEXT	
M_MAL_e	MALxt	

Product

Table 657: Properties of each product.

Id	Name	SBO
M_MAL_c	MAL	

Kinetic Law

$$v_{326} = \text{not specified} \tag{652}$$

6.327 Reaction R_ASPTP

This is a reversible reaction of two reactants forming one product.

Name ASPTP

Reaction equation

$$\text{M\_ASP\_e} + \text{M\_HEXT\_c} \rightleftharpoons \text{M\_ASP\_c} \tag{653}$$

Reactants

Table 658: Properties of each reactant.

Id	Name	SBO
M_ASP_e	ASPxt	
M_HEXT_c	HEXT	

Product

Table 659: Properties of each product.

Id	Name	SBO
M_ASP_c	ASP	

Kinetic Law

$$v_{327} = \text{not specified} \tag{654}$$

6.328 Reaction R_NUPCTP1

This is an irreversible reaction of two reactants forming one product.

Name NUPCTP1

Reaction equation

$$\text{M\_ADN\_e} + \text{M\_HEXT\_c} \longrightarrow \text{M\_ADN\_c} \tag{655}$$

Reactants

Table 660: Properties of each reactant.

Id	Name	SBO
M_ADN_e	ADNxt	
M_HEXT_c	HEXT	

Product

Table 661: Properties of each product.

Id	Name	SBO
M_ADN_c	ADN	

Kinetic Law

$$v_{328} = \text{not specified} \tag{656}$$

6.329 Reaction R_NUPCTP2

This is an irreversible reaction of two reactants forming one product.

Name NUPCTP2

Reaction equation

$$\text{M\_HEXT\_c} + \text{M\_URI\_e} \longrightarrow \text{M\_URI\_c} \tag{657}$$

Reactants

Table 662: Properties of each reactant.

Id	Name	SBO
M_HEXT_c	HEXT	
M_URI_e	URIxt	

Product

Table 663: Properties of each product.

Id	Name	SBO
M_URI_c	URI	

Kinetic Law

$$v_{329} = \text{not specified} \tag{658}$$

6.330 Reaction R_NUPCTP3

This is an irreversible reaction of two reactants forming one product.

Name NUPCTP3

Reaction equation

$$\text{M\_CYTD\_e} + \text{M\_HEXT\_c} \longrightarrow \text{M\_CYTD\_c} \tag{659}$$

Reactants

Table 664: Properties of each reactant.

Id	Name	SBO
M_CYTD_e	CYTDxt	
M_HEXT_c	HEXT	

Product

Table 665: Properties of each product.

Id	Name	SBO
M_CYTD_c	CYTD	

Kinetic Law

$$v_{330} = \text{not specified} \tag{660}$$

6.331 Reaction R_NUPCTP4

This is an irreversible reaction of two reactants forming one product.

Name NUPCTP4

Reaction equation

$$\text{M\_DT\_e} + \text{M\_HEXT\_c} \longrightarrow \text{M\_DT\_c} \tag{661}$$

Reactants

Table 666: Properties of each reactant.

Id	Name	SBO
M_DT_e	DTxt	
M_HEXT_c	HEXT	

Product

Table 667: Properties of each product.

Id	Name	SBO
M_DT_c	DT	

Kinetic Law

$$v_{331} = \text{not specified} \tag{662}$$

6.332 Reaction R_NUPCTP5

This is an irreversible reaction of two reactants forming one product.

Name NUPCTP5

Reaction equation

$$\text{M\_DA\_e} + \text{M\_HEXT\_c} \longrightarrow \text{M\_DA\_c} \tag{663}$$

Reactants

Table 668: Properties of each reactant.

Id	Name	SBO
M_DA_e	DAxt	
M_HEXT_c	HEXT	

Product

Table 669: Properties of each product.

Id	Name	SBO
M_DA_c	DA	

Kinetic Law

$$v_{332} = \text{not specified} \tag{664}$$

6.333 Reaction R_NUPCTP6

This is an irreversible reaction of two reactants forming one product.

Name NUPCTP6

Reaction equation

$$\text{M\_DC\_e} + \text{M\_HEXT\_c} \longrightarrow \text{M\_DC\_c} \tag{665}$$

Reactants

Table 670: Properties of each reactant.

Id	Name	SBO
M_DC_e	DCxt	
M_HEXT_c	HEXT	

Product

Table 671: Properties of each product.

Id	Name	SBO
M_DC_c	DC	

Kinetic Law

$$v_{333} = \text{not specified} \tag{666}$$

6.334 Reaction R_NUPCTP7

This is an irreversible reaction of two reactants forming one product.

Name NUPCTP7

Reaction equation

$$\text{M\_DU\_e} + \text{M\_HEXT\_c} \longrightarrow \text{M\_DU\_c} \tag{667}$$

Reactants

Table 672: Properties of each reactant.

Id	Name	SBO
M_DU_e	DUxt	
M_HEXT_c	HEXT	

Product

Table 673: Properties of each product.

Id	Name	SBO
M_DU_c	DU	

Kinetic Law

$$v_{334} = \text{not specified} \tag{668}$$

6.335 Reaction R_FRDO

This is an irreversible reaction of two reactants forming two products.

Name FRDO

Reaction equation

$$\text{M\_FERDXH\_c} + \text{M\_NADP\_c} \longrightarrow \text{M\_FERDX\_c} + \text{M\_NADPH\_c} \tag{669}$$

Reactants

Table 674: Properties of each reactant.

Id	Name	SBO
M_FERDXH_c	FERDXH	
M_NADP_c	NADP	

Products

Table 675: Properties of each product.

Id	Name	SBO
M_FERDX_c	FERDX	
M_NADPH_c	NADPH	

Kinetic Law

$$v_{335} = \text{not specified} \tag{670}$$

6.336 Reaction R_FLDO

This is an irreversible reaction of two reactants forming two products.

Name FLDO

Reaction equation

$$\text{M\_FLVDXH\_c} + \text{M\_NADP\_c} \longrightarrow \text{M\_FLVDX\_c} + \text{M\_NADPH\_c} \tag{671}$$

Reactants

Table 676: Properties of each reactant.

Id	Name	SBO
M_FLVDXH_c	FLVDXH	
M_NADP_c	NADP	

Products

Table 677: Properties of each product.

Id	Name	SBO
M_FLVDX_c	FLVDX	

Id	Name	SBO
M_NADPH_c	NADPH	

Kinetic Law

$$v_{336} = \text{not specified} \tag{672}$$

6.337 Reaction R_NDH__1

This is an irreversible reaction of two reactants forming three products.

Name NDH-1

Reaction equation

$$\text{M\_MK\_c} + \text{M\_NADPH\_c} \longrightarrow 2\,\text{M\_HEXT\_c} + \text{M\_MKH2\_c} + \text{M\_NADP\_c} \tag{673}$$

Reactants

Table 678: Properties of each reactant.

Id	Name	SBO
M_MK_c	MK	
M_NADPH_c	NADPH	

Products

Table 679: Properties of each product.

Id	Name	SBO
M_HEXT_c	HEXT	
M_MKH2_c	MKH2	
M_NADP_c	NADP	

Kinetic Law

$$v_{337} = \text{not specified} \tag{674}$$

6.338 Reaction R_FADOX

This is an irreversible reaction of two reactants forming two products.

Name FADOX

Reaction equation

$$\text{M\_FADH\_c} + \text{M\_MK\_c} \longrightarrow \text{M\_FAD\_c} + \text{M\_MKH2\_c} \tag{675}$$

Reactants

Table 680: Properties of each reactant.

Id	Name	SBO
M_FADH_c	FADH	
M_MK_c	MK	

Products

Table 681: Properties of each product.

Id	Name	SBO
M_FAD_c	FAD	
M_MKH2_c	MKH2	

Kinetic Law

$$v_{338} = \text{not specified} \tag{676}$$

6.339 Reaction R_CBB3O

This is an irreversible reaction of two reactants forming two products.

Name CBB3O

Reaction equation

$$\text{M\_MKH2\_c} + 0{\cdot}5\,\text{M\_O2\_c} \longrightarrow 2\,\text{M\_HEXT\_c} + \text{M\_MK\_c} \tag{677}$$

Reactants

Table 682: Properties of each reactant.

Id	Name	SBO
M_MKH2_c	MKH2	
M_O2_c	O2	

Products

Table 683: Properties of each product.

Id	Name	SBO
M_HEXT_c	HEXT	
M_MK_c	MK	

Kinetic Law

$$v_{339} = \text{not specified} \tag{678}$$

6.340 Reaction R_BC1O

This is an irreversible reaction of two reactants forming two products.

Name BC1O

Reaction equation

$$\text{M\_MKH2\_c} + 0{\cdot}5\,\text{M\_O2\_c} \longrightarrow 2\,\text{M\_HEXT\_c} + \text{M\_MK\_c} \tag{679}$$

Reactants

Table 684: Properties of each reactant.

Id	Name	SBO
M_MKH2_c	MKH2	
M_O2_c	O2	

Products

Table 685: Properties of each product.

Id	Name	SBO
M_HEXT_c	HEXT	
M_MK_c	MK	

Kinetic Law

$$v_{340} = \text{not specified} \tag{680}$$

6.341 Reaction R_HYDA

This is an irreversible reaction of two reactants forming two products.

Name HYDA

Reaction equation

$$\mathrm{M\_H2\_e} + \mathrm{M\_MK\_c} \longrightarrow 2\,\mathrm{M\_HEXT\_c} + \mathrm{M\_MKH2\_c} \tag{681}$$

Reactants

Table 686: Properties of each reactant.

Id	Name	SBO
M_H2_e	H2xt	
M_MK_c	MK	

Products

Table 687: Properties of each product.

Id	Name	SBO
M_HEXT_c	HEXT	
M_MKH2_c	MKH2	

Kinetic Law

$$v_{341} = \text{not specified} \tag{682}$$

6.342 Reaction R_ATPA

This is a reversible reaction of three reactants forming one product.

Name ATPA

Reaction equation

$$\mathrm{M\_ADP\_c} + 4\,\mathrm{M\_HEXT\_c} + \mathrm{M\_PI\_c} \rightleftharpoons \mathrm{M\_ATP\_c} \tag{683}$$

Reactants

Table 688: Properties of each reactant.

Id	Name	SBO
M_ADP_c	ADP	
M_HEXT_c	HEXT	
M_PI_c	PI	

Product

Table 689: Properties of each product.

Id	Name	SBO
M_ATP_c	ATP	

Kinetic Law

$$v_{342} = \text{not specified} \tag{684}$$

6.343 Reaction R_KGTP

This is a reversible reaction of two reactants forming one product.

Name KGTP

Reaction equation

$$\text{M\_AKG\_e} + \text{M\_HEXT\_c} \rightleftharpoons \text{M\_AKG\_c} \tag{685}$$

Reactants

Table 690: Properties of each reactant.

Id	Name	SBO
M_AKG_e	AKGxt	
M_HEXT_c	HEXT	

Product

Table 691: Properties of each product.

Id	Name	SBO
M_AKG_c	AKG	

Id	Name	SBO

Kinetic Law

$$v_{343} = \text{not specified} \tag{686}$$

6.344 Reaction R_NARK

This is an irreversible reaction of one reactant forming one product.

Name NARK

Reaction equation

$$\text{M\_NO2\_c} \longrightarrow \text{M\_NO2\_e} \tag{687}$$

Reactant

Table 692: Properties of each reactant.

Id	Name	SBO
M_NO2_c	NO2	

Product

Table 693: Properties of each product.

Id	Name	SBO
M_NO2_e	NO2xt	

Kinetic Law

$$v_{344} = \text{not specified} \tag{688}$$

6.345 Reaction R_NMNTP

This is an irreversible reaction of two reactants forming one product.

Name NMNTP

Reaction equation

$$\text{M\_HEXT\_c} + \text{M\_NMN\_e} \longrightarrow \text{M\_NMN\_c} \tag{689}$$

Reactants

Table 694: Properties of each reactant.

Id	Name	SBO
M_HEXT_c	HEXT	
M_NMN_e	NMNxt	

Product

Table 695: Properties of each product.

Id	Name	SBO
M_NMN_c	NMN	

Kinetic Law

$$v_{345} = \text{not specified} \tag{690}$$

6.346 Reaction R_VALTP

This is an irreversible reaction of two reactants forming three products.

Name VALTP

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_VAL\_e} \longrightarrow \text{M\_ADP\_c} + \text{M\_PI\_c} + \text{M\_VAL\_c} \tag{691}$$

Reactants

Table 696: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_VAL_e	VALxt	

Products

Table 697: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_PI_c	PI	
M_VAL_c	VAL	

Kinetic Law

$$v_{346} = \text{not specified} \tag{692}$$

6.347 Reaction R_ILETP

This is an irreversible reaction of two reactants forming three products.

Name ILETP

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_ILE\_e} \longrightarrow \text{M\_ADP\_c} + \text{M\_ILE\_c} + \text{M\_PI\_c} \tag{693}$$

Reactants

Table 698: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_ILE_e	ILExt	

Products

Table 699: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_ILE_c	ILE	
M_PI_c	PI	

Kinetic Law

$$v_{347} = \text{not specified} \tag{694}$$

6.348 Reaction R_LEUTP

This is an irreversible reaction of two reactants forming three products.

Name LEUTP

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_LEU\_e} \longrightarrow \text{M\_ADP\_c} + \text{M\_LEU\_c} + \text{M\_PI\_c} \tag{695}$$

Reactants

Table 700: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_LEU_e	LEUxt	

Products

Table 701: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_LEU_c	LEU	
M_PI_c	PI	

Kinetic Law

$$v_{348} = \text{not specified} \tag{696}$$

6.349 Reaction R_ASNTP

This is an irreversible reaction of two reactants forming three products.

Name ASNTP

Reaction equation

$$\text{M\_ASN\_e} + \text{M\_ATP\_c} \longrightarrow \text{M\_ADP\_c} + \text{M\_ASN\_c} + \text{M\_PI\_c} \tag{697}$$

Reactants

Table 702: Properties of each reactant.

Id	Name	SBO
M_ASN_e	ASNxt	
M_ATP_c	ATP	

Products

Table 703: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_ASN_c	ASN	
M_PI_c	PI	

Kinetic Law

$$v_{349} = \text{not specified} \tag{698}$$

6.350 Reaction R_THIAMTP

This is an irreversible reaction of two reactants forming three products.

Name THIAMTP

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_THIAM\_e} \longrightarrow \text{M\_ADP\_c} + \text{M\_PI\_c} + \text{M\_THIAMIN\_c} \tag{699}$$

Reactants

Table 704: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_THIAM_e	THIAMxt	

Products

Table 705: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_PI_c	PI	
M_THIAMIN_c	THIAMIN	

Kinetic Law

$$v_{350} = \text{not specified} \tag{700}$$

6.351 Reaction R_PITTP

This is a reversible reaction of two reactants forming one product.

Name PITTP

Reaction equation

$$\text{M\_HEXT\_c} + \text{M\_PI\_e} \rightleftharpoons \text{M\_PI\_c} \tag{701}$$

Reactants

Table 706: Properties of each reactant.

Id	Name	SBO
M_HEXT_c	HEXT	
M_PI_e	PIxt	

Product

Table 707: Properties of each product.

Id	Name	SBO
M_PI_c	PI	

Kinetic Law

$$v_{351} = \text{not specified} \tag{702}$$

6.352 Reaction R_O2TP

This is a reversible reaction of one reactant forming one product.

Name O2TP

Reaction equation

$$\mathrm{M\_O2\_e} \rightleftharpoons \mathrm{M\_O2\_c} \tag{703}$$

Reactant

Table 708: Properties of each reactant.

Id	Name	SBO
M_O2_e	O2xt	

Product

Table 709: Properties of each product.

Id	Name	SBO
M_O2_c	O2	

Kinetic Law

$$v_{352} = \text{not specified} \tag{704}$$

6.353 Reaction R_CO2TP

This is a reversible reaction of one reactant forming one product.

Name CO2TP

Reaction equation

$$\mathrm{M\_CO2\_e} \rightleftharpoons \mathrm{M\_CO2\_c} \tag{705}$$

Reactant

Table 710: Properties of each reactant.

Id	Name	SBO
M_CO2_e	CO2xt	

Product

Table 711: Properties of each product.

Id	Name	SBO
M_CO2_c	CO2	

Kinetic Law

$$v_{353} = \text{not specified} \tag{706}$$

6.354 Reaction R_UREATP

This is a reversible reaction of one reactant forming one product.

Name UREATP

Reaction equation

$$\text{M\_UREA\_e} \rightleftharpoons \text{M\_UREA\_c} \tag{707}$$

Reactant

Table 712: Properties of each reactant.

Id	Name	SBO
M_UREA_e	UREAxt	

Product

Table 713: Properties of each product.

Id	Name	SBO
M_UREA_c	UREA	

Kinetic Law

$$v_{354} = \text{not specified} \tag{708}$$

6.355 Reaction R_ADTP

This is an irreversible reaction of two reactants forming one product.

Name ADTP

Reaction equation

$$\text{M\_AD\_e} + \text{M\_HEXT\_c} \longrightarrow \text{M\_AD\_c} \tag{709}$$

Reactants

Table 714: Properties of each reactant.

Id	Name	SBO
M_AD_e	ADxt	
M_HEXT_c	HEXT	

Product

Table 715: Properties of each product.

Id	Name	SBO
M_AD_c	AD	

Kinetic Law

$$v_{355} = \text{not specified} \tag{710}$$

6.356 Reaction R_FORTR

This is a reversible reaction of one reactant forming one product.

Name FORTR

Reaction equation

$$\text{M\_FOR\_e} \rightleftharpoons \text{M\_FOR\_c} \tag{711}$$

Reactant

Table 716: Properties of each reactant.

Id	Name	SBO
M_FOR_e	FORxt	

Product

Table 717: Properties of each product.

Id	Name	SBO
M_FOR_c	FOR	

Kinetic Law

$$v_{356} = \text{not specified} \tag{712}$$

6.357 Reaction R_GNTP

This is a reversible reaction of one reactant forming one product.

Name GNTP

Reaction equation

$$\text{M\_GN\_e} \rightleftharpoons \text{M\_GN\_c} \tag{713}$$

Reactant

Table 718: Properties of each reactant.

Id	Name	SBO
M_GN_e	GNxt	

Product

Table 719: Properties of each product.

Id	Name	SBO
M_GN_c	GN	

Kinetic Law

$$v_{357} = \text{not specified} \tag{714}$$

6.358 Reaction R_GSNTP

This is an irreversible reaction of two reactants forming one product.

Name GSNTP

Reaction equation

$$\text{M\_GSN\_e} + \text{M\_HEXT\_c} \longrightarrow \text{M\_GSN\_c} \tag{715}$$

Reactants

Table 720: Properties of each reactant.

Id	Name	SBO
M_GSN_e	GSNxt	
M_HEXT_c	HEXT	

Product

Table 721: Properties of each product.

Id	Name	SBO
M_GSN_c	GSN	

Kinetic Law

$$v_{358} = \text{not specified} \tag{716}$$

6.359 Reaction R_HYXNTP

This is a reversible reaction of one reactant forming one product.

Name HYXNTP

Reaction equation

$$\text{M\_HYXN\_e} \rightleftharpoons \text{M\_HYXN\_c} \tag{717}$$

Reactant

Table 722: Properties of each reactant.

Id	Name	SBO
M_HYXN_e	HYXNxt	

Product

Table 723: Properties of each product.

Id	Name	SBO
M_HYXN_c	HYXN	

Kinetic Law

$$v_{359} = \text{not specified} \tag{718}$$

6.360 Reaction R_OROATP

This is an irreversible reaction of two reactants forming one product.

Name OROATP

Reaction equation

$$\text{M\_HEXT\_c} + \text{M\_OROA\_e} \longrightarrow \text{M\_OROA\_c} \tag{719}$$

Reactants

Table 724: Properties of each reactant.

Id	Name	SBO
M_HEXT_c	HEXT	
M_OROA_e	OROAxt	

Product

Table 725: Properties of each product.

Id	Name	SBO
M_OROA_c	OROA	

Kinetic Law

$$v_{360} = \text{not specified} \tag{720}$$

6.361 Reaction R_URATP

This is an irreversible reaction of two reactants forming one product.

Name URATP

Reaction equation

$$\text{M\_HEXT\_c} + \text{M\_URA\_e} \longrightarrow \text{M\_URA\_c} \tag{721}$$

Reactants

Table 726: Properties of each reactant.

Id	Name	SBO
M_HEXT_c	HEXT	
M_URA_e	URAxt	

Product

Table 727: Properties of each product.

Id	Name	SBO
M_URA_c	URA	

Kinetic Law

$$v_{361} = \text{not specified} \tag{722}$$

6.362 Reaction R_NH3TP

This is a reversible reaction of two reactants forming one product.

Name NH3TP

Reaction equation

$$\text{M\_HEXT\_c} + \text{M\_NH3\_e} \rightleftharpoons \text{M\_NH3\_c} \tag{723}$$

Reactants

Table 728: Properties of each reactant.

Id	Name	SBO
M_HEXT_c	HEXT	
M_NH3_e	NH3xt	

Product

Table 729: Properties of each product.

Id	Name	SBO
M_NH3_c	NH3	

Kinetic Law

$$v_{362} = \text{not specified} \tag{724}$$

6.363 Reaction R_PYRT

This is a reversible reaction of two reactants forming one product.

Name PYRT

Reaction equation

$$\text{M\_HEXT\_c} + \text{M\_PYR\_e} \rightleftharpoons \text{M\_PYR\_c} \tag{725}$$

Reactants

Table 730: Properties of each reactant.

Id	Name	SBO
M_HEXT_c	HEXT	
M_PYR_e	PYRxt	

Product

Table 731: Properties of each product.

Id	Name	SBO
M_PYR_c	PYR	

Kinetic Law

$$v_{363} = \text{not specified} \tag{726}$$

6.364 Reaction R_UREASE

This is an irreversible reaction of one reactant forming two products.

Name UREASE

Reaction equation

$$\text{M\_UREA\_c} \longrightarrow \text{M\_CO2\_c} + 2\,\text{M\_NH3\_c} \tag{727}$$

Reactant

Table 732: Properties of each reactant.

Id	Name	SBO
M_UREA_c	UREA	

Products

Table 733: Properties of each product.

Id	Name	SBO
M_CO2_c	CO2	
M_NH3_c	NH3	

Kinetic Law

$$v_{364} = \text{not specified} \tag{728}$$

6.365 Reaction R_SLFTP

This is an irreversible reaction of two reactants forming three products.

Name SLFTP

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_SLF\_e} \longrightarrow \text{M\_ADP\_c} + \text{M\_PI\_c} + \text{M\_SLF\_c} \tag{729}$$

Reactants

Table 734: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_SLF_e	SLFxt	

Products

Table 735: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_PI_c	PI	
M_SLF_c	SLF	

Kinetic Law

$$v_{365} = \text{not specified} \tag{730}$$

6.366 Reaction R_CYSTP

This is an irreversible reaction of two reactants forming three products.

Name CYSTP

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_CYS\_e} \longrightarrow \text{M\_ADP\_c} + \text{M\_CYS\_c} + \text{M\_PI\_c} \tag{731}$$

Reactants

Table 736: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_CYS_e	CYSxt	

Products

Table 737: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_CYS_c	CYS	
M_PI_c	PI	

Kinetic Law

$$v_{366} = \text{not specified} \tag{732}$$

6.367 Reaction R_HISTP

This is an irreversible reaction of two reactants forming three products.

Name HISTP

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_HIS\_e} \longrightarrow \text{M\_ADP\_c} + \text{M\_HIS\_c} + \text{M\_PI\_c} \tag{733}$$

Reactants

Table 738: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_HIS_e	HISxt	

Products

Table 739: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_HIS_c	HIS	
M_PI_c	PI	

Kinetic Law

$$v_{367} = \text{not specified} \tag{734}$$

6.368 Reaction R_LYSTP

This is a reversible reaction of two reactants forming one product.

Name LYSTP

Reaction equation

$$\text{M\_HEXT\_c} + \text{M\_LYS\_e} \rightleftharpoons \text{M\_LYS\_c} \tag{735}$$

Reactants

Table 740: Properties of each reactant.

Id	Name	SBO
M_HEXT_c	HEXT	
M_LYS_e	LYSxt	

Product

Table 741: Properties of each product.

Id	Name	SBO
M_LYS_c	LYS	

Kinetic Law

$$v_{368} = \text{not specified} \tag{736}$$

6.369 Reaction R_METTP

This is an irreversible reaction of two reactants forming three products.

Name METTP

Reaction equation

$$\text{M\_ATP\_c} + \text{M\_MET\_e} \longrightarrow \text{M\_ADP\_c} + \text{M\_MET\_c} + \text{M\_PI\_c} \tag{737}$$

Reactants

Table 742: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	
M_MET_e	METxt	

Products

Table 743: Properties of each product.

Id	Name	SBO
M_ADP_c	ADP	
M_MET_c	MET	
M_PI_c	PI	

Kinetic Law

$$v_{369} = \text{not specified} \tag{738}$$

6.370 Reaction R_PHETP

This is a reversible reaction of two reactants forming one product.

Name PHETP

Reaction equation

$$\text{M\_HEXT\_c} + \text{M\_PHE\_e} \rightleftharpoons \text{M\_PHE\_c} \tag{739}$$

Reactants

Table 744: Properties of each reactant.

Id	Name	SBO
M_HEXT_c	HEXT	
M_PHE_e	PHExt	

Product

Table 745: Properties of each product.

Id	Name	SBO
M_PHE_c	PHE	

Kinetic Law

$$v_{370} = \text{not specified} \tag{740}$$

6.371 Reaction R_THRTP

This is a reversible reaction of two reactants forming one product.

Name THRTP

Reaction equation

$$\text{M\_HEXT\_c} + \text{M\_THR\_e} \rightleftharpoons \text{M\_THR\_c} \tag{741}$$

Reactants

Table 746: Properties of each reactant.

Id	Name	SBO
M_HEXT_c	HEXT	
M_THR_e	THRxt	

Product

Table 747: Properties of each product.

Id	Name	SBO
M_THR_c	THR	

Kinetic Law

$$v_{371} = \text{not specified} \tag{742}$$

6.372 Reaction R_TRPTP

This is a reversible reaction of two reactants forming one product.

Name TRPTP

Reaction equation

$$\text{M\_HEXT\_c} + \text{M\_TRP\_e} \rightleftharpoons \text{M\_TRP\_c} \tag{743}$$

Reactants

Table 748: Properties of each reactant.

Id	Name	SBO
M_HEXT_c	HEXT	
M_TRP_e	TRPxt	

Product

Table 749: Properties of each product.

Id	Name	SBO
M_TRP_c	TRP	

Kinetic Law

$$v_{372} = \text{not specified} \tag{744}$$

6.373 Reaction R_TYRTP

This is a reversible reaction of two reactants forming one product.

Name TYRTP

Reaction equation

$$\text{M\_HEXT\_c} + \text{M\_TYR\_e} \rightleftharpoons \text{M\_TYR\_c} \tag{745}$$

Reactants

Table 750: Properties of each reactant.

Id	Name	SBO
M_HEXT_c	HEXT	
M_TYR_e	TYRxt	

Product

Table 751: Properties of each product.

Id	Name	SBO
M_TYR_c	TYR	

Kinetic Law

$$v_{373} = \text{not specified} \tag{746}$$

6.374 Reaction R_AACTP

This is a reversible reaction of two reactants forming one product.

Name AACTP

Reaction equation

$$\mathrm{M\_AAC\_e} + \mathrm{M\_HEXT\_c} \rightleftharpoons \mathrm{M\_AAC\_c} \tag{747}$$

Reactants

Table 752: Properties of each reactant.

Id	Name	SBO
M_AAC_e	AACxt	
M_HEXT_c	HEXT	

Product

Table 753: Properties of each product.

Id	Name	SBO
M_AAC_c	AAC	

Kinetic Law

$$v_{374} = \text{not specified} \tag{748}$$

6.375 Reaction R_BCRBTP

This is a reversible reaction of one reactant forming one product.

Name BCRBTP

Reaction equation

$$\mathrm{M\_H2CO3\_e} \rightleftharpoons \mathrm{M\_H2CO3\_c} \tag{749}$$

Reactant

Table 754: Properties of each reactant.

Id	Name	SBO
M_H2CO3_e	H2CO3xt	

Product

Table 755: Properties of each product.

Id	Name	SBO
M_H2CO3_c	H2CO3	

Kinetic Law

$$v_{375} = \text{not specified} \tag{750}$$

6.376 Reaction R_ICFA

This is a reversible reaction of one reactant forming one product.

Name ICFA

Reaction equation

$$\text{M\_CO2\_c} \rightleftharpoons \text{M\_H2CO3\_c} \tag{751}$$

Reactant

Table 756: Properties of each reactant.

Id	Name	SBO
M_CO2_c	CO2	

Product

Table 757: Properties of each product.

Id	Name	SBO
M_H2CO3_c	H2CO3	

Kinetic Law

$$v_{376} = \text{not specified} \tag{752}$$

6.377 Reaction R_GLYCLTP

This is a reversible reaction of one reactant forming one product.

Name GLYCLTP

Reaction equation

$$\text{M\_GLYCL\_e} \rightleftharpoons \text{M\_GLYCL\_c} \tag{753}$$

Reactant

Table 758: Properties of each reactant.

Id	Name	SBO
M_GLYCL_e	GLYCLxt	

Product

Table 759: Properties of each product.

Id	Name	SBO
M_GLYCL_c	GLYCL	

Kinetic Law

$$v_{377} = \text{not specified} \tag{754}$$

6.378 Reaction R_GLCD

This is an irreversible reaction of two reactants forming two products.

Name GLCD

Reaction equation

$$\text{M\_GLYCL\_c} + \text{M\_O2\_c} \longrightarrow \text{M\_GLX\_c} + \text{M\_H2O2\_c} \tag{755}$$

Reactants

Table 760: Properties of each reactant.

Id	Name	SBO
M_GLYCL_c	GLYCL	
M_O2_c	O2	

Products

Table 761: Properties of each product.

Id	Name	SBO
M_GLX_c	GLX	
M_H2O2_c	H2O2	

Kinetic Law

$$v_{378} = \text{not specified} \tag{756}$$

6.379 Reaction R_GLLDH

This is a reversible reaction of two reactants forming two products.

Name GLLDH

Reaction equation

$$\text{M\_GLAL\_c} + \text{M\_NAD\_c} \rightleftharpoons \text{M\_GLYCL\_c} + \text{M\_NADH\_c} \tag{757}$$

Reactants

Table 762: Properties of each reactant.

Id	Name	SBO
M_GLAL_c	GLAL	
M_NAD_c	NAD	

Products

Table 763: Properties of each product.

Id	Name	SBO
M_GLYCL_c	GLYCL	
M_NADH_c	NADH	

Kinetic Law

$$v_{379} = \text{not specified} \tag{758}$$

6.380 Reaction R_GLALTP

This is a reversible reaction of one reactant forming one product.

Name GLALTP

Reaction equation

$$\text{M\_GLAL\_c} \rightleftharpoons \text{M\_GLAL\_e} \tag{759}$$

Reactant

Table 764: Properties of each reactant.

Id	Name	SBO
M_GLAL_c	GLAL	

Product

Table 765: Properties of each product.

Id	Name	SBO
M_GLAL_e	GLALxt	

Kinetic Law

$$v_{380} = \text{not specified} \tag{760}$$

6.381 Reaction R_KATA

This is an irreversible reaction of one reactant forming one product.

Name KATA

Reaction equation

$$\text{M\_H2O2\_c} \longrightarrow \text{M\_O2\_c} \tag{761}$$

Reactant

Table 766: Properties of each reactant.

Id	Name	SBO
M_H2O2_c	H2O2	

Product

Table 767: Properties of each product.

Id	Name	SBO
M_O2_c	O2	

Kinetic Law

$$v_{381} = \text{not specified} \tag{762}$$

6.382 Reaction R_EX_DIPEPxt

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

Name EX_DIPEPxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_DIPEP\_e} \tag{763}$$

Product

Table 768: Properties of each product.

Id	Name	SBO
M_DIPEP_e	DIPEPxt	

Kinetic Law

$$v_{382} = \text{not specified} \tag{764}$$

6.383 Reaction R_EX_OPEPxt

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

Name EX_OPEPxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_OPEP\_e} \tag{765}$$

Product

Table 769: Properties of each product.

Id	Name	SBO
M_OPEP_e	OPEPxt	

Kinetic Law

$$v_{383} = \text{not specified} \tag{766}$$

6.384 Reaction R_EX_SERxt

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

Name EX_SERxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_SER\_e} \tag{767}$$

Product

Table 770: Properties of each product.

Id	Name	SBO
M_SER_e	SERxt	

Kinetic Law

$$v_{384} = \text{not specified} \tag{768}$$

6.385 Reaction R_EX_ETHxt

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

Name EX_ETHxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_ETH\_e} \tag{769}$$

Product

Table 771: Properties of each product.

Id	Name	SBO
M_ETH_e	ETHxt	

Kinetic Law

$$v_{385} = \text{not specified} \tag{770}$$

6.386 Reaction R_EX_ACxt

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

Name EX_ACxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_AC\_e} \tag{771}$$

Product

Table 772: Properties of each product.

Id	Name	SBO
M_AC_e	ACxt	

Kinetic Law

$$v_{386} = \text{not specified} \tag{772}$$

6.387 Reaction R_EX_GLACxt

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

Name EX_GLACxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_GLAC\_e} \tag{773}$$

Product

Table 773: Properties of each product.

Id	Name	SBO
M_GLAC_e	GLACxt	

Kinetic Law

$$v_{387} = \text{not specified} \tag{774}$$

6.388 Reaction R_EX_GLCxt

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

Name EX_GLCxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_GLC\_e} \tag{775}$$

Product

Table 774: Properties of each product.

Id	Name	SBO
M_GLC_e	GLCxt	

Kinetic Law

$$v_{388} = \text{not specified} \tag{776}$$

6.389 Reaction R_EX_PROxt

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

Name EX_PROxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_PRO\_e} \tag{777}$$

Product

Table 775: Properties of each product.

Id	Name	SBO
M_PRO_e	PROxt	

Kinetic Law

$$v_{389} = \text{not specified} \tag{778}$$

6.390 Reaction R_EX_NAxt

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

Name EX_NAxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_NA\_e} \tag{779}$$

Product

Table 776: Properties of each product.

Id	Name	SBO
M_NA_e	NAxt	

Kinetic Law

$$v_{390} = \text{not specified} \tag{780}$$

6.391 Reaction R_EX_LACxt

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

Name EX_LACxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_LAC\_e} \tag{781}$$

Product

Table 777: Properties of each product.

Id	Name	SBO
M_LAC_e	LACxt	

Kinetic Law

$$v_{391} = \text{not specified} \tag{782}$$

6.392 Reaction R_EX_GLNxt

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

Name EX_GLNxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_GLN\_e} \tag{783}$$

Product

Table 778: Properties of each product.

Id	Name	SBO
M_GLN_e	GLNxt	

Kinetic Law

$$v_{392} = \text{not specified} \tag{784}$$

6.393 Reaction R_EX_GLUxt

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

Name EX_GLUxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_GLU\_e} \tag{785}$$

Product

Table 779: Properties of each product.

Id	Name	SBO
M_GLU_e	GLUxt	

Kinetic Law

$$v_{393} = \text{not specified} \tag{786}$$

6.394 Reaction R_EX_ALAxt

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

Name EX_ALAxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_ALA\_e} \tag{787}$$

Product

Table 780: Properties of each product.

Id	Name	SBO
M_ALA_e	ALAxt	

Kinetic Law

$$v_{394} = \text{not specified} \tag{788}$$

6.395 Reaction R_EX_DALAxt

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

Name EX_DALAxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_DALA\_e} \tag{789}$$

Product

Table 781: Properties of each product.

Id	Name	SBO
M_DALA_e	DALAxt	

Kinetic Law

$$v_{395} = \text{not specified} \tag{790}$$

6.396 Reaction R_EX_GLYxt

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

Name EX_GLYxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_GLY\_e} \tag{791}$$

Product

Table 782: Properties of each product.

Id	Name	SBO
M_GLY_e	GLYxt	

Kinetic Law

$$v_{396} = \text{not specified} \tag{792}$$

6.397 Reaction R_EX_DSERxt

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

Name EX_DSERxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_DSER\_e} \tag{793}$$

Product

Table 783: Properties of each product.

Id	Name	SBO
M_DSER_e	DSERxt	

Kinetic Law

$$v_{397} = \text{not specified} \tag{794}$$

6.398 Reaction R_EX_ORNxt

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

Name EX_ORNxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_ORN\_e} \tag{795}$$

Product

Table 784: Properties of each product.

Id	Name	SBO
M_ORN_e	ORNxt	

Kinetic Law

$$v_{398} = \text{not specified} \tag{796}$$

6.399 Reaction R_EX_ARGxt

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

Name EX_ARGxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_ARG\_e} \tag{797}$$

Product

Table 785: Properties of each product.

Id	Name	SBO
M_ARG_e	ARGxt	

Kinetic Law

$$v_{399} = \text{not specified} \tag{798}$$

6.400 Reaction R_EX_SUCCxt

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

Name EX_SUCCxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_SUCC\_e} \tag{799}$$

Product

Table 786: Properties of each product.

Id	Name	SBO
M_SUCC_e	SUCCxt	

Kinetic Law

$$v_{400} = \text{not specified} \tag{800}$$

6.401 Reaction R_EX_FUMxt

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

Name EX_FUMxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_FUM\_e} \tag{801}$$

Product

Table 787: Properties of each product.

Id	Name	SBO
M_FUM_e	FUMxt	

Kinetic Law

$$v_{401} = \text{not specified} \tag{802}$$

6.402 Reaction R_EX_MALxt

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

Name EX_MALxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_MAL\_e} \tag{803}$$

Product

Table 788: Properties of each product.

Id	Name	SBO
M_MAL_e	MALxt	

Kinetic Law

$$v_{402} = \text{not specified} \tag{804}$$

6.403 Reaction R_EX_ASPxt

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

Name EX_ASPxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_ASP\_e} \tag{805}$$

Product

Table 789: Properties of each product.

Id	Name	SBO
M_ASP_e	ASPxt	

Kinetic Law

$$v_{403} = \text{not specified} \tag{806}$$

6.404 Reaction R_EX_ADNxt

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

Name EX_ADNxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_ADN\_e} \tag{807}$$

Product

Table 790: Properties of each product.

Id	Name	SBO
M_ADN_e	ADNxt	

Kinetic Law

$$v_{404} = \text{not specified} \tag{808}$$

6.405 Reaction R_EX_URIxt

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

Name EX_URIxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_URI\_e} \tag{809}$$

Product

Table 791: Properties of each product.

Id	Name	SBO
M_URI_e	URIxt	

Kinetic Law

$$v_{405} = \text{not specified} \tag{810}$$

6.406 Reaction R_EX_CYTDxt

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

Name EX_CYTDxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_CYTD\_e} \tag{811}$$

Product

Table 792: Properties of each product.

Id	Name	SBO
M_CYTD_e	CYTDxt	

Kinetic Law

$$v_{406} = \text{not specified} \tag{812}$$

6.407 Reaction R_EX_DTxt

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

Name EX_DTxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_DT\_e} \tag{813}$$

Product

Table 793: Properties of each product.

Id	Name	SBO
M_DT_e	DTxt	

Kinetic Law

$$v_{407} = \text{not specified} \tag{814}$$

6.408 Reaction R_EX_DAxt

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

Name EX_DAxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_DA\_e} \tag{815}$$

Product

Table 794: Properties of each product.

Id	Name	SBO
M_DA_e	DAxt	

Kinetic Law

$$v_{408} = \text{not specified} \tag{816}$$

6.409 Reaction R_EX_DCxt

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

Name EX_DCxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_DC\_e} \tag{817}$$

Product

Table 795: Properties of each product.

Id	Name	SBO
M_DC_e	DCxt	

Kinetic Law

$$v_{409} = \text{not specified} \tag{818}$$

6.410 Reaction R_EX_DUxt

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

Name EX_DUxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_DU\_e} \tag{819}$$

Product

Table 796: Properties of each product.

Id	Name	SBO
M_DU_e	DUxt	

Kinetic Law

$$v_{410} = \text{not specified} \tag{820}$$

6.411 Reaction R_EX_H2xt

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

Name EX_H2xt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_H2\_e} \tag{821}$$

Product

Table 797: Properties of each product.

Id	Name	SBO
M_H2_e	H2xt	

Kinetic Law

$$v_{411} = \text{not specified} \tag{822}$$

6.412 Reaction R_EX_AKGxt

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

Name EX_AKGxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_AKG\_e} \tag{823}$$

Product

Table 798: Properties of each product.

Id	Name	SBO
M_AKG_e	AKGxt	

Kinetic Law

$$v_{412} = \text{not specified} \tag{824}$$

6.413 Reaction R_EX_NO2xt

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

Name EX_NO2xt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_NO2\_e} \tag{825}$$

Product

Table 799: Properties of each product.

Id	Name	SBO
M_NO2_e	NO2xt	

Kinetic Law

$$v_{413} = \text{not specified} \tag{826}$$

6.414 Reaction R_EX_NMNxt

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

Name EX_NMNxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_NMN\_e} \tag{827}$$

Product

Table 800: Properties of each product.

Id	Name	SBO
M_NMN_e	NMNxt	

Kinetic Law

$$v_{414} = \text{not specified} \tag{828}$$

6.415 Reaction R_EX_VALxt

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

Name EX_VALxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_VAL\_e} \tag{829}$$

Product

Table 801: Properties of each product.

Id	Name	SBO
M_VAL_e	VALxt	

Kinetic Law

$$v_{415} = \text{not specified} \tag{830}$$

6.416 Reaction R_EX_ILExt

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

Name EX_ILExt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_ILE\_e} \tag{831}$$

Product

Table 802: Properties of each product.

Id	Name	SBO
M_ILE_e	ILExt	

Kinetic Law

$$v_{416} = \text{not specified} \tag{832}$$

6.417 Reaction R_EX_LEUxt

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

Name EX_LEUxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_LEU\_e} \tag{833}$$

Product

Table 803: Properties of each product.

Id	Name	SBO
M_LEU_e	LEUxt	

Kinetic Law

$$v_{417} = \text{not specified} \tag{834}$$

6.418 Reaction R_EX_ASNxt

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

Name EX_ASNxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_ASN\_e} \tag{835}$$

Product

Table 804: Properties of each product.

Id	Name	SBO
M_ASN_e	ASNxt	

Kinetic Law

$$v_{418} = \text{not specified} \tag{836}$$

6.419 Reaction R_EX_THIAMxt

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

Name EX_THIAMxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_THIAM\_e} \tag{837}$$

Product

Table 805: Properties of each product.

Id	Name	SBO
M_THIAM_e	THIAMxt	

Kinetic Law

$$v_{419} = \text{not specified} \tag{838}$$

6.420 Reaction R_EX_PIxt

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

Name EX_PIxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_PI\_e} \tag{839}$$

Product

Table 806: Properties of each product.

Id	Name	SBO
M_PI_e	PIxt	

Kinetic Law

$$v_{420} = \text{not specified} \tag{840}$$

6.421 Reaction R_EX_O2xt

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

Name EX_O2xt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_O2\_e} \tag{841}$$

Product

Table 807: Properties of each product.

Id	Name	SBO
M_O2_e	O2xt	

Kinetic Law

$$v_{421} = \text{not specified} \tag{842}$$

6.422 Reaction R_EX_CO2xt

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

Name EX_CO2xt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_CO2\_e} \tag{843}$$

Product

Table 808: Properties of each product.

Id	Name	SBO
M_CO2_e	CO2xt	

Kinetic Law

$$v_{422} = \text{not specified} \tag{844}$$

6.423 Reaction R_EX_UREAxt

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

Name EX_UREAxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_UREA\_e} \tag{845}$$

Product

Table 809: Properties of each product.

Id	Name	SBO
M_UREA_e	UREAxt	

Kinetic Law

$$v_{423} = \text{not specified} \tag{846}$$

6.424 Reaction R_EX_ADxt

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

Name EX_ADxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_AD\_e} \tag{847}$$

Product

Table 810: Properties of each product.

Id	Name	SBO
M_AD_e	ADxt	

Kinetic Law

$$v_{424} = \text{not specified} \tag{848}$$

6.425 Reaction R_EX_FORxt

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

Name EX_FORxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_FOR\_e} \tag{849}$$

Product

Table 811: Properties of each product.

Id	Name	SBO
M_FOR_e	FORxt	

Kinetic Law

$$v_{425} = \text{not specified} \tag{850}$$

6.426 Reaction R_EX_GNxt

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

Name EX_GNxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_GN\_e} \tag{851}$$

Product

Table 812: Properties of each product.

Id	Name	SBO
M_GN_e	GNxt	

Kinetic Law

$$v_{426} = \text{not specified} \tag{852}$$

6.427 Reaction R_EX_GSNxt

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

Name EX_GSNxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_GSN\_e} \tag{853}$$

Product

Table 813: Properties of each product.

Id	Name	SBO
M_GSN_e	GSNxt	

Kinetic Law

$$v_{427} = \text{not specified} \tag{854}$$

6.428 Reaction R_EX_HYXNxt

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

Name EX_HYXNxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_HYXN\_e} \tag{855}$$

Product

Table 814: Properties of each product.

Id	Name	SBO
M_HYXN_e	HYXNxt	

Kinetic Law

$$v_{428} = \text{not specified} \tag{856}$$

6.429 Reaction R_EX_OROAxt

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

Name EX_OROAxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_OROA\_e} \tag{857}$$

Product

Table 815: Properties of each product.

Id	Name	SBO
M_OROA_e	OROAxt	

Kinetic Law

$$v_{429} = \text{not specified} \tag{858}$$

6.430 Reaction R_EX_URAxt

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

Name EX_URAxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_URA\_e} \tag{859}$$

Product

Table 816: Properties of each product.

Id	Name	SBO
M_URA_e	URAxt	

Kinetic Law

$$v_{430} = \text{not specified} \tag{860}$$

6.431 Reaction R_EX_NH3xt

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

Name EX_NH3xt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_NH3\_e} \tag{861}$$

Product

Table 817: Properties of each product.

Id	Name	SBO
M_NH3_e	NH3xt	

Kinetic Law

$$v_{431} = \text{not specified} \tag{862}$$

6.432 Reaction R_EX_PYRxt

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

Name EX_PYRxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_PYR\_e} \tag{863}$$

Product

Table 818: Properties of each product.

Id	Name	SBO
M_PYR_e	PYRxt	

Kinetic Law

$$v_{432} = \text{not specified} \tag{864}$$

6.433 Reaction R_EX_SLFxt

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

Name EX_SLFxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_SLF\_e} \tag{865}$$

Product

Table 819: Properties of each product.

Id	Name	SBO
M_SLF_e	SLFxt	

Kinetic Law

$$v_{433} = \text{not specified} \tag{866}$$

6.434 Reaction R_EX_CYSxt

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

Name EX_CYSxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_CYS\_e} \tag{867}$$

Product

Table 820: Properties of each product.

Id	Name	SBO
M_CYS_e	CYSxt	

Kinetic Law

$$v_{434} = \text{not specified} \tag{868}$$

6.435 Reaction R_EX_HISxt

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

Name EX_HISxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_HIS\_e} \tag{869}$$

Product

Table 821: Properties of each product.

Id	Name	SBO
M_HIS_e	HISxt	

Kinetic Law

$$v_{435} = \text{not specified} \tag{870}$$

6.436 Reaction R_EX_LYSxt

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

Name EX_LYSxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_LYS\_e} \tag{871}$$

Product

Table 822: Properties of each product.

Id	Name	SBO
M_LYS_e	LYSxt	

Kinetic Law

$$v_{436} = \text{not specified} \tag{872}$$

6.437 Reaction R_EX_METxt

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

Name EX_METxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_MET\_e} \tag{873}$$

Product

Table 823: Properties of each product.

Id	Name	SBO
M_MET_e	METxt	

Kinetic Law

$$v_{437} = \text{not specified} \tag{874}$$

6.438 Reaction R_EX_PHExt

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

Name EX_PHExt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_PHE\_e} \tag{875}$$

Product

Table 824: Properties of each product.

Id	Name	SBO
M_PHE_e	PHExt	

Kinetic Law

$$v_{438} = \text{not specified} \tag{876}$$

6.439 Reaction R_EX_THRxt

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

Name EX_THRxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_THR\_e} \tag{877}$$

Product

Table 825: Properties of each product.

Id	Name	SBO
M_THR_e	THRxt	

Kinetic Law

$$v_{439} = \text{not specified} \tag{878}$$

6.440 Reaction R_EX_TRPxt

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

Name EX_TRPxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_TRP\_e} \tag{879}$$

Product

Table 826: Properties of each product.

Id	Name	SBO
M_TRP_e	TRPxt	

Kinetic Law

$$v_{440} = \text{not specified} \tag{880}$$

6.441 Reaction R_EX_TYRxt

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

Name EX_TYRxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_TYR\_e} \tag{881}$$

Product

Table 827: Properties of each product.

Id	Name	SBO
M_TYR_e	TYRxt	

Kinetic Law

$$v_{441} = \text{not specified} \tag{882}$$

6.442 Reaction R_EX_AACxt

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

Name EX_AACxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_AAC\_e} \tag{883}$$

Product

Table 828: Properties of each product.

Id	Name	SBO
M_AAC_e	AACxt	

Kinetic Law

$$v_{442} = \text{not specified} \tag{884}$$

6.443 Reaction R_EX_H2CO3xt

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

Name EX_H2CO3xt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_H2CO3\_e} \tag{885}$$

Product

Table 829: Properties of each product.

Id	Name	SBO
M_H2CO3_e	H2CO3xt	

Kinetic Law

$$v_{443} = \text{not specified} \tag{886}$$

6.444 Reaction R_EX_GLYCLxt

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

Name EX_GLYCLxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_GLYCL\_e} \tag{887}$$

Product

Table 830: Properties of each product.

Id	Name	SBO
M_GLYCL_e	GLYCLxt	

Kinetic Law

$$v_{444} = \text{not specified} \tag{888}$$

6.445 Reaction R_EX_GLALxt

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

Name EX_GLALxt

Reaction equation

$$\emptyset \rightleftharpoons \text{M\_GLAL\_e} \tag{889}$$

Product

Table 831: Properties of each product.

Id	Name	SBO
M_GLAL_e	GLALxt	

Kinetic Law

$$v_{445} = \text{not specified} \tag{890}$$

6.446 Reaction R_BIOMASS

This is an irreversible reaction of 47 reactants forming no product.

Name BIOMASS

Reaction equation

$$\text{M\_ACP\_c} + \text{M\_ALA\_c} + \text{M\_ARG\_c} + \text{M\_ASN\_c} + \text{M\_ASP\_c} + \text{M\_ATP\_c} + \text{M\_COA\_c} + \text{M\_CTP\_c} + \text{M\_CYS\_c} + \text{M} \tag{891}$$

Reactants

Table 832: Properties of each reactant.

Id	Name	SBO
M_ACP_c	ACP	
M_ALA_c	ALA	
M_ARG_c	ARG	
M_ASN_c	ASN	
M_ASP_c	ASP	
M_ATP_c	ATP	
M_COA_c	COA	
M_CTP_c	CTP	
M_CYS_c	CYS	
M_DATP_c	DATP	
M_DCTP_c	DCTP	
M_DGTP_c	DGTP	
M_DMK_c	DMK	
M_DTTP_c	DTTP	
M_FAD_c	FAD	
M_GLN_c	GLN	
M_GLU_c	GLU	
M_GLY_c	GLY	

Id	Name	SBO
M_GTP_c	GTP	
M_HIS_c	HIS	
M_ILE_c	ILE	
M_LEU_c	LEU	
M_LPS_c	LPS	
M_LYS_c	LYS	
M_MET_c	MET	
M_MK_c	MK	
M_MTHF_c	MTHF	
M_NADP_c	NADP	
M_NAD_c	NAD	
M_OPP_c	OPP	
M_PEPTIDO_c	PEPTIDO	
M_PE_c	PE	
M_PG_c	PG	
M_PHE_c	PHE	
M_PRO_c	PRO	
M_PS_c	PS	
M_PTH_c	PTH	
M_PTRC_c	PTRC	
M_SER_c	SER	
M_SPMD_c	SPMD	
M_THIAMIN_c	THIAMIN	
M_THR_c	THR	
M_TRP_c	TRP	
M_TYR_c	TYR	
M_UDPP_c	UDPP	
M_UTP_c	UTP	
M_VAL_c	VAL	

Kinetic Law

$$v_{446} = \text{not specified} \tag{892}$$

6.447 Reaction R_DM_DTTP

This is an irreversible reaction of one reactant forming no product.

Name DM_DTTP

Reaction equation

$$\text{M\_DTTP\_c} \longrightarrow \emptyset \tag{893}$$

Reactant

Table 833: Properties of each reactant.

Id	Name	SBO
M_DTTP_c	DTTP	

Kinetic Law

$$v_{447} = \text{not specified} \tag{894}$$

6.448 Reaction R_DM_GLN

This is an irreversible reaction of one reactant forming no product.

Name DM_GLN

Reaction equation

$$\text{M\_GLN\_c} \longrightarrow \emptyset \tag{895}$$

Reactant

Table 834: Properties of each reactant.

Id	Name	SBO
M_GLN_c	GLN	

Kinetic Law

$$v_{448} = \text{not specified} \tag{896}$$

6.449 Reaction R_DM_ILE

This is an irreversible reaction of one reactant forming no product.

Name DM_ILE

Reaction equation

$$\text{M\_ILE\_c} \longrightarrow \emptyset \tag{897}$$

Reactant

Table 835: Properties of each reactant.

Id	Name	SBO
M_ILE_c	ILE	

Kinetic Law

$$v_{449} = \text{not specified} \tag{898}$$

6.450 Reaction R_DM_CTP

This is an irreversible reaction of one reactant forming no product.

Name DM_CTP

Reaction equation

$$\text{M\_CTP\_c} \longrightarrow \emptyset \tag{899}$$

Reactant

Table 836: Properties of each reactant.

Id	Name	SBO
M_CTP_c	CTP	

Kinetic Law

$$v_{450} = \text{not specified} \tag{900}$$

6.451 Reaction R_DM_NAD

This is an irreversible reaction of one reactant forming no product.

Name DM_NAD

Reaction equation

$$\text{M\_NAD\_c} \longrightarrow \emptyset \tag{901}$$

Reactant

Table 837: Properties of each reactant.

Id	Name	SBO
M_NAD_c	NAD	

Kinetic Law

$$v_{451} = \text{not specified} \tag{902}$$

6.452 Reaction R_DM_DGTP

This is an irreversible reaction of one reactant forming no product.

Name DM_DGTP

Reaction equation

$$\text{M\_DGTP\_c} \longrightarrow \emptyset \tag{903}$$

Reactant

Table 838: Properties of each reactant.

Id	Name	SBO
M_DGTP_c	DGTP	

Kinetic Law

$$v_{452} = \text{not specified} \tag{904}$$

6.453 Reaction R_DM_DATP

This is an irreversible reaction of one reactant forming no product.

Name DM_DATP

Reaction equation

$$\text{M\_DATP\_c} \longrightarrow \emptyset \tag{905}$$

Reactant

Table 839: Properties of each reactant.

Id	Name	SBO
M_DATP_c	DATP	

Kinetic Law

$$v_{453} = \text{not specified} \tag{906}$$

6.454 Reaction R_DM_COA

This is an irreversible reaction of one reactant forming no product.

Name DM_COA

Reaction equation

$$\text{M\_COA\_c} \longrightarrow \emptyset \tag{907}$$

Reactant

Table 840: Properties of each reactant.

Id	Name	SBO
M_COA_c	COA	

Kinetic Law

$$v_{454} = \text{not specified} \tag{908}$$

6.455 Reaction R_DM_GLY

This is an irreversible reaction of one reactant forming no product.

Name DM_GLY

Reaction equation

$$\text{M\_GLY\_c} \longrightarrow \emptyset \tag{909}$$

Reactant

Table 841: Properties of each reactant.

Id	Name	SBO
M_GLY_c	GLY	

Kinetic Law

$$v_{455} = \text{not specified} \tag{910}$$

6.456 Reaction R_DM_ACP

This is an irreversible reaction of one reactant forming no product.

Name DM_ACP

Reaction equation

$$\text{M\_ACP\_c} \longrightarrow \emptyset \tag{911}$$

Reactant

Table 842: Properties of each reactant.

Id	Name	SBO
M_ACP_c	ACP	

Kinetic Law

$$v_{456} = \text{not specified} \tag{912}$$

6.457 Reaction R_DM_PHE

This is an irreversible reaction of one reactant forming no product.

Name DM_PHE

Reaction equation

$$\text{M\_PHE\_c} \longrightarrow \emptyset \tag{913}$$

Reactant

Table 843: Properties of each reactant.

Id	Name	SBO
M_PHE_c	PHE	

Kinetic Law

$$v_{457} = \text{not specified} \tag{914}$$

6.458 Reaction R_DM_ATP

This is an irreversible reaction of one reactant forming no product.

Name DM_ATP

Reaction equation

$$\text{M\_ATP\_c} \longrightarrow \emptyset \tag{915}$$

Reactant

Table 844: Properties of each reactant.

Id	Name	SBO
M_ATP_c	ATP	

Kinetic Law

$$v_{458} = \text{not specified} \tag{916}$$

6.459 Reaction R_DM_NADP

This is an irreversible reaction of one reactant forming no product.

Name DM_NADP

Reaction equation

$$\text{M\_NADP\_c} \longrightarrow \emptyset \tag{917}$$

Reactant

Table 845: Properties of each reactant.

Id	Name	SBO
M_NADP_c	NADP	

Kinetic Law

$$v_{459} = \text{not specified} \tag{918}$$

6.460 Reaction R_DM_GLU

This is an irreversible reaction of one reactant forming no product.

Name DM_GLU

Reaction equation

$$\text{M\_GLU\_c} \longrightarrow \emptyset \tag{919}$$

Reactant

Table 846: Properties of each reactant.

Id	Name	SBO
M_GLU_c	GLU	

Kinetic Law

$$v_{460} = \text{not specified} \tag{920}$$

6.461 Reaction R_DM_CYS

This is an irreversible reaction of one reactant forming no product.

Name DM_CYS

Reaction equation

$$\text{M\_CYS\_c} \longrightarrow \emptyset \tag{921}$$

Reactant

Table 847: Properties of each reactant.

Id	Name	SBO
M_CYS_c	CYS	

Kinetic Law

$$v_{461} = \text{not specified} \tag{922}$$

6.462 Reaction R_DM_PS

This is an irreversible reaction of one reactant forming no product.

Name DM_PS

Reaction equation

$$\text{M\_PS\_c} \longrightarrow \emptyset \tag{923}$$

Reactant

Table 848: Properties of each reactant.

Id	Name	SBO
M_PS_c	PS	

Kinetic Law

$$v_{462} = \text{not specified} \tag{924}$$

6.463 Reaction R_DM_HIS

This is an irreversible reaction of one reactant forming no product.

Name DM_HIS

Reaction equation

$$\text{M\_HIS\_c} \longrightarrow \emptyset \tag{925}$$

Reactant

Table 849: Properties of each reactant.

Id	Name	SBO
M_HIS_c	HIS	

Kinetic Law

$$v_{463} = \text{not specified} \tag{926}$$

6.464 Reaction R_DM_SER

This is an irreversible reaction of one reactant forming no product.

Name DM_SER

Reaction equation

$$\text{M\_SER\_c} \longrightarrow \emptyset \tag{927}$$

Reactant

Table 850: Properties of each reactant.

Id	Name	SBO
M_SER_c	SER	

Kinetic Law

$$v_{464} = \text{not specified} \tag{928}$$

6.465 Reaction R_DM_PTH

This is an irreversible reaction of one reactant forming no product.

Name DM_PTH

Reaction equation

$$\text{M\_PTH\_c} \longrightarrow \emptyset \tag{929}$$

Reactant

Table 851: Properties of each reactant.

Id	Name	SBO
M_PTH_c	PTH	

Kinetic Law

$$v_{465} = \text{not specified} \tag{930}$$

6.466 Reaction R_DM_PRO

This is an irreversible reaction of one reactant forming no product.

Name DM_PRO

Reaction equation

$$\text{M\_PRO\_c} \longrightarrow \emptyset \tag{931}$$

Reactant

Table 852: Properties of each reactant.

Id	Name	SBO
M_PRO_c	PRO	

Kinetic Law

$$v_{466} = \text{not specified} \tag{932}$$

6.467 Reaction R_DM_PEPTIDO

This is an irreversible reaction of one reactant forming no product.

Name DM_PEPTIDO

Reaction equation

$$\text{M\_PEPTIDO\_c} \longrightarrow \emptyset \tag{933}$$

Reactant

Table 853: Properties of each reactant.

Id	Name	SBO
M_PEPTIDO_c	PEPTIDO	

Kinetic Law

$$v_{467} = \text{not specified} \tag{934}$$

6.468 Reaction R_DM_PG

This is an irreversible reaction of one reactant forming no product.

Name DM_PG

Reaction equation

$$\text{M\_PG\_c} \longrightarrow \emptyset \tag{935}$$

Reactant

Table 854: Properties of each reactant.

Id	Name	SBO
M_PG_c	PG	

Kinetic Law

$$v_{468} = \text{not specified} \tag{936}$$

6.469 Reaction R_DM_UDPP

This is an irreversible reaction of one reactant forming no product.

Name DM_UDPP

Reaction equation

$$\text{M\_UDPP\_c} \longrightarrow \emptyset \tag{937}$$

Reactant

Table 855: Properties of each reactant.

Id	Name	SBO
M_UDPP_c	UDPP	

Kinetic Law

$$v_{469} = \text{not specified} \tag{938}$$

6.470 Reaction R_DM_ASN

This is an irreversible reaction of one reactant forming no product.

Name DM_ASN

Reaction equation

$$\text{M\_ASN\_c} \longrightarrow \emptyset \tag{939}$$

Reactant

Table 856: Properties of each reactant.

Id	Name	SBO
M_ASN_c	ASN	

Kinetic Law

$$v_{470} = \text{not specified} \tag{940}$$

6.471 Reaction R_DM_FAD

This is an irreversible reaction of one reactant forming no product.

Name DM_FAD

Reaction equation

$$\text{M\_FAD\_c} \longrightarrow \emptyset \tag{941}$$

Reactant

Table 857: Properties of each reactant.

Id	Name	SBO
M_FAD_c	FAD	

Kinetic Law

$$v_{471} = \text{not specified} \tag{942}$$

6.472 Reaction R_DM_DCTP

This is an irreversible reaction of one reactant forming no product.

Name DM_DCTP

Reaction equation

$$\text{M\_DCTP\_c} \longrightarrow \emptyset \tag{943}$$

Reactant

Table 858: Properties of each reactant.

Id	Name	SBO
M_DCTP_c	DCTP	

Kinetic Law

$$v_{472} = \text{not specified} \tag{944}$$

6.473 Reaction R_DM_DMK

This is an irreversible reaction of one reactant forming no product.

Name DM_DMK

Reaction equation

$$\text{M\_DMK\_c} \longrightarrow \emptyset \tag{945}$$

Reactant

Table 859: Properties of each reactant.

Id	Name	SBO
M_DMK_c	DMK	

Kinetic Law

$$v_{473} = \text{not specified} \tag{946}$$

6.474 Reaction R_DM_VAL

This is an irreversible reaction of one reactant forming no product.

Name DM_VAL

Reaction equation

$$\text{M\_VAL\_c} \longrightarrow \emptyset \tag{947}$$

Reactant

Table 860: Properties of each reactant.

Id	Name	SBO
M_VAL_c	VAL	

Kinetic Law

$$v_{474} = \text{not specified} \tag{948}$$

6.475 Reaction R_DM_PE

This is an irreversible reaction of one reactant forming no product.

Name DM_PE

Reaction equation

$$\text{M\_PE\_c} \longrightarrow \emptyset \tag{949}$$

Reactant

Table 861: Properties of each reactant.

Id	Name	SBO
M_PE_c	PE	

Kinetic Law

$$v_{475} = \text{not specified} \tag{950}$$

6.476 Reaction R_DM_LPS

This is an irreversible reaction of one reactant forming no product.

Name DM_LPS

Reaction equation

$$\text{M\_LPS\_c} \longrightarrow \emptyset \tag{951}$$

Reactant

Table 862: Properties of each reactant.

Id	Name	SBO
M_LPS_c	LPS	

Kinetic Law

$$v_{476} = \text{not specified} \tag{952}$$

6.477 Reaction R_DM_THIAMIN

This is an irreversible reaction of one reactant forming no product.

Name DM_THIAMIN

Reaction equation

$$\text{M\_THIAMIN\_c} \longrightarrow \emptyset \tag{953}$$

Reactant

Table 863: Properties of each reactant.

Id	Name	SBO
M_THIAMIN_c	THIAMIN	

Kinetic Law

$$v_{477} = \text{not specified} \tag{954}$$

6.478 Reaction R_DM_THR

This is an irreversible reaction of one reactant forming no product.

Name DM_THR

Reaction equation

$$\text{M\_THR\_c} \longrightarrow \emptyset \tag{955}$$

Reactant

Table 864: Properties of each reactant.

Id	Name	SBO
M_THR_c	THR	

Kinetic Law

$$v_{478} = \text{not specified} \tag{956}$$

6.479 Reaction R_DM_GTP

This is an irreversible reaction of one reactant forming no product.

Name DM_GTP

Reaction equation

$$\text{M\_GTP\_c} \longrightarrow \emptyset \tag{957}$$

Reactant

Table 865: Properties of each reactant.

Id	Name	SBO
M_GTP_c	GTP	

Kinetic Law

$$v_{479} = \text{not specified} \tag{958}$$

6.480 Reaction R_DM_UTP

This is an irreversible reaction of one reactant forming no product.

Name DM_UTP

Reaction equation

$$\text{M\_UTP\_c} \longrightarrow \emptyset \tag{959}$$

Reactant

Table 866: Properties of each reactant.

Id	Name	SBO
M_UTP_c	UTP	

Kinetic Law

$$v_{480} = \text{not specified} \tag{960}$$

6.481 Reaction R_DM_ASP

This is an irreversible reaction of one reactant forming no product.

Name DM_ASP

Reaction equation

$$\text{M\_ASP\_c} \longrightarrow \emptyset \tag{961}$$

Reactant

Table 867: Properties of each reactant.

Id	Name	SBO
M_ASP_c	ASP	

Kinetic Law

$$v_{481} = \text{not specified} \tag{962}$$

6.482 Reaction R_DM_TRP

This is an irreversible reaction of one reactant forming no product.

Name DM_TRP

Reaction equation

$$\text{M\_TRP\_c} \longrightarrow \emptyset \tag{963}$$

Reactant

Table 868: Properties of each reactant.

Id	Name	SBO
M_TRP_c	TRP	

Kinetic Law

$$v_{482} = \text{not specified} \tag{964}$$

6.483 Reaction R_DM_SPMD

This is an irreversible reaction of one reactant forming no product.

Name DM_SPMD

Reaction equation

$$\text{M\_SPMD\_c} \longrightarrow \emptyset \tag{965}$$

Reactant

Table 869: Properties of each reactant.

Id	Name	SBO
M_SPMD_c	SPMD	

Kinetic Law

$$v_{483} = \text{not specified} \tag{966}$$

6.484 Reaction R_DM_OPP

This is an irreversible reaction of one reactant forming no product.

Name DM_OPP

Reaction equation

$$\text{M\_OPP\_c} \longrightarrow \emptyset \tag{967}$$

Reactant

Table 870: Properties of each reactant.

Id	Name	SBO
M_OPP_c	OPP	

Kinetic Law

$$v_{484} = \text{not specified} \tag{968}$$

6.485 Reaction R_DM_LYS

This is an irreversible reaction of one reactant forming no product.

Name DM_LYS

Reaction equation

$$\text{M\_LYS\_c} \longrightarrow \emptyset \tag{969}$$

Reactant

Table 871: Properties of each reactant.

Id	Name	SBO
M_LYS_c	LYS	

Kinetic Law

$$v_{485} = \text{not specified} \tag{970}$$

6.486 Reaction R_DM_MK

This is an irreversible reaction of one reactant forming no product.

Name DM_MK

Reaction equation

$$\text{M\_MK\_c} \longrightarrow \emptyset \tag{971}$$

Reactant

Table 872: Properties of each reactant.

Id	Name	SBO
M_MK_c	MK	

Kinetic Law

$$v_{486} = \text{not specified} \tag{972}$$

6.487 Reaction R_DM_ALA

This is an irreversible reaction of one reactant forming no product.

Name DM_ALA

Reaction equation

$$\text{M\_ALA\_c} \longrightarrow \emptyset \tag{973}$$

Reactant

Table 873: Properties of each reactant.

Id	Name	SBO
M_ALA_c	ALA	

Kinetic Law

$$v_{487} = \text{not specified} \tag{974}$$

6.488 Reaction R_DM_MTHF

This is an irreversible reaction of one reactant forming no product.

Name DM_MTHF

Reaction equation

$$\text{M\_MTHF\_c} \longrightarrow \emptyset \tag{975}$$

Reactant

Table 874: Properties of each reactant.

Id	Name	SBO
M_MTHF_c	MTHF	

Kinetic Law

$$v_{488} = \text{not specified} \tag{976}$$

6.489 Reaction R_DM_LEU

This is an irreversible reaction of one reactant forming no product.

Name DM_LEU

Reaction equation

$$\text{M\_LEU\_c} \longrightarrow \emptyset \tag{977}$$

Reactant

Table 875: Properties of each reactant.

Id	Name	SBO
M_LEU_c	LEU	

Kinetic Law

$$v_{489} = \text{not specified} \tag{978}$$

6.490 Reaction R_DM_ARG

This is an irreversible reaction of one reactant forming no product.

Name DM_ARG

Reaction equation

$$\text{M\_ARG\_c} \longrightarrow \emptyset \tag{979}$$

Reactant

Table 876: Properties of each reactant.

Id	Name	SBO
M_ARG_c	ARG	

Kinetic Law

$$v_{490} = \text{not specified} \tag{980}$$

6.491 Reaction R_DM_PTRC

This is an irreversible reaction of one reactant forming no product.

Name DM_PTRC

Reaction equation

$$\text{M\_PTRC\_c} \longrightarrow \emptyset \tag{981}$$

Reactant

Table 877: Properties of each reactant.

Id	Name	SBO
M_PTRC_c	PTRC	

Kinetic Law

$$v_{491} = \text{not specified} \tag{982}$$

6.492 Reaction R_DM_TYR

This is an irreversible reaction of one reactant forming no product.

Name DM_TYR

Reaction equation

$$\text{M\_TYR\_c} \longrightarrow \emptyset \tag{983}$$

Reactant

Table 878: Properties of each reactant.

Id	Name	SBO
M_TYR_c	TYR	

Kinetic Law

$$v_{492} = \text{not specified} \tag{984}$$

6.493 Reaction R_DM_MET

This is an irreversible reaction of one reactant forming no product.

Name DM_MET

Reaction equation

$$\text{M\_MET\_c} \longrightarrow \emptyset \tag{985}$$

Reactant

Table 879: Properties of each reactant.

Id	Name	SBO
M_MET_c	MET	

Kinetic Law

$$v_{493} = \text{not specified} \tag{986}$$

7 Derived Rate Equations

When interpreted as an ordinary differential equation framework, this model implies the following set of equations for the rates of change of each species.

The identifiers for reactions, which are not defined properly or which are lacking a kinetic equation, are highlighted in red.

7.1 Species M_G6P_c

Name G6P

This species takes part in five reactions (as a reactant in R_PGI, R_G6PDH1, R_G6PDH2, R_ALGC1 and as a product in R_GLK1).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_G6P\_c} = v_{307} - v_1 - v_9 - v_{10} - v_{304} \tag{987}$$

7.2 Species M_F6P_c

Name F6P

This species takes part in six reactions (as a reactant in R_GLMS and as a product in R_PGI, R_FBP, R_TAL, R_TKTA2, R_PMI).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_F6P\_c} = v_1 + v_2 + v_{15} + v_{17} + v_{309} - v_{188} \tag{988}$$

7.3 Species M_FDP_c

Name FDP

This species takes part in two reactions (as a reactant in R_FBP, R_FBA).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_FDP\_c} = -v_2 - v_3 \tag{989}$$

7.4 Species M_PI_c

Name PI

This species takes part in 60 reactions (as a reactant in R_GAP, R_DEOD1, R_DEOD2, R_DEOD3, R_DEOD8, R_PTA, R_ATPA and as a product in R_FBP, R_PPA, R_PPSA, R_DHS1, R_AROB, R_AROA, R_AROC, R_ASD, R_THRC, R_METX, R_SERB, R_GLNA, R_CYSDN, R_PYRA, R_PYRB, R_PYRG, R_PURA, R_PURD, R_DEOD4, R_DEOD5, R_DEOD6, R_DEOD7, R_ACCABCD, R_PGPP, R_MURZ, R_MURC, R_MURD, R_MURE, R_MURF, R_MRAY, R_KDSA, R_KDOPH, R_BIOD, R_DHPPH, R_FOLC, R_PMDPHT, R_RIBE, R_BISPHDS, R_NADA, R_DPEPTP, R_OPEPTP, R_PROTP2, R_GLNTP, R_VALTP, R_ILETP, R_LEUTP, R_ASNTP, R_THIAMTP, R_PITTP, R_SLFTP, R_CYSTP, R_HISTP, R_METTP).

$$\begin{aligned}\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_PI\_c} = {} & v_2 + 2v_{32} + v_{34} + v_{38} + v_{39} + v_{43} + v_{44} + v_{58} + v_{61} + v_{71} + v_{76} + v_{98} + v_{99} + v_{111} \\ & + v_{112} + v_{119} + v_{121} + v_{126} + v_{155} + v_{156} + v_{157} + v_{158} + v_{168} + v_{186} + v_{191} + v_{193} \\ & + v_{194} + v_{195} + v_{196} + v_{199} + v_{212} + v_{213} + v_{220} + v_{224} + v_{230} + v_{251} + v_{253} \\ & + v_{267} + v_{275} + v_{293} + v_{294} + v_{311} + v_{315} + v_{346} + v_{347} + v_{348} + v_{349} + v_{350} \\ & + v_{351} + v_{365} + v_{366} + v_{367} + v_{369} - v_5 - v_{152} - v_{153} - v_{154} - v_{159} - v_{298} - v_{342}\end{aligned} \tag{990}$$

7.5 Species M_T3P1_c

Name T3P1

This species takes part in ten reactions (as a reactant in R_GAP, R_TAL, R_IPPPSYN, R_UNKRXN1 and as a product in R_FBA, R_TPI, R_TKTA1, R_TKTA2, R_EDA, R_TRPAB).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_T3P1\_c} = v_3 + v_4 + v_{16} + v_{17} + v_{19} + v_{50} - v_5 - v_{15} - v_{268} - v_{281} \tag{991}$$

7.6 Species M_T3P2_c

Name T3P2

This species takes part in four reactions (as a reactant in R_TPI, R_NADA and as a product in R_FBA, R_GPSA).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_T3P2\_c} = v_3 + v_{179} - v_4 - v_{275} \tag{992}$$

7.7 Species M_NAD_c

Name NAD

This species takes part in 17 reactions (as a reactant in R_GAP, R_G6PDH1, R_MAEB, R_MDH, R_TYRA2, R_SERA, R_PUTA2, R_ALD, R_GUAB, R_NADFG, R_GLLDH, R_BIOMASS, R_DM_NAD and as a product in R_FRD, R_METF, R_NADE, R_ADHE2).

$$\begin{aligned}\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_NAD\_c} = {} & v_{25} + v_{236} + v_{278} + 2v_{296} - v_5 - v_9 - v_{20} - v_{27} - v_{52} \\ & - v_{74} - v_{84} - v_{108} - v_{123} - v_{279} - v_{379} - v_{446} - v_{451}\end{aligned} \tag{993}$$

7.8 Species M_NADH_c

Name NADH

This species takes part in 13 reactions (as a reactant in R_FRD, R_METF, R_ADHE2 and as a product in R_GAP, R_G6PDH1, R_MAEB, R_MDH, R_TYRA2, R_SERA, R_PUTA2, R_ALD, R_GUAB, R_GLLDH).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_NADH\_c} = v_5 + v_9 + v_{20} + v_{27} + v_{52} + v_{74} + v_{84} + v_{108} + v_{123} + v_{379} - v_{25} - v_{236} - 2v_{296} \tag{994}$$

7.9 Species M_13DPG_c

Name 13DPG

This species takes part in two reactions (as a reactant in R_PGK and as a product in R_GAP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_13DPG\_c} = v_5 - v_6 \tag{995}$$

7.10 Species M_ADP_c

Name ADP

This species takes part in 65 reactions (as a reactant in R_PGK, R_NRDAB3, R_ACKA, R_ATPA and as a product in R_AROK, R_METL1, R_LYSC, R_THRB, R_MTHRKN, R_GLNA, R_CYSC, R_PYRA, R_PYRH, R_CMKA, R_PYRG, R_PURD, R_NDK1, R_NDK2, R_NDK3, R_NDK4, R_NDK5, R_NDK6, R_NDK7, R_NDK8, R_TDK1, R_TDK2, R_TMK1, R_TMK2, R_ADK1, R_ADK2, R_GMK1, R_GMK2, R_ACCABCD, R_DGKA, R_MURC, R_MURD, R_MURE, R_MURF, R_LPXK, R_KDOLIPH, R_LPSSYN, R_BIOD, R_FOLC, R_RIBF1, R_COAA, R_DPHCOAK, R_IPPPSYN, R_NADFG, R_THIM, R_THID, R_DPEPTP, R_OPEPTP, R_GLK1, R_GLK2, R_PROTP2, R_GLNTP, R_VALTP, R_ILETP, R_LEUTP, R_ASNTP, R_THIAMTP, R_SLFTP, R_CYSTP, R_HISTP, R_METTP).

$$\begin{aligned}\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_ADP\_c} = {} & v_{42} + v_{56} + v_{57} + v_{60} + v_{92} + v_{98} + v_{100} + 2v_{111} + v_{117} + v_{118} + v_{119} + v_{126} \\ & + v_{127} + v_{128} + v_{129} + v_{130} + v_{131} + v_{132} + v_{133} + v_{134} + v_{136} + v_{137} + v_{138} \\ & + v_{139} + 2v_{142} + v_{143} + v_{144} + v_{145} + v_{168} + v_{187} + v_{193} + v_{194} + v_{195} \\ & + v_{196} + v_{206} + v_{208} + 3v_{217} + v_{220} + v_{230} + v_{255} + v_{261} + v_{265} + v_{268} \\ & + v_{279} + v_{280} + v_{282} + v_{293} + v_{294} + v_{307} + v_{308} + v_{311} + v_{315} + v_{346} + v_{347} \\ & + v_{348} + v_{349} + v_{350} + v_{365} + v_{366} + v_{367} + v_{369} - v_6 - v_{149} - v_{299} - v_{342}\end{aligned} \tag{996}$$

7.11 Species M_3PG_c

Name 3PG

This species takes part in three reactions (as a reactant in R_PGM, R_SERA and as a product in R_PGK).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_3PG\_c} = v_6 - v_7 - v_{74} \tag{997}$$

7.12 Species M_ATP_c

Name ATP

This species takes part in 81 reactions (as a reactant in R_PRSA, R_PPSA, R_AROK, R_METL1, R_LYSC, R_THRB, R_METX, R_MTHRKN, R_GLNA, R_CYSDN, R_CYSC, R_ASNA, R_PYRA, R_PYRH, R_CMKA, R_PYRG, R_GUAA, R_PURD, R_NDK1, R_NDK2, R_NDK3, R_NDK4, R_NDK5, R_NDK6, R_NDK7, R_NDK8, R_TDK1, R_TDK2, R_TMK1, R_TMK2, R_ADK1, R_ADK2, R_GMK1, R_GMK2, R_ACCABCD, R_DGKA, R_MURC, R_MURD, R_MURE, R_MURF, R_LPXK, R_KDOLIPH, R_GMHA, R_BIOD, R_FOLK, R_FOLC, R_GLTX, R_RIBF1, R_RIBF2, R_PANC, R_COAA, R_PATRAN, R_DPHCOAK, R_IPPPSYN, R_NADD, R_NADE, R_NADFG, R_THIM, R_THID, R_MENE, R_DPEPTP, R_OPEPTP, R_ACOE, R_GLK1, R_GLK2, R_PROTP2, R_GLNTP, R_VALTP, R_ILETP, R_LEUTP, R_ASNTP, R_THIAMTP, R_SLFTP, R_CYSTP, R_HISTP, R_METTP, R_BIOMASS, R_DM_ATP and as a product in R_PGK, R_ACKA, R_ATPA).

$$\begin{aligned}\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_ATP\_c} = {} & v_{6} + v_{299} + v_{342} - v_{33} - v_{34} - v_{42} - v_{56} - v_{57} - v_{60} - v_{71} - v_{92} - v_{98} - v_{99} \\ & - v_{100} - v_{109} - 2v_{111} - v_{117} - v_{118} - v_{119} - v_{124} - v_{126} - v_{127} - v_{128} - v_{129} \\ & - v_{130} - v_{131} - v_{132} - v_{133} - v_{134} - v_{136} - v_{137} - v_{138} - v_{139} - v_{142} - v_{143} - v_{144} \\ & - v_{145} - v_{168} - v_{187} - v_{193} - v_{194} - v_{195} - v_{196} - v_{206} - v_{208} - v_{216} - v_{220} - v_{226} \\ & - v_{230} - v_{237} - v_{255} - v_{256} - v_{260} - v_{261} - v_{264} - v_{265} - v_{268} - v_{277} - v_{278} \\ & - v_{279} - v_{280} - v_{282} - v_{289} - v_{293} - v_{294} - v_{300} - v_{307} - v_{308} - v_{311} - v_{315} \\ & - v_{346} - v_{347} - v_{348} - v_{349} - v_{350} - v_{365} - v_{366} - v_{367} - v_{369} - v_{446} - v_{458}\end{aligned} \tag{998}$$

7.13 Species M_2PG_c

Name 2PG

This species takes part in two reactions (as a reactant in R_ENO and as a product in R_PGM).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_2PG\_c} = v_{7} - v_{8} \tag{999}$$

7.14 Species M_PEP_c

Name PEP

This species takes part in six reactions (as a reactant in R_DHS1, R_AROA, R_MURZ, R_KDSA and as a product in R_ENO, R_PPSA).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_PEP\_c} = v_{8} + v_{34} - v_{38} - v_{43} - v_{191} - v_{212} \tag{1000}$$

7.15 Species M_D6PGL_c

Name D6PGL

This species takes part in three reactions (as a reactant in R_PGL and as a product in R_G6PDH1, R_G6PDH2).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_D6PGL\_c} = v_9 + v_{10} - v_{11} \tag{1001}$$

7.16 Species M_NADP_c

Name NADP

This species takes part in 35 reactions (as a reactant in R_G6PDH2, R_GND, R_ICD, R_GPSA, R_FOLD1, R_FRDO, R_FLDO, R_BIOMASS, R_DM_NADP and as a product in R_AROE, R_ASD, R_METL2, R_DAPB, R_ILVC1, R_ILVC2, R_PROC, R_GDHA, R_CYSIJ, R_GUAC, R_TRXB, R_C120SN, R_C140SN, R_C141SY, R_C160SN, R_C161SY, R_C181SY, R_MURB, R_BIOB, R_FOLA, R_HEMA, R_RIBD2, R_ILVC3, R_IPPPSYN, R_NADFG, R_NDH__1).

$$\begin{aligned}\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_NADP\_c} = {} & v_{41} + v_{58} + v_{59} + v_{63} + v_{78} + v_{79} + v_{85} + v_{97} + 3v_{102} + v_{125} + v_{151} + 8v_{173} + 10v_{174} \\ & + 9v_{175} + 12v_{176} + 11v_{177} + 13v_{178} + v_{192} + 2v_{221} + v_{231} + v_{238} + v_{250} + v_{258} \\ & + 2v_{268} + v_{279} + v_{337} - v_{10} - v_{12} - v_{23} - v_{179} - v_{234} - v_{335} - v_{336} - v_{446} - v_{459}\end{aligned} \tag{1002}$$

7.17 Species M_NADPH_c

Name NADPH

This species takes part in 32 reactions (as a reactant in R_AROE, R_ASD, R_METL2, R_DAPB, R_ILVC1, R_ILVC2, R_PROC, R_GDHA, R_CYSIJ, R_GUAC, R_TRXB, R_C120SN, R_C140SN, R_C141SY, R_C160SN, R_C161SY, R_C181SY, R_MURB, R_BIOB, R_FOLA, R_HEMA, R_RIBD2, R_ILVC3, R_IPPPSYN, R_NDH__1 and as a product in R_G6PDH2, R_GND, R_ICD, R_GPSA, R_FOLD1, R_FRDO, R_FLDO).

$$\begin{aligned}\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_NADPH\_c} = {} & v_{10} + v_{12} + v_{23} + v_{179} + v_{234} + v_{335} + v_{336} - v_{41} - v_{58} - v_{59} - v_{63} - v_{78} \\ & - v_{79} - v_{85} - v_{97} - 3v_{102} - v_{125} - v_{151} - 8v_{173} - 10v_{174} - 9v_{175} - 12v_{176} \\ & - 11v_{177} - 13v_{178} - v_{192} - 2v_{221} - v_{231} - v_{238} - v_{250} - v_{258} - 2v_{268} - v_{337}\end{aligned} \tag{1003}$$

7.18 Species M_D6PGC_c

Name D6PGC

This species takes part in three reactions (as a reactant in R_GND, R_EDD and as a product in R_PGL).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_D6PGC\_c} = v_{11} - v_{12} - v_{18} \tag{1004}$$

7.19 Species M_CO2_c

Name CO2

This species takes part in 36 reactions (as a reactant in R_PYRA, R_ACCABCD, R_BIOD, R_ICFA and as a product in R_GND, R_MAEB, R_ICD, R_OOR_, R_POR_, R_TRPC2, R_TYRA2, R_LYSA, R_SPEA, R_SPED, R_PYRF, R_FABH2, R_FABF, R_C120SN, R_C140SN, R_C141SY, R_C160SN, R_C161SY, R_C181SY, R_PSD, R_BIOF, R_HEME, R_HEMF, R_PAND, R_PCDCL, R_IPPPSYN, R_NADC, R_THIF, R_MEND1, R_MENA, R_CO2TP, R_UREASE).

$$\begin{aligned}\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_CO2\_c} = {} & v_{12} + v_{20} + v_{23} + v_{29} + v_{35} + v_{49} + v_{52} + v_{68} + v_{87} + v_{89} + v_{116} + v_{171} + v_{172} \\ & + 4v_{173} + 5v_{174} + 5v_{175} + 6v_{176} + 6v_{177} + 7v_{178} + v_{184} + v_{218} + 4v_{243} + 2v_{244} + v_{259} \\ & + v_{263} + v_{268} + v_{276} + v_{284} + v_{286} + v_{291} + v_{353} + v_{364} - v_{111} - v_{168} - v_{220} - v_{376}\end{aligned} \tag{1005}$$

7.20 Species M_RL5P_c

Name RL5P

This species takes part in five reactions (as a reactant in R_RPI, R_RPE, R_A5PISO, R_RIBB and as a product in R_GND).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_RL5P\_c} = v_{12} - v_{13} - v_{14} - v_{211} - v_{252} \tag{1006}$$

7.21 Species M_R5P_c

Name R5P

This species takes part in four reactions (as a reactant in R_TKTA1, R_PRSA and as a product in R_RPI, R_DEOB2).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_R5P\_c} = v_{13} + v_{164} - v_{16} - v_{33} \tag{1007}$$

7.22 Species M_X5P_c

Name X5P

This species takes part in three reactions (as a reactant in R_TKTA1, R_TKTA2 and as a product in R_RPE).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_X5P\_c} = v_{14} - v_{16} - v_{17} \tag{1008}$$

7.23 Species M_S7P_c

Name S7P

This species takes part in three reactions (as a reactant in R_TAL, R_GMHA and as a product in R_TKTA1).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_S7P\_c} = v_{16} - v_{15} - v_{216} \tag{1009}$$

7.24 Species M_E4P_c

Name E4P

This species takes part in three reactions (as a reactant in R_TKTA2, R_DHS1 and as a product in R_TAL).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_E4P\_c} = v_{15} - v_{17} - v_{38} \tag{1010}$$

7.25 Species M_2KD6PG_c

Name 2KD6PG

This species takes part in two reactions (as a reactant in R_EDA and as a product in R_EDD).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_2KD6PG\_c} = v_{18} - v_{19} \tag{1011}$$

7.26 Species M_PYR_c

Name PYR

This species takes part in 16 reactions (as a reactant in R_PPSA, R_POR_, R_DAPA, R_IPPPSYN, R_UNKRXN1 and as a product in R_EDA, R_MAEB, R_SDAA, R_TRPE, R_TRPDE, R_DADA, R_ALD, R_PABC, R_MEND2, R_DLD, R_PYRT).

$$\begin{aligned}\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_PYR\_c} = {} & v_{19} + v_{20} + v_{37} + v_{45} + v_{46} + v_{106} + v_{108} + v_{228} \\ & + v_{287} + v_{314} + v_{363} - v_{34} - v_{35} - v_{62} - v_{268} - v_{281}\end{aligned} \tag{1012}$$

7.27 Species M_MAL_c

Name MAL

This species takes part in five reactions (as a reactant in R_MAEB, R_MDH and as a product in R_FUMC, R_ACEB, R_MALTP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_MAL\_c} = v_{26} + v_{28} + v_{326} - v_{20} - v_{27} \tag{1013}$$

7.28 Species M_ACCOA_c

Name ACCOA

This species takes part in twelve reactions (as a reactant in R_GLTA, R_ACEB, R_CYSE, R_ACCABCD, R_FABH1, R_FABH2, R_GLMU, R_ADHE2, R_PTA and as a product in R_ATOB, R_POR_, R_ACOE).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_ACCOA\_c} = 2v_{31} + v_{35} + v_{300} - v_{21} - v_{28} - v_{103} - v_{168} - v_{170} - v_{171} - v_{190} - v_{296} - v_{298} \tag{1014}$$

7.29 Species M_OA_c

Name OA

This species takes part in three reactions (as a reactant in R_GLTA, R_ASPB1 and as a product in R_MDH).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_OA\_c} = v_{27} - v_{21} - v_{54} \tag{1015}$$

7.30 Species M_COA_c

Name COA

This species takes part in 21 reactions (as a reactant in R_OOR_, R_ATOB, R_POR_, R_ACPS, R_MENE, R_ACOE, R_BIOMASS, R_DM_COA and as a product in R_GLTA, R_ACEB, R_DAPD, R_CYSE, R_FABD, R_FABH1, R_FABH2, R_GLMU, R_BIOF, R_DPHCOAK, R_MENB, R_ADHE2, R_PTA).

$$\begin{aligned}\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_COA\_c} = {} & v_{21} + v_{28} + v_{64} + v_{103} + v_{169} + v_{170} + v_{171} + v_{190} + v_{218} + v_{265} + v_{290} \\ & + v_{296} + v_{298} - v_{29} - v_{31} - v_{35} - v_{266} - v_{289} - v_{300} - v_{446} - v_{454}\end{aligned} \tag{1016}$$

7.31 Species M_CIT_c

Name CIT

This species takes part in two reactions (as a reactant in R_ACNB and as a product in R_GLTA).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_CIT\_c} = v_{21} - v_{22} \tag{1017}$$

7.32 Species M_ICIT_c

Name ICIT

This species takes part in two reactions (as a reactant in R_ICD and as a product in R_ACNB).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_ICIT\_c} = v_{22} - v_{23} \tag{1018}$$

7.33 Species M_AKG_c

Name AKG

This species takes part in 14 reactions (as a reactant in R_AKO, R_OOR_, R_ORNTRSN, R_GDHA, R_MEND1 and as a product in R_ICD, R_ASPB1, R_ASPB2, R_DAPC, R_SERC, R_ILVE1, R_ILVE2, R_ILVE3, R_KGTP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_AKG\_c} = v_{23} + v_{54} + v_{55} + v_{65} + v_{75} + v_{80} + v_{81} + v_{82} + v_{343} - v_{24} - v_{29} - v_{86} - v_{97} - v_{286} \tag{1019}$$

7.34 Species M_FAD_c

Name FAD

This species takes part in eight reactions (as a reactant in R_AKO, R_PUTA1, R_DADA, R_NADB, R_BIOMASS, R_DM_FAD and as a product in R_RIBF2, R_FADOX).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_FAD\_c} = v_{256} + v_{338} - v_{24} - v_{83} - v_{106} - v_{274} - v_{446} - v_{471} \tag{1020}$$

7.35 Species M_SUCC_c

Name SUCC

This species takes part in six reactions (as a product in R_AKO, R_FRD, R_SCOT, R_DAPE, R_METB2, R_SUCTP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_SUCC\_c} = v_{24} + v_{25} + v_{30} + v_{66} + v_{70} + v_{324} \tag{1021}$$

7.36 Species M_FADH_c

Name FADH

This species takes part in five reactions (as a reactant in R_FADOX and as a product in R_AKO, R_PUTA1, R_DADA, R_NADB).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_FADH\_c} = v_{24} + v_{83} + v_{106} + v_{274} - v_{338} \tag{1022}$$

7.37 Species M_FUM_c

Name FUM

This species takes part in five reactions (as a reactant in R_FRD, R_FUMC and as a product in R_ASPA, R_PURB, R_FUMTP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_FUM\_c} = v_{53} + v_{122} + v_{325} - v_{25} - v_{26} \tag{1023}$$

7.38 Species M_GLX_c

Name GLX

This species takes part in two reactions (as a reactant in R_ACEB and as a product in R_GLCD).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_GLX\_c} = v_{378} - v_{28} \tag{1024}$$

7.39 Species M_FERDX_c

Name FERDX

This species takes part in two reactions (as a reactant in R_OOR_ and as a product in R_FRDO).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_FERDX\_c} = v_{335} - v_{29} \tag{1025}$$

7.40 Species M_FERDXH_c

Name FERDXH

This species takes part in two reactions (as a reactant in R_FRDO and as a product in R_OOR_).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_FERDXH\_c} = v_{29} - v_{335} \tag{1026}$$

7.41 Species M_SUCCOA_c

Name SUCCOA

This species takes part in three reactions (as a reactant in R_SCOT, R_DAPD and as a product in R_OOR_).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_SUCCOA\_c} = v_{29} - v_{30} - v_{64} \tag{1027}$$

7.42 Species M_AAC_c

Name AAC

This species takes part in two reactions (as a reactant in R_SCOT and as a product in R_AACTP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_AAC\_c} = v_{374} - v_{30} \tag{1028}$$

7.43 Species M_AACCOA_c

Name AACCOA

This species takes part in two reactions (as a reactant in R_ATOB and as a product in R_SCOT).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_AACCOA\_c} = v_{30} - v_{31} \tag{1029}$$

7.44 Species M_PPI_c

Name PPI

This species takes part in 38 reactions (as a reactant in R_PPA and as a product in R_TRPD, R_METX, R_CYSDN, R_ASNA, R_PYRE, R_UPP, R_GUAA, R_DUT, R_APT, R_GPT1, R_GPT2, R_GPT3, R_CDSA, R_GLMU, R_KDSB, R_GMHA, R_DNTPH, R_FOLP, R_GLTX, R_UBIA, R_RIBA, R_RIBF2, R_PANC, R_PCLIG, R_PATRAN, R_ISPA1, R_ISPA2, R_ISPB, R_UPPS, R_NADC, R_NADD, R_NADE, R_THIB, R_MENE, R_MENA, R_ACOE, R_GALU).

$$\begin{aligned}\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_PPI\_c} = {} & v_{47} + v_{71} + v_{99} + v_{109} + v_{115} + v_{120} + v_{124} + v_{141} + v_{146} + v_{160} + v_{161} + v_{162} + v_{181} \\ & + v_{190} + v_{214} + v_{216} + v_{223} + v_{229} + v_{237} + v_{247} + v_{248} + v_{256} + v_{260} + v_{262} + v_{264} + v_{270} \\ & + v_{271} + 5v_{272} + 8v_{273} + v_{276} + v_{277} + v_{278} + v_{283} + v_{289} + v_{291} + v_{300} + v_{303} - v_{32}\end{aligned} \tag{1030}$$

7.45 Species M_PRPP_c

Name PRPP

This species takes part in nine reactions (as a reactant in R_TRPD, R_PYRE, R_UPP, R_APT, R_GPT1, R_GPT2, R_GPT3, R_NADC and as a product in R_PRSA).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_PRPP\_c} = v_{33} - v_{47} - v_{115} - v_{120} - v_{146} - v_{160} - v_{161} - v_{162} - v_{276} \tag{1031}$$

7.46 Species M_AMP_c

Name AMP

This species takes part in 14 reactions (as a reactant in R_ADK1 and as a product in R_PRSA, R_PPSA, R_ASNA, R_PURB, R_GUAA, R_APT, R_FOLK, R_GLTX, R_PANC, R_BISPHDS, R_NADE, R_MENE, R_ACOE).

$$\begin{aligned}\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_AMP\_c} = {} & v_{33} + v_{34} + v_{109} + v_{122} + v_{124} + v_{146} + v_{226} \\ & + v_{237} + v_{260} + v_{267} + v_{278} + v_{289} + v_{300} - v_{142}\end{aligned} \tag{1032}$$

7.47 Species M_FLVDX_c

Name FLVDX

This species takes part in two reactions (as a reactant in R_POR_ and as a product in R_FLDO).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_FLVDX\_c} = v_{336} - v_{35} \tag{1033}$$

7.48 Species M_FLVDXH_c

Name FLVDXH

This species takes part in two reactions (as a reactant in R_FLDO and as a product in R_POR_).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_FLVDXH\_c} = v_{35} - v_{336} \tag{1034}$$

7.49 Species M_GLN_c

Name GLN

This species takes part in eleven reactions (as a reactant in R_GLTMNS, R_TRPDE, R_TNSUNK, R_PYRA, R_PYRG, R_GUAA, R_GLMS, R_BIOMASS, R_DM_GLN and as a product in R_GLNA, R_GLNTP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_GLN\_c} = v_{98} + v_{315} - v_{36} - v_{46} - v_{96} - v_{111} - v_{119} - v_{124} - v_{188} - v_{446} - v_{448} \tag{1035}$$

7.50 Species M_GLU_c

Name GLU

This species takes part in 24 reactions (as a reactant in R_ASPB1, R_ASPB2, R_DAPC, R_SERC, R_ILVE1, R_ILVE2, R_ILVE3, R_GLNA, R_GLR, R_FOLC, R_GLTX, R_BIOMASS, R_DM_GLU and as a product in R_GLTMNS, R_TRPDE, R_PUTA2, R_ORNTRSN, R_TNSUNK, R_GDHA, R_PYRA, R_PYRG, R_GUAA, R_GLMS, R_GLTTP).

$$\begin{aligned}\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_GLU\_c} = {} & v_{36} + v_{46} + v_{84} + v_{86} + v_{96} + v_{97} + v_{111} + v_{119} + v_{124} + v_{188} + v_{316} - v_{54} \\ & - v_{55} - v_{65} - v_{75} - v_{80} - v_{81} - v_{82} - v_{98} - v_{197} - v_{230} - v_{237} - v_{446} - v_{460}\end{aligned} \tag{1036}$$

7.51 Species M_NH3_c

Name NH3

This species takes part in 19 reactions (as a reactant in R_TRPE, R_GDHA, R_GLNA, R_ASNA, R_PABB, R_NADE and as a product in R_GLTMNS, R_SDAA, R_ASPA, R_DADA, R_ALD, R_ANSB, R_GUAC, R_DCD, R_ADDM, R_HEMC, R_RIBD1, R_NH3TP, R_UREASE).

$$\begin{aligned}\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_NH3\_c} = {} & v_{36} + v_{37} + v_{53} + v_{106} + v_{108} + v_{110} + v_{125} + v_{140} + v_{167} + 4v_{241} \\ & + v_{249} + v_{362} + 2v_{364} - v_{45} - v_{97} - v_{98} - v_{109} - v_{227} - v_{278}\end{aligned} \tag{1037}$$

7.52 Species M_SER_c

Name SER

This species takes part in nine reactions (as a reactant in R_SDAA, R_TRPAB, R_GLYA, R_CYSE, R_PSSA, R_BIOMASS, R_DM_SER and as a product in R_SERB, R_SERTP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_SER\_c} = v_{76} + v_{295} - v_{37} - v_{50} - v_{77} - v_{103} - v_{183} - v_{446} - v_{464} \tag{1038}$$

7.53 Species M_3DDAH7P_c

Name 3DDAH7P

This species takes part in two reactions (as a reactant in R_AROB and as a product in R_DHS1).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_3DDAH7P\_c} = v_{38} - v_{39} \tag{1039}$$

7.54 Species M_DQT_c

Name DQT

This species takes part in two reactions (as a reactant in R_AROQ and as a product in R_AROB).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DQT\_c} = v_{39} - v_{40} \tag{1040}$$

7.55 Species M_DHSK_c

Name DHSK

This species takes part in two reactions (as a reactant in R_AROE and as a product in R_AROQ).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DHSK\_c} = v_{40} - v_{41} \tag{1041}$$

7.56 Species M_SME_c

Name SME

This species takes part in two reactions (as a reactant in R_AROK and as a product in R_AROE).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_SME\_c} = v_{41} - v_{42} \tag{1042}$$

7.57 Species M_SME5P_c

Name SME5P

This species takes part in two reactions (as a reactant in R_AROA and as a product in R_AROK).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_SME5P\_c} = v_{42} - v_{43} \tag{1043}$$

7.58 Species M_3PSME_c

Name 3PSME

This species takes part in two reactions (as a reactant in R_AROC and as a product in R_AROA).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_3PSME\_c} = v_{43} - v_{44} \tag{1044}$$

7.59 Species M_CHOR_c

Name CHOR

This species takes part in six reactions (as a reactant in R_TRPE, R_TRPDE, R_TYRA1, R_PABB, R_MENF and as a product in R_AROC).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_CHOR\_c} = v_{44} - v_{45} - v_{46} - v_{51} - v_{227} - v_{285} \tag{1045}$$

7.60 Species M_AN_c

Name AN

This species takes part in three reactions (as a reactant in R_TRPD and as a product in R_TRPE, R_TRPDE).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_AN\_c} = v_{45} + v_{46} - v_{47} \tag{1046}$$

7.61 Species M_NPRAN_c

Name NPRAN

This species takes part in two reactions (as a reactant in R_TRPC1 and as a product in R_TRPD).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_NPRAN\_c} = v_{47} - v_{48} \tag{1047}$$

7.62 Species M_CPAD5P_c

Name CPAD5P

This species takes part in two reactions (as a reactant in R_TRPC2 and as a product in R_TRPC1).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_CPAD5P\_c} = v_{48} - v_{49} \tag{1048}$$

7.63 Species M_IGP_c

Name IGP

This species takes part in two reactions (as a reactant in R_TRPAB and as a product in R_TRPC2).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_IGP\_c} = v_{49} - v_{50} \tag{1049}$$

7.64 Species M_TRP_c

Name TRP

This species takes part in four reactions (as a reactant in R_BIOMASS, R_DM_TRP and as a product in R_TRPAB, R_TRPTP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_TRP\_c} = v_{50} + v_{372} - v_{446} - v_{482} \tag{1050}$$

7.65 Species M_PHEN_c

Name PHEN

This species takes part in two reactions (as a reactant in R_TYRA2 and as a product in R_TYRA1).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_PHEN\_c} = v_{51} - v_{52} \tag{1051}$$

7.66 Species M_HPHPYR_c

Name HPHPYR

This species takes part in two reactions (as a reactant in R_ASPB2 and as a product in R_TYRA2).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_HPHPYR\_c} = v_{52} - v_{55} \tag{1052}$$

7.67 Species M_ASP_c

Name ASP

This species takes part in 13 reactions (as a reactant in R_ASPA, R_METL1, R_LYSC, R_ASNA, R_PYRB, R_PURA, R_PAND, R_NADB, R_BIOMASS, R_DM_ASP and as a product in R_ASPB1, R_ANSB, R_ASPTP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_ASP\_c} = v_{54} + v_{110} + v_{327} - v_{53} - v_{56} - v_{57} - v_{109} - v_{112} - v_{121} - v_{259} - v_{274} - v_{446} - v_{481} \tag{1053}$$

7.68 Species M_TYR_c

Name TYR

This species takes part in five reactions (as a reactant in R_THIF, R_BIOMASS, R_DM_TYR and as a product in R_ASPB2, R_TYRTP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_TYR\_c} = v_{55} + v_{373} - v_{284} - v_{446} - v_{492} \tag{1054}$$

7.69 Species M_BASP_c

Name BASP

This species takes part in three reactions (as a reactant in R_ASD and as a product in R_METL1, R_LYSC).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_BASP\_c} = v_{56} + v_{57} - v_{58} \tag{1055}$$

7.70 Species M_ASPSA_c

Name ASPSA

This species takes part in three reactions (as a reactant in R_METL2, R_DAPA and as a product in R_ASD).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_ASPSA\_c} = v_{58} - v_{59} - v_{62} \tag{1056}$$

7.71 Species M_HSER_c

Name HSER

This species takes part in two reactions (as a reactant in R_THRB and as a product in R_METL2).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_HSER\_c} = v_{59} - v_{60} \tag{1057}$$

7.72 Species M_PHSER_c

Name PHSER

This species takes part in two reactions (as a reactant in R_THRC and as a product in R_THRB).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_PHSER\_c} = v_{60} - v_{61} \tag{1058}$$

7.73 Species M_THR_c

Name THR

This species takes part in four reactions (as a reactant in R_BIOMASS, R_DM_THR and as a product in R_THRC, R_THRTP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_THR\_c} = v_{61} + v_{371} - v_{446} - v_{478} \tag{1059}$$

7.74 Species M_D23PIC_c

Name D23PIC

This species takes part in two reactions (as a reactant in R_DAPB and as a product in R_DAPA).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_D23PIC\_c} = v_{62} - v_{63} \tag{1060}$$

7.75 Species M_PIP26DX_c

Name PIP26DX

This species takes part in two reactions (as a reactant in R_DAPD and as a product in R_DAPB).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_PIP26DX\_c} = v_{63} - v_{64} \tag{1061}$$

7.76 Species M_NS2A6O_c

Name NS2A6O

This species takes part in two reactions (as a reactant in R_DAPC and as a product in R_DAPD).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_NS2A6O\_c} = v_{64} - v_{65} \tag{1062}$$

7.77 Species M_NS26DP_c

Name NS26DP

This species takes part in two reactions (as a reactant in R_DAPE and as a product in R_DAPC).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_NS26DP\_c} = v_{65} - v_{66} \tag{1063}$$

7.78 Species M_D26PIM_c

Name D26PIM

This species takes part in two reactions (as a reactant in R_DAPF and as a product in R_DAPE).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_D26PIM\_c} = v_{66} - v_{67} \tag{1064}$$

7.79 Species M_MDAP_c

Name MDAP

This species takes part in three reactions (as a reactant in R_LYSA, R_MURE and as a product in R_DAPF).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_MDAP\_c} = v_{67} - v_{68} - v_{195} \tag{1065}$$

7.80 Species M_LYS_c

Name LYS

This species takes part in four reactions (as a reactant in R_BIOMASS, R_DM_LYS and as a product in R_LYSA, R_LYSTP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_LYS\_c} = v_{68} + v_{368} - v_{446} - v_{485} \tag{1066}$$

7.81 Species M_OAHSER_c

Name OAHSER

This species takes part in one reaction (as a reactant in R_METB1).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_OAHSER\_c} = -v_{69} \tag{1067}$$

7.82 Species M_CYS_c

Name CYS

This species takes part in eight reactions (as a reactant in R_METB1, R_METB2, R_PCLIG, R_THIF, R_BIOMASS, R_DM_CYS and as a product in R_CYSK, R_CYSTP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_CYS\_c} = v_{104} + v_{366} - v_{69} - v_{70} - v_{262} - v_{284} - v_{446} - v_{461} \tag{1068}$$

7.83 Species M_AC_c

Name AC

This species takes part in six reactions (as a reactant in R_ACOE and as a product in R_METB1, R_CYSK, R_ENVA, R_ACKA, R_ACTP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_AC\_c} = v_{69} + v_{104} + v_{202} + v_{299} + v_{301} - v_{300} \tag{1069}$$

7.84 Species M_LLCT_c

Name LLCT

This species takes part in two reactions (as a product in R_METB1, R_METB2).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_LLCT\_c} = v_{69} + v_{70} \tag{1070}$$

7.85 Species M_OSLHSER_c

Name OSLHSER

This species takes part in one reaction (as a reactant in R_METB2).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_OSLHSER\_c} = -v_{70} \tag{1071}$$

7.86 Species M_MET_c

Name MET

This species takes part in seven reactions (as a reactant in R_METX, R_BIOMASS, R_DM_MET and as a product in R_METH, R_TNSUNK, R_BIOB, R_METTP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_MET\_c} = v_{73} + v_{96} + 2v_{221} + v_{369} - v_{71} - v_{446} - v_{493} \tag{1072}$$

7.87 Species M_SAM_c

Name SAM

This species takes part in five reactions (as a reactant in R_SPED, R_BIOA, R_BIOB, R_MENG and as a product in R_METX).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_SAM\_c} = v_{71} - v_{89} - v_{219} - 2v_{221} - v_{292} \tag{1073}$$

7.88 Species M_HCYS_c

Name HCYS

This species takes part in two reactions (as a reactant in R_ADCSASE, R_METH).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_HCYS\_c} = -v_{72} - v_{73} \tag{1074}$$

7.89 Species M_ADN_c

Name ADN

This species takes part in four reactions (as a reactant in R_ADCSASE, R_ADNUC and as a product in R_DEOD5, R_NUPCTP1).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_ADN\_c} = v_{156} + v_{328} - v_{72} - v_{165} \tag{1075}$$

7.90 Species M_SAH_c

Name SAH

This species takes part in two reactions (as a product in R_ADCSASE, R_MENG).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_SAH\_c} = v_{72} + v_{292} \tag{1076}$$

7.91 Species M_MTHF_c

Name MTHF

This species takes part in four reactions (as a reactant in R_METH, R_BIOMASS, R_DM_MTHF and as a product in R_METF).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_MTHF\_c} = v_{236} - v_{73} - v_{446} - v_{488} \tag{1077}$$

7.92 Species M_THF_c

Name THF

This species takes part in six reactions (as a reactant in R_GLYA and as a product in R_METH, R_FOLA, R_PURU, R_FMT, R_PANB).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_THF\_c} = v_{73} + v_{231} + v_{232} + v_{233} + v_{257} - v_{77} \tag{1078}$$

7.93 Species M_PHP_c

Name PHP

This species takes part in two reactions (as a reactant in R_SERC and as a product in R_SERA).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_PHP\_c} = v_{74} - v_{75} \tag{1079}$$

7.94 Species M_3PSER_c

Name 3PSER

This species takes part in two reactions (as a reactant in R_SERB and as a product in R_SERC).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_3PSER\_c} = v_{75} - v_{76} \tag{1080}$$

7.95 Species M_GLY_c

Name GLY

This species takes part in five reactions (as a reactant in R_PURD, R_BIOMASS, R_DM_GLY and as a product in R_GLYA, R_GLYTP2).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_GLY\_c} = v_{77} + v_{319} - v_{126} - v_{446} - v_{455} \tag{1081}$$

7.96 Species M_METTHF_c

Name METTHF

This species takes part in five reactions (as a reactant in R_THYA, R_FOLD1, R_METF, R_PANB and as a product in R_GLYA).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_METTHF\_c} = v_{77} - v_{135} - v_{234} - v_{236} - v_{257} \tag{1082}$$

7.97 Species M_ABUT_c

Name ABUT

This species takes part in one reaction (as a reactant in R_ILVC1).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_ABUT\_c} = -v_{78} \tag{1083}$$

7.98 Species M_DHMVA_c

Name DHMVA

This species takes part in one reaction (as a product in R_ILVC1).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DHMVA\_c} = v_{78} \tag{1084}$$

7.99 Species M_ACLAC_c

Name ACLAC

This species takes part in one reaction (as a reactant in R_ILVC2).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_ACLAC\_c} = -v_{79} \tag{1085}$$

7.100 Species M_DHVAL_c

Name DHVAL

This species takes part in one reaction (as a product in R_ILVC2).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DHVAL\_c} = v_{79} \tag{1086}$$

7.101 Species M_OMVAL_c

Name OMVAL

This species takes part in one reaction (as a reactant in R_ILVE1).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_OMVAL\_c} = -v_{80} \tag{1087}$$

7.102 Species M_ILE_c

Name ILE

This species takes part in four reactions (as a reactant in R_BIOMASS, R_DM_ILE and as a product in R_ILVE1, R_ILETP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_ILE\_c} = v_{80} + v_{347} - v_{446} - v_{449} \tag{1088}$$

7.103 Species M_OIVAL_c

Name OIVAL

This species takes part in two reactions (as a reactant in R_ILVE2, R_PANB).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_OIVAL\_c} = -v_{81} - v_{257} \tag{1089}$$

7.104 Species M_VAL_c

Name VAL

This species takes part in four reactions (as a reactant in R_BIOMASS, R_DM_VAL and as a product in R_ILVE2, R_VALTP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_VAL\_c} = v_{81} + v_{346} - v_{446} - v_{474} \tag{1090}$$

7.105 Species M_OICAP_c

Name OICAP

This species takes part in one reaction (as a reactant in R_ILVE3).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_OICAP\_c} = -v_{82} \tag{1091}$$

7.106 Species M_LEU_c

Name LEU

This species takes part in four reactions (as a reactant in R_BIOMASS, R_DM_LEU and as a product in R_ILVE3, R_LEUTP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_LEU\_c} = v_{82} + v_{348} - v_{446} - v_{489} \tag{1092}$$

7.107 Species M_PRO_c

Name PRO

This species takes part in seven reactions (as a reactant in R_PUTA1, R_BIOMASS, R_DM_PRO and as a product in R_PROC, R_PROTP1, R_PROTP2, R_PROTP3).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_PRO\_c} = v_{85} + v_{310} + v_{311} + v_{312} - v_{83} - v_{446} - v_{466} \tag{1093}$$

7.108 Species M_GLUGSAL_c

Name GLUGSAL

This species takes part in four reactions (as a reactant in R_PUTA2, R_PROC and as a product in R_PUTA1, R_ORNTRSN).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_GLUGSAL\_c} = v_{83} + v_{86} - v_{84} - v_{85} \tag{1094}$$

7.109 Species M_ORN_c

Name ORN

This species takes part in three reactions (as a reactant in R_ORNTRSN and as a product in R_ROCF, R_ORNTP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_ORN\_c} = v_{105} + v_{321} - v_{86} \tag{1095}$$

7.110 Species M_ARG_c

Name ARG

This species takes part in five reactions (as a reactant in R_SPEA, R_ROCF, R_BIOMASS, R_DM_ARG and as a product in R_ARGTP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_ARG\_c} = v_{322} - v_{87} - v_{105} - v_{446} - v_{490} \tag{1096}$$

7.111 Species M_AGM_c

Name AGM

This species takes part in two reactions (as a reactant in R_SPEB and as a product in R_SPEA).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_AGM\_c} = v_{87} - v_{88} \tag{1097}$$

7.112 Species M_UREA_c

Name UREA

This species takes part in four reactions (as a reactant in R_UREASE and as a product in R_SPEB, R_ROCF, R_UREATP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_UREA\_c} = v_{88} + v_{105} + v_{354} - v_{364} \tag{1098}$$

7.113 Species M_PTRC_c

Name PTRC

This species takes part in four reactions (as a reactant in R_SPEE, R_BIOMASS, R_DM_PTRC and as a product in R_SPEB).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_PTRC\_c} = v_{88} - v_{90} - v_{446} - v_{491} \tag{1099}$$

7.114 Species M_DSAM_c

Name DSAM

This species takes part in two reactions (as a reactant in R_SPEE and as a product in R_SPED).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DSAM\_c} = v_{89} - v_{90} \tag{1100}$$

7.115 Species M_SPMD_c

Name SPMD

This species takes part in three reactions (as a reactant in R_BIOMASS, R_DM_SPMD and as a product in R_SPEE).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_SPMD\_c} = v_{90} - v_{446} - v_{483} \tag{1101}$$

7.116 Species M_5MTA_c

Name 5MTA

This species takes part in two reactions (as a reactant in R_MTHAKN and as a product in R_SPEE).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_5MTA\_c} = v_{90} - v_{91} \tag{1102}$$

7.117 Species M_AD_c

Name AD

This species takes part in seven reactions (as a reactant in R_APT, R_DEOD5, R_ADDM and as a product in R_MTHAKN, R_DEOD2, R_ADNUC, R_ADTP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_AD\_c} = v_{91} + v_{153} + v_{165} + v_{355} - v_{146} - v_{156} - v_{167} \tag{1103}$$

7.118 Species M_5MTR_c

Name 5MTR

This species takes part in two reactions (as a reactant in R_MTHRKN and as a product in R_MTHAKN).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_5MTR\_c} = v_{91} - v_{92} \tag{1104}$$

7.119 Species M_5MTRP_c

Name 5MTRP

This species takes part in two reactions (as a reactant in R_MTHIPIS and as a product in R_MTHRKN).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_5MTRP\_c} = v_{92} - v_{93} \tag{1105}$$

7.120 Species M_5MTR1P_c

Name 5MTR1P

This species takes part in two reactions (as a reactant in R_NE1PH and as a product in R_MTHIPIS).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_5MTR1P\_c} = v_{93} - v_{94} \tag{1106}$$

7.121 Species M_DKMPP_c

Name DKMPP

This species takes part in two reactions (as a reactant in R_NE3UNK and as a product in R_NE1PH).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DKMPP\_c} = v_{94} - v_{95} \tag{1107}$$

7.122 Species M_FOR_c

Name FOR

This species takes part in seven reactions (as a product in R_NE3UNK, R_FOLE, R_PURU, R_FMT, R_RIBA, R_RIBB, R_FORTR).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_FOR\_c} = v_{95} + v_{222} + v_{232} + v_{233} + v_{248} + v_{252} + v_{356} \tag{1108}$$

7.123 Species M_KMB_c

Name KMB

This species takes part in two reactions (as a reactant in R_TNSUNK and as a product in R_NE3UNK).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_KMB\_c} = v_{95} - v_{96} \tag{1109}$$

7.124 Species M_SLF_c

Name SLF

This species takes part in two reactions (as a reactant in R_CYSDN and as a product in R_SLFTP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_SLF\_c} = v_{365} - v_{99} \tag{1110}$$

7.125 Species M_GTP_c

Name GTP

This species takes part in seven reactions (as a reactant in R_CYSDN, R_PURA, R_FOLE, R_RIBA, R_BIOMASS, R_DM_GTP and as a product in R_NDK1).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_GTP\_c} = v_{127} - v_{99} - v_{121} - v_{222} - v_{248} - v_{446} - v_{479} \tag{1111}$$

7.126 Species M_APS_c

Name APS

This species takes part in two reactions (as a reactant in R_CYSC and as a product in R_CYSDN).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_APS\_c} = v_{99} - v_{100} \tag{1112}$$

7.127 Species M_GDP_c

Name GDP

This species takes part in five reactions (as a reactant in R_NDK1, R_NRDAB4 and as a product in R_CYSDN, R_PURA, R_GMK1).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_GDP\_c} = v_{99} + v_{121} + v_{144} - v_{127} - v_{150} \tag{1113}$$

7.128 Species M_PAPS_c

Name PAPS

This species takes part in two reactions (as a reactant in R_CYSH and as a product in R_CYSC).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_PAPS\_c} = v_{100} - v_{101} \tag{1114}$$

7.129 Species M_RTHIO_c

Name RTHIO

This species takes part in six reactions (as a reactant in R_CYSH, R_NRDAB1, R_NRDAB2, R_NRDAB3, R_NRDAB4 and as a product in R_TRXB).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_RTHIO\_c} = v_{151} - v_{101} - v_{147} - v_{148} - v_{149} - v_{150} \tag{1115}$$

7.130 Species M_OTHIO_c

Name OTHIO

This species takes part in six reactions (as a reactant in R_TRXB and as a product in R_CYSH, R_NRDAB1, R_NRDAB2, R_NRDAB3, R_NRDAB4).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_OTHIO\_c} = v_{101} + v_{147} + v_{148} + v_{149} + v_{150} - v_{151} \tag{1116}$$

7.131 Species M_H2SO3_c

Name H2SO3

This species takes part in two reactions (as a reactant in R_CYSIJ and as a product in R_CYSH).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_H2SO3\_c} = v_{101} - v_{102} \tag{1117}$$

7.132 Species M_PAP_c

Name PAP

This species takes part in three reactions (as a reactant in R_BISPHDS and as a product in R_CYSH, R_ACPS).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_PAP\_c} = v_{101} + v_{266} - v_{267} \tag{1118}$$

7.133 Species M_H2S_c

Name H2S

This species takes part in two reactions (as a reactant in R_CYSK and as a product in R_CYSIJ).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_H2S\_c} = v_{102} - v_{104} \tag{1119}$$

7.134 Species M_ASER_c

Name ASER

This species takes part in two reactions (as a reactant in R_CYSK and as a product in R_CYSE).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_ASER\_c} = v_{103} - v_{104} \tag{1120}$$

7.135 Species M_DALA_c

Name DALA

This species takes part in four reactions (as a reactant in R_DADA, R_DDLA and as a product in R_ALR, R_DALATP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DALA\_c} = v_{107} + v_{318} - v_{106} - 2v_{198} \tag{1121}$$

7.136 Species M_ALA_c

Name ALA

This species takes part in seven reactions (as a reactant in R_ALR, R_ALD, R_MURC, R_BIOF, R_BIOMASS, R_DM_ALA and as a product in R_ALATP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_ALA\_c} = v_{317} - v_{107} - v_{108} - v_{193} - v_{218} - v_{446} - v_{487} \tag{1122}$$

7.137 Species M_ASN_c

Name ASN

This species takes part in five reactions (as a reactant in R_ANSB, R_BIOMASS, R_DM_ASN and as a product in R_ASNA, R_ASNTP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_ASN\_c} = v_{109} + v_{349} - v_{110} - v_{446} - v_{470} \tag{1123}$$

7.138 Species M_CAP_c

Name CAP

This species takes part in two reactions (as a reactant in R_PYRB and as a product in R_PYRA).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_CAP\_c} = v_{111} - v_{112} \tag{1124}$$

7.139 Species M_CAASP_c

Name CAASP

This species takes part in two reactions (as a reactant in R_PYRC and as a product in R_PYRB).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_CAASP\_c} = v_{112} - v_{113} \tag{1125}$$

7.140 Species M_DOROA_c

Name DOROA

This species takes part in two reactions (as a reactant in R_PYRD and as a product in R_PYRC).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DOROA\_c} = v_{113} - v_{114} \tag{1126}$$

7.141 Species M_MK_c

Name MK

This species takes part in ten reactions (as a reactant in R_PYRD, R_DLD, R_NDH__1, R_FADOX, R_HYDA, R_BIOMASS, R_DM_MK and as a product in R_MENG, R_CBB3O, R_BC1O).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_MK\_c} = v_{292} + v_{339} + v_{340} - v_{114} - v_{314} - v_{337} - v_{338} - v_{341} - v_{446} - v_{486} \tag{1127}$$

7.142 Species M_MKH2_c

Name MKH2

This species takes part in seven reactions (as a reactant in R_CBB3O, R_BC1O and as a product in R_PYRD, R_DLD, R_NDH__1, R_FADOX, R_HYDA).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_MKH2\_c} = v_{114} + v_{314} + v_{337} + v_{338} + v_{341} - v_{339} - v_{340} \tag{1128}$$

7.143 Species M_OROA_c

Name OROA

This species takes part in three reactions (as a reactant in R_PYRE and as a product in R_PYRD, R_OROATP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_OROA\_c} = v_{114} + v_{360} - v_{115} \tag{1129}$$

7.144 Species M_OMP_c

Name OMP

This species takes part in two reactions (as a reactant in R_PYRF and as a product in R_PYRE).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_OMP\_c} = v_{115} - v_{116} \tag{1130}$$

7.145 Species M_UMP_c

Name UMP

This species takes part in five reactions (as a reactant in R_PYRH and as a product in R_PYRF, R_UPP, R_MRAY, R_USHA12).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_UMP\_c} = v_{116} + v_{120} + v_{199} + v_{204} - v_{117} \tag{1131}$$

7.146 Species M_UDP_c

Name UDP

This species takes part in six reactions (as a reactant in R_NDK2, R_NRDAB2 and as a product in R_PYRH, R_MURG, R_LPXB, R_LPSSYN).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_UDP\_c} = v_{117} + v_{200} + v_{205} + 2v_{217} - v_{128} - v_{148} \tag{1132}$$

7.147 Species M_CMP_c

Name CMP

This species takes part in eight reactions (as a reactant in R_CMKA, R_PAPHTSE and as a product in R_CDH, R_PSSA, R_PGSA2, R_KDTA1, R_LPSSYN, R_PCLIG).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_CMP\_c} = v_{182} + v_{183} + v_{185} + v_{207} + 3v_{217} + v_{262} - v_{118} - v_{215} \tag{1133}$$

7.148 Species M_CDP_c

Name CDP

This species takes part in four reactions (as a reactant in R_NDK3, R_NRDAB1 and as a product in R_CMKA, R_LPSSYN).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_CDP\_c} = v_{118} + 2v_{217} - v_{129} - v_{147} \tag{1134}$$

7.149 Species M_UTP_c

Name UTP

This species takes part in six reactions (as a reactant in R_PYRG, R_GLMU, R_GALU, R_BIOMASS, R_DM_UTP and as a product in R_NDK2).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_UTP\_c} = v_{128} - v_{119} - v_{190} - v_{303} - v_{446} - v_{480} \tag{1135}$$

7.150 Species M_CTP_c

Name CTP

This species takes part in seven reactions (as a reactant in R_CDSA, R_KDSB, R_PCLIG, R_BIOMASS, R_DM_CTP and as a product in R_PYRG, R_NDK3).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_CTP\_c} = v_{119} + v_{129} - v_{181} - v_{214} - v_{262} - v_{446} - v_{450} \tag{1136}$$

7.151 Species M_URA_c

Name URA

This species takes part in three reactions (as a reactant in R_UPP and as a product in R_DEOD8, R_URATP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_URA\_c} = v_{159} + v_{361} - v_{120} \tag{1137}$$

7.152 Species M_IMP_c

Name IMP

This species takes part in four reactions (as a reactant in R_PURA, R_GUAB and as a product in R_GUAC, R_GPT2).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_IMP\_c} = v_{125} + v_{161} - v_{121} - v_{123} \tag{1138}$$

7.153 Species M_ASUC_c

Name ASUC

This species takes part in two reactions (as a reactant in R_PURB and as a product in R_PURA).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_ASUC\_c} = v_{121} - v_{122} \tag{1139}$$

7.154 Species M_XMP_c

Name XMP

This species takes part in three reactions (as a reactant in R_GUAA and as a product in R_GUAB, R_GPT1).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_XMP\_c} = v_{123} + v_{160} - v_{124} \tag{1140}$$

7.155 Species M_GMP_c

Name GMP

This species takes part in four reactions (as a reactant in R_GUAC, R_GMK1 and as a product in R_GUAA, R_GPT3).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_GMP\_c} = v_{124} + v_{162} - v_{125} - v_{144} \tag{1141}$$

7.156 Species M_PRAM_c

Name PRAM

This species takes part in one reaction (as a reactant in R_PURD).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_PRAM\_c} = -v_{126} \tag{1142}$$

7.157 Species M_GAR_c

Name GAR

This species takes part in one reaction (as a product in R_PURD).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_GAR\_c} = v_{126} \tag{1143}$$

7.158 Species M_DGDP_c

Name DGDP

This species takes part in three reactions (as a reactant in R_NDK4 and as a product in R_GMK2, R_NRDAB4).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DGDP\_c} = v_{145} + v_{150} - v_{130} \tag{1144}$$

7.159 Species M_DGTP_c

Name DGTP

This species takes part in three reactions (as a reactant in R_BIOMASS, R_DM_DGTP and as a product in R_NDK4).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DGTP\_c} = v_{130} - v_{446} - v_{452} \tag{1145}$$

7.160 Species M_DUDP_c

Name DUDP

This species takes part in three reactions (as a reactant in R_NDK5 and as a product in R_TMK2, R_NRDAB2).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DUDP\_c} = v_{139} + v_{148} - v_{131} \tag{1146}$$

7.161 Species M_DUTP_c

Name DUTP

This species takes part in three reactions (as a reactant in R_DUT and as a product in R_NDK5, R_DCD).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DUTP\_c} = v_{131} + v_{140} - v_{141} \tag{1147}$$

7.162 Species M_DCDP_c

Name DCDP

This species takes part in two reactions (as a reactant in R_NDK6 and as a product in R_NRDAB1).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DCDP\_c} = v_{147} - v_{132} \tag{1148}$$

7.163 Species M_DCTP_c

Name DCTP

This species takes part in four reactions (as a reactant in R_DCD, R_BIOMASS, R_DM_DCTP and as a product in R_NDK6).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DCTP\_c} = v_{132} - v_{140} - v_{446} - v_{472} \tag{1149}$$

7.164 Species M_DADP_c

Name DADP

This species takes part in three reactions (as a reactant in R_NDK7 and as a product in R_ADK2, R_NRDAB3).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DADP\_c} = v_{143} + v_{149} - v_{133} \tag{1150}$$

7.165 Species M_DATP_c

Name DATP

This species takes part in three reactions (as a reactant in R_BIOMASS, R_DM_DATP and as a product in R_NDK7).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DATP\_c} = v_{133} - v_{446} - v_{453} \tag{1151}$$

7.166 Species M_DTDP_c

Name DTDP

This species takes part in two reactions (as a reactant in R_NDK8 and as a product in R_TMK1).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DTDP\_c} = v_{138} - v_{134} \tag{1152}$$

7.167 Species M_DTTP_c

Name DTTP

This species takes part in three reactions (as a reactant in R_BIOMASS, R_DM_DTTP and as a product in R_NDK8).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DTTP\_c} = v_{134} - v_{446} - v_{447} \tag{1153}$$

7.168 Species M_DUMP_c

Name DUMP

This species takes part in four reactions (as a reactant in R_THYA, R_TMK2 and as a product in R_TDK2, R_DUT).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DUMP\_c} = v_{137} + v_{141} - v_{135} - v_{139} \tag{1154}$$

7.169 Species M_DHF_c

Name DHF

This species takes part in three reactions (as a reactant in R_FOLA and as a product in R_THYA, R_FOLC).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DHF\_c} = v_{135} + v_{230} - v_{231} \tag{1155}$$

7.170 Species M_DTMP_c

Name DTMP

This species takes part in three reactions (as a reactant in R_TMK1 and as a product in R_THYA, R_TDK1).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DTMP\_c} = v_{135} + v_{136} - v_{138} \tag{1156}$$

7.171 Species M_DT_c

Name DT

This species takes part in two reactions (as a reactant in R_TDK1 and as a product in R_NUPCTP4).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DT\_c} = v_{331} - v_{136} \tag{1157}$$

7.172 Species M_DU_c

Name DU

This species takes part in three reactions (as a reactant in R_TDK2, R_DEOD8 and as a product in R_NUPCTP7).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DU\_c} = v_{334} - v_{137} - v_{159} \tag{1158}$$

7.173 Species M_DAMP_c

Name DAMP

This species takes part in one reaction (as a reactant in R_ADK2).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DAMP\_c} = -v_{143} \tag{1159}$$

7.174 Species M_DGMP_c

Name DGMP

This species takes part in one reaction (as a reactant in R_GMK2).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DGMP\_c} = -v_{145} \tag{1160}$$

7.175 Species M_DIN_c

Name DIN

This species takes part in one reaction (as a reactant in R_DEOD1).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DIN\_c} = -v_{152} \tag{1161}$$

7.176 Species M_HYXN_c

Name HYXN

This species takes part in five reactions (as a reactant in R_DEOD4, R_GPT2 and as a product in R_DEOD1, R_ADDM, R_HYXNTP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_HYXN\_c} = v_{152} + v_{167} + v_{359} - v_{155} - v_{161} \tag{1162}$$

7.177 Species M_DR1P_c

Name DR1P

This species takes part in five reactions (as a reactant in R_DEOB1 and as a product in R_DEOD1, R_DEOD2, R_DEOD3, R_DEOD8).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DR1P\_c} = v_{152} + v_{153} + v_{154} + v_{159} - v_{163} \tag{1163}$$

7.178 Species M_DA_c

Name DA

This species takes part in three reactions (as a reactant in R_DEOD2 and as a product in R_BIOB, R_NUPCTP5).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DA\_c} = 2v_{221} + v_{332} - v_{153} \tag{1164}$$

7.179 Species M_DG_c

Name DG

This species takes part in one reaction (as a reactant in R_DEOD3).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DG\_c} = -v_{154} \tag{1165}$$

7.180 Species M_GN_c

Name GN

This species takes part in five reactions (as a reactant in R_DEOD6, R_GPT3 and as a product in R_DEOD3, R_GNNUC, R_GNTP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_GN\_c} = v_{154} + v_{166} + v_{357} - v_{157} - v_{162} \tag{1166}$$

7.181 Species M_R1P_c

Name R1P

This species takes part in five reactions (as a reactant in R_DEOD4, R_DEOD5, R_DEOD6, R_DEOD7, R_DEOB2).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_R1P\_c} = -v_{155} - v_{156} - v_{157} - v_{158} - v_{164} \tag{1167}$$

7.182 Species M_INS_c

Name INS

This species takes part in one reaction (as a product in R_DEOD4).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_INS\_c} = v_{155} \tag{1168}$$

7.183 Species M_GSN_c

Name GSN

This species takes part in three reactions (as a reactant in R_GNNUC and as a product in R_DEOD6, R_GSNTP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_GSN\_c} = v_{157} + v_{358} - v_{166} \tag{1169}$$

7.184 Species M_XAN_c

Name XAN

This species takes part in two reactions (as a reactant in R_DEOD7, R_GPT1).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_XAN\_c} = -v_{158} - v_{160} \tag{1170}$$

7.185 Species M_XTSN_c

Name XTSN

This species takes part in one reaction (as a product in R_DEOD7).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_XTSN\_c} = v_{158} \tag{1171}$$

7.186 Species M_DR5P_c

Name DR5P

This species takes part in one reaction (as a product in R_DEOB1).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DR5P\_c} = v_{163} \tag{1172}$$

7.187 Species M_RIB_c

Name RIB

This species takes part in two reactions (as a product in R_ADNUC, R_GNNUC).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_RIB\_c} = v_{165} + v_{166} \tag{1173}$$

7.188 Species M_MALCOA_c

Name MALCOA

This species takes part in two reactions (as a reactant in R_FABD and as a product in R_ACCABCD).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_MALCOA\_c} = v_{168} - v_{169} \tag{1174}$$

7.189 Species M_ACP_c

Name ACP

This species takes part in 17 reactions (as a reactant in R_FABD, R_FABH1, R_BIOMASS, R_DM_ACP and as a product in R_FABF, R_C120SN, R_C140SN, R_C141SY, R_C160SN, R_C161SY, R_C181SY, R_PLS, R_LPXA, R_LPXD, R_HTRB, R_MSBB, R_ACPS).

$$\begin{aligned}\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_ACP\_c} = {} & v_{172} + 4v_{173} + 5v_{174} + 5v_{175} + 6v_{176} + 6v_{177} + 7v_{178} + 2v_{180} \\ & + v_{201} + v_{203} + 2v_{209} + 2v_{210} + v_{266} - v_{169} - v_{170} - v_{446} - v_{456}\end{aligned} \tag{1175}$$

7.190 Species M_MALACP_c

Name MALACP

This species takes part in nine reactions (as a reactant in R_FABH2, R_FABF, R_C120SN, R_C140SN, R_C141SY, R_C160SN, R_C161SY, R_C181SY and as a product in R_FABD).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_MALACP\_c} = v_{169} - v_{171} - v_{172} - 4v_{173} - 5v_{174} - 5v_{175} - 6v_{176} - 6v_{177} - 7v_{178} \tag{1176}$$

7.191 Species M_ACACP_c

Name ACACP

This species takes part in two reactions (as a reactant in R_FABF and as a product in R_FABH1).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_ACACP\_c} = v_{170} - v_{172} \tag{1177}$$

7.192 Species M_ACTACP_c

Name ACTACP

This species takes part in eight reactions (as a reactant in R_C120SN, R_C140SN, R_C141SY, R_C160SN, R_C161SY, R_C181SY and as a product in R_FABH2, R_FABF).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_ACTACP\_c} = v_{171} + v_{172} - v_{173} - v_{174} - v_{175} - v_{176} - v_{177} - v_{178} \tag{1178}$$

7.193 Species M_C120ACP_c

Name C120ACP

This species takes part in three reactions (as a reactant in R_HTRB, R_MSBB and as a product in R_C120SN).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_C120ACP\_c} = v_{173} - v_{209} - v_{210} \tag{1179}$$

7.194 Species M_C140ACP_c

Name C140ACP

This species takes part in six reactions (as a reactant in R_PLS, R_LPXA, R_LPXD, R_HTRB, R_MSBB and as a product in R_C140SN).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_C140ACP\_c} = v_{174} - 0.035v_{180} - v_{201} - v_{203} - v_{209} - v_{210} \tag{1180}$$

7.195 Species M_C141ACP_c

Name C141ACP

This species takes part in two reactions (as a reactant in R_PLS and as a product in R_C141SY).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_C141ACP\_c} = v_{175} - 0.102v_{180} \tag{1181}$$

7.196 Species M_C160ACP_c

Name C160ACP

This species takes part in two reactions (as a reactant in R_PLS and as a product in R_C160SN).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_C160ACP\_c} = v_{176} - 0.717v_{180} \tag{1182}$$

7.197 Species M_C161ACP_c

Name C161ACP

This species takes part in two reactions (as a reactant in R_PLS and as a product in R_C161SY).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_C161ACP\_c} = v_{177} - 0.142v_{180} \tag{1183}$$

7.198 Species M_C181ACP_c

Name C181ACP

This species takes part in two reactions (as a reactant in R_PLS and as a product in R_C181SY).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_C181ACP\_c} = v_{178} - 1.004 v_{180} \tag{1184}$$

7.199 Species M_GL3P_c

Name GL3P

This species takes part in three reactions (as a reactant in R_GPSA, R_PLS, R_PGSA2).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_GL3P\_c} = -v_{179} - v_{180} - v_{185} \tag{1185}$$

7.200 Species M_PA_c

Name PA

This species takes part in four reactions (as a reactant in R_CDSA and as a product in R_PLS, R_CDH, R_DGKA).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_PA\_c} = v_{180} + v_{182} + v_{187} - v_{181} \tag{1186}$$

7.201 Species M_CDPDG_c

Name CDPDG

This species takes part in four reactions (as a reactant in R_CDH, R_PSSA, R_PGSA2 and as a product in R_CDSA).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_CDPDG\_c} = v_{181} - v_{182} - v_{183} - v_{185} \tag{1187}$$

7.202 Species M_PS_c

Name PS

This species takes part in four reactions (as a reactant in R_PSD, R_BIOMASS, R_DM_PS and as a product in R_PSSA).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_PS\_c} = v_{183} - v_{184} - v_{446} - v_{462} \tag{1188}$$

7.203 Species M_PE_c

Name PE

This species takes part in four reactions (as a reactant in R_PAPHTSE, R_BIOMASS, R_DM_PE and as a product in R_PSD).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_PE\_c} = v_{184} - v_{215} - v_{446} - v_{475} \tag{1189}$$

7.204 Species M_PGP_c

Name PGP

This species takes part in two reactions (as a reactant in R_PGPP and as a product in R_PGSA2).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_PGP\_c} = v_{185} - v_{186} \tag{1190}$$

7.205 Species M_PG_c

Name PG

This species takes part in three reactions (as a reactant in R_BIOMASS, R_DM_PG and as a product in R_PGPP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_PG\_c} = v_{186} - v_{446} - v_{468} \tag{1191}$$

7.206 Species M_DGR_c

Name DGR

This species takes part in two reactions (as a reactant in R_DGKA and as a product in R_PAPHTSE).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DGR\_c} = v_{215} - v_{187} \tag{1192}$$

7.207 Species M_GA6P_c

Name GA6P

This species takes part in two reactions (as a reactant in R_GLMM and as a product in R_GLMS).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_GA6P\_c} = v_{188} - v_{189} \tag{1193}$$

7.208 Species M_GA1P_c

Name GA1P

This species takes part in two reactions (as a reactant in R_GLMU and as a product in R_GLMM).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_GA1P\_c} = v_{189} - v_{190} \tag{1194}$$

7.209 Species M_UDPNAG_c

Name UDPNAG

This species takes part in four reactions (as a reactant in R_MURZ, R_MURG, R_LPXA and as a product in R_GLMU).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_UDPNAG\_c} = v_{190} - v_{191} - v_{200} - v_{201} \tag{1195}$$

7.210 Species M_UDPNAGEP_c

Name UDPNAGEP

This species takes part in two reactions (as a reactant in R_MURB and as a product in R_MURZ).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_UDPNAGEP\_c} = v_{191} - v_{192} \tag{1196}$$

7.211 Species M_UDPNAM_c

Name UDPNAM

This species takes part in two reactions (as a reactant in R_MURC and as a product in R_MURB).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_UDPNAM\_c} = v_{192} - v_{193} \tag{1197}$$

7.212 Species M_UDPNAMA_c

Name UDPNAMA

This species takes part in two reactions (as a reactant in R_MURD and as a product in R_MURC).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_UDPNAMA\_c} = v_{193} - v_{194} \tag{1198}$$

7.213 Species M_DGLU_c

Name DGLU

This species takes part in two reactions (as a reactant in R_MURD and as a product in R_GLR).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DGLU\_c} = v_{197} - v_{194} \tag{1199}$$

7.214 Species M_UDPNAMAG_c

Name UDPNAMAG

This species takes part in two reactions (as a reactant in R_MURE and as a product in R_MURD).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_UDPNAMAG\_c} = v_{194} - v_{195} \tag{1200}$$

7.215 Species M_UNAGD_c

Name UNAGD

This species takes part in two reactions (as a reactant in R_MURF and as a product in R_MURE).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_UNAGD\_c} = v_{195} - v_{196} \tag{1201}$$

7.216 Species M_AA_c

Name AA

This species takes part in two reactions (as a reactant in R_MURF and as a product in R_DDLA).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_AA\_c} = v_{198} - v_{196} \tag{1202}$$

7.217 Species M_UNAGDA_c

Name UNAGDA

This species takes part in two reactions (as a reactant in R_MRAY and as a product in R_MURF).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_UNAGDA\_c} = v_{196} - v_{199} \tag{1203}$$

7.218 Species M_UNPTDO_c

Name UNPTDO

This species takes part in two reactions (as a reactant in R_MURG and as a product in R_MRAY).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_UNPTDO\_c} = v_{199} - v_{200} \tag{1204}$$

7.219 Species M_PEPTIDO_c

Name PEPTIDO

This species takes part in three reactions (as a reactant in R_BIOMASS, R_DM_PEPTIDO and as a product in R_MURG).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_PEPTIDO\_c} = v_{200} - v_{446} - v_{467} \tag{1205}$$

7.220 Species M_UDPG2AA_c

Name UDPG2AA

This species takes part in two reactions (as a reactant in R_ENVA and as a product in R_LPXA).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_UDPG2AA\_c} = v_{201} - v_{202} \tag{1206}$$

7.221 Species M_UDPG2A_c

Name UDPG2A

This species takes part in two reactions (as a reactant in R_LPXD and as a product in R_ENVA).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_UDPG2A\_c} = v_{202} - v_{203} \tag{1207}$$

7.222 Species M_UDPG23A_c

Name UDPG23A

This species takes part in three reactions (as a reactant in R_USHA12, R_LPXB and as a product in R_LPXD).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_UDPG23A\_c} = v_{203} - v_{204} - v_{205} \tag{1208}$$

7.223 Species M_LIPX_c

Name LIPX

This species takes part in two reactions (as a reactant in R_LPXB and as a product in R_USHA12).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_LIPX\_c} = v_{204} - v_{205} \tag{1209}$$

7.224 Species M_DISAC1P_c

Name DISAC1P

This species takes part in two reactions (as a reactant in R_LPXK and as a product in R_LPXB).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DISAC1P\_c} = v_{205} - v_{206} \tag{1210}$$

7.225 Species M_LIPIV_c

Name LIPIV

This species takes part in two reactions (as a reactant in R_KDTA1 and as a product in R_LPXK).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_LIPIV\_c} = v_{206} - v_{207} \tag{1211}$$

7.226 Species M_CMPKDO_c

Name CMPKDO

This species takes part in three reactions (as a reactant in R_KDTA1, R_LPSSYN and as a product in R_KDSB).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_CMPKDO\_c} = v_{214} - v_{207} - 3v_{217} \tag{1212}$$

7.227 Species M_KDOLIPIV_c

Name KDOLIPIV

This species takes part in two reactions (as a reactant in R_KDOLIPH and as a product in R_KDTA1).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_KDOLIPIV\_c} = v_{207} - v_{208} \tag{1213}$$

7.228 Species M_KDOLIPVP_c

Name KDOLIPVP

This species takes part in three reactions (as a reactant in R_HTRB, R_MSBB and as a product in R_KDOLIPH).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_KDOLIPVP\_c} = v_{208} - v_{209} - v_{210} \tag{1214}$$

7.229 Species M_LIPA_c

Name LIPA

This species takes part in three reactions (as a reactant in R_LPSSYN and as a product in R_HTRB, R_MSBB).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_LIPA\_c} = v_{209} + v_{210} - v_{217} \tag{1215}$$

7.230 Species M_A5P_c

Name A5P

This species takes part in two reactions (as a reactant in R_KDSA and as a product in R_A5PISO).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_A5P\_c} = v_{211} - v_{212} \tag{1216}$$

7.231 Species M_KDOP_c

Name KDOP

This species takes part in two reactions (as a reactant in R_KDOPH and as a product in R_KDSA).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_KDOP\_c} = v_{212} - v_{213} \tag{1217}$$

7.232 Species M_KDO_c

Name KDO

This species takes part in two reactions (as a reactant in R_KDSB and as a product in R_KDOPH).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_KDO\_c} = v_{213} - v_{214} \tag{1218}$$

7.233 Species M_CDPETN_c

Name CDPETN

This species takes part in two reactions (as a reactant in R_LPSSYN and as a product in R_PAPHTSE).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_CDPETN\_c} = v_{215} - 2v_{217} \tag{1219}$$

7.234 Species M_ADPHEP_c

Name ADPHEP

This species takes part in two reactions (as a reactant in R_LPSSYN and as a product in R_GMHA).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_ADPHEP\_c} = v_{216} - 3v_{217} \tag{1220}$$

7.235 Species M_UDPG_c

Name UDPG

This species takes part in three reactions (as a reactant in R_LPSSYN and as a product in R_GALE, R_GALU).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_UDPG\_c} = v_{302} + v_{303} - 2v_{217} \tag{1221}$$

7.236 Species M_LPS_c

Name LPS

This species takes part in three reactions (as a reactant in R_BIOMASS, R_DM_LPS and as a product in R_LPSSYN).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_LPS\_c} = v_{217} - v_{446} - v_{476} \tag{1222}$$

7.237 Species M_CHCOA_c

Name CHCOA

This species takes part in one reaction (as a reactant in R_BIOF).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_CHCOA\_c} = -v_{218} \tag{1223}$$

7.238 Species M_AONA_c

Name AONA

This species takes part in two reactions (as a reactant in R_BIOA and as a product in R_BIOF).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_AONA\_c} = v_{218} - v_{219} \tag{1224}$$

7.239 Species M_SAMOB_c

Name SAMOB

This species takes part in one reaction (as a product in R_BIOA).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_SAMOB\_c} = v_{219} \tag{1225}$$

7.240 Species M_DANNA_c

Name DANNA

This species takes part in two reactions (as a reactant in R_BIOD and as a product in R_BIOA).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DANNA\_c} = v_{219} - v_{220} \tag{1226}$$

7.241 Species M_DTB_c

Name DTB

This species takes part in two reactions (as a reactant in R_BIOB and as a product in R_BIOD).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DTB\_c} = v_{220} - v_{221} \tag{1227}$$

7.242 Species M_BT_c

Name BT

This species takes part in one reaction (as a product in R_BIOB).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_BT\_c} = v_{221} \tag{1228}$$

7.243 Species M_AHTD_c

Name AHTD

This species takes part in two reactions (as a reactant in R_DNTPH and as a product in R_FOLE).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_AHTD\_c} = v_{222} - v_{223} \tag{1229}$$

7.244 Species M_DHPP_c

Name DHPP

This species takes part in two reactions (as a reactant in R_DHPPH and as a product in R_DNTPH).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DHPP\_c} = v_{223} - v_{224} \tag{1230}$$

7.245 Species M_DHP_c

Name DHP

This species takes part in two reactions (as a reactant in R_FOLB and as a product in R_DHPPH).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DHP\_c} = v_{224} - v_{225} \tag{1231}$$

7.246 Species M_AHHMP_c

Name AHHMP

This species takes part in two reactions (as a reactant in R_FOLK and as a product in R_FOLB).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_AHHMP\_c} = v_{225} - v_{226} \tag{1232}$$

7.247 Species M_GLAL_c

Name GLAL

This species takes part in three reactions (as a reactant in R_GLLDH, R_GLALTP and as a product in R_FOLB).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_GLAL\_c} = v_{225} - v_{379} - v_{380} \tag{1233}$$

7.248 Species M_AHHMD_c

Name AHHMD

This species takes part in two reactions (as a reactant in R_FOLP and as a product in R_FOLK).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_AHHMD\_c} = v_{226} - v_{229} \tag{1234}$$

7.249 Species M_ADCHOR_c

Name ADCHOR

This species takes part in two reactions (as a reactant in R_PABC and as a product in R_PABB).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_ADCHOR\_c} = v_{227} - v_{228} \tag{1235}$$

7.250 Species M_PABA_c

Name PABA

This species takes part in two reactions (as a reactant in R_FOLP and as a product in R_PABC).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_PABA\_c} = v_{228} - v_{229} \tag{1236}$$

7.251 Species M_DHPT_c

Name DHPT

This species takes part in two reactions (as a reactant in R_FOLC and as a product in R_FOLP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DHPT\_c} = v_{229} - v_{230} \tag{1237}$$

7.252 Species M_FTHF_c

Name FTHF

This species takes part in three reactions (as a reactant in R_PURU, R_FMT and as a product in R_FOLD2).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_FTHF\_c} = v_{235} - v_{232} - v_{233} \tag{1238}$$

7.253 Species M_METHF_c

Name METHF

This species takes part in two reactions (as a reactant in R_FOLD2 and as a product in R_FOLD1).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_METHF\_c} = v_{234} - v_{235} \tag{1239}$$

7.254 Species M_GTRNA_c

Name GTRNA

This species takes part in two reactions (as a reactant in R_HEMA and as a product in R_GLTX).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_GTRNA\_c} = v_{237} - v_{238} \tag{1240}$$

7.255 Species M_GSA_c

Name GSA

This species takes part in two reactions (as a reactant in R_HEML and as a product in R_HEMA).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_GSA\_c} = v_{238} - v_{239} \tag{1241}$$

7.256 Species M_ALAV_c

Name ALAV

This species takes part in two reactions (as a reactant in R_HEMB and as a product in R_HEML).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_ALAV\_c} = v_{239} - 8v_{240} \tag{1242}$$

7.257 Species M_PBG_c

Name PBG

This species takes part in two reactions (as a reactant in R_HEMC and as a product in R_HEMB).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_PBG\_c} = 4v_{240} - 4v_{241} \tag{1243}$$

7.258 Species M_HMB_c

Name HMB

This species takes part in two reactions (as a reactant in R_HEMD and as a product in R_HEMC).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_HMB\_c} = v_{241} - v_{242} \tag{1244}$$

7.259 Species M_UPRG_c

Name UPRG

This species takes part in two reactions (as a reactant in R_HEME and as a product in R_HEMD).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_UPRG\_c} = v_{242} - v_{243} \tag{1245}$$

7.260 Species M_CPP_c

Name CPP

This species takes part in two reactions (as a reactant in R_HEMF and as a product in R_HEME).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_CPP\_c} = v_{243} - v_{244} \tag{1246}$$

7.261 Species M_O2_c

Name O2

This species takes part in seven reactions (as a reactant in R_HEMF, R_HEMG, R_CBB3O, R_BC1O, R_GLCD and as a product in R_O2TP, R_KATA).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_O2\_c} = v_{352} + v_{381} - v_{244} - v_{245} - 0.5v_{339} - 0.5v_{340} - v_{378} \tag{1247}$$

7.262 Species M_PPHG_c

Name PPHG

This species takes part in two reactions (as a reactant in R_HEMG and as a product in R_HEMF).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_PPHG\_c} = v_{244} - v_{245} \tag{1248}$$

7.263 Species M_PPIX_c

Name PPIX

This species takes part in two reactions (as a reactant in R_HEMH and as a product in R_HEMG).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_PPIX\_c} = v_{245} - v_{246} \tag{1249}$$

7.264 Species M_PTH_c

Name PTH

This species takes part in three reactions (as a reactant in R_BIOMASS, R_DM_PTH and as a product in R_HEMH).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_PTH\_c} = v_{246} - v_{446} - v_{465} \tag{1250}$$

7.265 Species M_4HBZ_c

Name 4HBZ

This species takes part in one reaction (as a reactant in R_UBIA).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_4HBZ\_c} = -v_{247} \tag{1251}$$

7.266 Species M_OPP_c

Name OPP

This species takes part in five reactions (as a reactant in R_UBIA, R_MENA, R_BIOMASS, R_DM_OPP and as a product in R_ISPB).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_OPP\_c} = v_{272} - v_{247} - v_{291} - v_{446} - v_{484} \tag{1252}$$

7.267 Species M_O4HBZ_c

Name O4HBZ

This species takes part in one reaction (as a product in R_UBIA).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_O4HBZ\_c} = v_{247} \tag{1253}$$

7.268 Species M_D6RP5P_c

Name D6RP5P

This species takes part in two reactions (as a reactant in R_RIBD1 and as a product in R_RIBA).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_D6RP5P\_c} = v_{248} - v_{249} \tag{1254}$$

7.269 Species M_A6RP5P_c

Name A6RP5P

This species takes part in two reactions (as a reactant in R_RIBD2 and as a product in R_RIBD1).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_A6RP5P\_c} = v_{249} - v_{250} \tag{1255}$$

7.270 Species M_A6RP5P2_c

Name A6RP5P2

This species takes part in two reactions (as a reactant in R_PMDPHT and as a product in R_RIBD2).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_A6RP5P2\_c} = v_{250} - v_{251} \tag{1256}$$

7.271 Species M_A6RP_c

Name A6RP

This species takes part in three reactions (as a reactant in R_RIBE and as a product in R_PMDPHT, R_RIBC).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_A6RP\_c} = v_{251} + v_{254} - v_{253} \tag{1257}$$

7.272 Species M_DB4P_c

Name DB4P

This species takes part in two reactions (as a reactant in R_RIBE and as a product in R_RIBB).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DB4P\_c} = v_{252} - v_{253} \tag{1258}$$

7.273 Species M_D8RL_c

Name D8RL

This species takes part in two reactions (as a reactant in R_RIBC and as a product in R_RIBE).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_D8RL\_c} = v_{253} - 2v_{254} \tag{1259}$$

7.274 Species M_RIBFLV_c

Name RIBFLV

This species takes part in two reactions (as a reactant in R_RIBF1 and as a product in R_RIBC).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_RIBFLV\_c} = v_{254} - v_{255} \tag{1260}$$

7.275 Species M_FMN_c

Name FMN

This species takes part in two reactions (as a reactant in R_RIBF2 and as a product in R_RIBF1).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_FMN\_c} = v_{255} - v_{256} \tag{1261}$$

7.276 Species M_AKP_c

Name AKP

This species takes part in two reactions (as a reactant in R_ILVC3 and as a product in R_PANB).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_AKP\_c} = v_{257} - v_{258} \tag{1262}$$

7.277 Species M_PANT_c

Name PANT

This species takes part in two reactions (as a reactant in R_PANC and as a product in R_ILVC3).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_PANT\_c} = v_{258} - v_{260} \tag{1263}$$

7.278 Species M_bALA_c

Name bALA

This species takes part in two reactions (as a reactant in R_PANC and as a product in R_PAND).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_bALA\_c} = v_{259} - v_{260} \tag{1264}$$

7.279 Species M_PNTO_c

Name PNTO

This species takes part in two reactions (as a reactant in R_COAA and as a product in R_PANC).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_PNTO\_c} = v_{260} - v_{261} \tag{1265}$$

7.280 Species M_4PPNTO_c

Name 4PPNTO

This species takes part in two reactions (as a reactant in R_PCLIG and as a product in R_COAA).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_4PPNTO\_c} = v_{261} - v_{262} \tag{1266}$$

7.281 Species M_4PPNCYS_c

Name 4PPNCYS

This species takes part in two reactions (as a reactant in R_PCDCL and as a product in R_PCLIG).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_4PPNCYS\_c} = v_{262} - v_{263} \tag{1267}$$

7.282 Species M_4PPNTE_c

Name 4PPNTE

This species takes part in two reactions (as a reactant in R_PATRAN and as a product in R_PCDCL).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_4PPNTE\_c} = v_{263} - v_{264} \tag{1268}$$

7.283 Species M_DPCOA_c

Name DPCOA

This species takes part in two reactions (as a reactant in R_DPHCOAK and as a product in R_PATRAN).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DPCOA\_c} = v_{264} - v_{265} \tag{1269}$$

7.284 Species M_IPPP_c

Name IPPP

This species takes part in six reactions (as a reactant in R_IPPPISO, R_ISPA1, R_ISPA2, R_ISPB, R_UPPS and as a product in R_IPPPSYN).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_IPPP\_c} = v_{268} - v_{269} - v_{270} - v_{271} - 5v_{272} - 8v_{273} \tag{1270}$$

7.285 Species M_DMPP_c

Name DMPP

This species takes part in two reactions (as a reactant in R_ISPA1 and as a product in R_IPPPISO).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DMPP\_c} = v_{269} - v_{270} \tag{1271}$$

7.286 Species M_GPP_c

Name GPP

This species takes part in two reactions (as a reactant in R_ISPA2 and as a product in R_ISPA1).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_GPP\_c} = v_{270} - v_{271} \tag{1272}$$

7.287 Species M_FPP_c

Name FPP

This species takes part in three reactions (as a reactant in R_ISPB, R_UPPS and as a product in R_ISPA2).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_FPP\_c} = v_{271} - v_{272} - v_{273} \tag{1273}$$

7.288 Species M_UDPP_c

Name UDPP

This species takes part in three reactions (as a reactant in R_BIOMASS, R_DM_UDPP and as a product in R_UPPS).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_UDPP\_c} = v_{273} - v_{446} - v_{469} \tag{1274}$$

7.289 Species M_ISUCC_c

Name ISUCC

This species takes part in two reactions (as a reactant in R_NADA and as a product in R_NADB).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_ISUCC\_c} = v_{274} - v_{275} \tag{1275}$$

7.290 Species M_QA_c

Name QA

This species takes part in two reactions (as a reactant in R_NADC and as a product in R_NADA).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_QA\_c} = v_{275} - v_{276} \tag{1276}$$

7.291 Species M_NAMN_c

Name NAMN

This species takes part in two reactions (as a reactant in R_NADD and as a product in R_NADC).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_NAMN\_c} = v_{276} - v_{277} \tag{1277}$$

7.292 Species M_NAAD_c

Name NAAD

This species takes part in two reactions (as a reactant in R_NADE and as a product in R_NADD).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_NAAD\_c} = v_{277} - v_{278} \tag{1278}$$

7.293 Species M_THZ_c

Name THZ

This species takes part in two reactions (as a reactant in R_THIM and as a product in R_THIF).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_THZ\_c} = v_{284} - v_{280} \tag{1279}$$

7.294 Species M_THZP_c

Name THZP

This species takes part in two reactions (as a reactant in R_THIB and as a product in R_THIM).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_THZP\_c} = v_{280} - v_{283} \tag{1280}$$

7.295 Species M_DTP_c

Name DTP

This species takes part in two reactions (as a reactant in R_THIF and as a product in R_UNKRXN1).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DTP\_c} = v_{281} - v_{284} \tag{1281}$$

7.296 Species M_AHMP_c

Name AHMP

This species takes part in one reaction (as a reactant in R_THID).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_AHMP\_c} = -v_{282} \tag{1282}$$

7.297 Species M_AHMPP_c

Name AHMPP

This species takes part in two reactions (as a reactant in R_THIB and as a product in R_THID).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_AHMPP\_c} = v_{282} - v_{283} \tag{1283}$$

7.298 Species M_THMP_c

Name THMP

This species takes part in one reaction (as a product in R_THIB).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_THMP\_c} = v_{283} \tag{1284}$$

7.299 Species M_HBA_c

Name HBA

This species takes part in one reaction (as a product in R_THIF).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_HBA\_c} = v_{284} \tag{1285}$$

7.300 Species M_ICHOR_c

Name ICHOR

This species takes part in two reactions (as a reactant in R_MEND2 and as a product in R_MENF).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_ICHOR\_c} = v_{285} - v_{287} \tag{1286}$$

7.301 Species M_TPP_c

Name TPP

This species takes part in two reactions (as a reactant in R_MEND1 and as a product in R_MEND2).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_TPP\_c} = v_{287} - v_{286} \tag{1287}$$

7.302 Species M_SSALTPP_c

Name SSALTPP

This species takes part in two reactions (as a reactant in R_MEND2 and as a product in R_MEND1).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_SSALTPP\_c} = v_{286} - v_{287} \tag{1288}$$

7.303 Species M_SHCHC_c

Name SHCHC

This species takes part in two reactions (as a reactant in R_MENC and as a product in R_MEND2).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_SHCHC\_c} = v_{287} - v_{288} \tag{1289}$$

7.304 Species M_OSB_c

Name OSB

This species takes part in two reactions (as a reactant in R_MENE and as a product in R_MENC).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_OSB\_c} = v_{288} - v_{289} \tag{1290}$$

7.305 Species M_OSBCOA_c

Name OSBCOA

This species takes part in two reactions (as a reactant in R_MENB and as a product in R_MENE).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_OSBCOA\_c} = v_{289} - v_{290} \tag{1291}$$

7.306 Species M_DHNA_c

Name DHNA

This species takes part in two reactions (as a reactant in R_MENA and as a product in R_MENB).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DHNA\_c} = v_{290} - v_{291} \tag{1292}$$

7.307 Species M_DMK_c

Name DMK

This species takes part in four reactions (as a reactant in R_MENG, R_BIOMASS, R_DM_DMK and as a product in R_MENA).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DMK\_c} = v_{291} - v_{292} - v_{446} - v_{473} \tag{1293}$$

7.308 Species M_DIPEP_e

Name DIPEPxt

This species takes part in two reactions (as a reactant in R_DPEPTP and as a product in R_EX_DIPEPxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DIPEP\_e} = v_{382} - v_{293} \tag{1294}$$

7.309 Species M_DIPEP_c

Name DIPEP

This species takes part in one reaction (as a product in R_DPEPTP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DIPEP\_c} = v_{293} \tag{1295}$$

7.310 Species M_OPEP_e

Name OPEPxt

This species takes part in two reactions (as a reactant in R_OPEPTP and as a product in R_EX_OPEPxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_OPEP\_e} = v_{383} - v_{294} \tag{1296}$$

7.311 Species M_OPEP_c

Name OPEP

This species takes part in one reaction (as a product in R_OPEPTP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_OPEP\_c} = v_{294} \tag{1297}$$

7.312 Species M_SER_e

Name SERxt

This species takes part in two reactions (as a reactant in R_SERTP and as a product in R_EX_SERxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_SER\_e} = v_{384} - v_{295} \tag{1298}$$

7.313 Species M_HEXT_c

Name HEXT

This species takes part in 46 reactions (as a reactant in R_SERTP, R_ETHTP, R_ACTP, R_GLACTP, R_GLCTP, R_PROTP3, R_LACTP, R_GLTTP, R_ALATP, R_DALATP, R_GLYTP2, R_DSERTP, R_ORNTP, R_ARGTP, R_SUCTP, R_FUMTP, R_MALTP, R_ASPTP, R_NUPCTP1, R_NUPCTP2, R_NUPCTP3, R_NUPCTP4, R_NUPCTP5, R_NUPCTP6, R_NUPCTP7, R_ATPA, R_KGTP, R_NMNTP, R_PITTP, R_ADTP, R_GSNTP, R_OROATP, R_URATP, R_NH3TP, R_PYRT, R_LYSTP, R_PHETP, R_THRTP, R_TRPTP, R_TYRTP, R_AACTP and as a product in R_NATP, R_NDH__1, R_CBB3O, R_BC1O, R_HYDA).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_HEXT\_c} = v_{323} + 2v_{337} + 2v_{339} + 2v_{340} + 2v_{341} - v_{295} - v_{297} - v_{301} - v_{305} - v_{306} - v_{312} - v_{313} - v_{316} - v_{317} - v_{318} - v_{319} - v_{320} - v_{321} - v_{322} - v_{324} - v_{325} - v_{326} - v_{327} - v_{328} - v_{329} - v_{330} - v_{331} - v_{332} - v_{333} - v_{334} - 4v_{342} - v_{343} - v_{345} - v_{351} - v_{355} - v_{358} - v_{360} - v_{361} - v_{362} - v_{363} - v_{368} - v_{370} - v_{371} - v_{372} - v_{373} - v_{374} \tag{1299}$$

7.314 Species M_ETH_c

Name ETH

This species takes part in two reactions (as a product in R_ADHE2, R_ETHTP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_ETH\_c} = v_{296} + v_{297} \tag{1300}$$

7.315 Species M_ETH_e

Name ETHxt

This species takes part in two reactions (as a reactant in R_ETHTP and as a product in R_EX_ETHxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_ETH\_e} = v_{385} - v_{297} \tag{1301}$$

7.316 Species M_ACTP_c

Name ACTP

This species takes part in two reactions (as a reactant in R_ACKA and as a product in R_PTA).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_ACTP\_c} = v_{298} - v_{299} \tag{1302}$$

7.317 Species M_AC_e

Name ACxt

This species takes part in two reactions (as a reactant in R_ACTP and as a product in R_EX_ACxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_AC\_e} = v_{386} - v_{301} \tag{1303}$$

7.318 Species M_UDPGAL_c

Name UDPGAL

This species takes part in one reaction (as a reactant in R_GALE).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_UDPGAL\_c} = -v_{302} \tag{1304}$$

7.319 Species M_G1P_c

Name G1P

This species takes part in two reactions (as a reactant in R_GALU and as a product in R_ALGC1).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_G1P\_c} = v_{304} - v_{303} \tag{1305}$$

7.320 Species M_GLAC_e

Name GLACxt

This species takes part in two reactions (as a reactant in R_GLACTP and as a product in R_EX_GLACxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_GLAC\_e} = v_{387} - v_{305} \tag{1306}$$

7.321 Species M_GLAC_c

Name GLAC

This species takes part in one reaction (as a product in R_GLACTP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_GLAC\_c} = v_{305} \tag{1307}$$

7.322 Species M_GLC_e

Name GLCxt

This species takes part in two reactions (as a reactant in R_GLCTP and as a product in R_EX_GLCxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_GLC\_e} = v_{388} - v_{306} \tag{1308}$$

7.323 Species M_GLC_c

Name GLC

This species takes part in two reactions (as a reactant in R_GLK1 and as a product in R_GLCTP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_GLC\_c} = v_{306} - v_{307} \tag{1309}$$

7.324 Species M_MAN_c

Name MAN

This species takes part in one reaction (as a reactant in R_GLK2).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_MAN\_c} = -v_{308} \tag{1310}$$

7.325 Species M_MAN6P_c

Name MAN6P

This species takes part in two reactions (as a reactant in R_PMI and as a product in R_GLK2).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_MAN6P\_c} = v_{308} - v_{309} \tag{1311}$$

7.326 Species M_PRO_e

Name PROxt

This species takes part in four reactions (as a reactant in R_PROTP1, R_PROTP2, R_PROTP3 and as a product in R_EX_PROxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_PRO\_e} = v_{389} - v_{310} - v_{311} - v_{312} \tag{1312}$$

7.327 Species M_NA_e

Name NAxt

This species takes part in three reactions (as a reactant in R_PROTP1, R_NATP and as a product in R_EX_NAxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_NA\_e} = v_{390} - v_{310} - v_{323} \tag{1313}$$

7.328 Species M_NA_c

Name NA

This species takes part in two reactions (as a product in R_PROTP1, R_NATP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_NA\_c} = v_{310} + v_{323} \tag{1314}$$

7.329 Species M_LAC_e

Name LACxt

This species takes part in two reactions (as a reactant in R_LACTP and as a product in R_EX_LACxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_LAC\_e} = v_{391} - v_{313} \tag{1315}$$

7.330 Species M_LAC_c

Name LAC

This species takes part in two reactions (as a reactant in R_DLD and as a product in R_LACTP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_LAC\_c} = v_{313} - v_{314} \tag{1316}$$

7.331 Species M_GLN_e

Name GLNxt

This species takes part in two reactions (as a reactant in R_GLNTP and as a product in R_EX_GLNxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_GLN\_e} = v_{392} - v_{315} \tag{1317}$$

7.332 Species M_GLU_e

Name GLUxt

This species takes part in two reactions (as a reactant in R_GLTTP and as a product in R_EX_GLUxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_GLU\_e} = v_{393} - v_{316} \tag{1318}$$

7.333 Species M_ALA_e

Name ALAxt

This species takes part in two reactions (as a reactant in R_ALATP and as a product in R_EX_ALAxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_ALA\_e} = v_{394} - v_{317} \tag{1319}$$

7.334 Species M_DALA_e

Name DALAxt

This species takes part in two reactions (as a reactant in R_DALATP and as a product in R_EX_DALAxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DALA\_e} = v_{395} - v_{318} \tag{1320}$$

7.335 Species M_GLY_e

Name GLYxt

This species takes part in two reactions (as a reactant in R_GLYTP2 and as a product in R_EX_GLYxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_GLY\_e} = v_{396} - v_{319} \tag{1321}$$

7.336 Species M_DSER_e

Name DSERxt

This species takes part in two reactions (as a reactant in R_DSERTP and as a product in R_EX_DSERxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DSER\_e} = v_{397} - v_{320} \tag{1322}$$

7.337 Species M_DSER_c

Name DSER

This species takes part in one reaction (as a product in R_DSERTP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DSER\_c} = v_{320} \tag{1323}$$

7.338 Species M_ORN_e

Name ORNxt

This species takes part in two reactions (as a reactant in R_ORNTP and as a product in R_EX_ORNxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_ORN\_e} = v_{398} - v_{321} \tag{1324}$$

7.339 Species M_ARG_e

Name ARGxt

This species takes part in two reactions (as a reactant in R_ARGTP and as a product in R_EX_ARGxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_ARG\_e} = v_{399} - v_{322} \tag{1325}$$

7.340 Species M_SUCC_e

Name SUCCxt

This species takes part in two reactions (as a reactant in R_SUCTP and as a product in R_EX_SUCCxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_SUCC\_e} = v_{400} - v_{324} \tag{1326}$$

7.341 Species M_FUM_e

Name FUMxt

This species takes part in two reactions (as a reactant in R_FUMTP and as a product in R_EX_FUMxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_FUM\_e} = v_{401} - v_{325} \tag{1327}$$

7.342 Species M_MAL_e

Name MALxt

This species takes part in two reactions (as a reactant in R_MALTP and as a product in R_EX_MALxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_MAL\_e} = v_{402} - v_{326} \tag{1328}$$

7.343 Species M_ASP_e

Name ASPxt

This species takes part in two reactions (as a reactant in R_ASPTP and as a product in R_EX_ASPxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_ASP\_e} = v_{403} - v_{327} \tag{1329}$$

7.344 Species M_ADN_e

Name ADNxt

This species takes part in two reactions (as a reactant in R_NUPCTP1 and as a product in R_EX_ADNxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_ADN\_e} = v_{404} - v_{328} \tag{1330}$$

7.345 Species M_URI_e

Name URIxt

This species takes part in two reactions (as a reactant in R_NUPCTP2 and as a product in R_EX_URIxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_URI\_e} = v_{405} - v_{329} \tag{1331}$$

7.346 Species M_URI_c

Name URI

This species takes part in one reaction (as a product in R_NUPCTP2).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_URI\_c} = v_{329} \tag{1332}$$

7.347 Species M_CYTD_e

Name CYTDxt

This species takes part in two reactions (as a reactant in R_NUPCTP3 and as a product in R_EX_CYTDxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_CYTD\_e} = v_{406} - v_{330} \tag{1333}$$

7.348 Species M_CYTD_c

Name CYTD

This species takes part in one reaction (as a product in R_NUPCTP3).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_CYTD\_c} = v_{330} \tag{1334}$$

7.349 Species M_DT_e

Name DTxt

This species takes part in two reactions (as a reactant in R_NUPCTP4 and as a product in R_EX_DTxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DT\_e} = v_{407} - v_{331} \tag{1335}$$

7.350 Species M_DA_e

Name DAxt

This species takes part in two reactions (as a reactant in R_NUPCTP5 and as a product in R_EX_DAxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DA\_e} = v_{408} - v_{332} \tag{1336}$$

7.351 Species M_DC_e

Name DCxt

This species takes part in two reactions (as a reactant in R_NUPCTP6 and as a product in R_EX_DCxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DC\_e} = v_{409} - v_{333} \tag{1337}$$

7.352 Species M_DC_c

Name DC

This species takes part in one reaction (as a product in R_NUPCTP6).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DC\_c} = v_{333} \tag{1338}$$

7.353 Species M_DU_e

Name DUxt

This species takes part in two reactions (as a reactant in R_NUPCTP7 and as a product in R_EX_DUxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_DU\_e} = v_{410} - v_{334} \tag{1339}$$

7.354 Species M_H2_e

Name H2xt

This species takes part in two reactions (as a reactant in R_HYDA and as a product in R_EX_H2xt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_H2\_e} = v_{411} - v_{341} \tag{1340}$$

7.355 Species M_AKG_e

Name AKGxt

This species takes part in two reactions (as a reactant in R_KGTP and as a product in R_EX_AKGxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_AKG\_e} = v_{412} - v_{343} \tag{1341}$$

7.356 Species M_NO2_c

Name NO2

This species takes part in one reaction (as a reactant in R_NARK).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_NO2\_c} = -v_{344} \tag{1342}$$

7.357 Species M_NO2_e

Name NO2xt

This species takes part in two reactions (as a product in R_NARK, R_EX_NO2xt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_NO2\_e} = v_{344} + v_{413} \tag{1343}$$

7.358 Species M_NMN_e

Name NMNxt

This species takes part in two reactions (as a reactant in R_NMNTP and as a product in R_EX_NMNxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_NMN\_e} = v_{414} - v_{345} \tag{1344}$$

7.359 Species M_NMN_c

Name NMN

This species takes part in one reaction (as a product in R_NMNTP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_NMN\_c} = v_{345} \tag{1345}$$

7.360 Species M_VAL_e

Name VALxt

This species takes part in two reactions (as a reactant in R_VALTP and as a product in R_EX_VALxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_VAL\_e} = v_{415} - v_{346} \tag{1346}$$

7.361 Species M_ILE_e

Name ILExt

This species takes part in two reactions (as a reactant in R_ILETP and as a product in R_EX_ILExt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_ILE\_e} = v_{416} - v_{347} \tag{1347}$$

7.362 Species M_LEU_e

Name LEUxt

This species takes part in two reactions (as a reactant in R_LEUTP and as a product in R_EX_LEUxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_LEU\_e} = v_{417} - v_{348} \tag{1348}$$

7.363 Species M_ASN_e

Name ASNxt

This species takes part in two reactions (as a reactant in R_ASNTP and as a product in R_EX_ASNxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_ASN\_e} = v_{418} - v_{349} \tag{1349}$$

7.364 Species M_THIAM_e

Name THIAMxt

This species takes part in two reactions (as a reactant in R_THIAMTP and as a product in R_EX_THIAMxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_THIAM\_e} = v_{419} - v_{350} \tag{1350}$$

7.365 Species M_THIAMIN_c

Name THIAMIN

This species takes part in three reactions (as a reactant in R_BIOMASS, R_DM_THIAMIN and as a product in R_THIAMTP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_THIAMIN\_c} = v_{350} - v_{446} - v_{477} \tag{1351}$$

7.366 Species M_PI_e

Name PIxt

This species takes part in two reactions (as a reactant in R_PITTP and as a product in R_EX_PIxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_PI\_e} = v_{420} - v_{351} \tag{1352}$$

7.367 Species M_O2_e

Name O2xt

This species takes part in two reactions (as a reactant in R_O2TP and as a product in R_EX_O2xt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_O2\_e} = v_{421} - v_{352} \tag{1353}$$

7.368 Species M_CO2_e

Name CO2xt

This species takes part in two reactions (as a reactant in R_CO2TP and as a product in R_EX_CO2xt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_CO2\_e} = v_{422} - v_{353} \tag{1354}$$

7.369 Species M_UREA_e

Name UREAxt

This species takes part in two reactions (as a reactant in R_UREATP and as a product in R_EX_UREAxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_UREA\_e} = v_{423} - v_{354} \tag{1355}$$

7.370 Species M_AD_e

Name ADxt

This species takes part in two reactions (as a reactant in R_ADTP and as a product in R_EX_ADxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_AD\_e} = v_{424} - v_{355} \tag{1356}$$

7.371 Species M_FOR_e

Name FORxt

This species takes part in two reactions (as a reactant in R_FORTR and as a product in R_EX_FORxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_FOR\_e} = v_{425} - v_{356} \tag{1357}$$

7.372 Species M_GN_e

Name GNxt

This species takes part in two reactions (as a reactant in R_GNTP and as a product in R_EX_GNxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_GN\_e} = v_{426} - v_{357} \tag{1358}$$

7.373 Species M_GSN_e

Name GSNxt

This species takes part in two reactions (as a reactant in R_GSNTP and as a product in R_EX_GSNxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_GSN\_e} = v_{427} - v_{358} \tag{1359}$$

7.374 Species M_HYXN_e

Name HYXNxt

This species takes part in two reactions (as a reactant in R_HYXNTP and as a product in R_EX_HYXNxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_HYXN\_e} = v_{428} - v_{359} \tag{1360}$$

7.375 Species M_OROA_e

Name OROAxt

This species takes part in two reactions (as a reactant in R_OROATP and as a product in R_EX_OROAxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_OROA\_e} = v_{429} - v_{360} \tag{1361}$$

7.376 Species M_URA_e

Name URAxt

This species takes part in two reactions (as a reactant in R_URATP and as a product in R_EX_URAxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_URA\_e} = v_{430} - v_{361} \tag{1362}$$

7.377 Species M_NH3_e

Name NH3xt

This species takes part in two reactions (as a reactant in R_NH3TP and as a product in R_EX_NH3xt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_NH3\_e} = v_{431} - v_{362} \tag{1363}$$

7.378 Species M_PYR_e

Name PYRxt

This species takes part in two reactions (as a reactant in R_PYRT and as a product in R_EX_PYRxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_PYR\_e} = v_{432} - v_{363} \tag{1364}$$

7.379 Species M_SLF_e

Name SLFxt

This species takes part in two reactions (as a reactant in R_SLFTP and as a product in R_EX_SLFxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_SLF\_e} = v_{433} - v_{365} \tag{1365}$$

7.380 Species M_CYS_e

Name CYSxt

This species takes part in two reactions (as a reactant in R_CYSTP and as a product in R_EX_CYSxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_CYS\_e} = v_{434} - v_{366} \tag{1366}$$

7.381 Species M_HIS_e

Name HISxt

This species takes part in two reactions (as a reactant in R_HISTP and as a product in R_EX_HISxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_HIS\_e} = v_{435} - v_{367} \tag{1367}$$

7.382 Species M_HIS_c

Name HIS

This species takes part in three reactions (as a reactant in R_BIOMASS, R_DM_HIS and as a product in R_HISTP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_HIS\_c} = v_{367} - v_{446} - v_{463} \tag{1368}$$

7.383 Species M_LYS_e

Name LYSxt

This species takes part in two reactions (as a reactant in R_LYSTP and as a product in R_EX_LYSxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_LYS\_e} = v_{436} - v_{368} \tag{1369}$$

7.384 Species M_MET_e

Name METxt

This species takes part in two reactions (as a reactant in R_METTP and as a product in R_EX_METxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_MET\_e} = v_{437} - v_{369} \tag{1370}$$

7.385 Species M_PHE_e

Name PHExt

This species takes part in two reactions (as a reactant in R_PHETP and as a product in R_EX_PHExt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_PHE\_e} = v_{438} - v_{370} \tag{1371}$$

7.386 Species M_PHE_c

Name PHE

This species takes part in three reactions (as a reactant in R_BIOMASS, R_DM_PHE and as a product in R_PHETP).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_PHE\_c} = v_{370} - v_{446} - v_{457} \tag{1372}$$

7.387 Species M_THR_e

Name THRxt

This species takes part in two reactions (as a reactant in R_THRTP and as a product in R_EX_THRxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_THR\_e} = v_{439} - v_{371} \tag{1373}$$

7.388 Species M_TRP_e

Name TRPxt

This species takes part in two reactions (as a reactant in R_TRPTP and as a product in R_EX_TRPxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_TRP\_e} = v_{440} - v_{372} \tag{1374}$$

7.389 Species M_TYR_e

Name TYRxt

This species takes part in two reactions (as a reactant in R_TYRTP and as a product in R_EX_TYRxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_TYR\_e} = v_{441} - v_{373} \tag{1375}$$

7.390 Species M_AAC_e

Name AACxt

This species takes part in two reactions (as a reactant in R_AACTP and as a product in R_EX_AACxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_AAC\_e} = v_{442} - v_{374} \tag{1376}$$

7.391 Species M_H2CO3_e

Name H2CO3xt

This species takes part in two reactions (as a reactant in R_BCRBTP and as a product in R_EX_H2CO3xt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_H2CO3\_e} = v_{443} - v_{375} \tag{1377}$$

7.392 Species M_H2CO3_c

Name H2CO3

This species takes part in two reactions (as a product in R_BCRBTP, R_ICFA).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_H2CO3\_c} = v_{375} + v_{376} \tag{1378}$$

7.393 Species M_GLYCL_e

Name GLYCLxt

This species takes part in two reactions (as a reactant in R_GLYCLTP and as a product in R_EX_GLYCLxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_GLYCL\_e} = v_{444} - v_{377} \tag{1379}$$

7.394 Species M_GLYCL_c

Name GLYCL

This species takes part in three reactions (as a reactant in R_GLCD and as a product in R_GLYCLTP, R_GLLDH).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_GLYCL\_c} = v_{377} + v_{379} - v_{378} \tag{1380}$$

7.395 Species M_H2O2_c

Name H2O2

This species takes part in two reactions (as a reactant in R_KATA and as a product in R_GLCD).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_H2O2\_c} = v_{378} - v_{381} \tag{1381}$$

7.396 Species M_GLAL_e

Name GLALxt

This species takes part in two reactions (as a product in R_GLALTP, R_EX_GLALxt).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M\_GLAL\_e} = v_{380} + v_{445} \tag{1382}$$

A Glossary of Systems Biology Ontology Terms

SBO:0000625 Unknown SBO id 625: Unknown SBO id 625

SBO:0000626 Unknown SBO id 626: Unknown SBO id 626

SBML2LaTeX was developed by Andreas Dräger[a], Hannes Planatscher[a], Dieudonné M Wouamba[a], Adrian Schröder[a], Michael Hucka[b], Lukas Endler[c], Martin Golebiewski[d] and Andreas Zell[a]. Please see http://www.ra.cs.uni-tuebingen.de/software/SBML2LaTeX for more information.

[a]Center for Bioinformatics Tübingen (ZBIT), Germany
[b]California Institute of Technology, Beckman Institute BNMC, Pasadena, United States
[c]European Bioinformatics Institute, Wellcome Trust Genome Campus, Hinxton, United Kingdom
[d]EML Research gGmbH, Heidelberg, Germany