This worksheet provides information on all the reactions in the model
along with the associated proteins and genes
The fluxes correspond to chemostat growth on acetate and Fe(III) at 0.06 mmol/gdw hr

List of intracellular reactions

Abbreviation	Equation	Constraints Lower Bound	Constraints Upper Bound	Metabolic Pathway Classification Subsystem	Gene	Protein	Flux(mmol/gdw h	ConfidenceLevel	
AACPAT	[c] : accoa + acp --> acacp + coa	0	Infinity	Fatty Acid Synthesis	GSU1601, GSU0290	FabHAB	0.015075082	3	1
ACBIPGT	[c] : adcobap + gtp + h --> adgcoba + ppi	0	Infinity	Vitamins & Cofactor Biosynthesis	GSU3010	CobU	0	3	2
ACCOAC	[c] : accoa + atp + hco3 --> adp + h + malcoa + pi	0	Infinity	Lipid & Cell Wall Metabolism	GSU1402, GSU2370, GSU2020, GSU201	AccAD, Ac	0.25581673	3	3
ACGK	[c] : acglu + atp --> acg5p + adp	0	Infinity	Amino Acid Metabolism	GSU0150	ArgB	0.012094597	3	4
ACGS	[c] : accoa + glu-L --> acglu + coa + h	0	Infinity	Amino Acid Metabolism	GSU2061	ArgA	0	3	5
ACHBS	[c] : 2obut + h + pyr --> 2ahbut + co2	0	Infinity	Amino Acid Metabolism	GSU1911, GSU1736, GSU1910	IlvB, IlvN1	0.01204339	2	6
ACKr	[c] : ac + atp <==> actp + adp	-Infinity	Infinity	Central Metabolism	GSU3448, GSU2707	AckA2, Ack	0.93881496	4	7
ACLS	[c] : h + (2) pyr --> alac-S + co2	0	Infinity	Amino Acid Metabolism	GSU1911, GSU1736, GSU1910	IlvB, IlvN1	0.040216412	2	8
ACMAT1	[c] : acacp + h + malacp --> aaacp + acp + co2	0	Infinity	Fatty Acid Synthesis	GSU1601, GSU0290, GSU1605, GSU046	FabHAB, F	0.015075082	3	9
ACNPLYS	[c] : acmana + h2o + pep --> acnam + pi	0	Infinity	Lipid & Cell Wall Metabolism	GSU1970	AnpI	0	3	10
ACONT	[c] : cit <==> icit	-Infinity	Infinity	Central Metabolism	GSU1660, GSU2445, GSU0846	Aco2, Aco3	12.76518787	4	11
ACOTA	[c] : acorn + akg <==> acg5sa + glu-L	-Infinity	Infinity	Amino Acid Metabolism	GSU0151	ArgD	-0.012094597	3	12
ACt2	ac[e] + h[e] --> ac[c] + h[c]	-Infinity	Infinity	Transport	GSU1070, GSU2352, GSU1068	ActP	13.62917248	1	13
ADCL	[c] : 4adcho --> 4abz + h + pyr	0	Infinity	Amino Acid Metabolism	GSU0523	PabABC	0	1	14
ADCOBAK	[c] : adcoba + atp --> adcobap + adp + h	0	Infinity	Vitamins & Cofactor Biosynthesis	GSU3010	CobU	0	3	15
ADCOBAS	[c] : 1ap2ol + adcobhex --> adcoba + h2o	0	Infinity	Vitamins & Cofactor Biosynthesis	GSU2990	CobD	0	2	16
ADCOBHEXS	[c] : adcobdam + (4) atp + (4) gln-L + (4) h2o --> adcobhex + (4) adp + (4) glu-L + (	0	Infinity	Vitamins & Cofactor Biosynthesis	GSU2992	CobQ	0	3	17
ADCS	[c] : chor + gln-L --> 4adcho + glu-L	0	Infinity	Amino Acid Metabolism	GSU0523	PabABC	0	3	18
ADK1	[c] : amp + atp <==> (2) adp	-Infinity	Infinity	Nucleotide Metabolism	GSU2836	Adk	0.371679421	1	19
ADK2	[c] : amp + pppi <==> adp + ppi	-Infinity	Infinity	Nucleotide Metabolism	GSU2836	Adk	0	1	20
ADNK1	[c] : adn + atp --> adp + amp + h	0	Infinity	Nucleotide Metabolism			0	3	21
ADOCBLS	[c] : adgcoba + (0.5) h + (0.5) nad + rdmbzi --> cobamcoa + gmp + (0.5) nadh	0	Infinity	Vitamins & Cofactor Biosynthesis	GSU3008	CobS	0	3	22
ADPT	[c] : ade + prpp --> amp + ppi	0	Infinity	Nucleotide Metabolism	GSU1526	Apt	0	3	23
ADSK	[c] : aps + atp --> adp + h + paps	0	Infinity	Amino Acid Metabolism	GSU1718	CysC	0.010028616	3	24
ADSL1	[c] : dcamp --> amp + fum	0	Infinity	Nucleotide Metabolism	GSU1632	PurB	0.008269554	3	25
ADSL2	[c] : 25aics --> aicar + fum	0	Infinity	Nucleotide Metabolism	GSU1632	PurB	0.009517873	3	26
ADSS	[c] : asp-L + gtp + imp --> dcamp + gdp + (2) h + pi	0	Infinity	Nucleotide Metabolism	GSU3308	PurA	0.008269554	3	27
AGPAT	[c] : 12dag3p + coa --> 1ag3p + acoa	0	Infinity	Lipid & Cell Wall Metabolism	GSU3116, GSU2072	PlsC2, Pls(	0	3	28
AGPR	[c] : acg5sa + nadp + pi <==> acg5p + h + nadph	-Infinity	Infinity	Amino Acid Metabolism	GSU2874	ArgC	-0.012094597	3	29
AHC	[c] : ahcys + h2o <==> adn + hcys-L	-Infinity	Infinity	Amino Acid Metabolism	GSU1875	AhcY	0	3	30
AHCYSNS	[c] : ahcys + h2o --> ade + rhcys	0	Infinity	Nucleotide Metabolism	GSU1897, GSU0453	Pfs2, Pfs1	0	3	31
AHMMPS	[c] : air + h2o --> 4ahmmp + gcald + (0.5) o2 + pi	0	Infinity	Vitamins & Cofactor Biosynthesis	GSU3005, GSU0604	ThiC1, Thi(	0	3	32
AICART	[c] : 10fthf + aicar <==> fprica + thf	-Infinity	Infinity	Nucleotide Metabolism	GSU0609	PurH	0.013391588	2	33
AIRC	[c] : air + co2 --> 5aizc + h	0	Infinity	Nucleotide Metabolism	GSU0611, GSU2306	PurE	0.009517873	3	34
AKGD	[c] : akg + coa + nad --> co2 + nadh + succoa	0	Infinity	Central Metabolism	GSU2588, GSU1315, GSU2446, GSU244	Lpd, SucA,	0	3	35
ALAALA	[c] : (2) ala-D + atp <==> adp + alaala + h + pi	-Infinity	Infinity	Lipid & Cell Wall Metabolism	GSU3066	Ddl	0	3	36
ALAD_L	[c] : ala-L + h2o + nad --> h + nadh + nh4 + pyr	0	Infinity	Amino Acid Metabolism	GSU2292	Ald	0	1	37
ALAR	[c] : ala-L <==> ala-D	-Infinity	Infinity	Lipid & Cell Wall Metabolism	GSU0606	Alr	0.001337047	2	38
ALATA_L	[c] : akg + ala-L <==> glu-L + pyr	-Infinity	Infinity	Amino Acid Metabolism	GSU1242	AlaT	-0.023678235	3	39
ALDD2x	[c] : acald + h2o + nad --> ac + (2) h + nadh	0	Infinity	Amino Acid Metabolism	GSU0818	AldH	0.004131527	3	40
AMAA	[c] : acmama + h2o --> acmam + ala-L	0	Infinity	Lipid & Cell Wall Metabolism	GSU1821	AmiA1	0	1	41
AMAOT	[c] : 8aonn + amet <==> amob + dann	-Infinity	Infinity	Vitamins & Cofactor Biosynthesis	GSU1582	BioA	0	3	42
AMMQT8_2	[c] : 2dmmq8 + amet --> ahcys + h + mqn8	0	Infinity	Vitamins & Cofactor Biosynthesis			0	3	43
ANPRT	[c] : anth + prpp --> ppi + pran	0	Infinity	Amino Acid Metabolism	GSU2381, GSU2382	TrpD	0.002324229	3	44
ANS1	[c] : chor + gln-L --> anth + glu-L + h + pyr	0	Infinity	Amino Acid Metabolism	GSU2381, GSU2382, GSU2383	TrpD, TrpE	0.002324229	3	45
AOXS	[c] : ala-L + h + pmcoa <==> 8aonn + co2 + coa	-Infinity	Infinity	Vitamins & Cofactor Biosynthesis	GSU2629	BioF	0	2	46
APAT	[c] : accoa + h2o + thdp <==> acamoxm + coa	-Infinity	Infinity	Amino Acid Metabolism	GSU2281	CutE	0	3	47
APRAUR	[c] : 5apru + h + nadph --> 5aprbu + nadp	0	Infinity	Vitamins & Cofactor Biosynthesis	GSU1688	RibD	0	3	48
ARGDC	[c] : arg-L + h --> agm + co2	0	Infinity	Amino Acid Metabolism	GSU2537	SpeA	0	3	49
ARGSL	[c] : argsuc <==> arg-L + fum	-Infinity	Infinity	Amino Acid Metabolism	GSU0156	ArgH	0.012094597	3	50
ARGSS	[c] : asp-L + atp + citr-L --> amp + argsuc + h + ppi	0	Infinity	Amino Acid Metabolism	GSU0153	ArgG	0.012094597	3	51
ASAD	[c] : aspsa + nadp + pi <==> 4pasp + h + nadph	-Infinity	Infinity	Amino Acid Metabolism	GSU2878	Asd	-0.048200391	3	52

ASNS1	[c] : asp-L + atp + gln-L + h2o --> amp + asn-L + glu-L + h + ppi	0	Infinity	Amino Acid Metabolism	GSU1953	AsnB	0.009856451	3	53
ASP1DC	[c] : asp-L + h --> ala-B + co2	0	Infinity	Amino Acid Metabolism	GSU1707	Gad	0	3	54
ASPCT	[c] : asp-L + cbp --> cbasp + h + pi	0	Infinity	Nucleotide Metabolism	GSU1271	PyrB	0.011582558	2	55
ASPK	[c] : asp-L + atp <==> 4pasp + adp	-Infinity	Infinity	Amino Acid Metabolism	GSU1799	AspK	0.048200391	3	56
ASPO1	[c] : asp-L + nad --> (2) h + iasp + nadh	0	Infinity	Amino Acid Metabolism	GSU1827	NadB	0	3	57
ASPT	[c] : asp-L --> fum + nh4	0	Infinity	Amino Acid Metabolism	GSU0479	AspA	0	4	58
ASPTA1	[c] : akg + asp-L <==> glu-L + oaa	-Infinity	Infinity	Amino Acid Metabolism	GSU1061, GSU0084, GSU1242	AspB	-0.109377876	1	59
ATO	[c] : ac + succoa --> accoa + succ	0	Infinity	Central Metabolism	GSU0490	AtoA	12.70451767	3	60
ATPM	[c] : atp + h2o --> adp + h + pi	0.45	0.45	Energy Metabolism			0.45	4	61
ATPPRT	[c] : atp + prpp --> ppi + prbatp	0	Infinity	Amino Acid Metabolism	GSU3101, GSU1530	HisG2, His	0.003873714	1	62
ATPS4	adp[c] + (4) h[e] + pi[c] --> atp[c] + (3) h[c] + h2o[c]	0	Infinity	Transport	GSU0108, GSU0109, GSU0110, GSU011	AtpABCDE	5.829004341	3	63
BPNT	[c] : h2o + pap --> amp + pi	0	Infinity	Other			0.010028616	3	64
BTMAT1	[c] : 2beacp + h + nadh --> butacp + nad	0	Infinity	Fatty Acid Synthesis	GSU1008	FabI	0.015075082	1	65
BTS	[c] : dtbt + (2) s --> btn + h2s	0	Infinity	Vitamins & Cofactor Biosynthesis	GSU1584	BioB	0	2	66
CA2abc	atp[c] + ca2[e] + h2o[c] --> adp[c] + ca2[c] + h[c] + pi[c]	0	Infinity	Transport	GSU2351	Cadp	5.64E-05	3	67
CA2abc1	atp[c] + ca2[c] + h2o[c] --> adp[c] + ca2[e] + h[c] + pi[c]	0	Infinity	Transport	GSU1678	Cat	0	3	68
CBMK	[c] : atp + cbm --> adp + cbp	0	Infinity	Central Metabolism	GSU2487	ArcC	0	1	69
CBPS	[c] : (2) atp + gln-L + h2o + hco3 --> (2) adp + cbp + glu-L + (2) h + pi	0	Infinity	Nucleotide Metabolism	GSU1273, GSU1276	CarAB	0.023677155	1	70
CD2abc1	atp[c] + cd2[c] + h2o[c] --> adp[c] + cd2[e] + h[c] + pi[c]	0	Infinity	Transport	GSU3398, GSU3399, GSU3400, GSU214	CzcA, Cdp	0	3	71
CD2abc2	atp[c] + cd2[e] + h2o[c] --> adp[c] + cd2[c] + h[c] + pi[c]	0	Infinity	Transport	GSU2147, GSU2325	Cdp1, Cdp	0	3	72
CDGPT	[c] : cdpdag + glyc3p --> cmp + h + pglyp	0	Infinity	Lipid & Cell Wall Metabolism	GSU1825	PgsA	0	3	73
CDPDSP	[c] : cdpdag + ser-L --> cmp + h + ps	0	Infinity	Lipid & Cell Wall Metabolism	GSU1907	PssA1	0	3	74
CDPMEK	[c] : 4c2me + atp --> 2p4c2me + adp + h	0	Infinity	Vitamins & Cofactor Biosynthesis	GSU0660	IspE	0	3	75
CHORM	[c] : chor --> pphn	0	Infinity	Amino Acid Metabolism	GSU3142, GSU1828, GSU2608	AroA1, Phe	0.01321367	1	76
CHORS	[c] : 3psme --> chor + pi	0	Infinity	Amino Acid Metabolism	GSU2027	AroF	0.015537899	3	77
CITt6	cit[e] + h[e] <==> cit[c] + h[c]	-Infinity	Infinity	Transport			0	4	78
CLPNS	[c] : cdpdag + pgly --> cdlp + cmp + h	0	Infinity	Other	GSU3384, GSU3372, GSU0482	Cls	0	3	79
CO1DAMAT	[c] : atp + co1dam + h2o + (0.5) nadh --> adcobdam + (0.5) h + (0.5) nad + pi + ppi	0	Infinity	Vitamins & Cofactor Biosynthesis			0	3	80
CO2DAMR	[c] : (2) co2dam + nadh --> (2) co1dam + h + nad	0	Infinity	Vitamins & Cofactor Biosynthesis			0	3	81
CO2t	co2[e] <==> co2[c]	-Infinity	Infinity	Transport			-24.89497864	3	82
COBALTt5	cobalt2[c] <==> cobalt2[e]	-Infinity	Infinity	Transport	GSU3322, GSU1399	CorA2, Cor	0	3	83
COBAT	[c] : cobamcoa + pi + ppi <==> atp + cbl1 + h + (0.5) h2o2	-Infinity	Infinity	Vitamins & Cofactor Biosynthesis	GSU1577	CobA	0	1	84
CODH	[c] : CO + fdxo-4:2 + h2o --> co2 + fdxr-4:2 + (2) h	0	Infinity	Other	GSU2097, GSU2098	CooS	0	4	85
CPPPGO	[c] : cpppg3 + (2) h + o2 --> (2) co2 + (2) h2o + pppg9	0	Infinity	Vitamins & Cofactor Biosynthesis	GSU0012	HemY	0	3	86
CPPPGOAN	[c] : (2) amet + cpppg3 + (2) fdxo-4:2 + (2) nadph --> (2) co2 + (2) dad-5 + (2) fdxr-	0	Infinity	Vitamins & Cofactor Biosynthesis	GSU3059, GSU0030, GSU2227	HemN	0	3	87
CRET	[c] : crtn + h2o --> creat	0	Infinity	Amino Acid Metabolism	GSU1722	CreT	0	3	88
CS	[c] : accoa + h2o + oaa --> cit + coa + h	0	Infinity	Central Metabolism	GSU1106	Cit	12.76518787	3	89
CTL	[c] : cysth-L + h2o --> 2obut + cys-L + h + nh3	0	Infinity	Amino Acid Metabolism			0.003744591	3	90
CTPS1	[c] : atp + nh3 + utp --> adp + ctp + h + pi	0	Infinity	Nucleotide Metabolism	GSU1895	PyrG	0	3	91
CTPS2	[c] : atp + gln-L + h2o + utp --> adp + ctp + glu-L + (2) h + pi	0	Infinity	Nucleotide Metabolism	GSU1895	PyrG	0.00365063	3	92
CYCPO	[c] : (2) focytc + (2) h + h2o2 --> (2) ficytc + (2) h2o	0	Infinity	Other	GSU2813, GSU0466	CcpA1, Cc	0	1	93
CYOR1m	(2) ficytc[c] + mql7[c] --> (2) focytc[c] + h[e] + h[c] + mqn7[c]	0	Infinity	Energy Metabolism	GSU1215, GSU1216, GSU1640, GSU164	CydABCD	49.27386611	3	94
CYSS	[c] : acser + h2s --> ac + cys-L + h	0	Infinity	Amino Acid Metabolism	GSU3158, GSU0535	CysK2, Cys	0	3	95
CYSTL	[c] : cysth-L + h2o --> hcys-L + nh4 + pyr	0	Infinity	Amino Acid Metabolism	GSU0944, GSU0945	Cylb	0	2	96
CYSTS	[c] : hcys-L + ser-L --> cysth-L + h2o	0	Infinity	Amino Acid Metabolism			0.003744591	3	97
CYTK1	[c] : atp + cmp <==> adp + cdp	-Infinity	Infinity	Nucleotide Metabolism	GSU2605	Cmk	0	2	98
CYTK2	[c] : atp + dcmp <==> adp + dcdp	-Infinity	Infinity	Nucleotide Metabolism	GSU2605	Cmk	0	3	99
Clt	cl[e] <==> cl[c]	-Infinity	Infinity	Transport	GSU2363	ClC	0	3	100
Coabc	atp[c] + cobalt2[e] + h2o[c] --> adp[c] + cobalt2[c] + h[c] + pi[c]	0	Infinity	Transport	GSU3398, GSU3399, GSU3400, GSU300	CzcA, Cob	0	3	101
Cuabc	atp[c] + cu2[e] + h2o[c] --> adp[c] + cu2[c] + h[c] + pi[c]	0	Infinity	Transport	GSU2452, GSU3398, GSU3399, GSU340	Cudp, Czc	0	3	102
DADK	[c] : atp + damp <==> adp + dadp	-Infinity	Infinity	Nucleotide Metabolism	GSU2836	Adk	0	3	103
DAGK	[c] : 12dgr + atp --> 12dag3p + adp + h	0	Infinity	Lipid & Cell Wall Metabolism	GSU2283	DgkA	0	3	104
DAHPS	[c] : e4p + h2o + pep --> 2dda7p + pi	0	Infinity	Amino Acid Metabolism	GSU2291, GSU3333, GSU3142	AroG, AroA	0.015537899	3	105
DAPDC	[c] : 26dap-M + h --> co2 + lys-L	0	Infinity	Amino Acid Metabolism	GSU0158	LysA	0.014031454	3	106
DAPE	[c] : 26dap-LL <==> 26dap-M	-Infinity	Infinity	Amino Acid Metabolism	GSU0531	DapF	0.015368502	3	107
DB4PS	[c] : ru5p-D --> db4p + for + h	0	Infinity	Vitamins & Cofactor Biosynthesis	GSU1690	RibA	0	3	108
DBTS	[c] : atp + co2 + dann --> adp + dtbt + (3) h + pi	0	Infinity	Vitamins & Cofactor Biosynthesis	GSU1583, GSU1681	BioD	0	3	109
DDMAT5	[c] : 2tddacp + h + nadh --> ddeacp + nad	0	Infinity	Fatty Acid Synthesis	GSU1008	FabI	0.015075082	3	110

DEMAT4	[c] : 2tdeacp + h + nadh --> decacp + nad	0	Infinity	Fatty Acid Synthesis	GSU1008	FabI	0.015075082	3	111
DGK1	[c] : atp + dgmp <==> adp + dgdp	-Infinity	Infinity	Nucleotide Metabolism	GSU2238	Gmk	0	3	112
DGTPH	[c] : dgtp + h2o --> dgsn + pppi	0	Infinity	Nucleotide Metabolism	GSU1246	Dgt	0	3	113
DHAD1	[c] : 23dhmb --> 3mob + h2o	0	Infinity	Amino Acid Metabolism	GSU1912	IlvD	0.040216412	3	114
DHAD2	[c] : 23dhmp --> 3mop + h2o	0	Infinity	Amino Acid Metabolism	GSU1912	IlvD	0.01204339	3	115
DHDPRy	[c] : 23dhdp + h + nadph --> nadp + thdp	0	Infinity	Amino Acid Metabolism	GSU0160	DapB	0.015368502	3	116
DHDPS	[c] : aspsa + pyr --> 23dhdp + h + (2) h2o	0	Infinity	Amino Acid Metabolism	GSU0159	DapA	0.015368502	3	117
DHFOR2	[c] : dhf + nadp <==> fol + nadph	-Infinity	Infinity	Vitamins & Cofactor Biosynthesis	GSU0571	DfrA	0.001242879	1	118
DHFOR3	[c] : fol + h + (2) nadph <==> (2) nadp + thf	-Infinity	Infinity	Vitamins & Cofactor Biosynthesis	GSU0571	DfrA	0.001242879	3	119
DHFR	[c] : dhf + h + nadph <==> nadp + thf	-Infinity	Infinity	Vitamins & Cofactor Biosynthesis	GSU0571	DfrA	0	3	120
DHFS	[c] : atp + dhpt + glu-L --> adp + dhf + h + pi	0	Infinity	Vitamins & Cofactor Biosynthesis	GSU2368	FolC	0	3	121
DHNAOT	[c] : dhna + nad + octdp --> 2dmmq8 + co2 + nadh + ppi	0	Infinity	Vitamins & Cofactor Biosynthesis			0	2	122
DHORD4	[c] : dhor-S + mqn7 <==> mql7 + orot	-Infinity	Infinity	Nucleotide Metabolism	GSU1755, GSU1756	PyrDK	0.011582558	3	123
DHORTS	[c] : dhor-S + h2o <==> cbasp + h	-Infinity	Infinity	Nucleotide Metabolism	GSU1272	PyrC	-0.011582558	3	124
DHPPDA	[c] : 25dhpp + h2o --> 5apru + nh3	0	Infinity	Vitamins & Cofactor Biosynthesis	GSU1688	RibD	0	3	125
DHPS1	[c] : 2ahhmp + 4abz --> dhpt + h2o	0	Infinity	Vitamins & Cofactor Biosynthesis	GSU1808	FolP	0	3	126
DHQD1	[c] : 3dhq <==> 3dhsk + h2o	-Infinity	Infinity	Amino Acid Metabolism	GSU2022	AroC	0.015537899	1	127
DHQS	[c] : 2dda7p --> 3dhq + pi	0	Infinity	Amino Acid Metabolism	GSU2025	AroB	0.015537899	3	128
DMATT	[c] : dmpp + ipdp --> grdp + ppi	0	Infinity	Other	GSU1765	IspA	0	3	129
DMOCT	[c] : ctp + kdo --> ckdo + ppi	0	Infinity	Other	GSU1896	KdsB	0	3	130
DMPPS	[c] : h + h2mb4p + nadh --> dmpp + h2o + nad	0	Infinity	Vitamins & Cofactor Biosynthesis			0	3	131
DPCOAK	[c] : atp + dpcoa --> adp + coa + h	0	Infinity	Vitamins & Cofactor Biosynthesis	GSU0513	CoaE	0	3	132
DPR	[c] : 2dhp + h + nadph --> nadp + pant-R	0	Infinity	Vitamins & Cofactor Biosynthesis	GSU2683	YlbQ	0	3	133
DTMPK	[c] : atp + dtmp <==> adp + dtdp	-Infinity	Infinity	Nucleotide Metabolism	GSU3301, GSU2229	Tmk2, Tmk	0.001242879	3	134
DUTPDP	[c] : dutp + h2o --> dump + h + ppi	0	Infinity	Nucleotide Metabolism	GSU1595	YncF	0.001242879	3	135
DXPRI	[c] : dxyl5p + h + nadph <==> 2me4p + nadp	-Infinity	Infinity	Lipid & Cell Wall Metabolism	GSU1915	Dxr	0	3	136
DXPS	[c] : g3p + h + pyr --> co2 + dxyl5p	0	Infinity	Vitamins & Cofactor Biosynthesis	GSU1764, GSU0686	Dxs1, Dxs2	0	3	137
ENO	[c] : 2pg <==> h2o + pep	-Infinity	Infinity	Central Metabolism	GSU2286	Eno	-0.265534865	3	138
EPPP	[c] : h2o + polypi --> (2) h + pi	0	Infinity	Other	GSU2559	Ppx	0	3	139
FBA	[c] : fdp <==> dhap + g3p	-Infinity	Infinity	Central Metabolism	GSU1245	Fba	-0.08532516	3	140
FBP	[c] : fdp + h2o --> f6p + pi	0	Infinity	Central Metabolism	GSU1651	Fbp	0.08532516	1	141
FCLT	[c] : fe2 + ppp9 --> h + pheme	0	Infinity	Vitamins & Cofactor Biosynthesis	GSU3312	HemH	0	3	142
FDH	[c] : for + nad --> co2 + nadh	0	Infinity	Central Metabolism	GSU0777, GSU0778, GSU0779, GSU078	Fdh1	0	2	143
FE2abc	atp[c] + fe2[e] + h2o[c] --> adp[c] + fe2[c] + h[c] + pi[c]	0	Infinity	Transport	GSU3268, GSU1380	FeoB1, Fe	0	3	144
FERCYT	fe3[e] + focytc[c] --> fe2[e] + ficytc[c]	0	Infinity	Transport			98.54773223	3	145
FMNAT	[c] : atp + fmn + h --> fad + ppi	0	Infinity	Vitamins & Cofactor Biosynthesis	GSU1487	RibC	0	4	146
FNOR	[c] : fdxr-4:2 + h + nadp <==> fdxo-4:2 + nadph	0	Infinity	Energy Metabolism			12.24856252	3	147
FOMETR	[c] : 5fothf + h <==> h2o + methf	-Infinity	Infinity	Vitamins & Cofactor Biosynthesis	GSU1136	Ftcl	0	4	148
FORt2	for[e] + h[e] <==> for[c] + h[c]	-Infinity	Infinity	Transport			0	1	149
FRD5	[c] : mqn7 + succ <==> fum + mql7	-Infinity	Infinity	Central Metabolism	GSU1176, GSU1177, GSU1178	Frd	12.71988617	2	150
FRTT	[c] : frdp + ipdp --> ggdp + ppi	0	Infinity	Lipid & Cell Wall Metabolism	GSU1317	IspB	0	2	151
FUM	[c] : fum + h2o <==> mal-L	-Infinity	Infinity	Central Metabolism	GSU0994	Fum1	12.74976819	1	152
FUMt4	fum[e] + (3) h[e] --> fum[c] + (3) h[c]	0	0	Putative Transporters			0	3	153
G1Dx	[c] : glc-D + nad --> g15lac + h + nadh	0	Infinity	Central Metabolism	GSU0696	Gdh	0	3	154
G1Dy	[c] : glc-D + nadp --> g15lac + h + nadph	0	Infinity	Central Metabolism	GSU0696	Gdh	0	3	155
G1PACT	[c] : accoa + gam1p --> acgam1p + coa + h	0	Infinity	Lipid & Cell Wall Metabolism			0.003382151	3	156
G1PTMT	[c] : dttp + g1p + h --> dtdpglc + ppi	0	Infinity	Nucleotide Metabolism	GSU2083	RfbA	0	3	157
G1SAT	[c] : glu1sa <==> 5aop	-Infinity	Infinity	Vitamins & Cofactor Biosynthesis	GSU0337	HemL	0	4	158
G3PD1	[c] : glyc3p + nad <==> dhap + h + nadh	0	Infinity	Central Metabolism	GSU0006	GpsA	0	3	159
G3PD2	[c] : glyc3p + nadp <==> dhap + h + nadph	0	Infinity	Central Metabolism	GSU0006	GpsA	0	3	160
G3PD4	[c] : glyc3p + mqn7 --> dhap + mql7	0	Infinity	Central Metabolism	GSU2761	GlpA	0	3	161
G5SADs	[c] : glu5sa <==> 1pyr5c + h + h2o	-Infinity	Infinity	Amino Acid Metabolism			0.009038667	3	162
G5SD	[c] : glu5p + h + nadph --> glu5sa + nadp + pi	0	Infinity	Amino Acid Metabolism	GSU3211	ProA	0.009038667	4	163
GALT	[c] : gal1p + h + utp <==> ppi + udpgal	-Infinity	Infinity	Carbohydrate Metabolism	GSU3256	GalT	0	3	164
GALU	[c] : g1p + h + utp <==> ppi + udpg	-Infinity	Infinity	Lipid & Cell Wall Metabolism	GSU0859	GalU	7.08E-04	3	165
GAPD	[c] : g3p + nad + pi <==> 13dpg + h + nadh	-Infinity	Infinity	Central Metabolism	GSU1629	Gap	-0.199656034	3	166
GAPDy1	[c] : g3p + h2o + nadp --> 3pg + (2) h + nadph	0	Infinity	Central Metabolism	GSU1108	Gap1	0	2	167
GARFT	[c] : 10fthf + gar <==> fgam + h + thf	-Infinity	Infinity	Nucleotide Metabolism	GSU1759	PurN	0.009517873	3	168

GCCa	[c] : gly + h + lpro --> alpro + co2		0	Infinity	Amino Acid Metabolism	GSU0376, GSU0377, GSU0378, GSU201	GcvH1, Gc	0	3	169
GCCb	[c] : alpro + thf --> dhlpro + mlthf + nh4		0	Infinity	Amino Acid Metabolism	GSU0375	GcvT	0	3	170
GCCc	[c] : dhlpro + nad --> h + lpro + nadh		0	Infinity	Amino Acid Metabolism	GSU2588, GSU1315, GSU2446	Lpd	0	3	171
GCOP	[c] : atp + glycogen + h2o --> adp + g1p + h		0	Infinity	Carbohydrate Metabolism	GSU2066, GSU0371	GlgP	0	3	172
GDMANE	[c] : gdpddm <==> gdpofuc	-Infinity		Infinity	Lipid & Cell Wall Metabolism	GSU0627	Fcl	0	3	173
GDPMD	[c] : gdpman --> gdpddm + h2o		0	Infinity	Lipid & Cell Wall Metabolism	GSU0626	Gmd	0	3	174
GF6PTA	[c] : f6p + gln-L --> gam6p + glu-L		0	Infinity	Lipid & Cell Wall Metabolism	GSU0270	GlmS	0.003382151	3	175
GGTT	[c] : ggdp + ipdp --> pendp + ppi		0	Infinity	Other	GSU1317	IspB	0	2	176
GHMT	[c] : ser-L + thf <==> gly + h2o + mlthf	-Infinity		Infinity	Amino Acid Metabolism	GSU1607	GlyA	0.030436366	3	177
GK1	[c] : atp + gmp <==> adp + gdp	-Infinity		Infinity	Nucleotide Metabolism	GSU2238	Gmk	0.005122033	3	178
GLCS1	[c] : adpglc --> adp + glycogen + h		0	Infinity	Carbohydrate Metabolism	GSU1023, GSU3257	GlgA1, Glg	0.055555556	3	179
GLGC	[c] : atp + g1p + h --> adpglc + ppi		0	Infinity	Carbohydrate Metabolism			0.055555556	2	180
GLNS	[c] : atp + glu-L + nh4 --> adp + gln-L + h + pi		0	Infinity	Amino Acid Metabolism	GSU1835	GlnA	0	3	181
GLNSP3	[c] : atp + nh3 + uaagmda --> adp + pi + uaagtmda		0	Infinity	Lipid & Cell Wall Metabolism	GSU1835	GlnA	0	3	182
GLNTRS	[c] : atp + gln-L + trnagln --> amp + glntrna + h + ppi		0	Infinity	Amino Acid Metabolism	GSU3366	GlnS	0	3	183
GLNabc	atp[c] + gln-L[e] + h2o[c] --> adp[c] + gln-L[c] + h[c] + pi[c]		0	Infinity	Transport	GSU0800, GSU2649, GSU0799, GSU265	GlnH, GlnF	0	3	184
GLU5K	[c] : atp + glu-L --> adp + glu5p		0	Infinity	Amino Acid Metabolism	GSU3212	ProB	0.009038667	3	185
GLUDx	[c] : glu-L + h2o + nad <==> akg + h + nadh + nh4	-Infinity		0	Amino Acid Metabolism	GSU1564	GudA	-0.415700364	3	186
GLUDy	[c] : glu-L + h2o + nadp <==> akg + h + nadph + nh4	-Infinity		0	Amino Acid Metabolism	GSU1305	GudB	0	3	187
GLUPRT	[c] : gln-L + h2o + prpp --> glu-L + ppi + pram		0	Infinity	Nucleotide Metabolism	GSU1636	PurF	0.009517873	3	188
GLUR	[c] : glu-D <==> glu-L	-Infinity		Infinity	Amino Acid Metabolism	GSU2923	MurI	-0.001337047	2	189
GLUSy	[c] : akg + gln-L + h + nadph --> (2) glu-L + nadp		0	Infinity	Amino Acid Metabolism	GSU1239, GSU3057	GltAB	0	3	190
GLUSz	[c] : akg + fdxr-4:2 + gln-L + (2) h <==> fdxo-4:2 + (2) glu-L	-Infinity		Infinity	Amino Acid Metabolism	GSU3450	GltF	-0.081682428	3	191
GLUTRR	[c] : glutrna + (2) h + nadph --> glu1sa + nadp + trnaglu		0	Infinity	Vitamins & Cofactor Biosynthesis	GSU3284	HemA	0	1	192
GLUTRS	[c] : atp + glu-L + trnaglu --> amp + glutrna + h + ppi		0	Infinity	Vitamins & Cofactor Biosynthesis	GSU1329, GSU1219	GltX1, GltX	0	3	193
GLYD	[c] : h + hpyr + nadh <==> glyc-R + nad	-Infinity		Infinity	Central Metabolism	GSU1672	HprA	0	3	194
GLYK	[c] : atp + glyc --> adp + glyc3p + h		0	Infinity	Central Metabolism	GSU2762	GlpK	0	3	195
GLYt6	gly[e] + h[e] <==> gly[c] + h[c]	-Infinity		Infinity	Transport	GSU2951, GSU2950	ProV, ProW	0	3	196
GMPS2	[c] : atp + gln-L + h2o + xmp --> amp + glu-L + gmp + (2) h + ppi		0	Infinity	Nucleotide Metabolism	GSU2194	GuaA	0.005122033	1	197
GOFUCR	[c] : gdpofuc + h + nadph --> gdpfuc + nadp		0	Infinity	Lipid & Cell Wall Metabolism	GSU0627	Fcl	0	3	198
GRTT	[c] : grdp + ipdp --> frdp + ppi		0	Infinity	Other	GSU1765	IspA	0	3	199
GSADH	[c] : glu5sa + h2o + nad --> glu-L + (2) h + nadh		0	Infinity	Amino Acid Metabolism	GSU3395	PyrcPrd	0	3	200
GSHPO	[c] : (2) gthrd + h2o2 --> gthox + (2) h2o		0	Infinity	Other	GSU0352	Gpo1	0	4	201
GTPCII	[c] : gtp + (3) h2o --> 25dhpp + for + (2) h + ppi		0	Infinity	Vitamins & Cofactor Biosynthesis	GSU1690	RibA	0	1	202
GTPDPK	[c] : atp + gtp --> amp + gdptp + h		0	Infinity	Nucleotide Metabolism	GSU2236	RelA	0	3	203
GUAPRT	[c] : gua + prpp --> gmp + ppi		0	Infinity	Nucleotide Metabolism	GSU1526	Apt	0	3	204
H2Ot5	h2o[e] <==> h2o[c]	-Infinity		Infinity	Transport			21.52584487	1	205
H2td	h2[c] <==> h2[e]	-Infinity		Infinity	Transport			0	3	206
HBUHL1	[c] : 3hbacp --> 2beacp + h2o		0	Infinity	Fatty Acid Synthesis	GSU2265, GSU0458	FabZ1, FaI	0.015075082	1	207
HBUR1	[c] : aaacp + h + nadph --> 3hbacp + nadp		0	Infinity	Fatty Acid Synthesis	GSU1603, GSU0461	FabG2	0.015075082	3	208
HBZOPT	[c] : 4hbz + octdp --> 3ophb + ppi		0	Infinity	Other	GSU1502, GSU0439	UbiA	0	3	209
HCO3E	[c] : co2 + h2o <==> h + hco3	-Infinity		Infinity	Nonenzymatic Chemical Reactions	GSU0067, GSU2307	CynT	0.404291443	3	210
HDACPHL	[c] : h2o + hdeacp --> acp + h + hdca		0	Infinity	Fatty Acid Synthesis			0.01355987	3	211
HDDHL5	[c] : 3hddacp --> 2tddacp + h2o		0	Infinity	Fatty Acid Synthesis	GSU2265, GSU0458	FabZ1, FaI	0.015075082	2	212
HDDR5	[c] : 3oxddacp + h + nadph --> 3hddacp + nadp		0	Infinity	Fatty Acid Synthesis	GSU1603, GSU0461	FabG2	0.015075082	2	213
HDEHL4	[c] : 3hdeacp --> 2tdeacp + h2o		0	Infinity	Fatty Acid Synthesis	GSU2265, GSU0458	FabZ1, FaI	0.015075082	3	214
HDER4	[c] : 3oxdeacp + h + nadph --> 3hdeacp + nadp		0	Infinity	Fatty Acid Synthesis	GSU1603, GSU0461	FabG2	0.015075082	3	215
HDH	[c] : h2 + nad --> h + nadh		0	Infinity		GSU0121, GSU0122, GSU0123, GSU241	Hox	0	3	216
HDH2	(2) h[c] + h2[c] + mqn7[c] --> (2) h[e] + mql7[c]		0	Infinity	Energy Metabolism	GSU0782, GSU0783, GSU0784, GSU078	PhyB	0	1	217
HDMAT7	[c] : 2thdeacp + h + nadh --> hdeacp + nad		0	Infinity	Fatty Acid Synthesis	GSU1008	FabI	0.013791608	3	218
HEMAT2	[c] : 2theacp + h + nadh --> hexacp + nad		0	Infinity	Fatty Acid Synthesis	GSU1008	FabI	0.015075082	3	219
HEPTT	[c] : hepdp + ipdp --> octdp + ppi		0	Infinity	Lipid & Cell Wall Metabolism	GSU1317	IspB	0	3	220
HEX1	[c] : atp + glc-D --> adp + g6p + h		0	Infinity	Central Metabolism	GSU1702	Glk	0	3	221
HEXTT	[c] : hexdp + ipdp --> hepdp + ppi		0	Infinity	Lipid & Cell Wall Metabolism	GSU1317	IspB	0	3	222
HGBAMCOC	[c] : atp + cobalt2 + h2o + hgbam + nadh --> adp + co2dam + h + nad + pi		0	Infinity	Vitamins & Cofactor Biosynthesis			0	3	223
HGBAMS	[c] : (2) atp + (2) gln-L + h2o + hgbyr --> (2) adp + (2) glu-L + h + hgbam + ppi		0	Infinity	Vitamins & Cofactor Biosynthesis	GSU3006	CobB	0	3	224
HGR	[c] : hg2 + nadph <==> h + hg0 + nadp	-Infinity		Infinity	Central Metabolism	GSU3424	MerA	0	3	225
HHDHL7	[c] : 3hpaacp --> 2thdeacp + h2o		0	Infinity	Fatty Acid Synthesis	GSU2265, GSU0458	FabZ1, FaI	0.013791608	1	226

HHDR7	[c] : 3oxhdacp + h + nadph --> 3hpaacp + nadp	0	Infinity	Fatty Acid Synthesis	GSU1603, GSU0461	FabG2	0.013791608	2	227
HHYHL2	[c] : 3hhacp --> 2theacp + h2o	0	Infinity	Fatty Acid Synthesis	GSU2265, GSU0458	FabZ1, Fal	0.015075082	3	228
HHYR2	[c] : 3oxhacp + h + nadph --> 3hhacp + nadp	0	Infinity	Fatty Acid Synthesis	GSU1603, GSU0461	FabG2	0.015075082	3	229
HIBD	[c] : 3hmp + nad --> 2mop + h + nadh	0	Infinity	Amino Acid Metabolism	GSU1451, GSU1372	MmsB2, M	0	3	230
HISTD	[c] : h2o + histd + (2) nad --> (3) h + his-L + (2) nadh	0	Infinity	Amino Acid Metabolism	GSU3100	HisD	0.003873714	3	231
HISTP	[c] : h2o + hisp --> histd + pi	0	Infinity	Amino Acid Metabolism	GSU2084	HisJ	0.003873714	3	232
HMBS	[c] : h2o + (4) ppbng --> hmbil + (4) nh4	0	Infinity	Cofactor and Prosthetic Group Biosynth	GSU3285	HemC	0	3	233
HMPK1	[c] : 4ahmmp + atp --> 4ampm + adp + h	0	Infinity	Vitamins & Cofactor Biosynthesis	GSU0605	ThiD	0	3	234
HMPK2	[c] : 4ahmmp + ctp --> 4ampm + cdp + h	0	Infinity	Vitamins & Cofactor Biosynthesis	GSU0605	ThiD	0	3	235
HMPK3	[c] : 4ahmmp + utp --> 4ampm + h + udp	0	Infinity	Vitamins & Cofactor Biosynthesis	GSU0605	ThiD	0	3	236
HMPK4	[c] : 4ahmmp + gtp --> 4ampm + gdp + h	0	Infinity	Vitamins & Cofactor Biosynthesis	GSU0605	ThiD	0	3	237
HOCHL3	[c] : 3hocacp --> 2toceacp + h2o	0	Infinity	Fatty Acid Synthesis	GSU2265, GSU0458	FabZ1, Fal	0.015075082	3	238
HOCR3	[c] : 3oxocacp + h + nadph --> 3hocacp + nadp	0	Infinity	Fatty Acid Synthesis	GSU1603, GSU0461	FabG2	0.015075082	3	239
HODHL8	[c] : 3hocdacp --> 2tocdacp + h2o	0	Infinity	Fatty Acid Synthesis	GSU2265, GSU0458	FabZ1, Fal	2.32E-04	3	240
HODR8	[c] : 3oxocdacp + h + nadph --> 3hocdacp + nadp	0	Infinity	Fatty Acid Synthesis	GSU1603, GSU0461	FabG2	2.32E-04	1	241
HP5CD	[c] : 1p3h5c + (2) h2o + nad --> 4hglu + h + nadh	0	Infinity	Amino Acid Metabolism	GSU3395	PyrcPrd	0	3	242
HPOD	[c] : Lhpro + fad --> 1p3h5c + fadh2 + h	0	Infinity	Amino Acid Metabolism	GSU3395	PyrcPrd	0	3	243
HPPK	[c] : 2ahhmp + atp --> 2ahhmd + amp + h	0	Infinity	Vitamins & Cofactor Biosynthesis	GSU2979	FolK	0	3	244
HSAT	[c] : accoa + hom-L <==> achms + coa	-Infinity	Infinity	Amino Acid Metabolism	GSU2462	MetA1	0.010028616	3	245
HSDy	[c] : hom-L + nadp <==> aspsa + h + nadph	-Infinity	Infinity	Amino Acid Metabolism	GSU1693	Hom	-0.03283189	4	246
HSK	[c] : atp + hom-L --> adp + h + phom	0	Infinity	Amino Acid Metabolism			0.022803273	1	247
HSTPT	[c] : glu-L + imacp --> akg + h + hisp	0	Infinity	Amino Acid Metabolism	GSU2989, GSU3099	HisC	0.003873714	3	248
HTDHL6	[c] : 3htdacp --> 2ttdeacp + h2o	0	Infinity	Fatty Acid Synthesis	GSU2265, GSU0458	FabZ1, Fal	0.015075082	3	249
HTDR6	[c] : 3oxtdacp + h + nadph --> 3htdacp + nadp	0	Infinity	Fatty Acid Synthesis	GSU1603, GSU0461	FabG2	0.015075082	3	250
HXPRT	[c] : hxan + prpp --> imp + ppi	0	Infinity	Nucleotide Metabolism	GSU1017	Hpt	0	3	251
ICDHy	[c] : icit + nadp <==> akg + co2 + nadph	-Infinity	Infinity	Central Metabolism	GSU1465	Icd	12.76518787	3	252
ICHORSi	[c] : chor --> ichor	0	Infinity	Vitamins & Cofactor Biosynthesis			0	3	253
ICHORT	[c] : h2o + ichor --> 23ddhb + pyr	0	Infinity	Vitamins & Cofactor Biosynthesis	GSU0569	EntB	0	2	254
IG3PS	[c] : gln-L + prlp --> aicar + eig3p + glu-L + (2) h	0	Infinity	Amino Acid Metabolism	GSU3095, GSU3097	HisF	0.003873714	3	255
IGPDH	[c] : eig3p + h --> h2o + imacp	0	Infinity	Amino Acid Metabolism	GSU3098	HisB	0.003873714	3	256
IGPS	[c] : 2cpr5p + h --> 3ig3p + co2 + h2o	0	Infinity	Amino Acid Metabolism	GSU2380	TrpC	0.002324229	1	257
ILETA	[c] : akg + ile-L <==> 3mop + glu-L	-Infinity	Infinity	Amino Acid Metabolism	GSU0656	IlvE	-0.011879391	3	258
ILEabc	atp[c] + h2o[c] + ile-L[e] --> adp[c] + h[c] + ile-L[c] + pi[c]	0	Infinity	Transport	GSU3391, GSU3392, GSU3393, GSU339	BraB, BrnC	0	3	259
ILEt6	h[e] + ile-L[e] <==> h[c] + ile-L[c]	-Infinity	Infinity	Transport	GSU0768	AzlC	0	3	260
IMPC	[c] : h2o + imp <==> fprica	-Infinity	Infinity	Nucleotide Metabolism	GSU0609	PurH	-0.013391588	3	261
IMPD	[c] : h2o + imp + nad --> h + nadh + xmp	0	Infinity	Nucleotide Metabolism	GSU2195	GuaB	0.005122033	3	262
IPDPS	[c] : h + h2mb4p + nadh --> h2o + ipdp + nad	0	Infinity	Vitamins & Cofactor Biosynthesis			0	3	263
IPMD	[c] : 3c2hmp + nad --> 3c4mop + h + nadh	0	Infinity	Amino Acid Metabolism	GSU2879	LeuB	0.022835386	2	264
IPPMIa	[c] : 3c2hmp <==> 2ippm + h2o	-Infinity	Infinity	Amino Acid Metabolism	GSU1902, GSU1903	LeuCD	-0.022835386	1	265
IPPMIb	[c] : 2ippm + h2o <==> 3c3hmp	-Infinity	Infinity	Amino Acid Metabolism	GSU1902, GSU1903	LeuCD	-0.022835386	1	266
IPPS	[c] : 3mob + accoa + h2o --> 3c3hmp + coa + h	0	Infinity	Amino Acid Metabolism	GSU0937, GSU1906	LeuA	0.022835386	1	267
KARA1	[c] : 23dhmb + nadp <==> alac-S + h + nadph	-Infinity	Infinity	Amino Acid Metabolism	GSU1909	IlvC	-0.040216412	2	268
KARA2	[c] : 2ahbut + h + nadph <==> 23dhmp + nadp	-Infinity	Infinity	Amino Acid Metabolism	GSU1909	IlvC	0.01204339	2	269
KAS1	[c] : (14) h + ibcoa + (5) malcoa + (10) nadph --> (5) co2 + (6) coa + fa1 + (4) h2o +	0	Infinity	Lipid & Cell Wall Metabolism	GSU1605, GSU0460, GSU0459, GSU160	FabF, Fab(	7.84E-05	3	270
KAS17	[c] : accoa + (22) h + (8) malcoa + (15) nadph --> (8) co2 + (9) coa + (7) h2o + (15)	0	Infinity	Fatty Acid Synthesis	GSU1605, GSU0460, GSU0459, GSU160	FabF, Fab(	0.001386864	3	271
KAS3	[c] : (14) h + ivcoa + (5) malcoa + (10) nadph --> (5) co2 + (6) coa + fa3 + (4) h2o +	0	Infinity	Fatty Acid Synthesis	GSU1605, GSU0460, GSU0459, GSU160	FabF, Fab(	0.003743464	3	272
KAS4	[c] : 2mbcoa + (14) h + (5) malcoa + (10) nadph --> (5) co2 + (6) coa + fa4 + (4) h2	0	Infinity	Fatty Acid Synthesis	GSU1605, GSU0460, GSU0459, GSU160	FabF, Fab(	1.64E-04	3	273
KAS7	[c] : accoa + (19) h + (7) malcoa + (13) nadph --> (7) co2 + (8) coa + (6) h2o + hdc	0	Infinity	Fatty Acid Synthesis	GSU1605, GSU0460, GSU0459, GSU160	FabF, Fab(	0.016613849	2	274
KAS9	[c] : (16) h + ivcoa + (6) malcoa + (11) nadph --> (6) co2 + (7) coa + fa9 + (5) h2o +	0	Infinity	Fatty Acid Synthesis	GSU1605, GSU0460, GSU0459, GSU160	FabF, Fab(	6.70E-04	1	275
KDOPS	[c] : ara5p + h2o + pep --> kdo8p + pi	0	Infinity	Lipid & Cell Wall Metabolism	GSU1894	KdsA	0	3	276
Kt6	h[e] + k[e] <==> h[c] + k[c]	0	Infinity	Transport	GSU1016, GSU1204, GSU2759, GSU248	TrkA, KefC	0.420658442	3	277
Ktabc	atp[c] + h2o[c] + k[e] --> adp[c] + h[e] + k[c] + pi[c]	0	Infinity	Transport	GSU2480, GSU2481, GSU2482	KdpABC	0	2	278
L-LACt4	h[e] + lac-L[e] --> h[c] + lac-L[c]	0	Infinity	Transport	GSU0226, GSU1622	LctP	0	2	279
LDH_L	[c] : lac-L + nad <==> h + nadh + pyr	-Infinity	Infinity	Central Metabolism	GSU1466	MLdh	0	3	280
LEUD	[c] : h2o + leu-D + nad --> 4mop + h + nadh + nh4	0	Infinity	Valine, leucine, and isoleucine metaboli	GSU1305	Bcd	0	1	281
LEUTA	[c] : akg + leu-L <==> 4mop + glu-L	-Infinity	Infinity	Amino Acid Metabolism	GSU0656	IlvE	-0.018421664	3	282
LEUabc	atp[c] + h2o[c] + leu-L[e] --> adp[c] + h[c] + leu-L[c] + pi[c]	0	Infinity	Transport	GSU3391, GSU3392, GSU3393, GSU339	BraB, BrnC	0	1	283
LEUt6	h[e] + leu-L[e] <==> h[c] + leu-L[c]	-Infinity	Infinity	Transport	GSU0768	AzlC	0	3	284

LGTHL	[c] : gthrd + mthgxl --> lgt-S		0	Infinity	Other	GSU3303	GloA	0	3	285
LPADSS	[c] : lipidX + u23ga --> h + lipidAds + udp		0	Infinity	Lipid & Cell Wall Metabolism	GSU2261	LpxB	0	3	286
LYSt3	h[e] + lys-L[c] --> h[c] + lys-L[e]		0	Infinity	Transport	GSU2777, GSU1194	LysE2, Lys	0	3	287
MACPMT	[c] : acp + malcoa --> coa + malacp		0	Infinity	Fatty Acid Synthesis	GSU1602, GSU0240	FabD	0.104473837	3	288
MALt6	h[e] + mal-L[e] <==> h[c] + mal-L[c]	-Infinity		Infinity	Transport			0	3	289
MAN1PT1	[c] : gtp + h + man1p --> gdpman + ppi		0	Infinity	Central Metabolism	GSU1202, GSU2364, GSU3254	RfbAGs, M	0	3	290
MAN6PI	[c] : man6p <==> f6p	-Infinity		Infinity	Central Metabolism	GSU1202, GSU2364	RfbAGs	0	3	291
MCMAT2	[c] : butacp + h + malacp --> 3oxhacp + acp + co2		0	Infinity	Fatty Acid Synthesis	GSU1601, GSU0290, GSU1605, GSU046	FabHAB, F	0.015075082	3	292
MCMAT3	[c] : h + hexacp + malacp --> 3oxocacp + acp + co2		0	Infinity	Fatty Acid Synthesis	GSU1601, GSU0290, GSU1605, GSU046	FabHAB, F	0.015075082	3	293
MCMAT4	[c] : h + malacp + octacp --> 3oxdeacp + acp + co2		0	Infinity	Fatty Acid Synthesis	GSU1601, GSU0290, GSU1605, GSU046	FabHAB, F	0.015075082	3	294
MCMAT5	[c] : decacp + h + malacp --> 3oxddacp + acp + co2		0	Infinity	Fatty Acid Synthesis	GSU1601, GSU0290, GSU1605, GSU046	FabHAB, F	0.015075082	3	295
MCMAT6	[c] : ddeacp + h + malacp --> 3oxtdacp + acp + co2		0	Infinity	Fatty Acid Synthesis	GSU1601, GSU0290, GSU1605, GSU046	FabHAB, F	0.015075082	1	296
MCMAT7	[c] : h + malacp + tdeacp --> 3oxhdacp + acp + co2		0	Infinity	Fatty Acid Synthesis	GSU1601, GSU0290, GSU1605, GSU046	FabHAB, F	0.013791608	3	297
MCMAT8	[c] : h + hdeacp + malacp --> 3oxocdacp + acp + co2		0	Infinity	Fatty Acid Synthesis	GSU1601, GSU0290, GSU1605, GSU046	FabHAB, F	2.32E-04	3	298
MDH	[c] : mal-L + nad <==> h + nadh + oaa	-Infinity		Infinity	Central Metabolism	GSU1466	MLdh	12.74976819	3	299
ME1x	[c] : mal-L + nad --> co2 + nadh + pyr		0	Infinity	Central Metabolism	GSU2308	Scfa	0	3	300
ME2	[c] : mal-L + nadp --> co2 + nadph + pyr		0	Infinity	Central Metabolism	GSU1700	Mae	0	3	301
MECDPDH	[c] : 2mecdp + nadh --> h2mb4p + h2o + nad		0	Infinity	Vitamins & Cofactor Biosynthesis			0	3	302
MECDPS	[c] : 2p4c2me --> 2mecdp + cmp		0	Infinity	Vitamins & Cofactor Biosynthesis	GSU3367	IspF	0	3	303
MEPCT	[c] : 2me4p + ctp + h --> 4c2me + ppi		0	Infinity	Other	GSU3368	IspD	0	3	304
METACH	[c] : achms + h2s <==> ac + h + hcys-L	-Infinity		Infinity	Amino Acid Metabolism	GSU2425, GSU1183	MetAC	0.010028616	3	305
METAT	[c] : atp + h2o + met-L --> amet + pi + ppi		0	Infinity	Amino Acid Metabolism	GSU0918, GSU1880	MetK	0	3	306
METS	[c] : 5mthf + hcys-L --> h + met-L + thf		0	Infinity	Amino Acid Metabolism	GSU2921	MetH	0.006284026	3	307
MGt5	mg2[c] <==> mg2[e]	-Infinity		Infinity	Transport	GSU3322, GSU1399	CorA2, Cor	-0.001918676	3	308
MMCD	[c] : h + mmcoa-S --> co2 + ppcoa		0	Infinity	Other	GSU3299	MmdA	0	3	309
MMM	[c] : mmcoa-R --> succoa		0	Infinity	Other	GSU1578, GSU3302	MutAB	0	3	310
MNabc	atp[c] + h2o[c] + mn2[e] --> adp[c] + h[c] + mn2[c] + pi[c]		0	Infinity	Transport	GSU2986, GSU2984, GSU2985	ZnuA, ZnuI	0	3	311
MOBDabc	atp[c] + h2o[c] + mobd[e] --> adp[c] + h[c] + mobd[c] + pi[c]		0	Infinity	Transport	GSU2960, GSU2961, GSU2962, GSU296	ModABCE	0	3	312
MOHMT	[c] : 3mob + h2o + mlthf --> 2dhp + thf		0	Infinity	Vitamins & Cofactor Biosynthesis	GSU1705	PanB	0	3	313
MTAN	[c] : 5mta + h2o --> 5mtr + ade		0	Infinity	Nucleotide Metabolism	GSU1897, GSU0453	Pfs2, Pfs1	0	1	314
MTAP	[c] : 5mta + pi --> 5mdr1p + ade		0	Infinity	Nucleotide Metabolism	GSU1112	MtaP	0	3	315
MTHFC	[c] : h2o + methf <==> 10fthf + h	-Infinity		Infinity	Vitamins & Cofactor Biosynthesis	GSU0215, GSU0862	FolD1, FolI	0.022909461	3	316
MTHFD	[c] : mlthf + nadp <==> methf + nadph	-Infinity		Infinity	Vitamins & Cofactor Biosynthesis	GSU0215, GSU0862	FolD1, FolI	0.022909461	3	317
MTHFR	[c] : fadh2 + h + mlthf --> 5mthf + fad		0	Infinity	Vitamins & Cofactor Biosynthesis	GSU2974, GSU0860	MetF	0	3	318
MTHFR1	[c] : (2) h + mlthf + nadph --> 5mthf + nadp		0	Infinity	Vitamins & Cofactor Biosynthesis	GSU2974, GSU0860	MetF	0.006284026	3	319
N2t	n2[c] <==> n2[e]	-Infinity		Infinity	Transport			0	1	320
NACCYT	[c] : acnam + ctp --> cmpacna + ppi		0	Infinity	Lipid & Cell Wall Metabolism	GSU1972	NeuA	0	3	321
NADH5	(3) h[c] + mqn7[c] + nadh[c] --> (2) h[e] + mql7[c] + nad[c]		0	Infinity	Energy Metabolism	GSU0843, GSU2095, GSU0734, GSU073	NoxA, Nad	12.14594773	3	322
NADK	[c] : atp + nad --> adp + h + nadp		0	Infinity	Vitamins & Cofactor Biosynthesis	GSU2065	NadK	0	3	323
NADPH5	(3) h[c] + mqn7[c] + nadph[c] --> (2) h[e] + mql7[c] + nadp[c]		0	Infinity	Energy Metabolism	GSU0509, GSU0510	Sfr	24.39644966	3	324
NADS1	[c] : atp + dnad + nh4 --> amp + h + nad + ppi		0	Infinity	Vitamins & Cofactor Biosynthesis	GSU0651, GSU0652	NadE	0	3	325
NAt7	h[e] + na1[c] <==> h[c] + na1[e]		0	Infinity	Transport	GSU1203, GSU2303, GSU2338, GSU234	NhaC	0	3	326
NDPK1	[c] : atp + gdp <==> adp + gtp	-Infinity		Infinity	Nucleotide Metabolism	GSU1110	Ndk	0.022177324	3	327
NDPK2	[c] : atp + udp <==> adp + utp	-Infinity		Infinity	Nucleotide Metabolism	GSU1110	Ndk	0.010339679	3	328
NDPK3	[c] : atp + cdp <==> adp + ctp	-Infinity		Infinity	Nucleotide Metabolism	GSU1110	Ndk	-0.001242879	4	329
NDPK4	[c] : atp + dtdp <==> adp + dttp	-Infinity		Infinity	Nucleotide Metabolism	GSU1110	Ndk	0.001242879	4	330
NDPK5	[c] : atp + dgdp <==> adp + dgtp	-Infinity		Infinity	Nucleotide Metabolism	GSU1110	Ndk	0.001242879	3	331
NDPK6	[c] : atp + dudp <==> adp + dutp	-Infinity		Infinity	Nucleotide Metabolism	GSU1110	Ndk	0.001242879	4	332
NDPK7	[c] : atp + dcdp <==> adp + dctp	-Infinity		Infinity	Nucleotide Metabolism	GSU1110	Ndk	0.001242879	3	333
NDPK8	[c] : atp + dadp <==> adp + datp	-Infinity		Infinity	Nucleotide Metabolism	GSU1110	Ndk	0.00124284	3	334
NH4DIS	[c] : nh4 <==> h + nh3	-Infinity		Infinity	Nonenzymatic Chemical Reactions			-0.003744591	3	335
NH4OHD	[c] : h + nh4oh <==> h2o + nh4	-Infinity		Infinity	Nonenzymatic Chemical Reactions			0	3	336
NH4t3	k[c] + nh4[e] --> k[e] + nh4[c]		0	Infinity	Transport	GSU0940, GSU1221	AmtB	0.407340576	3	337
NIT2	[c] : (8) atp + (4) fdxr-4:2 + (2) h + (8) h2o + n2 --> (8) adp + (4) fdxo-4:2 + h2 + (2)		0	Infinity	Nitrogen	GSU2819, GSU2820, GSU2821, GSU280	Nif2, Nif1	0	3	338
NIabc	atp[c] + h2o[c] + ni2[e] --> adp[c] + h[c] + ni2[c] + pi[c]		0	Infinity	Transport	GSU3398, GSU3399, GSU3400, GSU143	CzcA, NikA	0	3	339
NIt5	ni2[c] <==> ni2[e]	-Infinity		Infinity	Transport	GSU3322, GSU1399	CorA2, Cor	0	1	340
NNAM	[c] : h2o + ncam --> nac + nh4		0	Infinity	Vitamins & Cofactor Biosynthesis	GSU2290	PncA	0	3	341
NNAT	[c] : atp + h + nicrnt --> dnad + ppi		0	Infinity	Vitamins & Cofactor Biosynthesis	GSU3210	NadD	0	3	342

NNDMBRT	[c] : dmbzid + nicrnt --> 5prdmbz + h + nac		0	Infinity	Vitamins & Cofactor Biosynthesis	GSU3009	CobT	0	3	343
NNDMBRT2	[c] : ribflv --> dmbzid + unknown1		0	Infinity	Vitamins & Cofactor Biosynthesis	GSU3009	CobT	0	3	344
NNDPR	[c] : (2) h + prpp + quln --> co2 + nicrnt + ppi		0	Infinity	Vitamins & Cofactor Biosynthesis	GSU1936, GSU2963	NadC1, Na	0	3	345
NPHS	[c] : sbzcoa --> coa + dhna		0	Infinity	Vitamins & Cofactor Biosynthesis			0	1	346
NTRIRfc	[c] : (6) focytc + (8) h + no2 --> (6) ficytc + (2) h2o + nh4		0	Infinity	Amino Acid Metabolism	GSU3154, GSU3155	NrfH	0	2	347
NTRIRy	[c] : (4) h + (3) nadph + no2 --> h2o + (3) nadp + nh4oh		0	Infinity	Energy Metabolism	GSU1237, GSU3265	NasDE	0	1	348
OCBT	[c] : cbp + orn-L <==> citr-L + h + pi	-Infinity		Infinity	Amino Acid Metabolism	GSU0152	ArgF	0.012094597	1	349
OCDMAT8	[c] : 2tocdacp + h + nadh --> nad + ocdacp		0	Infinity	Fatty Acid Synthesis	GSU1008	FabI	2.32E-04	1	350
OCMAT3	[c] : 2toceacp + h + nadh --> nad + octacp		0	Infinity	Fatty Acid Synthesis	GSU1008	FabI	0.015075082	1	351
OCTDPS	[c] : frdp + (5) ipdp --> octdp + (5) ppi		0	Infinity	Vitamins & Cofactor Biosynthesis			0	2	352
OCTT	[c] : ipdp + octdp --> nondp + ppi		0	Infinity	Lipid & Cell Wall Metabolism	GSU1317	IspB	0	3	353
ODACPHL	[c] : h2o + ocdacp --> acp + h + ocdca		0	Infinity	Fatty Acid Synthesis			2.32E-04	3	354
OIVD1	[c] : 4mop + coa + nad <==> co2 + ivcoa + nadh	-Infinity		Infinity	Valine, leucine, and isoleucine metabolism			0.004413722	2	355
OIVD2	[c] : 3mob + coa + nad --> co2 + ibcoa + nadh		0	Infinity	Valine, leucine, and isoleucine metabolism			7.84E-05	3	356
OIVD3	[c] : 3mop + coa + nad --> 2mbcoa + co2 + nadh		0	Infinity	Valine, leucine, and isoleucine metabolism			1.64E-04	3	357
OMCDC	[c] : 3c4mop + h --> 4mop + co2		0	Infinity	Amino Acid Metabolism			0.022835386	1	358
OMPDC	[c] : h + orot5p --> co2 + ump		0	Infinity	Nucleotide Metabolism	GSU1461	PyrF	0.011582558	1	359
OOR	[c] : akg + coa + fdxo-4:2 --> co2 + fdxr-4:2 + h + succoa		0	Infinity	Central Metabolism	GSU1468, GSU1469, GSU1470	Ofo	12.71988617	3	360
OPHBDC	[c] : 3ophb + h --> 2oph + co2		0	Infinity	Other	GSU0440	UbiX	0	3	361
ORNTAC	[c] : acorn + glu-L <==> acglu + orn-L	-Infinity		Infinity	Amino Acid Metabolism	GSU2049	ArgJ	0.012094597	3	362
ORPT	[c] : orot5p + ppi <==> orot + prpp	-Infinity		Infinity	Nucleotide Metabolism	GSU1637	PyrE	-0.011582558	3	363
OXFOt4	for[c] + oxa[e] <==> for[e] + oxa[c]	-Infinity		Infinity	Transport	GSU2490	OfA	0	3	364
OXGDC2	[c] : akg + (2) h + thmpp --> co2 + ssaltpp		0	Infinity	Vitamins & Cofactor Biosynthesis			0	3	365
P5CD	[c] : 1pyr5c + (2) h2o + nad --> glu-L + h + nadh		0	Infinity	Amino Acid Metabolism	GSU3395	PyrcPrd	0	3	366
P5CR	[c] : 1pyr5c + (2) h + nadph --> nadp + pro-L		0	Infinity	Amino Acid Metabolism	GSU2541	ProG	0.009038667	3	367
PANTS	[c] : ala-B + atp + pant-R --> amp + h + pnto-R + ppi		0	Infinity	Vitamins & Cofactor Biosynthesis	GSU1706	PanC	0	3	368
PAPPT3	[c] : udcpp + ugmda --> uagmda + ump		0	Infinity	Lipid & Cell Wall Metabolism	GSU3072	MraY	0	1	369
PAPSR2	[c] : (2) h + pap + so3 + trdox --> paps + trdrd	-Infinity		Infinity	Central Metabolism	GSU1716	CysH	-0.010028616	3	370
PC	[c] : atp + hco3 + pyr --> adp + h + oaa + pi		0	Infinity	Central Metabolism	GSU2428	Pyc	0.124797558	3	371
PC11M	[c] : amet + pre4 --> ahcys + h + pre5		0	Infinity	Vitamins & Cofactor Biosynthesis	GSU2994	CobM	0	1	372
PC17M	[c] : amet + pre3b --> ahcys + (3) h + pre4		0	Infinity	Vitamins & Cofactor Biosynthesis	GSU2993	CbiG	0	3	373
PC20M	[c] : amet + shcl --> ahcys + h + pre3a		0	Infinity	Vitamins & Cofactor Biosynthesis	GSU2995	CobI	0	3	374
PC3BS	[c] : h + (0.5) o2 + pre3a --> pre3b		0	Infinity	Vitamins & Cofactor Biosynthesis			0	3	375
PC6AR	[c] : h + nadph + pre6a --> nadp + pre6b		0	Infinity	Vitamins & Cofactor Biosynthesis			0	3	376
PC6YM	[c] : (2) amet + pre6b --> (2) ahcys + co2 + (2) h + pre8		0	Infinity	Vitamins & Cofactor Biosynthesis	GSU2996	CobL	0	3	377
PC8XM	[c] : h + pre8 --> hgbyr		0	Infinity	Vitamins & Cofactor Biosynthesis	GSU2999	CobH	0	3	378
PDH	[c] : coa + nad + pyr --> accoa + co2 + nadh		0	Infinity	Central Metabolism	GSU2588, GSU1315, GSU2446, GSU265	Lpd, PdhAl	0	2	379
PFK	[c] : atp + f6p --> adp + fdp + h		0	Infinity	Central Metabolism	GSU1703, GSU2068	Pfk4, Pfk3	0	3	380
PFL	[c] : coa + pyr <==> accoa + for	-Infinity		Infinity	Central Metabolism	GSU2101	Pfl	0	3	381
PGAMT	[c] : gam1p <==> gam6p	-Infinity		Infinity	Lipid & Cell Wall Metabolism	GSU1805	GlmM	-0.003382151	3	382
PGCD	[c] : 3pg + nad --> 3php + h + nadh		0	Infinity	Amino Acid Metabolism	GSU1198	SerA	0.064816747	3	383
PGI	[c] : g6p <==> f6p	-Infinity		Infinity	Central Metabolism	GSU1311	Pgi	-0.057856737	3	384
PGK	[c] : 13dpg + adp <==> 3pg + atp	-Infinity		Infinity	Central Metabolism	GSU1628	Pgk-Tpi	-0.199656034	3	385
PGLUSYN	[c] : atp + glu-D --> adp + h + pi + polglu		0	Infinity	Lipid & Cell Wall Metabolism	GSU0036	PgsA1	0	2	386
PGLYCP	[c] : 2pglyc + h2o --> glyclt + pi		0	Infinity	Other	GSU2192, GSU2069	Gph1P, Gp	0	3	387
PGM	[c] : 3pg <==> 2pg	-Infinity		Infinity	Central Metabolism	GSU1612, GSU3207	Gpm1, Gpı	-0.265534865	3	388
PGMT	[c] : g1p <==> g6p	-Infinity		Infinity	Central Metabolism	GSU2013, GSU3321	Pmgm1, Pı	-0.056263612	3	389
PGPPH	[c] : h2o + pglyp --> pgly + pi		0	Infinity	Vitamins & Cofactor Biosynthesis	GSU0142	PgpA	0	1	390
PHCYT	[c] : 12dag3p + ctp + h --> cdpdag + ppi		0	Infinity	Lipid & Cell Wall Metabolism	GSU1916	CdsA	0	3	391
PHETA1	[c] : akg + phe-L <==> glu-L + phpyr	-Infinity		Infinity	Amino Acid Metabolism	GSU1061, GSU0084, GSU1242, GSU298	AspB, HisC	-0.007575264	2	392
PIabc	atp[c] + h2o[c] + pi[e] --> adp[c] + h[c] + (2) pi[c]		0	Infinity	Transport	GSU1096, GSU1097, GSU1098, GSU109	PstABCS	0	1	393
PIt6	h[e] + pi[e] <==> h[c] + pi[c]	-Infinity		Infinity	Transport	GSU0389	PitA	0.106676825	3	394
PIt7	(3) na1[e] + pi[e] <==> (3) na1[c] + pi[c]	-Infinity		Infinity	Transport	GSU1742	YjbB	0	3	395
PMANM	[c] : man1p <==> man6p	-Infinity		Infinity	Central Metabolism	GSU2013, GSU3321	Pmgm1, Pı	0	3	396
PMDPHT	[c] : 5aprbu + h2o --> 4r5au + pi		0	Infinity	Vitamins & Cofactor Biosynthesis			0	3	397
PMPK	[c] : 4ampm + atp --> 2mahmp + adp		0	Infinity	Vitamins & Cofactor Biosynthesis	GSU0605	ThiD	0	2	398
PNTEH	[c] : h2o + ptth --> cysam + pnto-R		0	Infinity	Vitamins & Cofactor Biosynthesis	GSU0448, GSU2290	Phyd, PncA	0	3	399
PNTK	[c] : atp + pnto-R --> 4ppan + adp + h		0	Infinity	Vitamins & Cofactor Biosynthesis			0	3	400

POR	[c] : coa + fdxo-4:2 + pyr <==> accoa + co2 + fdxr-4:2 + h	-Infinity	Infinity	Central Metabolism	GSU2052, GSU2053, GSU0097, GSU185	Pfer	-0.553006075	3	401
PPA	[c] : h2o + ppi --> h + (2) pi	0	Infinity	Other	GSU2975	Ppa	0	2	402
PPA_1	h2o[c] + ppi[c] --> h[e] + (2) pi[c]	0	Infinity	Transport	GSU3291	Ppa1	0.411143142	3	403
PPBNGS	[c] : (2) 5aop --> h + (2) h2o + ppbng	0	Infinity	Vitamins & Cofactor Biosynthesis	GSU0135	HemB	0	3	404
PPCDC	[c] : 4ppcys + h --> co2 + pan4p	0	Infinity	Vitamins & Cofactor Biosynthesis	GSU1124	Dfp	0	3	405
PPCK	[c] : atp + oaa --> adp + co2 + pep	0	Infinity	Central Metabolism	GSU3385	PckA	0	3	406
PPDK	[c] : atp + pi + pyr --> amp + h + pep + ppi	0	Infinity	Central Metabolism	GSU0580	PpdK	0.299009795	2	407
PPIK	[c] : atp + ppi --> adp + pppi	0	Infinity	Other	GSU3323	Ppk	0	3	408
PPNCL	[c] : 4ppan + ctp + cys-L --> 4ppcys + cdp + h + pi	0	Infinity	Vitamins & Cofactor Biosynthesis	GSU1124	Dfp	0	3	409
PPND	[c] : nad + pphn --> 34hpp + co2 + nadh	0	Infinity	Amino Acid Metabolism	GSU2607	TyrA	0.005638407	3	410
PPNDH	[c] : h + pphn --> co2 + h2o + phpyr	0	Infinity	Amino Acid Metabolism	GSU1828, GSU2608	PheA	0.007575264	3	411
PPPGO	[c] : (1.5) o2 + pppg9 --> (3) h2o + ppp9	0	Infinity	Vitamins & Cofactor Biosynthesis	GSU0012	HemY	0	3	412
PPS	[c] : atp + h2o + pyr --> amp + (2) h + pep + pi	0	Infinity	Central Metabolism	GSU0803	Pps	0	3	413
PPTGS2	[c] : uaagtmdga --> (2) h + pptg1 + udcpdp	0	Infinity	Lipid & Cell Wall Metabolism			0	3	414
PPTT	[c] : ipdp + pendp --> hexdp + ppi	0	Infinity	Lipid & Cell Wall Metabolism	GSU1317	IspB	0	3	415
PRAGS	[c] : atp + gly + pram --> adp + gar + h + pi	0	Infinity	Nucleotide Metabolism	GSU0610	PurD	0.009517873	3	416
PRAI	[c] : pran <==> 2cpr5p	-Infinity	Infinity	Amino Acid Metabolism	GSU2378	TrpF	0.002324229	1	417
PRAIS	[c] : atp + fpram --> adp + air + h + pi	0	Infinity	Nucleotide Metabolism	GSU1758	PurM	0.009517873	3	418
PRAMPC	[c] : h + h2o + prbamp --> prfp	0	Infinity	Amino Acid Metabolism	GSU1531	HisI	0.003873714	3	419
PRASCS	[c] : 5aizc + asp-L + atp <==> 25aics + adp + h + pi	-Infinity	Infinity	Nucleotide Metabolism	GSU2091	PurC	0.009517873	2	420
PRATPP	[c] : h2o + prbatp --> h + ppi + prbamp	0	Infinity	Amino Acid Metabolism	GSU3094, GSU1531	HisE, HisI	0.003873714	1	421
PRE6AS	[c] : amet + h2o + pre5 --> ac + ahcys + h + pre6a	0	Infinity	Vitamins & Cofactor Biosynthesis			0	3	422
PRFGS	[c] : atp + fgam + gln-L + h2o --> adp + fpram + glu-L + (2) h + pi	0	Infinity	Nucleotide Metabolism	GSU1634, GSU1635	PurLQS	0.009517873	4	423
PRMICI	[c] : prfp <==> prlp	-Infinity	Infinity	Amino Acid Metabolism	GSU3096	HisA	0.003873714	4	424
PROt5	na1[e] + pro-L[e] <==> na1[c] + pro-L[c]	-Infinity	Infinity	Transport	GSU0518	NaPt	0	2	425
PRPPS	[c] : atp + r5p <==> amp + h + prpp	-Infinity	Infinity	Amino Acid Metabolism	GSU0661	Prs	0.027298374	3	426
PSCVT	[c] : pep + skm5p <==> 3psme + pi	-Infinity	Infinity	Amino Acid Metabolism	GSU2606	AroE	0.015537899	3	427
PSERT	[c] : 3php + glu-L --> akg + pser-L	0	Infinity	Amino Acid Metabolism	GSU3260	SerC	0.064816747	3	428
PSP_L	[c] : h2o + pser-L --> pi + ser-L	0	Infinity	Amino Acid Metabolism			0.064816747	3	429
PSRED3	(2) h[e] + mql7[c] + ss[e] --> (2) h2s[e] + mqn7[c]	0	Infinity	Other	GSU0085, GSU0087, GSU0088, GSU008	Psr	0	1	430
PSULF	[e] : h2s + s <==> (2) h + ss	-Infinity	Infinity	Nonenzymatic Chemical Reactions			0	1	431
PTAr	[c] : accoa + pi <==> actp + coa	-Infinity	Infinity	Central Metabolism	GSU2706	Pta	-0.93881496	1	432
PTHPS	[c] : ahdt --> 6pthp + pppi	0	Infinity	Vitamins & Cofactor Biosynthesis	GSU1720	Ptps	0	1	433
PTPAT	[c] : atp + h + pan4p <==> dpcoa + ppi	-Infinity	Infinity	Vitamins & Cofactor Biosynthesis	GSU1243	CoaD	0	3	434
PYK	[c] : adp + h + pep --> atp + pyr	0	Infinity	Central Metabolism	GSU3331	Pyk	0	3	435
PYRZAM	[c] : h2o + malm --> male + nh4	0	Infinity	Other	GSU2290	PncA	0	3	436
QULNS	[c] : dhap + iasp --> (2) h2o + pi + quln	0	Infinity	Vitamins & Cofactor Biosynthesis	GSU0021	NadA	0	1	437
RBFK	[c] : atp + ribflv --> adp + fmn + h	0	Infinity	Vitamins & Cofactor Biosynthesis	GSU1487	RibC	0	3	438
RBFSa	[c] : 4r5au + db4p --> dmlz + (2) h2o + pi	0	Infinity	Vitamins & Cofactor Biosynthesis	GSU1689, GSU1691	RibEH	0	3	439
RBFSb	[c] : (2) dmlz --> 4r5au + ribflv	0	Infinity	Vitamins & Cofactor Biosynthesis	GSU1689, GSU1691	RibEH	0	3	440
RBK	[c] : atp + rib-D --> adp + h + r5p	0	Infinity	Central Metabolism	GSU0692	RbsK	0	3	441
RBZP	[c] : 5prdmbz + h2o --> pi + rdmbzi	0	Infinity	Vitamins & Cofactor Biosynthesis	GSU3007	CobC	0	3	442
RNDR1	[c] : adp + trdrd --> dadp + h2o + trdox	0	Infinity	Nucleotide Metabolism	GSU1532, GSU1871, GSU2157	NrdEF	0.00124284	3	443
RNDR2	[c] : gdp + trdrd --> dgdp + h2o + trdox	0	Infinity	Nucleotide Metabolism	GSU1532, GSU1871, GSU2157	NrdEF	0.001242879	3	444
RNDR3	[c] : cdp + trdrd --> dcdp + h2o + trdox	0	Infinity	Nucleotide Metabolism	GSU1532, GSU1871, GSU2157	NrdEF	0.001242879	3	445
RNDR4	[c] : trdrd + udp --> dudp + h2o + trdox	0	Infinity	Nucleotide Metabolism	GSU1532, GSU1871, GSU2157	NrdEF	0.001242879	3	446
RPE	[c] : ru5p-D <==> xu5p-D	-Infinity	Infinity	Central Metabolism	GSU3374	Rpe	-0.024086272	3	447
RPI	[c] : r5p <==> ru5p-D	-Infinity	Infinity	Central Metabolism	GSU1606	Rpi	-0.024086272	3	448
SADT2	[c] : atp + gtp + h2o + so4 --> aps + gdp + pi + ppi	0	Infinity	Amino Acid Metabolism	GSU1717, GSU1718	Sat	0.010028616	3	449
SBDH	[c] : nadp + sbt6p --> h + nadph + srb1p	0	Infinity	Carbohydrate Metabolism	GSU0193	Sodh	0	2	450
SDPDS	[c] : h2o + sl26da --> 26dap-LL + succ	0	Infinity	Amino Acid Metabolism			0.015368502	1	451
SDPTA	[c] : akg + sl26da <==> glu-L + sl2a6o	-Infinity	Infinity	Amino Acid Metabolism	GSU0162	Sudt	-0.015368502	1	452
SERAT	[c] : accoa + ser-L <==> acser + coa	-Infinity	Infinity	Amino Acid Metabolism	GSU2572	CysE	0	3	453
SERD_L	[c] : ser-L --> nh4 + pyr	0	Infinity	Amino Acid Metabolism	GSU0486	IlvA	0	2	454
SHCHCS2	[c] : ichor + ssaltpp --> 2shchc + h + pyr + thmpp	0	Infinity	Vitamins & Cofactor Biosynthesis			0	1	455
SHCHD	[c] : nadp + shcl --> (2) h + nadph + srch	0	Infinity	Vitamins & Cofactor Biosynthesis	GSU3282, GSU3286	CysG	0	3	456
SHCHF	[c] : fe2 + srch --> (2) h + sheme	0	Infinity	Vitamins & Cofactor Biosynthesis	GSU3282, GSU3286	CysG	0	2	457
SHK3D	[c] : 3dhsk + h + nadph <==> nadp + skm	-Infinity	Infinity	Amino Acid Metabolism	GSU1490	AroD	0.015537899	3	458

SHKK	[c] : atp + skm --> adp + h + skm5p		0	Infinity	Amino Acid Metabolism	GSU2026	AroK	0.015537899	3	459
SO4t2	h[e] + so4[e] --> h[c] + so4[c]		0	Infinity	Transport	GSU2312	SulP	0.010028616	3	460
SOD	[c] : (2) h + (2) o2- --> h2o2 + o2		0	Infinity	Other	GSU1158	SodB	0	3	461
SPMS	[c] : ametam + ptrc --> 5mta + h + spmd		0	Infinity	Amino Acid Metabolism	GSU2502	SpeE	0	3	462
SUCBZL	[c] : atp + coa + sucbz --> amp + ppi + sbzcoa		0	Infinity	Vitamins & Cofactor Biosynthesis			0	1	463
SUCBZS	[c] : 2shchc --> h2o + sucbz		0	Infinity	Vitamins & Cofactor Biosynthesis			0	1	464
SUCFUMtdc	fum[e] + succ[c] <==> fum[c] + succ[e]	-Infinity		Infinity	Transport	GSU2751	DcuB	0	3	465
SUCOAS	[c] : atp + coa + succ <==> adp + pi + succoa		0	Infinity	Central Metabolism	GSU1058, GSU1059	SucCD	0	3	466
SULR	[c] : (3) h2o + h2s + (3) nadp <==> (5) h + (3) nadph + so3	-Infinity		Infinity	Central Metabolism	GSU2527	YvgQR	-0.010028616	2	467
SULabc	atp[c] + h2o[c] + so4[e] --> adp[c] + h[c] + pi[c] + so4[c]		0	Infinity	Transport	GSU1349, GSU1346, GSU1347, GSU134	CysAP, Cy	0	3	468
TADSK	[c] : atp + h2o + lipidA --> adp + h + lipid4 + pi		0	Infinity	Lipid & Cell Wall Metabolism	GSU2258	LpxK	0	3	469
TAL	[c] : g3p + s7p <==> e4p + f6p	-Infinity		Infinity	Central Metabolism	GSU2977	Tal	-0.004274186	3	470
TDACPHL	[c] : h2o + tdeacp --> acp + h + myrt		0	Infinity	Fatty Acid Synthesis			0.001283473	1	471
TDMAT6	[c] : 2ttdeacp + h + nadh --> nad + tdeacp		0	Infinity	Fatty Acid Synthesis	GSU1008	FabI	0.015075082	3	472
TDPDRR	[c] : dtdp6dm + nadp <==> dtdpddm + h + nadph	-Infinity		Infinity	Carbohydrate Metabolism	GSU2365	RfbD	0	3	473
TDPGDH	[c] : dtdpglc --> dtdpddg + h2o		0	Infinity	Other	GSU2366	RfbB1	0	3	474
THDPS	[c] : h2o + succoa + thdp --> coa + sl2a6o		0	Infinity	Amino Acid Metabolism			0.015368502	1	475
THPDH	[c] : nad + phthr --> amopbut-L + h + nadh		0	Infinity	Vitamins & Cofactor Biosynthesis	GSU0115	PdxA	0	2	476
THRA	[c] : thr-L <==> acald + gly	-Infinity		Infinity	Amino Acid Metabolism	GSU3408	Tha	0.004131527	3	477
THRD_L	[c] : thr-L --> 2obut + nh4		0	Infinity	Amino Acid Metabolism	GSU0486	IlvA	0.0082988	3	478
THRLAD	[c] : thr-LA --> acald + gly		0	Infinity	Amino Acid Metabolism	GSU3162	LtaA	0	3	479
THRS	[c] : h2o + phom --> pi + thr-L		0	Infinity	Amino Acid Metabolism	GSU1695	ThrC	0.022803273	3	480
TKT1	[c] : r5p + xu5p-D <==> g3p + s7p	-Infinity		Infinity	Central Metabolism	GSU3423, GSU2918, GSU2919	Tkt1, Tkt2	-0.004274186	3	481
TKT2	[c] : e4p + xu5p-D <==> f6p + g3p	-Infinity		Infinity	Central Metabolism	GSU3423, GSU2918, GSU2919	Tkt1, Tkt2	-0.019812085	3	482
TMDK1	[c] : atp + thymd --> adp + dtmp + h		0	Infinity	Nucleotide Metabolism	GSU3301, GSU2229	Tmk2, Tmk	0	3	483
TMDS	[c] : dump + mlthf --> dhf + dtmp		0	Infinity	Nucleotide Metabolism	GSU3106	ThyA	0.001242879	1	484
TMPK	[c] : atp + thmmp --> adp + thmpp		0	Infinity	Vitamins & Cofactor Biosynthesis	GSU3194	ThiL	0	3	485
TMPPP	[c] : 2mahmp + 4mpetz + h --> ppi + thmmp		0	Infinity	Vitamins & Cofactor Biosynthesis	GSU0587	ThiE	0	3	486
TPI	[c] : dhap <==> g3p	-Infinity		Infinity	Central Metabolism	GSU1628	Pgk-Tpi	-0.08532516	3	487
TRDR	[c] : h + nadph + trdox --> nadp + trdrd		0	Infinity	Central Metabolism	GSU0488	TrxB	0.015000094	3	488
TRE6PP	[c] : h2o + tre6p --> pi + tre		0	Infinity	Carbohydrate Metabolism	GSU2302, GSU2336	OtsB	0	3	489
TRPS1	[c] : 3ig3p + ser-L --> g3p + h2o + trp-L		0	Infinity	Amino Acid Metabolism	GSU2371, GSU2379	TrpAB	0.002324229	3	490
TYRTA	[c] : akg + tyr-L <==> 34hpp + glu-L	-Infinity		Infinity	Amino Acid Metabolism	GSU1061, GSU0084, GSU1242, GSU298	AspB, HisC	-0.005638407	3	491
UAAGDS	[c] : 26dap-M + atp + uamag --> adp + h + pi + ugmd		0	Infinity	Lipid & Cell Wall Metabolism	GSU3074	MurE	0	3	492
UACAT	[c] : 3htdacp + uacgam --> acp + u3aga		0	Infinity	Lipid & Cell Wall Metabolism	GSU2264, GSU0999	LpxA	0	3	493
UAG2E	[c] : uacgam <==> uacmam	-Infinity		Infinity	Lipid & Cell Wall Metabolism	GSU2243, GSU2245	YvyH1, Yvy	0	3	494
UAG2EMA	[c] : h2o + uacgam <==> acmana + h + udp	-Infinity		Infinity	Lipid & Cell Wall Metabolism	GSU2243, GSU2245	YvyH1, Yvy	0	3	495
UAGCVT	[c] : pep + uacgam --> pi + uaccg		0	Infinity	Lipid & Cell Wall Metabolism	GSU3102	MurAA	0.001337047	3	496
UAGDP	[c] : acgam1p + h + utp --> ppi + uacgam		0	Infinity	Lipid & Cell Wall Metabolism	GSU0271	GcaD	0.003382151	3	497
UAGPT3	[c] : uacgam + uagmda --> h + uaagmda + udp		0	Infinity	Lipid & Cell Wall Metabolism	GSU3069	MurG	0	3	498
UAGT3	[c] : (5) gly + uaagtmda --> (5) h2o + uaagtmdga		0	Infinity	Lipid & Cell Wall Metabolism			0	1	499
UAMAGS	[c] : atp + glu-D + uama --> adp + h + pi + uamag		0	Infinity	Lipid & Cell Wall Metabolism	GSU3071	MurD	0	3	500
UAMAS	[c] : ala-L + atp + uamr --> adp + h + pi + uama		0	Infinity	Lipid & Cell Wall Metabolism	GSU3068	MurC	0	3	501
UAPGR	[c] : h + nadph + uaccg --> nadp + uamr		0	Infinity	Lipid & Cell Wall Metabolism	GSU3067	MurB	0.001337047	3	502
UDCPDP	[c] : h2o + udcpdp --> h + pi + udcpp		0	Infinity	Lipid & Cell Wall Metabolism			0	1	503
UDCPK	[c] : atp + udcp --> adp + h + udcpp		0	Infinity	Lipid & Cell Wall Metabolism	GSU0387	BacA1	0	3	504
UDPDPS	[c] : decdp + ipdp --> ppi + udcpdp		0	Infinity	Lipid & Cell Wall Metabolism	GSU1917	UppS	0	3	505
UDPG4E	[c] : udpg <==> udpgal	-Infinity		Infinity	Lipid & Cell Wall Metabolism	GSU2240	GalE	0	3	506
UDPGD	[c] : h2o + (2) nad + udpg <==> (3) h + (2) nadh + udpglcur	-Infinity		Infinity	Lipid & Cell Wall Metabolism	GSU1816	Ugd	0	3	507
UGMDDS	[c] : alaala + atp + ugmd --> adp + h + pi + ugmda		0	Infinity	Lipid & Cell Wall Metabolism	GSU3073	MurF	0	1	508
UGSAT	[c] : acp + h + u23ga <==> 3htdacp + u3hga	-Infinity		Infinity	Lipid & Cell Wall Metabolism	GSU2266	LpxD	0	3	509
UHGADA	[c] : h2o + u3aga --> ac + u3hga		0	Infinity	Lipid & Cell Wall Metabolism	GSU0731	LpxC	0	3	510
UPP3MT	[c] : (2) amet + uppg3 --> (2) ahcys + h + shcl		0	Infinity	Vitamins & Cofactor Biosynthesis	GSU3282, GSU3286	CysG	0	3	511
UPP3S	[c] : hmbil --> h2o + uppg3		0	Infinity	Vitamins & Cofactor Biosynthesis	GSU3286	HemD	0	3	512
UPPDC1	[c] : (4) h + uppg3 --> (4) co2 + cpppg3		0	Infinity	Vitamins & Cofactor Biosynthesis	GSU3453	HemE	0	3	513
UPPRT	[c] : prpp + ura --> ppi + ump		0	Infinity	Nucleotide Metabolism	GSU0933	Upp	0	3	514
URAt6	h[e] + ura[e] <==> h[c] + ura[c]	-Infinity		Infinity	Transport	GSU0932	UraA	0	3	515
URIDK1	[c] : atp + ump --> adp + udp		0	Infinity	Nucleotide Metabolism	GSU1919	PyrH	0.011582558	3	516

URIDK2	[c] : atp + dump --> adp + dudp		0	Infinity	Nucleotide Metabolism	GSU1919	PyrH	0	3	517
VALTA	[c] : akg + val-L <==> 3mob + glu-L	-Infinity		Infinity	Amino Acid Metabolism	GSU0656	IlvE	-0.017302591	3	518
VALabc	atp[c] + h2o[c] + val-L[e] --> adp[c] + h[c] + pi[c] + val-L[c]		0	Infinity	Transport	GSU3391, GSU3392, GSU3393, GSU339	BraB, BrnC	0	3	519
VALt6	h[e] + val-L[e] <==> h[c] + val-L[c]	-Infinity		Infinity	Transport	GSU0768	AzlC	0	2	520
ZN2abc1	atp[c] + h2o[c] + zn2[c] --> adp[c] + h[c] + pi[c] + zn2[e]		0	Infinity	Transport	GSU3398, GSU3399, GSU3400	CzcA	0	2	521
ZN2abc2	atp[c] + h2o[c] + zn2[e] --> adp[c] + h[c] + pi[c] + zn2[c]		0	Infinity	Transport	GSU2986, GSU2984, GSU2985	ZnuA, ZnuI	0	3	522

The reaction agg_GS13m represents the biomass reaction
This sheet gives information on all the reactions that allow the exchange of the metabolites with the environment

List of Exchange Reactions

Abbreviation	Equation	Lower bound	Upper bou	Flux
EX_h(e)	[e] : h <==>	-Infinity	Infinity	85.2872503
EX_fe2(e)	[e] : fe2 <=	-Infinity	Infinity	98.5477322
EX_co2(e)	[e] : co2 <=	-Infinity	Infinity	24.8949786
EX_so4(e)	[e] : so4 <=	-Infinity	Infinity	-0.01002862
EX_pi(e)	[e] : pi <==	-Infinity	Infinity	-0.10667682
EX_nh4(e)	[e] : nh4 <=	-Infinity	Infinity	-0.40734058
EX_mg2(e)	[e] : mg2 <	-Infinity	Infinity	-0.00191868
EX_k(e)	[e] : k <==>	-Infinity	Infinity	-0.01331787
EX_h2o(e)	[e] : h2o <=	-Infinity	Infinity	-21.5258449
EX_fe3(e)	[e] : fe3 <=	-150	0	-98.5477322
EX_ac(e)	[e] : ac <==	-20	0	-13.6291725
agg_GS13m	[c] : (0.022	0.06	0.06	0.06
EX_zn2(e)	[e] : zn2 <=	-Infinity	Infinity	0
EX_val-L(e)	[e] : val-L <	0	Infinity	0
EX_ura(e)	[e] : ura <=	0	Infinity	0
EX_succ(e)	[e] : succ <	0	Infinity	0
EX_ss(e)	[e] : ss <==	0	Infinity	0
EX_s(e)	[e] : s <==>	0	Infinity	0
EX_pro-L(e)	[e] : pro-L <	0	Infinity	0
EX_oxa(e)	[e] : oxa <=	0	Infinity	0
EX_ni2(e)	[e] : ni2 <=	-Infinity	Infinity	0
EX_na1(e)	[e] : na1 <=	-Infinity	Infinity	0
EX_n2(e)	[e] : n2 <==	-Infinity	Infinity	0
EX_mobd(e)	[e] : mobd	-Infinity	Infinity	0
EX_mn2(e)	[e] : mn2 <	-Infinity	Infinity	0
EX_mal-L(e)	[e] : mal-L	0	Infinity	0
EX_lys-L(e)	[e] : lys-L <	0	Infinity	0
EX_leu-L(e)	[e] : leu-L <	0	Infinity	0
EX_lac-L(e)	[e] : lac-L <	0	Infinity	0
EX_ile-L(e)	[e] : ile-L <=	0	Infinity	0
EX_h2s(e)	[e] : h2s <=	0	Infinity	0
EX_h2(e)	[e] : h2 <==	0	Infinity	0
EX_gly(e)	[e] : gly <==	0	Infinity	0
EX_gln-L(e)	[e] : gln-L <	0	Infinity	0
EX_fum(e)	[e] : fum <=	0	Infinity	0
EX_for(e)	[e] : for <==	0	Infinity	0
EX_cu2(e)	[e] : cu2 <=	-Infinity	Infinity	0
EX_cobalt2(e)	[e] : cobalt2	-Infinity	Infinity	0
EX_cl(e)	[e] : cl <==>	-Infinity	Infinity	0
EX_cit(e)	[e] : cit <==	0	Infinity	0
EX_cd2(e)	[e] : cd2 <=	-Infinity	Infinity	0
EX_ca2(e)	[e] : ca2 <=	-Infinity	Infinity	-5.643E-05
DM_val-L(c)	[c] : val-L --	0	0	0
DM_utp(c)	[c] : utp -->	0	0	0
DM_tyr-L(c)	[c] : tyr-L --	0	0	0

DM_trp-L(c)	[c] : trp-L --	0	0	0
DM_thr-L(c)	[c] : thr-L --	0	0	0
DM_ser-L(c)	[c] : ser-L -	0	0	0
DM_r5p(c)	[c] : r5p -->	0	0	0
DM_pyr(c)	[c] : pyr -->	0	0	0
DM_pro-L(c)	[c] : pro-L -	0	0	0
DM_pptg-BS(c)	[c] : pptg1 ·	0	0	0
DM_phe-L(c)	[c] : phe-L	0	0	0
DM_pep(c)	[c] : pep -->	0	0	0
DM_oaa(c)	[c] : oaa -->	0	0	0
DM_mqn8(c)	[c] : mqn8 ·	0	0	0
DM_met(c)	[c] : met-L	0	0	0
DM_lys-L(c)	[c] : lys-L --	0	0	0
DM_leu-L(c)	[c] : leu-L -	0	0	0
DM_ile-L(c)	[c] : ile-L --	0	0	0
DM_his-L(c)	[c] : his-L --	0	0	0
DM_gtp(c)	[c] : gtp -->	0	0	0
DM_gly(c)	[c] : gly -->	0	0	0
DM_glu-L(c)	[c] : glu-L -	0	0	0
DM_gln-L(c)	[c] : gln-L -	0	0	0
DM_g6p(c)	[c] : g6p -->	0	0	0
DM_fa8(c)	[c] : hdca --	0	0	0
DM_fa2(c)	[c] : myrt --	0	0	0
DM_fa13(c)	[c] : ocdca	0	0	0
DM_f6p(c)	[c] : f6p -->	0	0	0
DM_e4p(c)	[c] : e4p -->	0	0	0
DM_dttp(c)	[c] : dttp -->	0	0	0
DM_dhap(c)	[c] : dhap -	0	0	0
DM_dgtp(c)	[c] : dgtp --	0	0	0
DM_dctp(c)	[c] : dctp --	0	0	0
DM_datp(c)	[c] : datp --	0	0	0
DM_cys-L(c)	[c] : cys-L -	0	0	0
DM_ca2(c)	[c] : ca2 -->	0	0	0
DM_asp-L(c)	[c] : asp-L ·	0	0	0
DM_asn-L(c)	[c] : asn-L ·	0	0	0
DM_arg-L(c)	[c] : arg-L -	0	0	0
DM_ala-L(c)	[c] : ala-L -	0	0	0
DM_akg(c)	[c] : akg -->	0	0	0
DM_accoa(c)	[c] : accoa	0	0	0
DM_3pg(c)	[c] : 3pg -->	0	0	0
DM_26dap-M(c)	[c] : 26dap·	0	0	0

List of Metabolites

Abbreviation	Compartm	Name
10fthf	Cytosol	10-Formyltetrahydrofolate
12dag3p	Cytosol	1,2-Diacyl-sn-glycerol 3-phosphate
12dgr	Cytosol	1,2-Diacylglycerol
13dpg	Cytosol	3-Phospho-D-glyceroyl phosphate
1ag3p	Cytosol	1-Acyl-sn-glycerol 3-phosphate
1ap2ol	Cytosol	1-Aminopropan-2-ol
1p3h5c	Cytosol	L-1-Pyrroline-3-hydroxy-5-carboxylate
1pyr5c	Cytosol	1-Pyrroline-5-carboxylate
23ddhb	Cytosol	2,3-Dihydro-2,3-dihydroxybenzoate
23dhdp	Cytosol	2,3-Dihydrodipicolinate
23dhmb	Cytosol	(R)-2,3-Dihydroxy-3-methylbutanoate
23dhmp	Cytosol	(R)-2,3-Dihydroxy-3-methylpentanoate

25aics	Cytosol	(S)-2-[5-Amino-1-(5-phospho-D-ribosyl)imidazole-4-carboxamido]succinate
25dhpp	Cytosol	2,5-Diamino-6-hydroxy-4-(5'-phosphoribosylamino)-pyrimidine
26dap-LL	Cytosol	LL-2,6-Diaminoheptanedioate
26dap-M	Cytosol	meso-2,6-Diaminoheptanedioate
2ahbut	Cytosol	(S)-2-Aceto-2-hydroxybutanoate
2ahhmd	Cytosol	2-Amino-4-hydroxy-6-hydroxymethyl-7,8-dihydropteridine diphosphate
2ahhmp	Cytosol	2-Amino-4-hydroxy-6-hydroxymethyl-7,8-dihydropteridine
2beacp	Cytosol	But-2-enoyl-[acyl-carrier protein]
2cpr5p	Cytosol	1-(2-Carboxyphenylamino)-1-deoxy-D-ribulose 5-phosphate
2dda7p	Cytosol	2-Dehydro-3-deoxy-D-arabino-heptonate 7-phosphate
2dhp	Cytosol	2-Dehydropantoate
2dmmq8	Cytosol	2-Demethylmenaquinone 8
2ippm	Cytosol	2-Isopropylmaleate
2mahmp	Cytosol	2-Methyl-4-amino-5-hydroxymethylpyrimidine diphosphate
2mbcoa	Cytosol	2-Methylbutanoyl-CoA
2me4p	Cytosol	2-C-methyl-D-erythritol 4-phosphate
2mecdp	Cytosol	2-C-methyl-D-erythritol 2,4-cyclodiphosphate
2mop	Cytosol	2-Methyl-3-oxopropanoate
2obut	Cytosol	2-Oxobutanoate
2oph	Cytosol	2-Octaprenylphenol
2p4c2me	Cytosol	2-phospho-4-(cytidine 5'-diphospho)-2-C-methyl-D-erythritol
2pg	Cytosol	D-Glycerate 2-phosphate
2pglyc	Cytosol	2-Phosphoglycolate
2shchc	Cytosol	2-Succinyl-6-hydroxy-2,4-cyclohexadiene-1-carboxylate
2tddacp	Cytosol	trans-Dodec-2-enoyl-[acyl-carrier protein]
2tdeacp	Cytosol	trans-Dec-2-enoyl-[acyl-carrier protein]
2thdeacp	Cytosol	trans-Hexadec-2-enoyl-[acyl-carrier protein]
2theacp	Cytosol	trans-Hex-2-enoyl-[acp]
2tocdacp	Cytosol	trans-Octadec-2-enoyl-[acyl-carrier-protein]
2toceacp	Cytosol	trans-Oct-2-enoyl-[acp]
2ttdeacp	Cytosol	trans-Tetradec-2-enoyl-[acyl-carrier protein]
34hpp	Cytosol	3-(4-Hydroxyphenyl)pyruvate
3c2hmp	Cytosol	3-Carboxy-2-hydroxy-4-methylpentanoate
3c3hmp	Cytosol	3-Carboxy-3-hydroxy-4-methylpentanoate
3c4mop	Cytosol	3-Carboxy-4-methyl-2-oxopentanoate
3dhq	Cytosol	3-Dehydroquinate
3dhsk	Cytosol	3-Dehydroshikimate
3hbacp	Cytosol	(3R)-3-Hydroxybutanoyl-[acyl-carrier protein]
3hddacp	Cytosol	(R)-3-Hydroxydodecanoyl-[acyl-carrier protein]
3hdeacp	Cytosol	(3R)-3-Hydroxydecanoyl-[acyl-carrier protein]
3hhacp	Cytosol	(R)-3-Hydroxyhexanoyl-[acp]
3hmp	Cytosol	3-Hydroxy-2-methylpropanoate
3hocacp	Cytosol	(R)-3-Hydroxyoctanoyl-[acyl-carrier protein]
3hocdacp	Cytosol	(3R)-3-Hydroxyoctadecanoyl-[acyl-carrier protein
3hpaacp	Cytosol	(3R)-3-Hydroxypalmitoyl-[acyl-carrier protein]
3htdacp	Cytosol	(3R)-3-Hydroxytetradecanoyl-[acyl-carrier protein]
3ig3p	Cytosol	C'-(3-Indolyl)-glycerol 3-phosphate
3mob	Cytosol	3-Methyl-2-oxobutanoate
3mop	Cytosol	(S)-3-Methyl-2-oxopentanoate
3ophb	Cytosol	3-Octaprenyl-4-hydroxybenzoate
3oxddacp	Cytosol	3-Oxododecanoyl-[acyl-carrier protein]
3oxdeacp	Cytosol	3-Oxodecanoyl-[acyl-carrier protein]
3oxhacp	Cytosol	3-Oxohexanoyl-[acyl-carrier protein]
3oxhdacp	Cytosol	3-Oxohexadecanoyl-[acp]
3oxocacp	Cytosol	3-Oxooctanoyl-[acyl-carrier protein]
3oxocdacp	Cytosol	3-Oxooctadecanoyl-[acp]
3oxtdacp	Cytosol	3-Oxotetradecanoyl-[acyl-carrier protein]
3pg	Cytosol	3-Phospho-D-glycerate

3php	Cytosol	3-Phosphohydroxypyruvate
3psme	Cytosol	5-O-(1-Carboxyvinyl)-3-phosphoshikimate
4abz	Cytosol	4-Aminobenzoate
4adcho	Cytosol	4-amino-4-deoxychorismate
4ahmmp	Cytosol	4-Amino-5-hydroxymethyl-2-methylpyrimidine
4ampm	Cytosol	4-Amino-2-methyl-5-phosphomethylpyrimidine
4c2me	Cytosol	4-(cytidine 5'-diphospho)-2-C-methyl-D-erythritol
4hbz	Cytosol	4-Hydroxybenzoate
4hglu	Cytosol	4-Hydroxy-L-glutamate
4mop	Cytosol	4-Methyl-2-oxopentanoate
4mpetz	Cytosol	4-Methyl-5-(2-phosphoethyl)-thiazole
4pasp	Cytosol	4-Phospho-L-aspartate
4ppan	Cytosol	D-4'-Phosphopantothenate
4ppcys	Cytosol	N-((R)-4-Phosphopantothenoyl)-L-cysteine
4r5au	Cytosol	4-(1-D-Ribitylamino)-5-aminouracil
5aizc	Cytosol	5-amino-1-(5-phospho-D-ribosyl)imidazole-4-carboxylate
5aop	Cytosol	5-Amino-4-oxopentanoate
5aprbu	Cytosol	5-Amino-6-(5'-phosphoribitylamino)uracil
5apru	Cytosol	5-Amino-6-(5'-phosphoribosylamino)uracil
5fothf	Cytosol	5-Formyltetrahydrofolate
5mdr1p	Cytosol	5-Methylthio-5-deoxy-D-ribose 1-phosphate
5mta	Cytosol	5-Methylthioadenosine
5mthf	Cytosol	5-Methyltetrahydrofolate
5mtr	Cytosol	5-Methylthio-D-ribose
5prdmbz	Cytosol	N1-(5-Phospho-alpha-D-ribosyl)-5,6-dimethylbenzimidazole
6pthp	Cytosol	6-Pyruvoyl-5,6,7,8-tetrahydropterin
8aonn	Cytosol	8-Amino-7-oxononanoate
CO	Cytosol	Carbon monoxide
Lhpro	Cytosol	L-Hydroxyproline
aaacp	Cytosol	Acetoacetyl-[acyl-carrier protein]
ac	Cytosol	Acetate
ac[e]	Extracellul	Acetate
acacp	Cytosol	Acetyl-[acyl-carrier protein]
acald	Cytosol	Acetaldehyde
acamoxm	Cytosol	N-Acetyl-L-2-amino-6-oxopimelate
accoa	Cytosol	Acetyl-CoA
acg5p	Cytosol	N-Acetyl-L-glutamyl 5-phosphate
acg5sa	Cytosol	N-Acetyl-L-glutamate 5-semialdehyde
acgam1p	Cytosol	N-Acetyl-D-glucosamine 1-phosphate
acglu	Cytosol	N-Acetyl-L-glutamate
achms	Cytosol	O-Acetyl-L-homoserine
acmam	Cytosol	N-Acetyl-D-muramoate
acmama	Cytosol	N-Acetyl-D-muramoyl-L-alanine
acmana	Cytosol	N-Acetyl-D-mannosamine
acnam	Cytosol	N-Acetylneuraminate
acoa	Cytosol	Acyl-CoA
acorn	Cytosol	N2-Acetyl-L-ornithine
acp	Cytosol	Acyl-carrier Protein
acser	Cytosol	O-Acetyl-L-serine
actp	Cytosol	Acetyl phosphate
adcoba	Cytosol	Adenosyl cobinamide
adcobap	Cytosol	Adenosyl cobinamide phosphate
adcobdam	Cytosol	Adenosyl cobyrinate diamide
adcobhex	Cytosol	adenosyl-cobyric acid
ade	Cytosol	Adenine
adgcoba	Cytosol	Adenosine-GDP-cobinamide
adn	Cytosol	Adenosine
adp	Cytosol	ADP

adpglc	Cytosol	ADPglucose
agm	Cytosol	Agmatine
ahcys	Cytosol	S-Adenosyl-L-homocysteine
ahdt	Cytosol	2-Amino-4-hydroxy-6-(erythro-1,2,3-trihydroxypropyl)dihydropteridine triphosphate
aicar	Cytosol	5-Amino-1-(5-Phospho-D-ribosyl)imidazole-4-carboxamide
air	Cytosol	5-amino-1-(5-phospho-D-ribosyl)imidazole
akg	Cytosol	2-Oxoglutarate
ala-B	Cytosol	beta-Alanine
ala-D	Cytosol	D-Alanine
ala-L	Cytosol	L-Alanine
alaala	Cytosol	D-Alanyl-D-alanine
alac-S	Cytosol	(S)-2-Acetolactate
alpro	Cytosol	S-Aminomethyldihydrolipoylprotein
amet	Cytosol	S-Adenosyl-L-methionine
ametam	Cytosol	S-Adenosylmethioninamine
amob	Cytosol	S-Adenosyl-4-methylthio-2-oxobutanoate
amopbut-L	Cytosol	2-Amino-3-oxo-4-phosphonooxybutyrate
amp	Cytosol	AMP
anth	Cytosol	Anthranilate
aps	Cytosol	Adenosine 5'-phosphosulfate
ara5p	Cytosol	D-Arabinose 5-phosphate
arg-L	Cytosol	L-Arginine
argsuc	Cytosol	N(omega)-(L-Arginino)succinate
asn-L	Cytosol	L-Asparagine
asp-L	Cytosol	L-Aspartate
aspsa	Cytosol	L-Aspartate 4-semialdehyde
atp	Cytosol	ATP
btn	Cytosol	Biotin
butacp	Cytosol	Butyryl-[acyl-carrier protein]
ca2	Cytosol	Calcium
ca2[e]	Extracellul	Calcium
cbasp	Cytosol	N-Carbamoyl-L-aspartate
cbl1	Cytosol	Cob(I)alamin
cbm	Cytosol	Carbamate
cbp	Cytosol	Carbamoyl phosphate
cd2	Cytosol	Cadmium
cd2[e]	Extracellul	Cadmium
cdlp	Cytosol	Cardiolipin
cdp	Cytosol	CDP
cdpdag	Cytosol	CDPdiacylglycerol
chor	Cytosol	Chorismate
cit	Cytosol	Citrate
cit[e]	Extracellul	Citrate
citr-L	Cytosol	L-Citrulline
ckdo	Cytosol	CMP-3-deoxy-D-manno-octulosonate
cl	Cytosol	Chloride
cl[e]	Extracellul	Chloride
cmp	Cytosol	CMP
cmpacna	Cytosol	CMP-N-acetylneuraminate
co1dam	Cytosol	Cob(I)yrinate a,c diamide
co2	Cytosol	CO2
co2[e]	Extracellul	CO2
co2dam	Cytosol	Cob(II)yrinate a,c diamide
coa	Cytosol	Coenzyme A
cobalt2	Cytosol	Co2+
cobalt2[e]	Extracellul	Co2+
cobamcoa	Cytosol	Cobamide coenzyme
cpppg3	Cytosol	Coproporphyrinogen III

creat	Cytosol	Creatine
crtn	Cytosol	Creatinine
ctp	Cytosol	CTP
cu2	Cytosol	Cu2+
cu2[e]	Extracellul	Cu2+
cys-L	Cytosol	L-Cysteine
cysam	Cytosol	Cysteamine
cysth-L	Cytosol	L-Cystathionine
dad-5	Cytosol	5'-Deoxyadenosine
dadp	Cytosol	dADP
damp	Cytosol	dAMP
dann	Cytosol	7,8-Diaminononanoate
datp	Cytosol	dATP
db4p	Cytosol	3,4-dihydroxy-2-butanone 4-phosphate
dcamp	Cytosol	N6-(1,2-Dicarboxyethyl)-AMP
dcdp	Cytosol	dCDP
dcmp	Cytosol	dCMP
dctp	Cytosol	dCTP
ddeacp	Cytosol	Dodecanoyl-[acyl-carrier protein]
decacp	Cytosol	Decanoyl-[acyl-carrier protein]
decdp	Cytosol	all-trans-Decaprenyl diphosphate
dgdp	Cytosol	dGDP
dgmp	Cytosol	dGMP
dgsn	Cytosol	Deoxyguanosine
dgtp	Cytosol	dGTP
dhap	Cytosol	Dihydroxyacetone phosphate
dhf	Cytosol	7,8-Dihydrofolate
dhlpro	Cytosol	Dihydrolipolprotein
dhna	Cytosol	1,4-Dihydroxy-2-naphthoate
dhor-S	Cytosol	(S)-Dihydroorotate
dhpt	Cytosol	Dihydropteroate
dmbzid	Cytosol	5,6-Dimethylbenzimidazole
dmlz	Cytosol	6,7-Dimethyl-8-(1-D-ribityl)lumazine
dmpp	Cytosol	Dimethylallyl diphosphate
dnad	Cytosol	Deamino-NAD+
dpcoa	Cytosol	Dephospho-CoA
dtbt	Cytosol	Dethiobiotin
dtdp	Cytosol	dTDP
dtdp6dm	Cytosol	dTDP-6-deoxy-L-mannose
dtdpddg	Cytosol	dTDP-4-dehydro-6-deoxy-D-glucose
dtdpddm	Cytosol	dTDP-4-dehydro-6-deoxy-L-mannose
dtdpglc	Cytosol	dTDPglucose
dtmp	Cytosol	dTMP
dttp	Cytosol	dTTP
dudp	Cytosol	dUDP
dump	Cytosol	dUMP
dutp	Cytosol	dUTP
dxyl5p	Cytosol	1-deoxy-D-xylulose 5-phosphate
e4p	Cytosol	D-Erythrose 4-phosphate
eig3p	Cytosol	D-erythro-1-(Imidazol-4-yl)glycerol 3-phosphate
f6p	Cytosol	D-Fructose 6-phosphate
fa1	Cytosol	Fatty acid (Iso-C14:0)
fa3	Cytosol	Fatty acid (Iso-C15:0)
fa4	Cytosol	Fatty acid (Anteiso-C15:0)
fa9	Cytosol	Fatty acid (Iso-C17:1)
fad	Cytosol	FAD
fadh2	Cytosol	FADH2
fdp	Cytosol	D-Fructose 1,6-bisphosphate

fdxo-4:2	Cytosol	ferrodoxin (oxidized form 4:2)
fdxr-4:2	Cytosol	ferrodoxin (reduced form 4:2)
fe2	Cytosol	Fe2+
fe2[e]	Extracellul	Fe2+
fe3[e]	Extracellul	Fe3+
fgam	Cytosol	N2-Formyl-N1-(5-phospho-D-ribosyl)glycinamide
ficytc	Cytosol	Ferricytochrome c
fmn	Cytosol	flavin mononucleotide
focytc	Cytosol	Ferrocytochrome c
fol	Cytosol	Folate
for	Cytosol	Formate
for[e]	Extracellul	Formate
fpram	Cytosol	2-(Formamido)-N1-(5-phospho-D-ribosyl)acetamidine
fprica	Cytosol	5-Formamido-1-(5-phospho-D-ribosyl)imidazole-4-carboxamide
frdp	Cytosol	Farnesyl diphosphate
fum	Cytosol	Fumarate
fum[e]	Extracellul	Fumarate
g15lac	Cytosol	D-Glucono-1,5-lactone
g1p	Cytosol	D-Glucose 1-phosphate
g3p	Cytosol	Glyceraldehyde 3-phosphate
g6p	Cytosol	D-Glucose 6-phosphate
gal1p	Cytosol	alpha-D-Galactose 1-phosphate
gam1p	Cytosol	D-Glucosamine 1-phosphate
gam6p	Cytosol	D-Glucosamine 6-phosphate
gar	Cytosol	N1-(5-Phospho-D-ribosyl)glycinamide
gcald	Cytosol	Glycolaldehyde
gdp	Cytosol	GDP
gdpddm	Cytosol	GDP-4-dehydro-6-deoxy-D-mannose
gdpfuc	Cytosol	GDP-L-fucose
gdpman	Cytosol	GDP-D-mannose
gdpofuc	Cytosol	GDP-4-oxo-L-fucose
gdptp	Cytosol	Guanosine 3'-diphosphate 5'-triphosphate
ggdp	Cytosol	Geranylgeranyl diphosphate
glc-D	Cytosol	D-Glucose
gln-L	Cytosol	L-Glutamine
gln-L[e]	Extracellul	L-Glutamine
glntrna	Cytosol	L-Glutaminyl-tRNA(Gln)
glu-D	Cytosol	D-Glutamate
glu-L	Cytosol	L-Glutamate
glu1sa	Cytosol	L-Glutamate 1-semialdehyde
glu5p	Cytosol	L-Glutamate 5-phosphate
glu5sa	Cytosol	L-Glutamate 5-semialdehyde
glutrna	Cytosol	L-Glutamyl-tRNA(Glu)
gly	Cytosol	Glycine
gly[e]	Extracellul	Glycine
glyc	Cytosol	Glycerol
glyc-R	Cytosol	(R)-Glycerate
glyc3p	Cytosol	sn-Glycerol 3-phosphate
glyclt	Cytosol	Glycolate
glycogen	Cytosol	glycogen
gmp	Cytosol	GMP
grdp	Cytosol	Geranyl diphosphate
gthox	Cytosol	Oxidized glutathione
gthrd	Cytosol	Reduced glutathione
gtp	Cytosol	GTP
gua	Cytosol	Guanine
h	Cytosol	H+
h2	Cytosol	H2

h2[e]	Extracellular	H2
h2mb4p	Cytosol	1-hydroxy-2-methyl-2-(E)-butenyl 4-diphosphate
h2o	Cytosol	H2O
h2o2	Cytosol	Hydrogen peroxide
h2o[e]	Extracellular	H2O
h2s	Cytosol	Hydrogen sulfide
h2s[e]	Extracellular	Hydrogen sulfide
h[e]	Extracellular	H+
hco3	Cytosol	Bicarbonate
hcys-L	Cytosol	L-Homocysteine
hdca	Cytosol	Hexadecanoate (n-C16:0)
hdcea	Cytosol	hexadecenoate (n-C16:1)
hdeacp	Cytosol	Hexadecanoyl-[acyl-carrier protein]
hepdp	Cytosol	all-trans-Heptaprenyl diphosphate
hexacp	Cytosol	Hexanoyl-[acyl-carrier protein]
hexdp	Cytosol	all-trans-Hexaprenyl diphosphate
hg0	Cytosol	Mercury (uncharged)
hg2	Cytosol	Mercury (charged +2)
hgbam	Cytosol	Hydrogenobyrinate a,c diamide
hgbyr	Cytosol	Hydrogenobyrinate
his-L	Cytosol	L-Histidine
hisp	Cytosol	L-Histidinol phosphate
histd	Cytosol	L-Histidinol
hmbil	Cytosol	Hydroxymethylbilane
hom-L	Cytosol	L-Homoserine
hpyr	Cytosol	Hydroxypyruvate
hxan	Cytosol	Hypoxanthine
iasp	Cytosol	Iminoaspartate
ibcoa	Cytosol	Isobutyryl-CoA
ichor	Cytosol	Isochorismate
icit	Cytosol	Isocitrate
ile-L	Cytosol	L-Isoleucine
ile-L[e]	Extracellular	L-Isoleucine
imacp	Cytosol	3-(Imidazol-4-yl)-2-oxopropyl phosphate
imp	Cytosol	IMP
ipdp	Cytosol	Isopentenyl diphosphate
ivcoa	Cytosol	Isovaleryl-CoA
k	Cytosol	K+
k[e]	Extracellular	K+
kdo	Cytosol	3-Deoxy-D-manno-2-octulosonate
kdo8p	Cytosol	3-Deoxy-D-manno-octulosonate 8-phosphate
lac-L	Cytosol	L-Lactate
lac-L[e]	Extracellular	L-Lactate
leu-D	Cytosol	D-Leucine
leu-L	Cytosol	L-Leucine
leu-L[e]	Extracellular	L-Leucine
lgt-S	Cytosol	(R)-S-Lactoylglutathione
lipid4	Cytosol	2,3,2'3'-Tetrakis(3-hydroxytetradecanoyl)-D-glucosaminyl-1,6-beta-D-glucosamine 1,4'-bisphosphate
lipidA	Cytosol	2,3-Bis(3-hydroxytetradecanoyl)-D-glucosaminyl-1,6-beta-D-2,3-bis(3-hydroxytetradecanoyl)-beta-D-glucosaminyl 1-phosphate
lipidAds	Cytosol	Lipid A Disaccharide
lipidX	Cytosol	2,3-Bis(3-hydroxytetradecanoyl)-beta-D-glucosaminyl 1-phosphate
lpro	Cytosol	Lipoylprotein
lys-L	Cytosol	L-Lysine
lys-L[e]	Extracellular	L-Lysine
mal-L	Cytosol	L-Malate
mal-L[e]	Extracellular	L-Malate
malacp	Cytosol	Malonyl-[acyl-carrier protein]
malcoa	Cytosol	Malonyl-CoA

male	Cytosol	Maleate
malm	Cytosol	Maleamate
man1p	Cytosol	D-Mannose 1-phosphate
man6p	Cytosol	D-Mannose 6-phosphate
met-L	Cytosol	L-Methionine
methf	Cytosol	5,10-Methenyltetrahydrofolate
mg2	Cytosol	Mg
mg2[e]	Extracellul	Mg
mlthf	Cytosol	5,10-Methylenetetrahydrofolate
mmcoa-R	Cytosol	(R)-Methylmalonyl-CoA
mmcoa-S	Cytosol	(S)-Methylmalonyl-CoA
mn2	Cytosol	Mn2+
mn2[e]	Extracellul	Mn2+
mobd	Cytosol	Molybdate
mobd[e]	Extracellul	Molybdate
mql7	Cytosol	Menaquinol 7
mqn7	Cytosol	Menaquinone 7
mqn8	Cytosol	Menaquinone 8
mthgxl	Cytosol	Methylglyoxal
myrt	Cytosol	Myristate; Fatty acid (n-C14:0) fa2
n2	Cytosol	N2
n2[e]	Extracellul	N2
na1	Cytosol	Sodium
na1[e]	Extracellul	Sodium
nac	Cytosol	Nicotinate
nad	Cytosol	Nicotinamide adenine dinucleotide
nadh	Cytosol	Nicotinamide adenine dinucleotide - reduced
nadp	Cytosol	Nicotinamide adenine dinucleotide phosphate
nadph	Cytosol	Nicotinamide adenine dinucleotide phosphate - reduced
ncam	Cytosol	Nicotinamide
nh3	Cytosol	Ammonia
nh4	Cytosol	Ammonium
nh4[e]	Extracellul	Ammonium
nh4oh	Cytosol	Ammonium hydroxide
ni2	Cytosol	Ni2+
ni2[e]	Extracellul	Ni2+
nicrnt	Cytosol	Nicotinate D-ribonucleotide
no2	Cytosol	Nitrite
nondp	Cytosol	all-trans-Nonaprenyl diphosphate
o2	Cytosol	O2
o2-	Cytosol	Superoxide
oaa	Cytosol	Oxaloacetate
ocdacp	Cytosol	Octadecanoyl-[acyl-carrier protein]
ocdca	Cytosol	octadecanoate (n-C18:0)
ocdcea	Cytosol	octadecenoate (n-C18:1)
octacp	Cytosol	Octanoyl-[acyl-carrier protein]
octdp	Cytosol	all-trans-Octaprenyl diphosphate
orn-L	Cytosol	L-Ornithine
orot	Cytosol	Orotate
orot5p	Cytosol	Orotidine 5'-phosphate
oxa	Cytosol	Oxalate
oxa[e]	Extracellul	Oxalate
pan4p	Cytosol	Pantetheine 4'-phosphate
pant-R	Cytosol	(R)-Pantoate
pap	Cytosol	Adenosine 3',5'-bisphosphate
paps	Cytosol	3'-Phosphoadenylyl sulfate
pendp	Cytosol	all-trans-Pentaprenyl diphosphate
pep	Cytosol	Phosphoenolpyruvate

pgly	Cytosol	Phosphatidylglycerol
pglyp	Cytosol	Phosphatidylglycerophosphate
phe-L	Cytosol	L-Phenylalanine
pheme	Cytosol	Protoheme
phom	Cytosol	O-Phospho-L-homoserine
phpyr	Cytosol	Phenylpyruvate
phthr	Cytosol	O-Phospho-4-hydroxy-L-threonine
pi	Cytosol	Phosphate
pi[e]	Extracellul	Phosphate
pmcoa	Cytosol	Pimeloyl-CoA
pnto-R	Cytosol	(R)-Pantothenate
polglu	Cytosol	Poly-gamma-D-glutamate
polypi	Cytosol	Polyphosphate
ppbng	Cytosol	Porphobilinogen
ppcoa	Cytosol	Propanoyl-CoA
pphn	Cytosol	Prephenate
ppi	Cytosol	Diphosphate
ppp9	Cytosol	Protoporphyrin
pppg9	Cytosol	Protoporphyrinogen IX
pppi	Cytosol	Inorganic triphosphate
pptg1	Cytosol	Peptidoglycan subunit
pram	Cytosol	5-Phospho-beta-D-ribosylamine
pran	Cytosol	N-(5-Phospho-D-ribosyl)anthranilate
prbamp	Cytosol	1-(5-Phosphoribosyl)-AMP
prbatp	Cytosol	1-(5-Phosphoribosyl)-ATP
pre3a	Cytosol	Precorrin 3 A
pre3b	Cytosol	Precorrin 3B
pre4	Cytosol	Precorrin 4
pre5	Cytosol	Precorrin 5
pre6a	Cytosol	Precorrin 6A
pre6b	Cytosol	Precorrin 6B
pre8	Cytosol	Precorrin 8
prfp	Cytosol	1-(5-Phosphoribosyl)-5-[(5-phosphoribosylamino)methylideneamino]imidazole-4-carboxamide
prlp	Cytosol	5-[(5-phospho-1-deoxyribulos-1-ylamino)methylideneamino]-1-(5-phosphoribosyl)imidazole-4-carboxamide
pro-L	Cytosol	L-Proline
pro-L[e]	Extracellul	L-Proline
prpp	Cytosol	5-Phospho-alpha-D-ribose 1-diphosphate
ps	Cytosol	Phosphatidylserine
pser-L	Cytosol	O-Phospho-L-serine
ptrc	Cytosol	Putrescine
ptth	Cytosol	Pantetheine
pyr	Cytosol	Pyruvate
quln	Cytosol	Quinolinate
r5p	Cytosol	alpha-D-Ribose 5-phosphate
rdmbzi	Cytosol	N1-(alpha-D-ribosyl)-5,6-dimethylbenzimidazole
rhcys	Cytosol	S-Ribosyl-L-homocysteine
rib-D	Cytosol	D-Ribose
ribflv	Cytosol	Riboflavin
ru5p-D	Cytosol	D-Ribulose 5-phosphate
s	Cytosol	Sulfur
s7p	Cytosol	Sedoheptulose 7-phosphate
s[e]	Extracellul	Sulfur
sbt6p	Cytosol	D-Sorbitol 6-phosphate
sbzcoa	Cytosol	O-Succinylbenzoyl-CoA
ser-L	Cytosol	L-Serine
shcl	Cytosol	Sirohydrochlorin
sheme	Cytosol	Siroheme
skm	Cytosol	Shikimate

skm5p	Cytosol	Shikimate 5-phosphate
sl26da	Cytosol	N-Succinyl-LL-2,6-diaminoheptanedioate
sl2a6o	Cytosol	N-Succinyl-2-L-amino-6-oxoheptanedioate
so3	Cytosol	Sulfite
so4	Cytosol	Sulfate
so4[e]	Extracellul	Sulfate
spmd	Cytosol	Spermidine
srb1p	Cytosol	Sorbose 1-phosphate
srch	Cytosol	Sirochlorin
ss[e]	Extracellul	Disulfide
ssaltpp	Cytosol	Succinate semialdehyde-thiamin diphosphate anion
sucbz	Cytosol	o-Succinylbenzoate
succ	Cytosol	Succinate
succ[e]	Extracellul	Succinate
succoa	Cytosol	Succinyl-CoA
tdeacp	Cytosol	Tetradecanoyl-[acyl-carrier protein]
thdp	Cytosol	2,3,4,5-Tetrahydrodipicolinate
thf	Cytosol	5,6,7,8-Tetrahydrofolate
thmmp	Cytosol	Thiamin monophosphate
thmpp	Cytosol	Thiamine diphosphate
thr-L	Cytosol	L-Threonine
thr-LA	Cytosol	L-Allo-threonine
thymd	Cytosol	Thymidine
trdox	Cytosol	Oxidized thioredoxin
trdrd	Cytosol	Reduced thioredoxin
tre	Cytosol	Trehalose
tre6p	Cytosol	alpha,alpha'-Trehalose 6-phosphate
trnagln	Cytosol	tRNA(Gln)
trnaglu	Cytosol	tRNA (Glu)
trp-L	Cytosol	L-Tryptophan
tyr-L	Cytosol	L-Tyrosine
u23ga	Cytosol	UDP-2,3-bis(3-hydroxytetradecanoyl)glucosamine
u3aga	Cytosol	UDP-3-O-(3-hydroxytetradecanoyl)-N-acetylglucosamine
u3hga	Cytosol	UDP-3-O-(3-hydroxytetradecanoyl)-D-glucosamine
uaagmda	Cytosol	Undecaprenyl-diphospho-N-acetylmuramoyl-(N-acetylglucosamine)-L-alanyl-D-glutamyl-meso-2,6-diaminopimeloyl-D-alanyl-D-alanine
uaagtmda	Cytosol	Undecaprenyl-diphospho-N-acetylmuramoyl-(N-acetylglucosamine)-L-alanyl-D-glutaminyl-meso-2,6-diaminopimeloyl-D-alanyl-D-alanine
uaagtmdga	Cytosol	Undecaprenyl-diphospho-N-acetylmuramoyl-(N-acetylglucosamine)-L-alanyl-D-glutaminyl-meso-2,6-diaminopimeloyl-(glycyl)5-D-alanyl-D-alanine
uaccg	Cytosol	UDP-N-acetyl-3-O-(1-carboxyvinyl)-D-glucosamine
uacgam	Cytosol	UDP-N-acetyl-D-glucosamine
uacmam	Cytosol	UDP-N-acetyl-D-mannosamine
uagmda	Cytosol	Undecaprenyl-diphospho-N-acetylmuramoyl-L-alanyl-D-glutamyl-meso-2,6-diaminopimeloyl-D-alanyl-D-alanine
uama	Cytosol	UDP-N-acetylmuramoyl-L-alanine
uamag	Cytosol	UDP-N-acetylmuramoyl-L-alanyl-D-glutamate
uamr	Cytosol	UDP-N-acetylmuramate
udcp	Cytosol	Undecaprenol
udcpdp	Cytosol	Undecaprenyl diphosphate
udcpp	Cytosol	Undecaprenyl phosphate
udp	Cytosol	UDP
udpg	Cytosol	UDPglucose
udpgal	Cytosol	UDPgalactose
udpglcur	Cytosol	UDP-D-glucuronate
ugmd	Cytosol	UDP-N-acetylmuramoyl-L-alanyl-D-gamma-glutamyl-meso-2,6-diaminopimelate
ugmda	Cytosol	UDP-N-acetylmuramoyl-L-alanyl-D-glutamyl-meso-2,6-diaminopimeloyl-D-alanyl-D-alanine
ump	Cytosol	UMP
unknown1	Cytosol	Unknown Product
uppg3	Cytosol	Uroporphyrinogen III
ura	Cytosol	Uracil
ura[e]	Extracellul	Uracil

utp	Cytosol	UTP
val-L	Cytosol	L-Valine
val-L[e]	Extracellul	L-Valine
xmp	Cytosol	Xanthosine 5'-phosphate
xu5p-D	Cytosol	D-Xylulose 5-phosphate
zn2	Cytosol	Zinc
zn2[e]	Extracellul	Zinc