Table S1. List of reactions in the stoichiometric metabolic network.

No.	Reaction
	Glycolysis
1	atp[c] + glc[c] -> adp[c] + g6p[c] + h[c]
2	g6p[c] <=> f6p[c]
3	atp[c] + f6p[c] -> adp[c] + f16p[c] + h[c]
4	f16p[c] <=> 2 g3p[c]
5	g3p[c] + adp[c] + p[c] + nad[c] <=> 3gp[c] + atp[c] + nadh[c] + h[c]
6	3gp[c] <=> h2o[c] + pep[c]
7	adp[c] + h[c] + pep[c] -> atp[c] + pyr[c]
8	2 h[c] + nadh[c] + pyr[c] <=> nad[c] + lac[c]
9	gtp[c] + oaa[c] -> co2[c] + gdp[c] + pep[c]
	Pentose phosphate pathway
10	2 nadp[c] + h2o[c] + g6p[c] <=> 2 nadph[c] + 6pg[c] + h[c]
11	nadp[c] + 6pg[c] <=> nadph[c] + co2[c] + ri5p[c]
12	ri5p[c] <=> r5p[c]
13	ri5p[c] <=> x5p[c]
14	g3p[c] + s7p[c] <=> r5p[c] + x5p[c]
15	x5p[c] + e4p[c] <=> g3p[c] + f6p[c]
	Tricarboxylic Acid Cycle (TCA)
16	succoa[c] + acetoac[c] <=> suc[c] + acetoaccoa[c]
17	gtp[m] + h2o[m] --> gdp[m] + p[m] + h[m]
18	atp[m] + h2o[m] <=> adp[m] + p[m] + h[m]
19	fadh2[m] + fad[c] <=> fad[m] + fadh2[c]
20	pyr[m] + coa[m] + nad[m] --> accoa[m] + co2[m] + nadh[m]
21	mal[m] + nadp[m] -> pyr[m] + co2[m] + nadph[m]
22	pyr[m] + atp[m] + h2o[m] + co2[m] <=> oaa[m] + adp[m] + p[m]
23	accoa[m] + h2o[m] + oaa[m] <=> cit[m] + coa[m] + h[m]
24	cit[m] <=> isocit[m]
25	isocit[m] + nad[m] --> akg[m] + co2[m] + nadh[m]
26	akg[m] + coa[m] --> succoa[m] + co2[m] + h[m]
27	gdp[m] + p[m] + succoa[m] <=> gtp[m] + suc[m] + coa[m]
28	suc[m] + fad[m] <=> fum[m] + fadh2[m]
29	fum[m] + h2o[m] <=> mal[m]
30	mal[m] + nad[m] <=> oaa[m] + nadh[m] + h[m]
31	nadph[m] <=> nadp[m] + h[m]
32	nadh[m] <=> nad[m] + h[m]
	Amino acid metabolism
33	nad[c] + 3gp[c] + glu[c] + h2o[c] <=> h[c] + nadh[c] + ser[c] + akg[c] + p[c]
34	ser[c] --> nh4[c] + pyr[c]
35	ser[c] <=> gly[c]
36	cys[c] + h2o[c] + nad[c] <=> pyr[c] + nh4[c] + nadh[c] + h[c]
37	pyr[c] + glu[c] <=> ala[c] + akg[c]
38	h[c] + oaa[c] <=> co2[c] + pyr[c]
39	mal[c] + nad[c] <=> oaa[c] + nadh[c] + h[c]
40	coa[c] + atp[c] + cit[c] -> accoa[c] + adp[c] + p[c] + oaa[c]
41	fum[c] + h2o[c] <=> mal[c]
42	nad[c] + mal[c] -> nadh[c] + co2[c] + pyr[c]

43	atp[c] + propcoa[c] + hco3[c] <=> adp[c] + succoa[c] + p[c] + h[c]
44	akg[c] + val[c] + 3 nad[c] + o2[c] + fad[c] + coa[c] +2 h[c] <=> glu[c] + propcoa[c] + 2 co2[c] + 3 nadh[c] + fadh2[c]
45	thr[c] --> akbut[c] + nh4[c]
46	ser[c] + met[c] + atp[c] + 2 o2[c] + h[c] <=> cys[c] + akbut[c] + nh4[c] + amp[c] + pp[c] + co2[c] + h2o[c]
47	akg[c] + ile[c] + 2 nad[c] + fad[c] + 2 coa[c] + h[c] -> glu[c] + propcoa[c] + co2[c] + 2 nadh[c] + fadh2[c] + accoa[c]
48	akbut[c] + coa[c] + nad[c] <=> propcoa[c] + co2[c] + nadh[c]
49	phe[c] + nadh[c] + o2[c] + h[c] -> tyr[c] + nad[c] + h2o[c]
50	akg[c] + tyr[c] + h2o[c] + 2 o2[c] <=> fum[c] + glu[c] + acetoac[c] + co2[c] + 2 h[c]
51	akg[c] + leu[c] + atp[c] + nad[c] + fad[c] + hco3[c] + coa[c] <=> glu[c] + acetoac[c] + accoa[c] + adp[c] + nadh[c] + fadh2[c] + p[c] + co2[c]
52	thr[c] + coa[c] + nad[c] <=> accoa[c] + nadh[c] + h[c] + gly [c]
53	lys[c] + 2 akg[c] + nad[c] + h2o[c] + fad[c] <=> aoxo[c] + 2 glu[c] + nadh[c] + fadh2[c]
54	trp[c] + 3 h2o[c] + 3 o2[c] <=> ala[c] + co2[c] + aoxo[c] + nh4[c] + for[c]
55	aoxo[c] + coa[c] + 2 nad[c] + h2o[c] <=> acetoaccoa[c] + 2 nadh[c] + 2 co2[c] + 2 h[c]
56	acetoaccoa[c] + coa[c] <=> 2 accoa[c]
57	asp[c] + akg[c] <=> oaa[c] + glu[c]
58	asn[c] + h2o[c] --> asp[c] + nh4[c]
59	nh4[c] + atp[c] + glu[c] -> h[c] + adp[c] + p[c] + gln[c]
60	gln[c] + h2o[c] --> glu[c] + nh4[c]
61	gluysa[c] + nad[c] + h2o[c] --> glu[c] + nadh[c] + 2 h[c]
62	orn[c] + akg[c] --> gluysa[c] + glu[c]
63	arg[c] + h2o[c] --> orn[c] + urea[c]
64	pro[c] + nad[c] + h2o[c] --> gluysa[c] + h[c] + nadh[c]
65	his[c] + 4 h2o[c] <=> glu[c] + 2 nh4[c] + for[c]
66	glu[c] + nad[c] <=> akg[c] + nh4[c] + nadh[c] + h[c]
67	atp[c] + asp[c] + gln[c] + h2o[c] <=> amp[c] + asn[c] + glu[c] + pp[c] + h[c]
68	ser[c] + hocys[c] <=> cys[c] + nh4[c] + akbut[c]
69	asp[m] + akg[m] <=> oaa[m] + glu[m]
70	glu[m] + nad[m] + h2o[m] <=> akg[m] + nh4[m] + nadh[m] + h[m]

Transport reactions

71	succoa[m] <=> succoa[c]	115	suc[c] <=> suc[ext]
72	co2[m] <=> co2[c]	116	mal[c] <=> mal[ext]
73	nh4[m] <=> nh4[c]	117	accoa[c] <=> accoa[ext]
74	asp[m] <=> asp[c]	118	lys[ext] <=>
75	akg[m] <=> akg[c]	119	trp[ext] <=>
76	cit[m] <=> cit[c]	120	tyr[ext] <=>
77	accoa[m] <=> accoa[c]	121	phe[ext] <=>
78	suc[m] <=> suc[c]	122	asp[ext] <=>
79	mal[m] <=> mal[c]	123	leu[ext] <=>
80	pyr[m] <=> pyr[c]	124	asn[ext] <=>
81	for[c] <=> for[ext]	125	gln[ext] <=>

pyr[c] <=> pyr[ext]

lys[c] <=> lys[ext]

trp[c] <=> trp[ext]

tyr[c] <=> tyr[ext]

phe[c] <=> phe[ext]

asp[c] <=> asp[ext]

leu[c] <=> leu[ext]

asn[c] <=> asn[ext]

gln[c] <=> gln[ext]

glu[c] <=> glu[ext]

his[c] <=> his[ext]

pro[c] <=> pro[ext]

arg[c] <=> arg[ext]

ile[c] <=> ile[ext]

val[c] <=> val[ext]

met[c] <=> met[ext]

cit[c] <=> cit[ext]

thr[c] <=> thr[ext]

cys[c] <=> cys[ext]

ser[c] <=> ser[ext]

ala[c] <=> ala[ext]

nh4[c] <=> nh4[ext]

co2[c] <=> co2[ext]

gly[c] <=> gly[ext]

glc[c] <=> glc[ext]

hocys[c] <=> hocys[ext]

s7p[c] <=> s7p[ext]

urea[c] <=> urea[ext]

e4p[c] <=> e4p[ext]

lac[c] <=> lac[ext]

o2[c] <=> o2[ext]

glu[ext] <=>

his[ext] <=>

pro[ext] <=>

arg[ext] <=>

ile[ext] <=>

val[ext] <=>

met[ext] <=>

thr[ext] <=>

cys[ext] <=>

ser[ext] <=>

ala[ext] <=>

nh4[ext] <=>

co2[ext] <=>

gly[ext] <=>

hocys[ext] -->

lac[ext] <=>

glc[ext] <=>

s7p[ext] <=>

urea[ext] <=>

e4p[ext] <=>

o2[ext] <=>

cit[ext] <=>

for[ext] -->

pyr[ext] <=>

ri5p[ext] -->

suc[ext] <=>

accoa[ext] <=>

mal[ext] <=>

biomass[c] -> biomass[ext]

biomass[ext] -->

mAb[ext] ->

113	hco3[c] + h[c] <=> h2o[c] + co2[ext]	157	fum[c] <=> fum[ext]
114	ri5p[c] <=> ri5p[ext]	158	fum[ext] <=>
	Energy maintenance		
159	h2o[c] + atp[c] -> h[c] + adp[c] + p[c]		
160	gtp[c] + h2o[c] <=> gdp[c] + p[c] + h[c]		
	Biomass formation		
161	0.282 g6p[c] + 0.073 r5p[c] + 1.15 o2[c] + 4.02 nadph[c] + 2.08 accoa[c] + 0.28 pro[c] + 23 h2o[c] + 32.258 atp[c] + 0.19 met[c] + 0.66 gly[c] + 0.236 phe[c] + 0.27 glu[c] + 0.568 ala[c] + 0.26 asn[c] + 0.105 cys[c] + 0.558 gln[c] + 0.43 ser[c] + 0.32 thr[c] + 0.31 arg[c] + 0.398 asp[c] + 0.12 his[c] + 0.54 leu[c] + 0.278 ile[c] + 0.49 lys[c] + 0.41 val[c] + 0.0318 trp[c] + 0.16 tyr[c] -> biomass[c] + 28.063 h[c] + 31.961 adp[c] + 31.961 p[c] + 0.297 pp[c] + 4.02 nadp[c] + 1.97 coa[c] + 0.19 co2[c] + 0.297 amp[c] + 0.06059 hocys[c]		
	Protein synthesis		
162	5.68 ala[c] + 7.99 arg[c] + 6.68 asn[c] + 10.79 asp[c] + 6.09 cys[c] + 3.92 glu[c] + 4.83 gln[c] + 7.32 gly[c] + 5.09 his[c] + 2.09 ile[c] + 7.04 leu[c] + 7.30 lys[c] + 3.99 met[c] + 4.37 phe[c] + 1.88 pro[c] + 2.49 ser[c] + 3.17 thr[c] + 1.03 trp[c] + 4.51 tyr[c] + 3.76 val[c] -> mAb[c]		

* [c] indicates metabolites in the cytosol, [ext] indicates extracellular metabolites