AMBIENT: Active Modules for Bipartite Networks. Using high-throughput transcriptomic data to dissect metabolic response.

Supplementary Figures S1-S4

Each diagram represents a single module inferred by either `ambient` or GiGA, being areas of significantly affected areas of up- and down-regulation in the metabolic network of *S. cerevisiae*. In each diagram, reactions found by both methods are colour-coded, and up- and down-regulated reactions identified by DeRisi and coworkers have black borders. Arrow directions on edges indicate the conventional direction assigned to each reaction; where an arrow points from a reaction to a metabolite, that metabolite is a product of that reaction, and where the arrow points from a metabolite to a reaction it is a substrate. A key can be found below the figure legends.

Figure S1 - statistically significant up-regulated modules found by `ambient`

Shows modules 2, 3 and 4, panels A, B and C respectively, inferred by `ambient` to be up-regulated (module 1 is shown in the main text, Figure 1).

Figure S2 - statistically significant down-regulated modules found by `ambient`

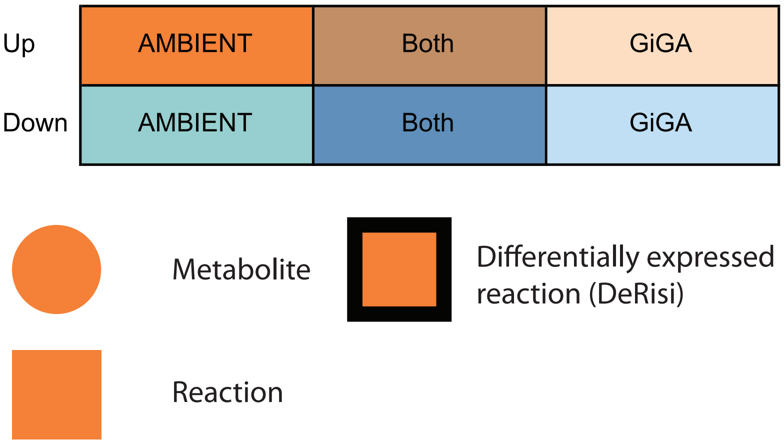
Shows the single down-module inferred by `ambient`.

Figure S3 - statistically significant up-regulated modules found by GiGA

Shows the two modules inferred by GiGA to be up-regulated.

Figure S4 - statistically significant down-regulated modules found by GiGA

Shows the six modules inferred by GiGA to be down-regulated.



Up	AMBIENT	Both	GiGA
Down	AMBIENT	Both	GiGA

● Metabolite

■ Reaction

▣ Differentially expressed reaction (DeRisi)

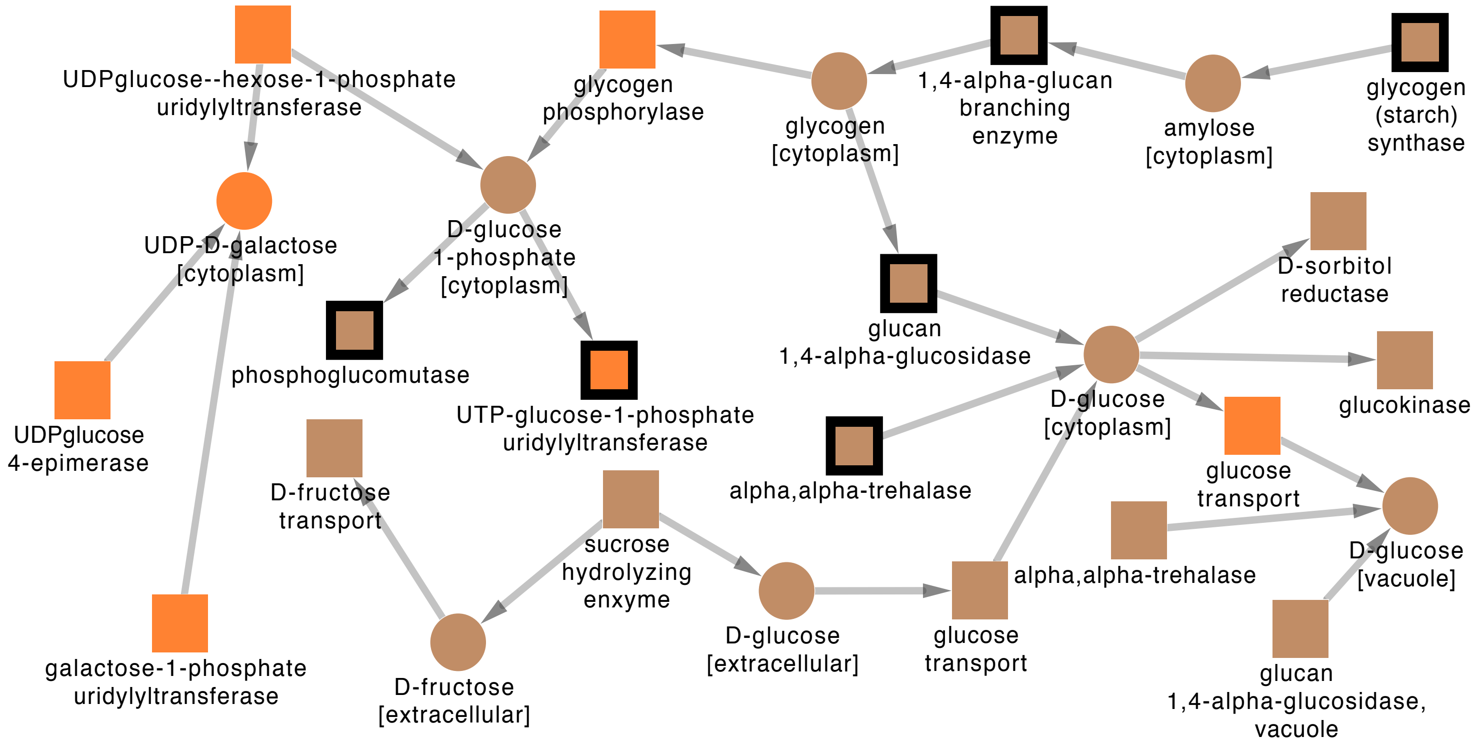


Figure S1A - u2

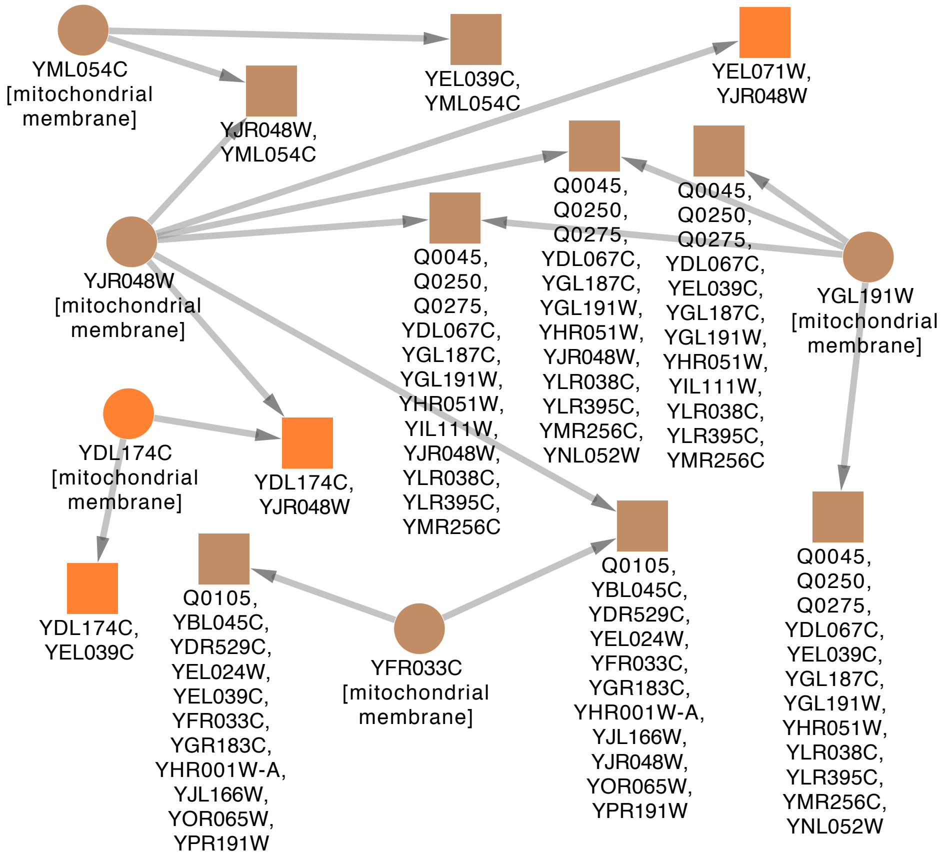


Figure S1B - u3

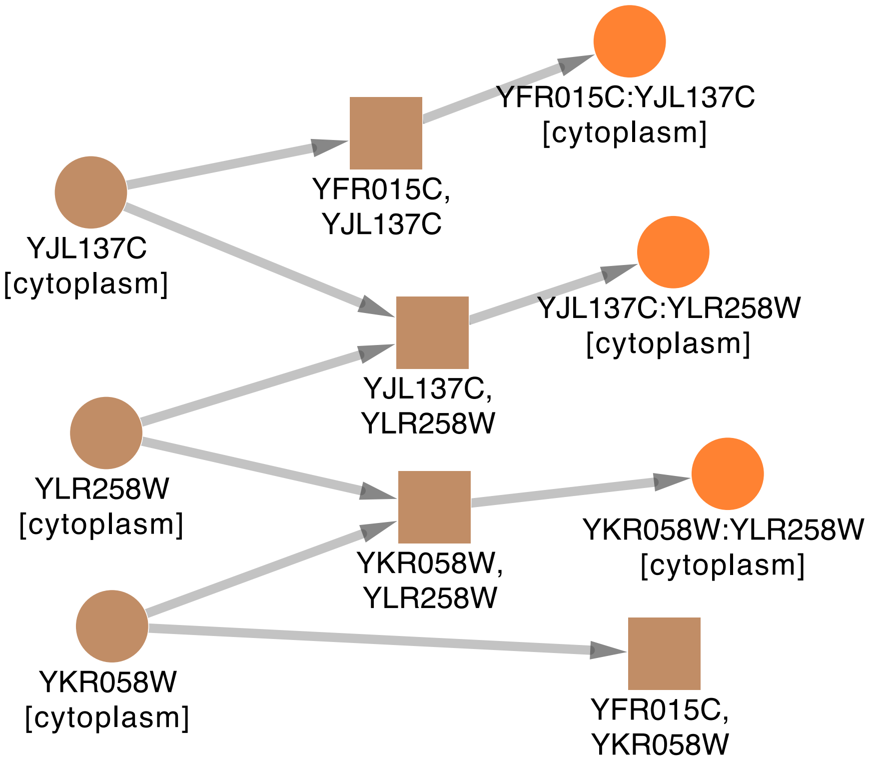


Figure S1C - u4

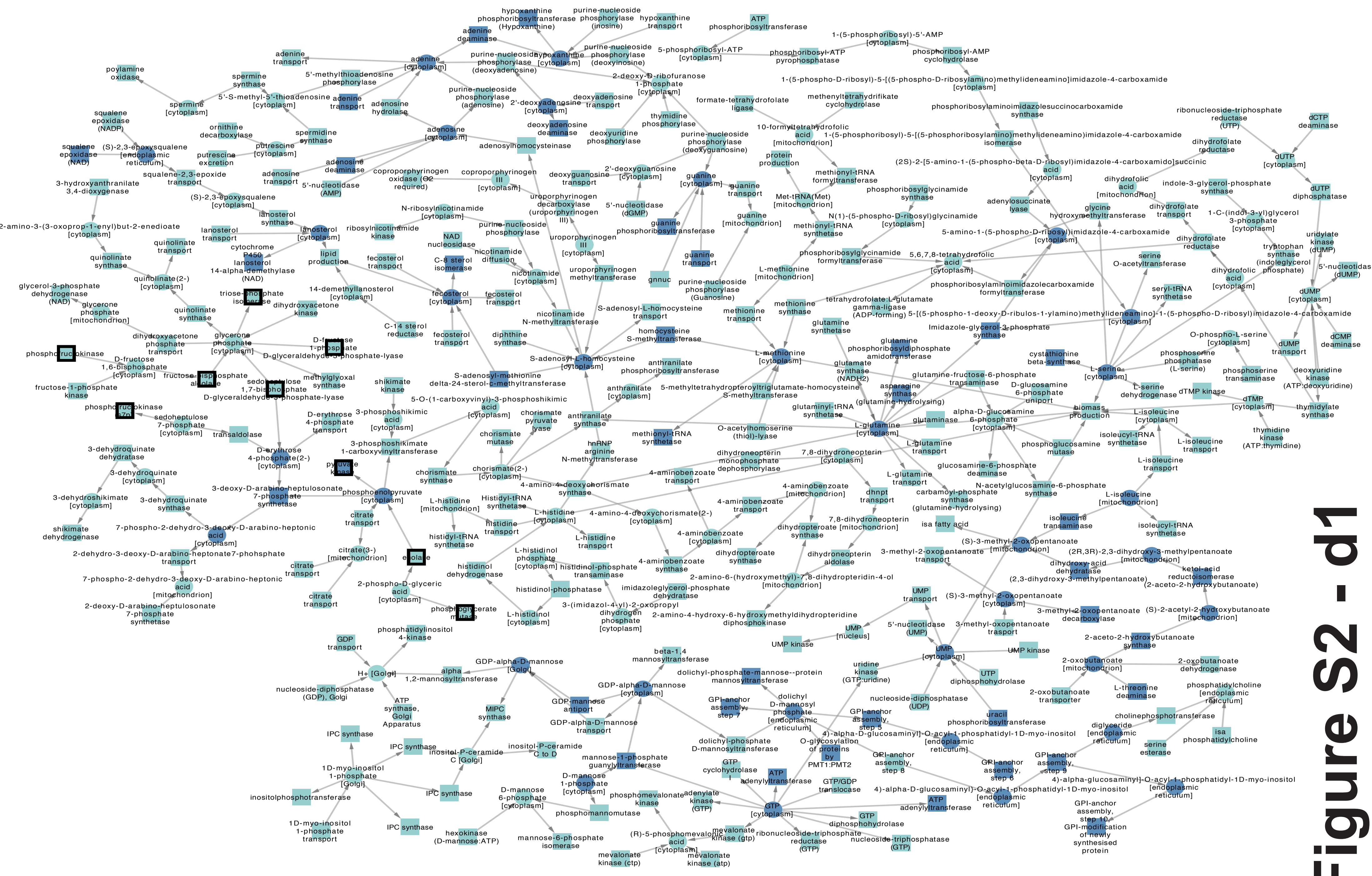

hypoxanthine phosphoribosyltransferase (Hypoxanthine)
purine-nucleoside phosphorylase (inosine)
hypoxanthine transport
ATP phosphoribosyltransferase
1-(5-phosphoribosyl)-5'-AMP [cytoplasm]
adenine deaminase
adenine transport
adenine [cytoplasm]
purine-nucleoside phosphorylase (deoxyadenosine)
hypoxanthine [cytoplasm]
purine-nucleoside phosphorylase (deoxyinosine)
5-phosphoribosyl-ATP [cytoplasm]
phosphoribosyl-ATP pyrophosphatase
phosphoribosyl-AMP cyclohydrolase
poylamine oxidase
spermine synthase
5'-methylthioadenosine phosphorylase
2-deoxy-D-ribofuranose 1-phosphate [cytoplasm]
1-(5-phospho-D-ribosyl)-5-[(5-phospho-D-ribosylamino)methylideneamino]imidazole-4-carboxamide [cytoplasm]
spermine [cytoplasm]
5'-S-methyl-5'-thioadenosine [cytoplasm]
adenine transport
adenosine hydrolase
purine-nucleoside phosphorylase (adenosine)
2'-deoxyadenosine [cytoplasm]
deoxyadenosine transport
formate-tetrahydrofolate ligase
methenyltetrahydrifikate cyclohydrolase
phosphoribosylaminoimidazolesuccinocarboxamide synthase
ribonucleoside-triphosphate reductase (UTP)
dCTP deaminase
squalene epoxidase (NADP)
ornithine decarboxylase
spermidine synthase
adenosine [cytoplasm]
deoxyadenosine deaminase
thymidine phosphorylase
deoxyuridine phosphorylase
purine-nucleoside phosphorylase (deoxyguanosine)
10-formyltetrahydrofolic acid [mitochondrion]
1-(5-phosphoribosyl)-5-[(5-phosphoribosylamino)methylideneamino]imidazole-4-carboxamide isomerase
dihydrofolate reductase
dUTP [cytoplasm]
squalene epoxidase (NAD)
(S)-2,3-epoxysqualene [endoplasmic reticulum]
putrescine [cytoplasm]
putrescine excretion
adenosylhomocysteinase
adenosine deaminase
protein production
(2S)-2-[5-amino-1-(5-phospho-beta-D-ribosyl)imidazole-4-carboxamido]succinic acid [cytoplasm]
squalene-2,3-epoxide transport
adenosine transport
5'-nucleotidase (AMP)
coproporphyrinogen oxidase (O2 required)
coproporphyrinogen III [cytoplasm]
deoxyguanosine transport
2'-deoxyguanosine [cytoplasm]
guanine [cytoplasm]
guanine transport
methionyl-tRNA formyltransferase
dihydrofolic acid [mitochondrion]
indole-3-glycerol-phosphate synthase
dUTP diphosphatase
3-hydroxyanthranilate 3,4-dioxygenase
(S)-2,3-epoxysqualene [cytoplasm]
uroporphyrinogen decarboxylase (uroporphyrinogen III)
5'-nucleotidase (dGMP)
Met-tRNA(Met) [mitochondrion]
phosphoribosylglycinamide synthase
adenylosuccinate lyase
glycine hydroxymethyltransferase
dihydrofolate transport
1-C-(indol-3-yl)glycerol 3-phosphate [cytoplasm]
lanosterol synthase
N-ribosylnicotinamide [cytoplasm]
guanine [mitochondrion]
N(1)-(5-phospho-D-ribosyl)glycinamide [cytoplasm]
2-amino-3-(3-oxoprop-1-enyl)but-2-enedioate [cytoplasm]
lanosterol transport
lanosterol [cytoplasm]
ribosylnicotinamide kinase
purine-nucleoside phosphorylase
guanine phosphoribosyltransferase
methionyl-tRNA synthetase
5-amino-1-(5-phospho-D-ribosyl)imidazole-4-carboxamide [cytoplasm]
uridylate kinase (dUMP)
quinolinate transport
cytochrome P450 lanosterol 14-alpha-demethylase (NAD)
NAD nucleosidase
uroporphyrinogen III [cytoplasm]
dihydrofolate reductase
tryptophan synthase (indoleglycerol phosphate)
quinolinate synthase
lipid production
fecosterol transport
C-8 sterol isomerase
nicotinamide diffusion
guanine transport
L-methionine [mitochondrion]
phosphoribosylglycinamide formyltransferase
5,6,7,8-tetrahydrofolic acid [cytoplasm]
serine O-acetyltransferase
5'-nucleotidase (dUMP)
quinolinate(2-) [cytoplasm]
nicotinamide [cytoplasm]
uroporphyrinogen methyltransferase
gnnuc
dihydrofolic acid [cytoplasm]
glycerol-3-phosphate dehydrogenase (NAD)
14-demethyllanosterol [cytoplasm]
fecosterol [cytoplasm]
fecosterol transport
purine-nucleoside phosphorylase (Guanosine)
phosphoribosylaminoimidazolecarboxamide formyltransferase
seryl-tRNA synthetase
dUMP [cytoplasm]
glycerone phosphate [mitochondrion]
triose-phosphate isomerase
dihydroxyacetone kinase
methionine synthase
tetrahydrofolate:L-glutamate gamma-ligase (ADP-forming)
quinolinate synthase
S-adenosyl-L-homocysteine transport
methionine transport
glutamine synthetase
5-[(5-phospho-1-deoxy-D-ribulos-1-ylamino)methylideneamino]-1-(5-phospho-D-ribosyl)imidazole-4-carboxamide [cytoplasm]
C-14 sterol reductase
nicotinamide N-methyltransferase
homocysteine S-methyltransferase
glutamine phosphoribosyldiphosphate amidotransferase
Imidazole-glycerol-3-phosphate synthase
O-phospho-L-serine [cytoplasm]
dUMP transport
dCMP deaminase
dihydroxyacetone phosphate transport
glycerone phosphate [cytoplasm]
D-fructose 1-phosphate
D-glyceraldehyde-3-phosphate-lyase
fecosterol transport
diphthine synthase
L-methionine [cytoplasm]
cystathionine beta-synthase
phosphoserine phosphatase (L-serine)
phosphofructokinase
D-fructose 1,6-bisphosphate [cytoplasm]
fructose-bisphosphate aldolase
S-adenosyl-L-homocysteine [cytoplasm]
anthranilate phosphoribosyltransferase
glutamate synthase (NADH2)
L-serine [cytoplasm]
deoxyuridine kinase (ATP:deoxyuridine)
fructose-1-phosphate kinase
sedoheptulose 1,7-bisphosphate
methylglyoxal synthase
S-adenosyl-methionine delta-24-sterol-c-methyltransferase
5-methyltetrahydropteroyltriglutamate-homocysteine S-methyltransferase
glutamine-fructose-6-phosphate transaminase
phosphoserine transaminase
D-glyceraldehyde-3-phosphate-lyase
shikimate kinase
5-O-(1-carboxyvinyl)-3-phosphoshikimic acid [cytoplasm]
anthranilate [cytoplasm]
asparagine synthase (glutamine-hydrolysing)
D-glucosamine 6-phosphate uniport
L-serine dehydrogenase
dTMP kinase
dTMP [cytoplasm]
phosphofructokinase
sedoheptulose 7-phosphate [cytoplasm]
D-erythrose 4-phosphate transport
3-phosphoshikimic acid [cytoplasm]
chorismate pyruvate lyase
anthranilate synthase
glutaminyl-tRNA synthetase
L-glutamine [cytoplasm]
glutaminase
alpha-D-glucosamine 6-phosphate [cytoplasm]
biomass production
L-isoleucine [cytoplasm]
thymidylate synthase
transaldolase
3-dehydroquinate dehydratase
D-erythrose 4-phosphate(2-) [cytoplasm]
3-phosphoshikimate 1-carboxyvinyltransferase
chorismate mutase
hnRNP arginine N-methyltransferase
methionyl-tRNA synthetase
O-acetylhomoserine (thiol)-lyase
isoleucyl-tRNA synthetase
L-isoleucine transport
thymidine kinase (ATP:thymidine)
3-dehydroquinate [cytoplasm]
pyruvate kinase
chorismate synthase
chorismate(2-) [cytoplasm]
dihydroneopterin monophosphate dephosphorylase
7,8-dihydroneopterin [cytoplasm]
L-glutamine transport
phosphoglucosamine mutase
4-aminobenzoate transport
glucosamine-6-phosphate deaminase
L-isoleucine transport
3-dehydroshikimate [cytoplasm]
3-dehydroquinate synthase
3-deoxy-D-arabino-heptulosonate 7-phosphate synthetase
phosphoenolpyruvate [cytoplasm]
L-histidine [mitochondrion]
Histidyl-tRNA synthetase
4-amino-4-deoxychorismate synthase
4-aminobenzoate [mitochondrion]
dhnpt transport
L-glutamine transport
carbamoyl-phosphate synthase (glutamine-hydrolysing)
N-acetylglucosamine-6-phosphate synthase
L-isoleucine [mitochondrion]
shikimate dehydrogenase
7-phospho-2-dehydro-3-deoxy-D-arabino-heptonic acid [cytoplasm]
citrate transport
histidine transport
L-histidine [cytoplasm]
4-amino-4-deoxychorismate(2-) [cytoplasm]
4-aminobenzoate transport
7,8-dihydroneopterin
dihydropteroate [mitochondrion]
dihydropteroate synthase
isa fatty acid
isoleucine transaminase
isoleucyl-tRNA synthetase
2-dehydro-3-deoxy-D-arabino-heptonate7-phohsphate transport
citrate(3-) [mitochondrion]
histidyl-tRNA synthetase
L-histidine transport
4-aminobenzoate [cytoplasm]
(S)-3-methyl-2-oxopentanoate [mitochondrion]
(2R,3R)-2,3-dihydroxy-3-methylpentanoate [mitochondrion]
citrate transport
enolase
histidinol dehydrogenase
L-histidinol phosphate [cytoplasm]
histidinol-phosphate transaminase
dihydropteroate synthase
dihydroneopterin aldolase
3-methyl-2-oxopentanoate transport
dihydroxy-acid dehydratase (2,3-dihydroxy-3-methylpentanoate)
ketol-acid reductoisomerase (2-aceto-2-hydroxybutanoate)
7-phospho-2-dehydro-3-deoxy-D-arabino-heptonic acid [mitochondrion]
4-aminobenzoate synthase
2-amino-6-(hydroxymethyl)-7,8-dihydropteridin-4-ol [mitochondrion]
2-phospho-D-glyceric acid [cytoplasm]
imidazoleglycerol-phosphate dehydratase
citrate transport
histidinol-phosphatase
UMP transport
(S)-3-methyl-2-oxopentanoate [cytoplasm]
2-deoxy-D-arabino-heptulosonate 7-phosphate synthetase
phosphoglycerate mutase
3-(imidazol-4-yl)-2-oxopropyl dihydrogen phosphate [cytoplasm]
L-histidinol [cytoplasm]
2-amino-4-hydroxy-6-hydroxymethyldihydropteridine diphosphokinase
UMP [nucleus]
5'-nucleotidase (UMP)
3-methyl-2-oxopentanoate decarboxylase
3-methyl-oxopentanoate trasport
(S)-2-acetyl-2-hydroxybutanoate [mitochondrion]
GDP transport
phosphatidylinositol 4-kinase
UMP kinase
2-aceto-2-hydroxybutanoate synthase
beta-1,4 mannosyltransferase
UMP [cytoplasm]
UMP kinase
GDP-alpha-D-mannose [Golgi]
H+ [Golgi]
alpha 1,2-mannosyltransferase
GDP-alpha-D-mannose [cytoplasm]
dolichyl-phosphate-mannose--protein mannosyltransferase
uridine kinase (GTP:uridine)
UTP diphosphohydrolase
2-oxobutanoate [mitochondrion]
2-oxobutanoate dehydrogenase
nucleoside-diphosphatase (GDP), Golgi
ATP synthase, Golgi Apparatus
MIPC synthase
GDP-mannose antiport
GPI-anchor assembly, step 7
dolichyl D-mannosyl phosphate [endoplasmic reticulum]
nucleoside-diphosphatase (UDP)
2-oxobutanoate transporter
L-threonine deaminase
phosphatidylcholine [endoplasmic reticulum]
GPI-anchor assembly, step 5
uracil phosphoribosyltransferase
IPC synthase
GDP-alpha-D-mannose transport
dolichyl-phosphate D-mannosyltransferase
4)-alpha-D-glucosaminyl]-O-acyl-1-phosphatidyl-1D-myo-inositol [endoplasmic reticulum]
cholinephosphotransferase
IPC synthase
inositol-P-ceramide C [Golgi]
inositol-P-ceramide C to D
O-glycosylation of proteins by PMT1:PMT2
diglyceride [endoplasmic reticulum]
isa phosphatidylcholine
1D-myo-inositol 1-phosphate [Golgi]
mannose-1-phosphate guanylyltransferase
GTP cyclohydrolase I
ATP adenylyltransferase
GPI-anchor assembly, step 8
GPI-anchor assembly, step 6
GPI-anchor assembly, step 9
serine esterase
IPC synthase
D-mannose 1-phosphate [cytoplasm]
GTP/GDP translocase
4)-alpha-glucosaminyl]-O-acyl-1-phosphatidyl-1D-myo-inositol [endoplasmic reticulum]
inositolphosphotransferase
D-mannose 6-phosphate [cytoplasm]
phosphomevalonate kinase
adenylate kinase (GTP)
GTP [cytoplasm]
4)-alpha-D-glucosaminyl)-O-acyl-1-phosphatidyl-1D-myo-inositol [endoplasmic reticulum]
phosphomannomutase
ATP adenylyltransferase
GTP diphosphohydrolase
GPI-anchor assembly, step 10, GPI-modification of newly synthesised protein
1D-myo-inositol 1-phosphate transport
IPC synthase
hexokinase (D-mannose:ATP)
mannose-6-phosphate isomerase
(R)-5-phosphomevalonic acid [cytoplasm]
mevalonate kinase (gtp)
ribonucleoside-triphosphate reductase (GTP)
nucleoside-triphosphatase (GTP)
mevalonate kinase (ctp)
mevalonate kinase (atp)

Figure S2 - d1

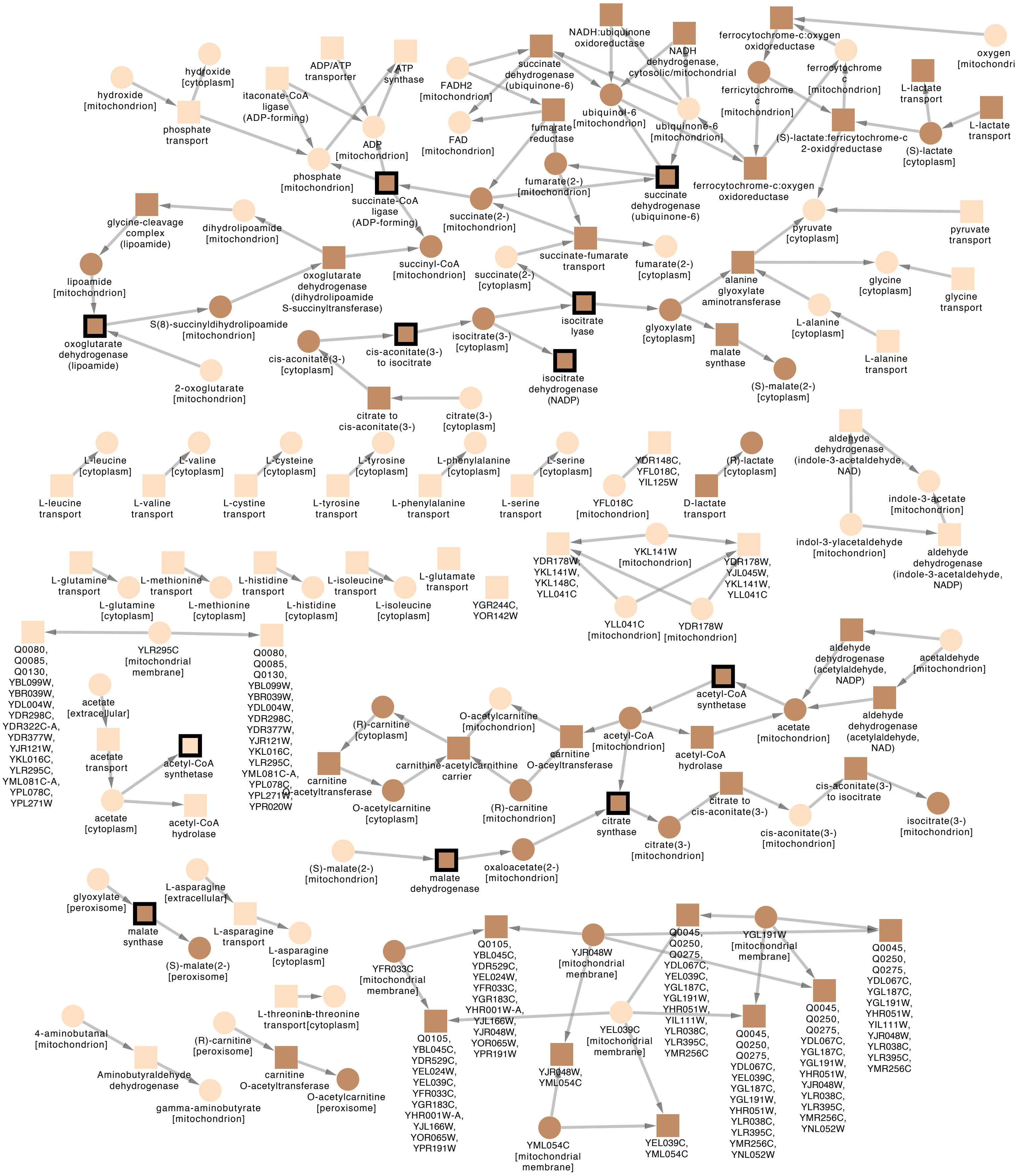


Figure S3A - GiGA up 1

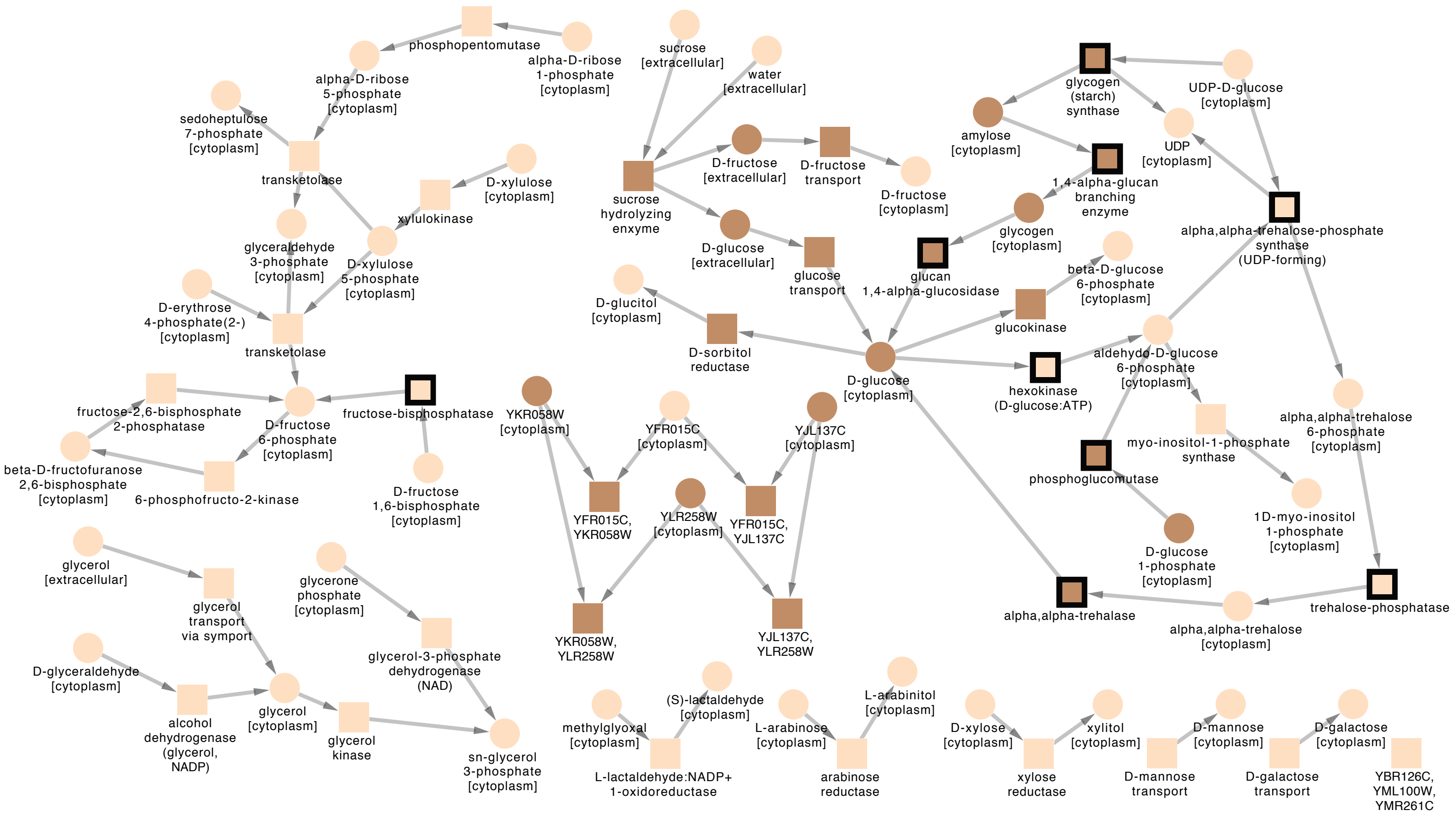


Figure S3B - GiGA up 2

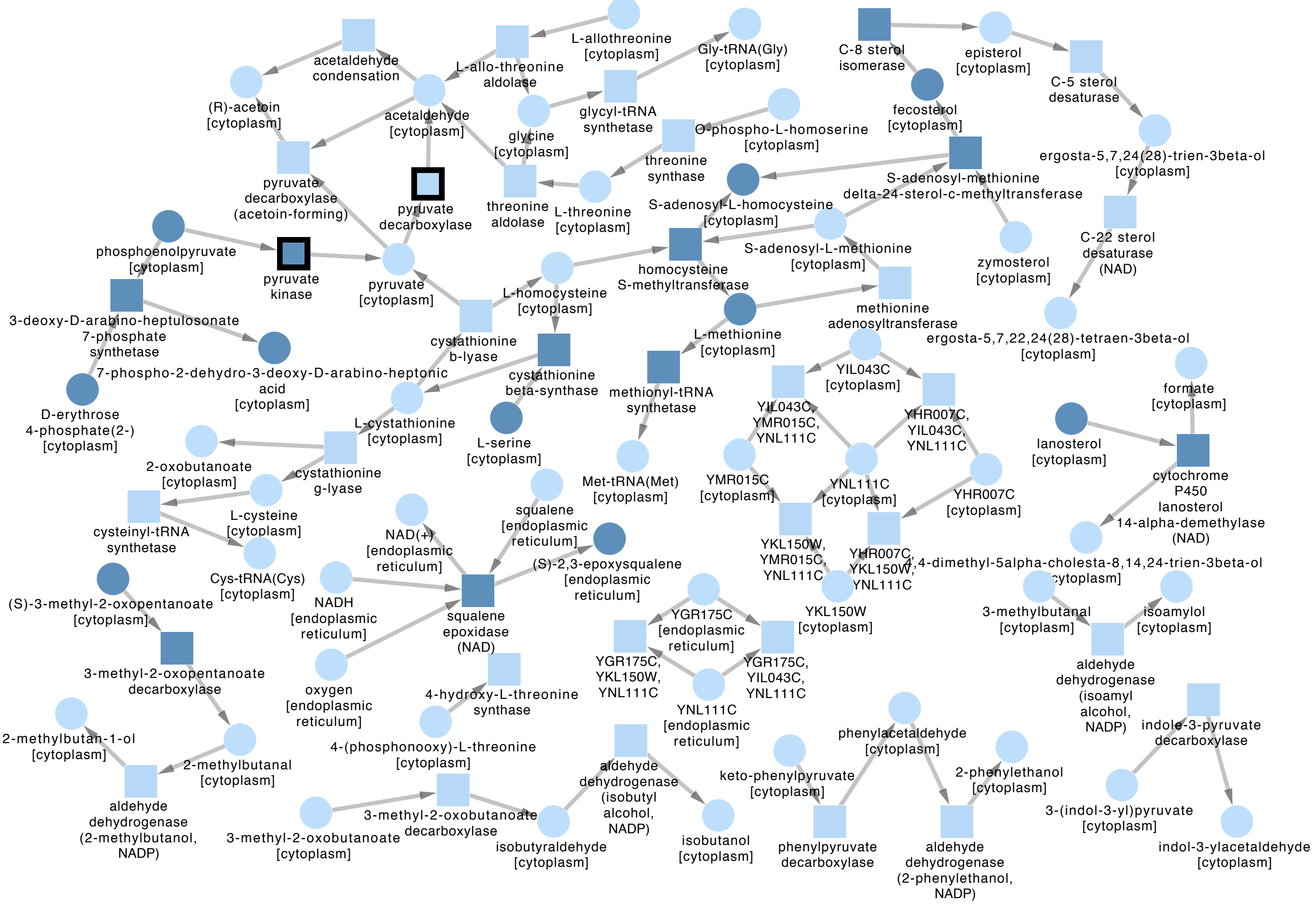


Figure S4A - GiGA down 1

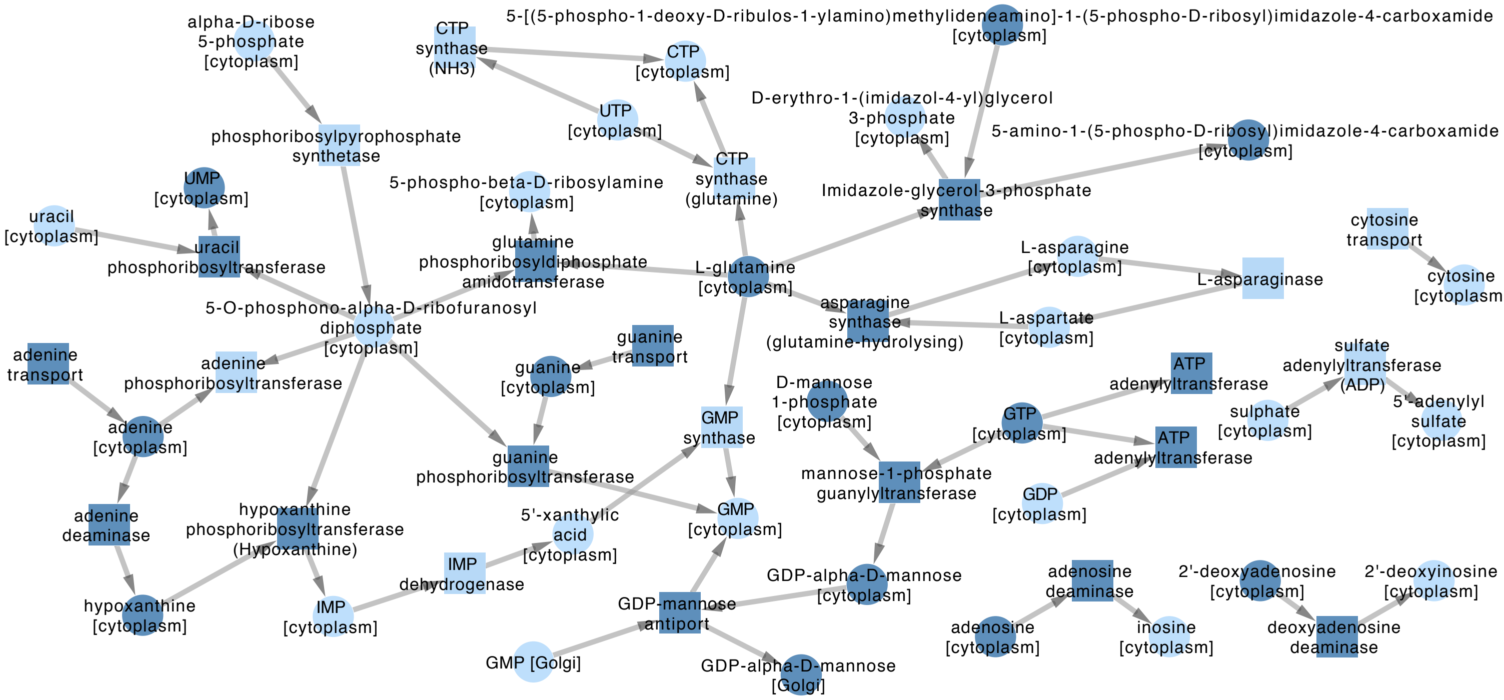


Figure S4B - GiGA down 2

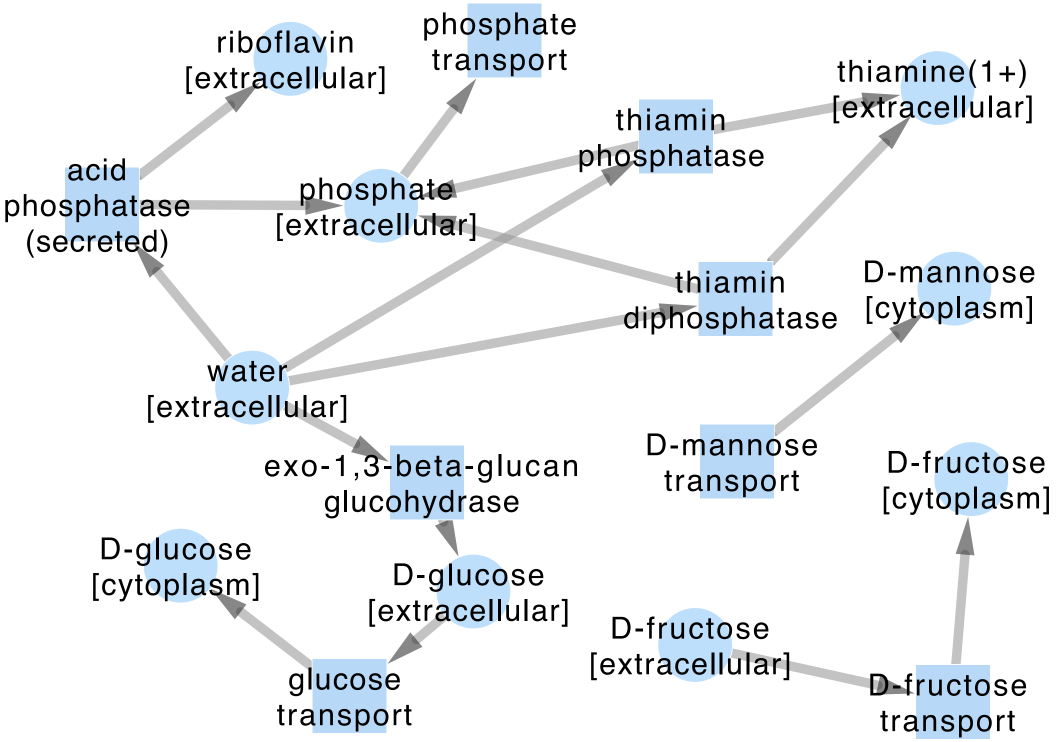


Figure S4C - GiGA down 3

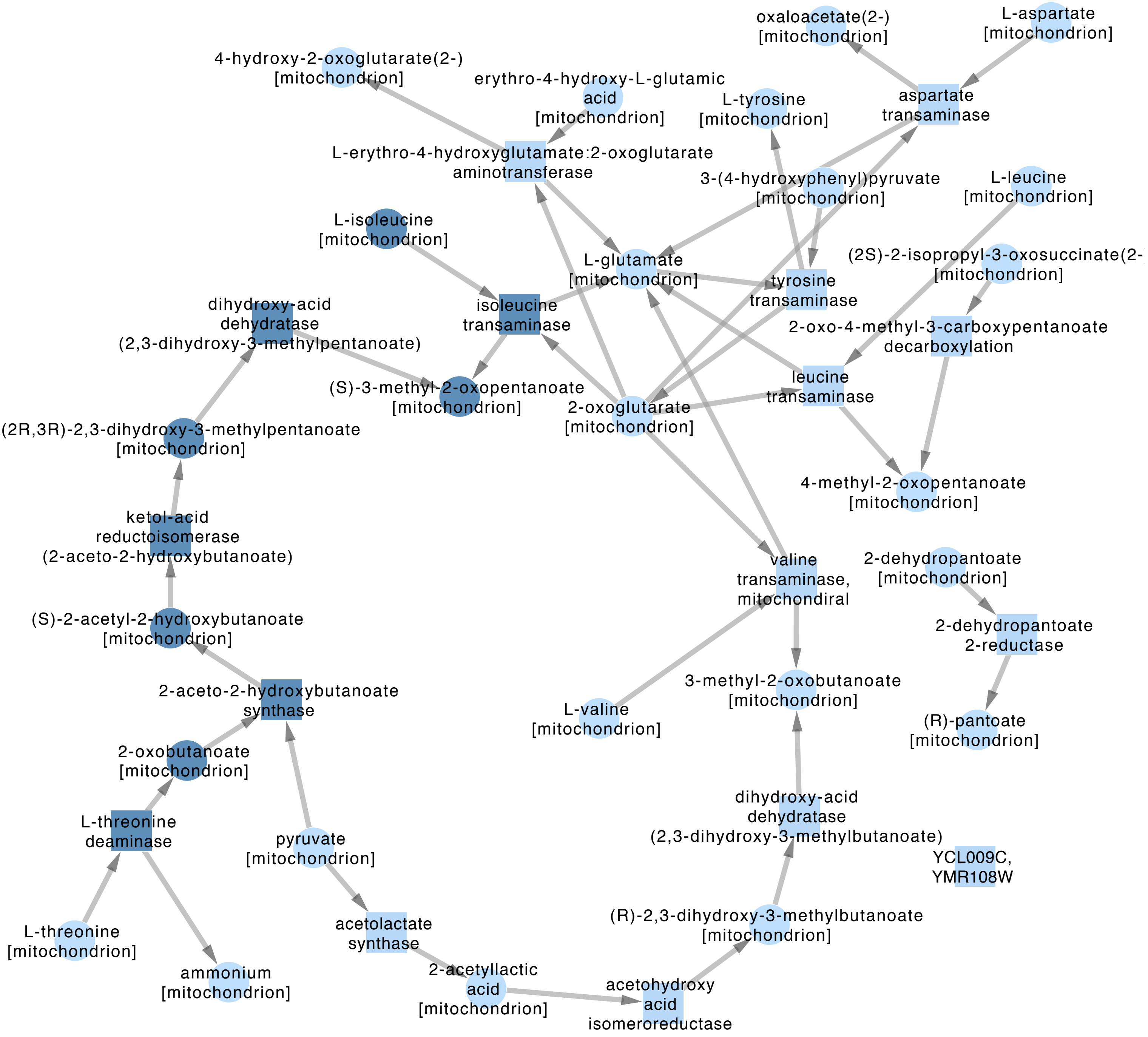


Figure S4D - GiGA down 4

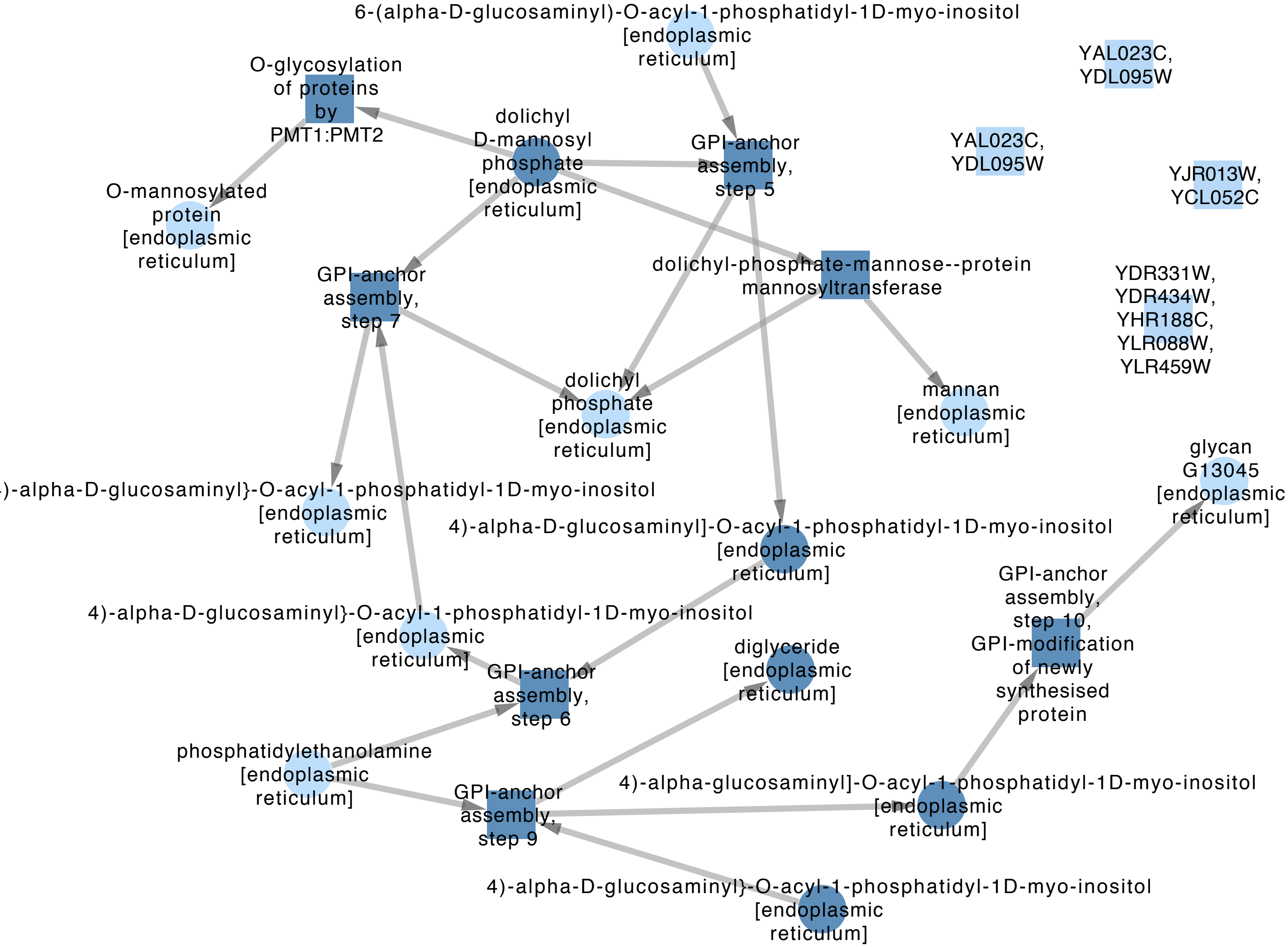


Figure S4E - GiGA down 5

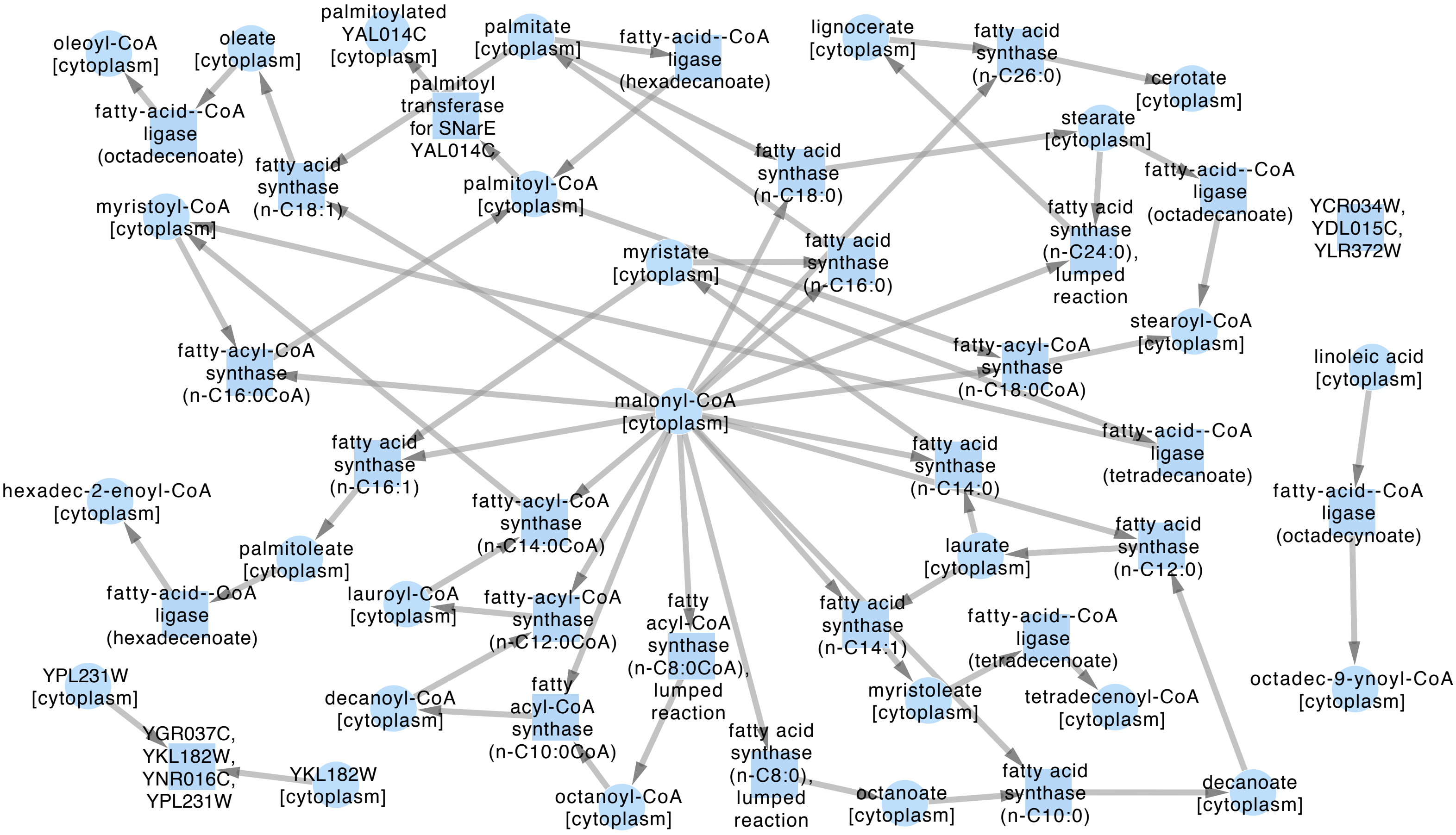


Figure S4F - GiGA down 6