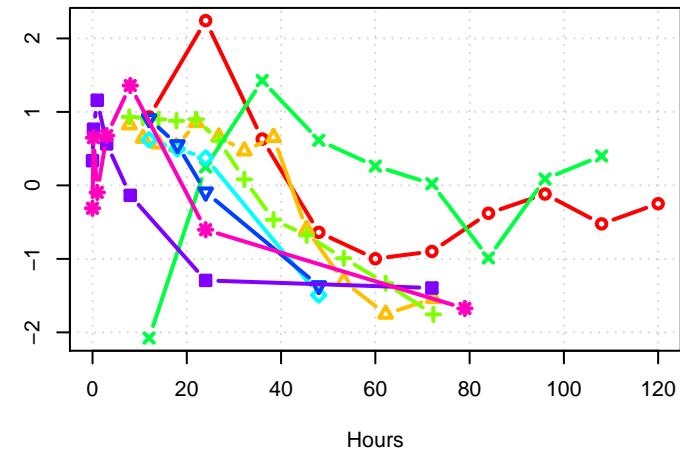


- WT
- △— trans
- +— prot
- *— Sch9
- ◇— g0.5
- ▽— g2
- ×— o1
- *— o20

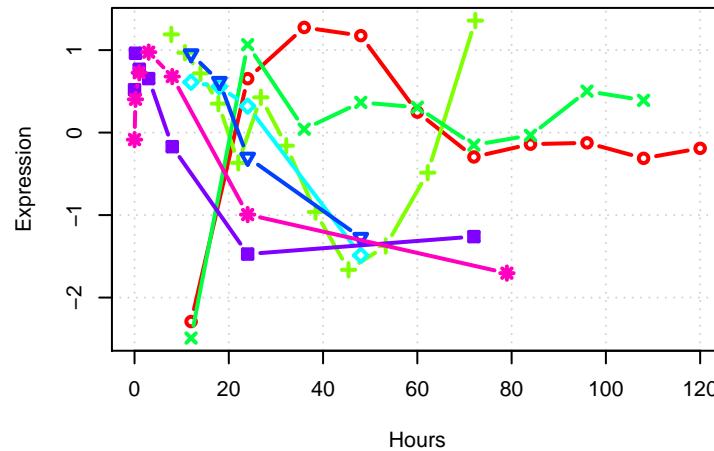
2-ketoglutarate dehydrogenase complex

2-ketoglutarate dehydrogenase complex

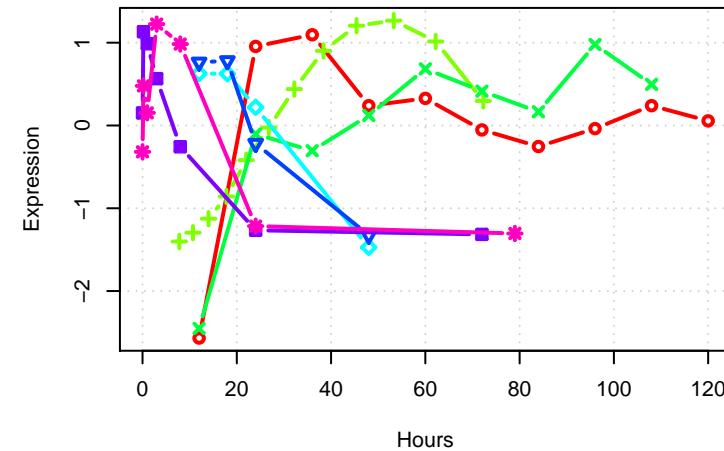
lpd1 YFL018C
ipoamide dehydrogenase



Dihydrolipoyl transsuccinylase

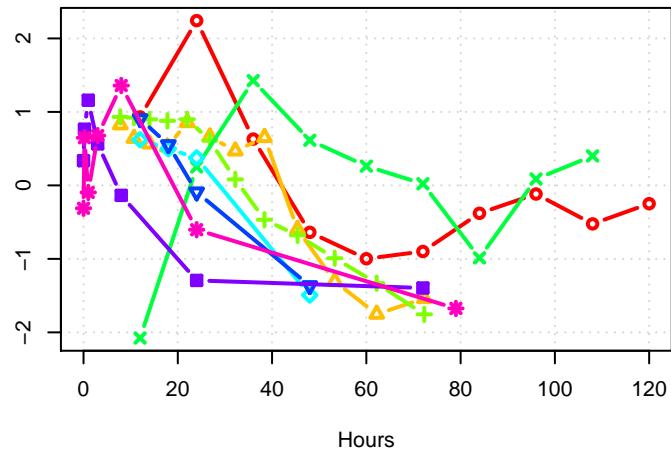


kgd1 - HETSW
Subunit of the mitochondrial alpha-ketoglutarate dehydrogenase complex



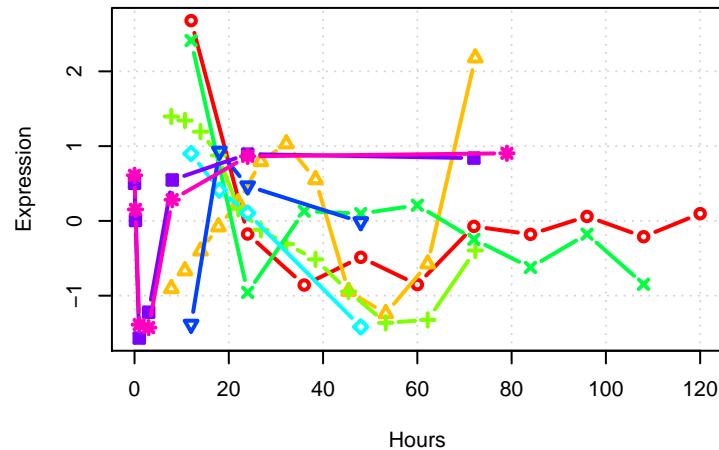
folate biosynthesis

lpd1 YFL018C
Dihydrolipoamide dehydrogenase

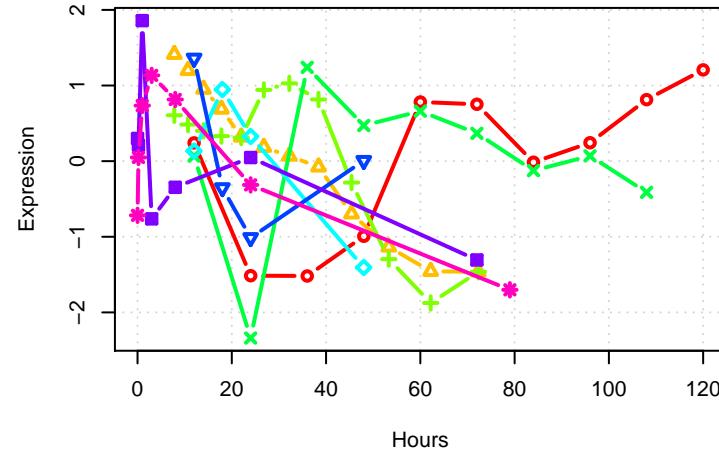


folate biosynthesis

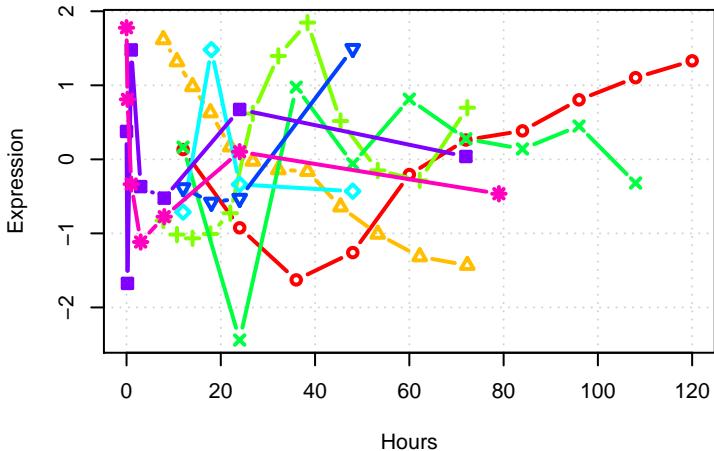
cdc21 YOR074C
Thymidylate synthase



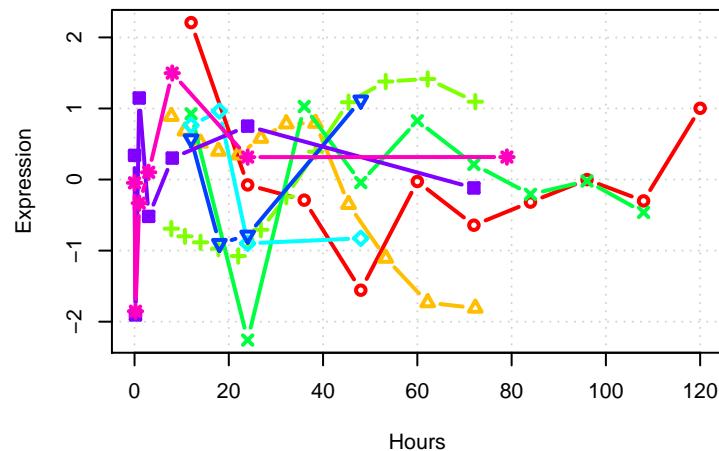
gcv1 YDR019C
T subunit of the mitochondrial glycine decarboxylase complex



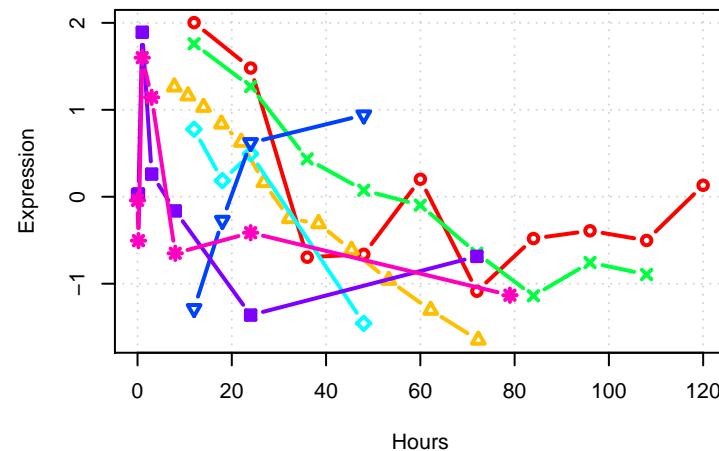
gcv2 YMR189W
P subunit of the mitochondrial glycine decarboxylase complex



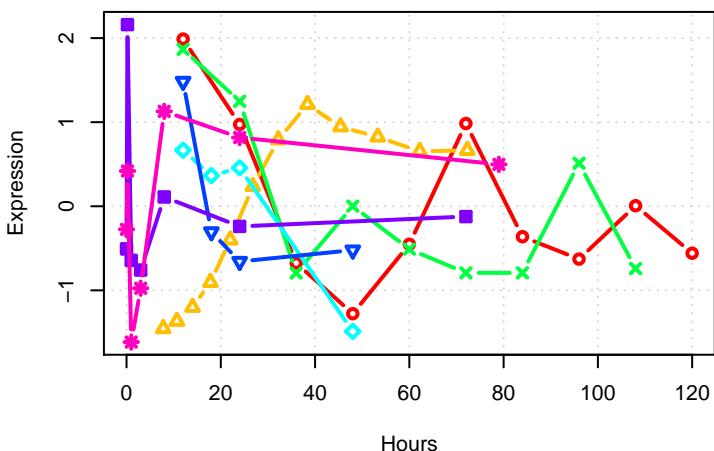
gcv3 YAL044C
H subunit of the mitochondrial glycine decarboxylase complex



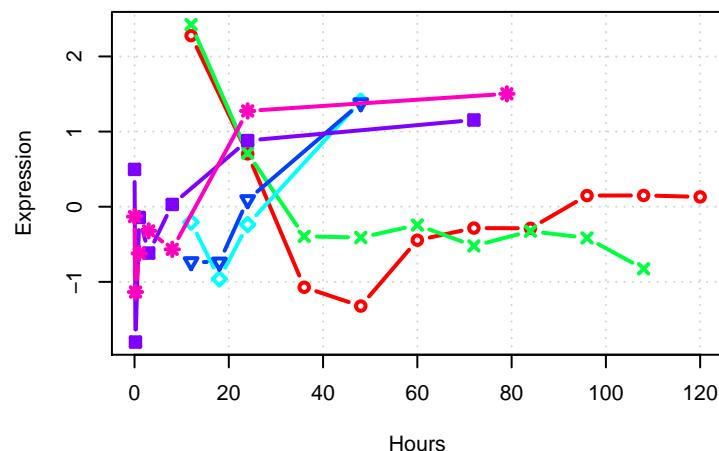
abz2 YMR289W
Aminodeoxychorismate lyase (4-amino-4-deoxychorismate lyase)



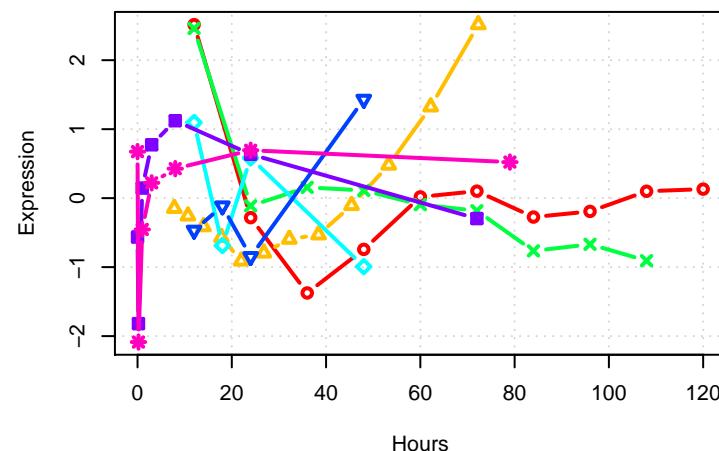
abz1 YNR033W
Para-aminobenzoate (PABA) synthase



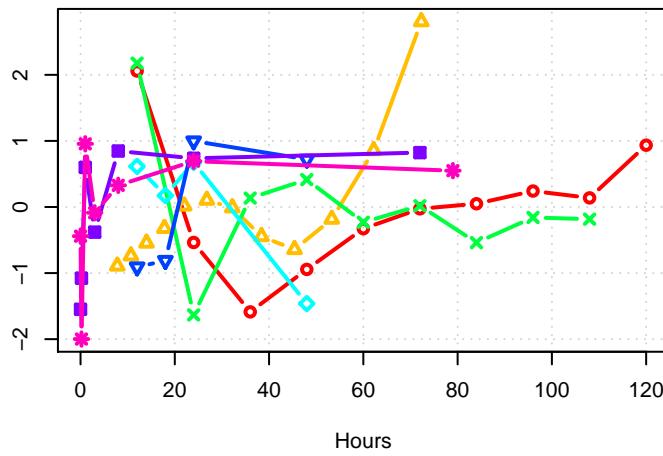
fol1 YNL256W
Multifunctional enzyme of the folic acid biosynthesis pathway



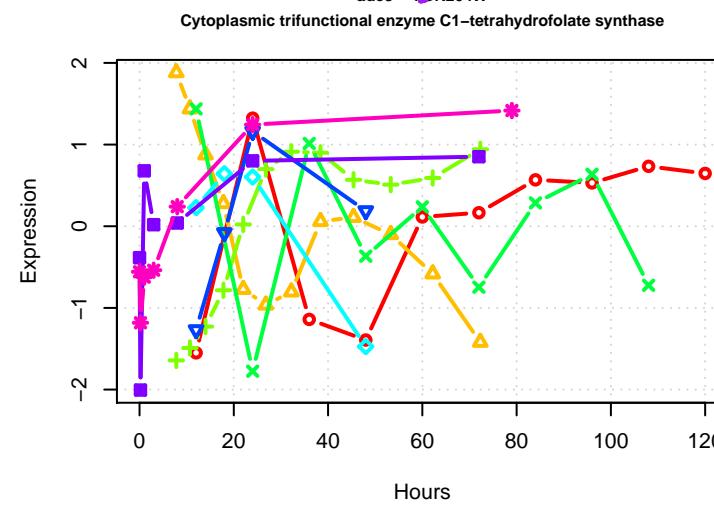
dfr1 YOR236W
Dihydrofolate reductase involved in tetrahydrofolate biosynthesis



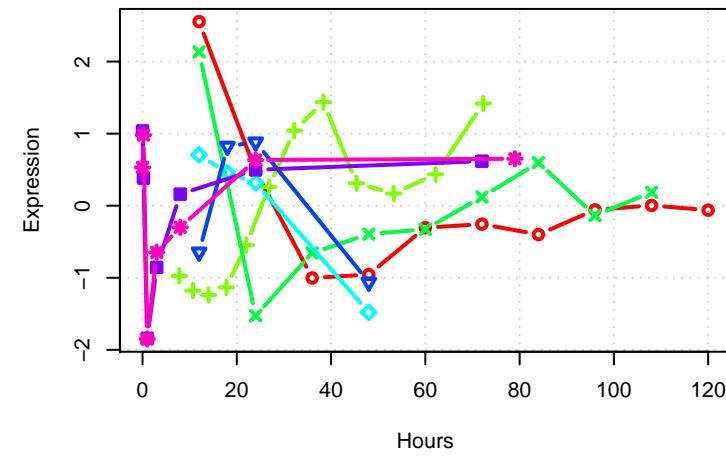
fol3 YMR113W
Dihydrofolate synthetase, involved in folic acid biosynthesis



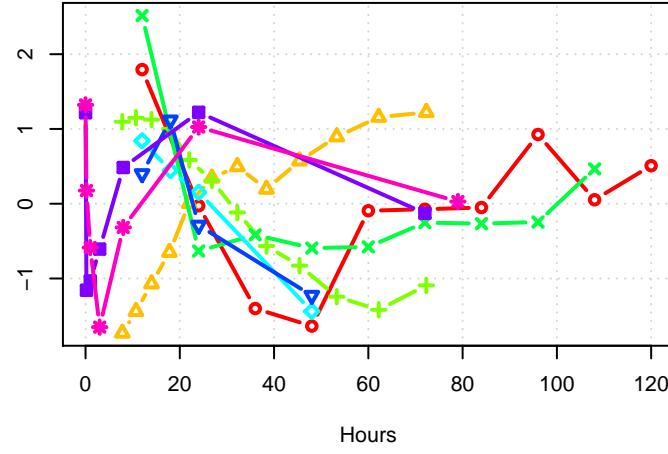
folate biosynthesis
aae3 YLR204W



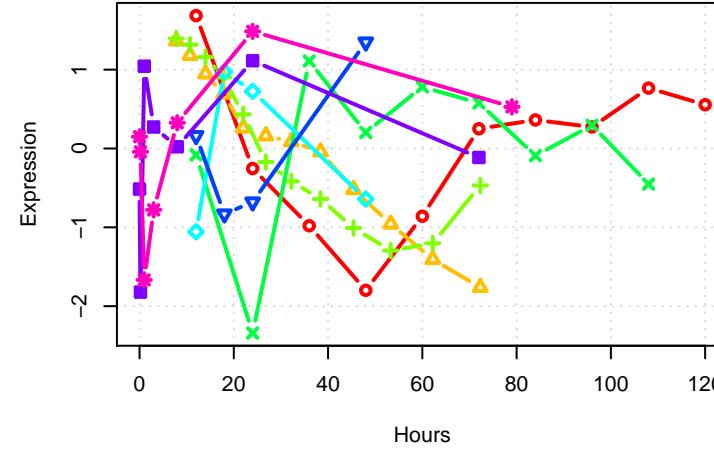
mis1 YBR084W
Mitochondrial C1-tetrahydrofolate synthase



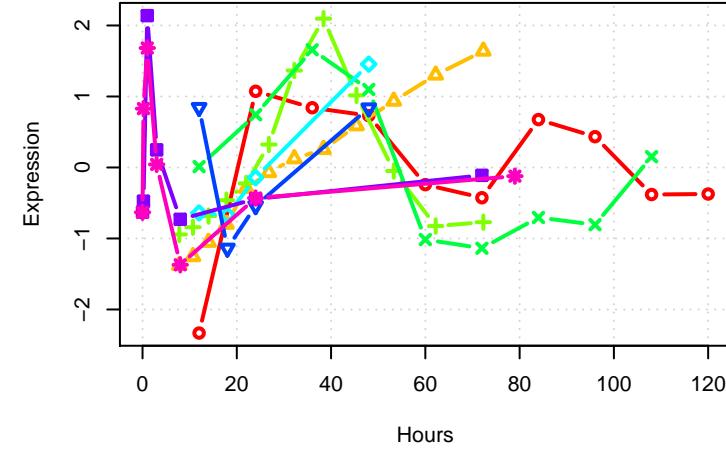
shm1 YBR263W
Mitochondrial serine hydroxymethyltransferase



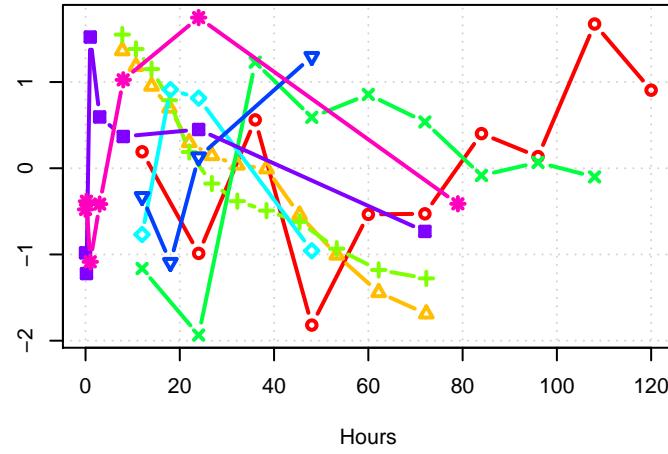
shm2 YLR058C
Cytosolic serine hydroxymethyltransferase



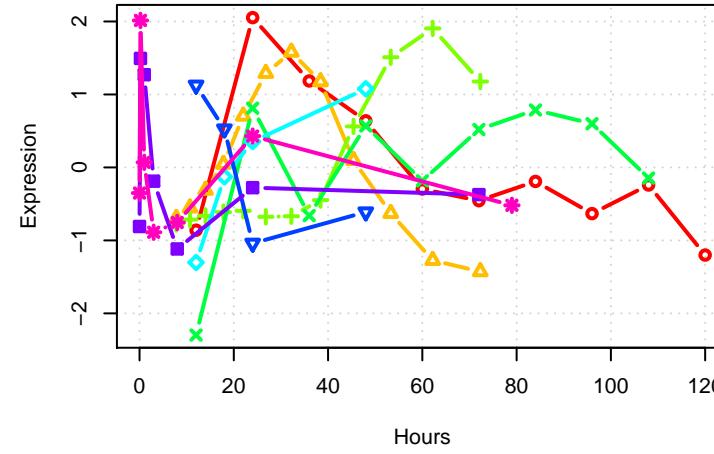
fol2 YGR267C
GTP-cyclohydrolase I, catalyzes first step in folic acid biosynthesis



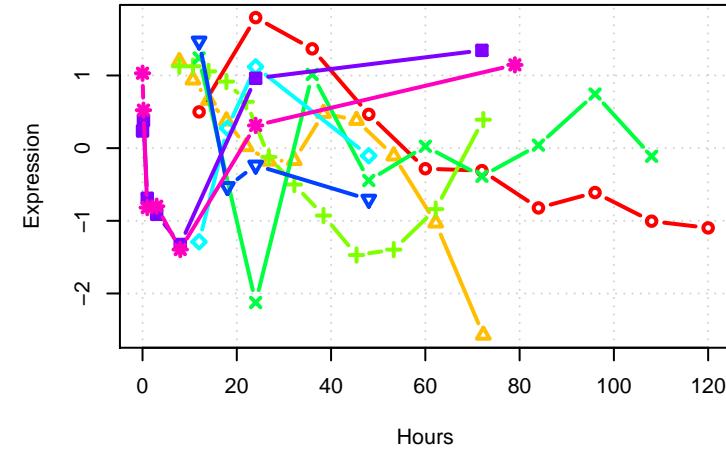
mtd1 YKR080W
NAD-dependent 5,10-methylenetetrahydrofolate dehydrogenase



met12 YPL023C
Protein with MTHFR activity in vitro

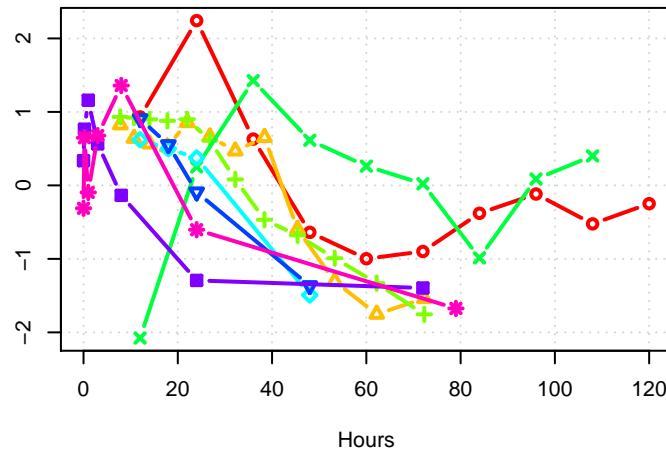


met13 YGL125W
Major isozyme of methylenetetrahydrofolate reductase



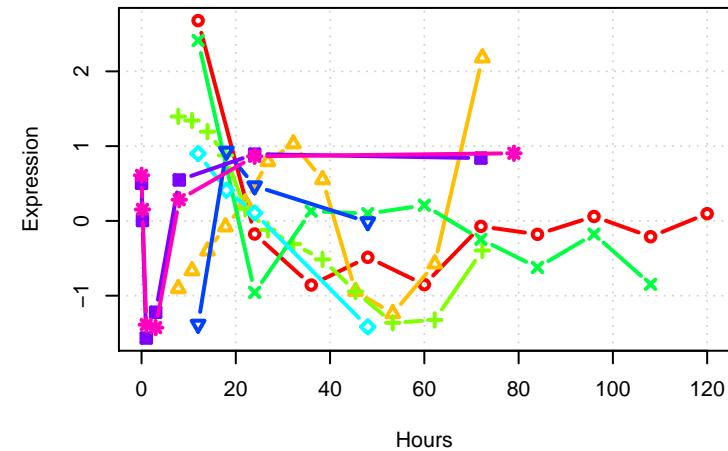
folate interconversions

lpd1 YFL018C
Dihydrolipoamide dehydrogenase

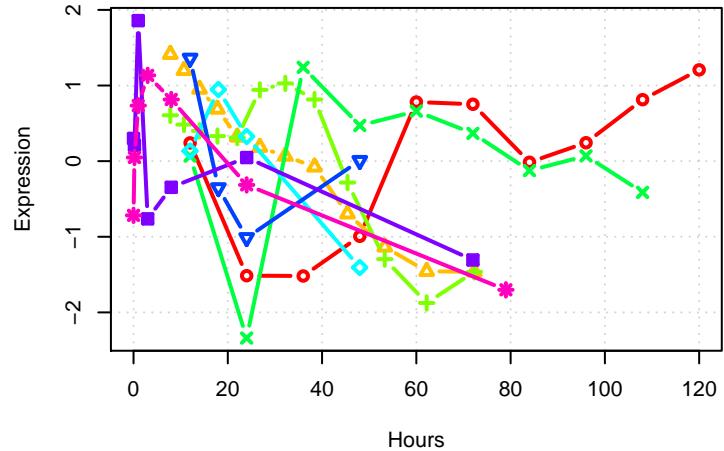


folate interconversions

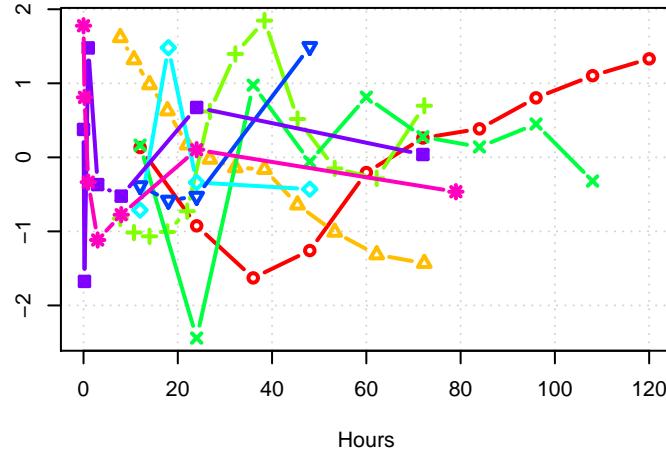
coc21 YCR074C
Thymidylate synthase



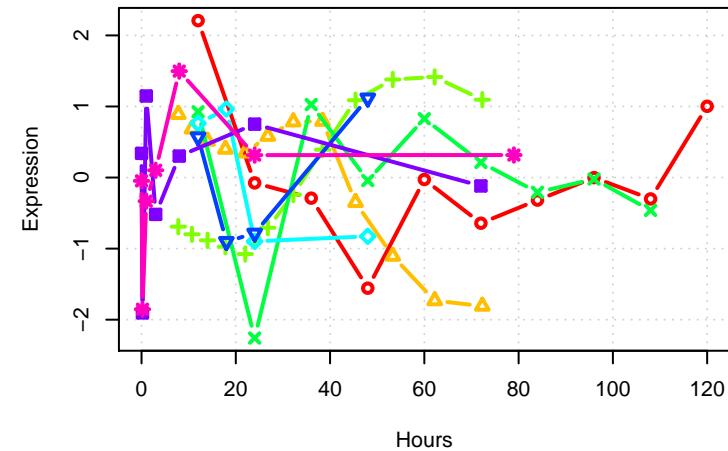
gcv1 YDR019C
T subunit of the mitochondrial glycine decarboxylase complex



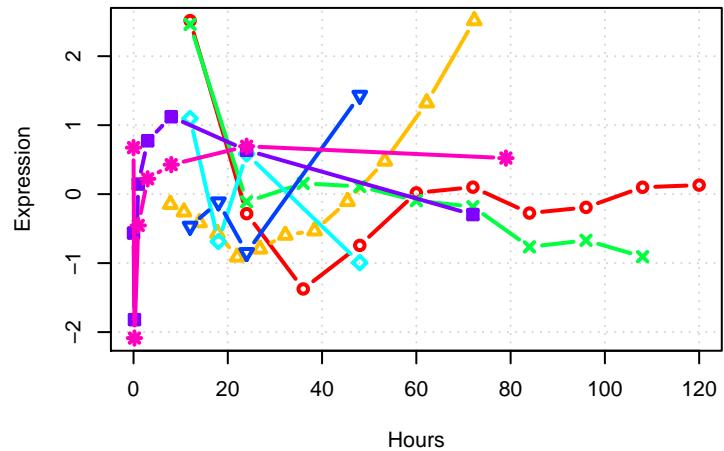
gcv2 YMR189W
P subunit of the mitochondrial glycine decarboxylase complex



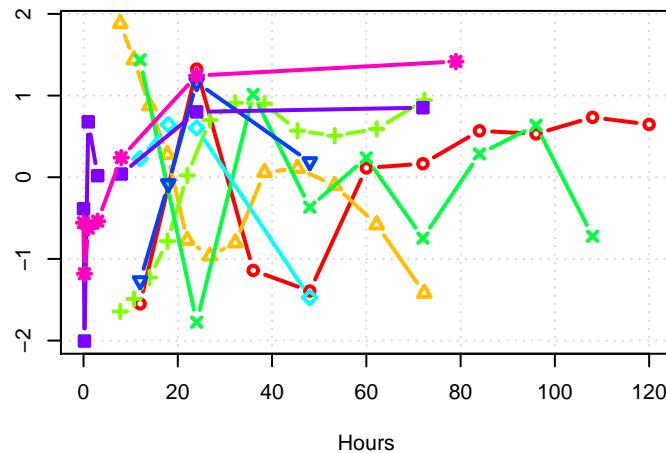
gcv3 YAL044C
H subunit of the mitochondrial glycine decarboxylase complex



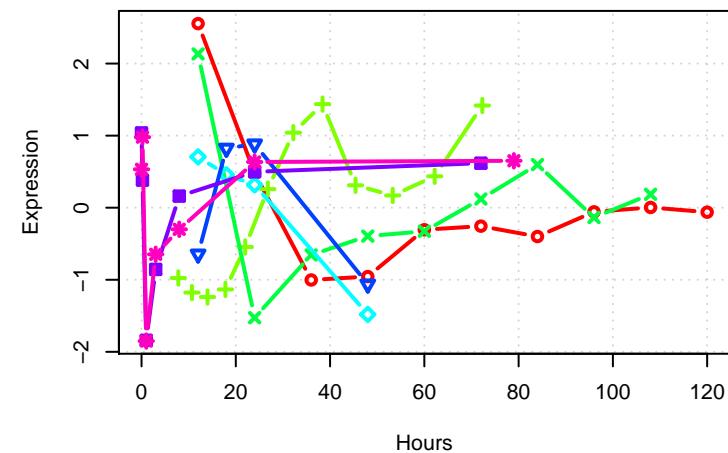
dfr1 YOR236W
Dihydrofolate reductase involved in tetrahydrofolate biosynthesis



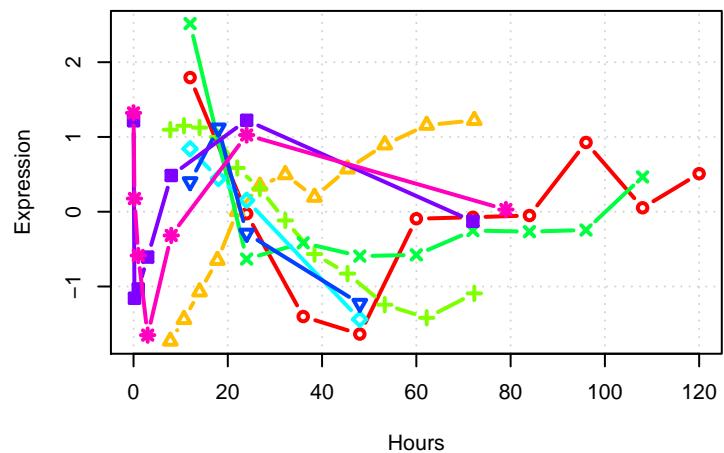
ade3 YGR204W
Cytoplasmic trifunctional enzyme C1-tetrahydrofolate synthase



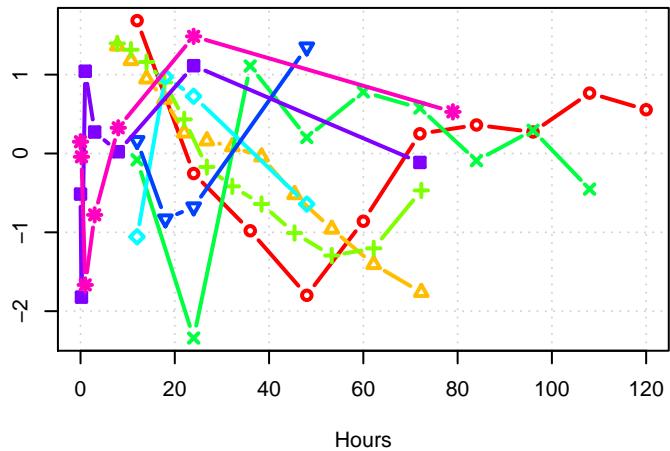
mis1 YBR084W
Mitochondrial C1-tetrahydrofolate synthase



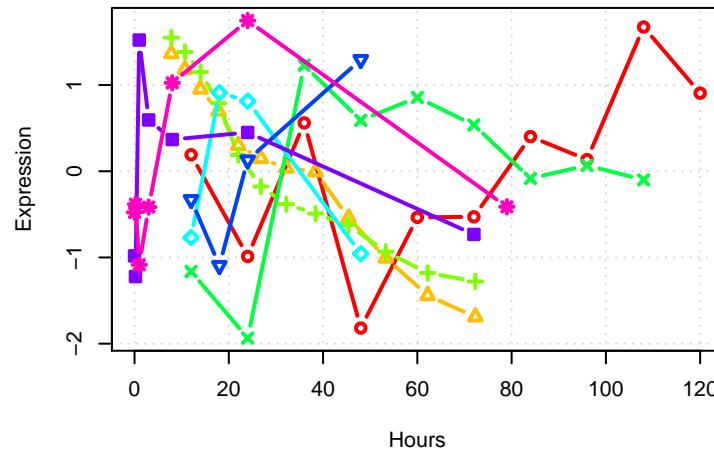
shm1 YBR263W
Mitochondrial serine hydroxymethyltransferase



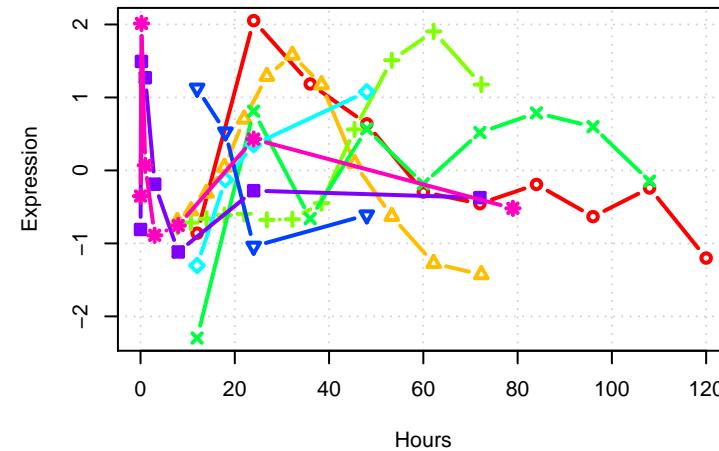
shm2 YLR058C
Cytosolic serine hydroxymethyltransferase



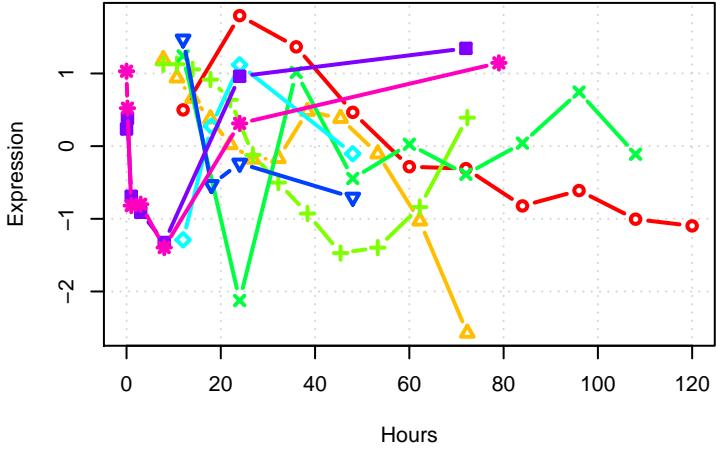
folate interconversions
mtdr YKR080W
NAD-dependent 5,10-methylenetetrahydrofolate dehydrogenase



met12 YPL023C
Protein with MTHFR activity in vitro

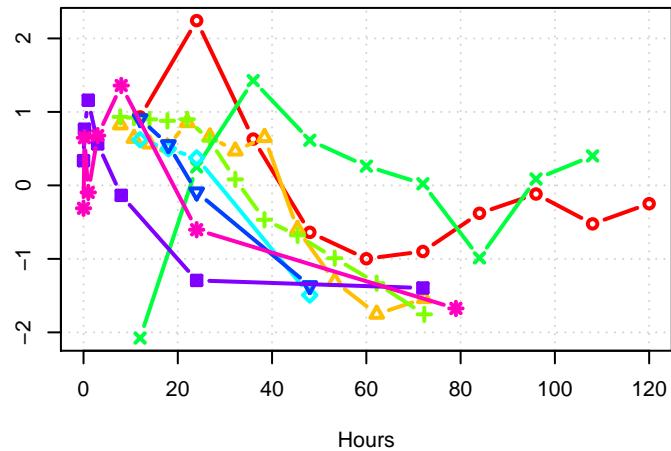


met13 YGL125W
Major isozyme of methylenetetrahydrofolate reductase

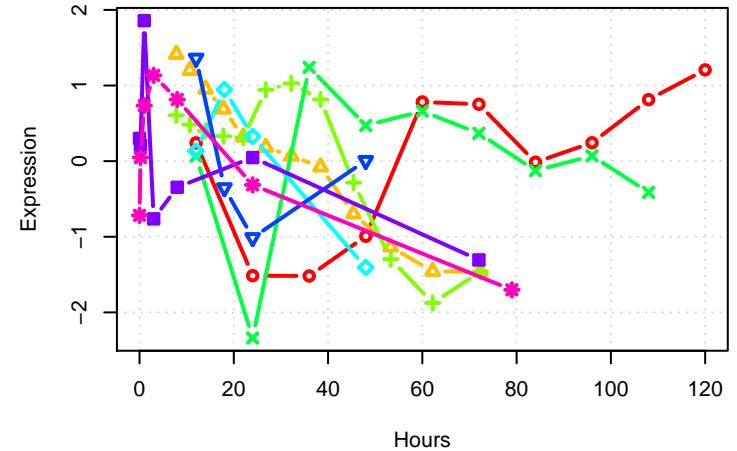


folate transformations

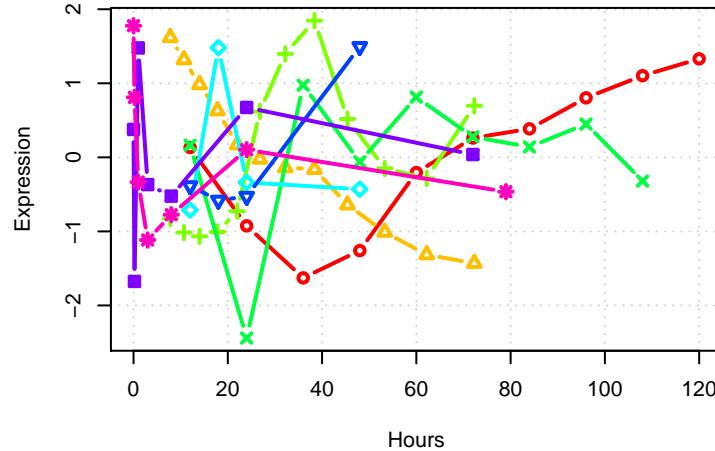
lpd1 YFL018C
Dihydrolipoamide dehydrogenase



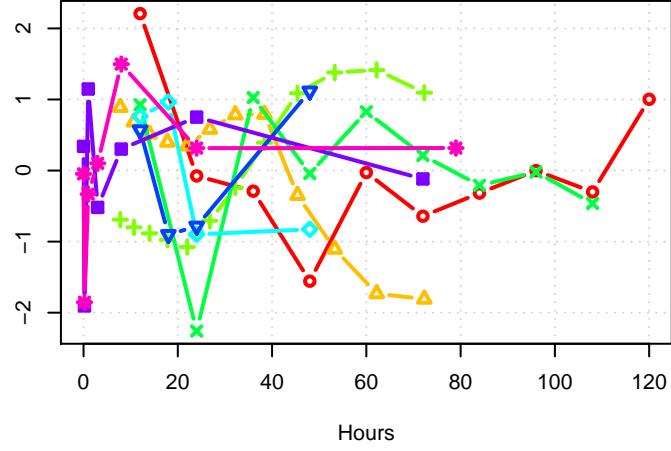
folate transformations
gcv1 YDR019C
T subunit of the mitochondrial glycine decarboxylase complex



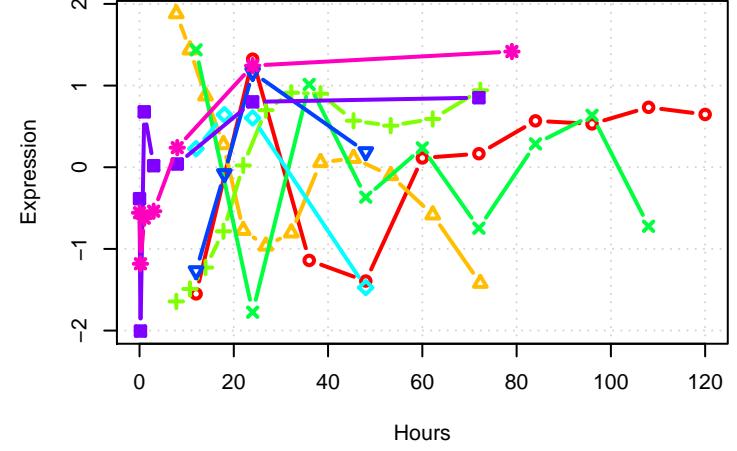
gcv2 YMR189W
P subunit of the mitochondrial glycine decarboxylase complex



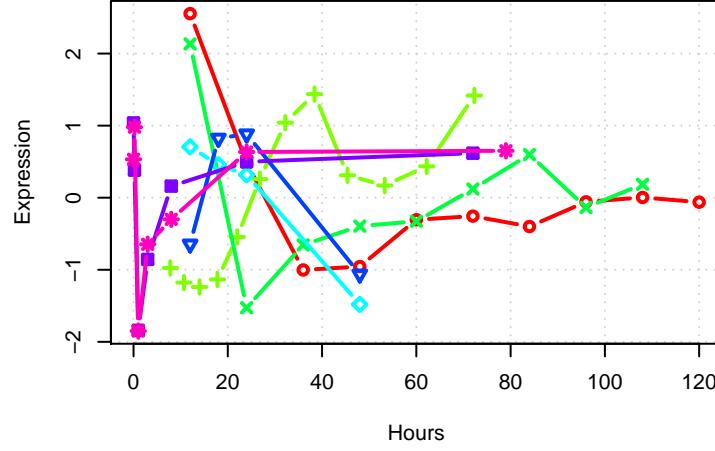
gcv3 YAL044C
H subunit of the mitochondrial glycine decarboxylase complex



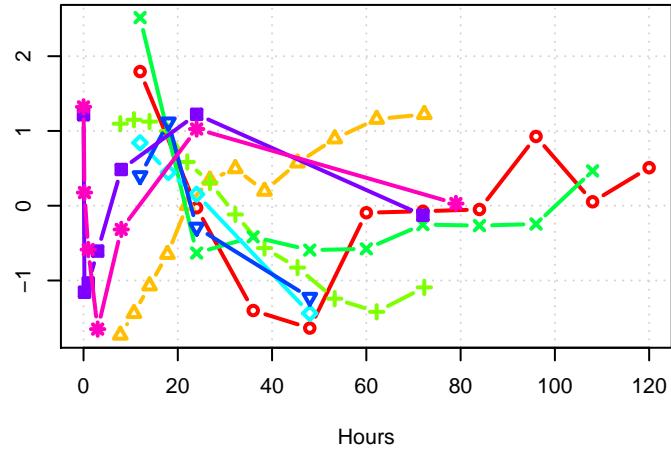
ade3 YGR204W
Cytoplasmic trifunctional enzyme C1-tetrahydrofolate synthase



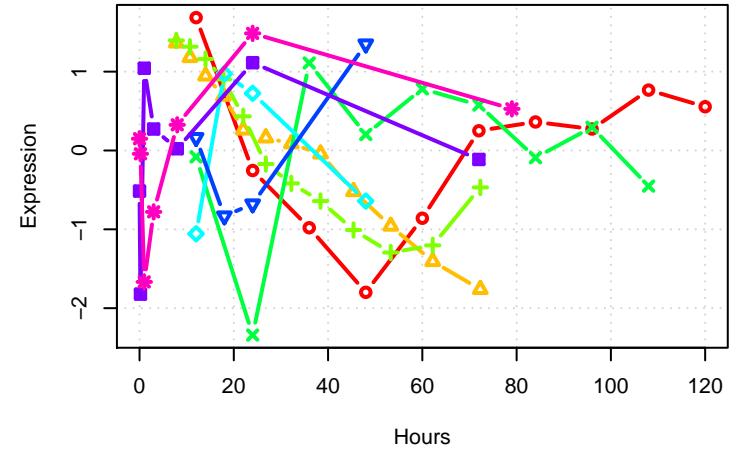
mis1 YBR084W
Mitochondrial C1-tetrahydrofolate synthase



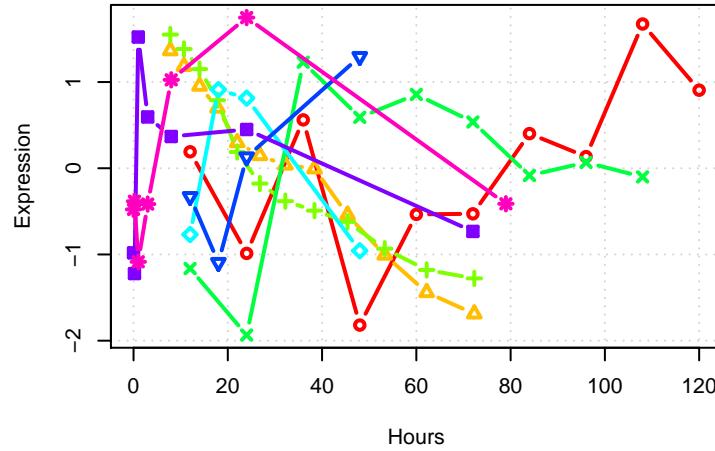
shm1 YBR263W
Mitochondrial serine hydroxymethyltransferase



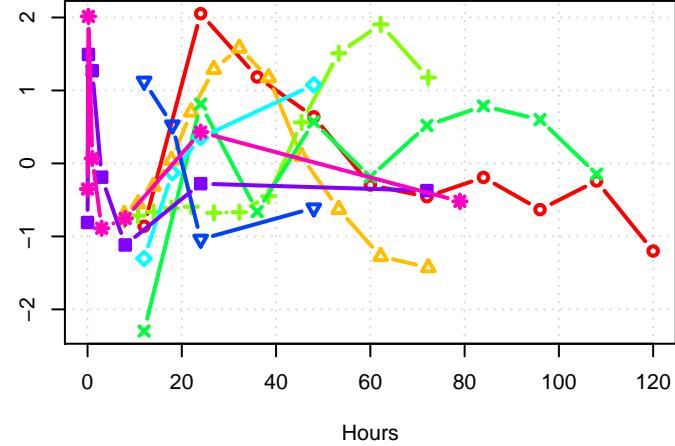
shm2 YLR058C
Cytosolic serine hydroxymethyltransferase



mtd1 YKR080W
NAD-dependent 5,10-methylenetetrahydrofolate dehydrogenase

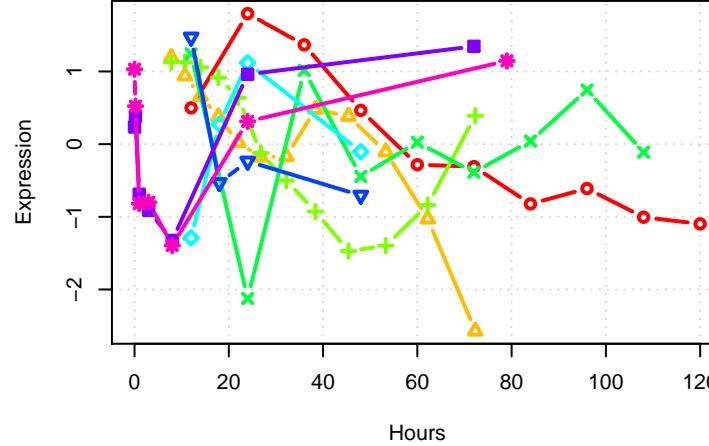


met12 YPL023C
in with MTHFR activity in vitro

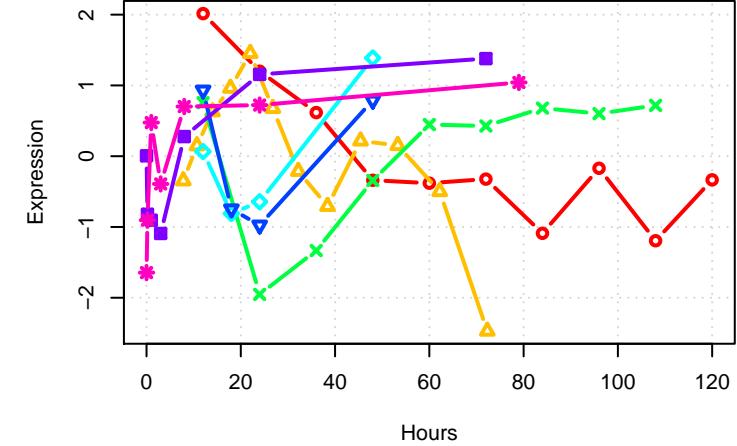


folate transformations

met13 YGL125W

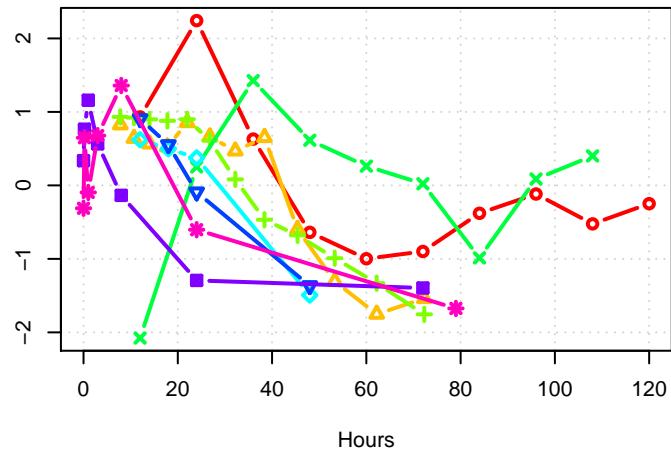


fau1 YER183C
5,10-methenyltetrahydrofolate synthetase

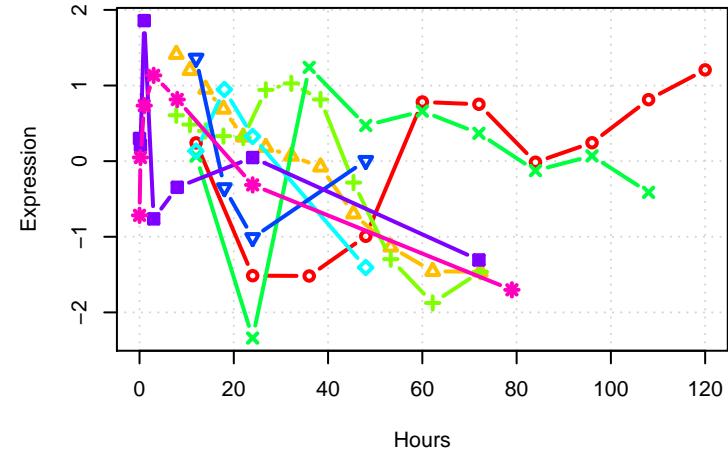


glycine cleavage complex

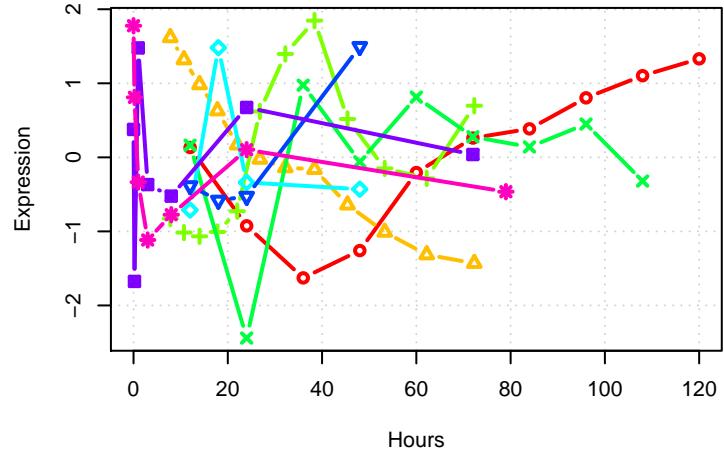
lpd1 YFL018C
Dihydrolipoamide dehydrogenase



glycine cleavage complex
gcv1 YMR189C
T subunit of the mitochondrial glycine decarboxylase complex

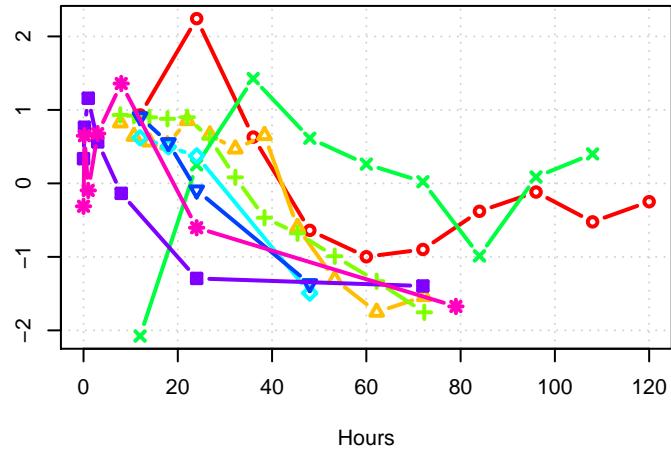


gcv2 YMR189W
P subunit of the mitochondrial glycine decarboxylase complex



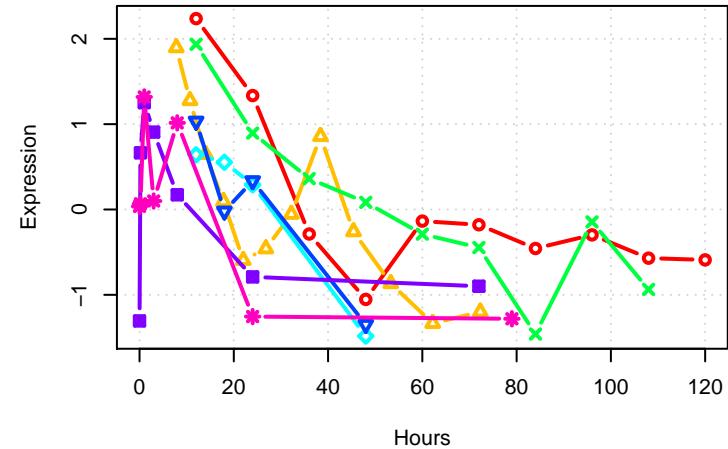
pyruvate dehydrogenase complex

lpd1 YFL018C
Dihydrolipoamide dehydrogenase

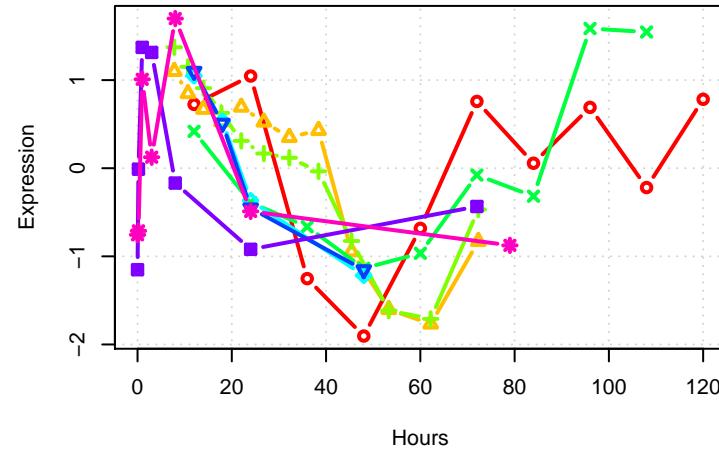


pyruvate dehydrogenase complex

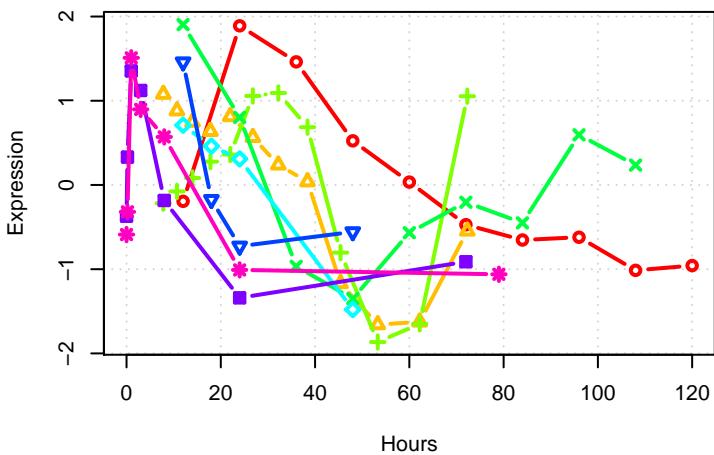
lat1 YL071W
Dihydrolipoamide acetyltransferase component (E2) of the PDC



pda1 YER178W
E1 alpha subunit of the pyruvate dehydrogenase (PDH) complex

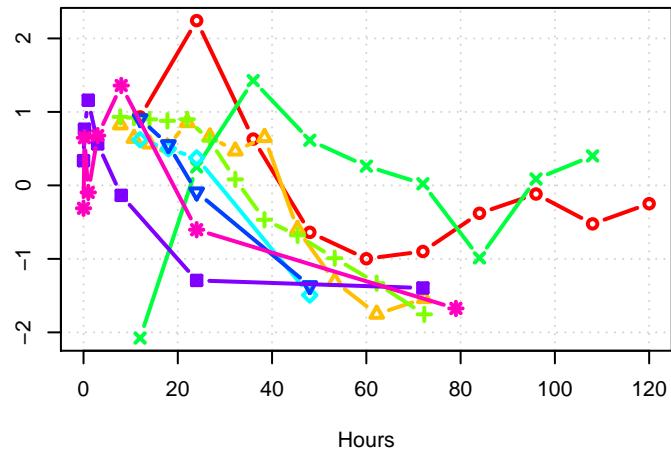


pbdb1 YBR221C
E1 beta subunit of the pyruvate dehydrogenase (PDH) complex



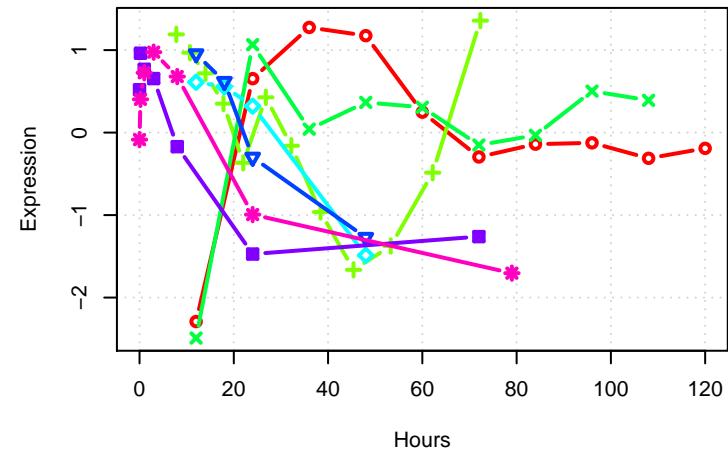
TCA cycle, aerobic respiration

lpd1 YFL018C
Dihydrolipoamide dehydrogenase

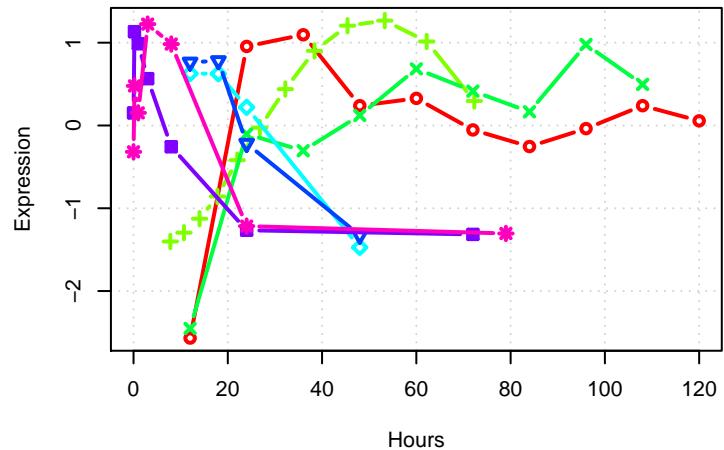


TCA cycle, aerobic respiration

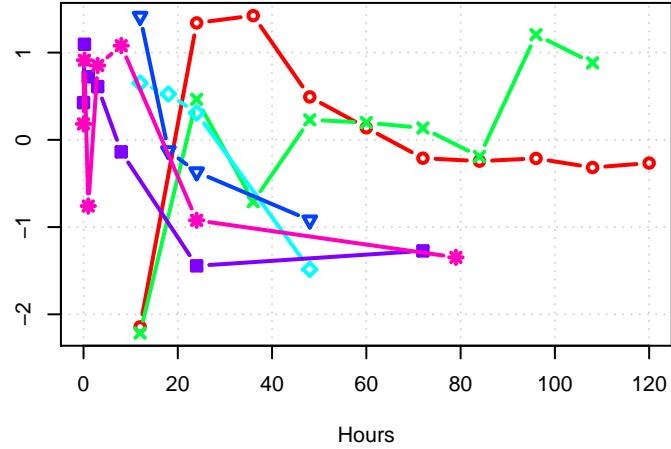
kgd2 YDR148C
Dihydrolipoyl transsuccinylase



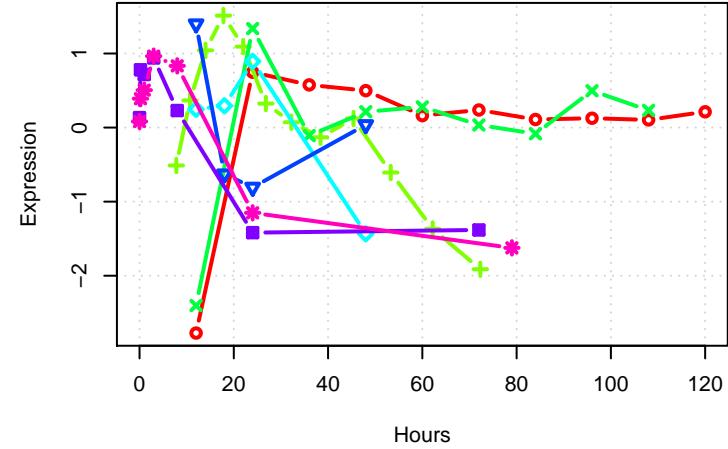
kgd1 YIL125W
Subunit of the mitochondrial alpha-ketoglutarate dehydrogenase complex



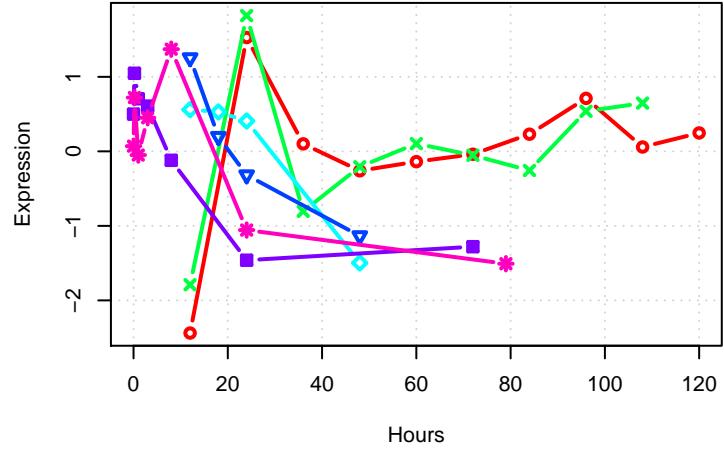
sdh1 YKL148C
Flavoprotein subunit of succinate dehydrogenase



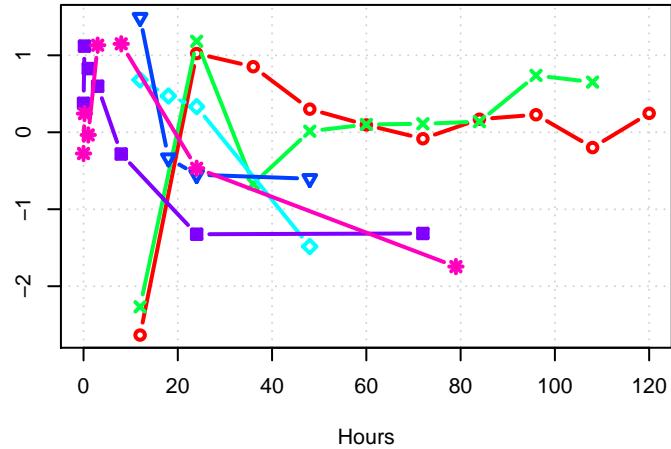
sdh2 YLL041C
Iron-sulfur protein subunit of succinate dehydrogenase



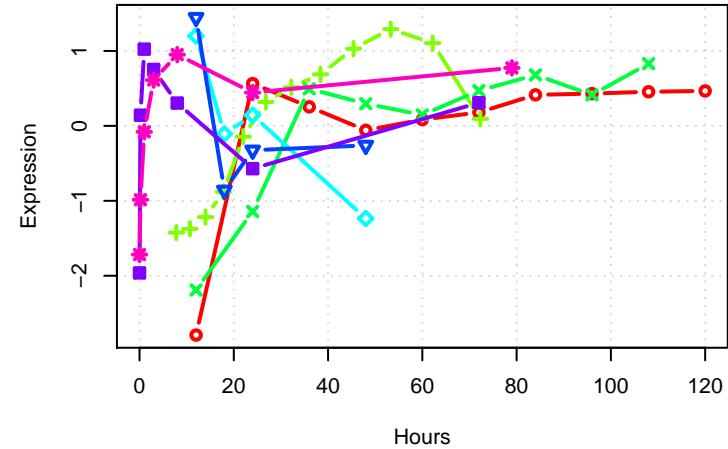
sdh3 YKL141W
Subunit of succinate dehydrogenase and of TIM22 translocase



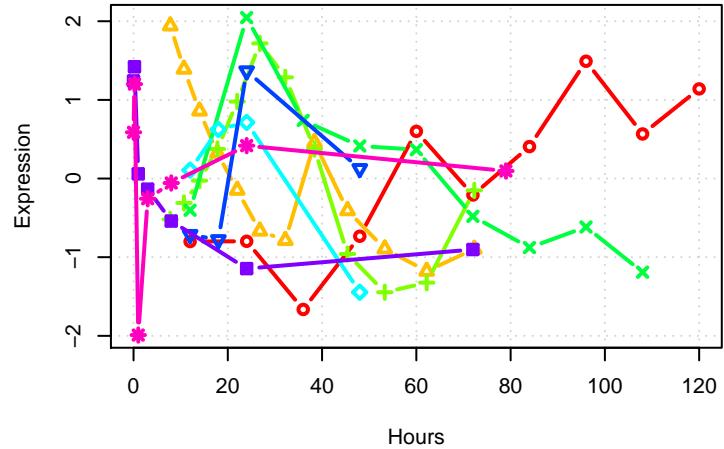
sdh4 YDR178W
Membrane anchor subunit of succinate dehydrogenase (SDH)



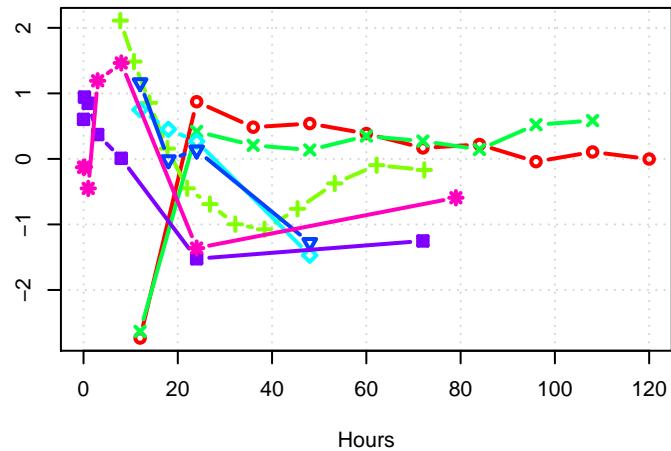
pyc1 YGL062W
Pyruvate carboxylase isoform



pyc2 YBR218C
Pyruvate carboxylase isoform

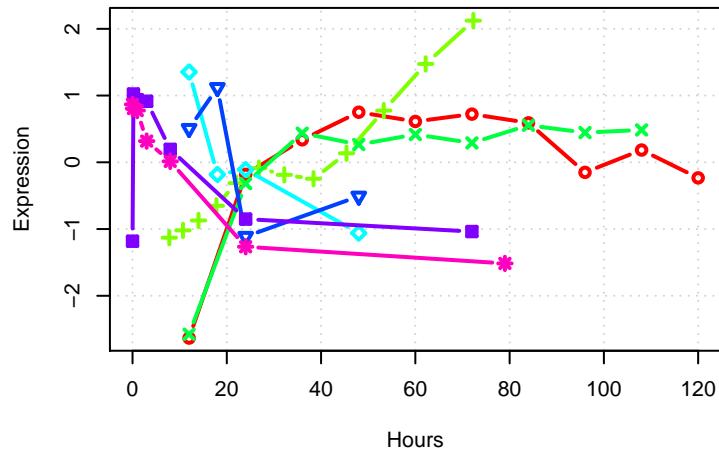


mdh1 YKL085W
Mitochondrial malate dehydrogenase

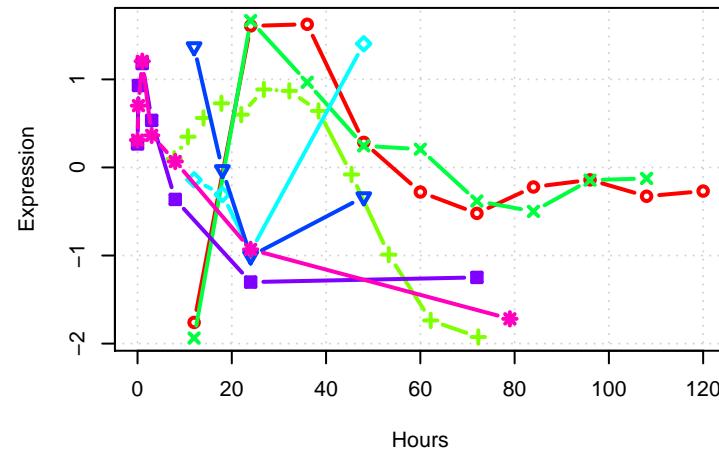


TCA cycle, aerobic respiration

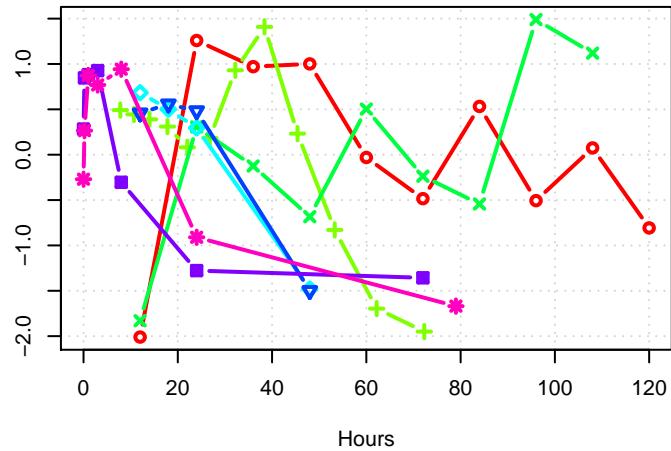
mdh2 YOL126C
Cytoplasmic malate dehydrogenase



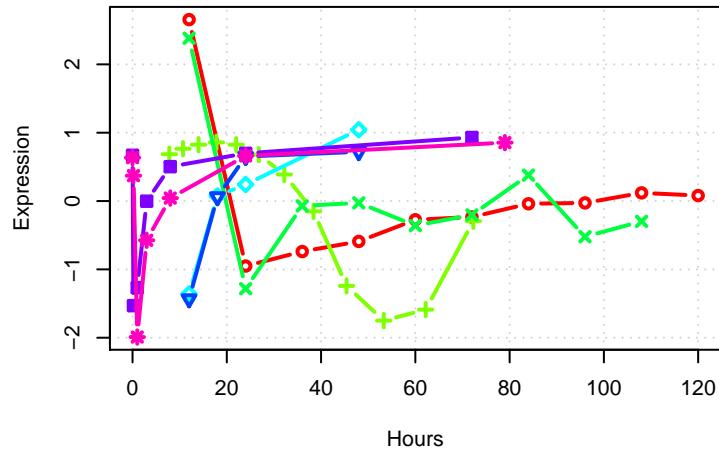
mdh3 YDL078C
Peroxisomal malate dehydrogenase



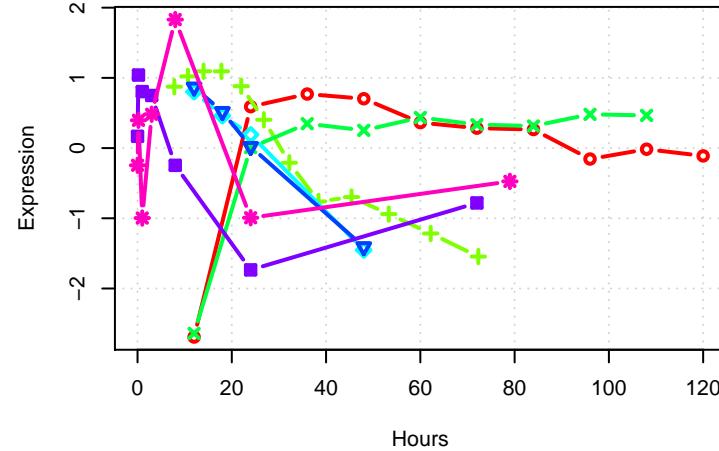
aco1 YLR304C
Aconitase



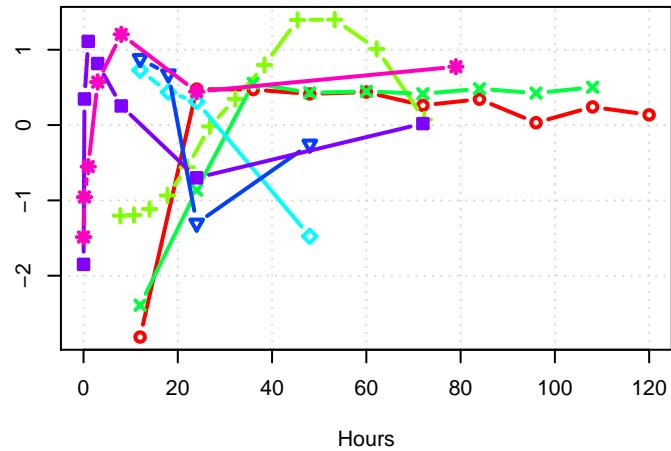
aco2 YJL200C
Putative mitochondrial aconitase isozyme



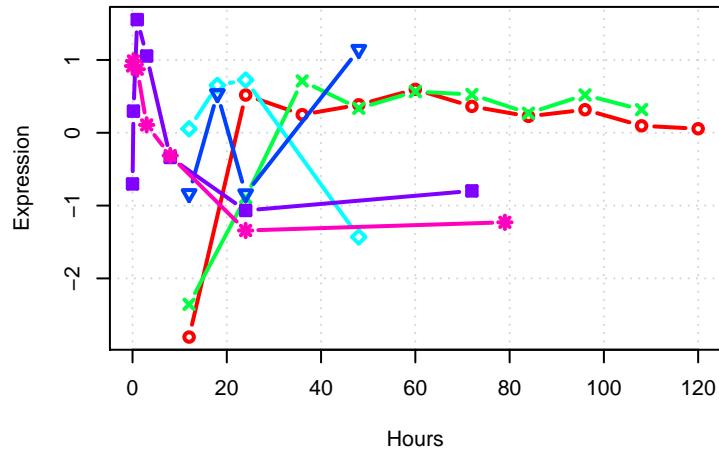
cit1 YNR001C
Citrate synthase



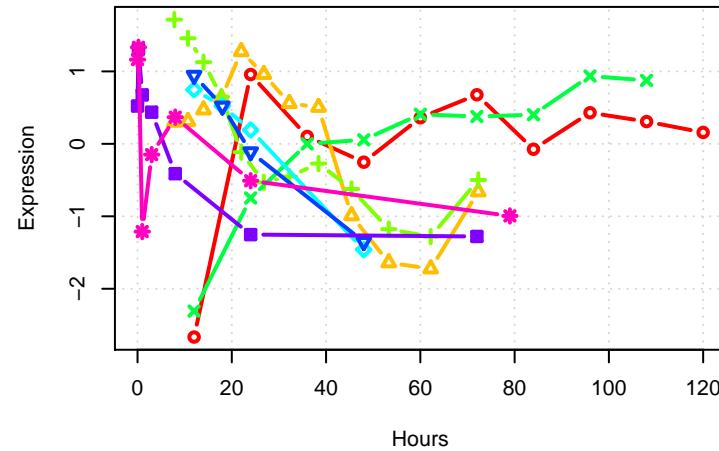
cit2 YCR005C
Citrate synthase, peroxisomal isozyme involved in glyoxylate cycle



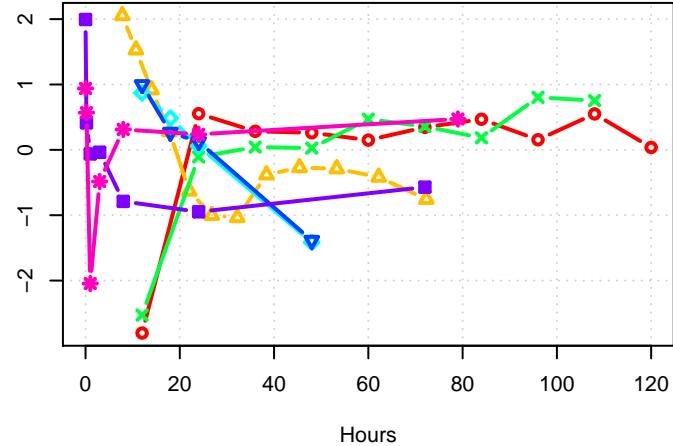
cit3 YPR001W
Dual specificity mitochondrial citrate and methylcitrate synthase



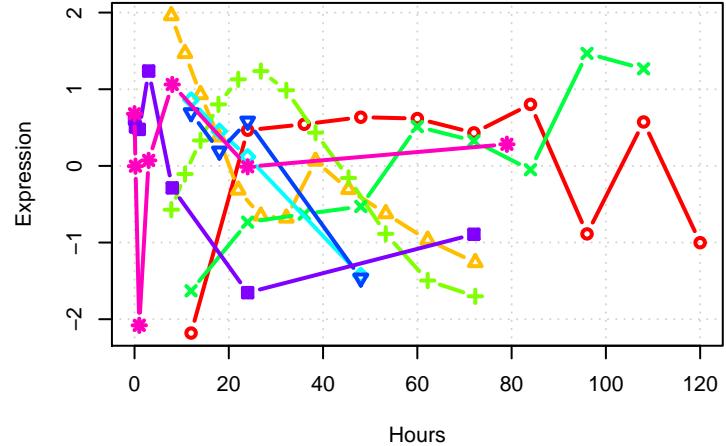
fum1 YPL262W
Fumarase



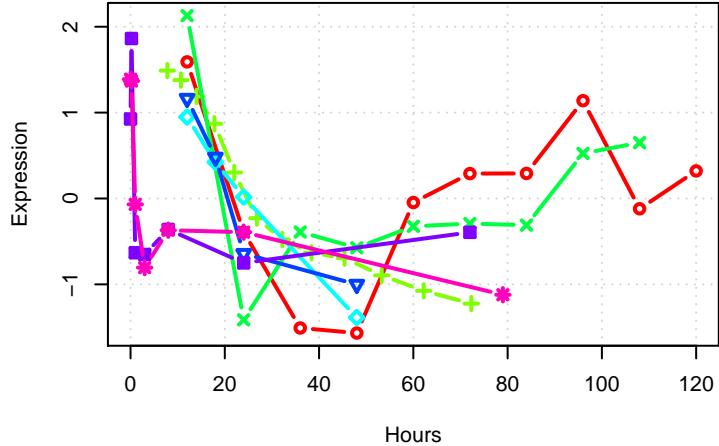
idh1 YNL037C
Subunit of mitochondrial NAD(+)-dependent isocitrate dehydrogenase



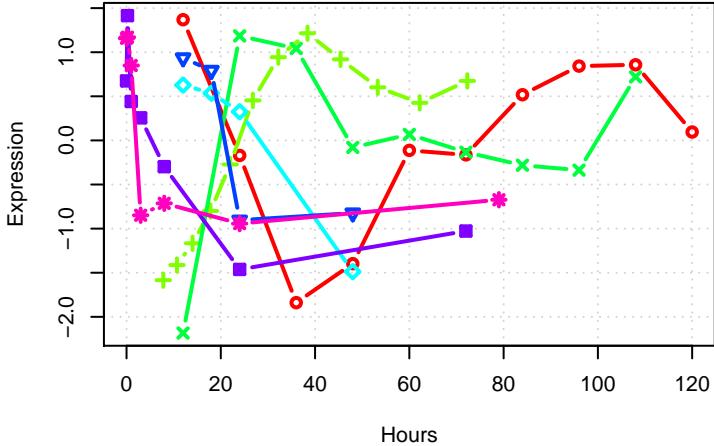
lsc2 YOR156W
Subunit of mitochondrial NAD(+)-dependent isocitrate dehydrogenase



lsc1 YOR142W
Alpha subunit of succinyl-CoA ligase

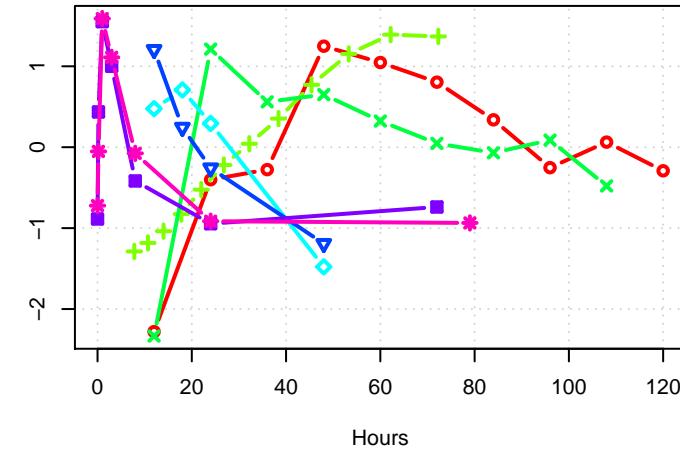


lsc2 YGR244C
Beta subunit of succinyl-CoA ligase



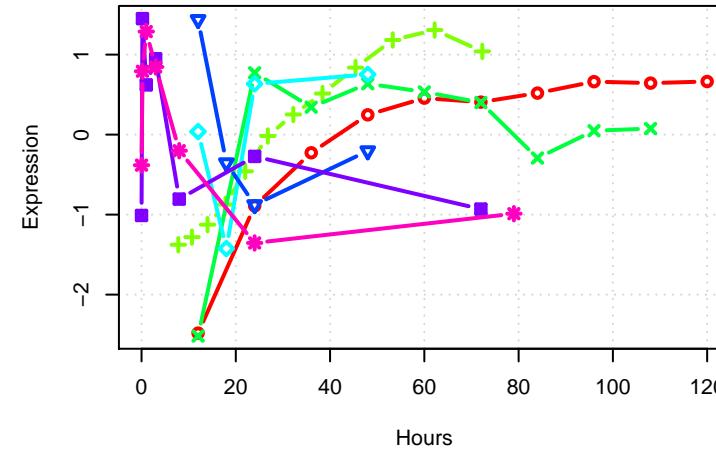
4–aminobutyrate degradation

uga1 YGR019W
Gamma-aminobutyrate (GABA) transaminase



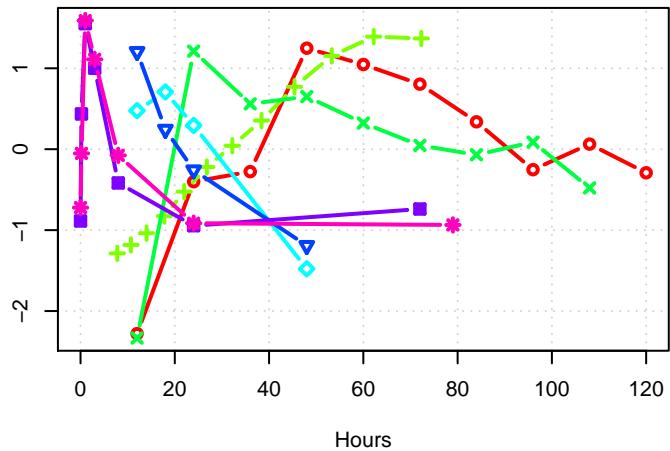
4-aminobutyrate degradation

uga2 YGR066W
Succinate semialdehyde dehydrogenase



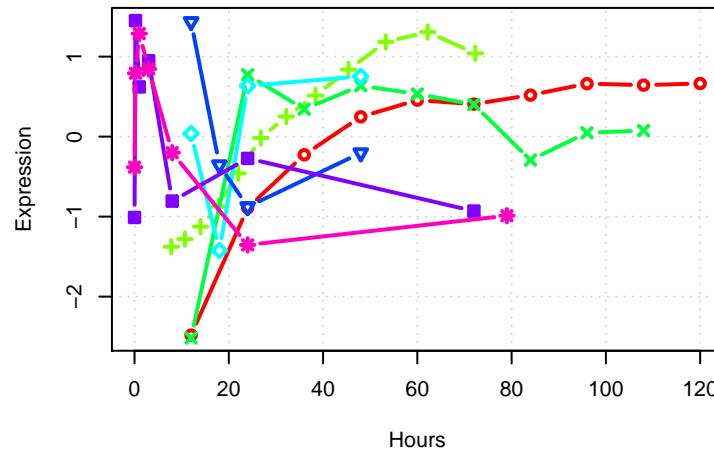
glutamate degradation I

uga1 YGR019W
Gamma-aminobutyrate (GABA) transaminase

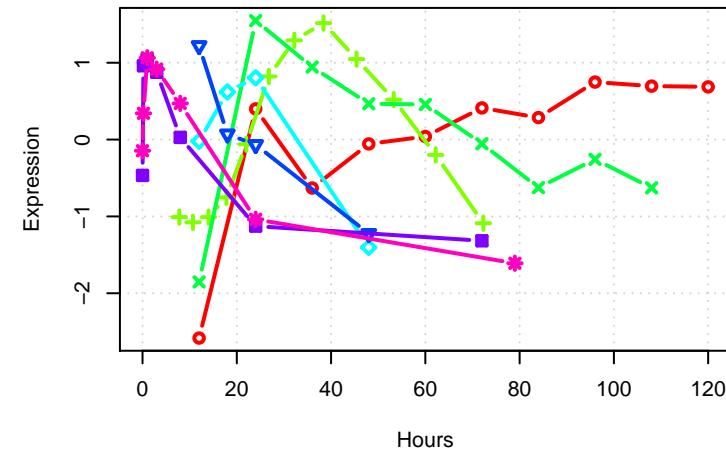


glutamate degradation I

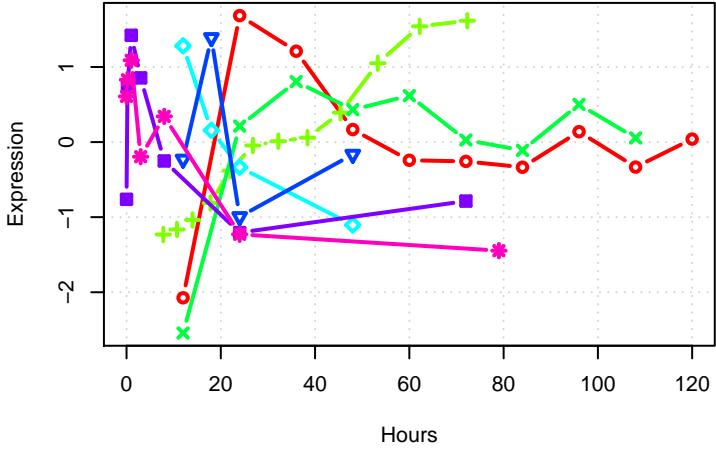
ugaz Yel400w
Succinate semialdehyde dehydrogenase



gad1 YMR250W
Glutamate decarboxylase

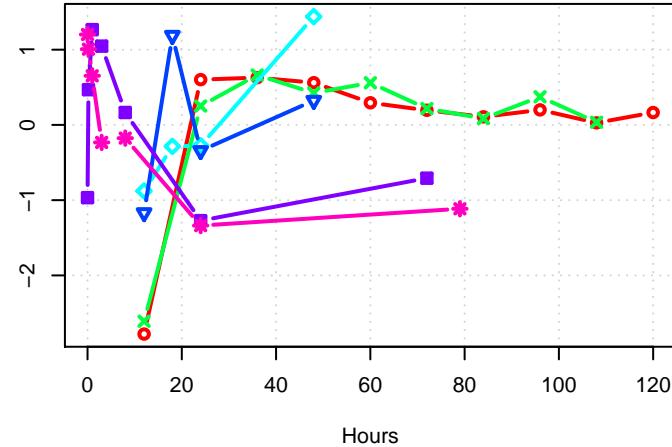


gdh2 YDL215C
NAD(+-)dependent glutamate dehydrogenase

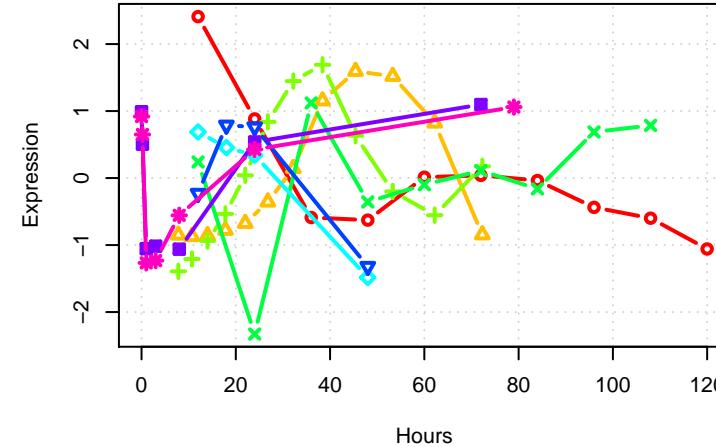


acetate utilization

acs1 YAL054C
Acetyl-coA synthetase isoform

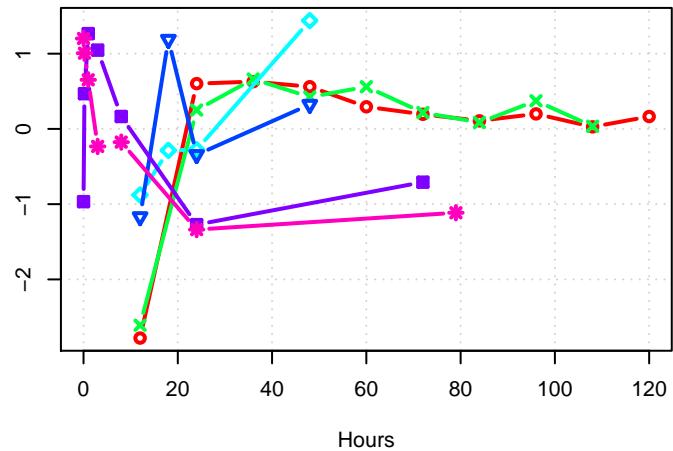


acetate utilization
acs2 YLR153C
Acetyl-coA synthetase isoform



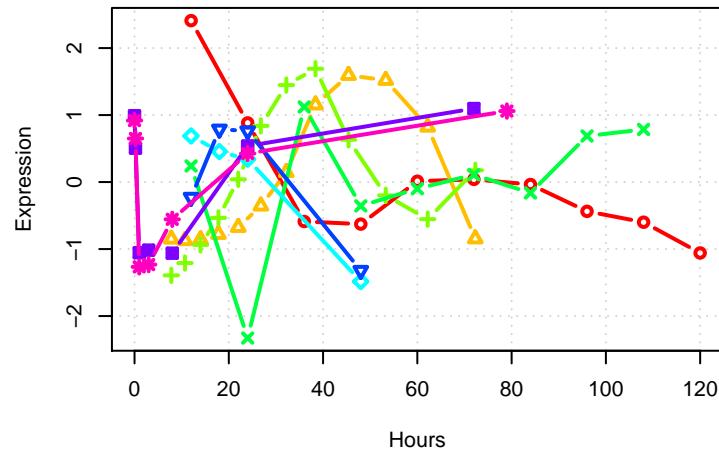
ethanol degradation

acs1 YAL054C
Acetyl-coA synthetase isoform

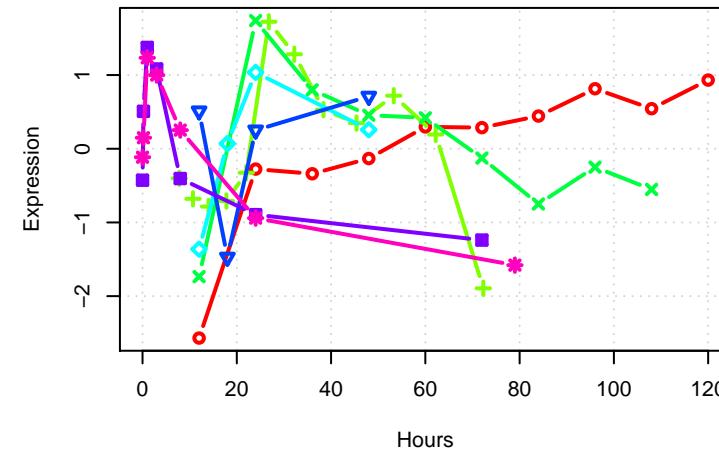


ethanol degradation

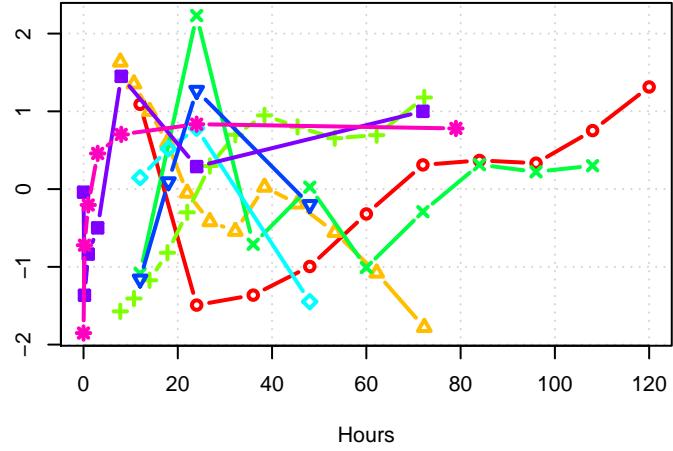
acs2 YLR193C
Acetyl-coA synthetase isoform



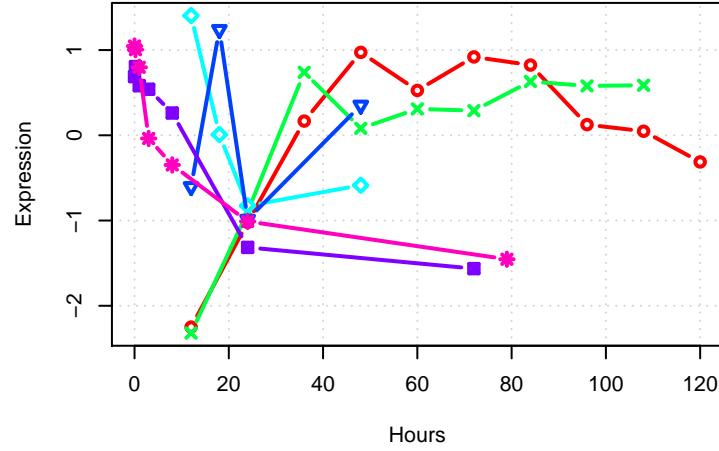
ald2 YMR170C
Cytoplasmic aldehyde dehydrogenase



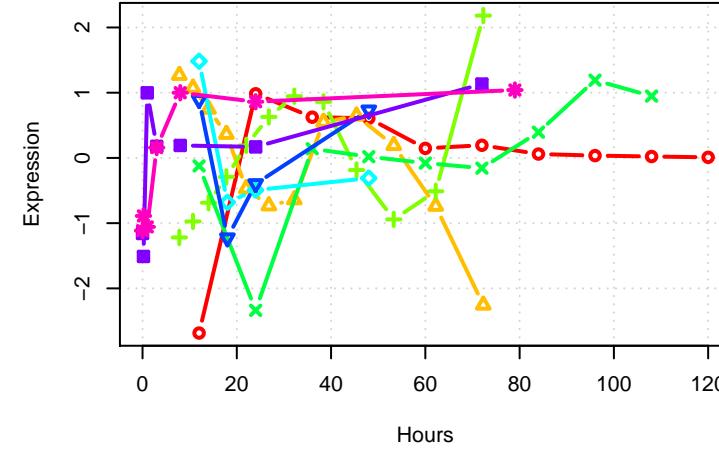
adh1 YOL086C
Alcohol dehydrogenase



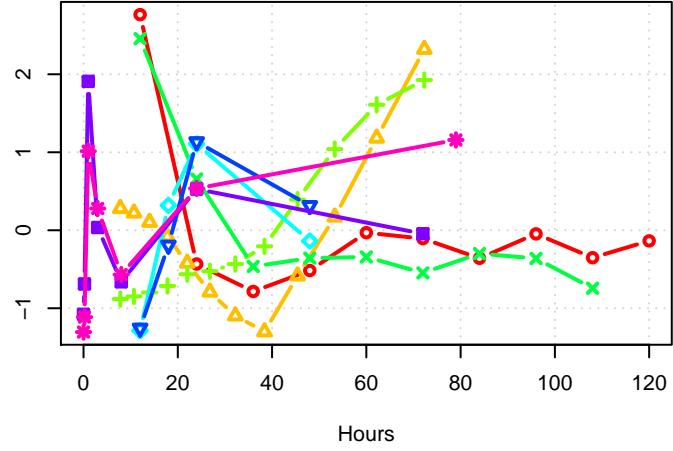
adh2 YMR303C
Glucose-repressible alcohol dehydrogenase II



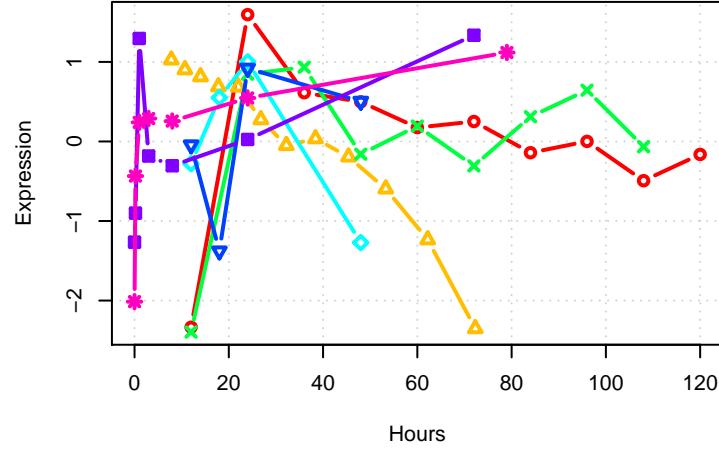
adh3 YMR083W
Mitochondrial alcohol dehydrogenase isozyme III



adh4 YGL256W
Alcohol dehydrogenase isoenzyme type IV

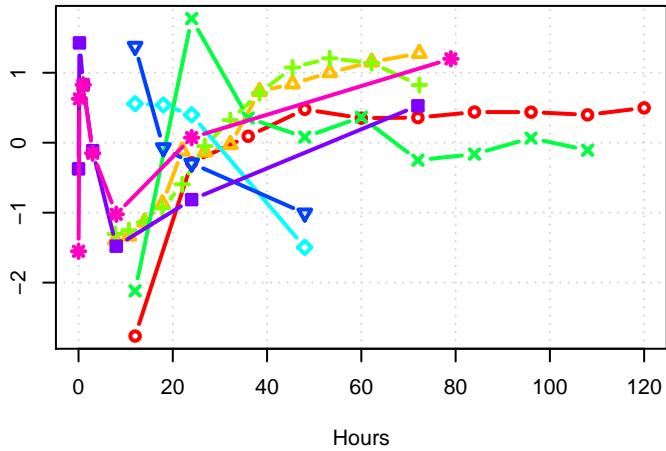


adh5 YBR145W
Alcohol dehydrogenase isoenzyme V



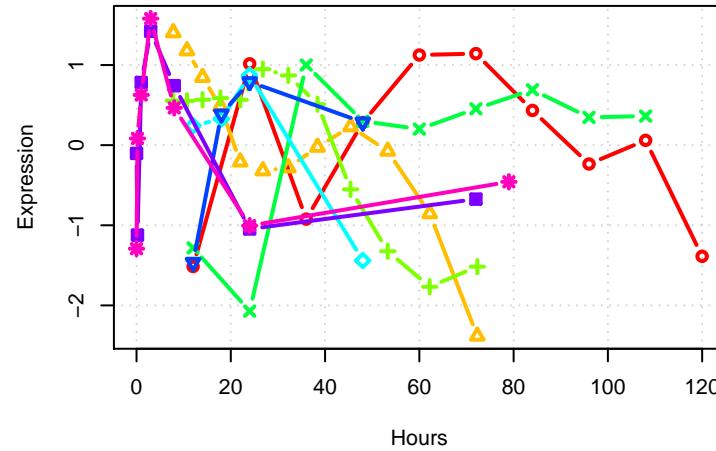
acetoin biosynthesis

bdh1 YAL060W
NAD-dependent (R,R)-butanediol dehydrogenase

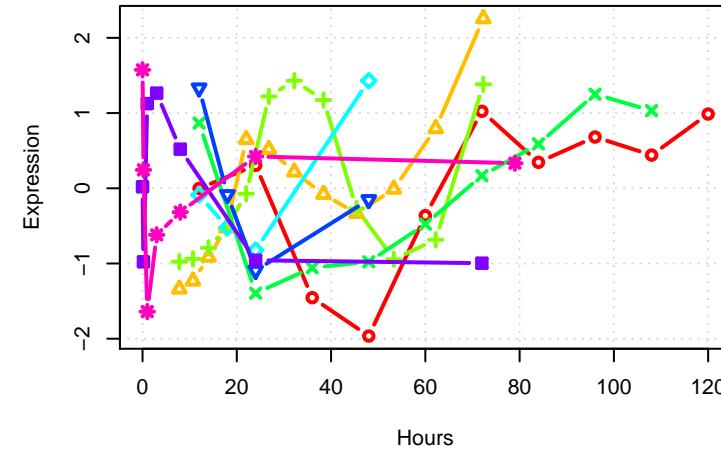


acetoin biosynthesis

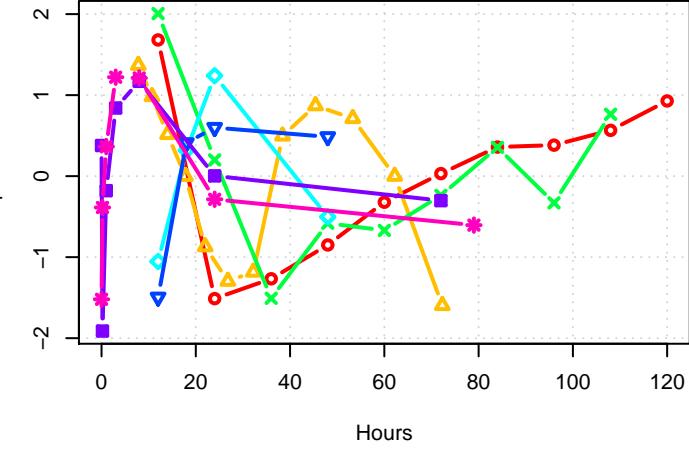
iv2 YMR06W
Acetolactate synthase



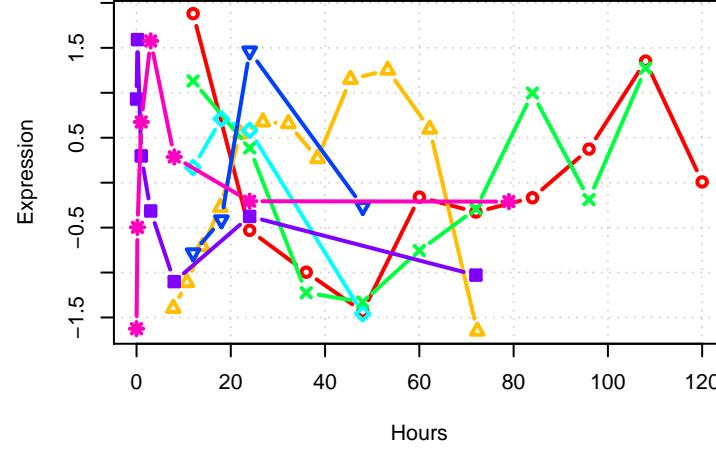
ilv6 YCL009C
Regulatory subunit of acetolactate synthase



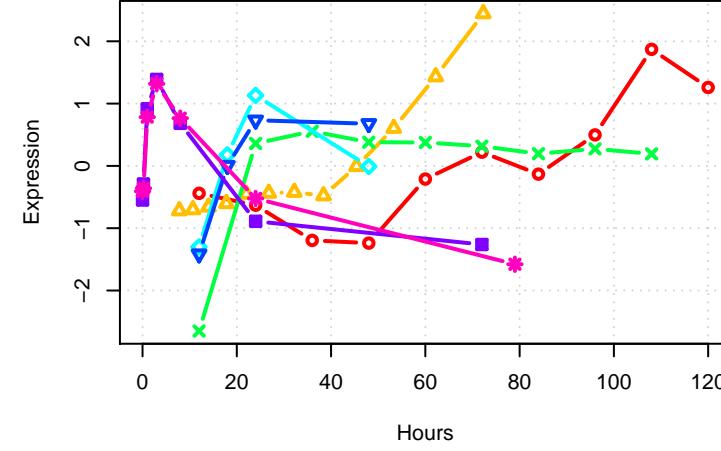
pdc1 YLR044C
Major of three pyruvate decarboxylase isozymes



pdc5 YLR134W
Minor isoform of pyruvate decarboxylase



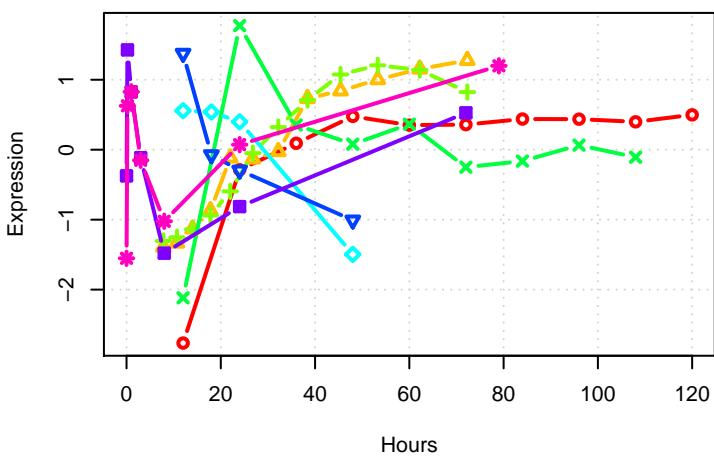
pdc6 YGR087C
Minor isoform of pyruvate decarboxylase



butanediol biosynthesis

butanediol biosynthesis

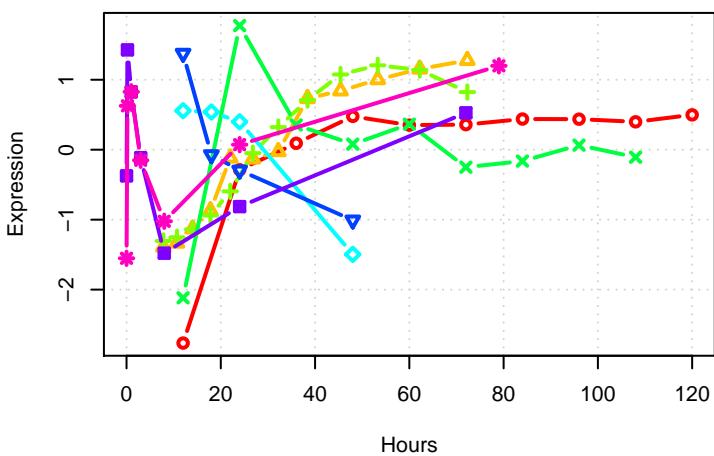
bdh1 YAL060W
NAD-dependent (R,R)-butanediol dehydrogenase



butanediol degradation

butanediol degradation

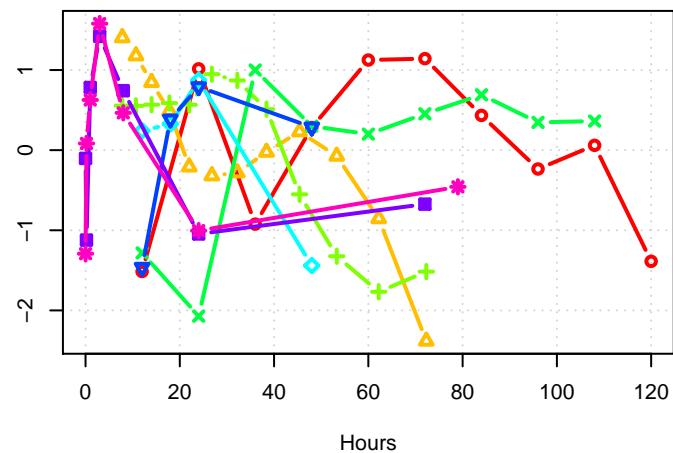
bdh1 YAL060W
NAD-dependent (R,R)-butanediol dehydrogenase



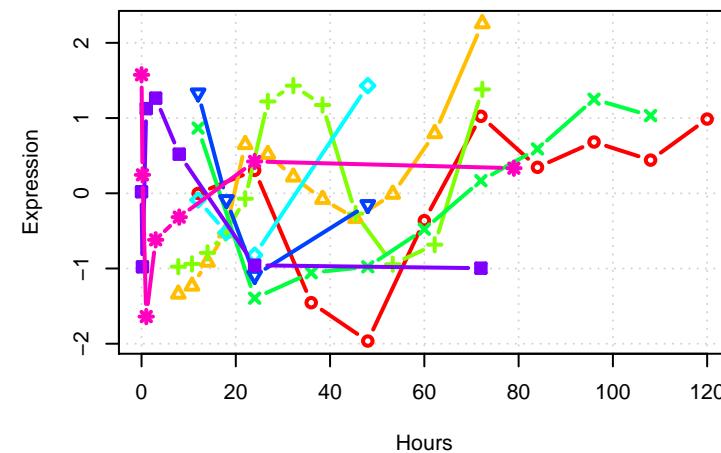
isoleucine biosynthesis

isoleucine biosynthesis

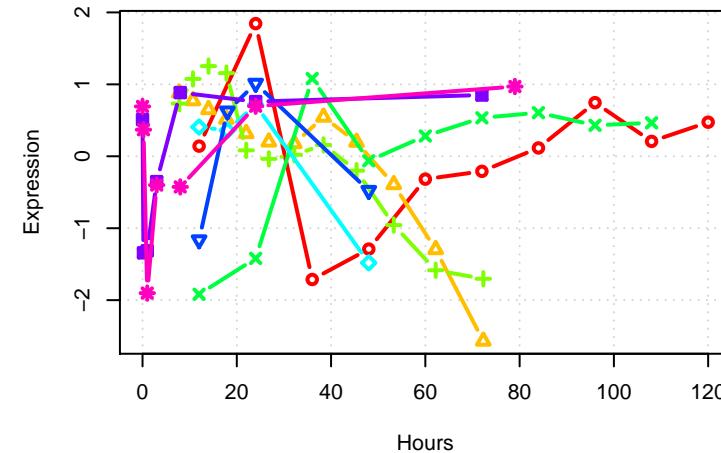
ilv2 YMR108W
Acetolactate synthase



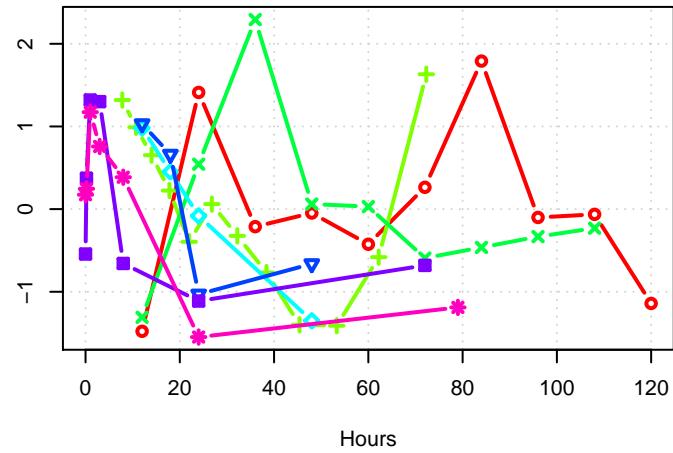
ilv6 YCL009C
Regulatory subunit of acetolactate synthase



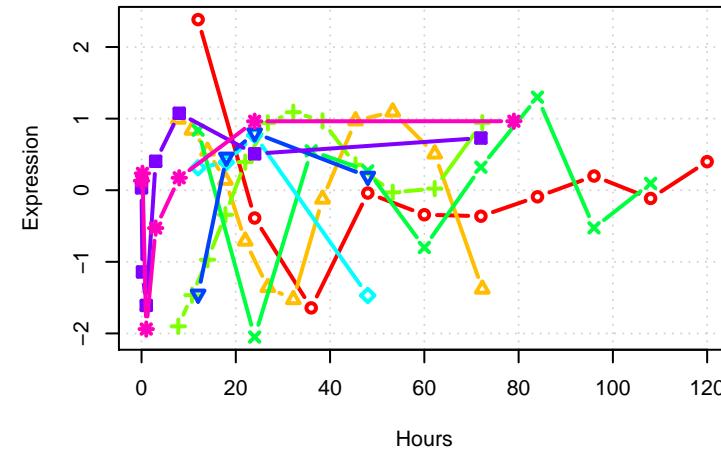
bat1 YHR208W
Mitochondrial branched-chain amino acid (BCAA) aminotransferase



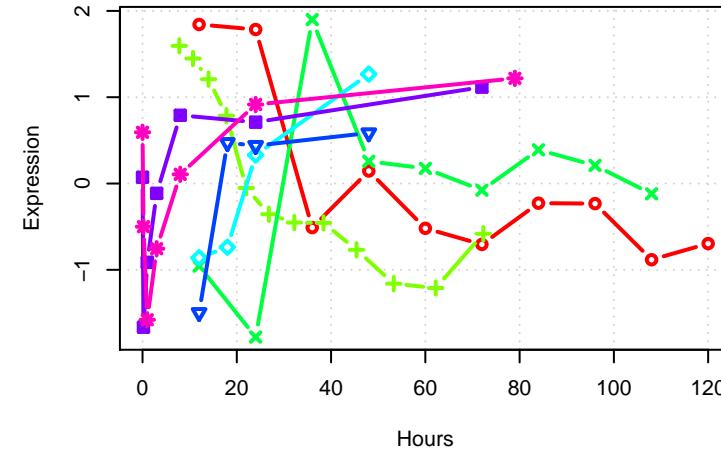
bat2 YJR148W
Cytosolic branched-chain amino acid (BCAA) aminotransferase



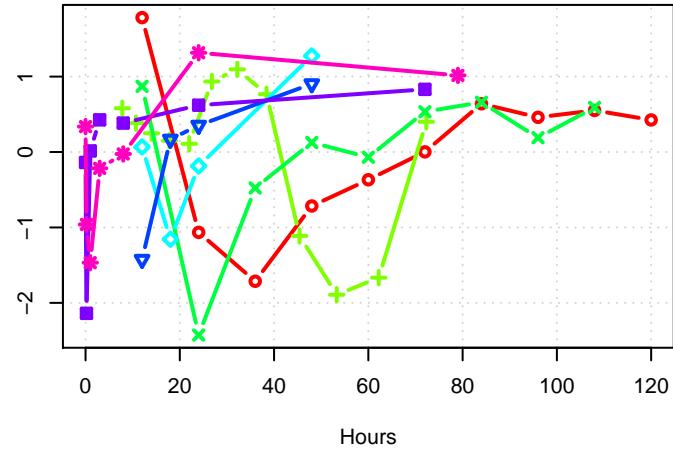
ilv3 YJR016C
Dihydroxyacid dehydratase



ilv5 YLR355C
Acetohydroxyacid reductoisomerase and mtDNA binding protein

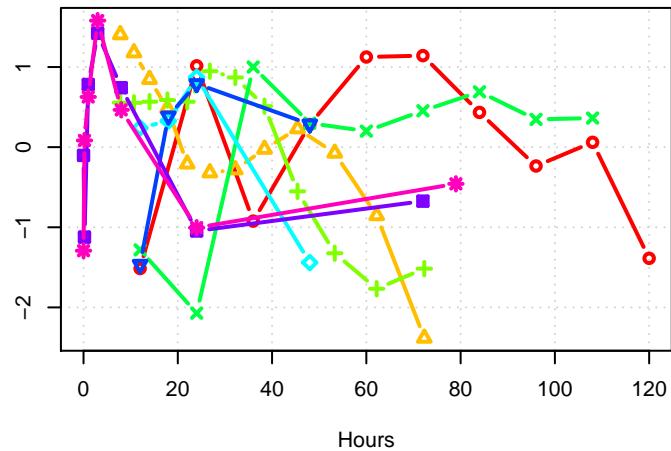


ilv1 YER086W
Threonine deaminase, catalyzes first step in isoleucine biosynthesis

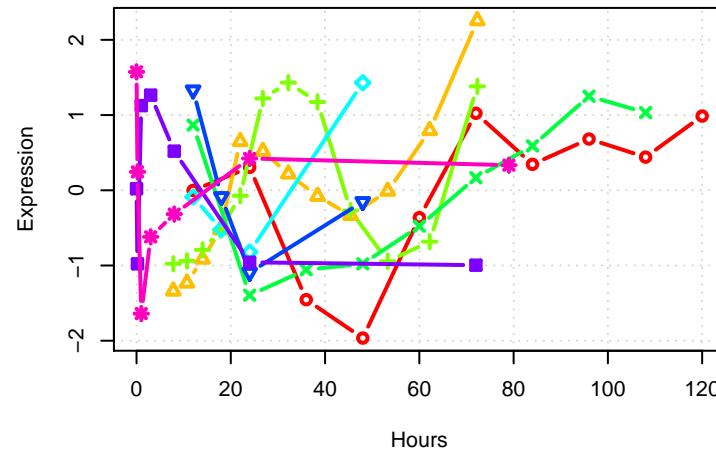


valine biosynthesis

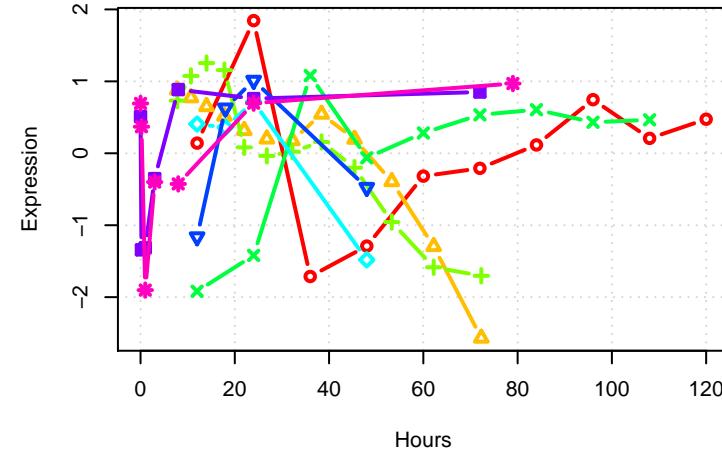
ilv2 YMR108W
Acetolactate synthase



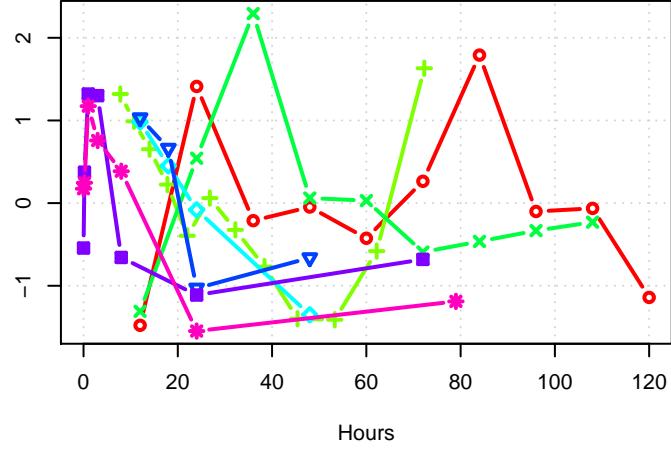
valine biosynthesis
ilv6 YLR009C
Regulatory subunit of acetolactate synthase



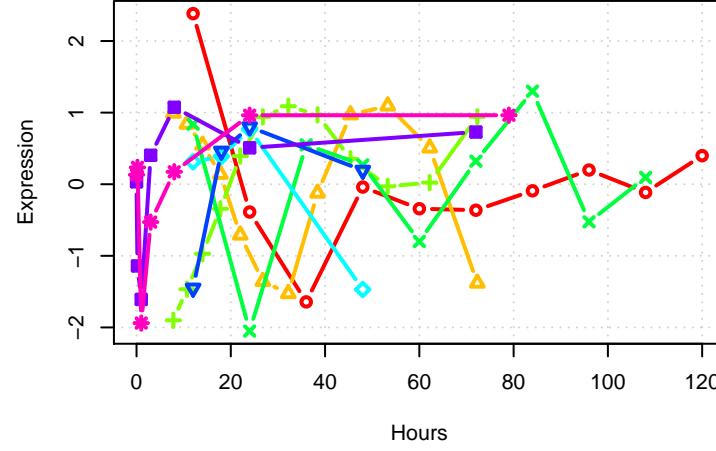
bat1 YHR208W
Mitochondrial branched-chain amino acid (BCAA) aminotransferase



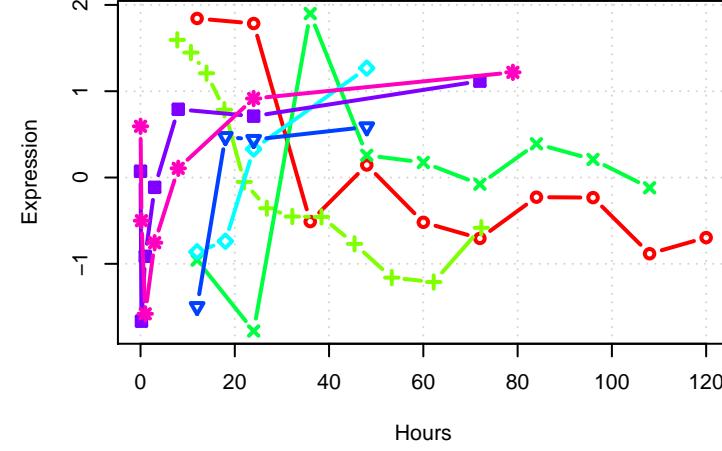
bat2 YJR148W
Cytosolic branched-chain amino acid (BCAA) aminotransferase



ilv3 YJR016C
Dihydroxyacid dehydratase

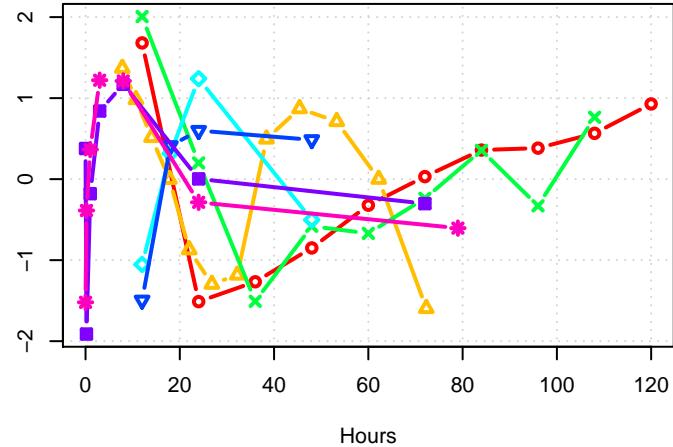


ilv5 YLR355C
Acetohydroxyacid reductoisomerase and mtDNA binding protein



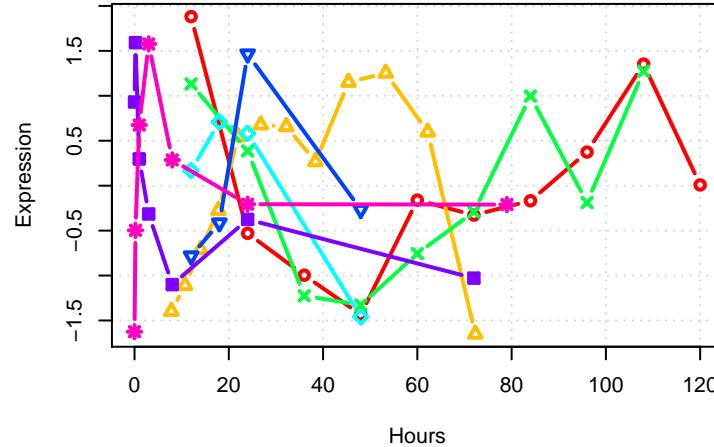
acetoin biosynthesis II

pdc1 YLR044C
Major of three pyruvate decarboxylase isozymes

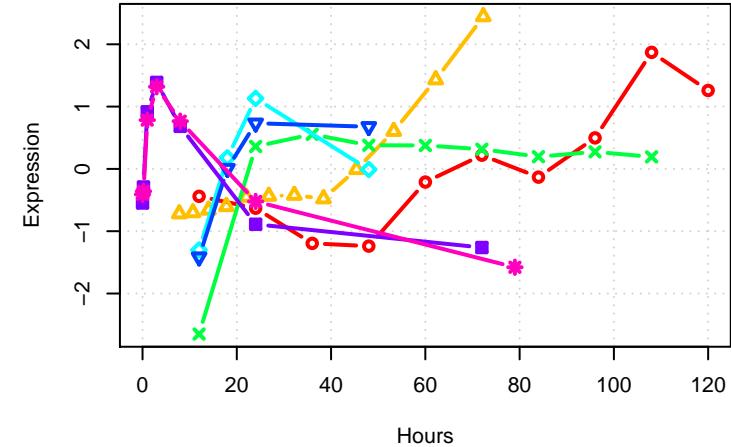


acetoin biosynthesis II

pac5 YLR134W
Minor isoform of pyruvate decarboxylase

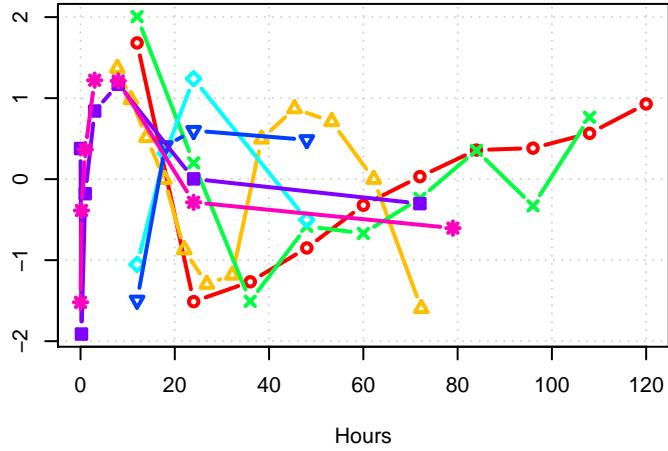


pdc6 YGR087C
Minor isoform of pyruvate decarboxylase



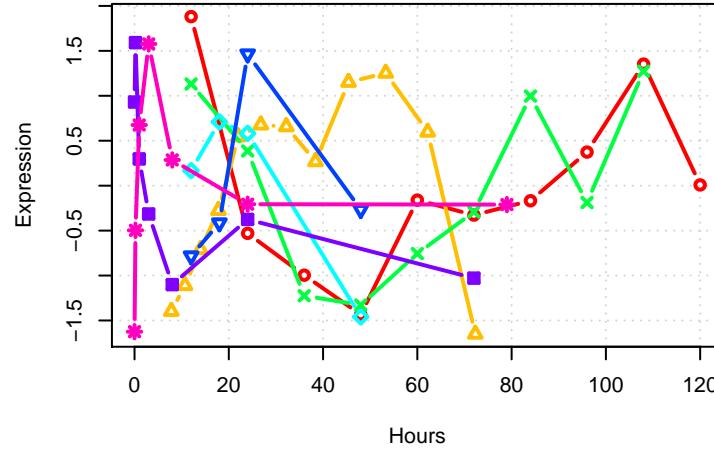
isoleucine degradation

pdc1 YLR044C
Major of three pyruvate decarboxylase isozymes

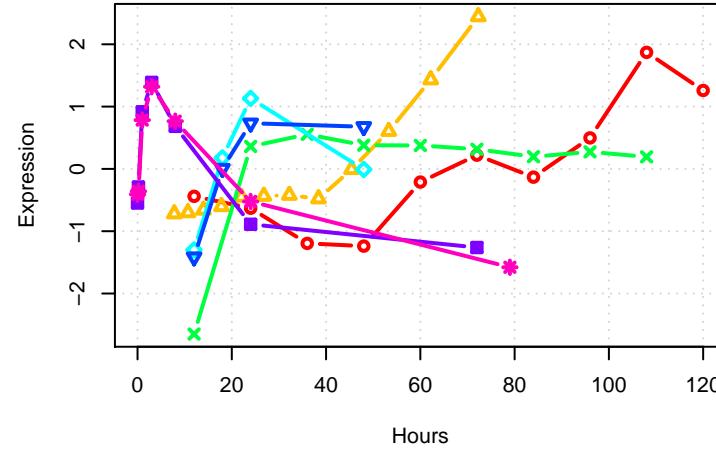


isoleucine degradation

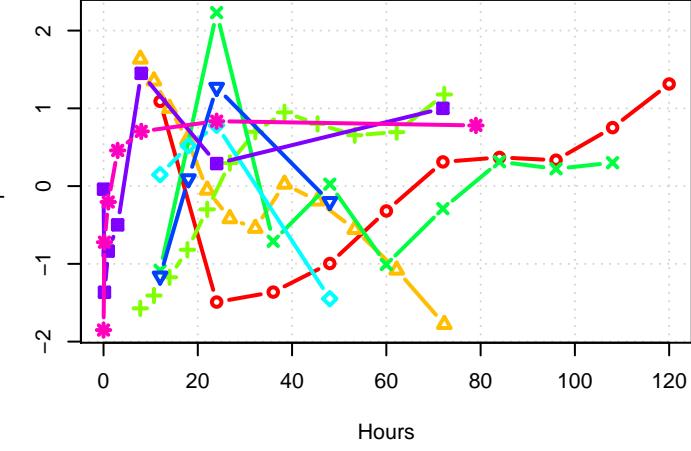
pdc5 YLR34W
Minor isoform of pyruvate decarboxylase



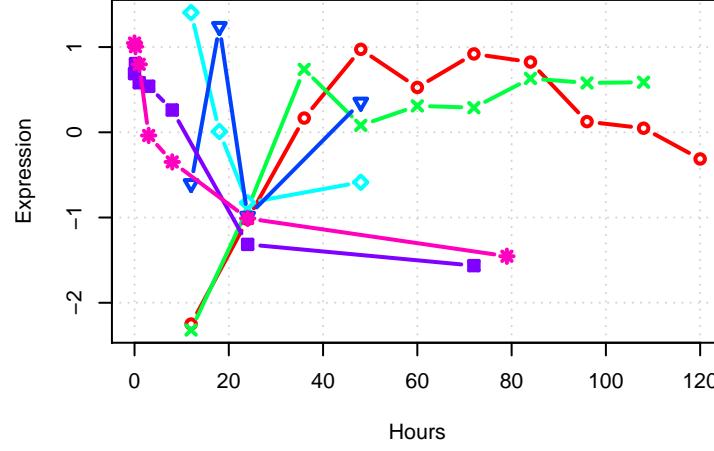
pdc6 YGR087C
Minor isoform of pyruvate decarboxylase



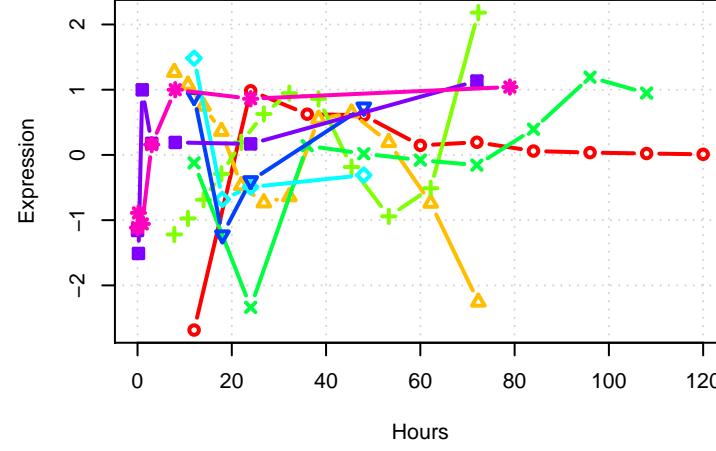
adh1 YOL086C
Alcohol dehydrogenase



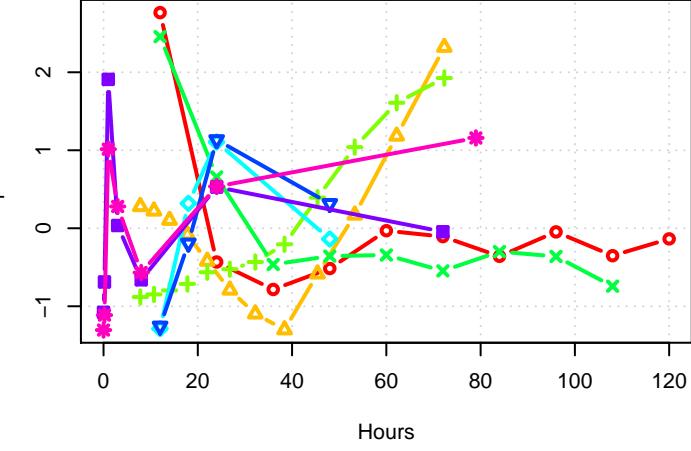
adh2 YMR303C
Glucose-repressible alcohol dehydrogenase II



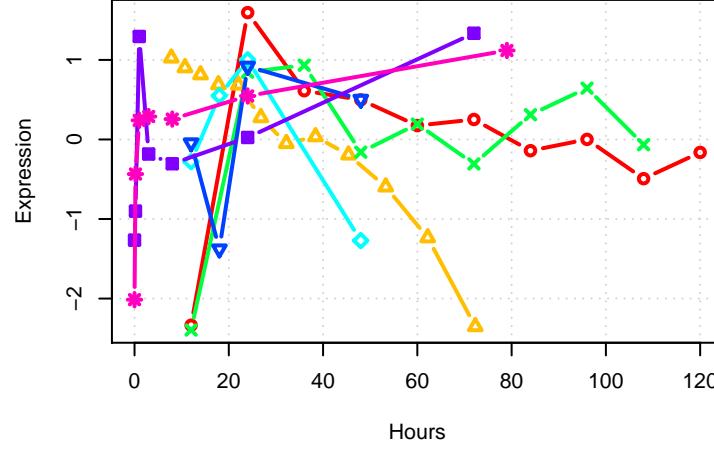
adh3 YMR083W
Mitochondrial alcohol dehydrogenase isozyme III



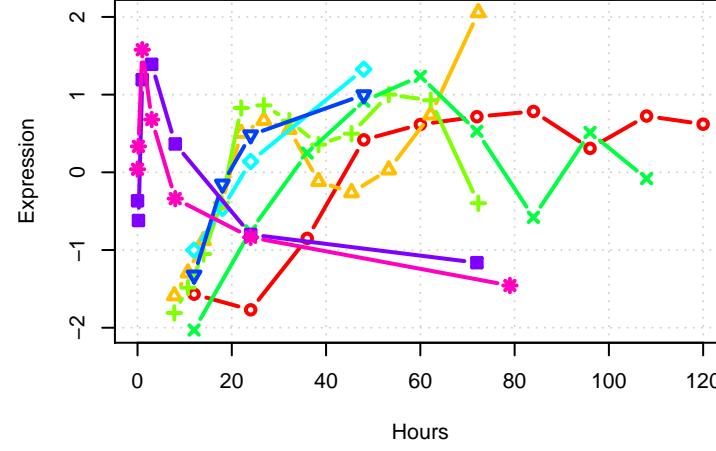
adh4 YGL256W
Alcohol dehydrogenase isoenzyme type IV



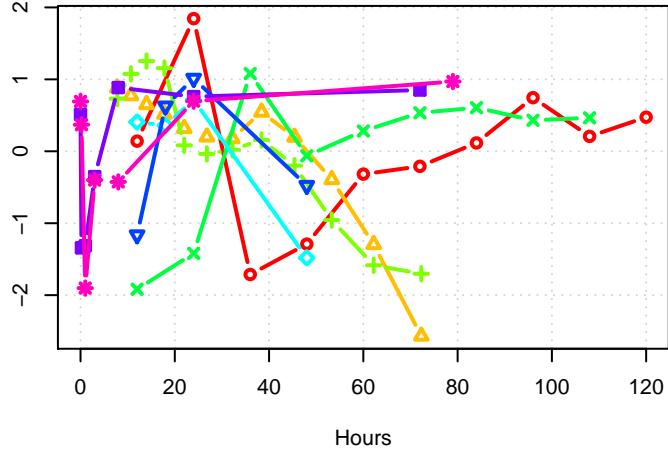
adh5 YBR145W
Alcohol dehydrogenase isoenzyme V



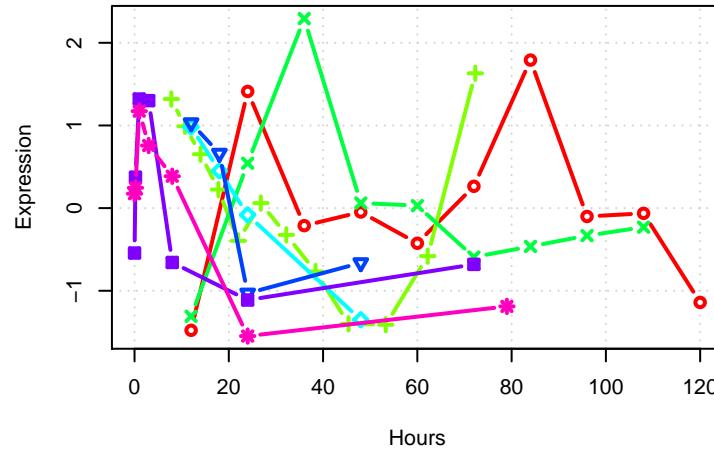
sfa1 YDL168W
Bifunctional alcohol dehydrogenase and formaldehyde dehydrogenase



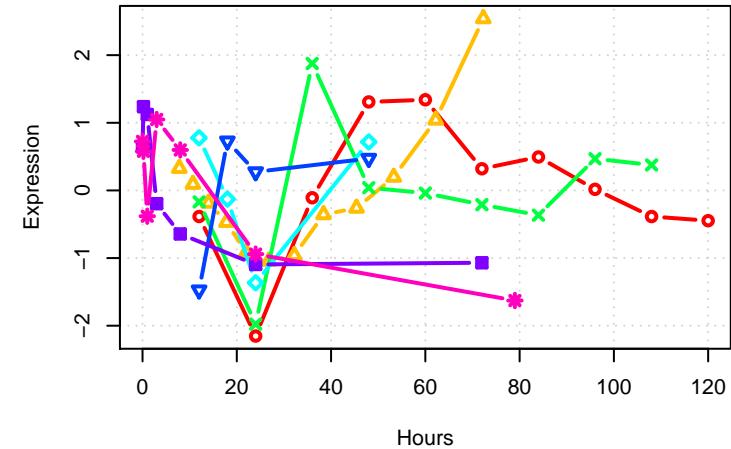
bat1 YHR208W
Mitochondrial branched-chain amino acid (BCAA) aminotransferase



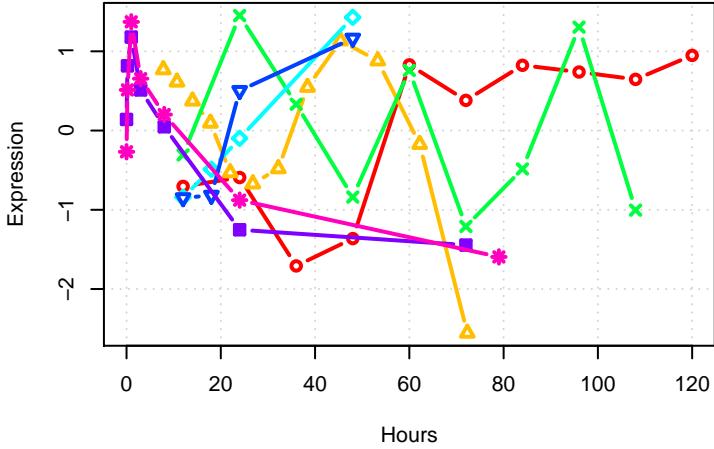
isoleucine degradation
bat2 YJR380W
Cytosolic branched-chain amino acid (BCAA) aminotransferase



aro10 YDR380W
Phenylpyruvate decarboxylase

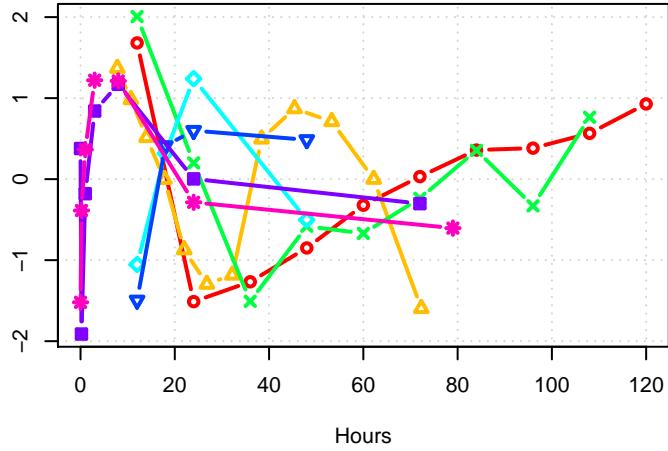


thi3 YDL080C
Regulatory protein that binds Pdc2p and Thi2p transcription factors



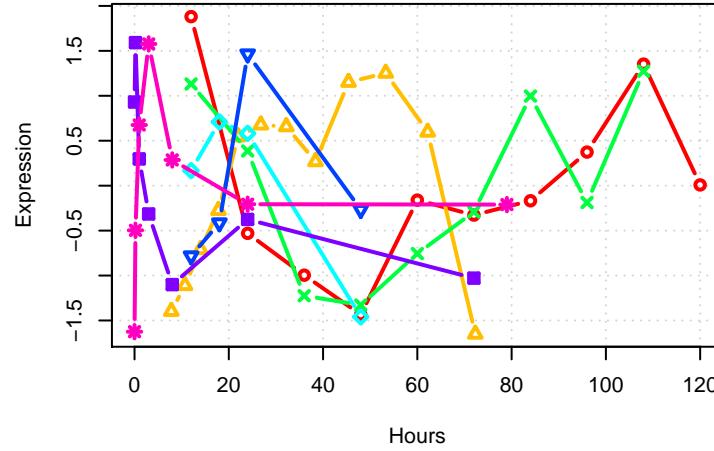
phenylalanine degradation

pdc1 YLR044C
Major of three pyruvate decarboxylase isozymes

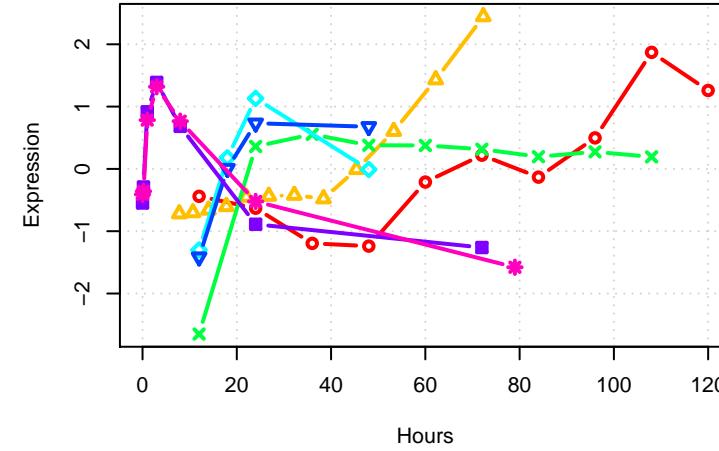


phenylalanine degradation

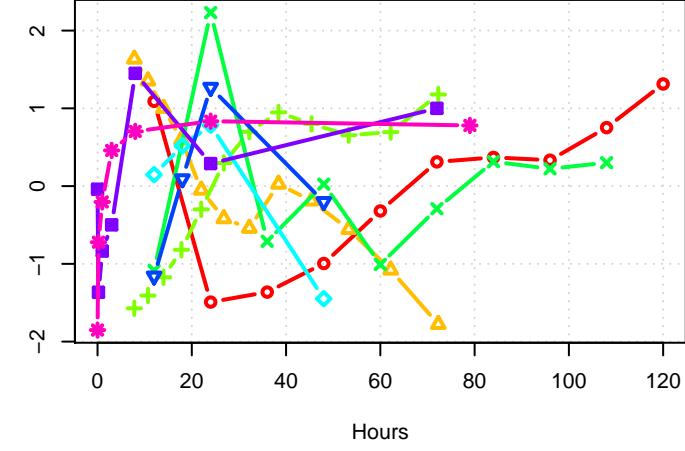
pdc5 YLR134W
Minor isoform of pyruvate decarboxylase



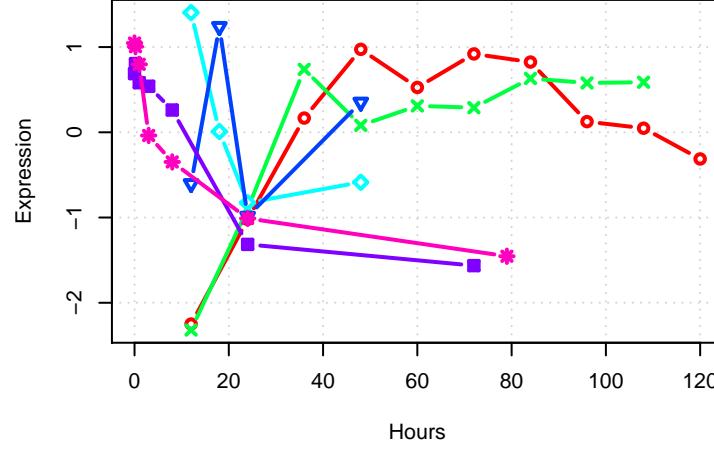
pdc6 YGR087C
Minor isoform of pyruvate decarboxylase



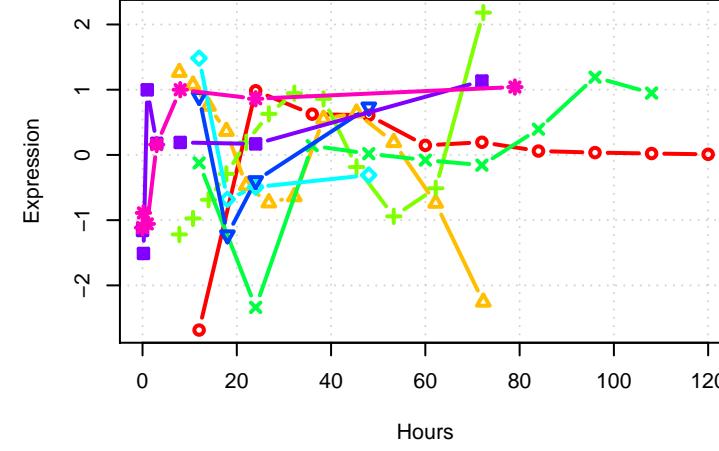
adh1 YOL086C
Alcohol dehydrogenase



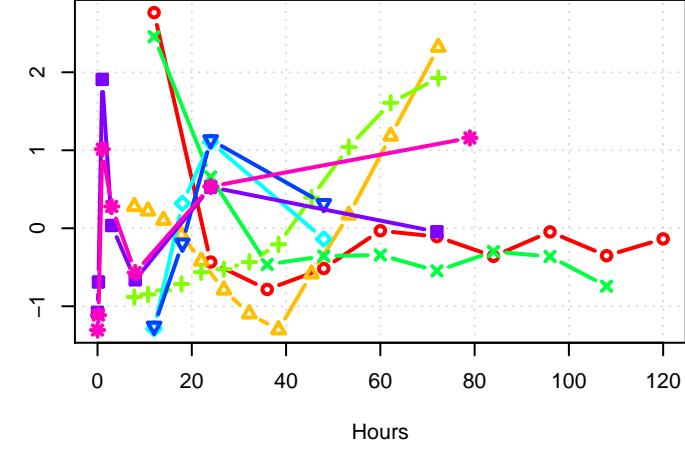
adh2 YMR303C
Glucose-repressible alcohol dehydrogenase II



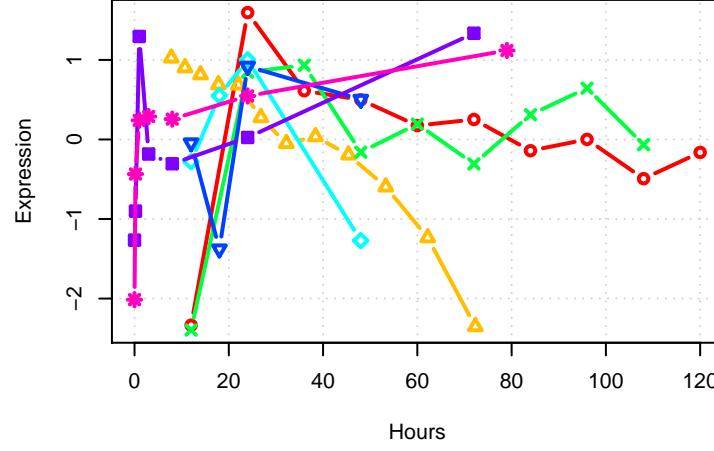
adh3 YMR083W
Mitochondrial alcohol dehydrogenase isozyme III



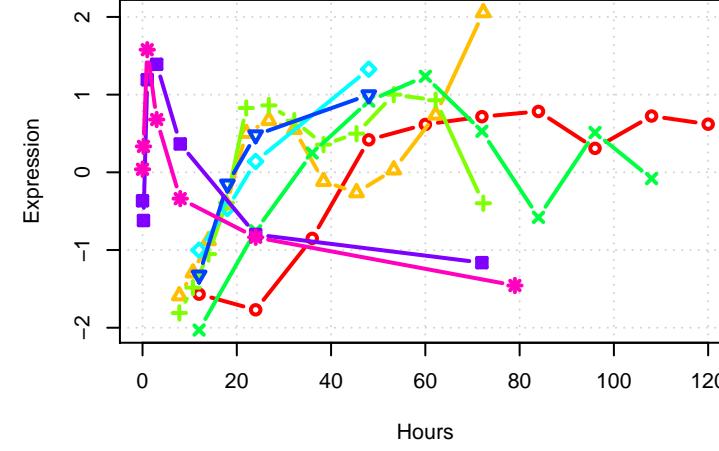
adh4 YGL256W
Alcohol dehydrogenase isoenzyme type IV



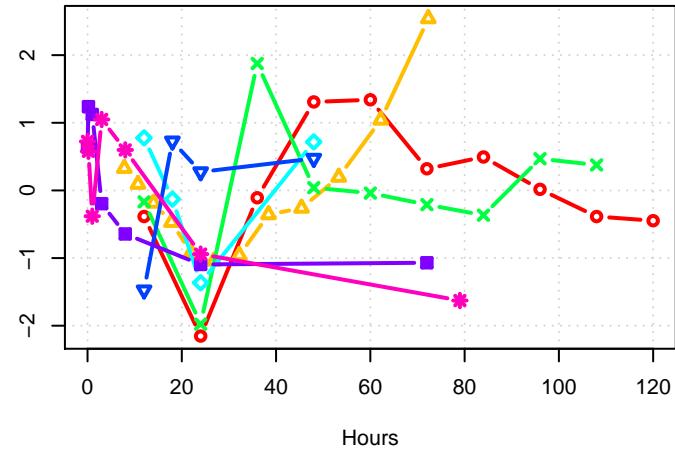
adh5 YBR145W
Alcohol dehydrogenase isoenzyme V



sfa1 YDL168W
Bifunctional alcohol dehydrogenase and formaldehyde dehydrogenase

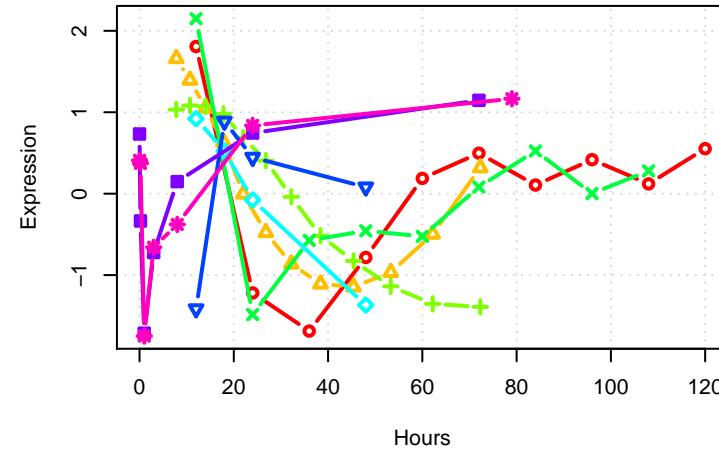


aro10 YDR380W
Phenylpyruvate decarboxylase

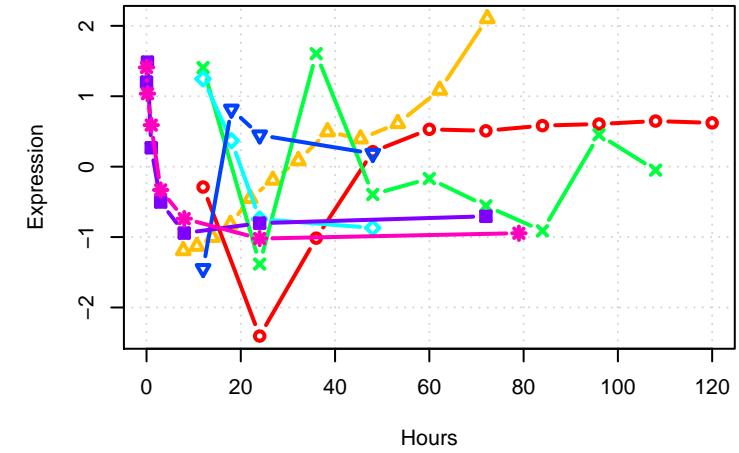


phenylalanine degradation

aro8 YGL202W
Aromatic aminotransferase I

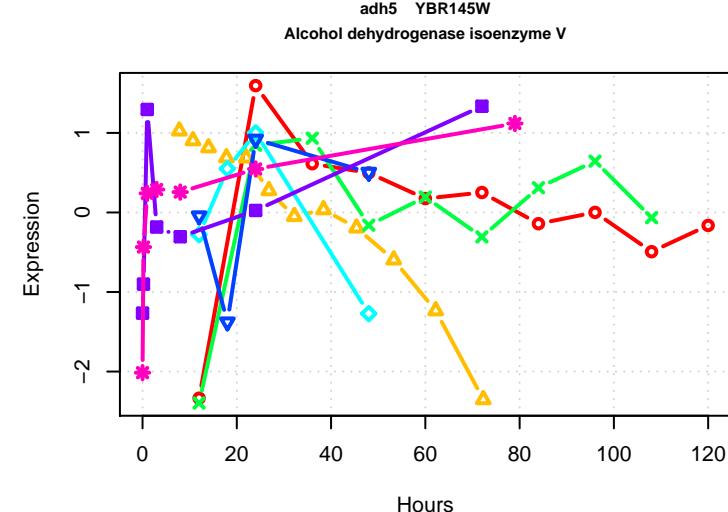
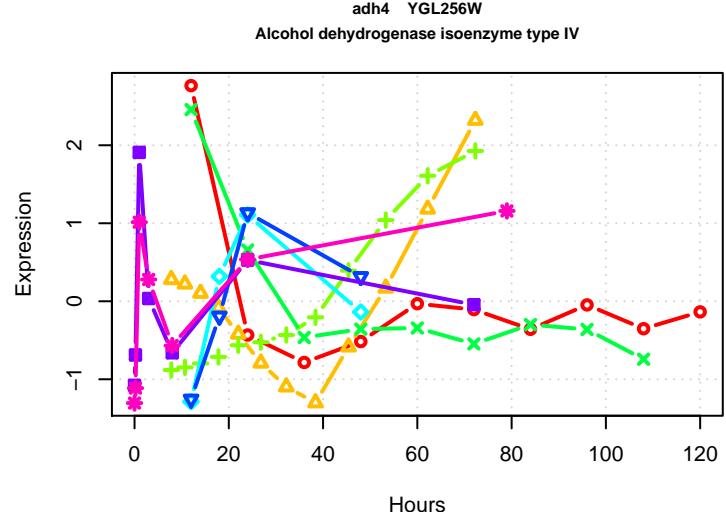
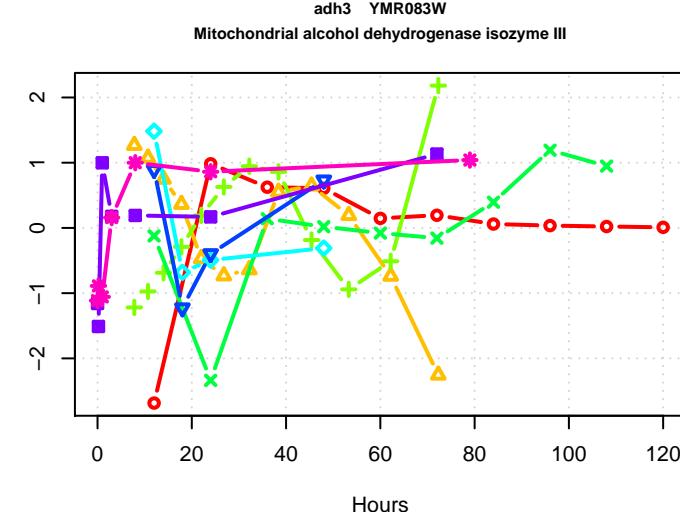
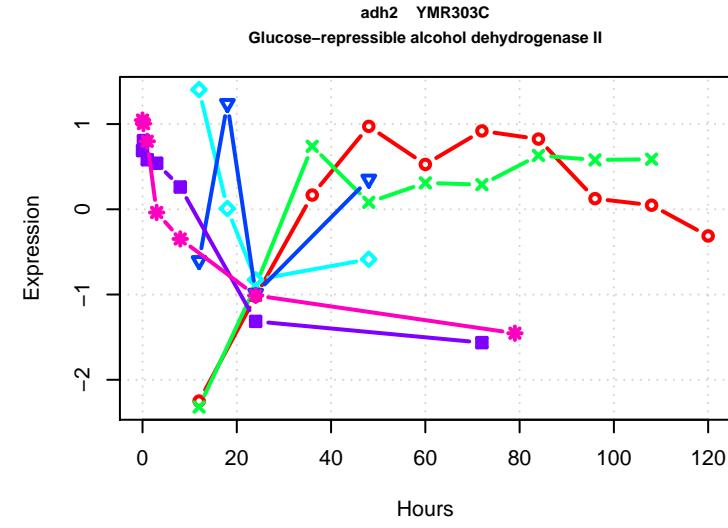
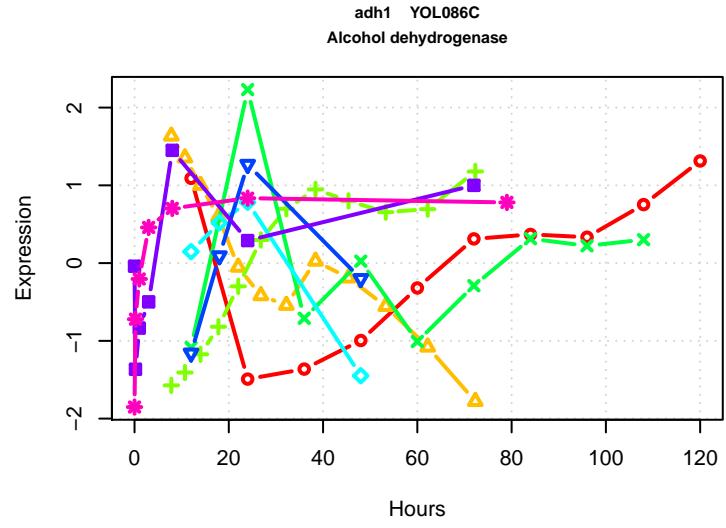
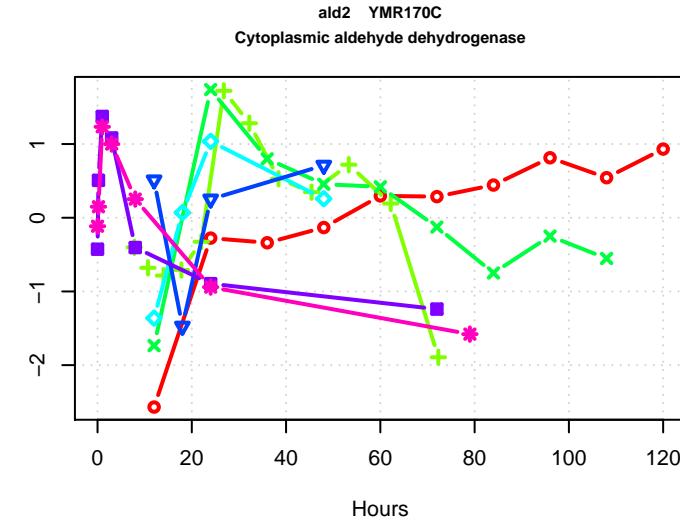
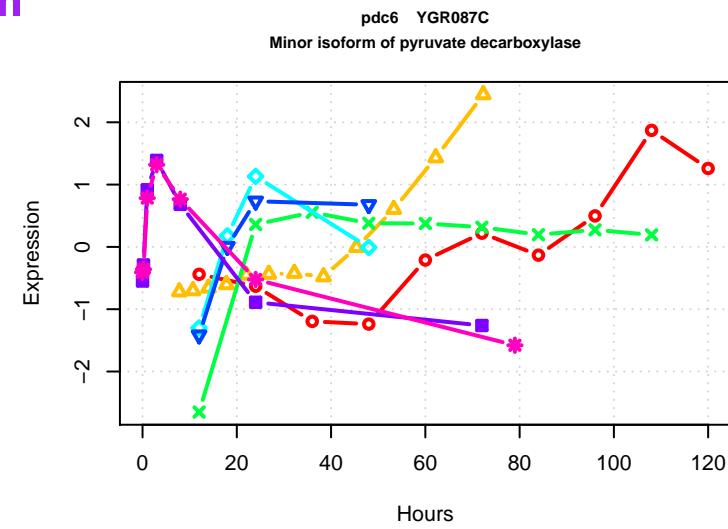
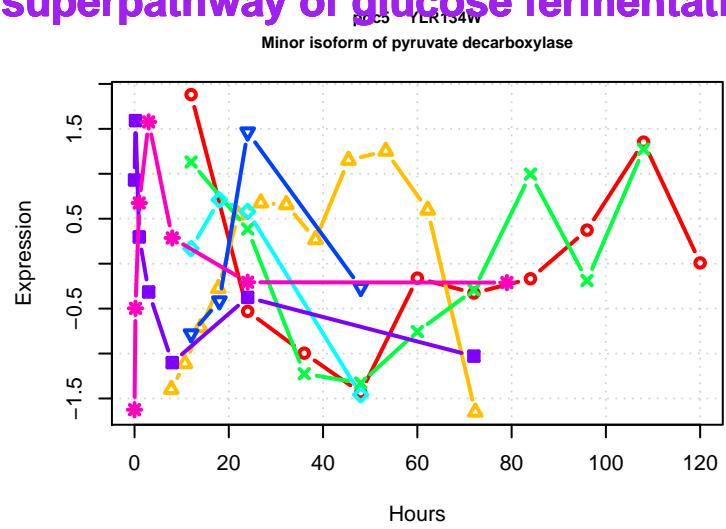
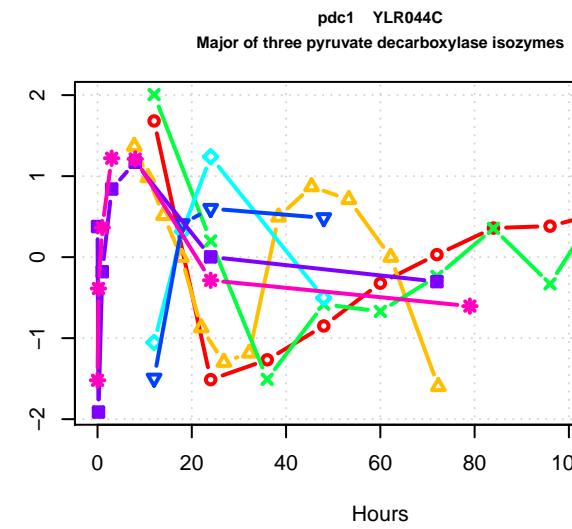


aro9 YHR137W
Aromatic aminotransferase II



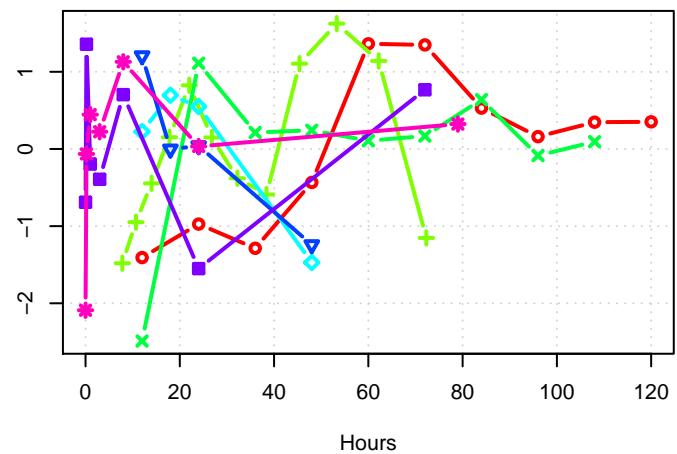
superpathway of glucose fermentation

superpathway of glucose fermentation

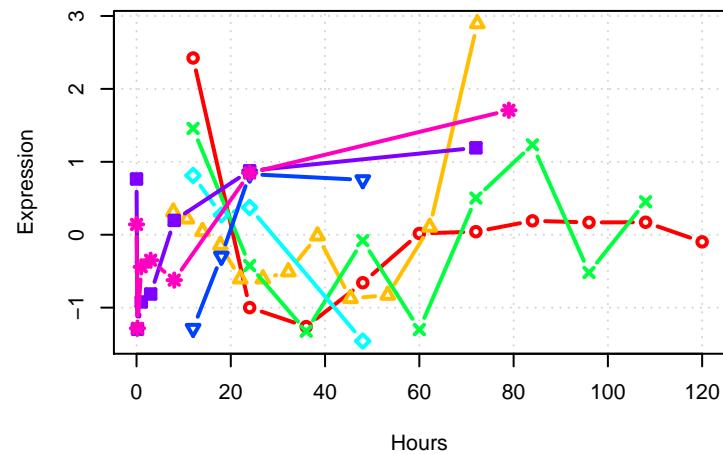


superpathway of glucose fermentation

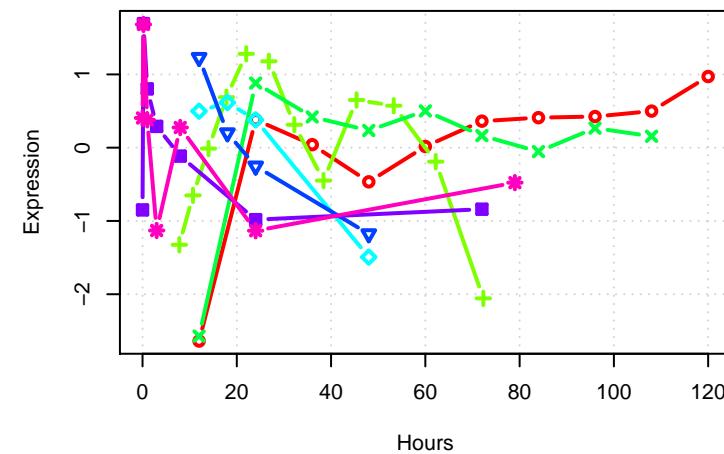
hxk1 YFR053C
Hexokinase isoenzyme 1



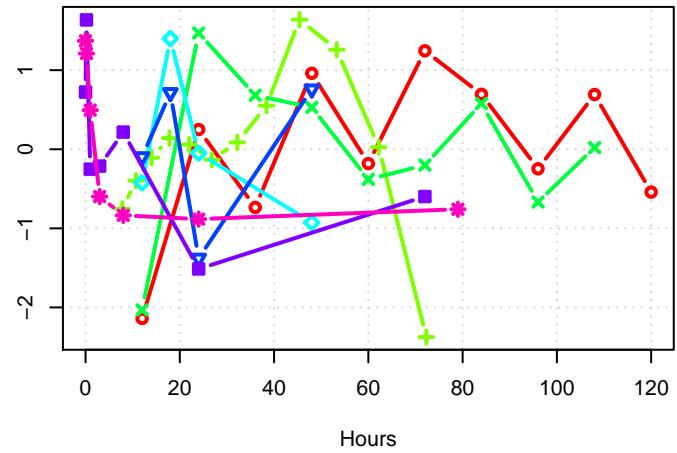
hxk2 YGL263W
Hexokinase isoenzyme 2



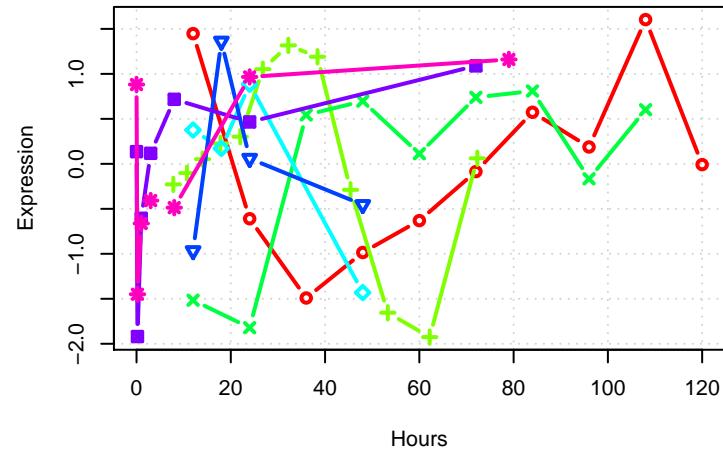
glk1 YCL040W
Glucokinase



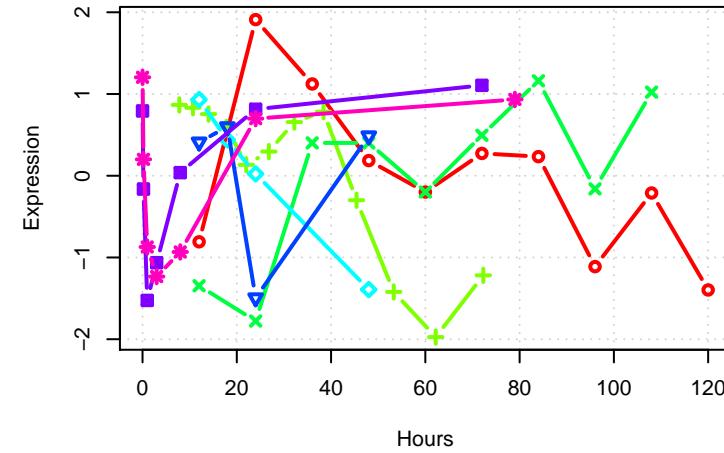
ald4 YOR374W
Mitochondrial aldehyde dehydrogenase



ald5 YER073W
Mitochondrial aldehyde dehydrogenase

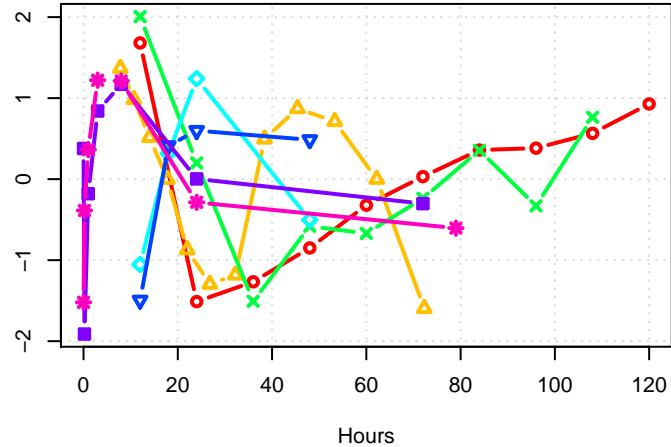


ald6 YPL061W
Cytosolic aldehyde dehydrogenase



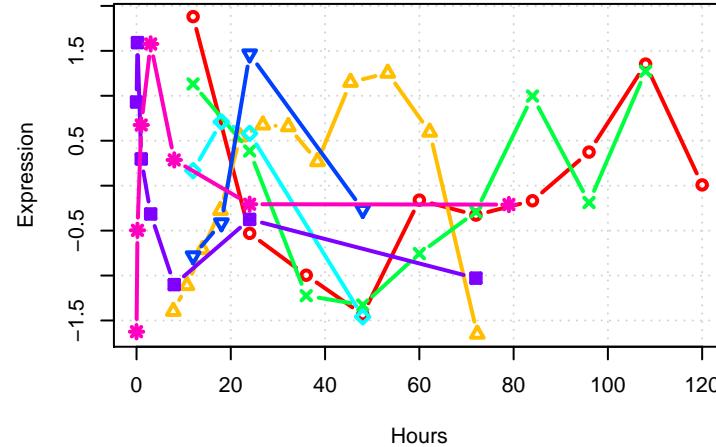
tryptophan degradation

pdc1 YLR044C
Major of three pyruvate decarboxylase isozymes

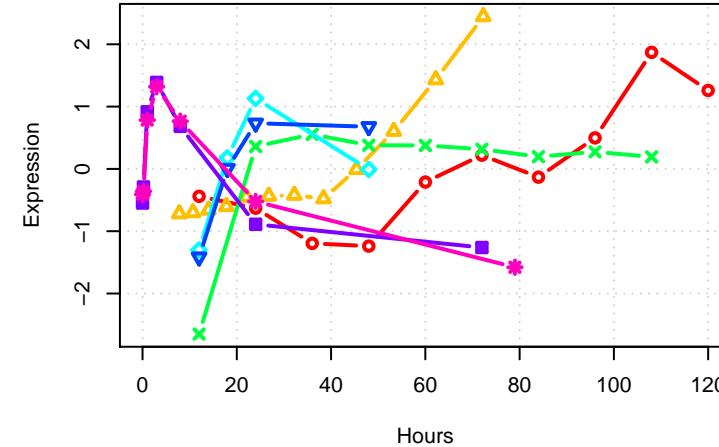


tryptophan degradation

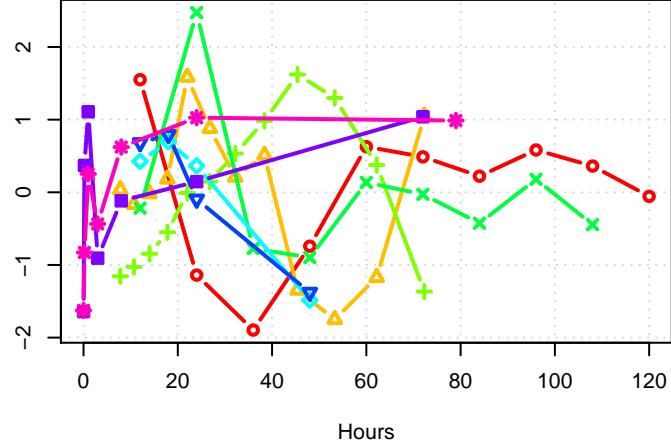
pdc5 YLR244W
Minor isoform of pyruvate decarboxylase



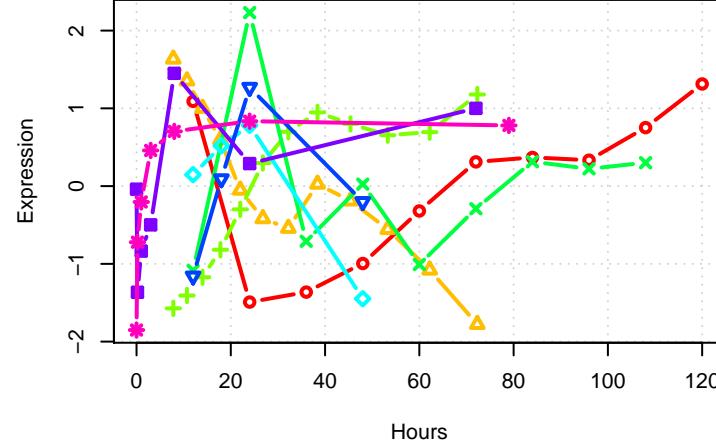
pdc6 YGR087C
Minor isoform of pyruvate decarboxylase



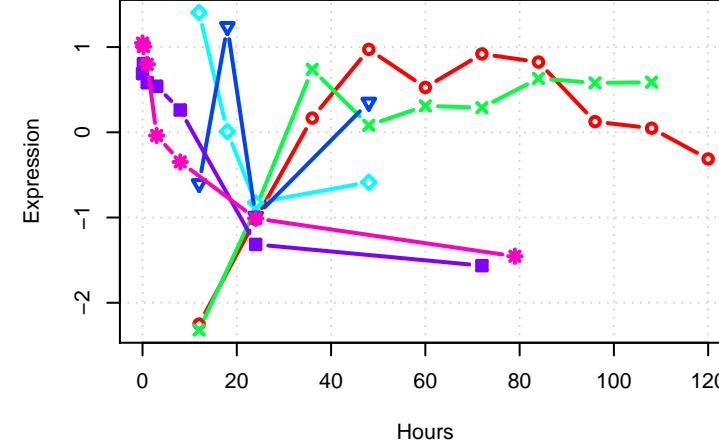
bna6 YFR047C
Quinolinate phosphoribosyl transferase



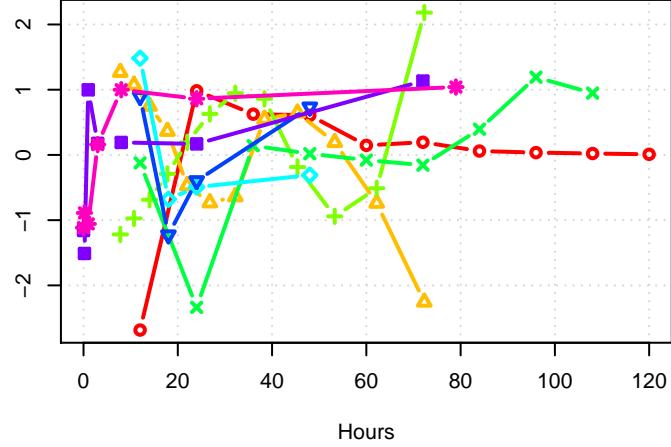
adh1 YOL086C
Alcohol dehydrogenase



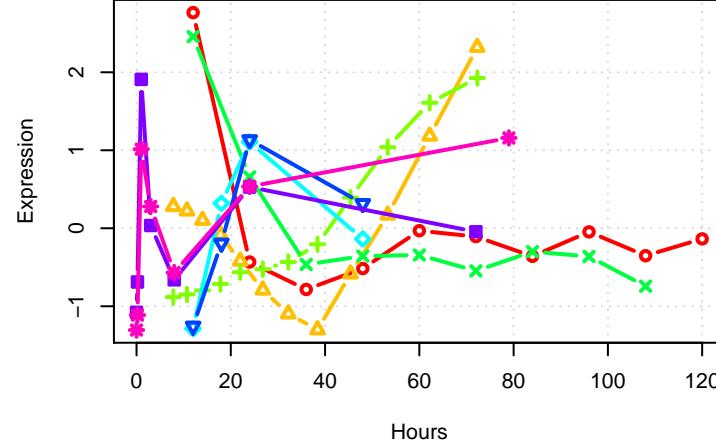
adh2 YMR303C
Glucose-repressible alcohol dehydrogenase II



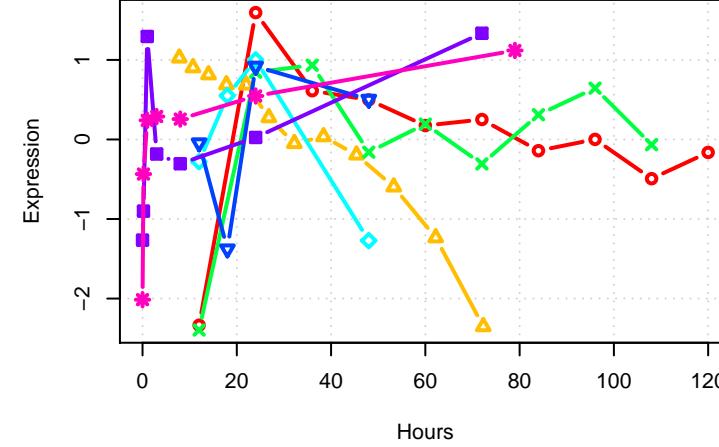
adh3 YMR083W
Mitochondrial alcohol dehydrogenase isozyme III



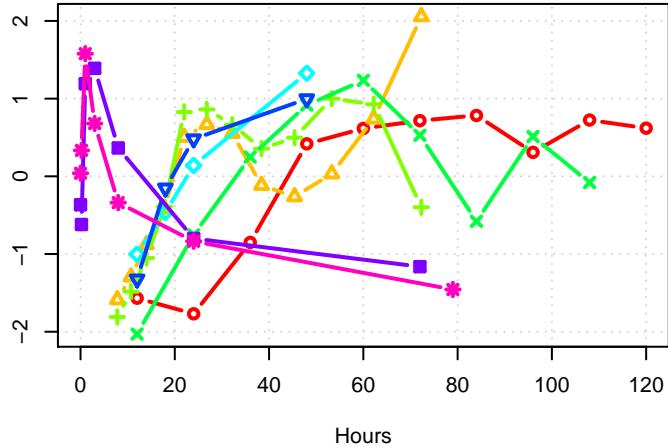
adh4 YGL256W
Alcohol dehydrogenase isoenzyme type IV



adh5 YBR145W
Alcohol dehydrogenase isoenzyme V

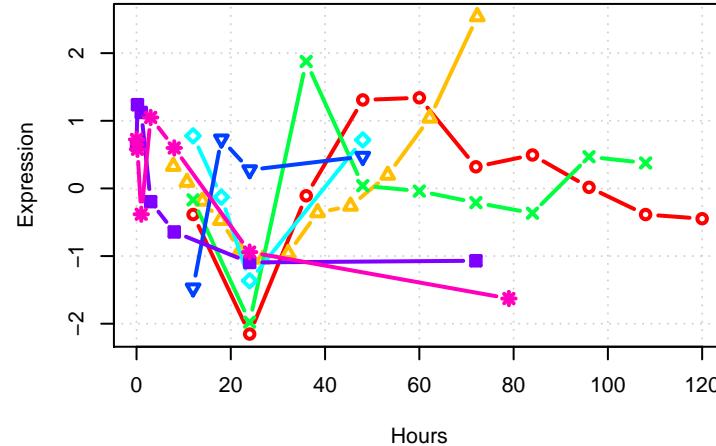


sfa1 YDL168W
Bifunctional alcohol dehydrogenase and formaldehyde dehydrogenase

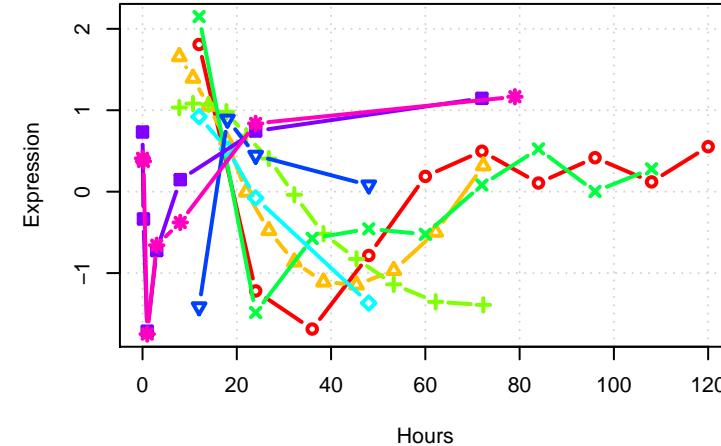


tryptophan degradation

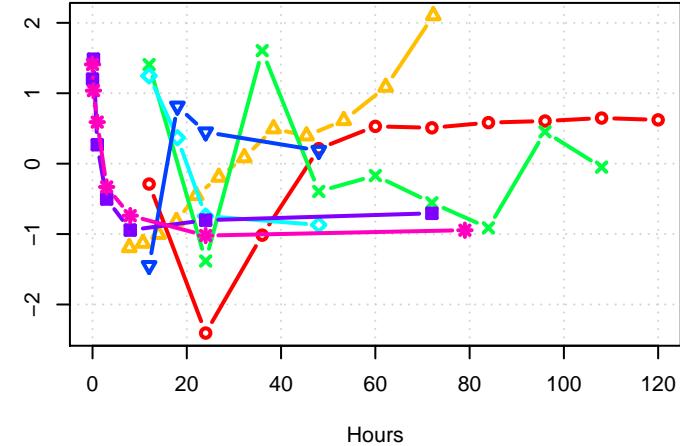
aro10 YDR310W
Phenylpyruvate decarboxylase



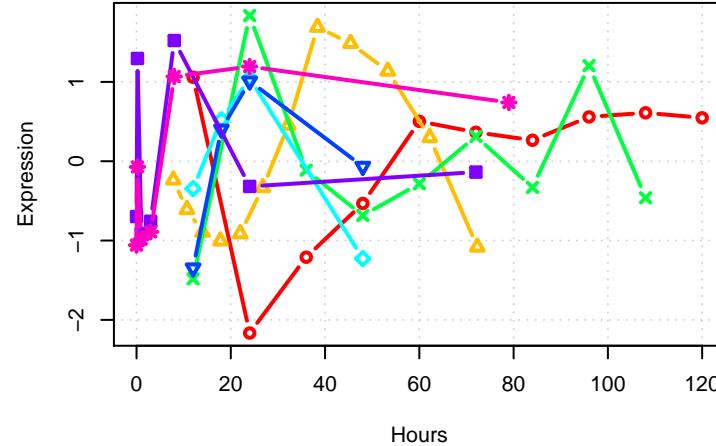
aro8 YGL202W
Aromatic aminotransferase I



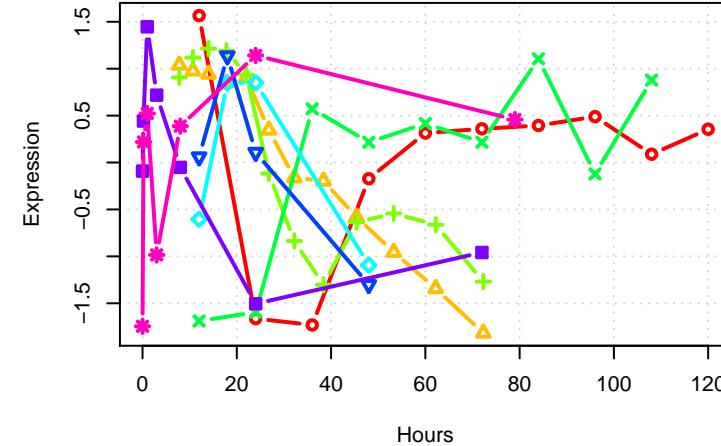
aro9 YHR137W
Aromatic aminotransferase II



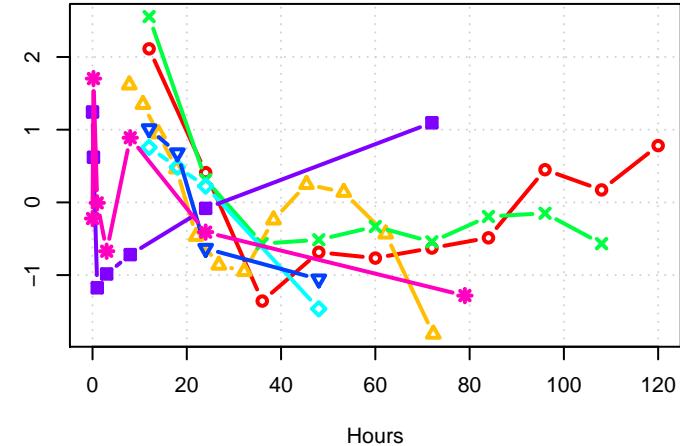
bna5 YLR231C
Kynureninase



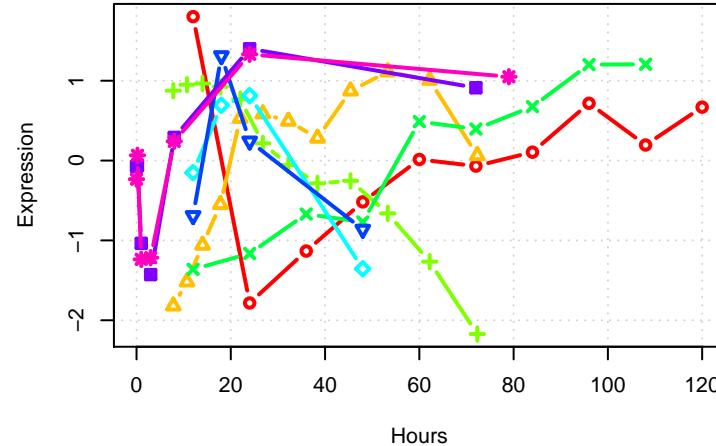
bna1 YJR025C
3-hydroxyanthranilic acid dioxygenase



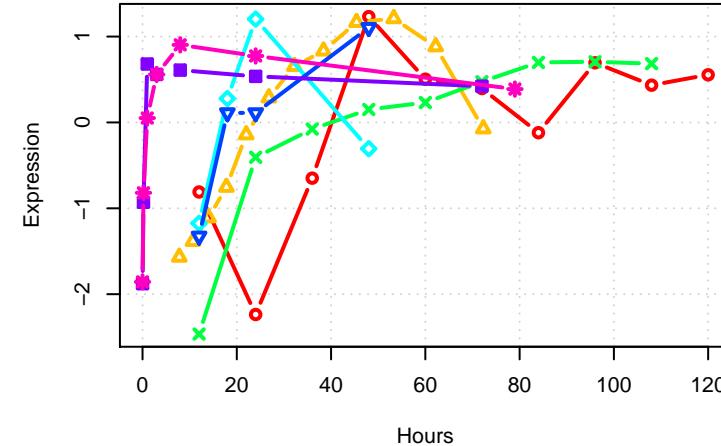
bna7 YDR428C
Formylkynurenone formamidase



bna4 YBL098W
Kynurenone 3-monoxygenase

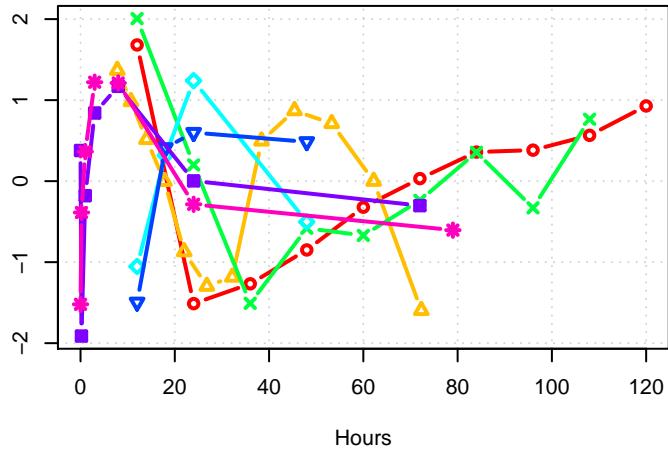


bna2 YJR078W
Tryptophan 2,3-dioxygenase or indoleamine 2,3-dioxygenase

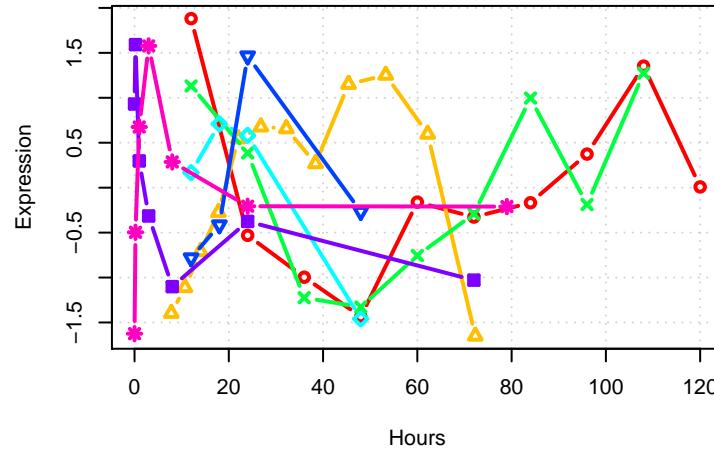


valine degradation

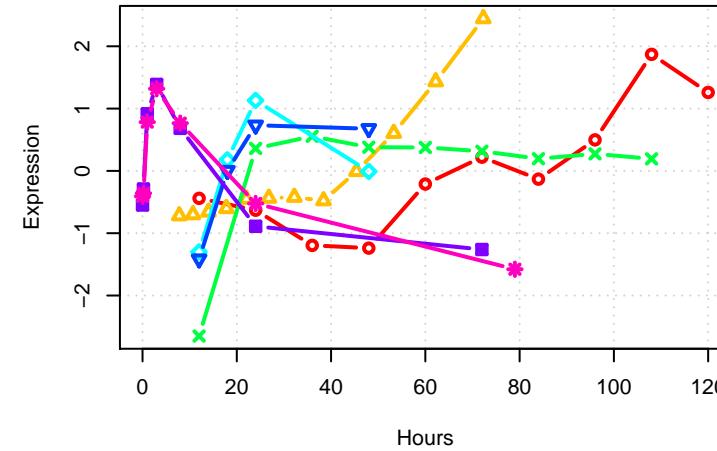
pdc1 YLR044C
Major of three pyruvate decarboxylase isozymes



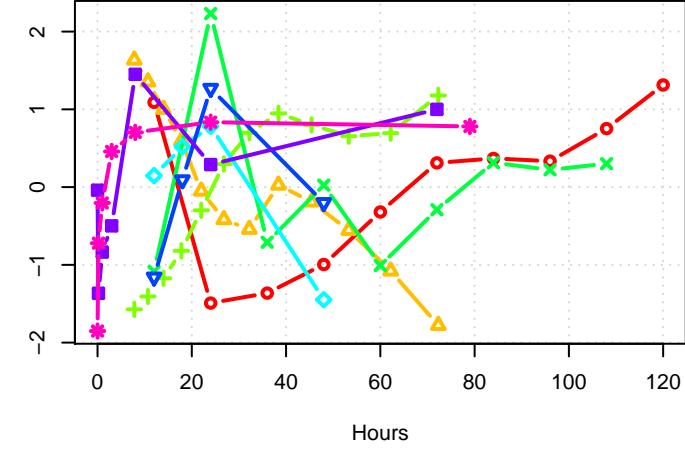
valine degradation
pdc5 YLR134W
Minor isoform of pyruvate decarboxylase



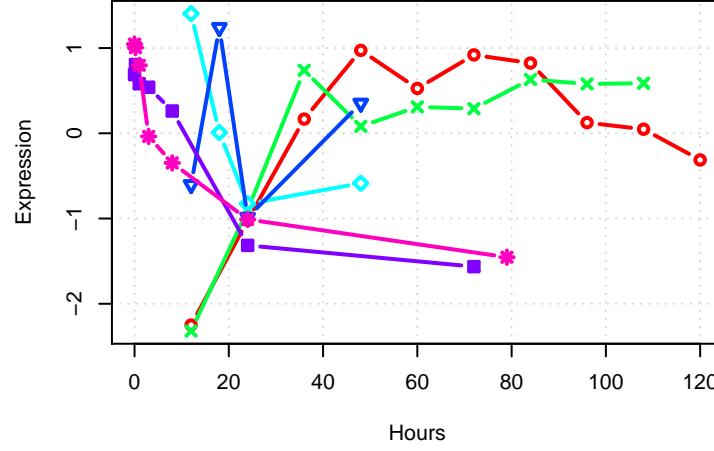
pdc6 YGR087C
Minor isoform of pyruvate decarboxylase



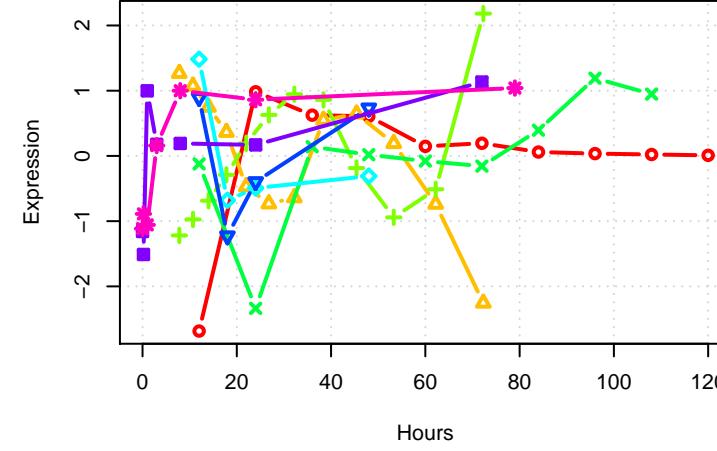
adh1 YOL086C
Alcohol dehydrogenase



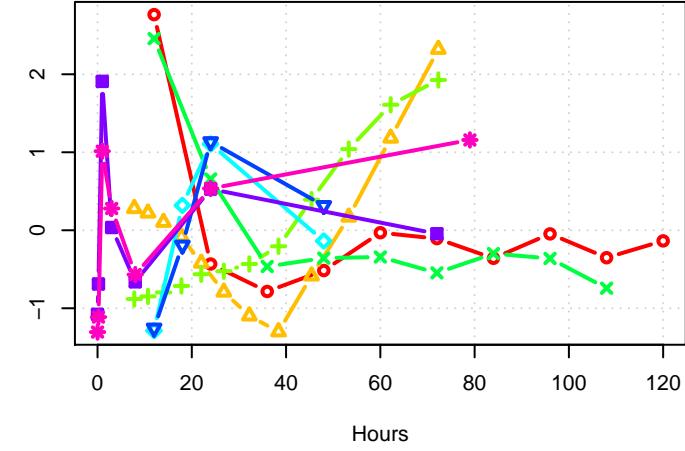
adh2 YMR303C
Glucose-repressible alcohol dehydrogenase II



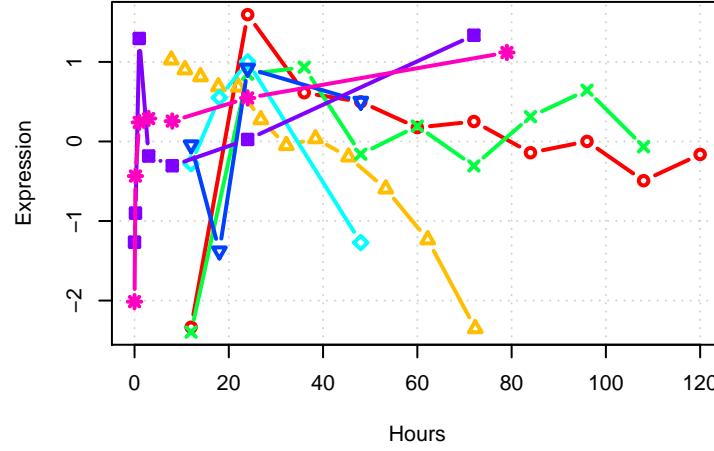
adh3 YMR083W
Mitochondrial alcohol dehydrogenase isozyme III



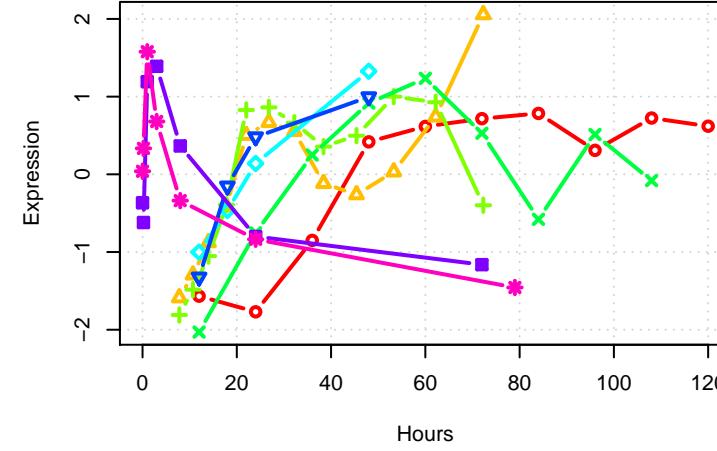
adh4 YGL256W
Alcohol dehydrogenase isoenzyme type IV



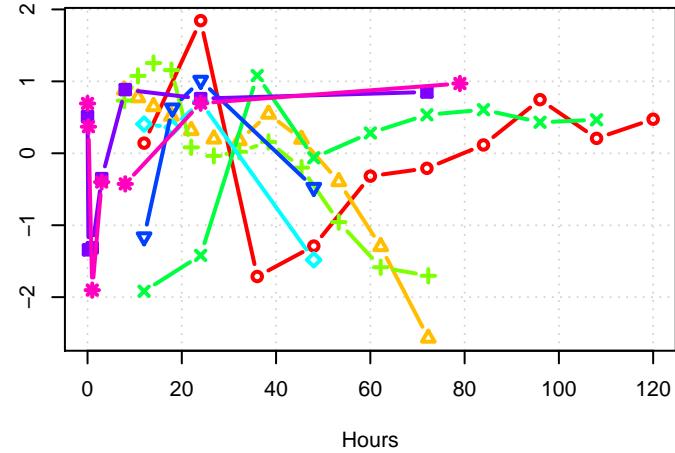
adh5 YBR145W
Alcohol dehydrogenase isoenzyme V



sfa1 YDL168W
Bifunctional alcohol dehydrogenase and formaldehyde dehydrogenase

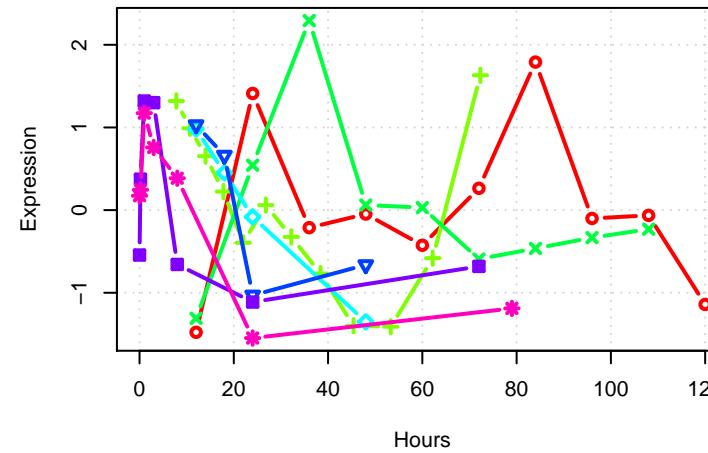


bat1 YHR208W
Mitochondrial branched-chain amino acid (BCAA) aminotransferase



valine degradation

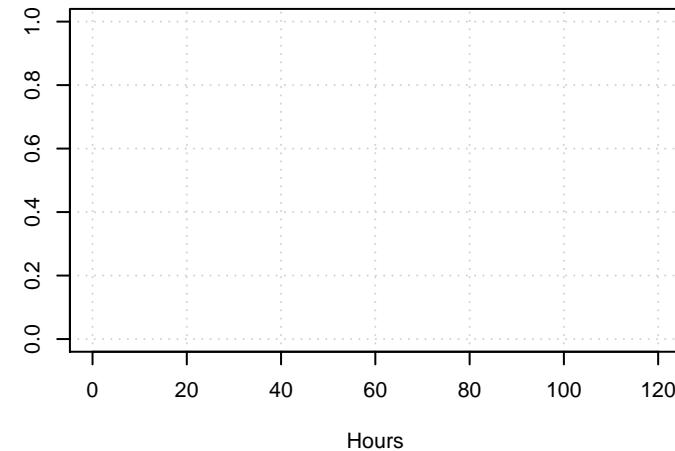
bat2 YJR146W



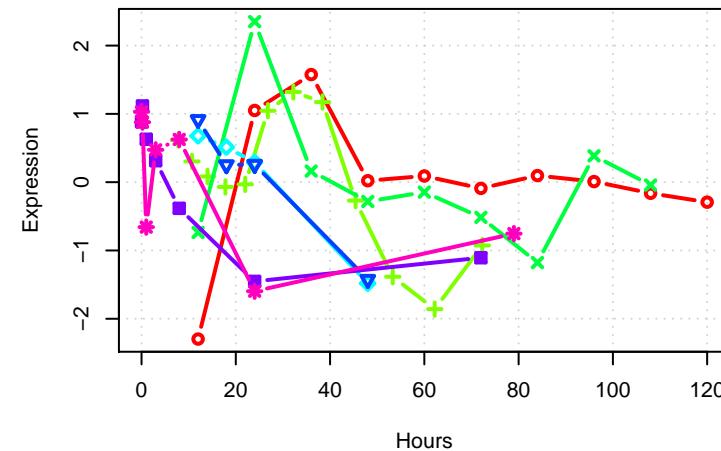
aerobic respiration, electron transport chain

aerobic respiration, electron transport chain

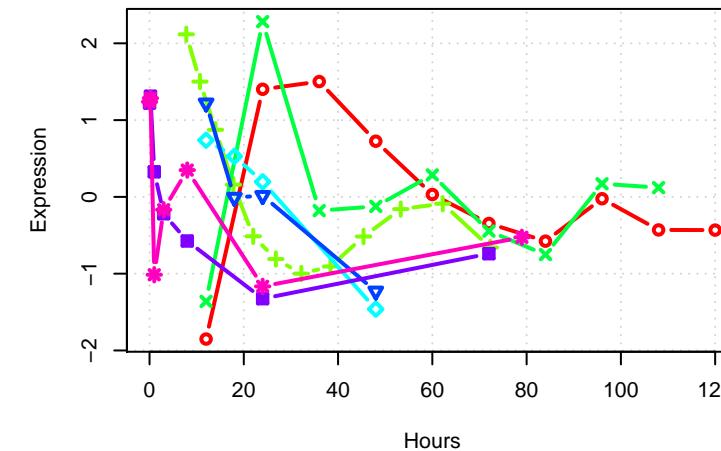
cob Q0105
Cytochrome b



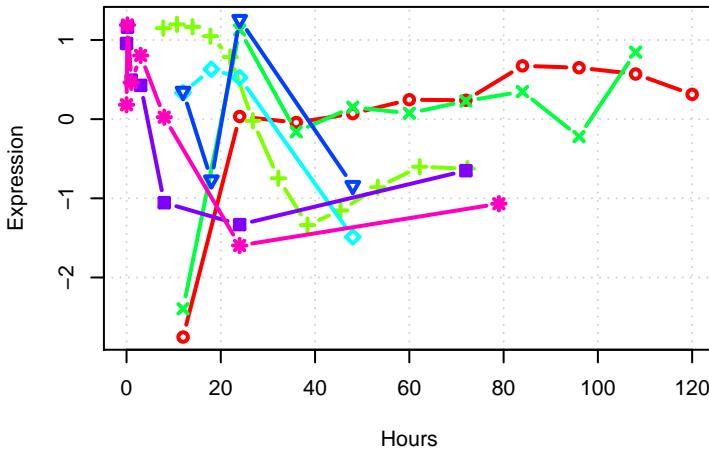
cor1 YBL045C
Core subunit of the ubiquinol-cytochrome c reductase complex



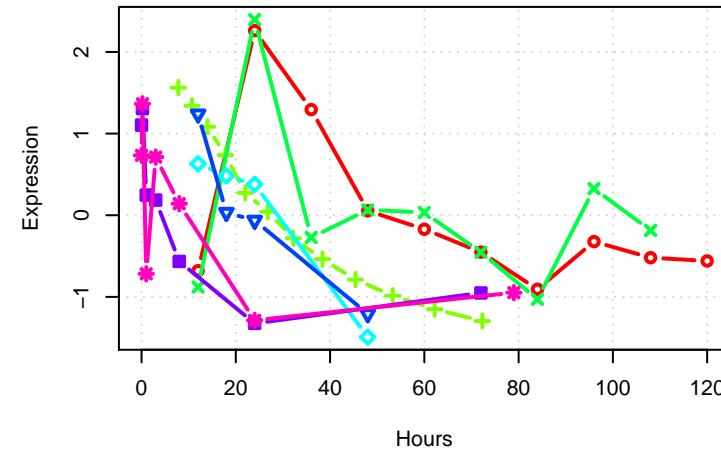
cyt1 YOR065W
Cytochrome c1



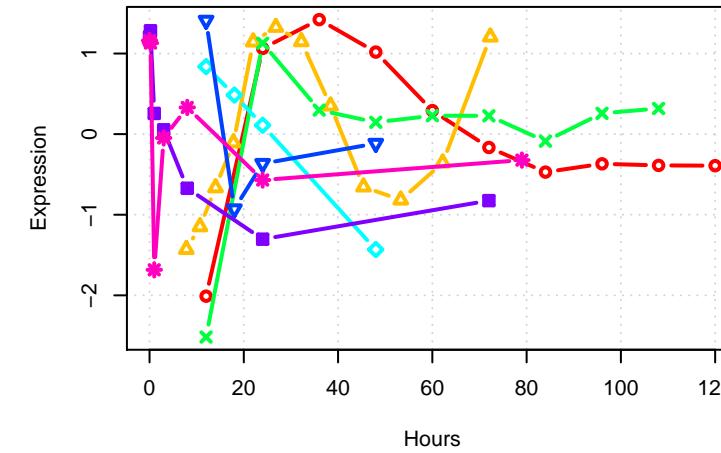
qcr10 YHR001W-A
Subunit of the ubiquinol-cytochrome c oxidoreductase complex



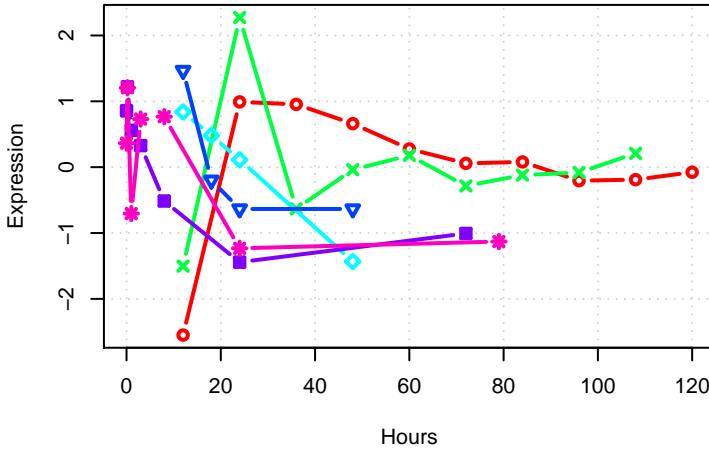
qcr2 YPR191W
Subunit 2 of ubiquinol cytochrome-c reductase (Complex III)



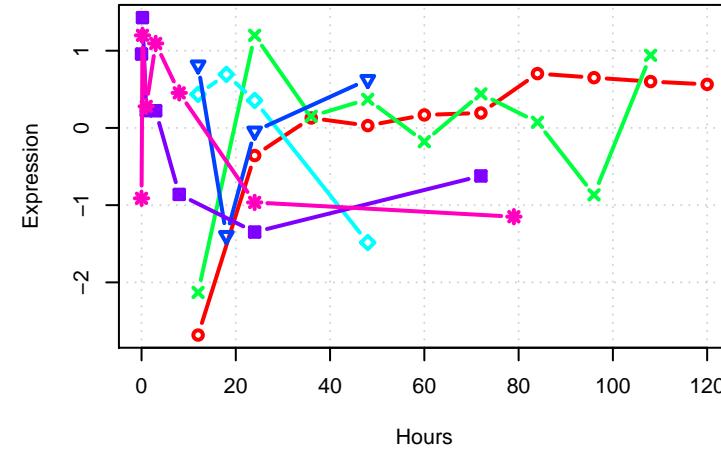
qcr6 YFR033C
Subunit 6 of the ubiquinol cytochrome-c reductase complex



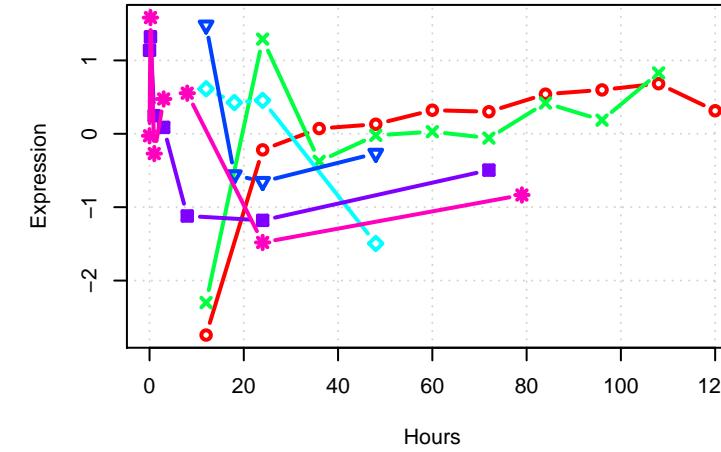
qcr7 YDR529C
Subunit 7 of ubiquinol cytochrome-c reductase (Complex III)



qcr8 YJL166W
Subunit 8 of ubiquinol cytochrome-c reductase (Complex III)

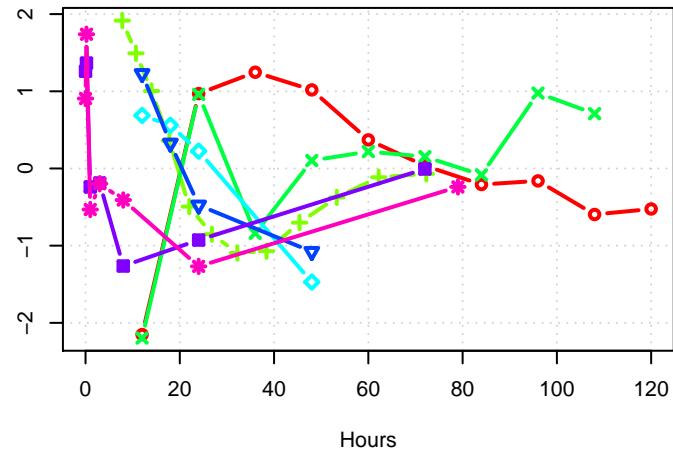


qcr9 YGR183C
Subunit 9 of ubiquinol cytochrome-c reductase (Complex III)

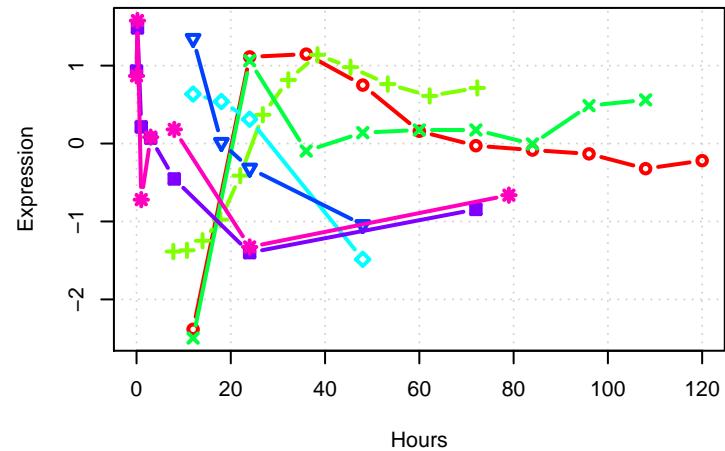


aerobic respiration, electron transport chain

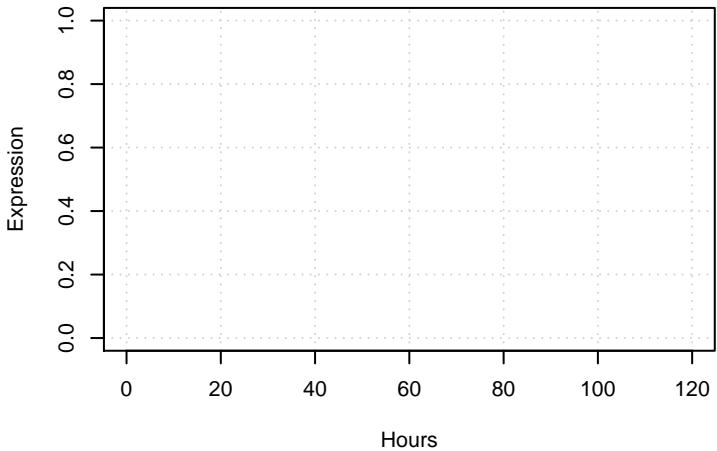
rip1 YEL024W
Ubiquinol-cytochrome-c reductase



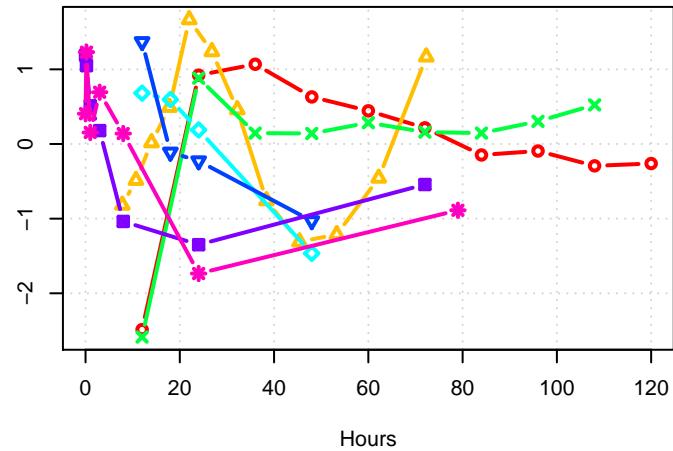
mdr1 Ywl120C
NADH:ubiquinone oxidoreductase



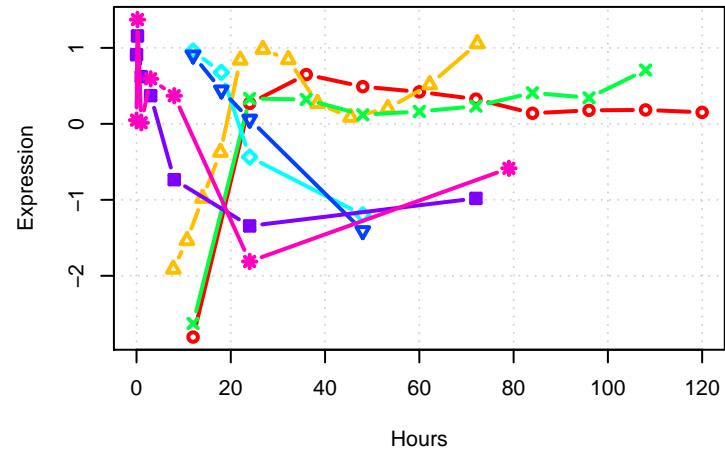
cox1 Q0045
Subunit I of cytochrome c oxidase (Complex IV)



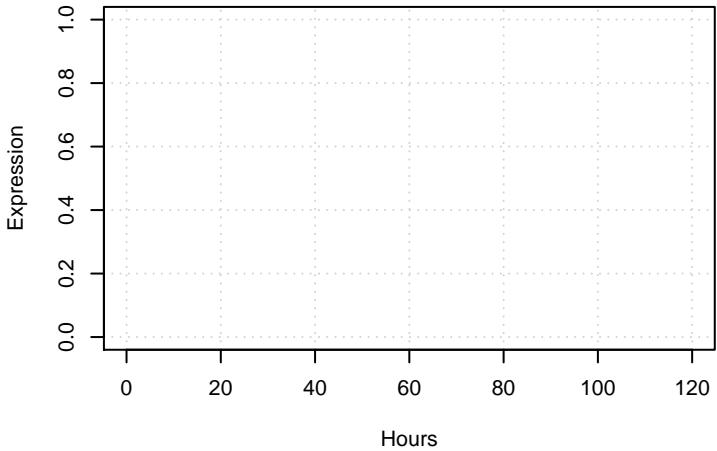
cox12 YLR038C
Subunit VIb of cytochrome c oxidase



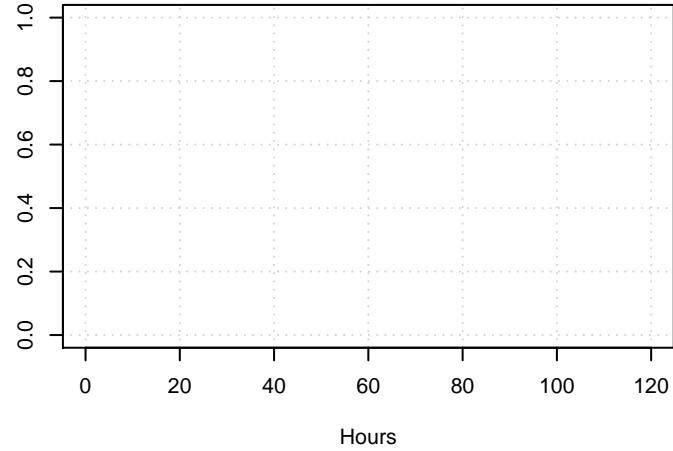
cox13 YGL191W
Subunit VIa of cytochrome c oxidase



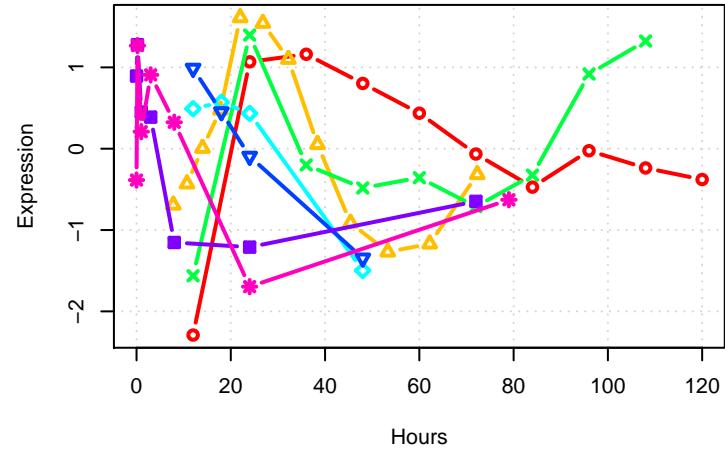
cox2 Q0250
Subunit II of cytochrome c oxidase (Complex IV)



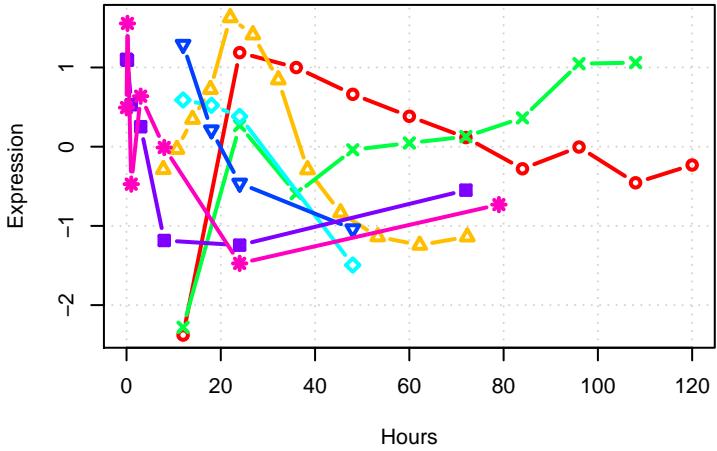
cox3 Q0275
Subunit III of cytochrome c oxidase (Complex IV)



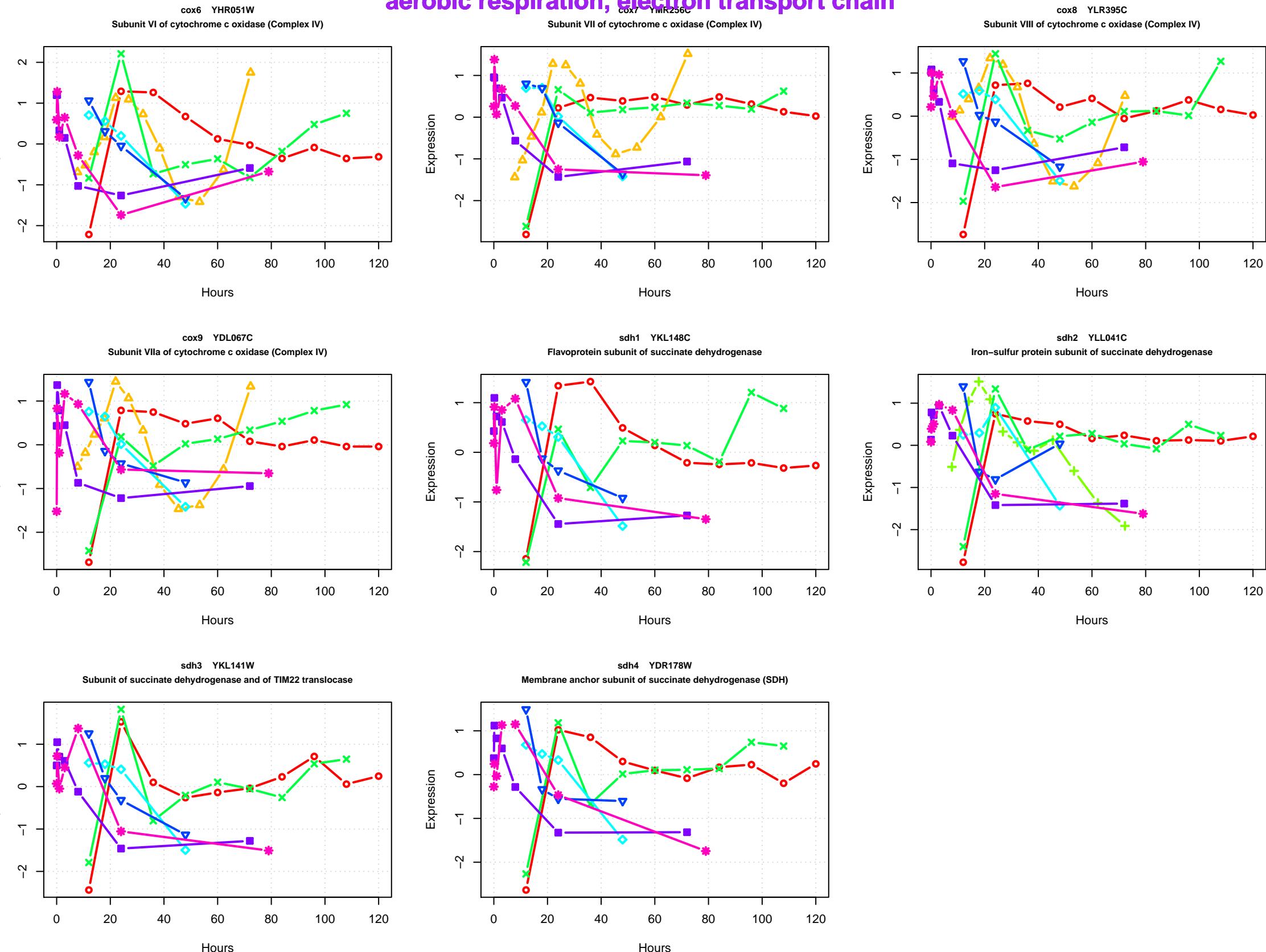
cox4 YGL187C
Subunit IV of cytochrome c oxidase



cox5a YNL052W
Subunit Va of cytochrome c oxidase

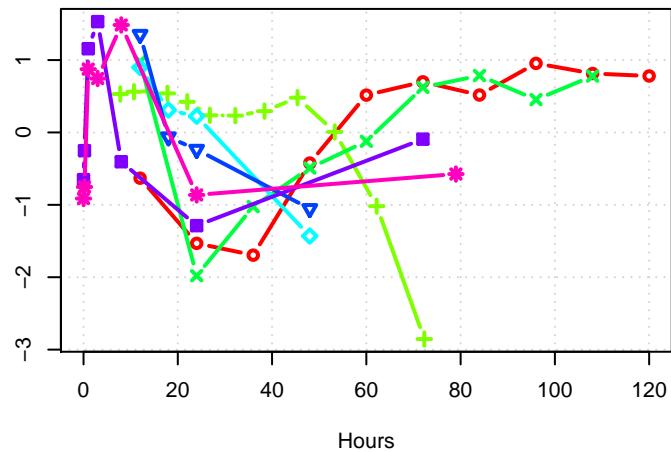


aerobic respiration, electron transport chain



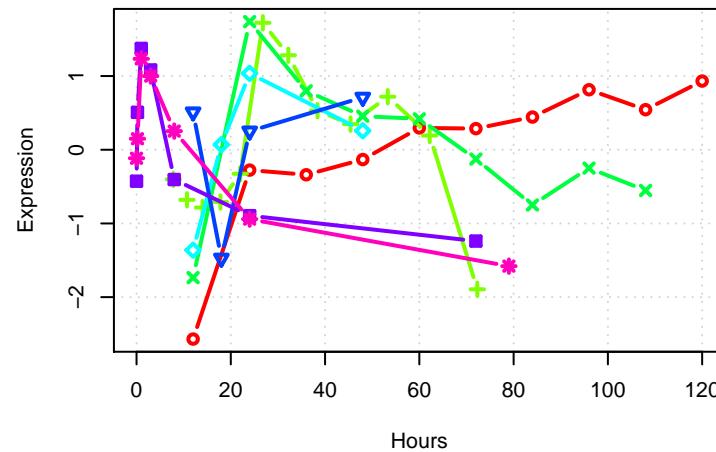
alanine biosynthesis

alt1 YLR089C
Alanine transaminase (glutamic pyruvic transaminase)

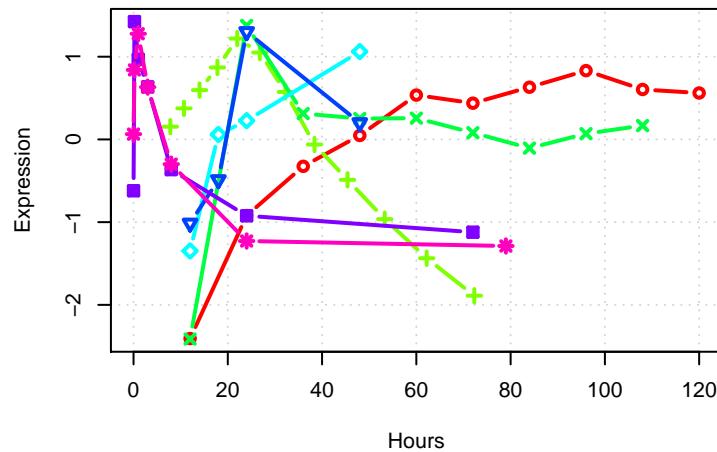


alanine biosynthesis

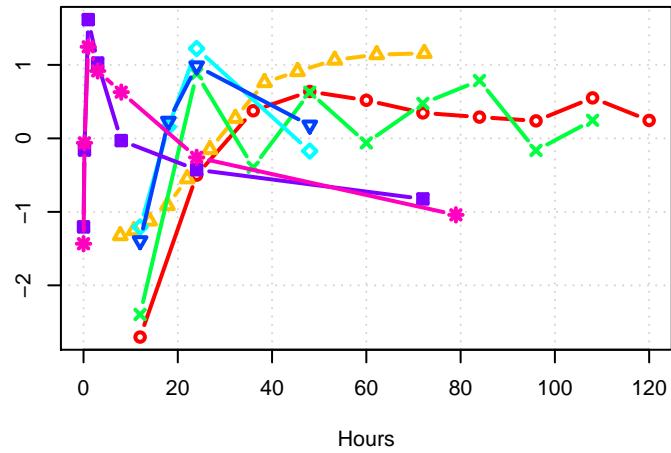
ald2 YMB170C
Cytoplasmic aldehyde dehydrogenase



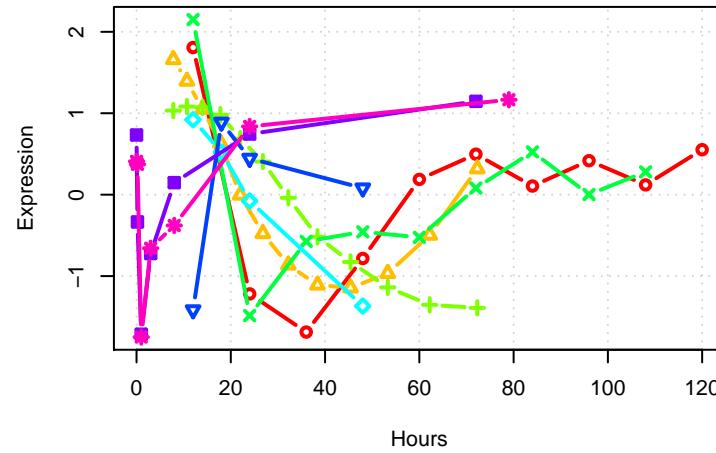
ald3 YMR169C
Cytoplasmic aldehyde dehydrogenase



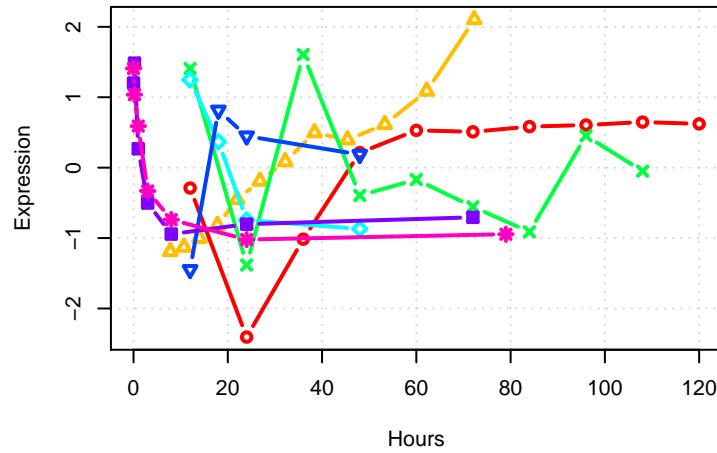
fms1 YMR020W
Polyamine oxidase



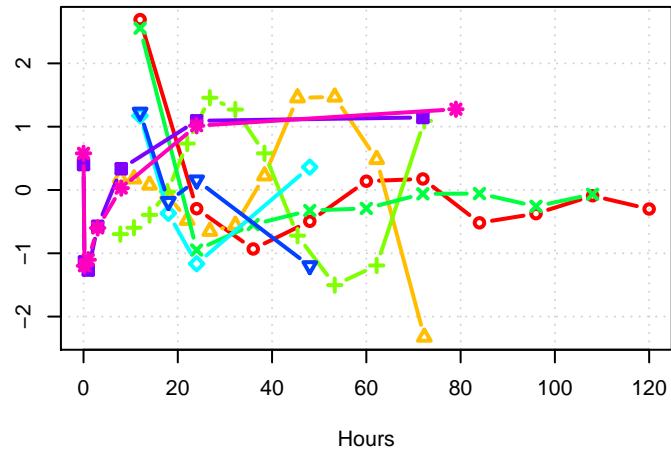
aro8 YGL202W
Aromatic aminotransferase I



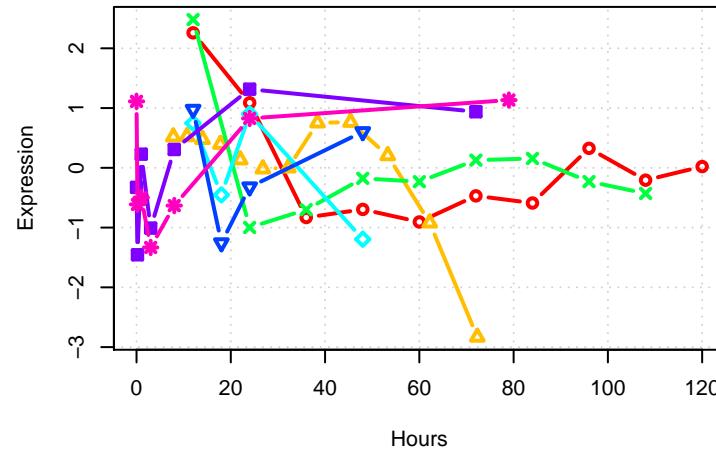
aro9 YHR137W
Aromatic aminotransferase II



aro7 YPR060C
Chorismate mutase

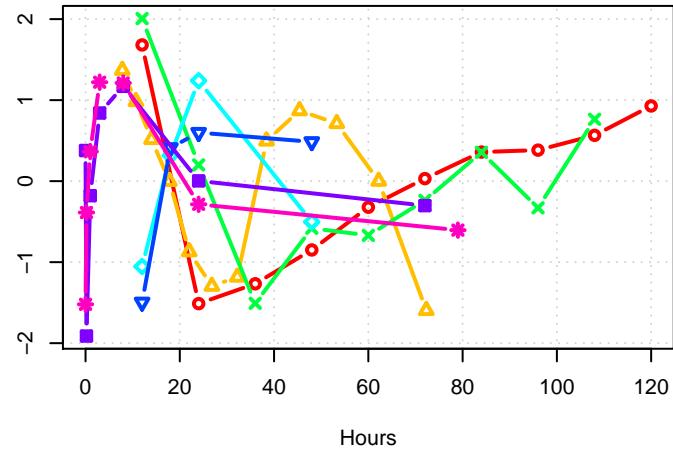


pha2 YNL316C
Prephenate dehydratase

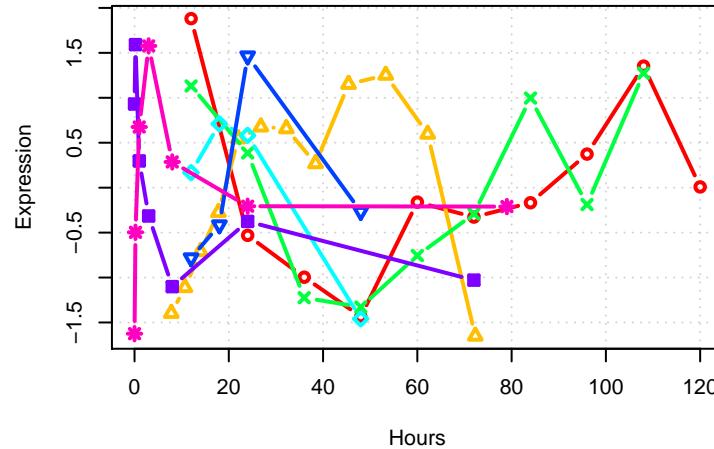


alanine degradation

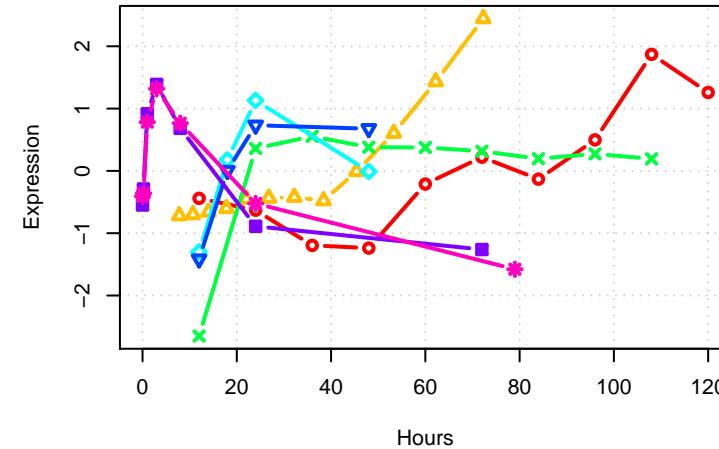
pdc1 YLR044C
Major of three pyruvate decarboxylase isozymes



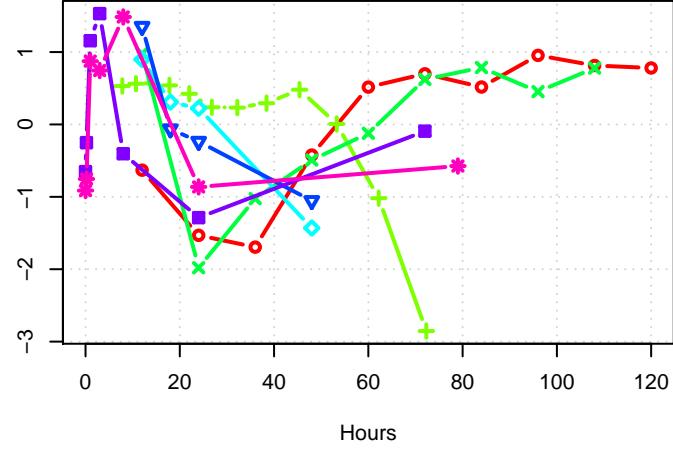
alanine degradation
pdc3 YLR134W
Minor isoform of pyruvate decarboxylase



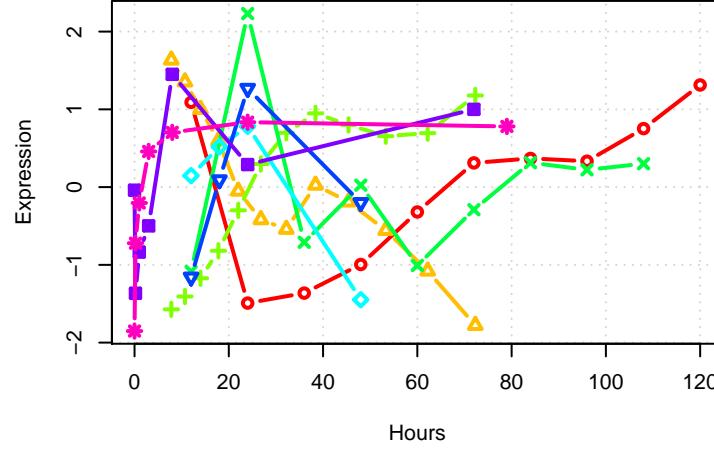
pdc6 YGR087C
Minor isoform of pyruvate decarboxylase



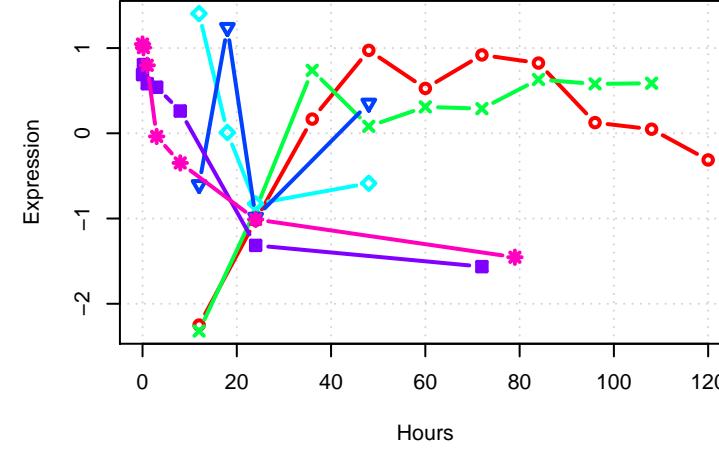
alt1 YLR089C
Alanine transaminase (glutamic pyruvic transaminase)



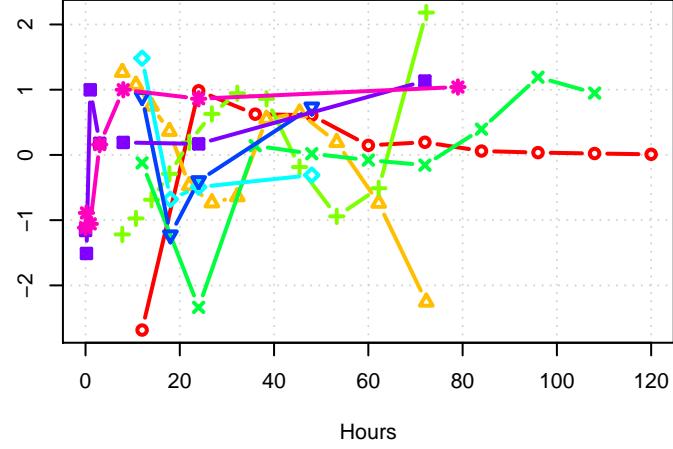
adh1 YOL086C
Alcohol dehydrogenase



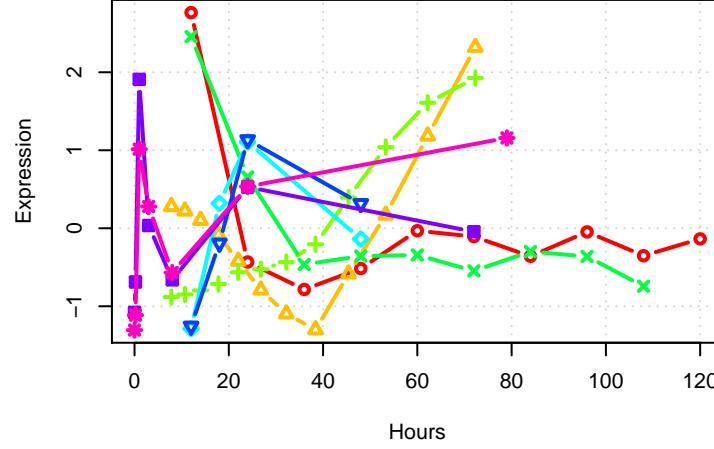
adh2 YMR303C
Glucose-repressible alcohol dehydrogenase II



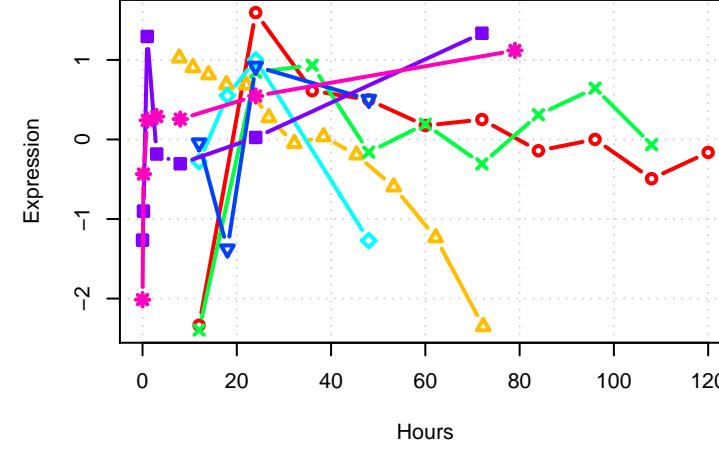
adh3 YMR083W
Mitochondrial alcohol dehydrogenase isozyme III



adh4 YGL256W
Alcohol dehydrogenase isoenzyme type IV

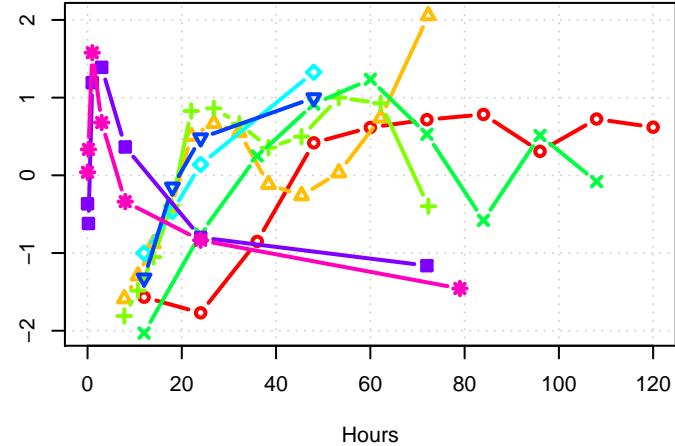


adh5 YBR145W
Alcohol dehydrogenase isoenzyme V



sfa1 YDL168W

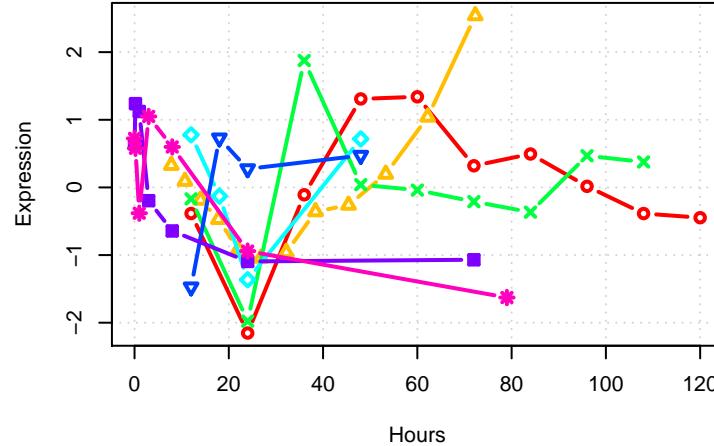
Bifunctional alcohol dehydrogenase and formaldehyde dehydrogenase



alanine degradation

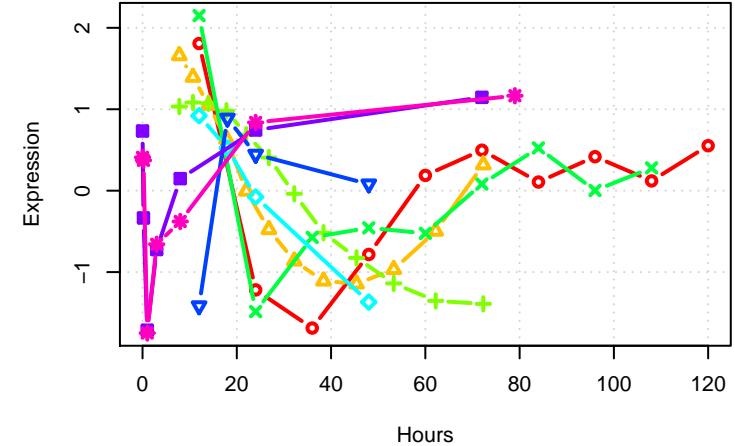
aro10 LDR360W

Phenylpyruvate decarboxylase



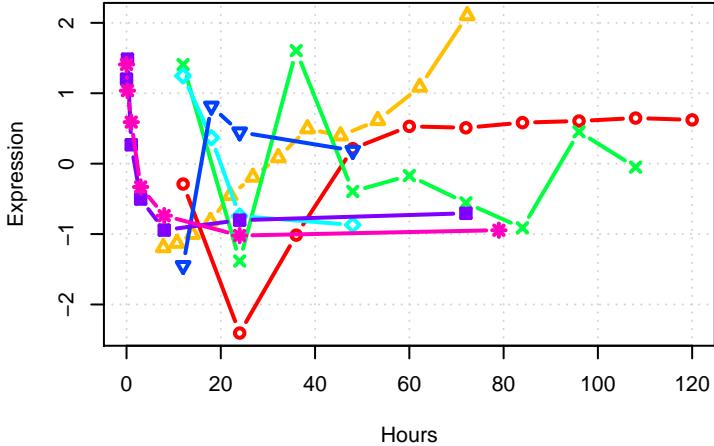
aro8 YGL202W

Aromatic aminotransferase I



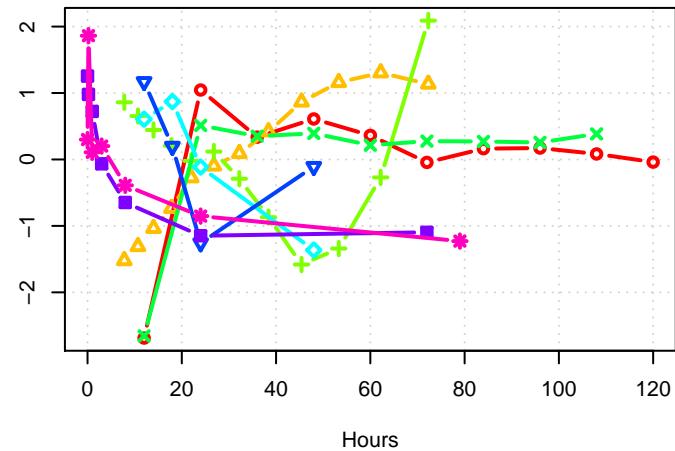
aro9 YHR137W

Aromatic aminotransferase II



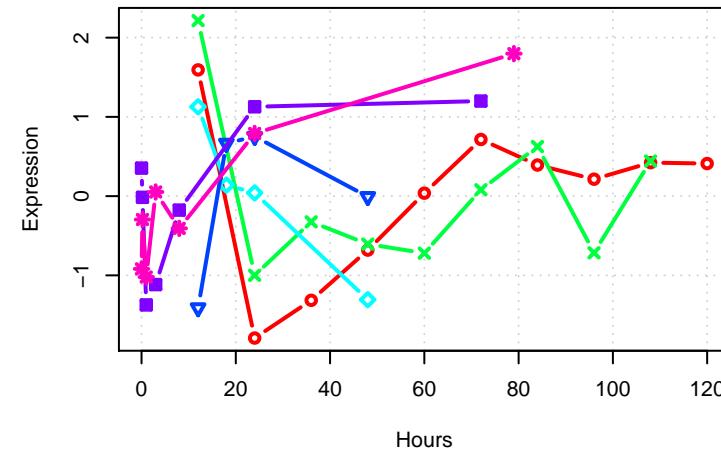
allantoin degradation

dal2 YIR029W
Allantoicase

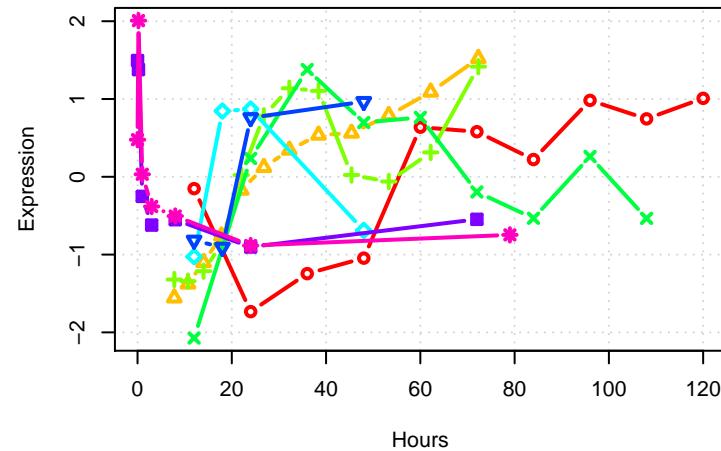


allantoin degradation

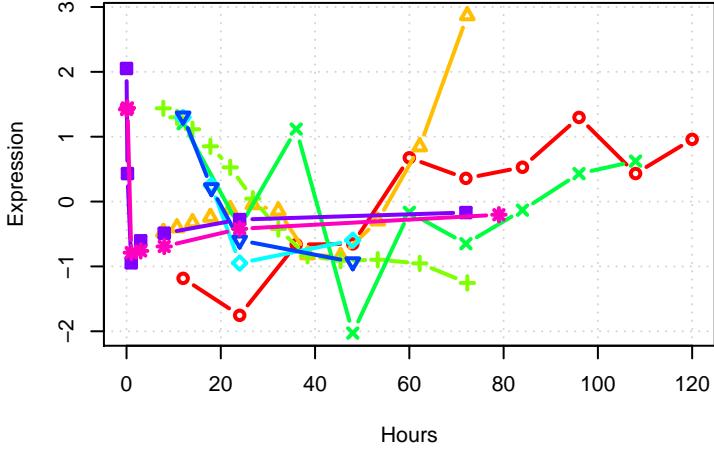
dal1 YIR027C
Allantoinase



dur12 YBR208C
Urea amidolyase

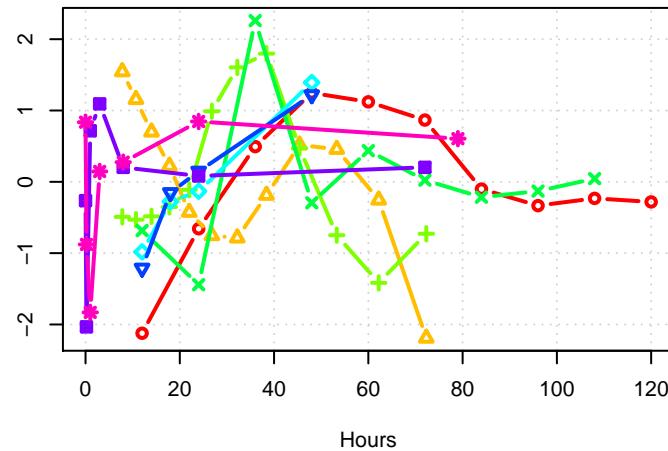


dal3 YIR032C
Ureidoglycolate lyase



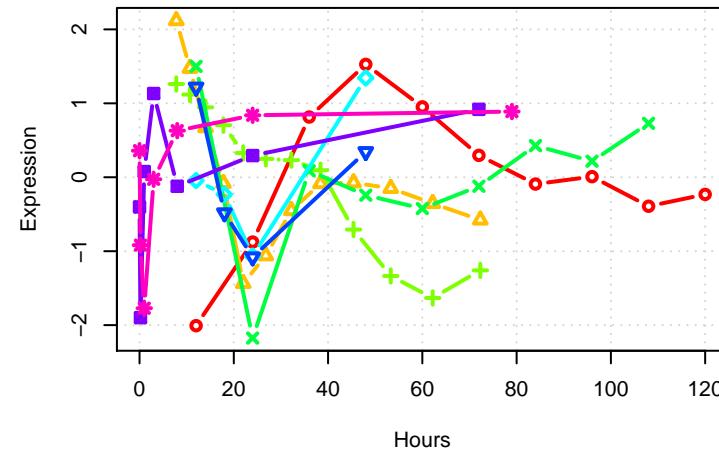
arginine biosynthesis

arg56 YER069W
Acetylglutamate kinase and N-acetyl-gamma-glutamyl-phosphate reductase

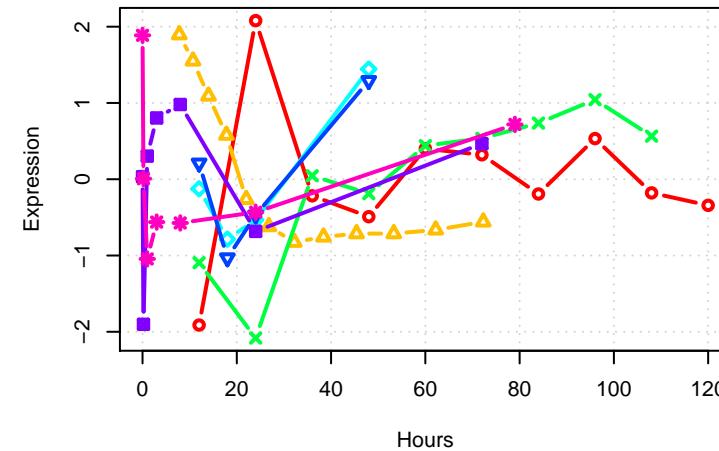


arginine biosynthesis

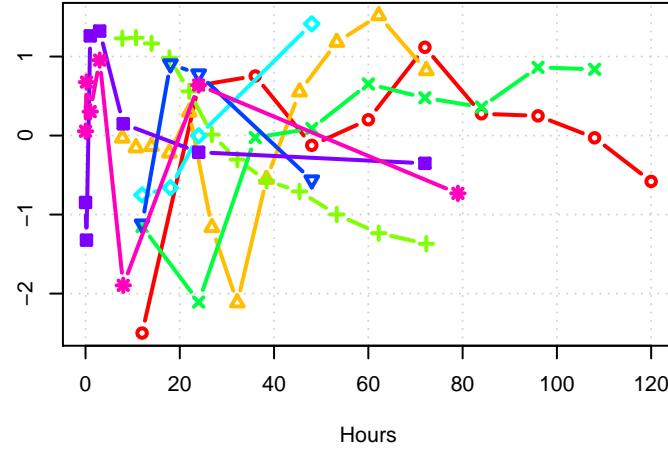
arg6 YOL140W
Acetylornithine aminotransferase



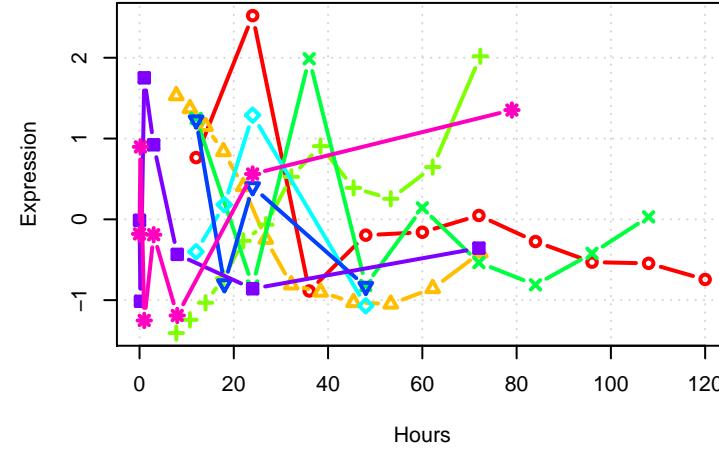
arg2 YJL071W
Acetylglutamate synthase (glutamate N-acetyltransferase)



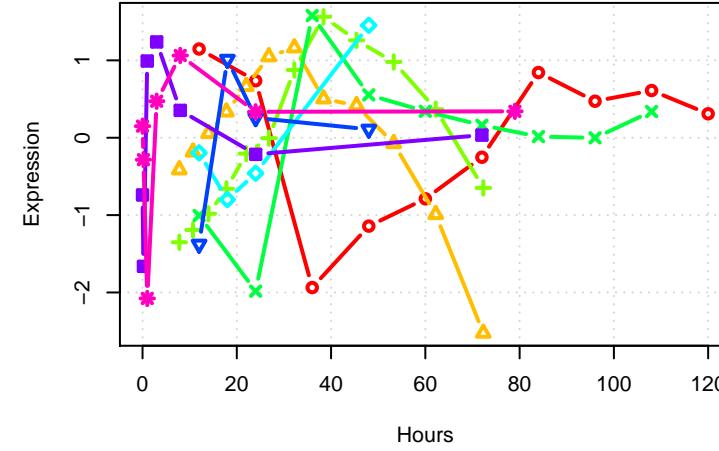
arg7 YMR062C
Mitochondrial ornithine acetyltransferase



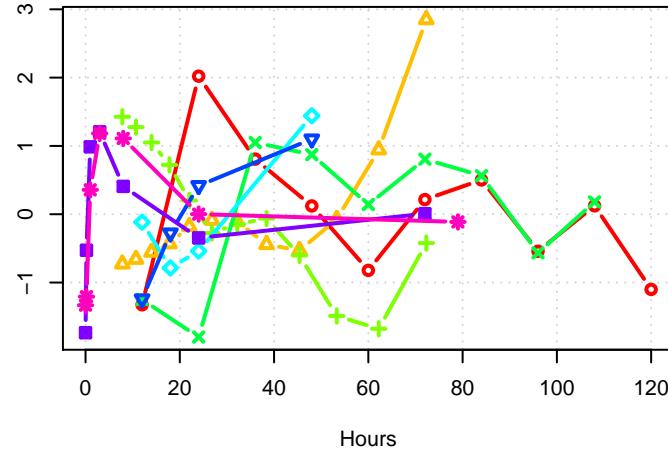
arg4 YHR018C
Argininosuccinate lyase



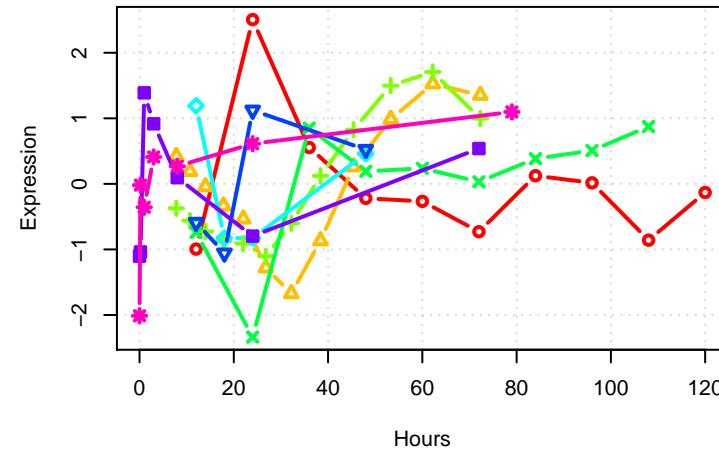
arg1 YOL058W
Argininosuccinate synthetase



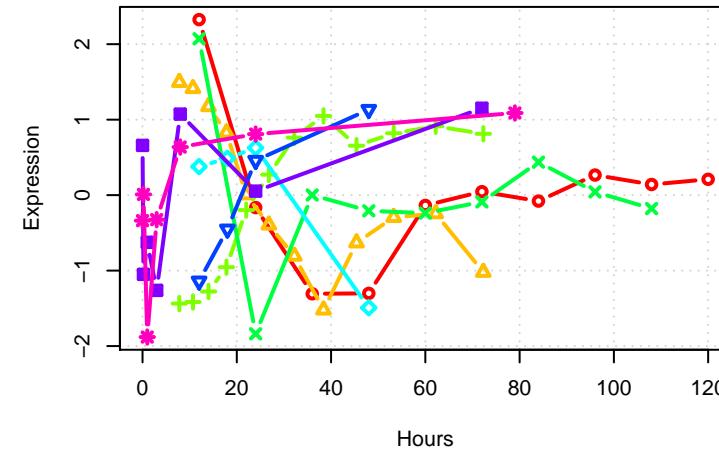
cpa1 YOR303W
Small subunit of carbamoyl phosphate synthetase



cpa2 YJR109C
Large subunit of carbamoyl phosphate synthetase

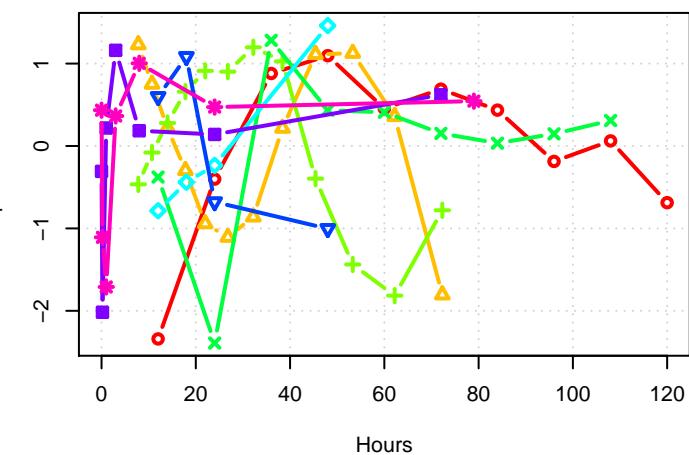


ura2 YJL130C
Bifunctional carbamoylphosphate synthetase/aspartate transcarbamoylase



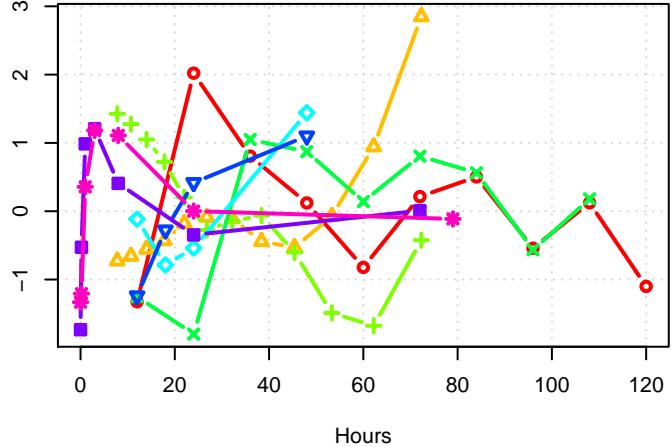
arginine biosynthesis

arg3 YJL088W
Ornithine carbamoyltransferase



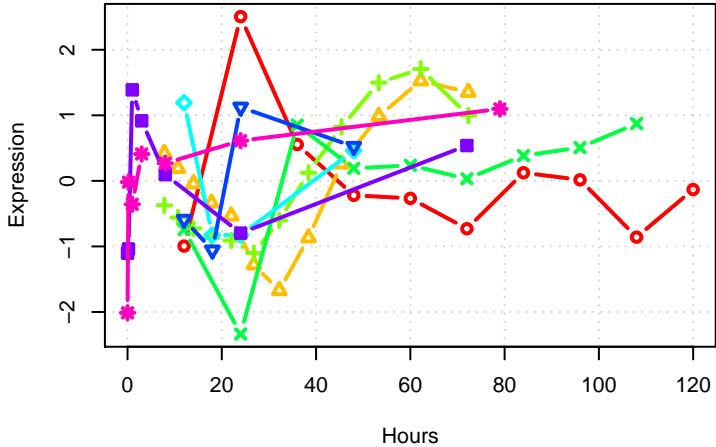
citrulline biosynthesis

cpa1 YOR303W
Small subunit of carbamoyl phosphate synthetase

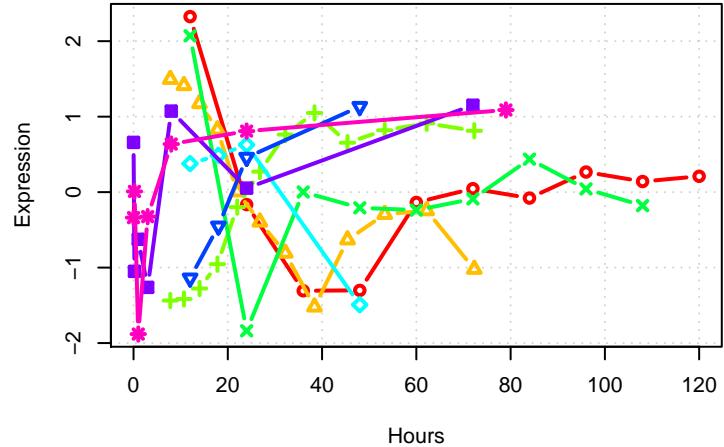


citrulline biosynthesis

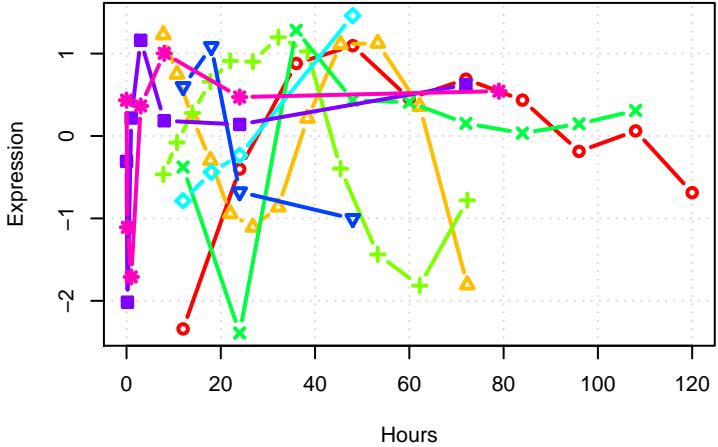
cpa2 YJK19C
Large subunit of carbamoyl phosphate synthetase



ura2 YJL130C
Bifunctional carbamoylphosphate synthetase/aspartate transcarbamylase



arg3 YJL088W
Ornithine carbamoyltransferase



de novo biosynthesis of pyrimidine ribonucleotides

de novo biosynthesis of pyrimidine ribonucleotides

cpa1 YOR303W

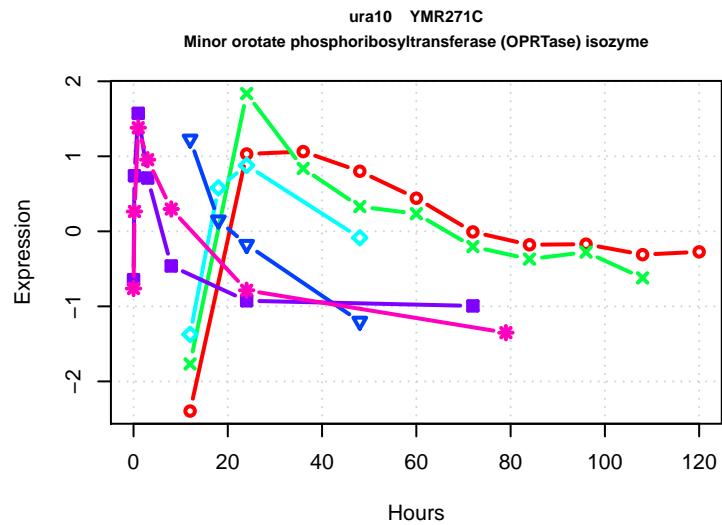
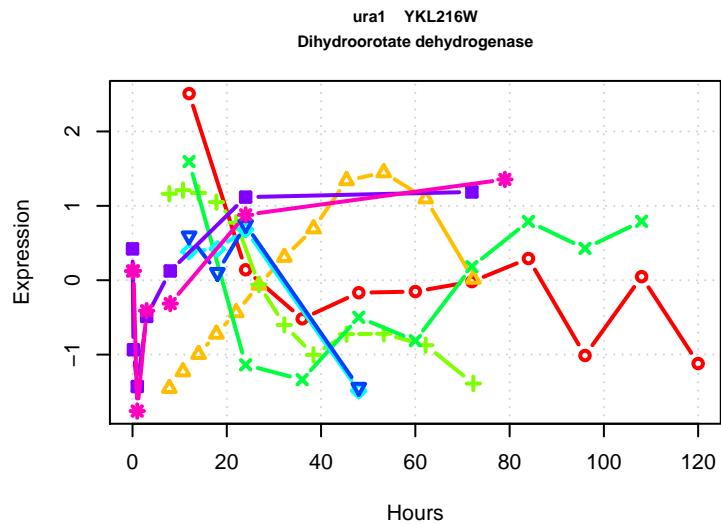
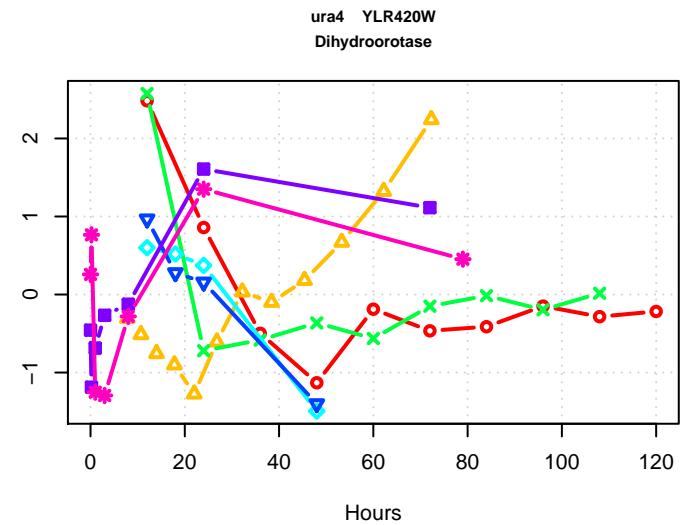
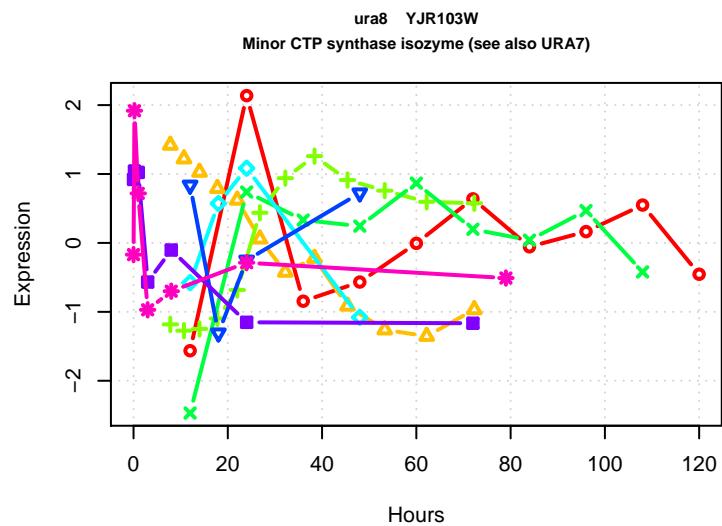
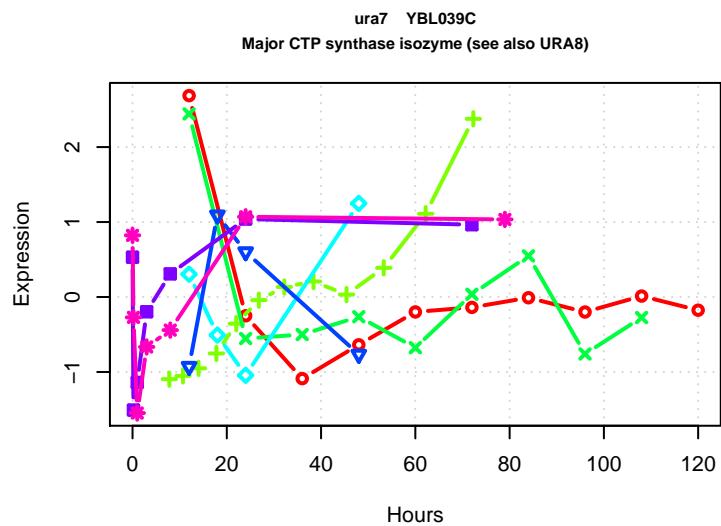
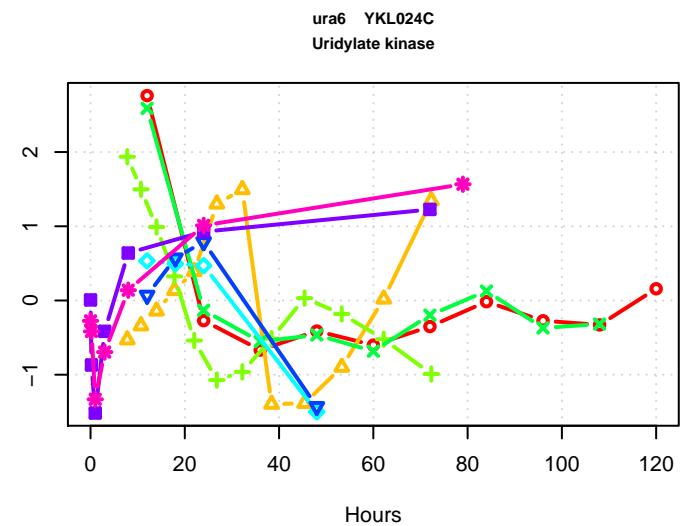
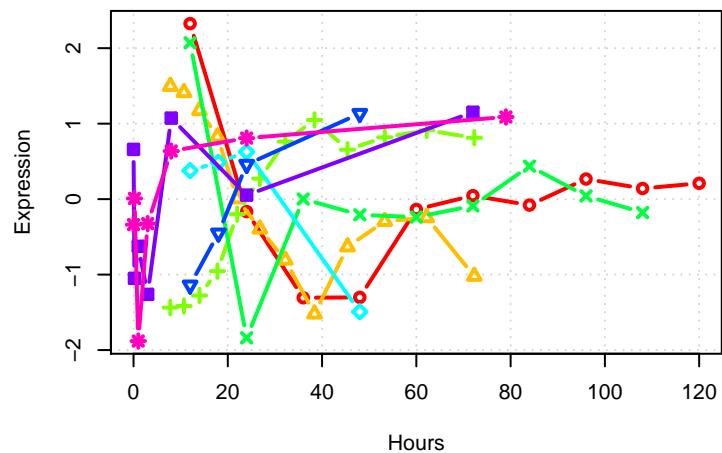
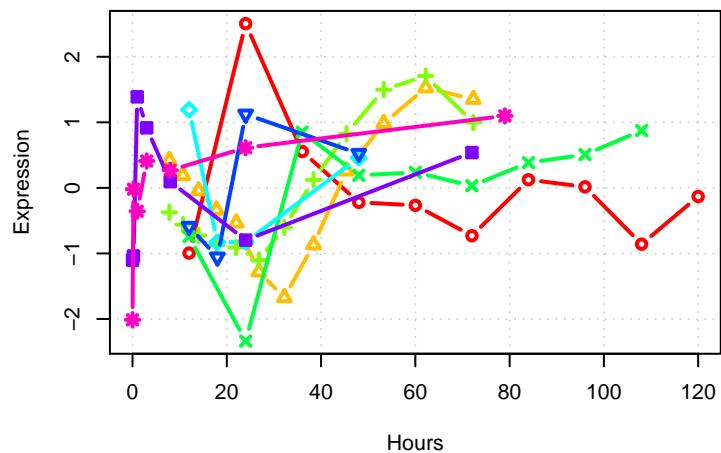
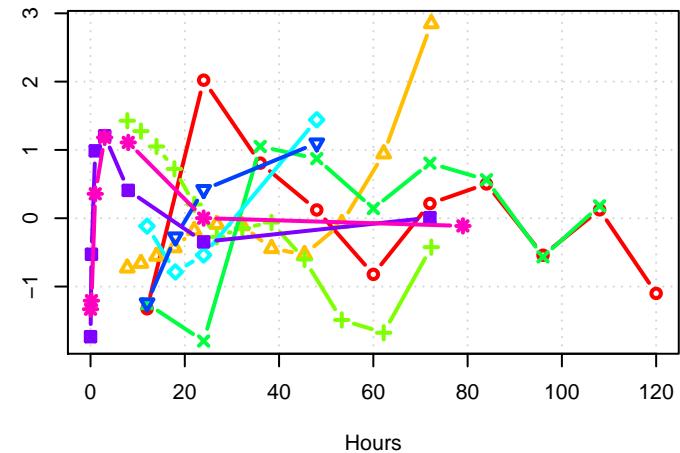
Small subunit of carbamoyl phosphate synthetase

cpa2 YJR109C

Large subunit of carbamoyl phosphate synthetase

ura2 YJL130C

Bifunctional carbamoylphosphate synthetase/aspartate transcarbamylase



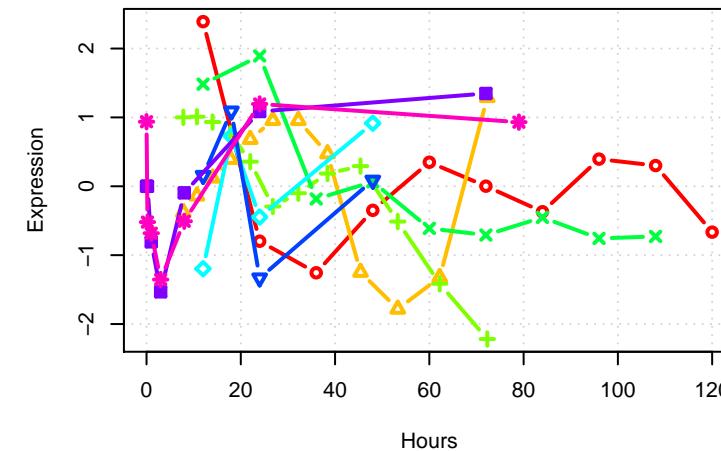
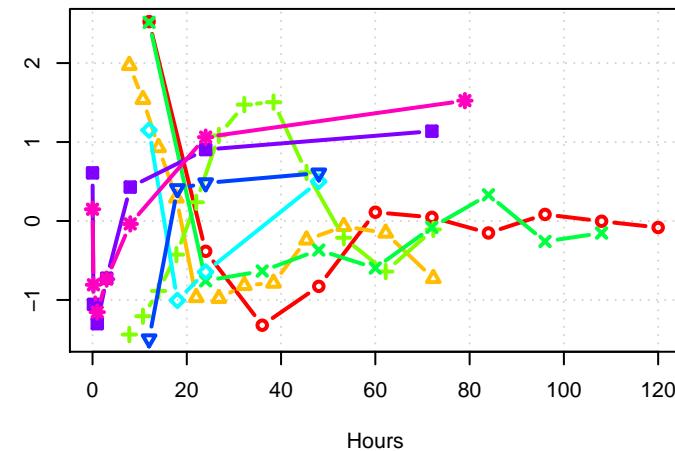
de novo biosynthesis of pyrimidine ribonucleotides

ura5 YML106W

Major orotate phosphoribosyltransferase (OPRTase) isozyme

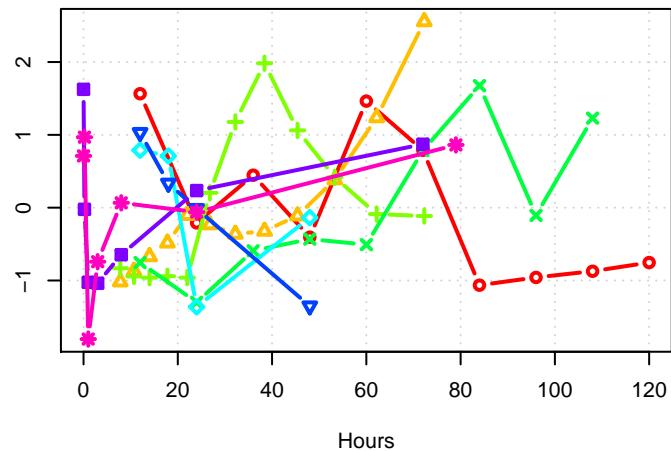
ur5 YEL021W

Orotidine-5'-phosphate (OMP) decarboxylase



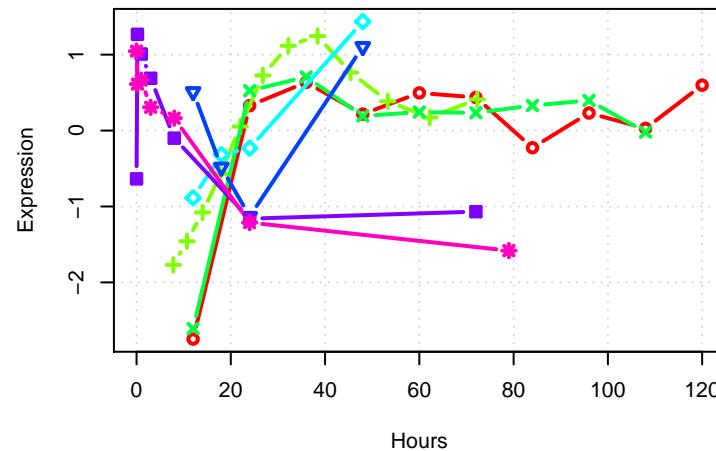
arginine degradation (anaerobic)

car1 YPL111W
Arginase, catabolizes arginine to ornithine and urea

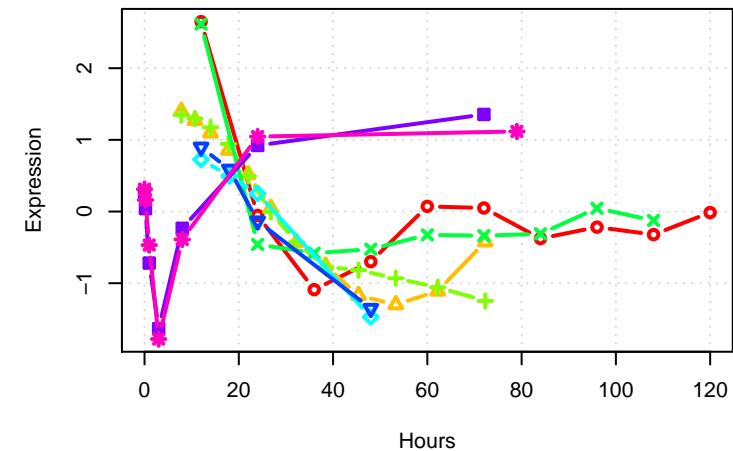


arginine degradation (anaerobic)

car2 YLR436W
L-ornithine transaminase (OTase)



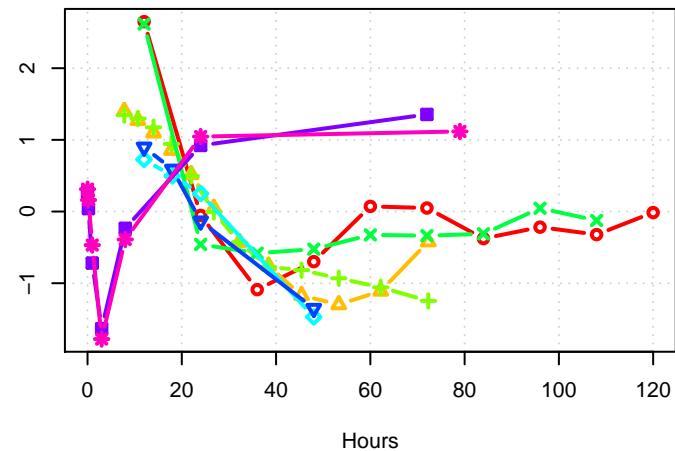
pro3 YER023W
Delta 1-pyrroline-5-carboxylate reductase



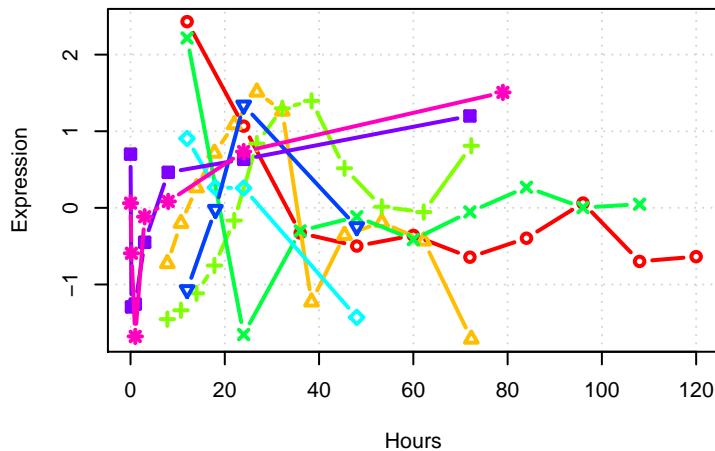
proline biosynthesis

proline biosynthesis

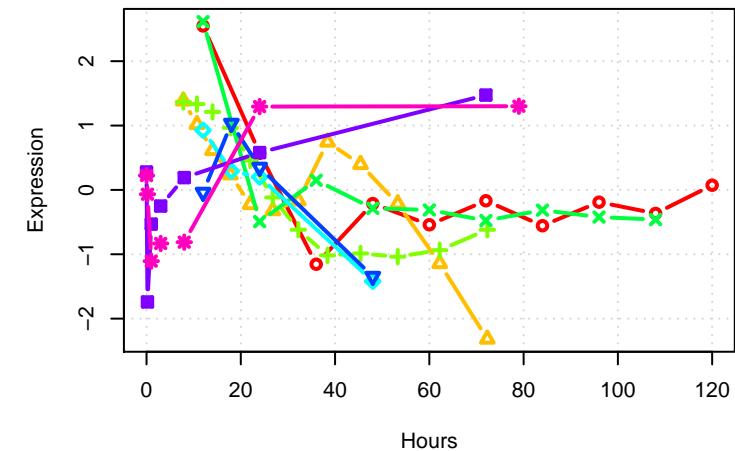
pro3 YER023W
Delta 1-pyrroline-5-carboxylate reductase



pro1 YDL300C
Gamma-glutamyl kinase

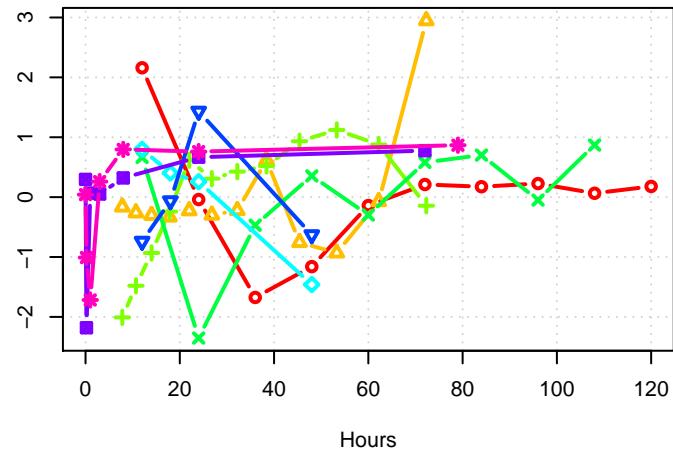


pro2 YOR323C
Gamma-glutamyl phosphate reductase



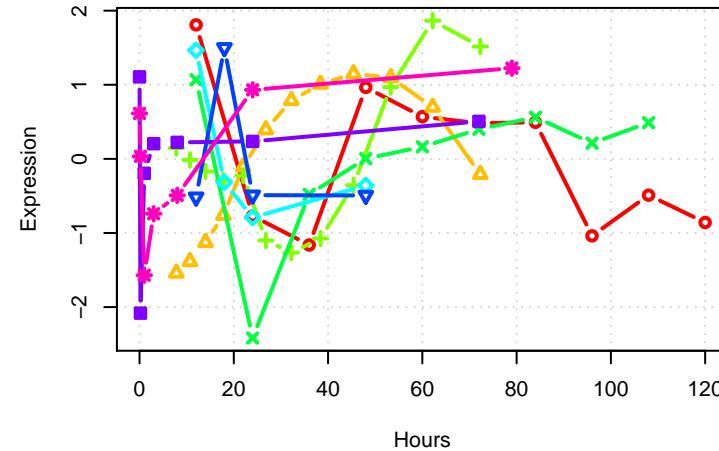
asparagine biosynthesis

asn1 YPR145W
Asparagine synthetase

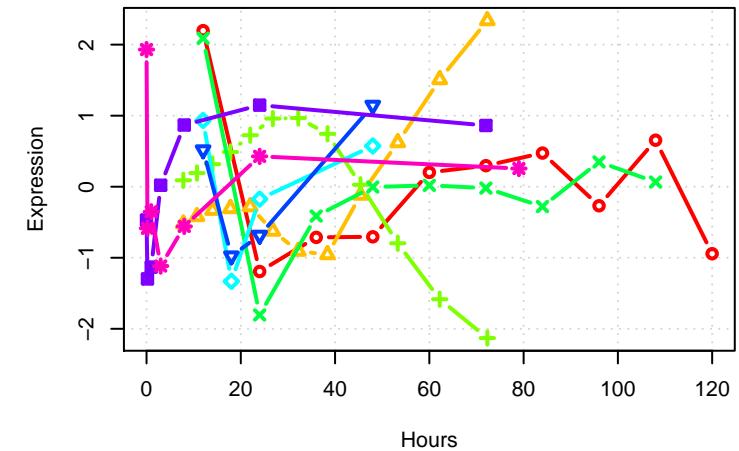


asparagine biosynthesis

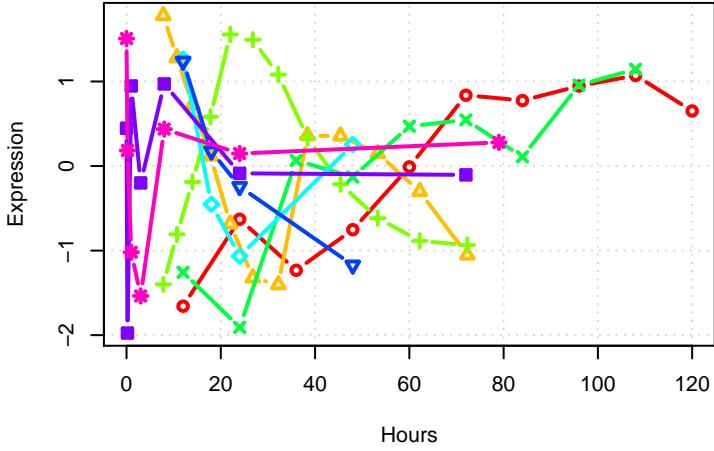
asn2 YGR124W
Asparagine synthetase



aat1 YKL106W
Mitochondrial aspartate aminotransferase

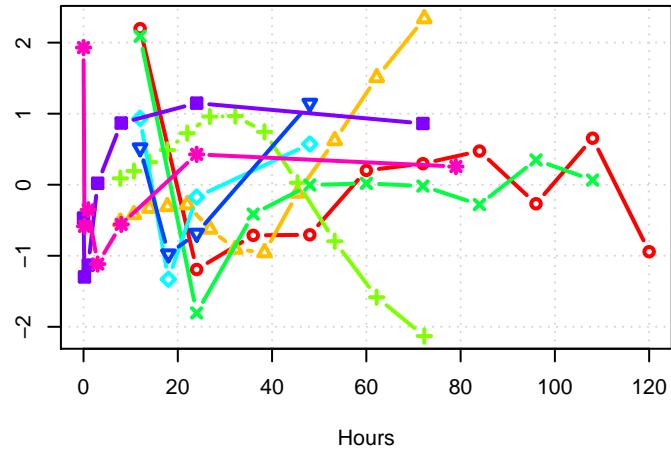


aat2 YLR027C
Cytosolic aspartate aminotransferase involved in nitrogen metabolism

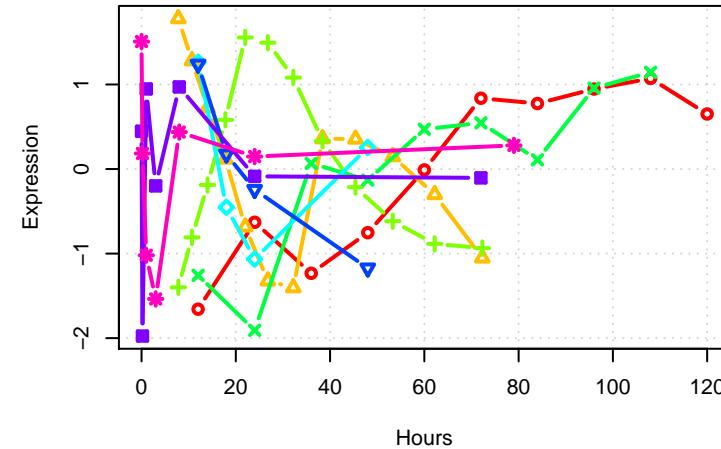


asparagine degradation

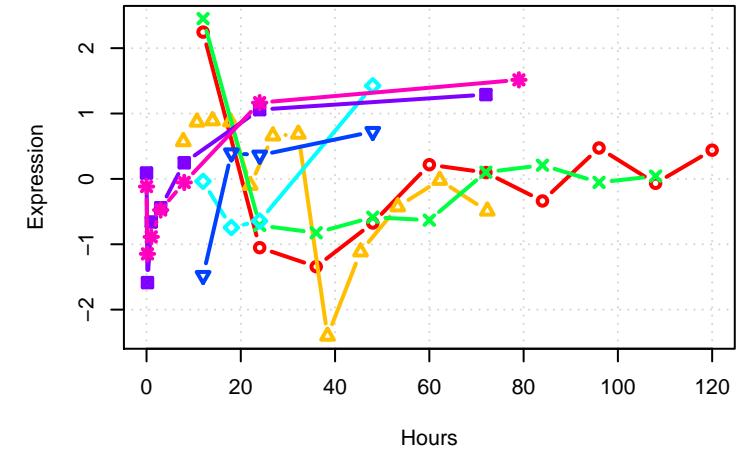
aat1 YKL106W
Mitochondrial aspartate aminotransferase



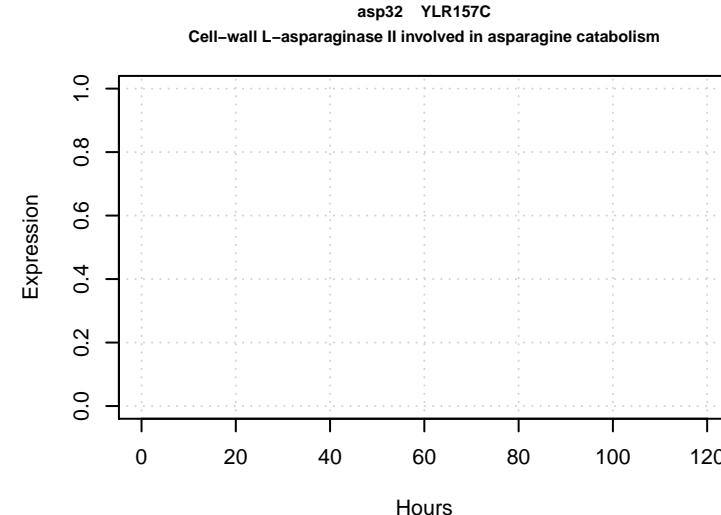
asparagine degradation
aat2 YLR027C
Cytosolic aspartate aminotransferase involved in nitrogen metabolism



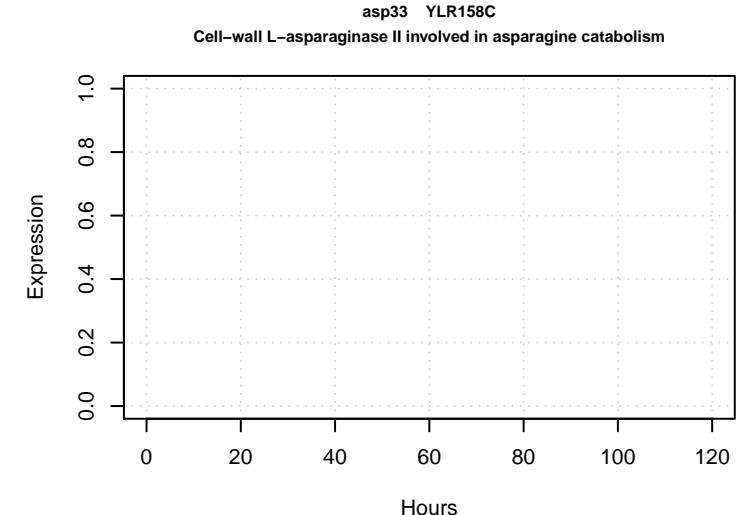
asp1 YDR321W
Cytosolic L-asparaginase, involved in asparagine catabolism



asp31 YLR155C
Cell-wall L-asparaginase II involved in asparagine catabolism



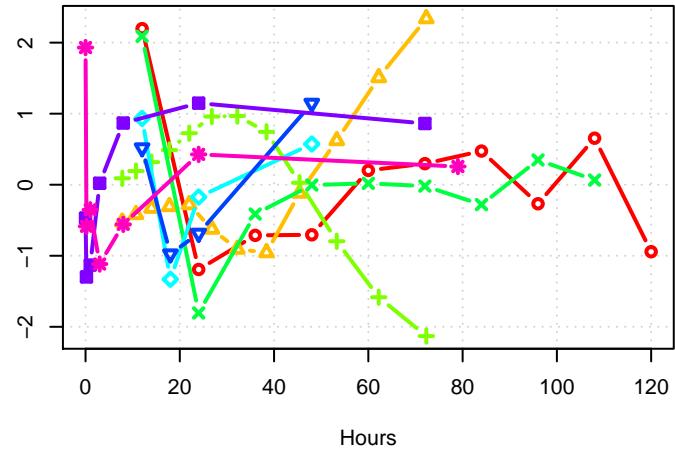
asp32 YLR157C
Cell-wall L-asparaginase II involved in asparagine catabolism



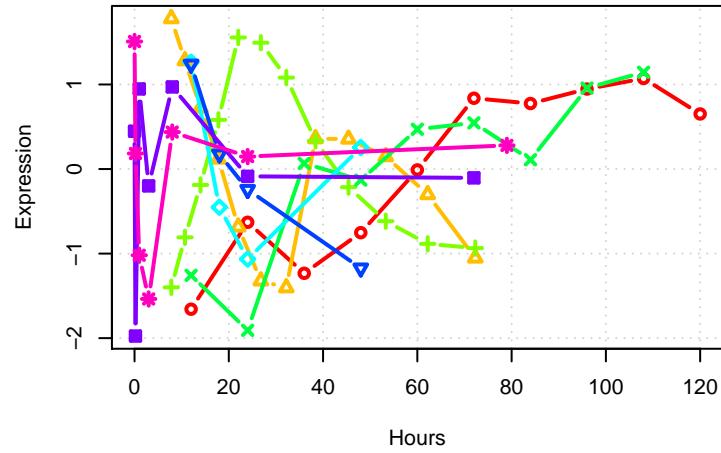
asp34 YLR160C
Cell-wall L-asparaginase II involved in asparagine catabolism

aspartate biosynthesis

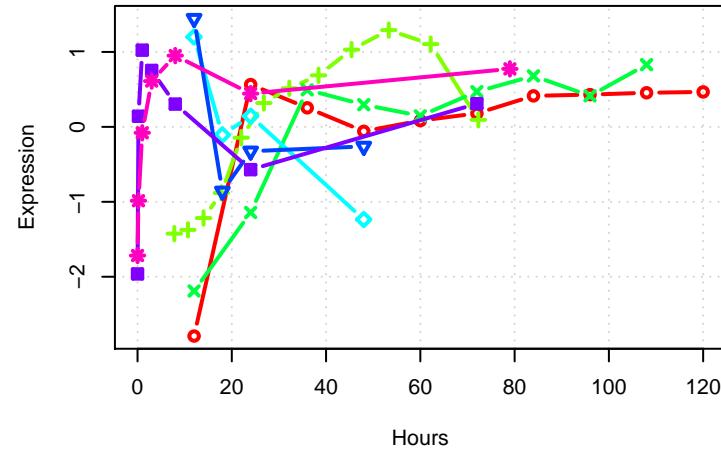
aat1 YKL106W
Mitochondrial aspartate aminotransferase



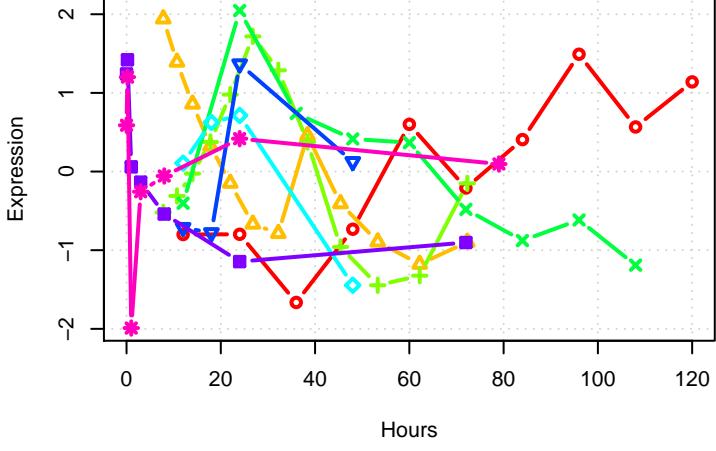
aspartate biosynthesis
aat2 YLR027C
Cytosolic aspartate aminotransferase involved in nitrogen metabolism



pyc1 YGL062W
Pyruvate carboxylase isoform

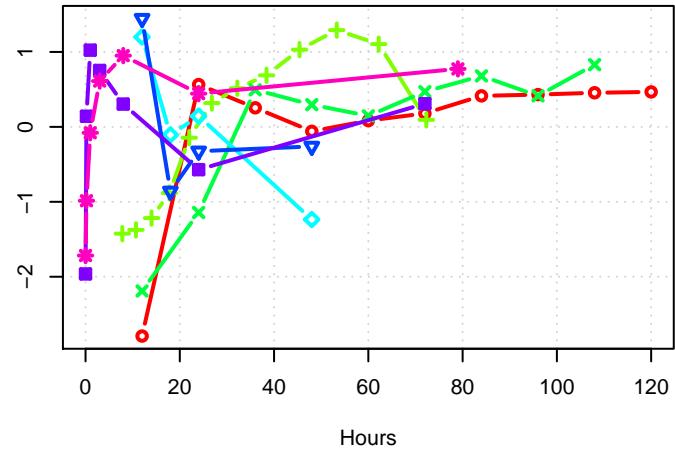


pyc2 YBR218C
Pyruvate carboxylase isoform

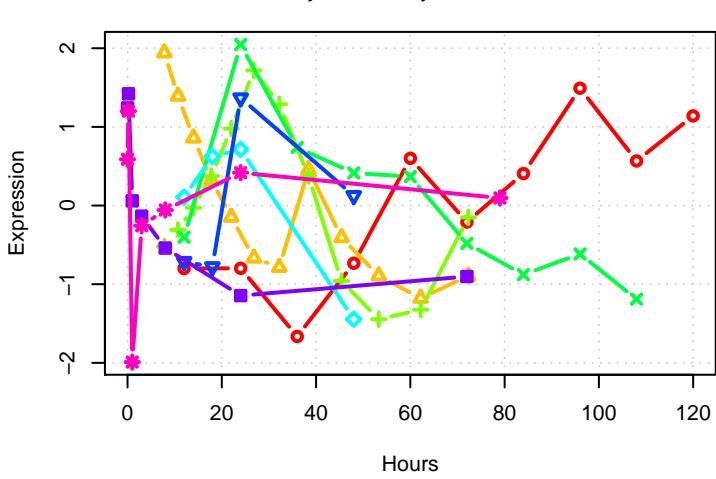


gluconeogenesis

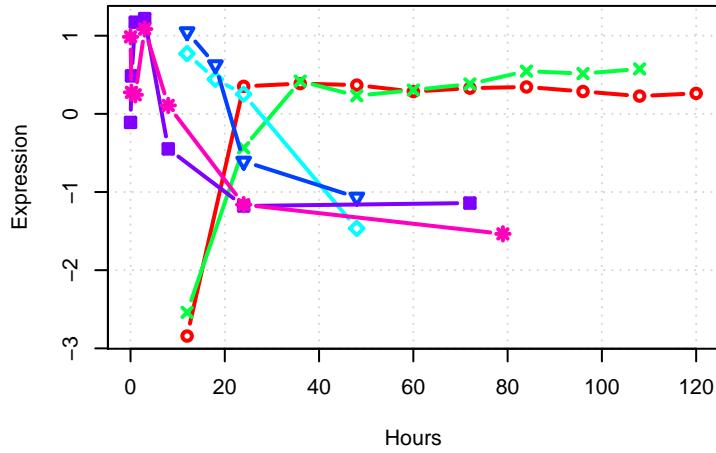
pyc1 YGL062W
Pyruvate carboxylase isoform



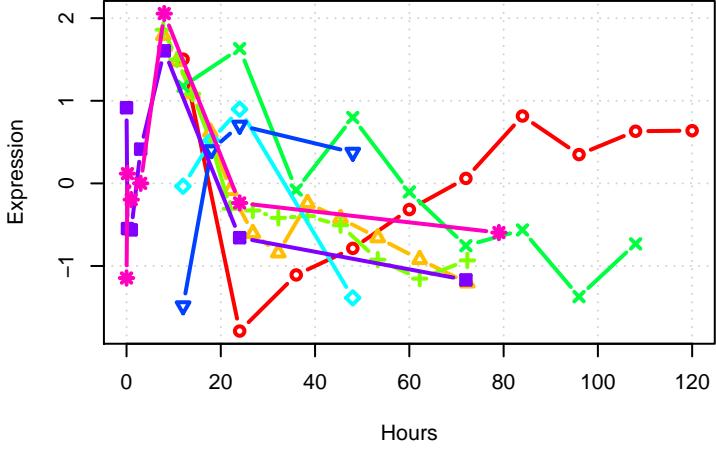
gluconeogenesis



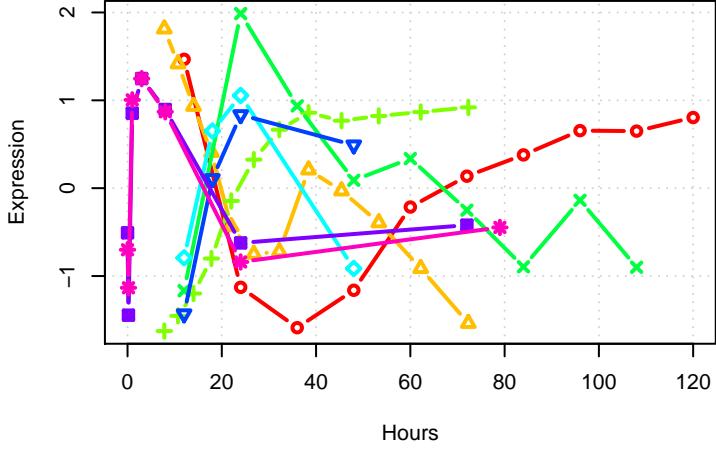
fbp1 YLR377C
Fructose-1,6-bisphosphatase



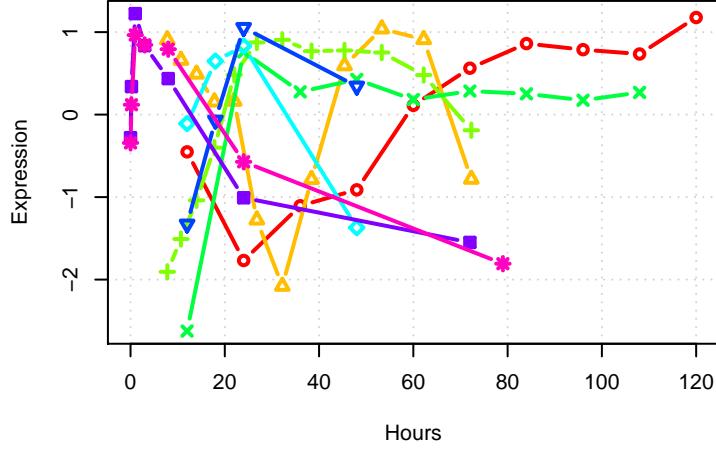
fba1 YKL060C
Fructose 1,6-bisphosphate aldolase



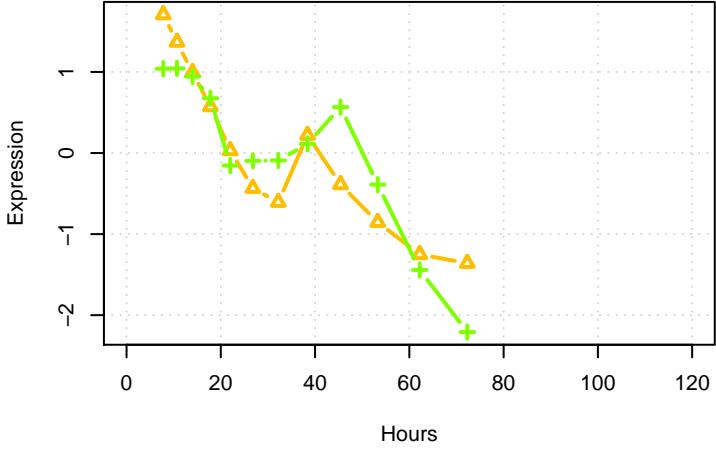
pgi1 YBR196C
Glycolytic enzyme phosphogluucose isomerase



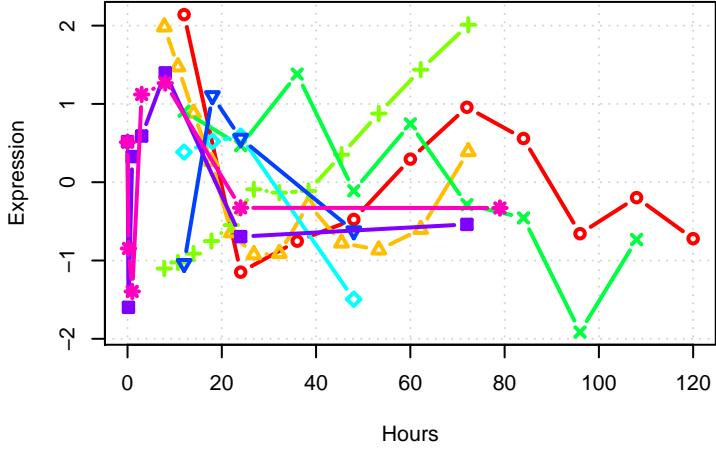
tdh1 YJL052W
Glyceraldehyde-3-phosphate dehydrogenase (GAPDH), isozyme 1



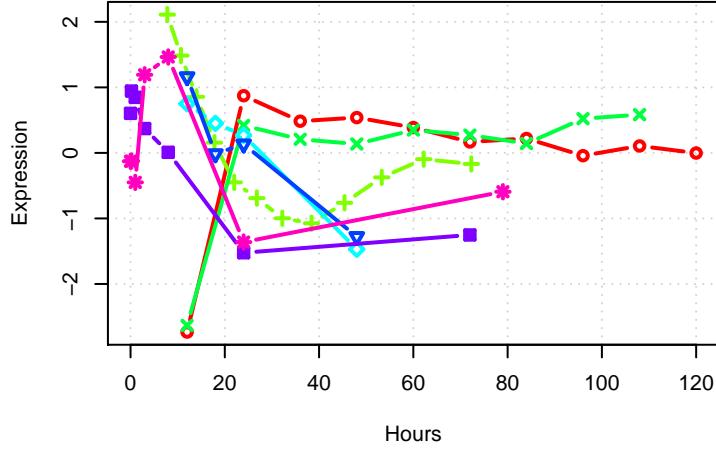
tdh2 YJR009C
Glyceraldehyde-3-phosphate dehydrogenase (GAPDH), isozyme 2



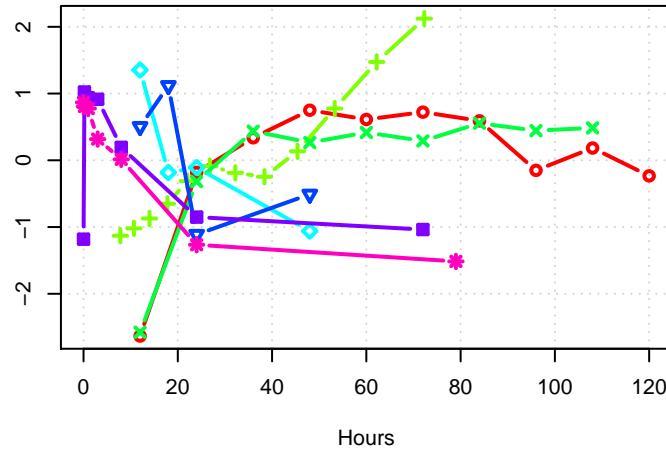
tdh3 YGR192C
Glyceraldehyde-3-phosphate dehydrogenase (GAPDH), isozyme 3



mdh1 YKL085W
Mitochondrial malate dehydrogenase

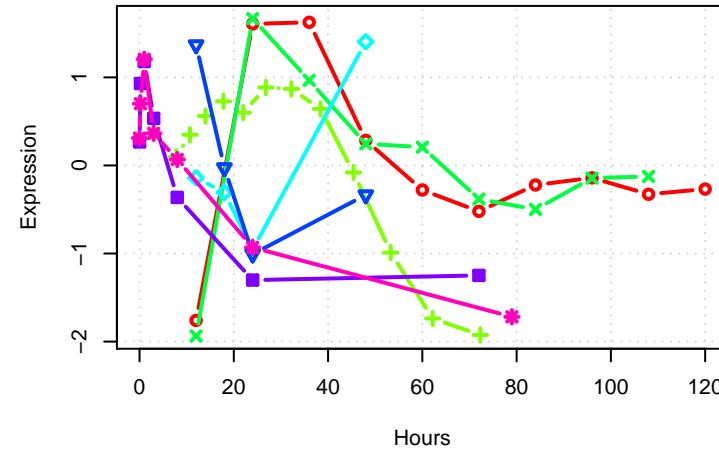


mdh2 YOL126C
Cytoplasmic malate dehydrogenase

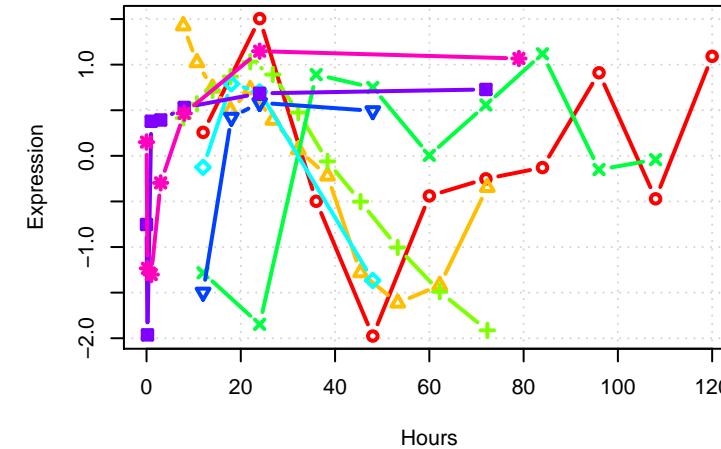


gluconeogenesis

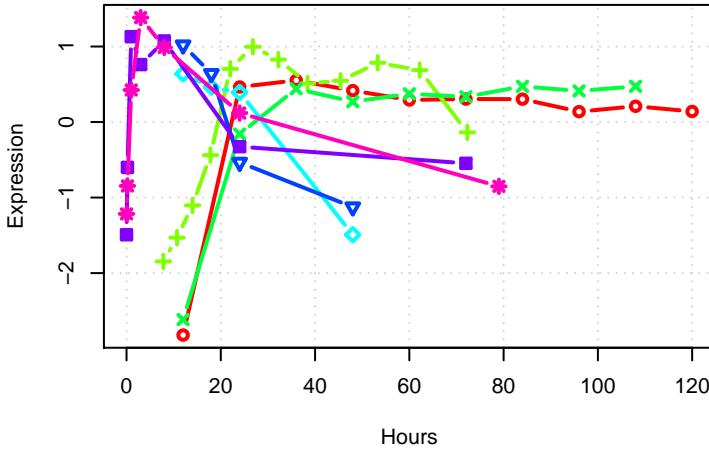
mdh3 YOL78C
Peroxisomal malate dehydrogenase



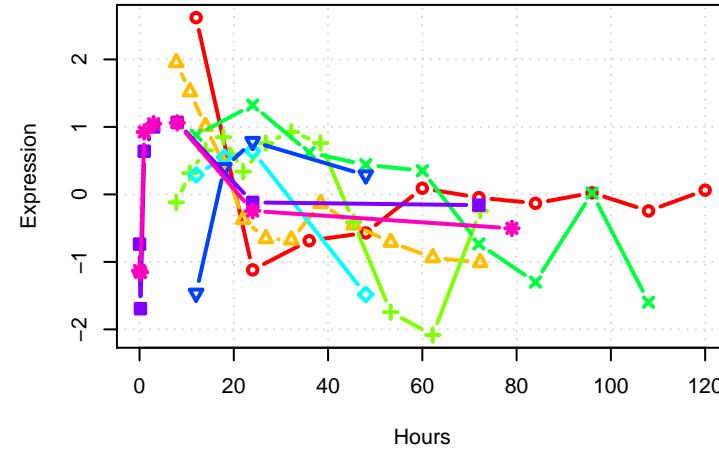
mae1 YKL029C
Mitochondrial malic enzyme



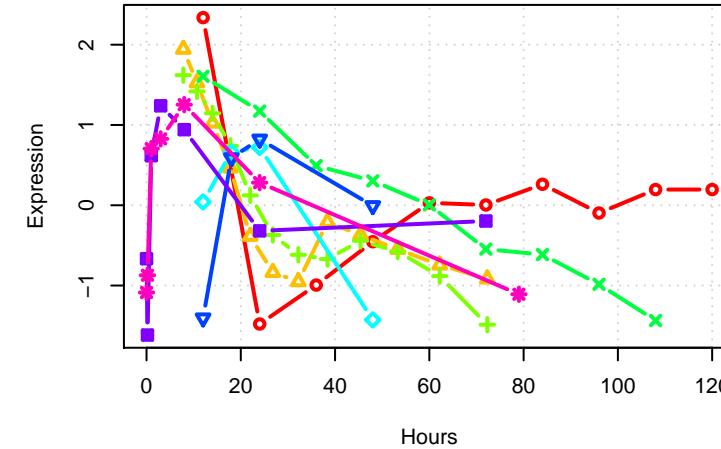
pck1 YKR097W
Phosphoenolpyruvate carboxykinase



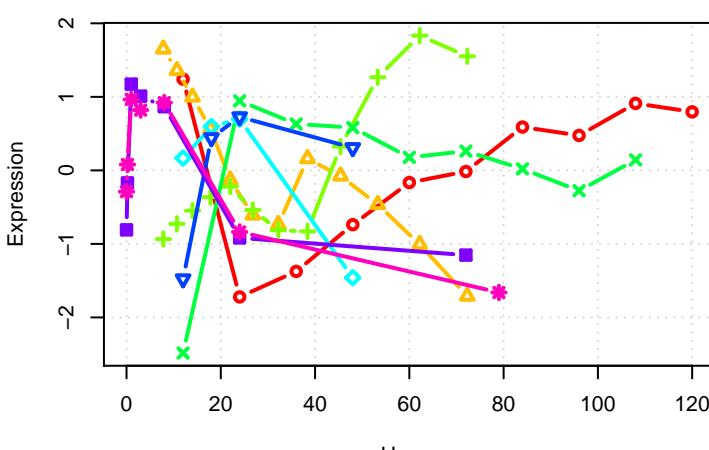
pgk1 YCR012W
3-phosphoglycerate kinase



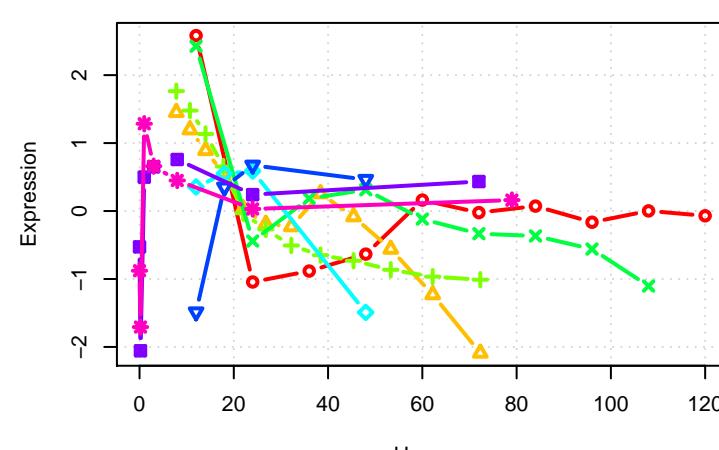
gpm1 YKL152C
Tetrameric phosphoglycerate mutase



eno1 YGR254W
Enolase I, a phosphopyruvate hydratase



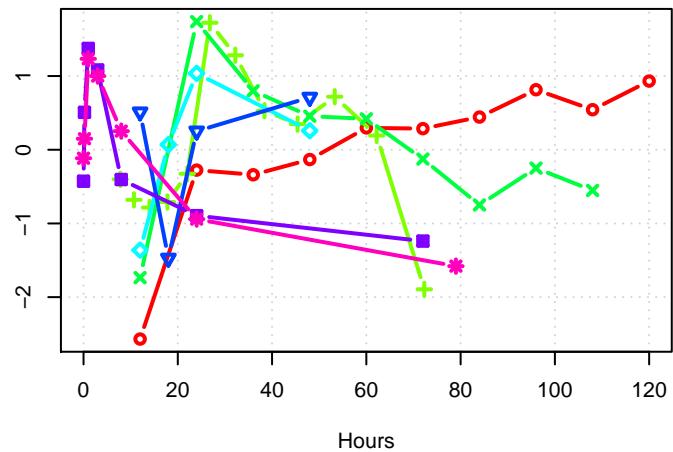
eno2 YHR174W
Enolase II, a phosphopyruvate hydratase



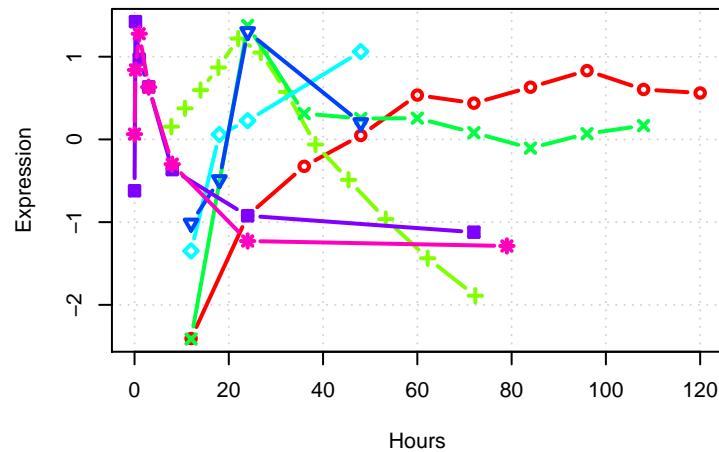
beta-alanine biosynthesis

beta-alanine biosynthesis

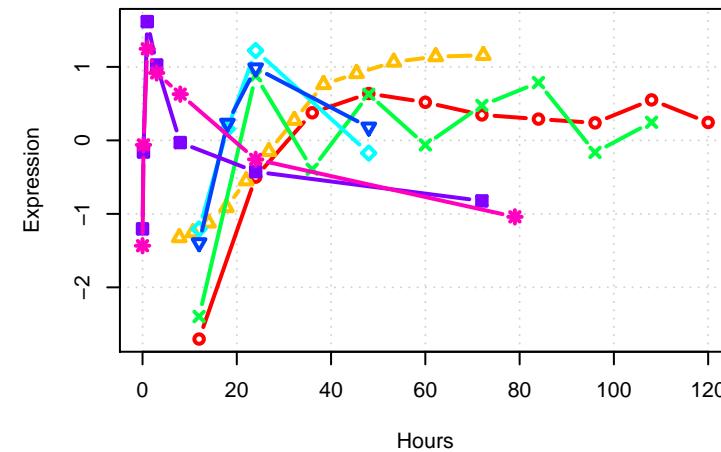
ald2 YMR170C
Cytoplasmic aldehyde dehydrogenase



ald3 YMR169C
Cytoplasmic aldehyde dehydrogenase

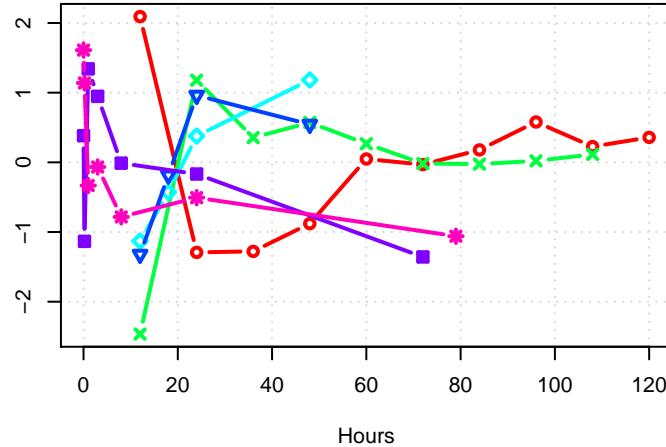


fms1 YMR020W
Polyamine oxidase



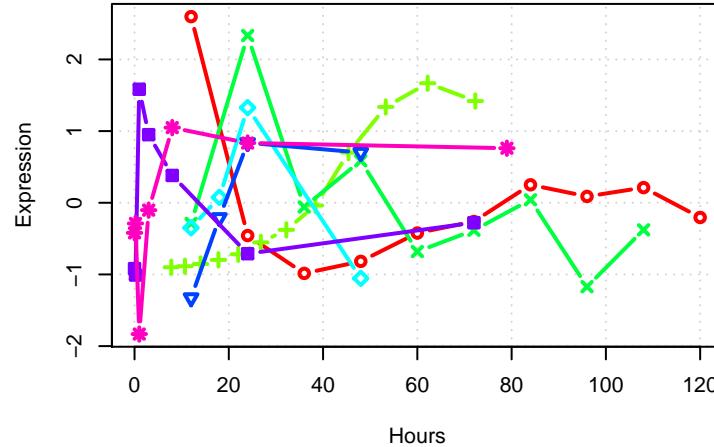
biotin biosynthesis

bio3 YNR058W
7,8-diamino-pelargonic acid aminotransferase (DAPA)

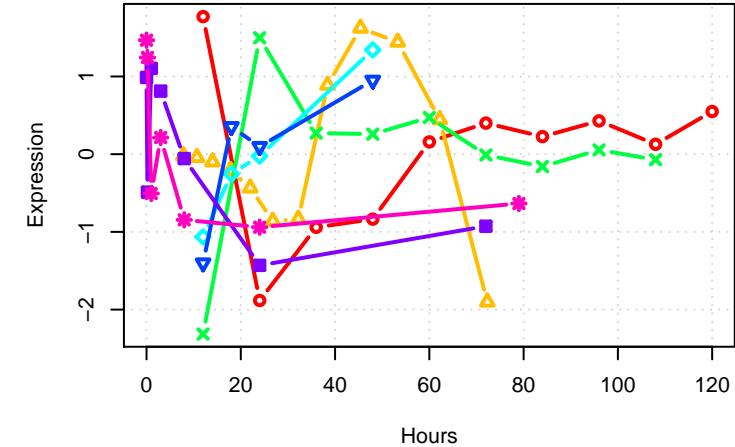


biotin biosynthesis

bio2 YGR286C
Biotin synthase

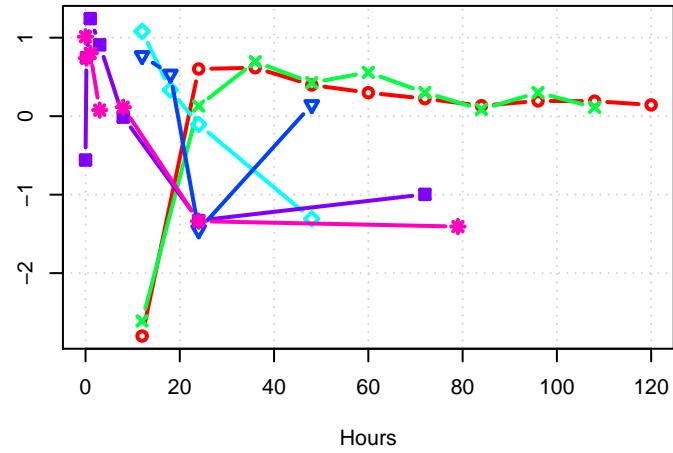


bio4 YNR057C
Dethiobiotin synthetase

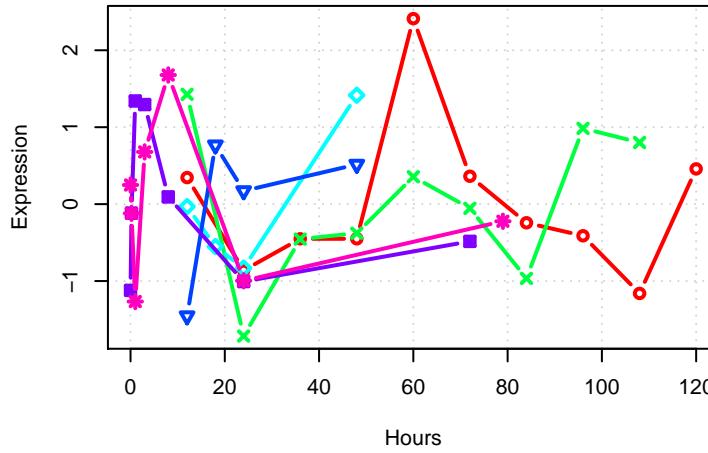


carnitine shuttle

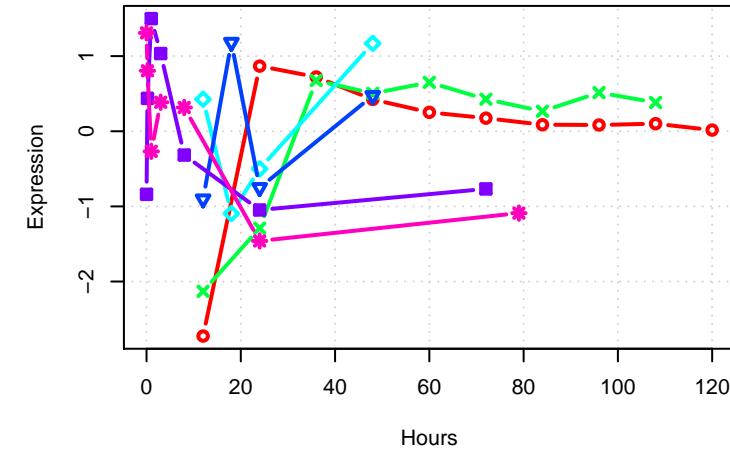
cat2 YML042W
Carnitine acetyl-CoA transferase



carnitine shuttle
yat1 YAR035W
Outer mitochondrial carnitine acetyltransferase



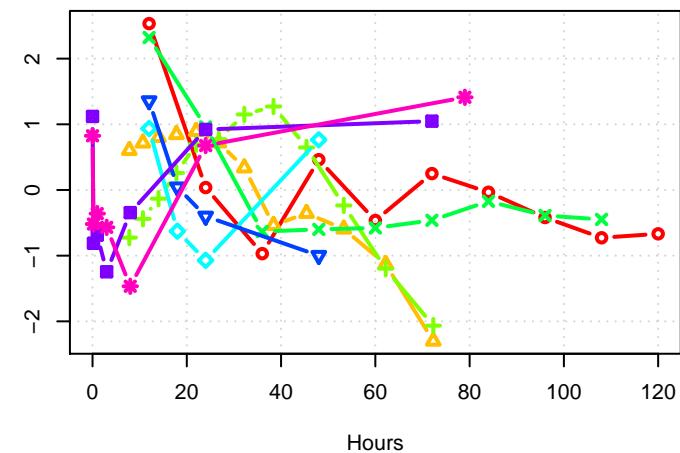
yat2 YER024W
Carnitine acetyltransferase



CDP–diacylglycerol biosynthesis

CDP-diacylglycerol biosynthesis

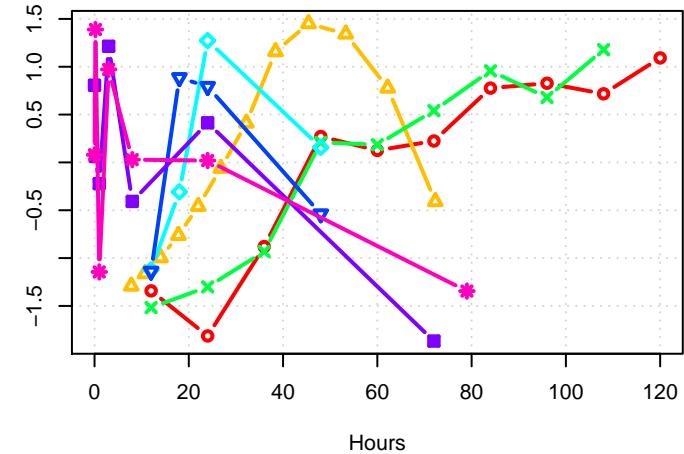
cds1 YBR029C
Phosphatidate cytidylyltransferase (CDP-diglyceride synthetase)



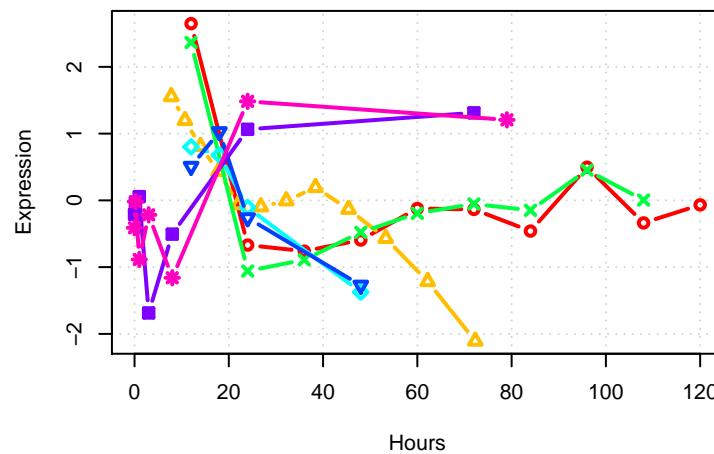
chitin biosynthesis

chitin biosynthesis

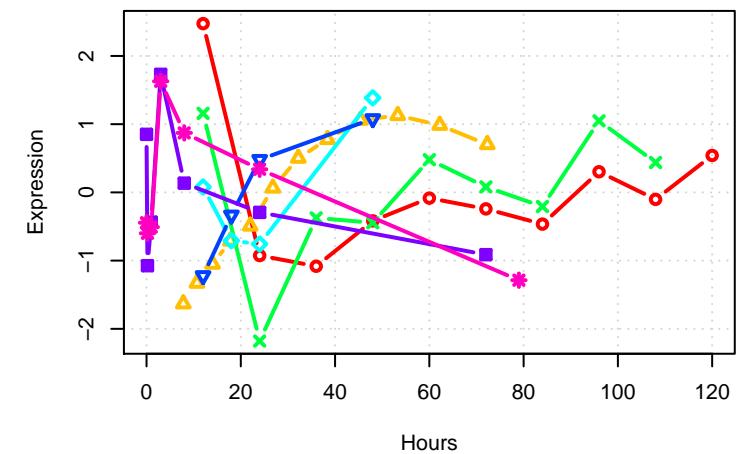
chs1 YNL192W
Chitin synthase I



chs2 YLR038W
Chitin synthase II

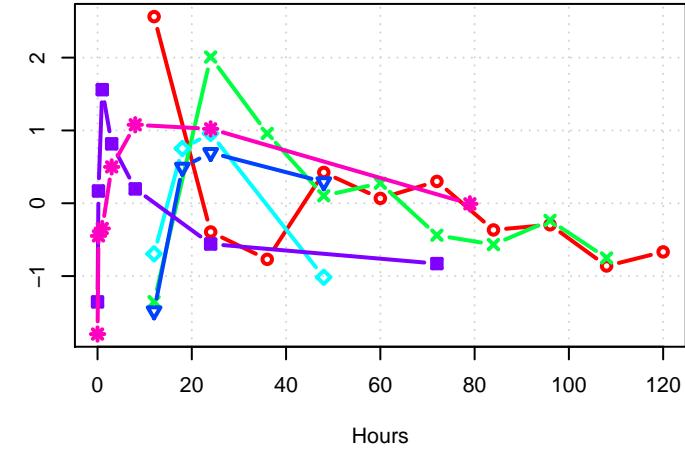


chs3 YBR023C
Chitin synthase III



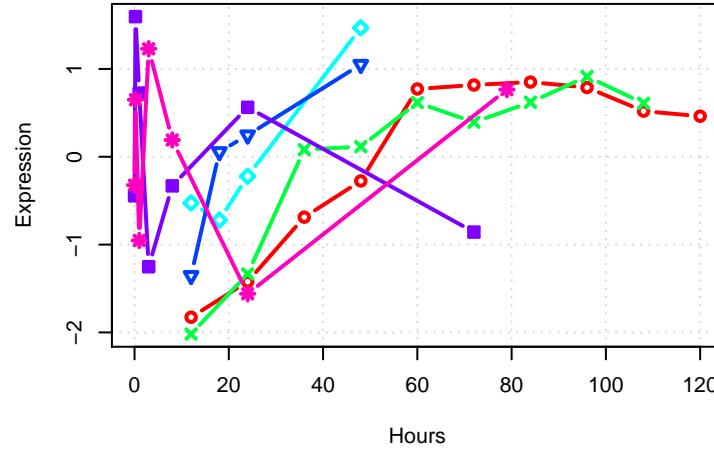
chitosan biosynthesis

cda1 YLR307W
Chitin deacetylase



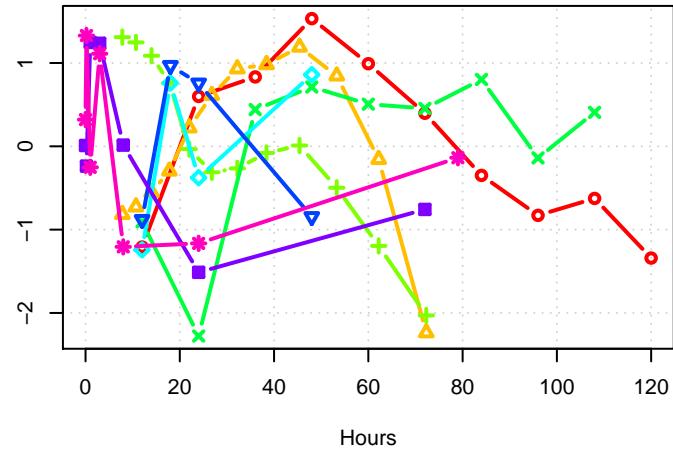
chitosan biosynthesis

cda2 YLR308W
Chitin deacetylase

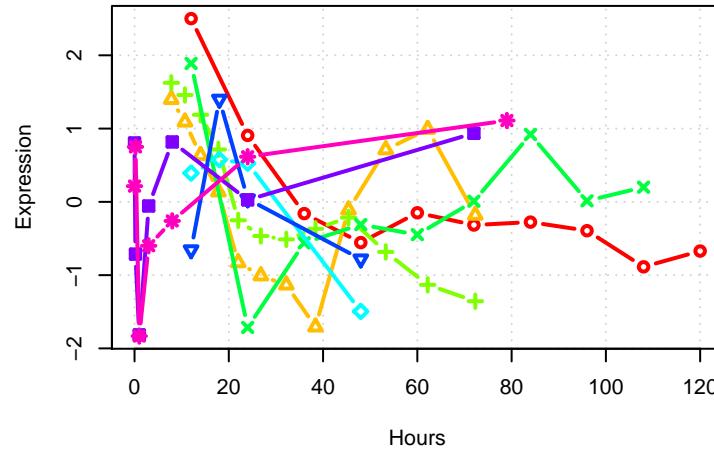


chorismate biosynthesis

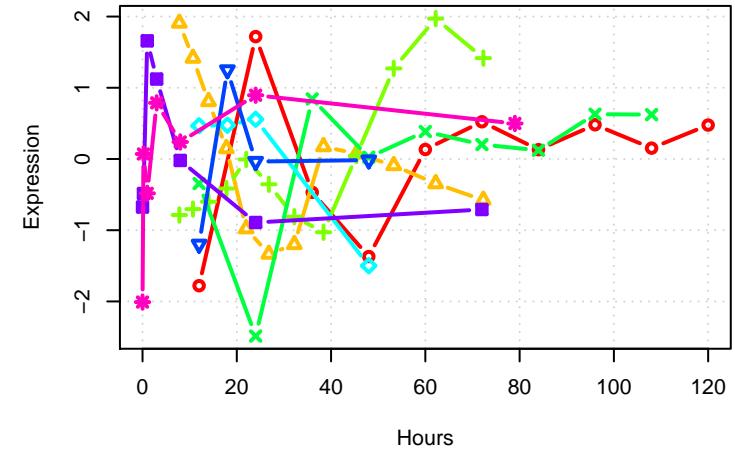
aro3 YDR035W
3-deoxy-D-arabino-heptulosonate-7-phosphate (DAHP) synthase



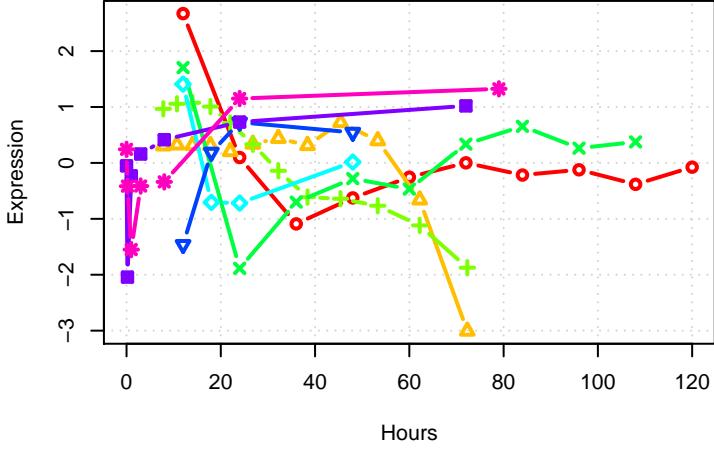
chorismate biosynthesis
aro4 YBR243C
3-deoxy-D-arabino-heptulosonate-7-phosphate (DAHP) synthase



aro1 YDR127W
Pentafunctional arom protein



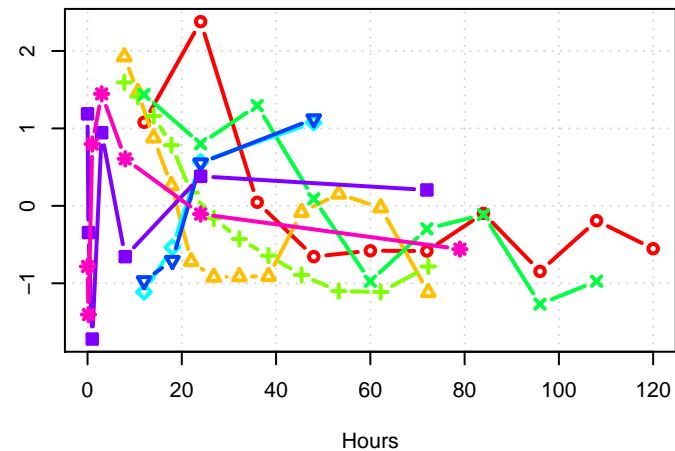
aro2 YGL148W
Bifunctional chorismate synthase and flavin reductase



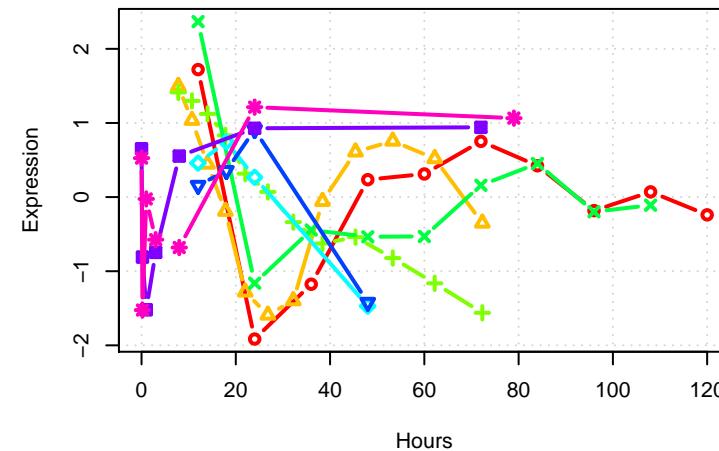
cysteine biosynthesis from homocysteine

cysteine biosynthesis from homocysteine

cys4 YGR155W
Cystathione beta-synthase



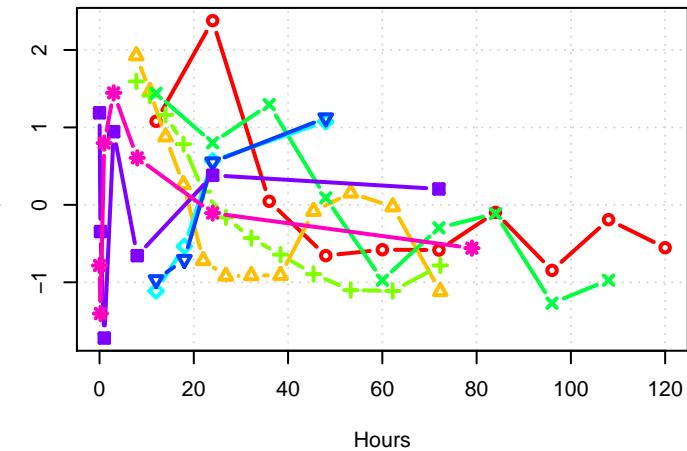
cys3 YAL012W
Cystathione gamma-lyase



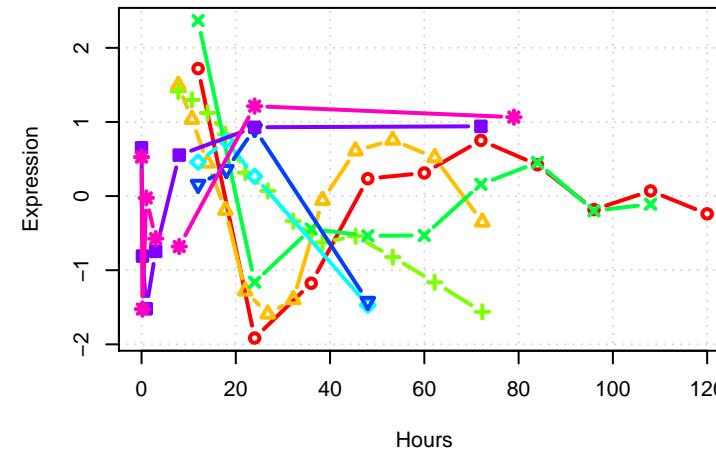
cysteine biosynthesis/homocysteine degradation

cys4 YGR155W
Cystathione beta-synthase

cysteine biosynthesis/homocysteine degradation

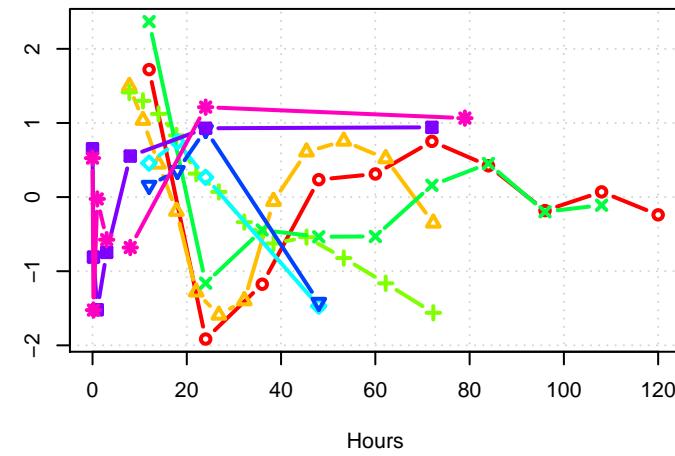


cys5 YAL012W
Cystathione gamma-lyase

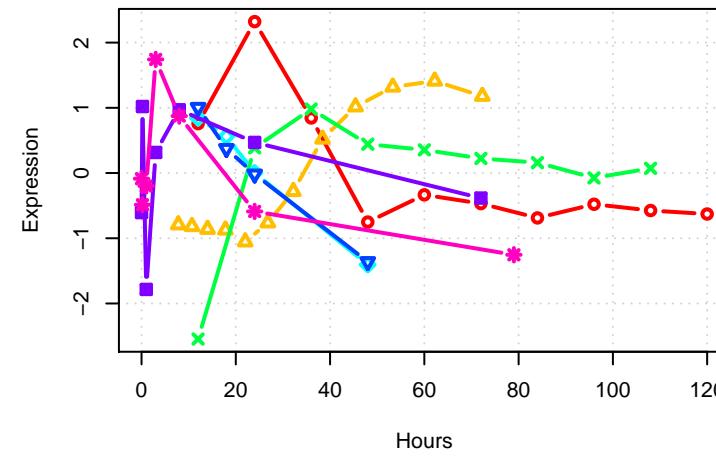


threonine degradation

cys3 YAL012W
Cystathionine gamma-lyase



threonine degradation
char YGL064C
Catabolic L-serine (L-threonine) deaminase

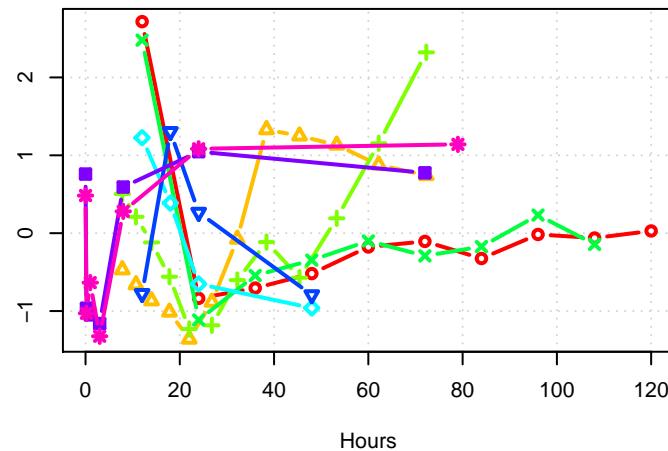


de novo biosynthesis of purine nucleotides

de novo biosynthesis of purine nucleotides

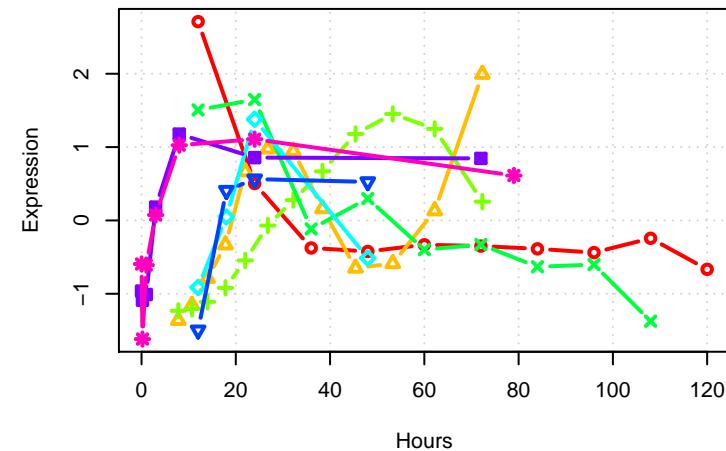
rnr1 YER070W

Major isoform of large subunit of ribonucleotide-diphosphate reductase



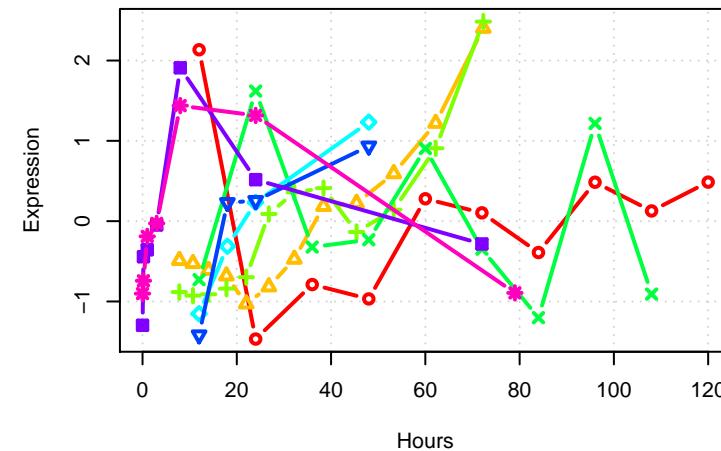
bioRxiv preprint doi: <https://doi.org/10.1101/2023.09.11.570000>; this version posted September 11, 2023. The copyright holder for this preprint (which was not certified by peer review) is the author/funder, who has granted bioRxiv a license to display the preprint in perpetuity. It is made available under a [CC-BY-ND 4.0 International license](https://creativecommons.org/licenses/by-nd/4.0/).

Ribonucleotide-diphosphate reductase (RNR), small subunit



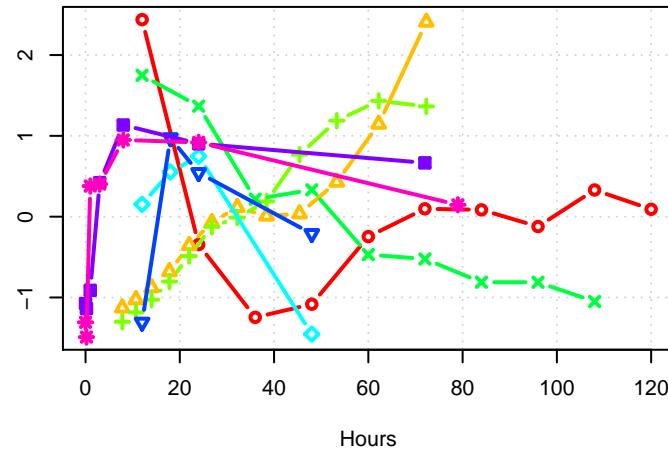
rnr3 YIL066C

Minor isoform of large subunit of ribonucleotide-diphosphate reductase



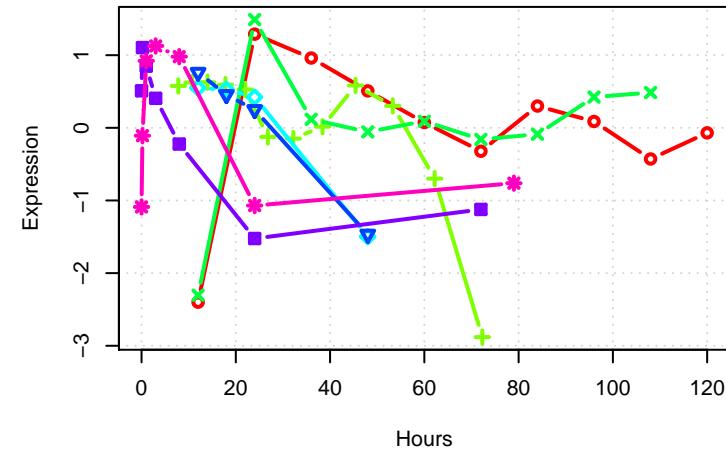
rnr4 YGR180C

Ribonucleotide-diphosphate reductase (RNR) small subunit



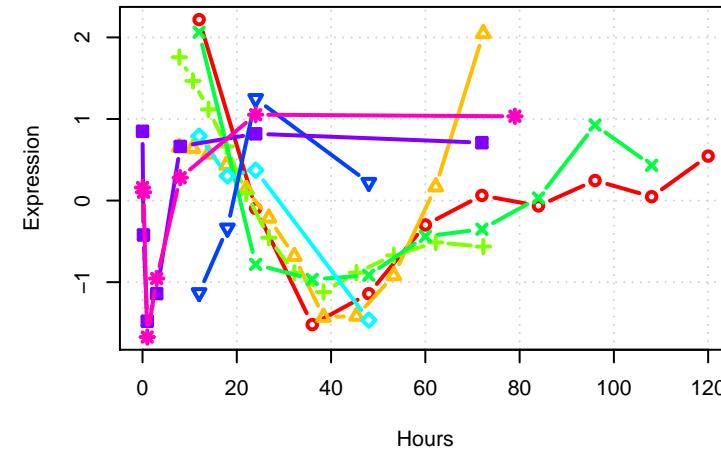
ynk1 YKL067W

Nucleoside diphosphate kinase



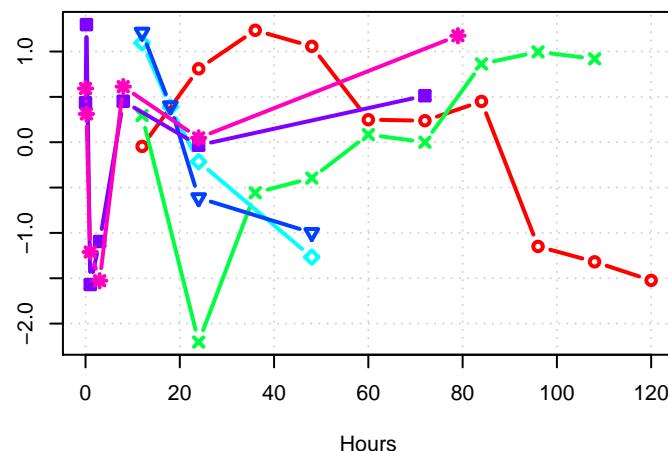
adk1 YDR226W

Adenylate kinase, required for purine metabolism



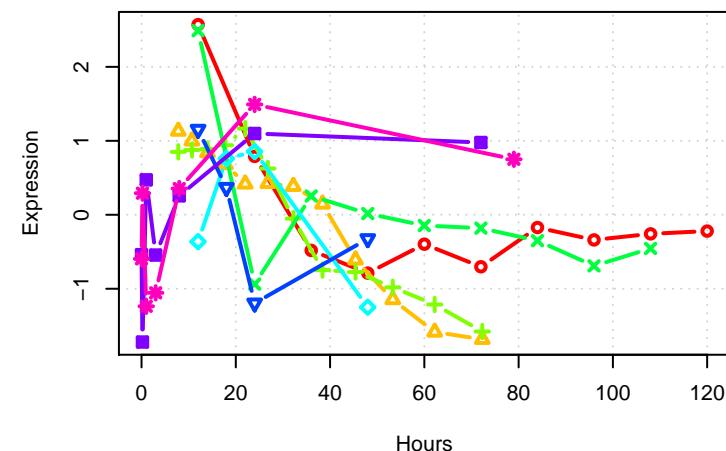
adk2 YER170W

Mitochondrial adenylate kinase



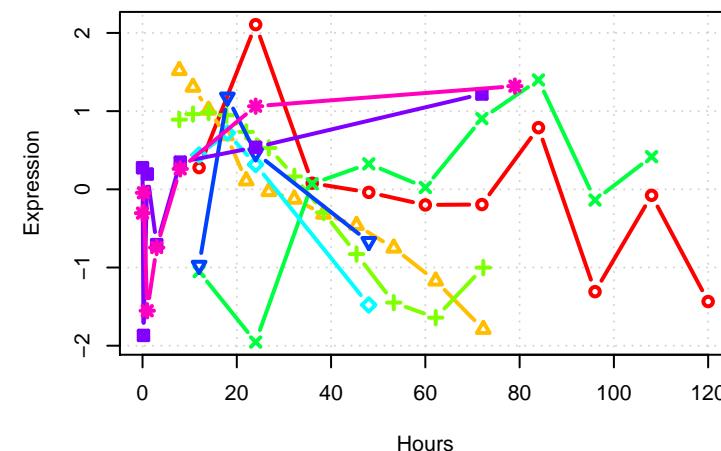
ade13 YLR359W

Adenylosuccinate Lyase



ade12 YNL220W

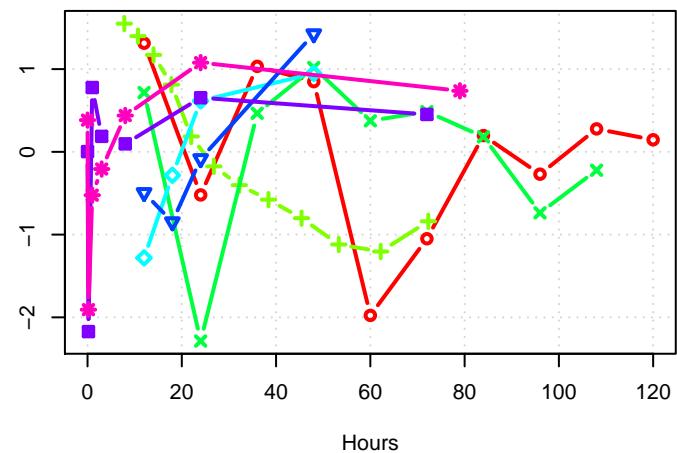
Adenylosuccinate synthase



de novo biosynthesis of purine nucleotides

ade4 YMR300C

Phosphoribosylpyrophosphate amidotransferase (PRPPAT)



gua1 YMR217W

GMP synthase

guk1

YDR454C

Guanylate kinase

imd2

YHR216W

Inosine monophosphate dehydrogenase

imd3

YLR432W

Inosine monophosphate dehydrogenase

imd4

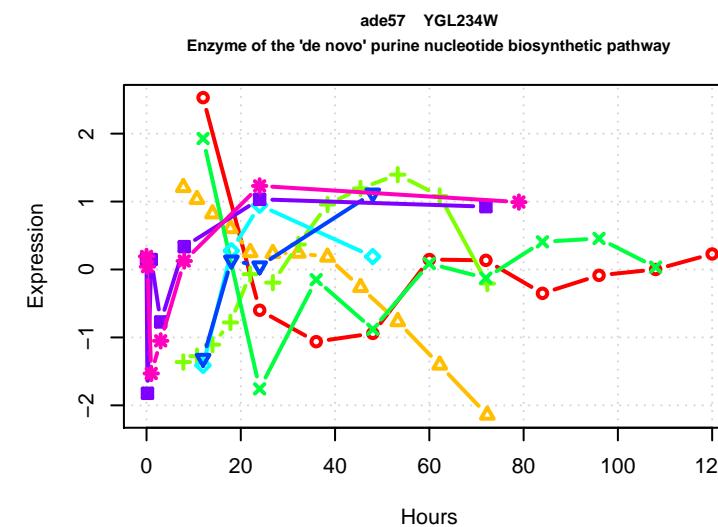
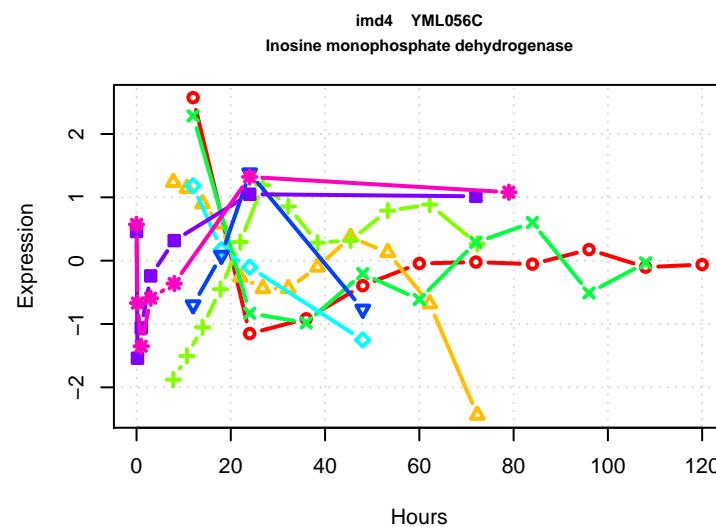
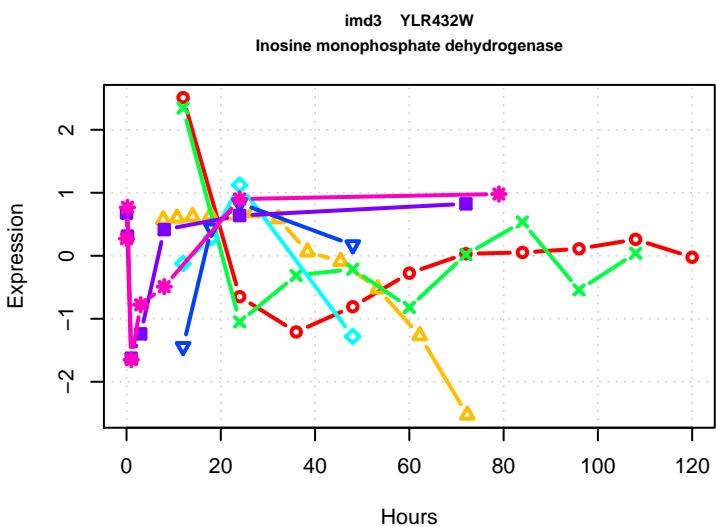
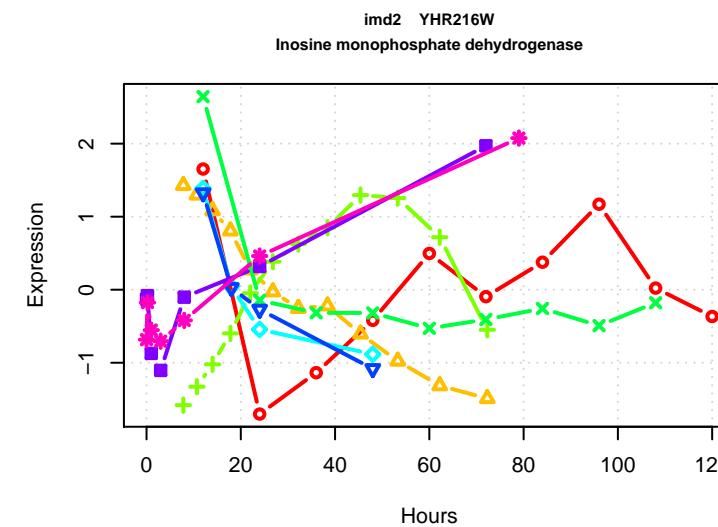
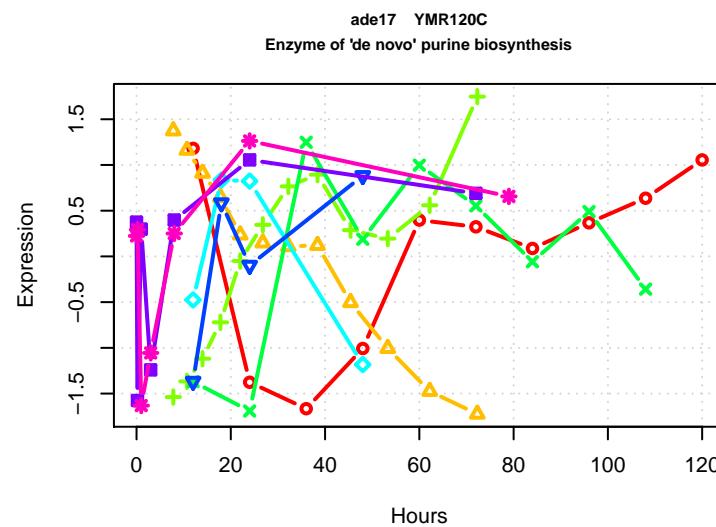
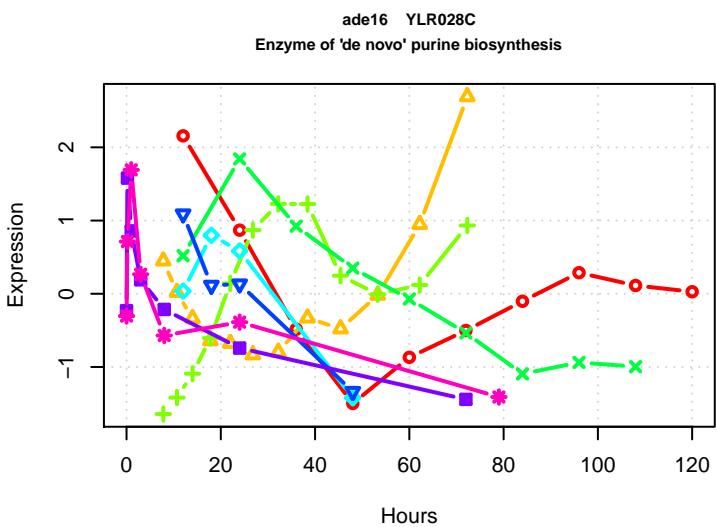
YML056C

Inosine monophosphate dehydrogenase

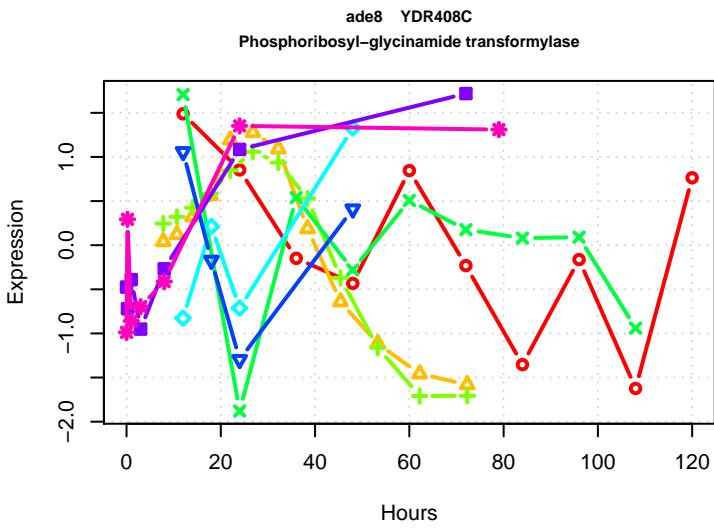
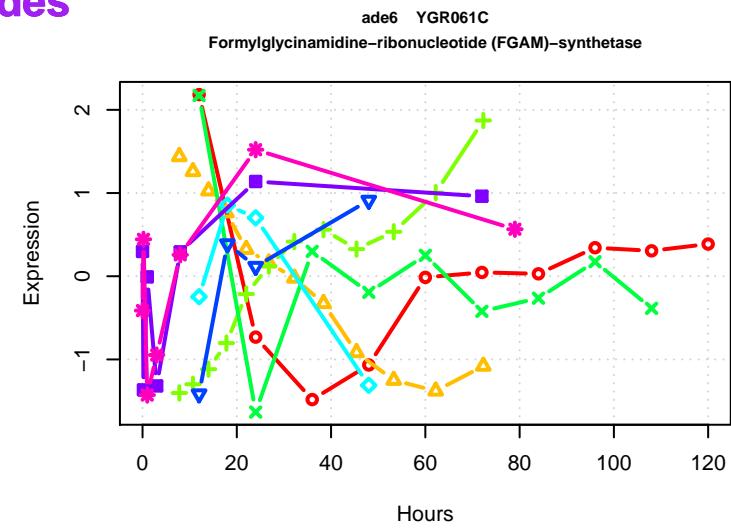
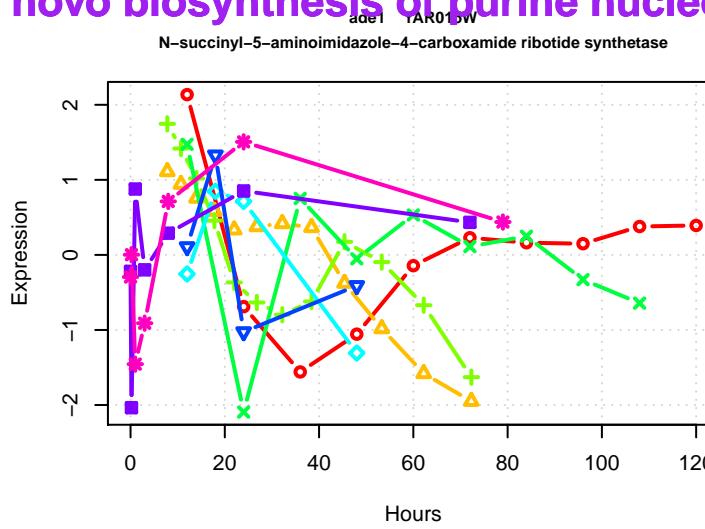
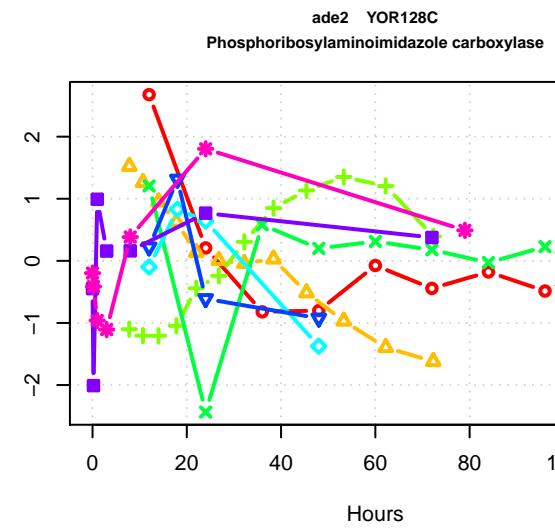
ade57

YGL234W

Enzyme of the 'de novo' purine nucleotide biosynthetic pathway



de novo biosynthesis of purine nucleotides

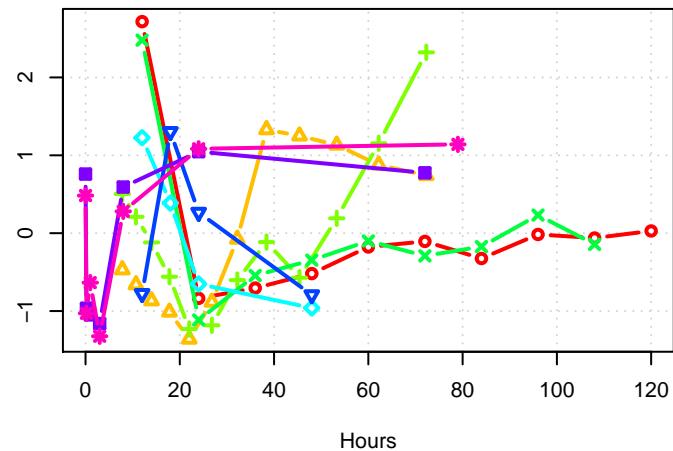


de novo biosynthesis of pyrimidine deoxyribonucleotides

de novo biosynthesis of pyrimidine deoxyribonucleotides

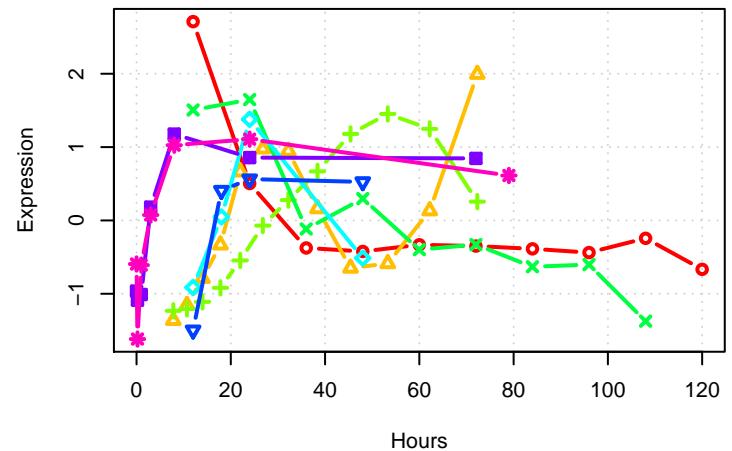
rnr1 YER070W

Major isoform of large subunit of ribonucleotide-diphosphate reductase



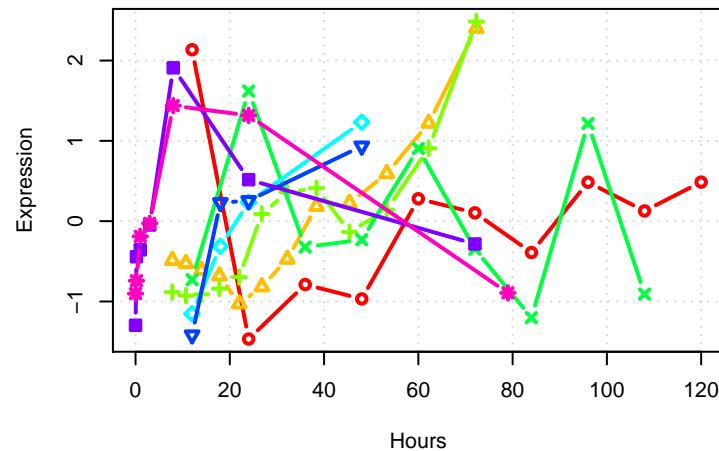
rnr2 YJL026W

Ribonucleotide-diphosphate reductase (RNR), small subunit



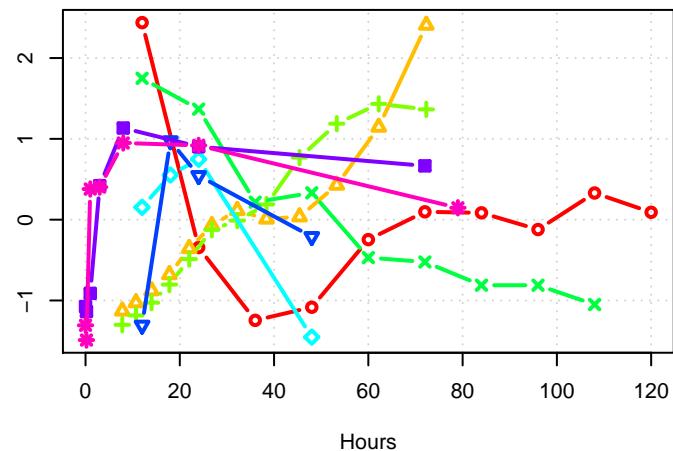
rnr3 YIL066C

Minor isoform of large subunit of ribonucleotide-diphosphate reductase



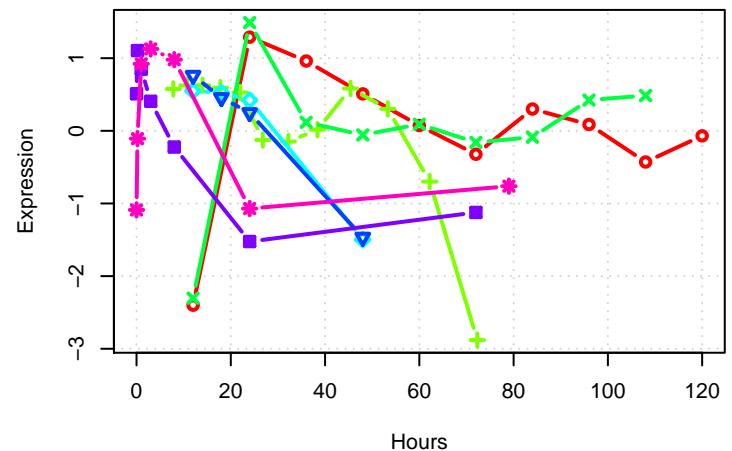
rnr4 YGR180C

Ribonucleotide-diphosphate reductase (RNR) small subunit



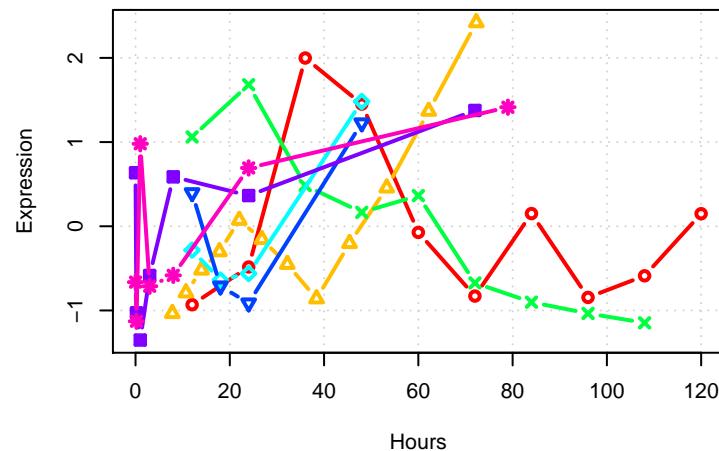
ynk1 YKL067W

Nucleoside diphosphate kinase



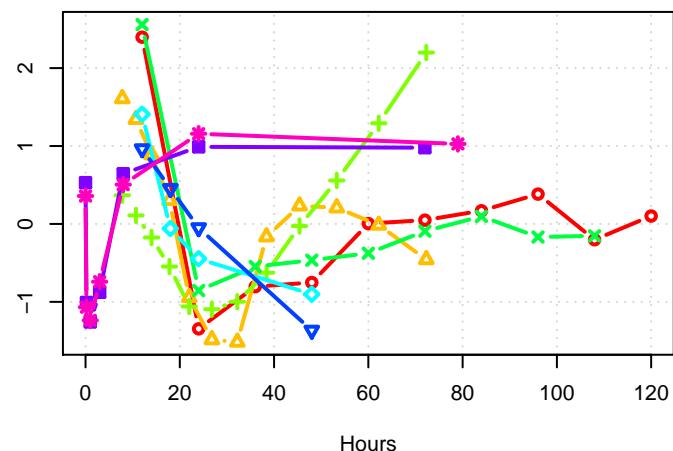
cdc8 YJR057W

Thymidylate and uridylate kinase



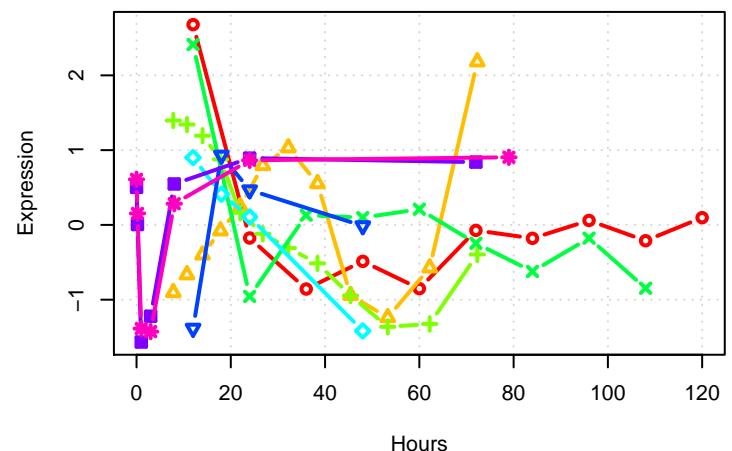
dut1 YBR252W

Deoxyuridine triphosphate diphosphatase (dUTPase)



cdc21 YOR074C

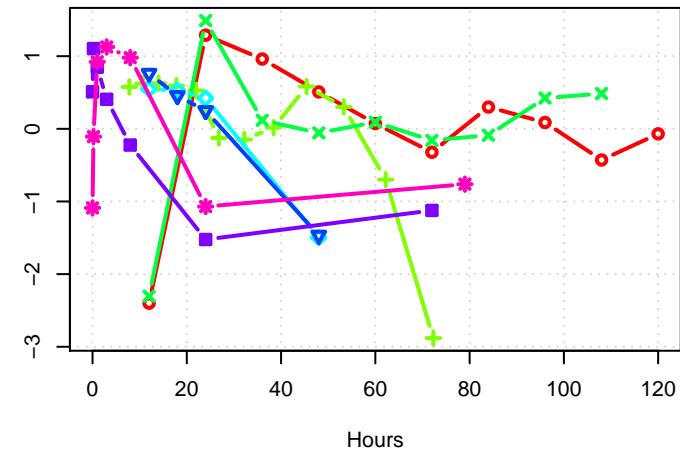
Thymidylate synthase



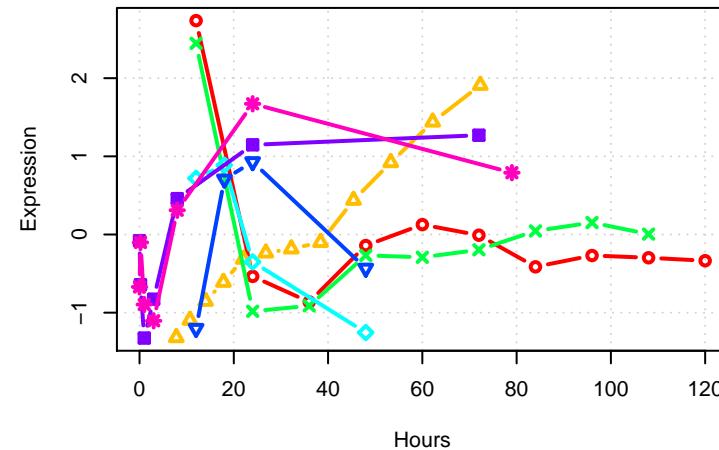
salvage pathways of pyrimidine ribonucleotides

salvage pathways of pyrimidine ribonucleotides

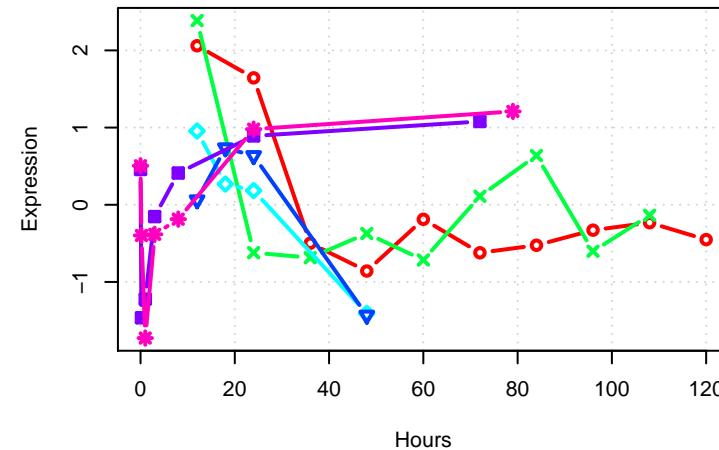
ynk1 YKL067W
Nucleoside diphosphate kinase



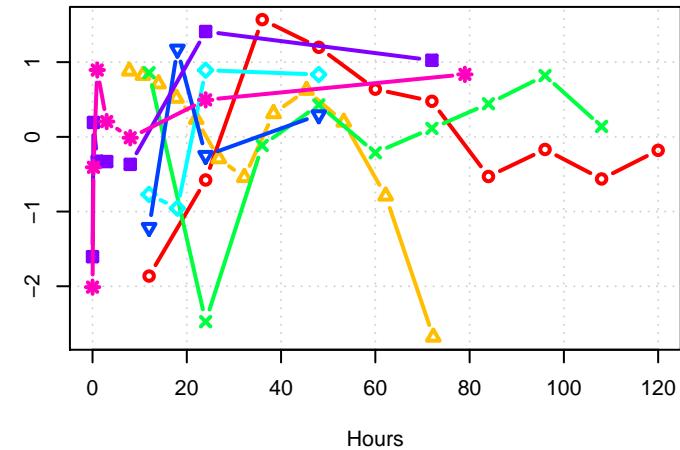
uif1 YDR400W
Uridine nucleosidase (uridine-cytidine N-ribohydrolase)



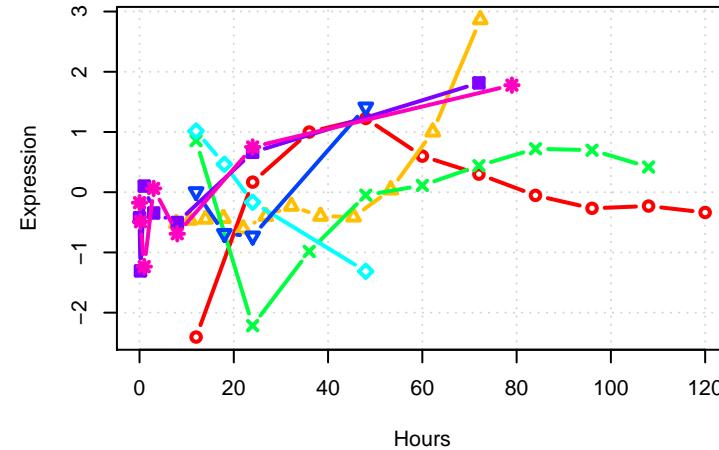
urk1 YNR012W
Uridine/cytidine kinase



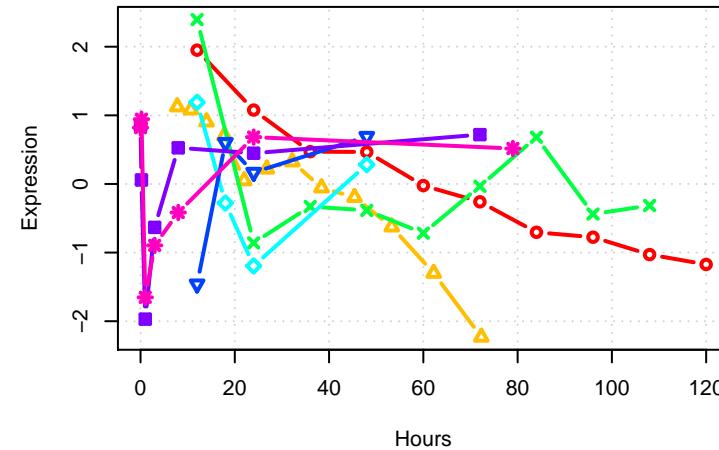
cdd1 YLR245C
Cytidine deaminase



fcy1 YPR062W
Cytosine deaminase



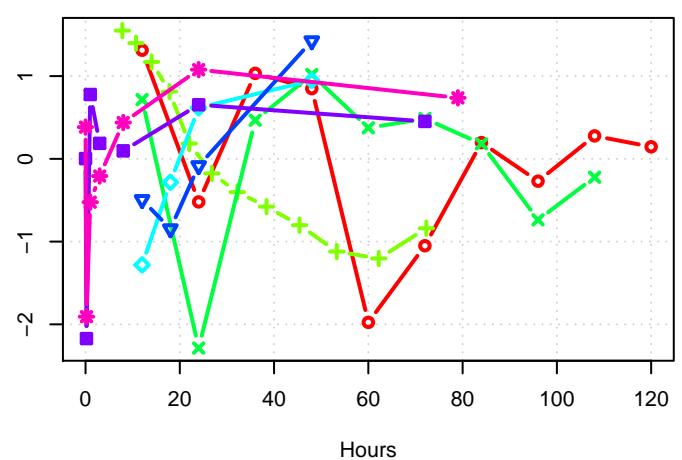
fur1 YHR128W
Uracil phosphoribosyltransferase



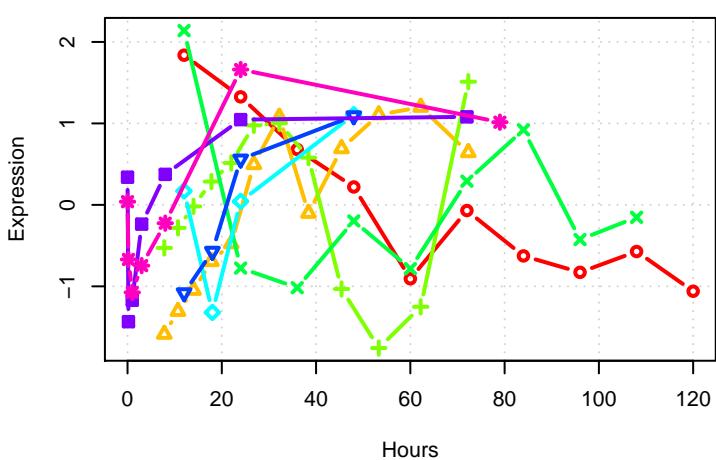
superpathway of histidine, purine, and pyrimidine biosynthesis

superpathway of histidine, purine, and pyrimidine biosynthesis

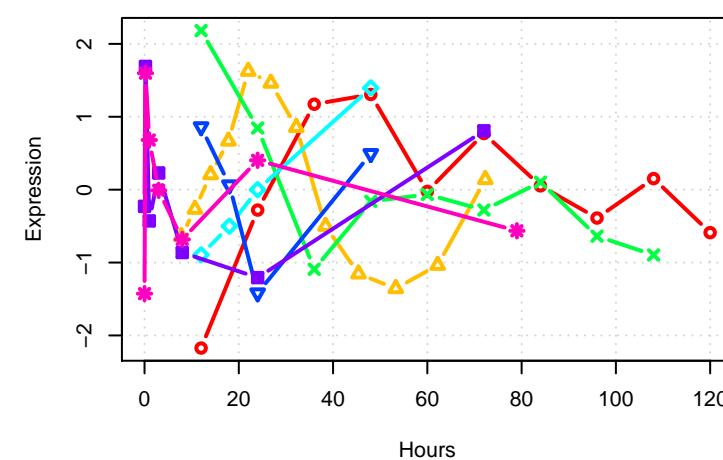
ade4 YMR300C
Phosphoribosylpyrophosphate amidotransferase (PRPPAT)



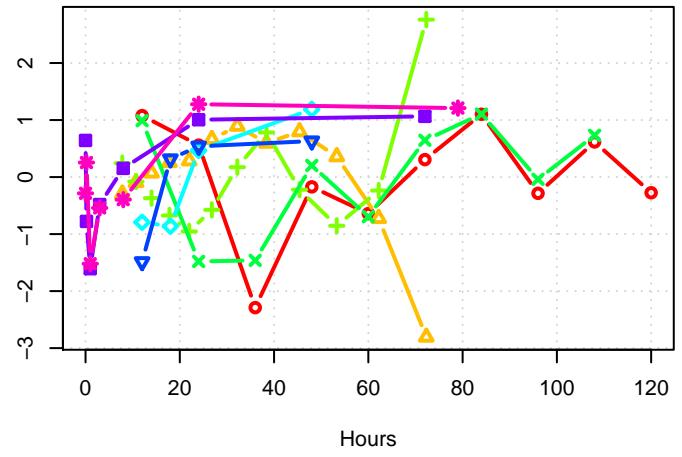
prs1 YKL181W
5-phospho-ribosyl-1(alpha)-pyrophosphate synthetase



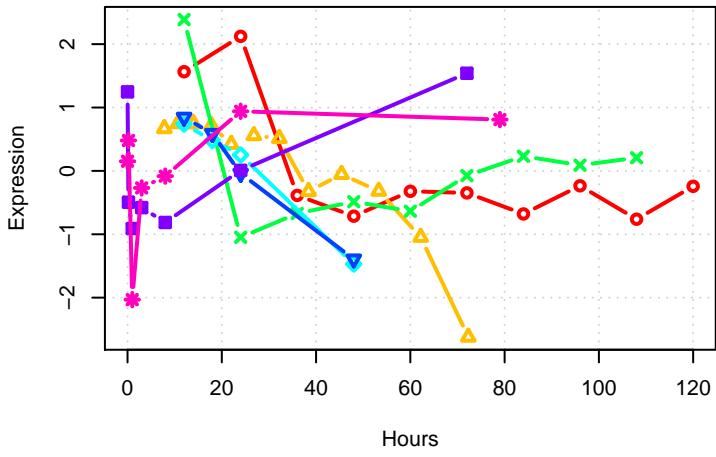
prs2 YER099C
5-phospho-ribosyl-1(alpha)-pyrophosphate synthetase, synthesizes PRPP



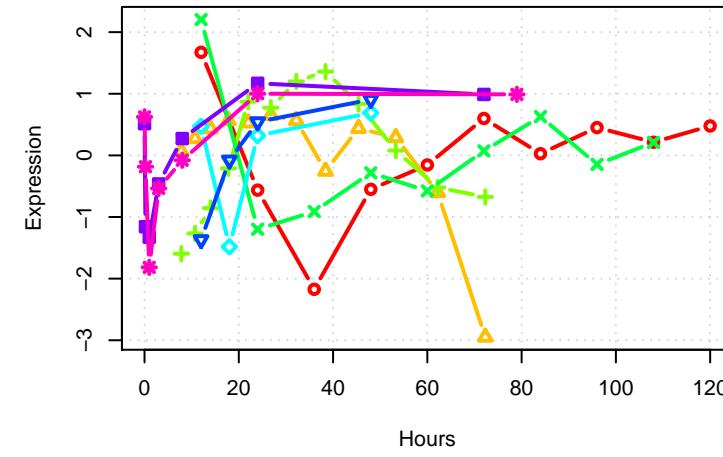
prs3 YHL011C
5-phospho-ribosyl-1(alpha)-pyrophosphate synthetase



prs4 YBL068W
5-phospho-ribosyl-1(alpha)-pyrophosphate synthetase, synthesizes PRPP



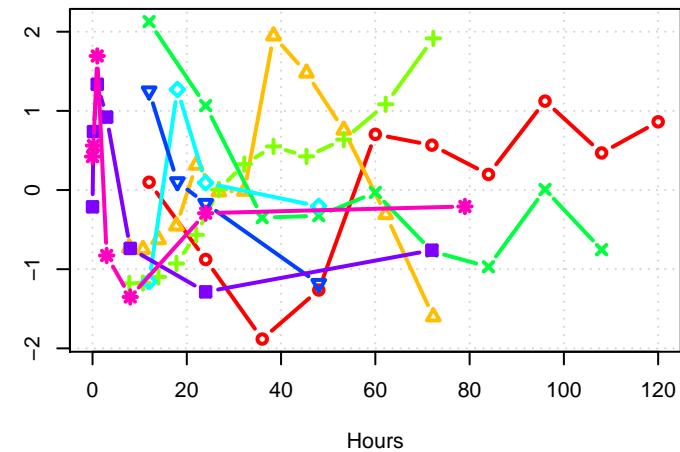
prs5 YOL061W
5-phospho-ribosyl-1(alpha)-pyrophosphate synthetase



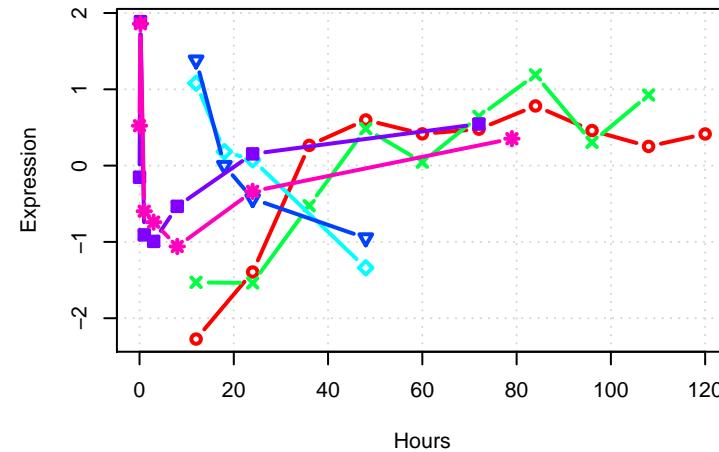
de novo NAD biosynthesis

de novo NAD biosynthesis

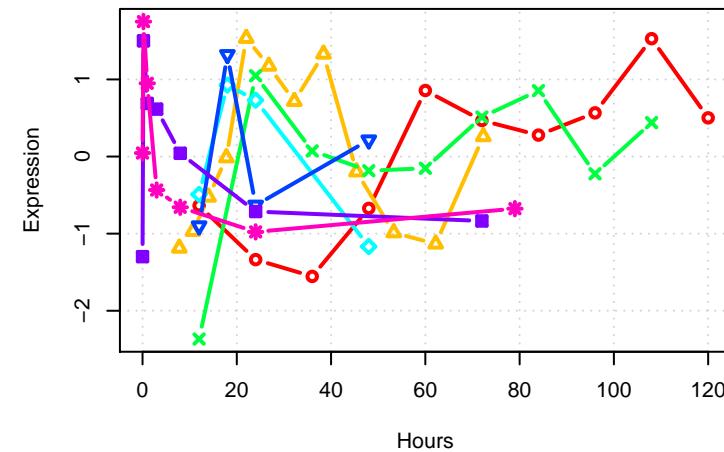
qns1 YHR074W
Glutamine-dependent NAD(+) synthetase



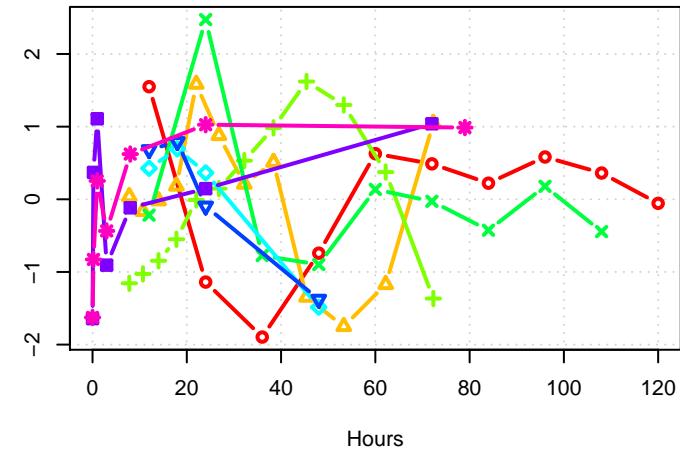
nma1 YLR328W
Nicotinic acid mononucleotide adenylyltransferase



nma2 YGR010W
Nicotinic acid mononucleotide adenylyltransferase

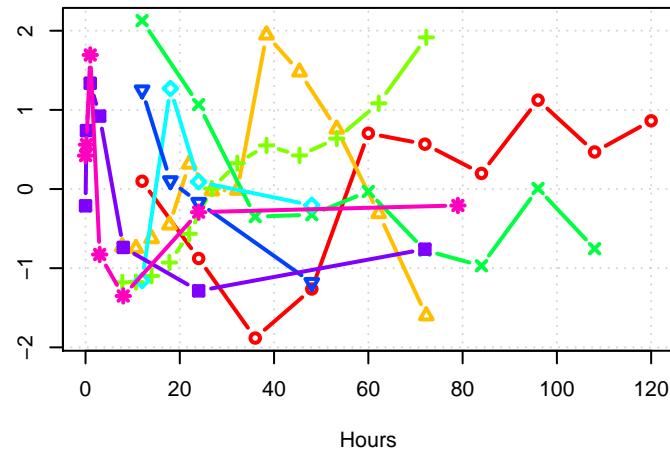


bna6 YFR047C
Quinolinate phosphoribosyl transferase



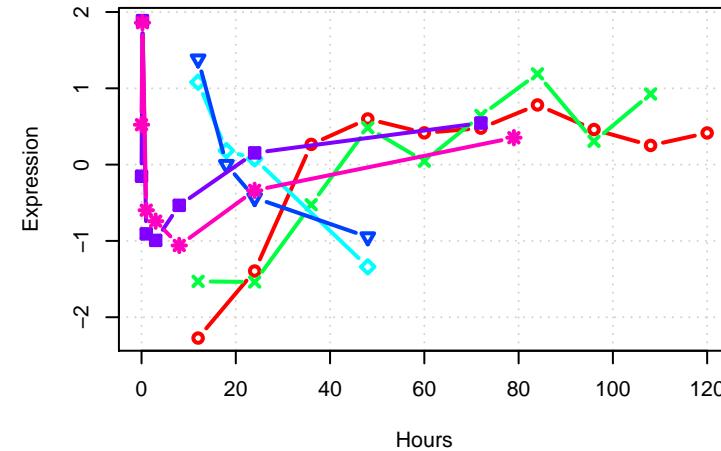
NAD salvage pathway

qns1 YHR074W
Glutamine-dependent NAD(+) synthetase

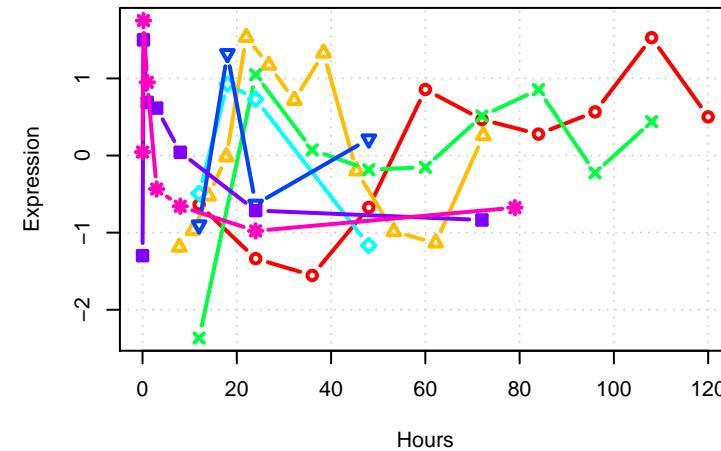


NAD salvage pathway

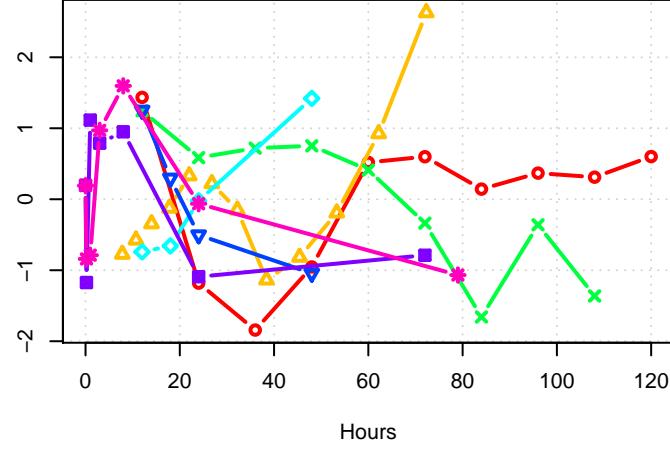
nmat1 YLR328W
Nicotinic acid mononucleotide adenylyltransferase



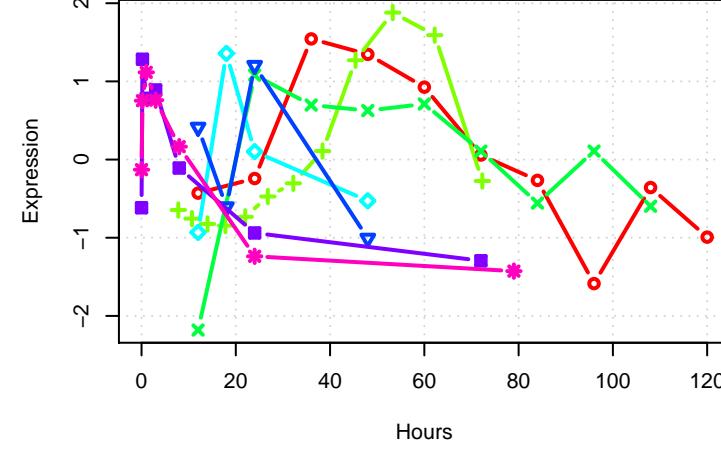
nma2 YGR010W
Nicotinic acid mononucleotide adenylyltransferase



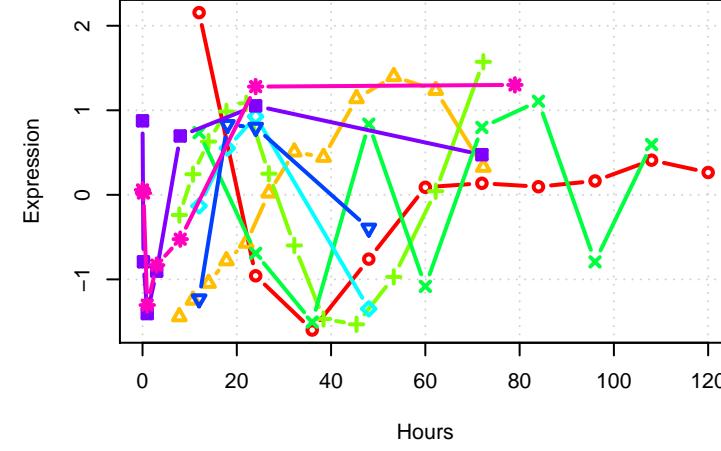
sir2 YDL042C
Conserved NAD⁺ dependent histone deacetylase of the Sirtuin family



pnc1 YGL037C
Nicotinamidase that converts nicotinamide to nicotinic acid

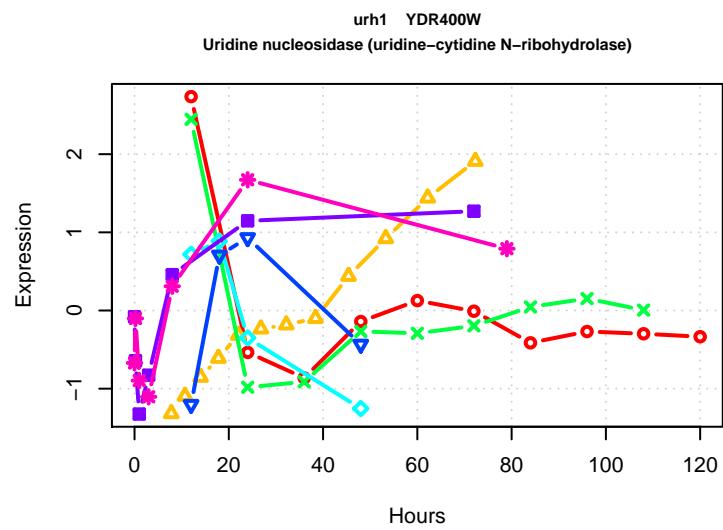
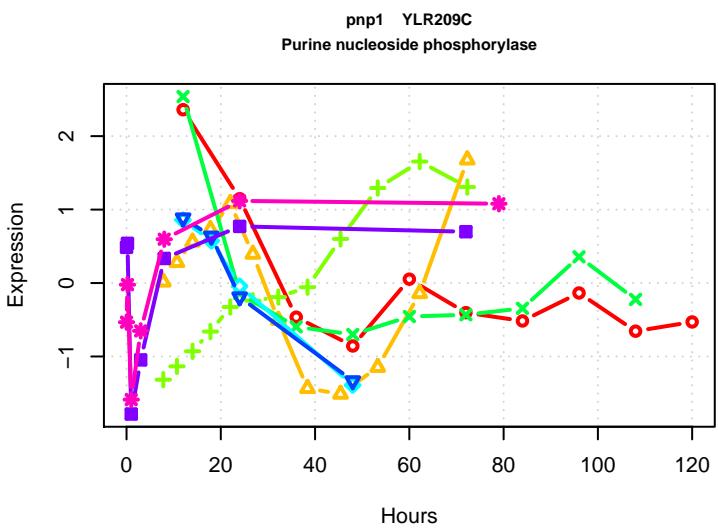
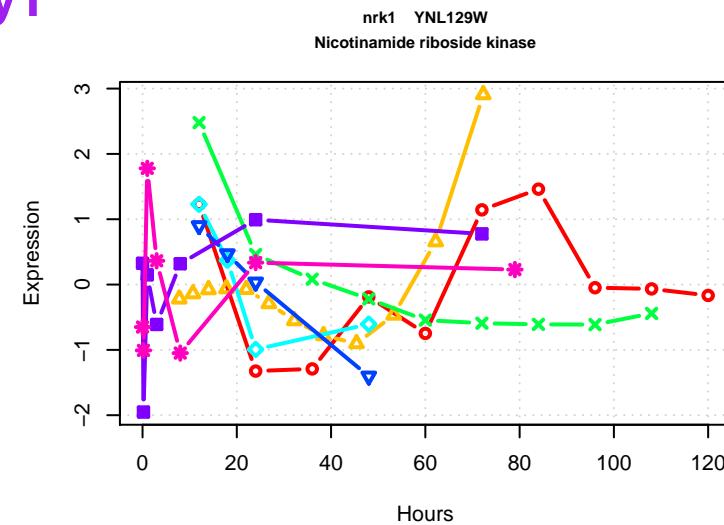
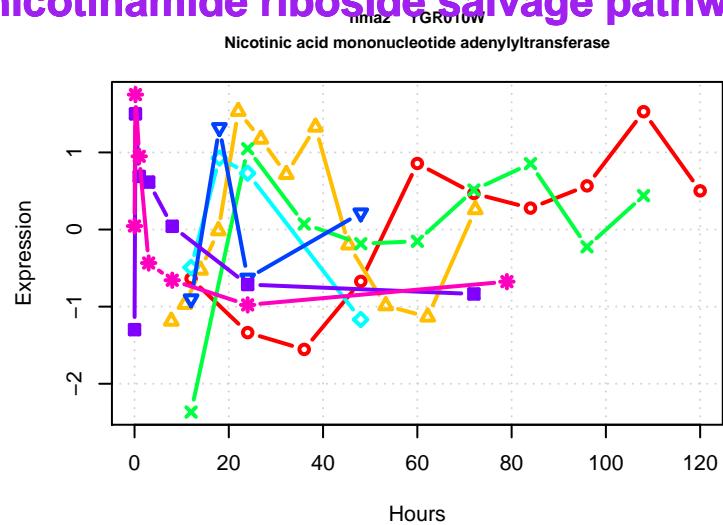
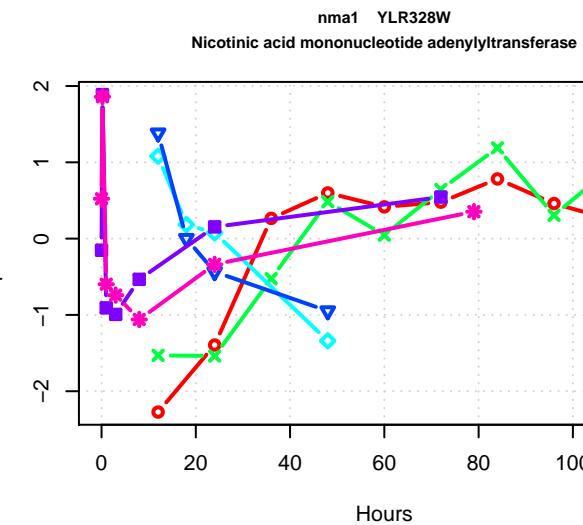


npt1 YOR209C
Nicotinate phosphoribosyltransferase



nicotinamide riboside salvage pathway I

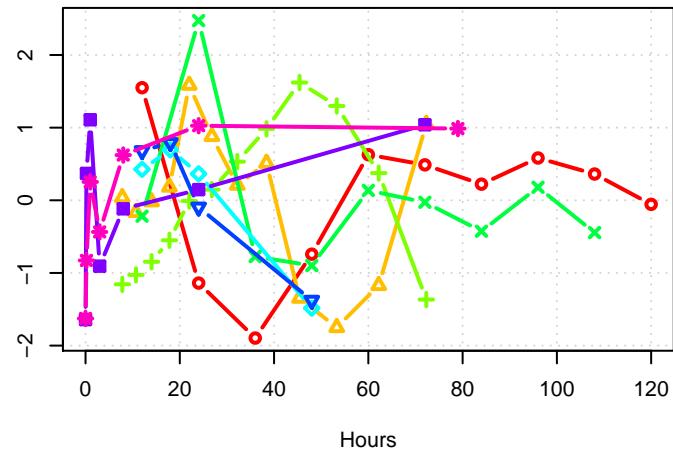
nicotinamide riboside salvage pathway I



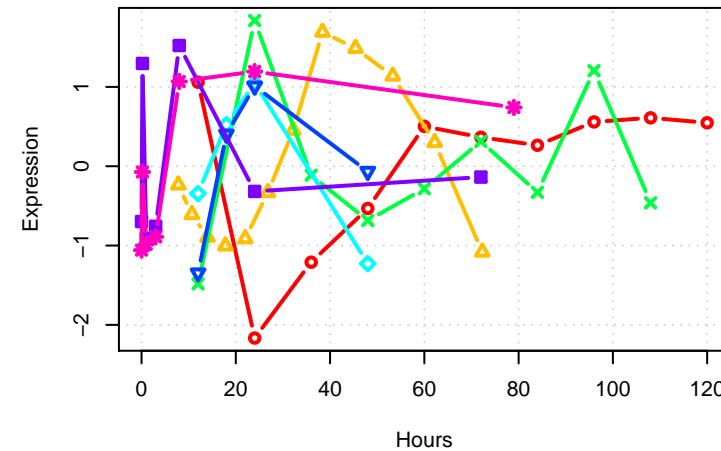
tryptophan degradation via kynurenine

tryptophan degradation via kynurenine

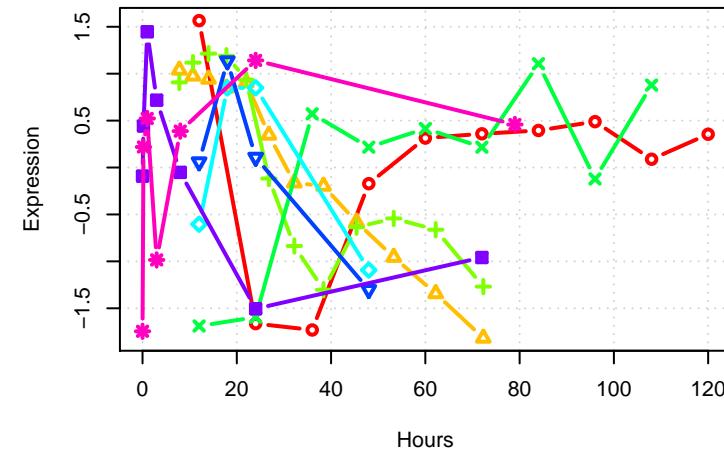
bna6 YFR047C
Quinolinate phosphoribosyl transferase



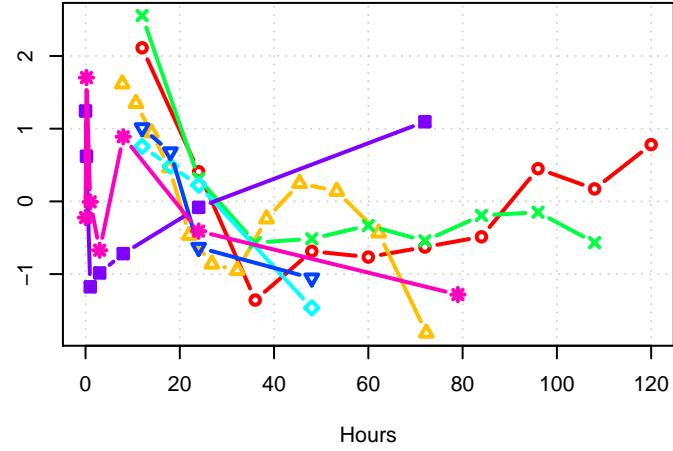
bna5 YLR231C
Kynureninase



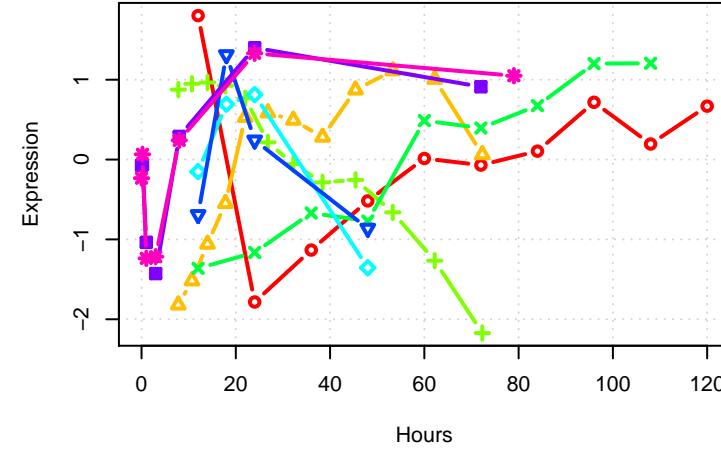
bna1 YJR025C
3-hydroxyanthranilic acid dioxygenase



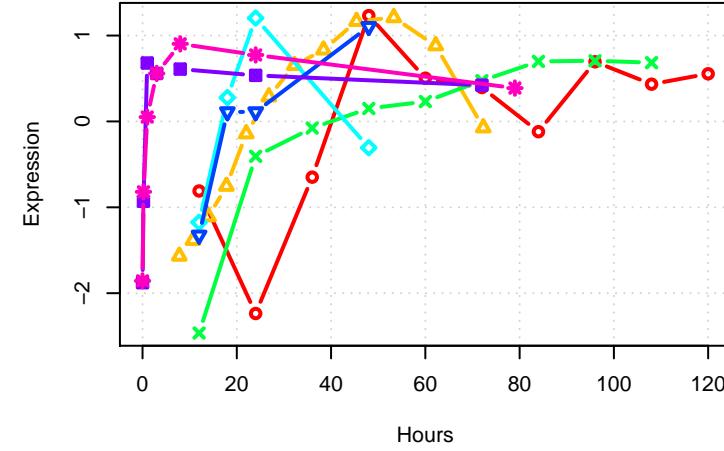
bna7 YDR428C
Formylkynurenine formamidase



bna4 YBL098W
Kynurenine 3-monoxygenase



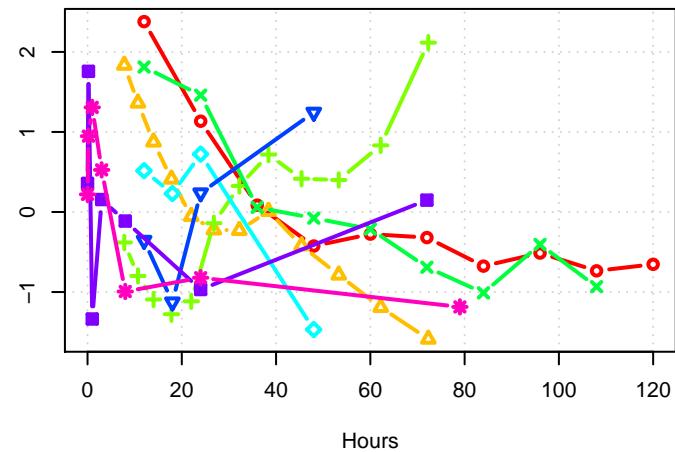
bna2 YJR078W
Tryptophan 2,3-dioxygenase or indoleamine 2,3-dioxygenase



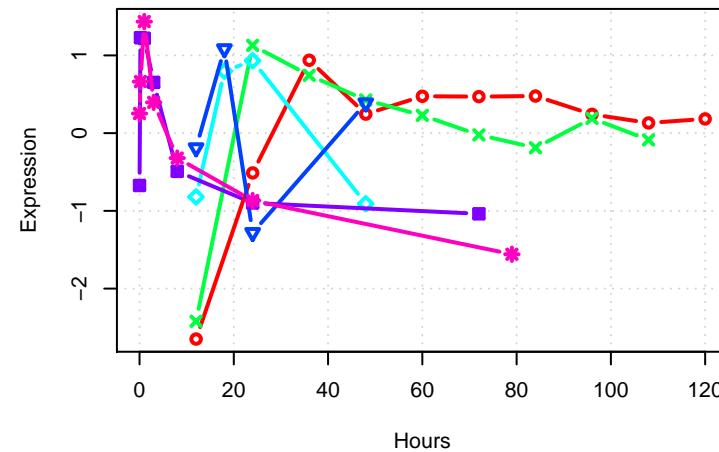
dehydro-D-arabinono-1,4-lactone biosynthesis

dehydro-D-arabinono-1,4-lactone biosynthesis

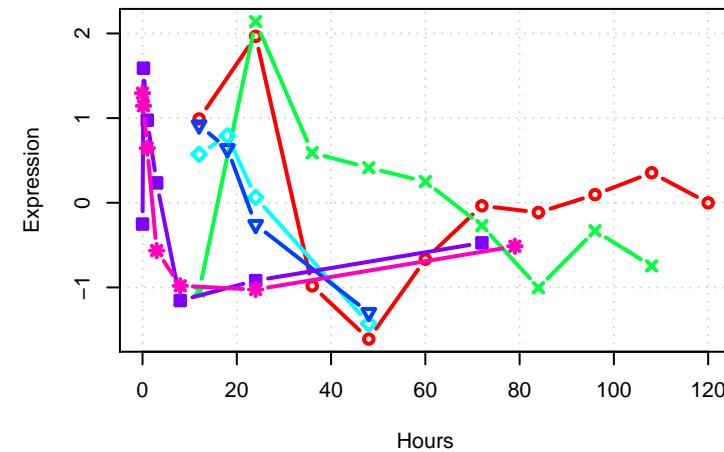
alo1 YML086C
D-Arabinono-1,4-lactone oxidase



ara2 YMR041C
NAD-dependent arabinose dehydrogenase

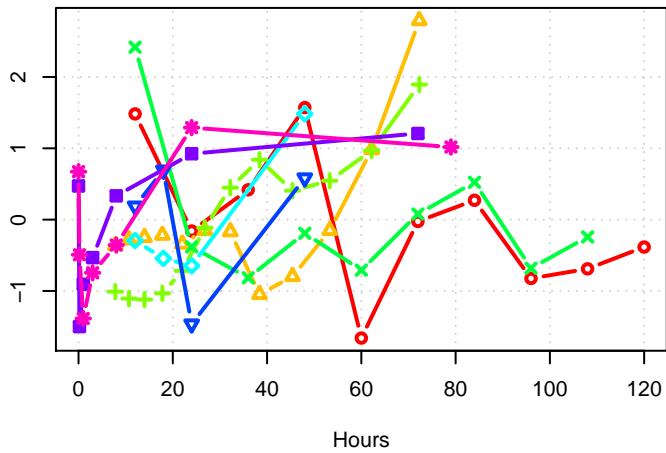


ara1 YBR149W
NADP+ dependent arabinose dehydrogenase



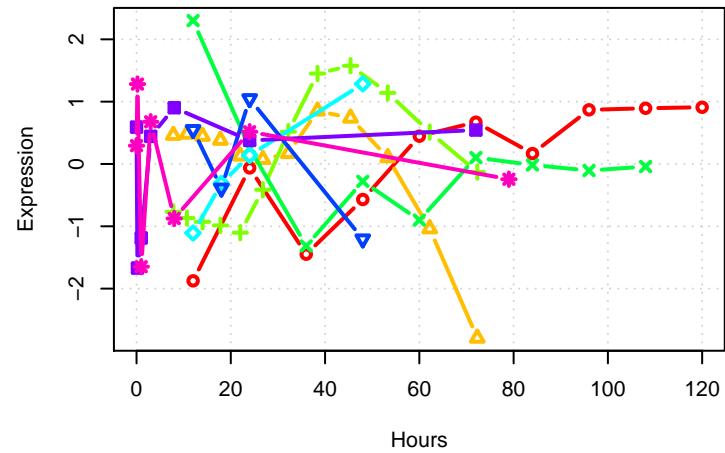
diphthamide biosynthesis

dph1 YIL103W
Protein required for synthesis of diphthamide

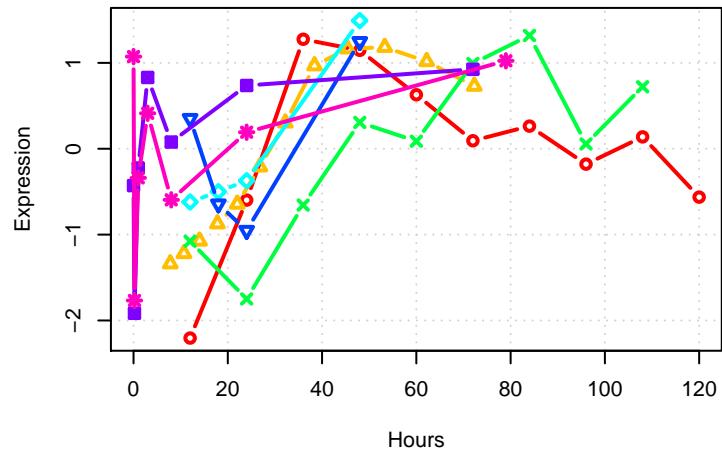


diphthamide biosynthesis

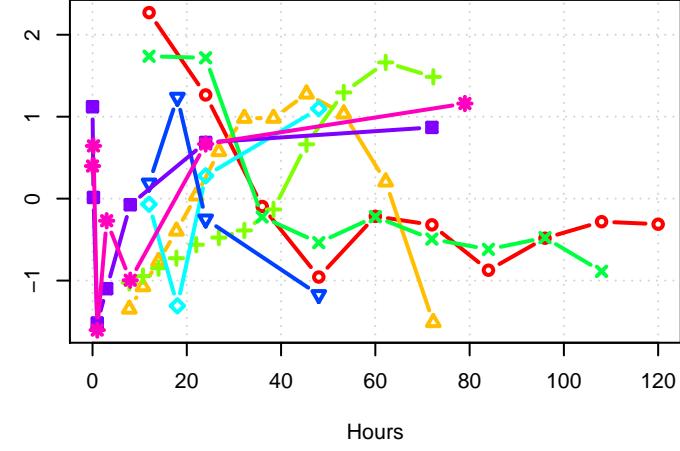
dph2 YKL197W
Protein required for synthesis of diphthamide



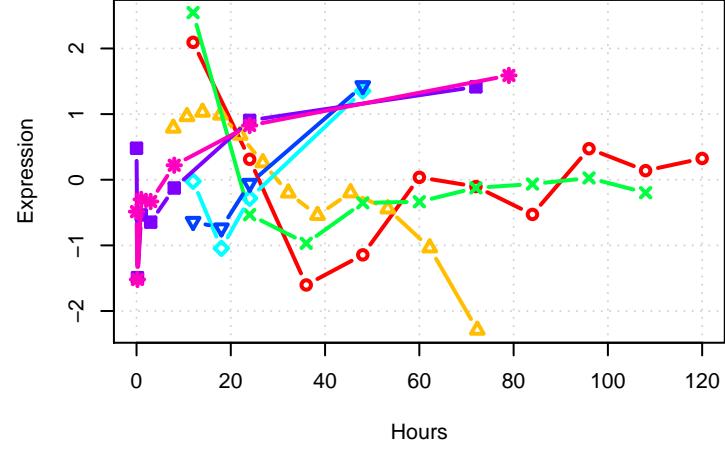
kti11 YBL071W-A
Zn-ribbon protein that co-purifies with Dph1 and Dph2



dph5 YLR172C
Methyltransferase required for synthesis of diphthamide



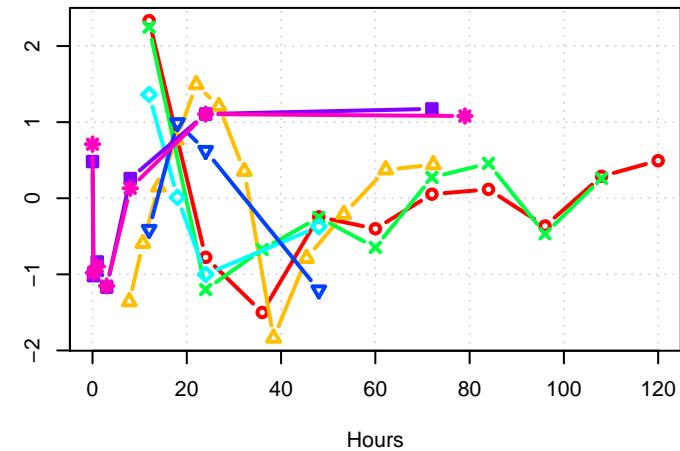
rrt2 YBR246W
Methylesterase performing penultimate step of diphthamide biosynthesis



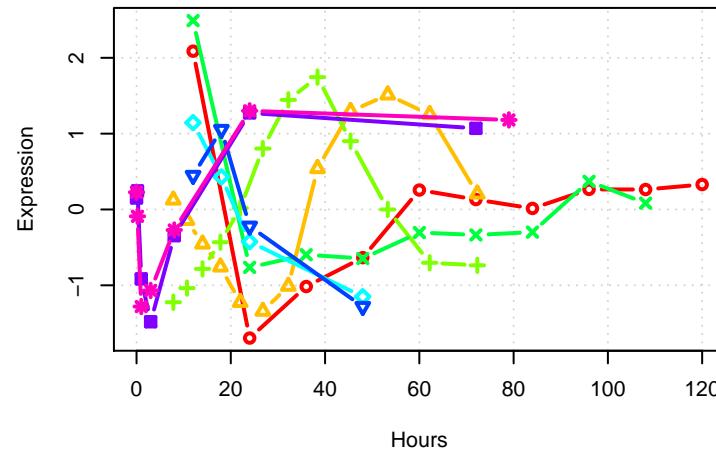
dolichyl glucosyl phosphate biosynthesis

dolichyl glucosyl phosphate biosynthesis

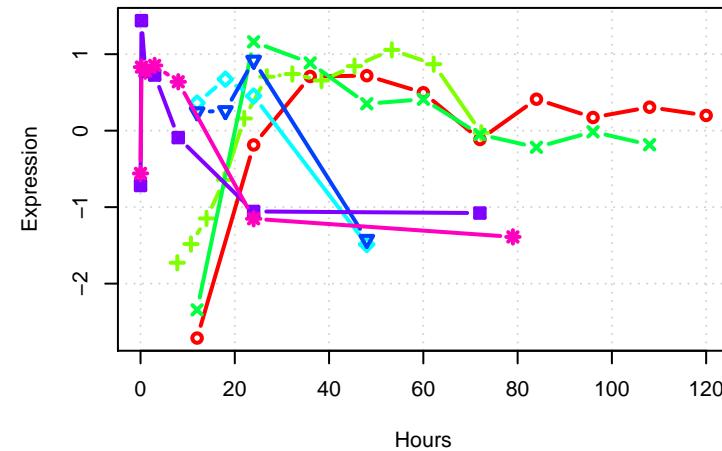
alg5 YPL227C
UDP-glucose:dolichyl-phosphate glucosyltransferase



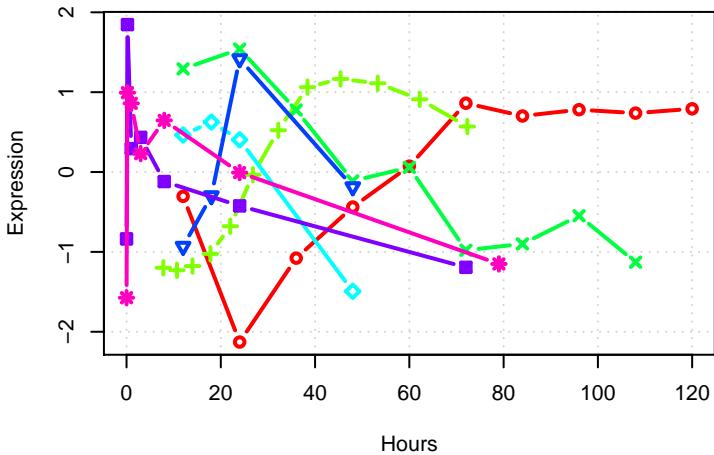
pgm1 YKL127W
Phosphoglucomutase, minor isoform



pgm2 YMR105C
Phosphoglucomutase

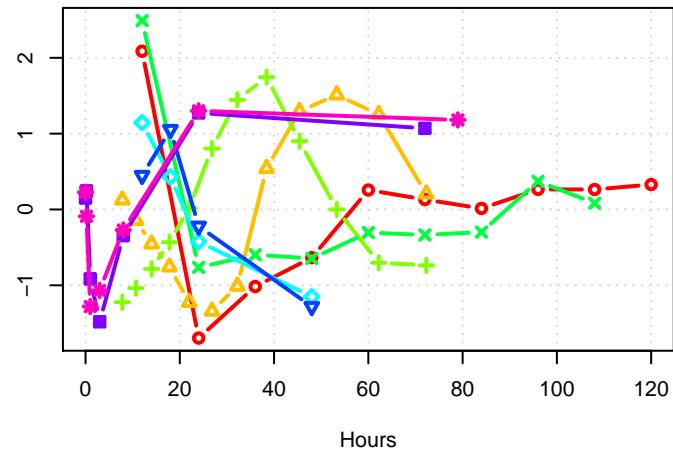


ugp1 YKL035W
UDP-glucose pyrophosphorylase (UGPase)



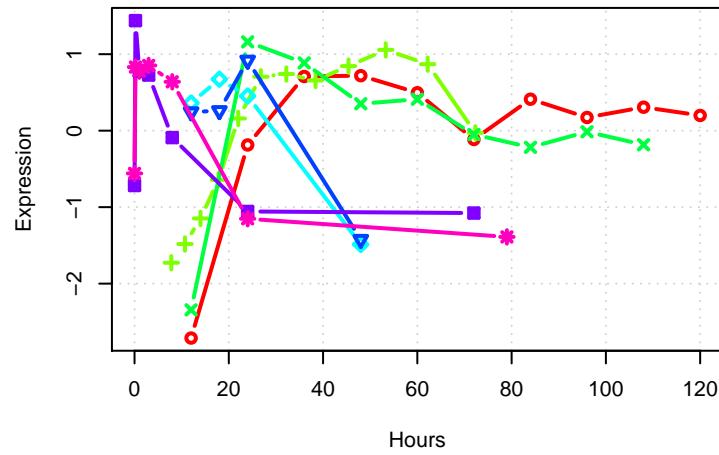
galactose degradation

pgm1 YKL127W
Phosphoglucomutase, minor isoform

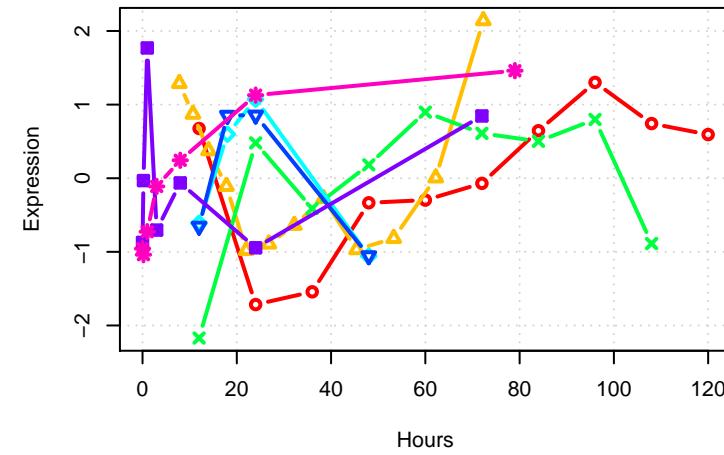


galactose degradation

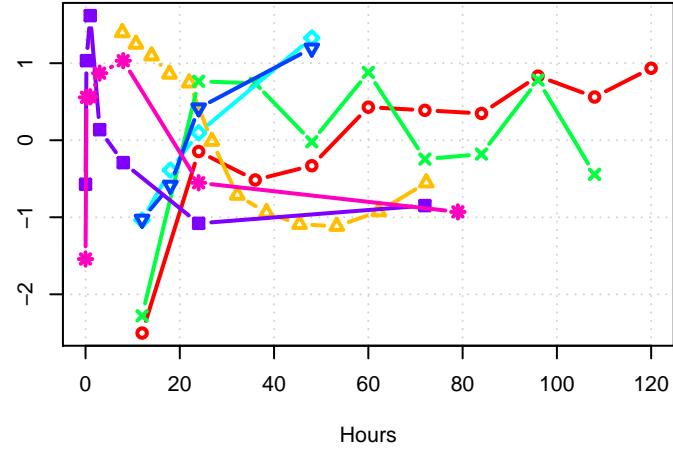
pgm2 YMR105C
Phosphoglucomutase



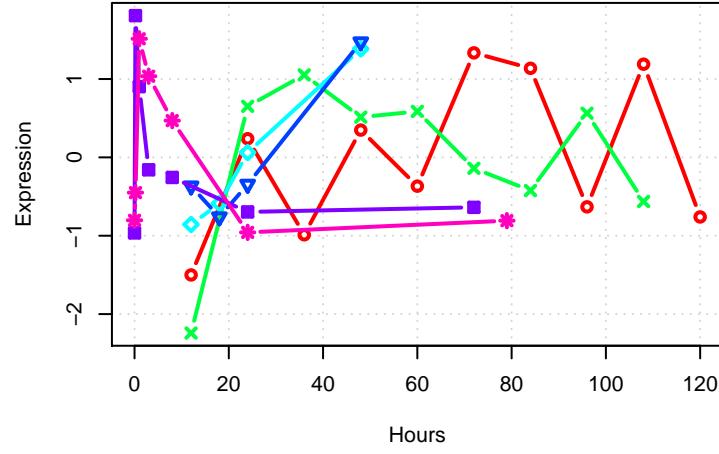
gal10 YBR019C
UDP-glucose 4-epimerase



gal1 YBR020W
Galactokinase

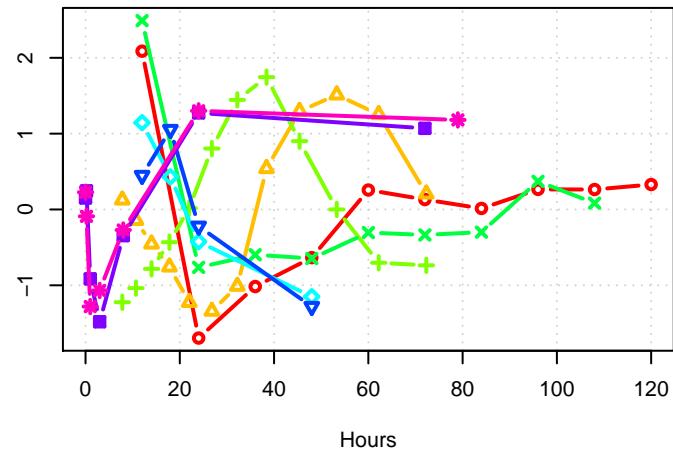


gal7 YBR018C
Galactose-1-phosphate uridylyl transferase



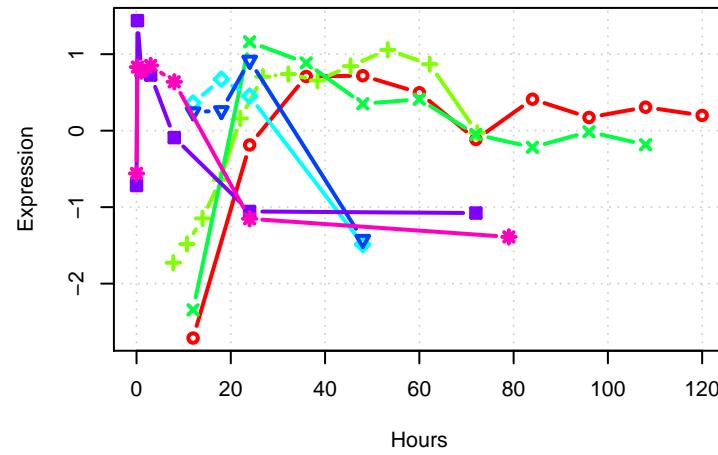
glycogen biosynthesis

pgm1 YKL127W
Phosphoglucomutase, minor isoform

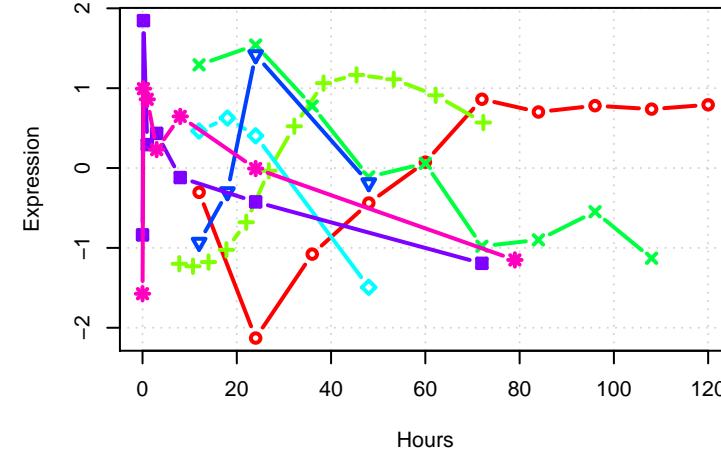


glycogen biosynthesis

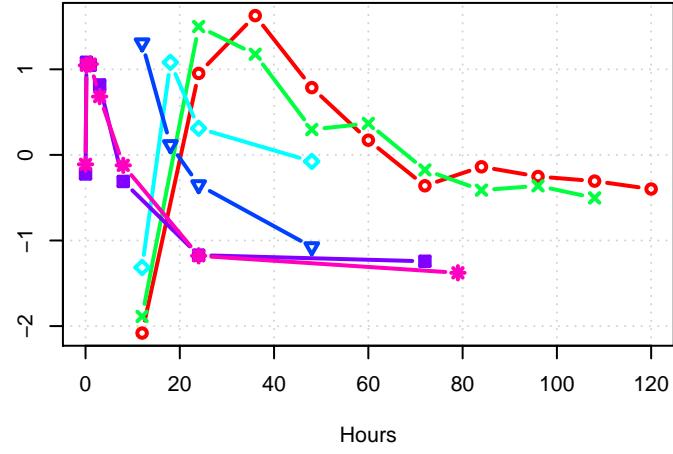
pgm2 YMR15C
Phosphoglucomutase



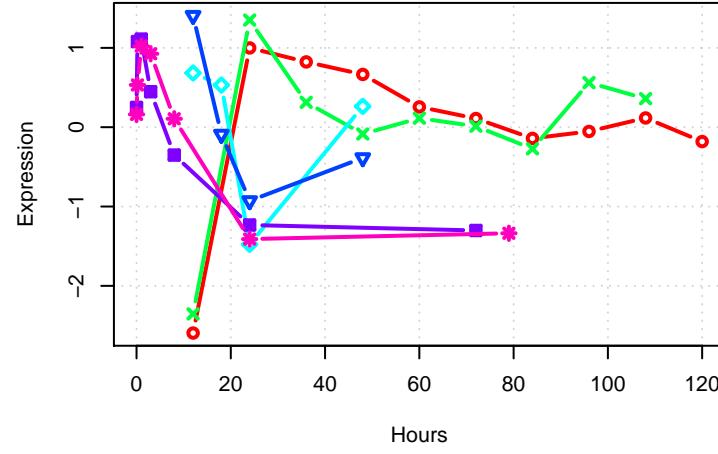
ugp1 YKL035W
UDP-glucose pyrophosphorylase (UGPase)



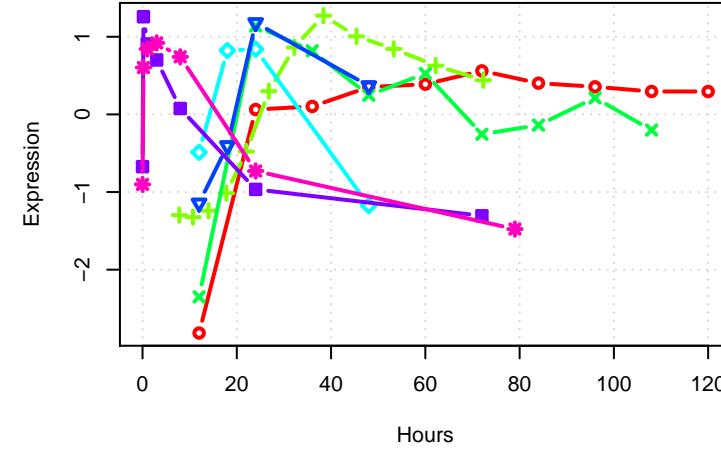
glg1 YKR058W
Glycogenin glucosyltransferase



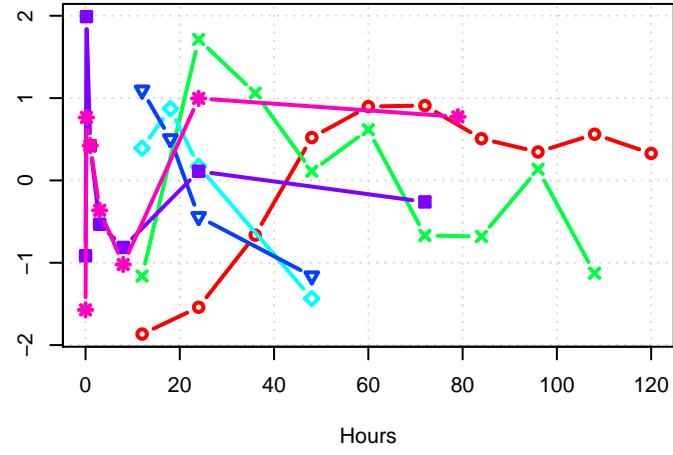
glg2 YJL137C
Glycogenin glucosyltransferase



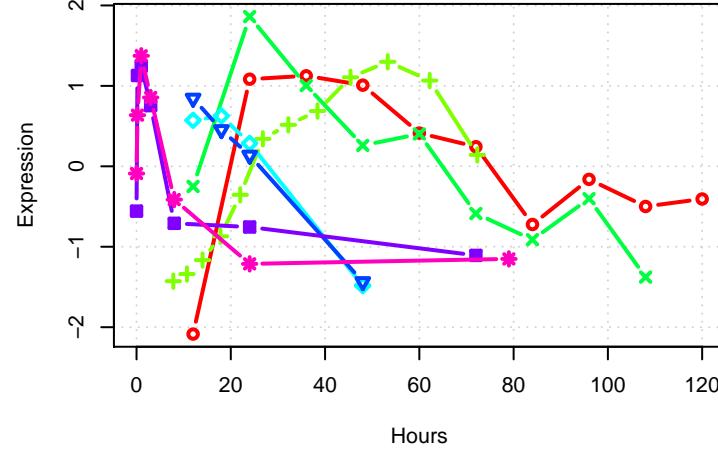
glc3 YEL011W
Glycogen branching enzyme, involved in glycogen accumulation



gsy1 YFR015C
Glycogen synthase



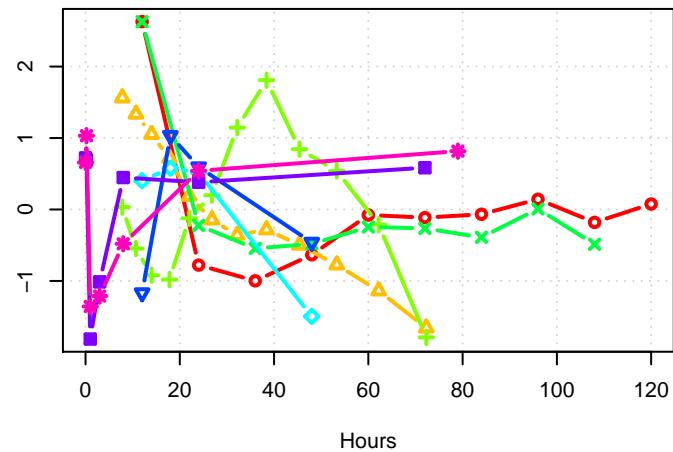
gsy2 YLR258W
Glycogen synthase



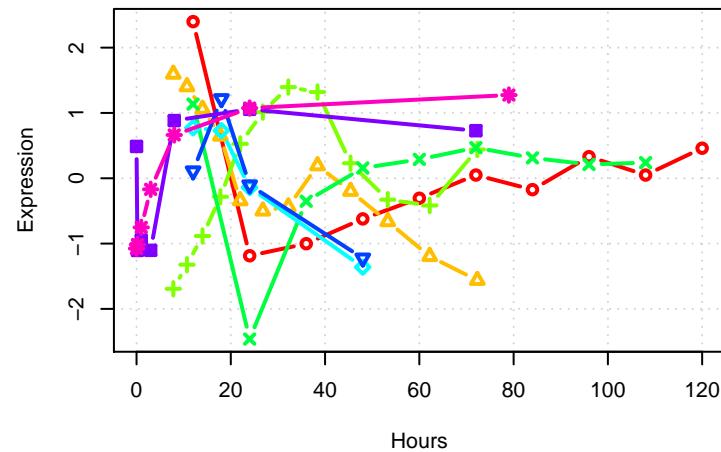
dolichyl phosphate D–mannose biosynthesis

dolichyl phosphate D-mannose biosynthesis

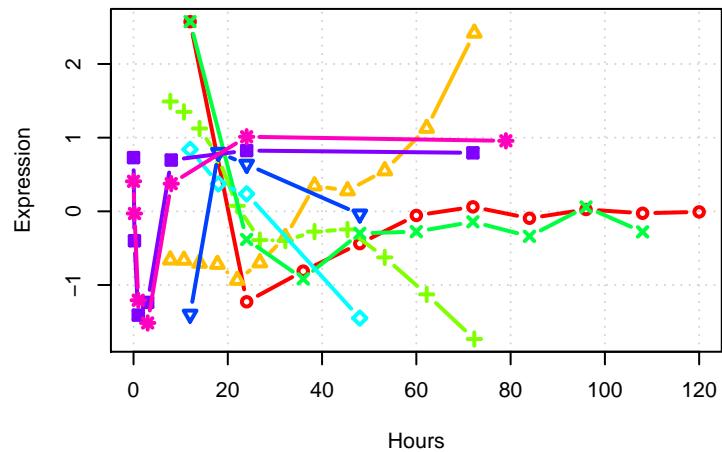
dpm1 YPR183W
Dolichol phosphate mannose (Dol-P-Man) synthase of ER membrane



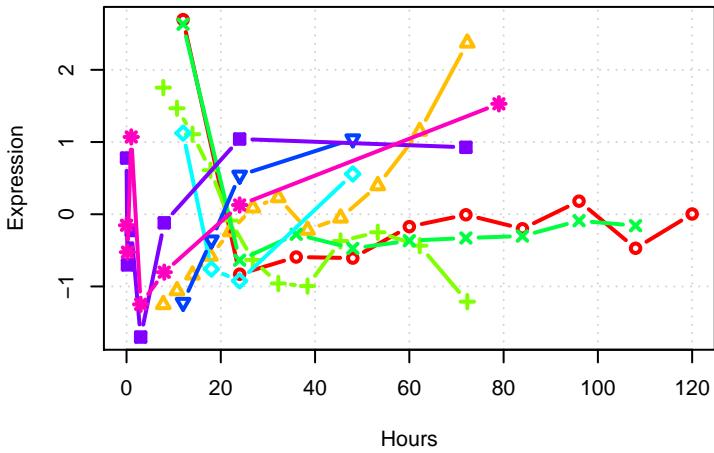
psa1 YDE055C
GDP-mannose pyrophosphorylase (mannose-1-phosphate guanyltransferase)



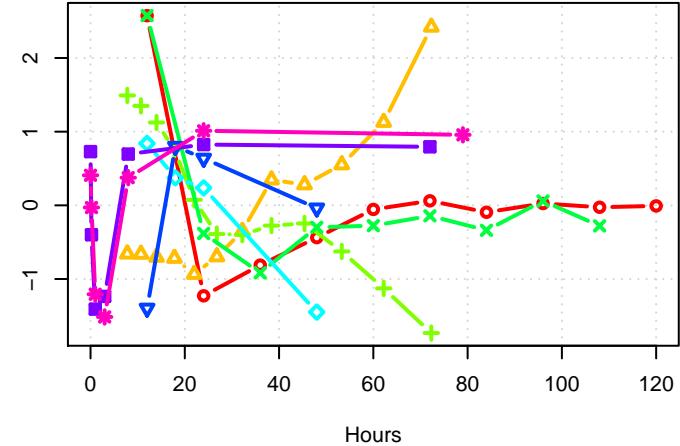
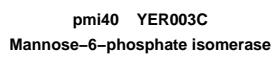
pmi40 YER003C
Mannose-6-phosphate isomerase



sec53 YFL045C
Phosphomannomutase



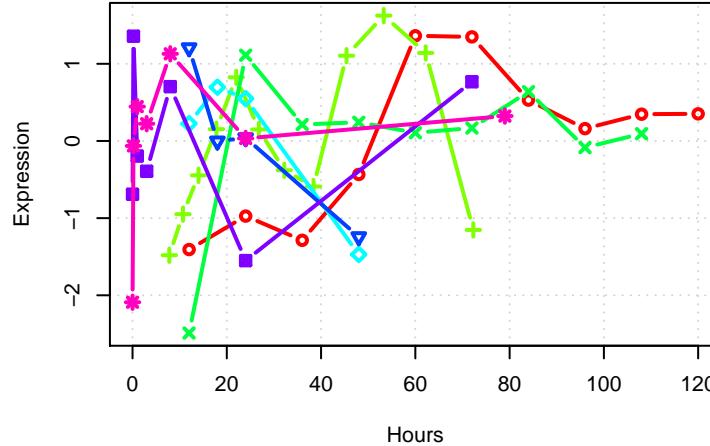
mannose degradation



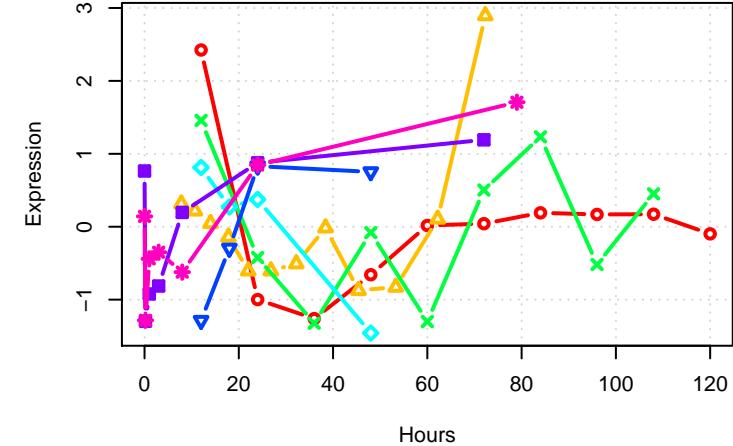
mannose degradation

hxx1 Yfr053C

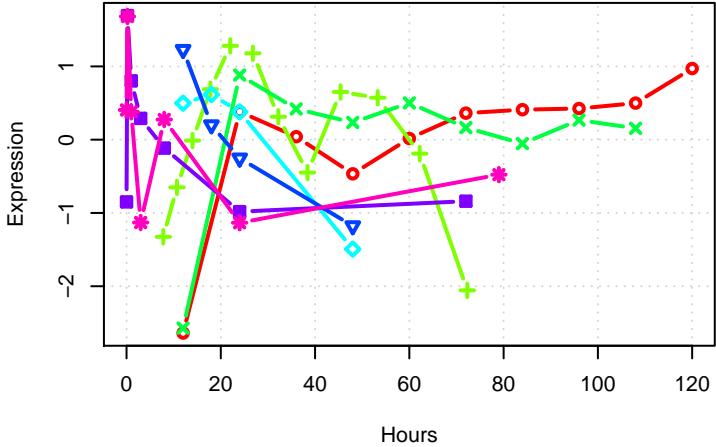
Hexokinase isoenzyme 1



hxa2 YGL253W
Hexokinase isoenzyme 2

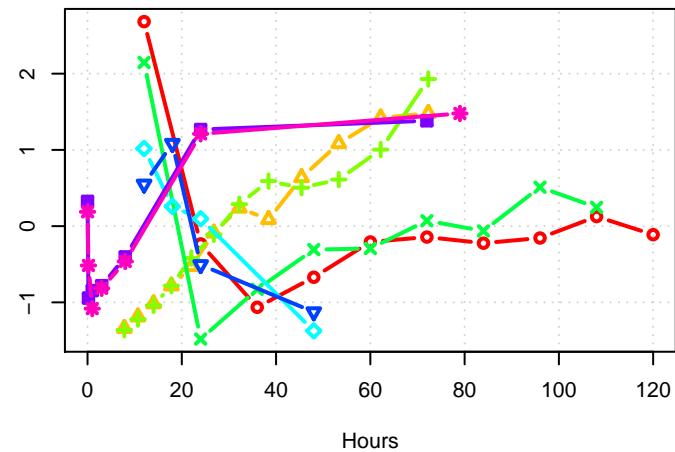


glk1 YCL040W
Glucokinase



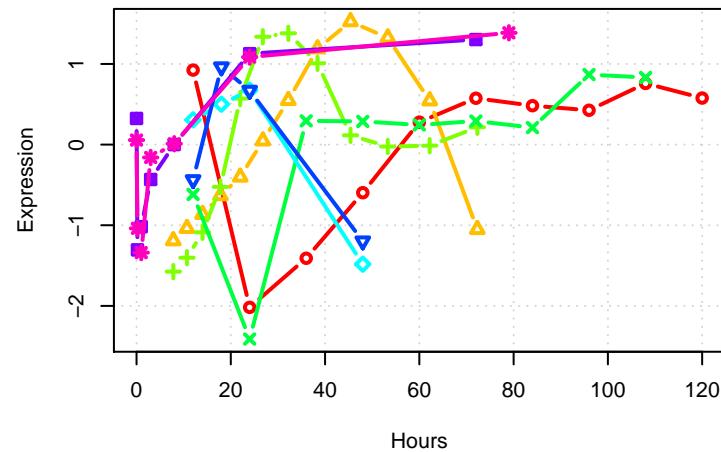
ergosterol biosynthesis

erg2 YMR202W
C-8 sterol isomerase

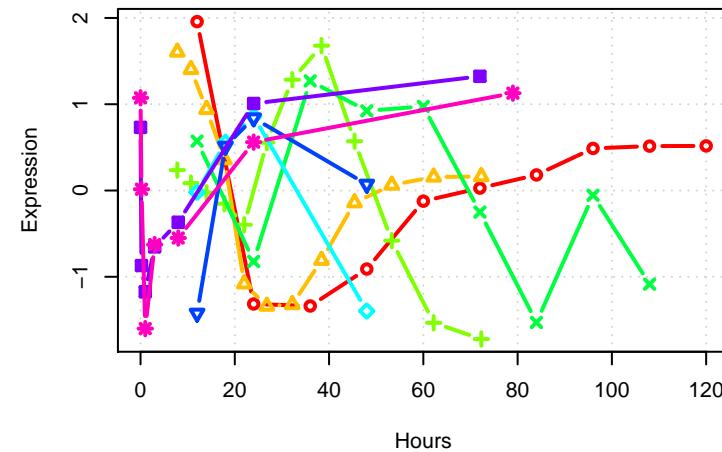


ergosterol biosynthesis

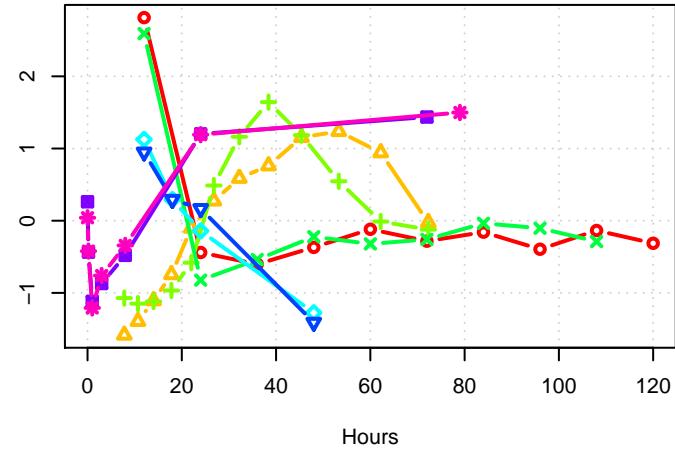
erg3 YER061W
C-5 sterol desaturase



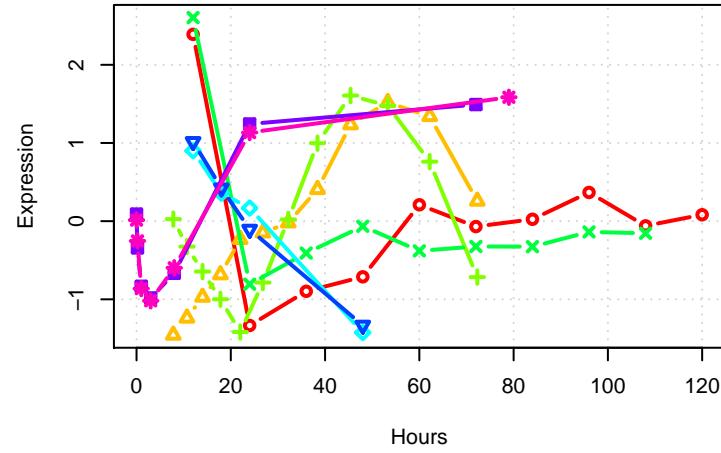
erg5 YMR015C
C-22 sterol desaturase



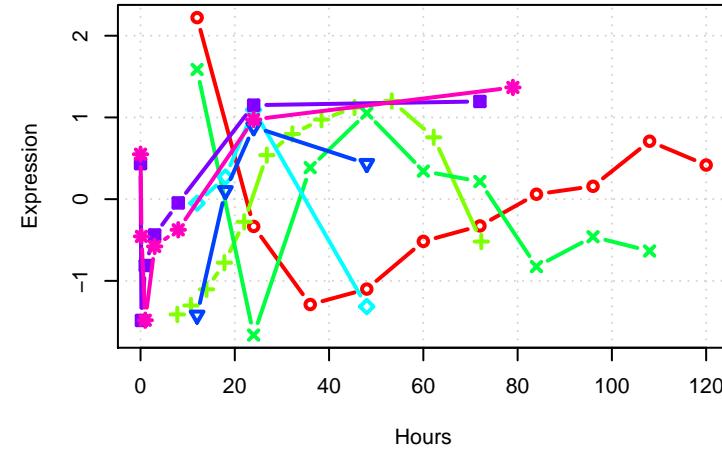
erg26 YGL001C
C-3 sterol dehydrogenase



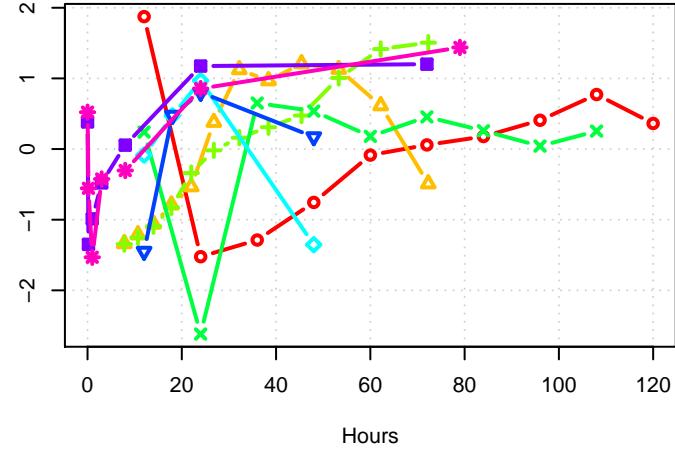
erg27 YLR100W
3-keto sterol reductase



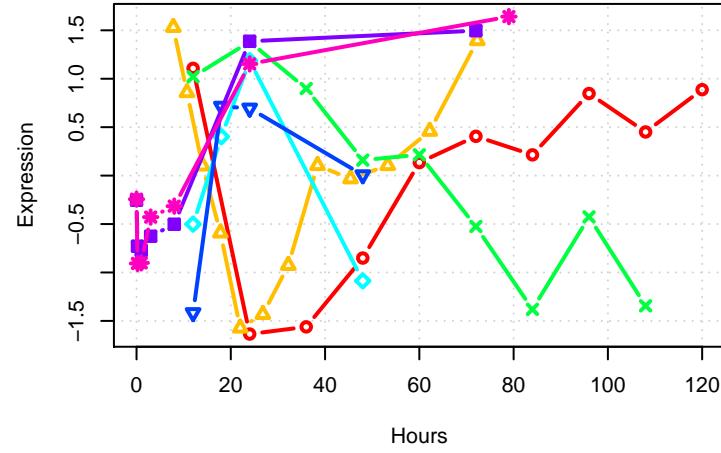
erg11 YHR007C
Lanosterol 14-alpha-demethylase



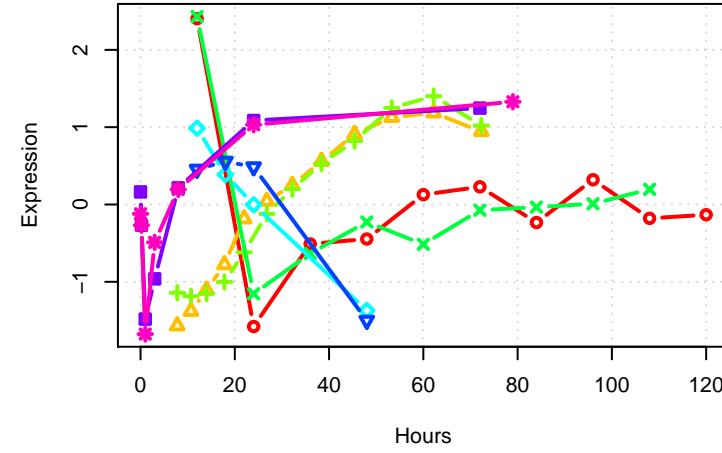
erg25 YGR060W
C-4 methyl sterol oxidase



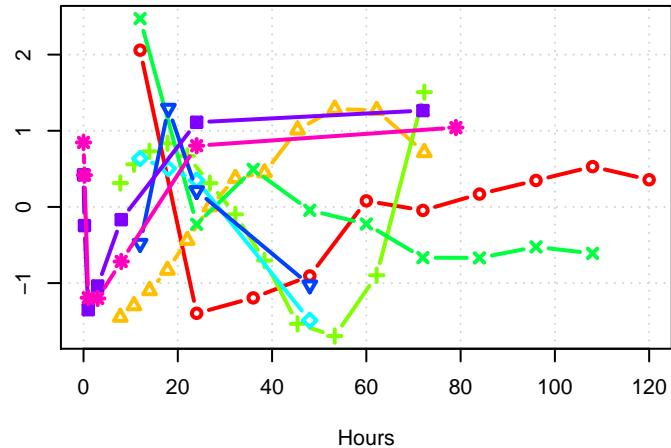
erg24 YNL280C
C-14 sterol reductase



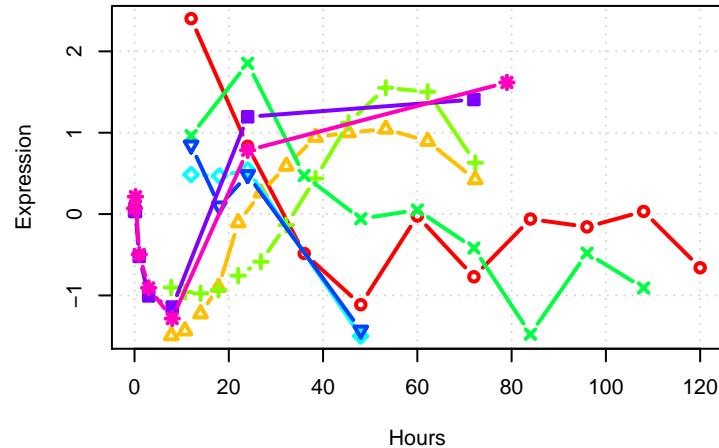
erg4 YGL012W
C-24(28) sterol reductase



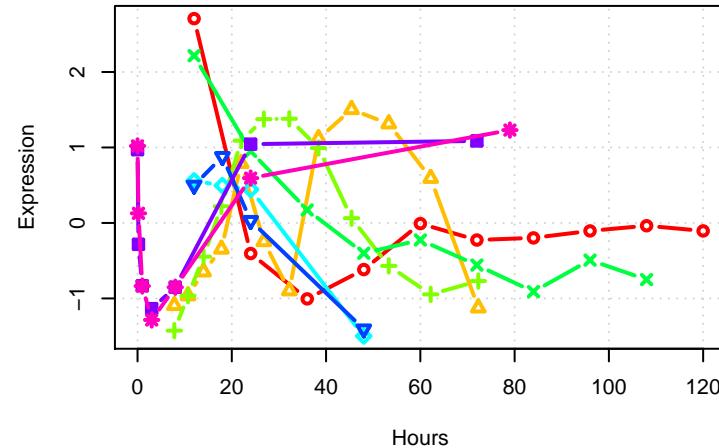
erg6 YML008C
Delta(24)-sterol C-methyltransferase



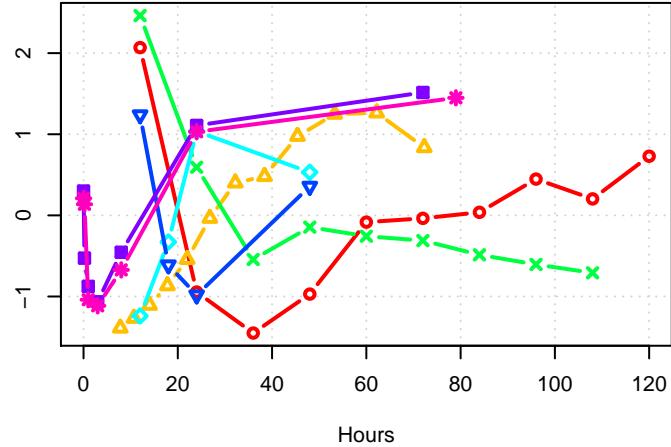
erg5 YHR190W
Farnesyl-diphosphate farnesyl transferase (squalene synthase)



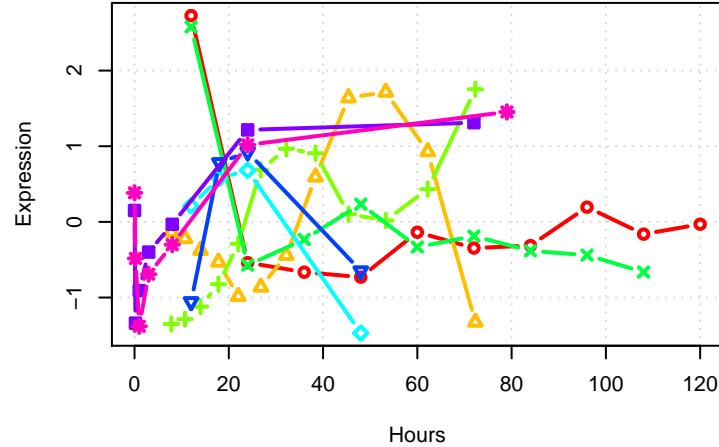
erg20 YJL167W
Farnesyl pyrophosphate synthetase



erg7 YHR072W
Lanosterol synthase

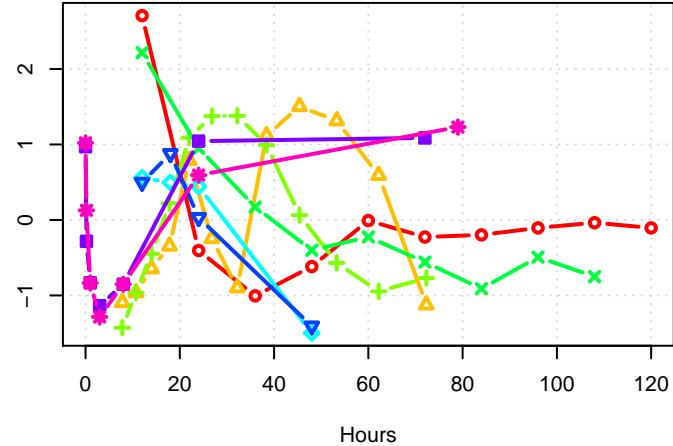


erg1 YGR175C
Squalene epoxidase



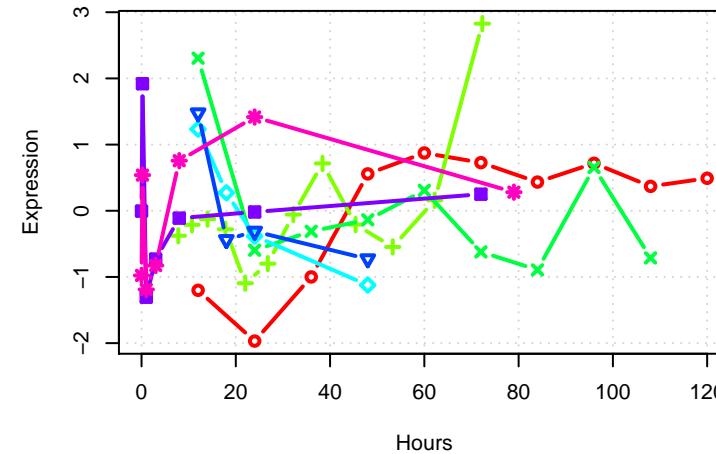
hexaprenyl diphosphate biosynthesis

erg20 YJL167W
Farnesyl pyrophosphate synthetase

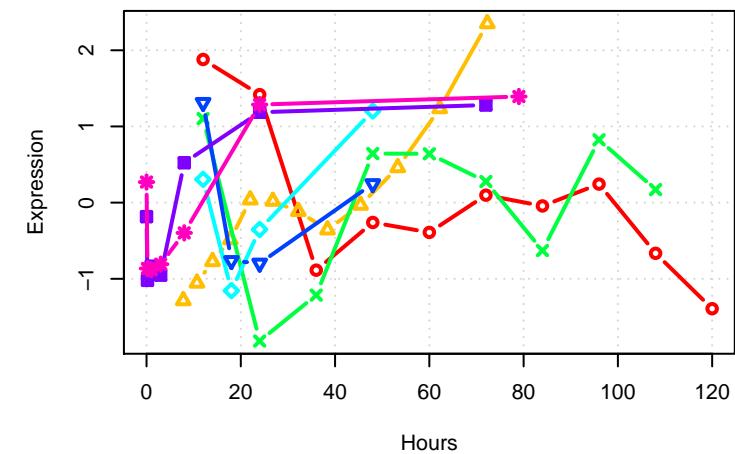


hexaprenyl diphosphate biosynthesis

coq1 YBR003W
Hexaprenyl pyrophosphate synthetase



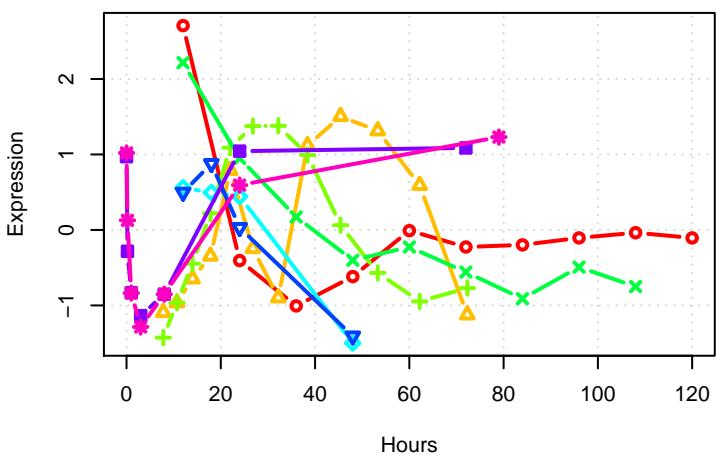
bts1 YPL069C
Geranylgeranyl diphosphate synthase (GGPS)



superpathway of ergosterol biosynthesis

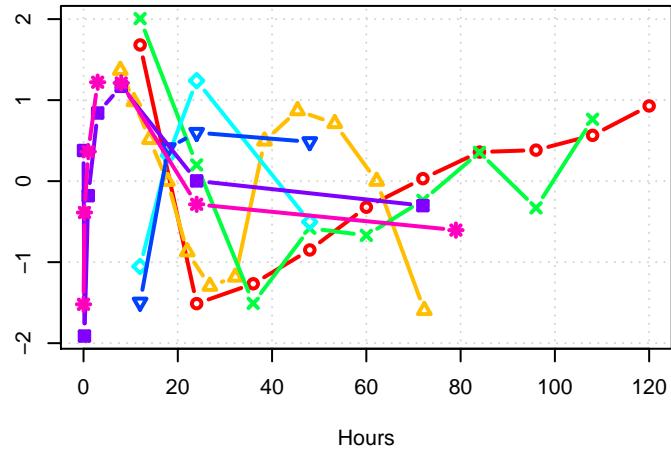
superpathway of ergosterol biosynthesis

erg20 YJL167W
Farnesyl pyrophosphate synthetase

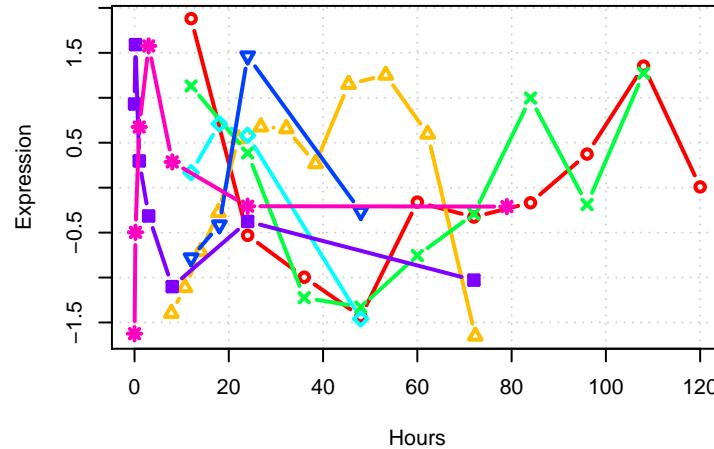


leucine degradation

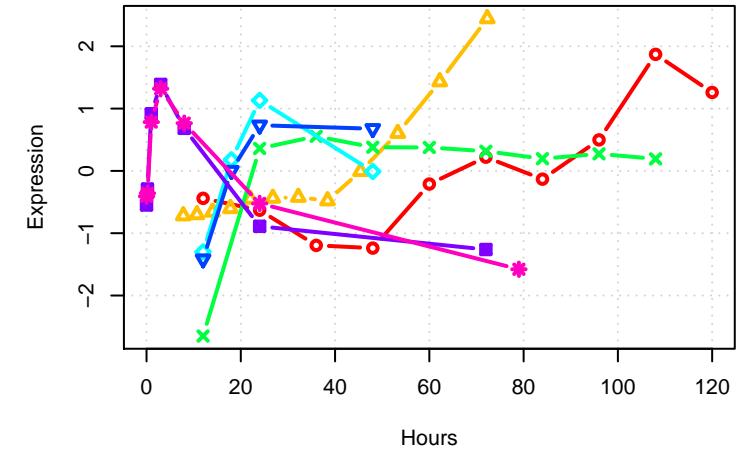
pdc1 YLR044C
Major of three pyruvate decarboxylase isozymes



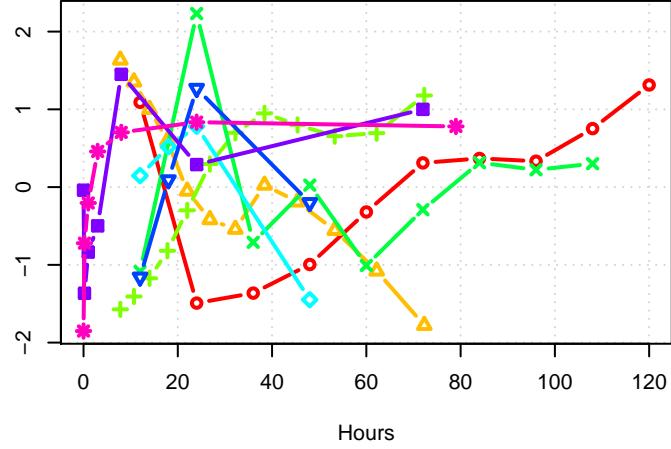
leucine degradation
pdc2 YLR134W
Minor isoform of pyruvate decarboxylase



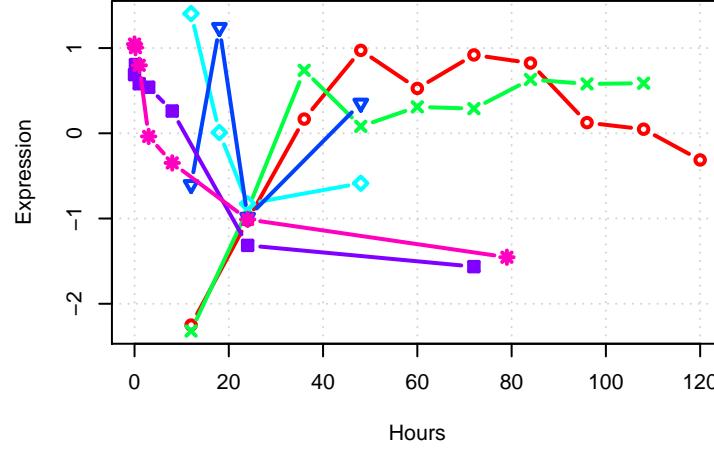
pdc6 YGR087C
Minor isoform of pyruvate decarboxylase



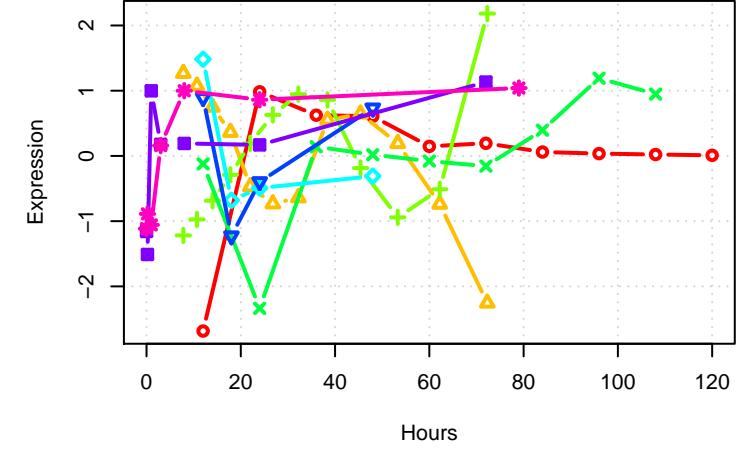
adh1 YOL086C
Alcohol dehydrogenase



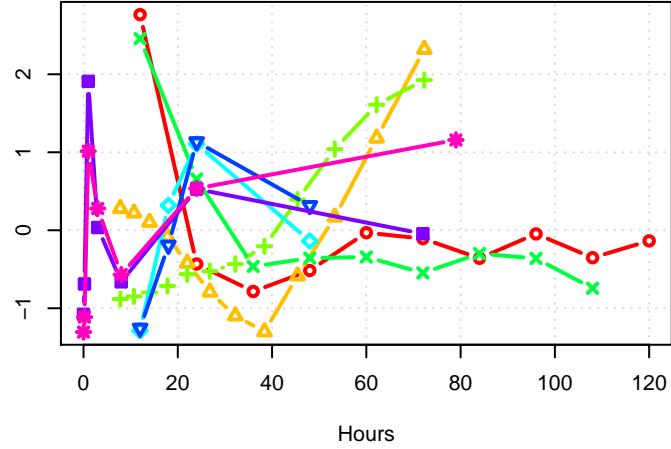
adh2 YMR303C
Glucose-repressible alcohol dehydrogenase II



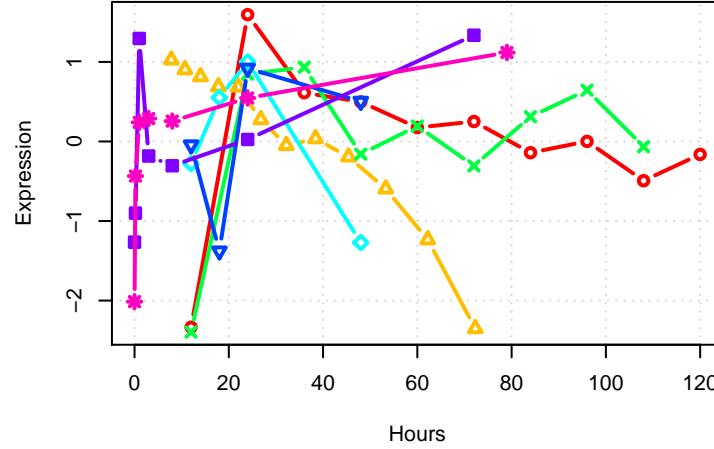
adh3 YMR083W
Mitochondrial alcohol dehydrogenase isozyme III



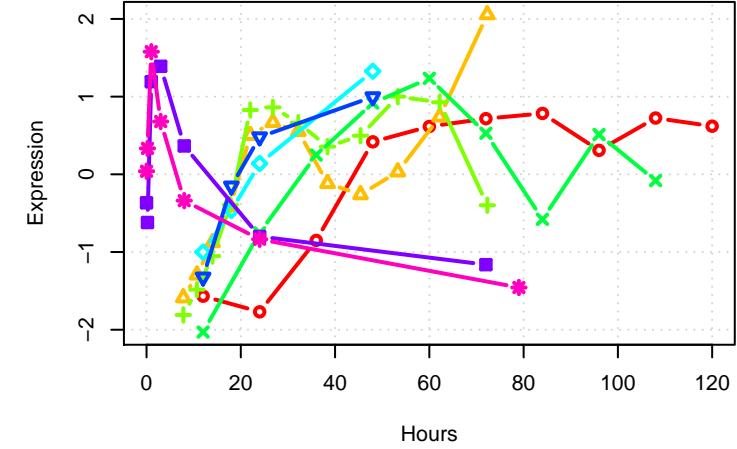
adh4 YGL256W
Alcohol dehydrogenase isoenzyme type IV



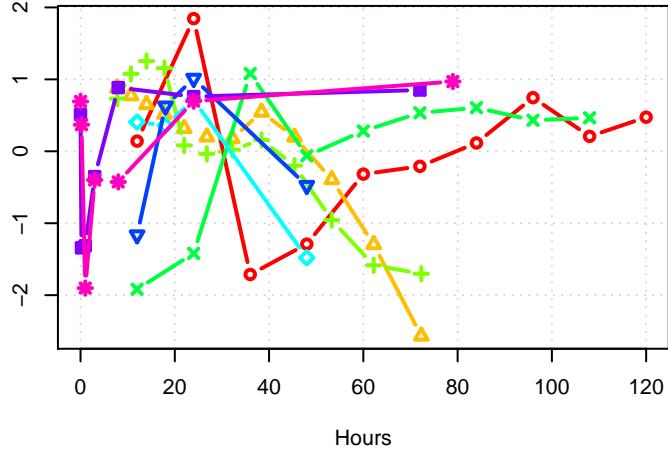
adh5 YBR145W
Alcohol dehydrogenase isoenzyme V



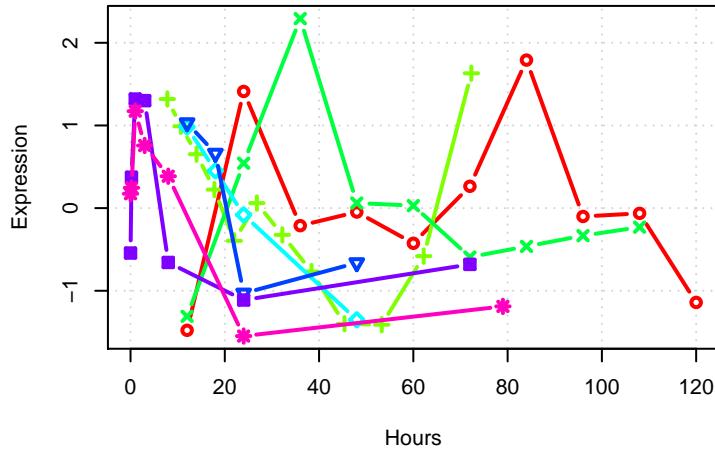
sfa1 YDL168W
Bifunctional alcohol dehydrogenase and formaldehyde dehydrogenase



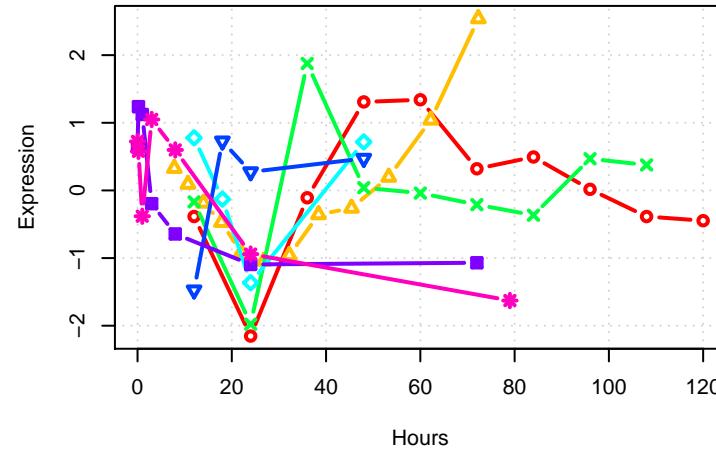
bat1 YHR208W
Mitochondrial branched-chain amino acid (BCAA) aminotransferase



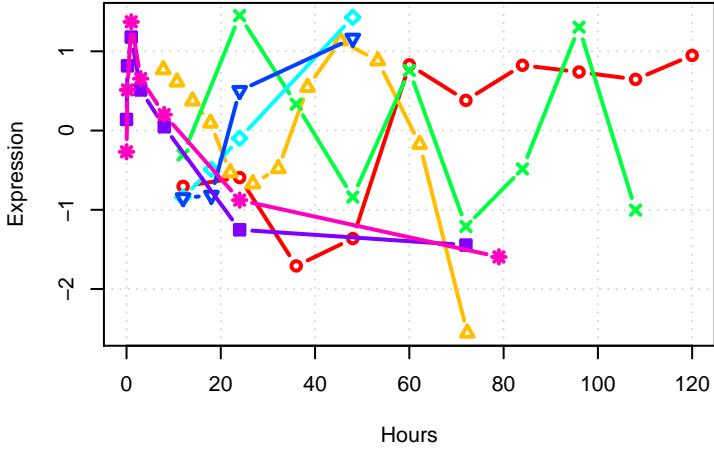
leucine degradation
bat2 YJR148W
Cytosolic branched-chain amino acid (BCAA) aminotransferase



aro10 YDR380W
Phenylpyruvate decarboxylase



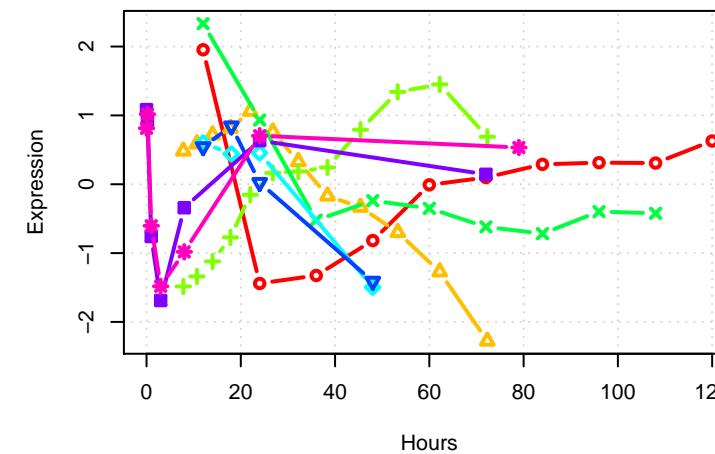
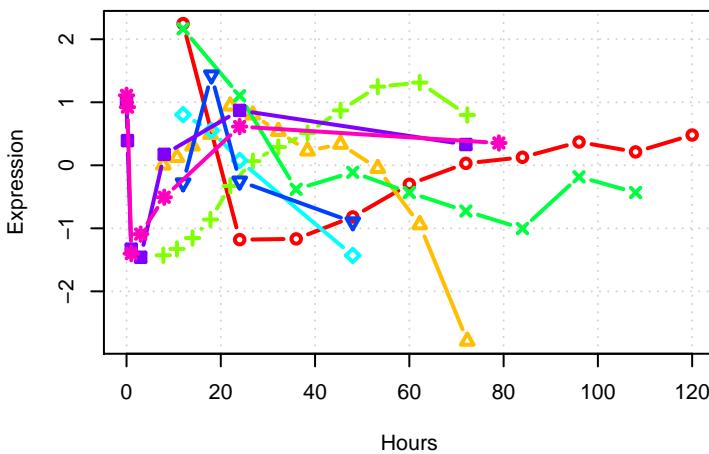
thi3 YDL080C
Regulatory protein that binds Pdc2p and Thi2p transcription factors



fatty acid biosynthesis (concise)

fatty acid biosynthesis (concise)

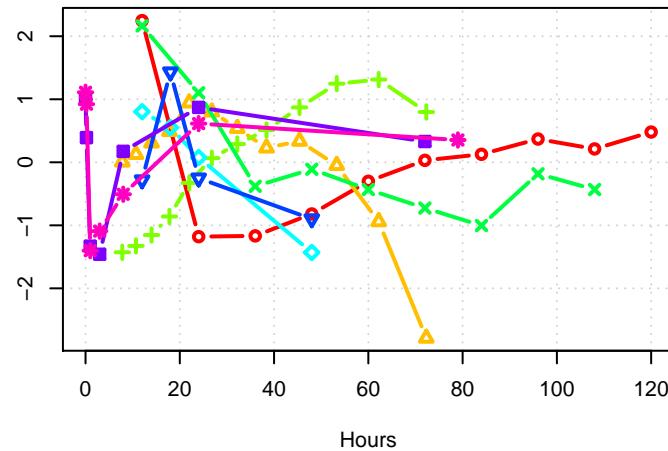
Alpha subunit of fatty acid synthetase



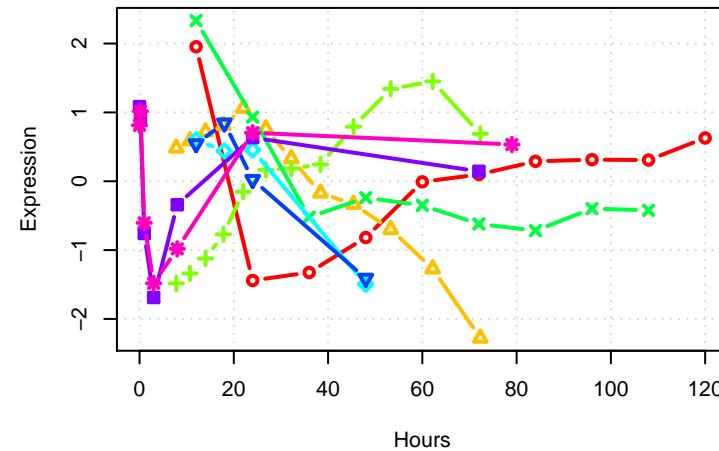
fatty acid biosynthesis, initial steps

fatty acid biosynthesis, initial steps

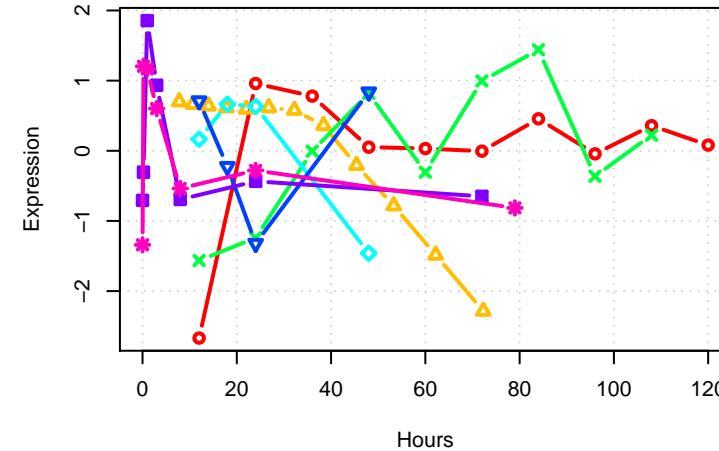
fas1 YKL182W
Beta subunit of fatty acid synthetase



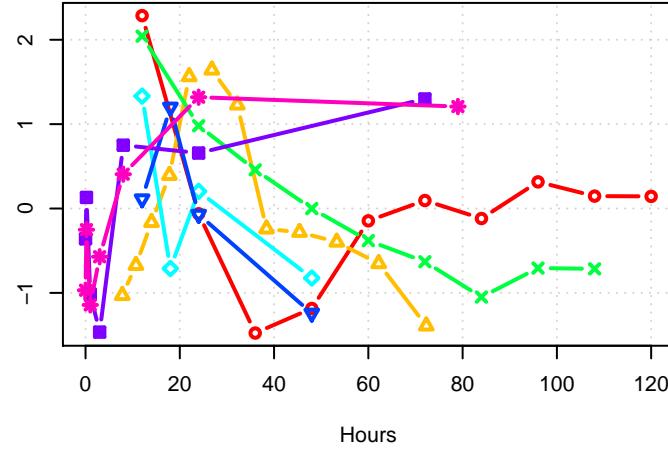
fas2 YPL231W
Alpha subunit of fatty acid synthetase



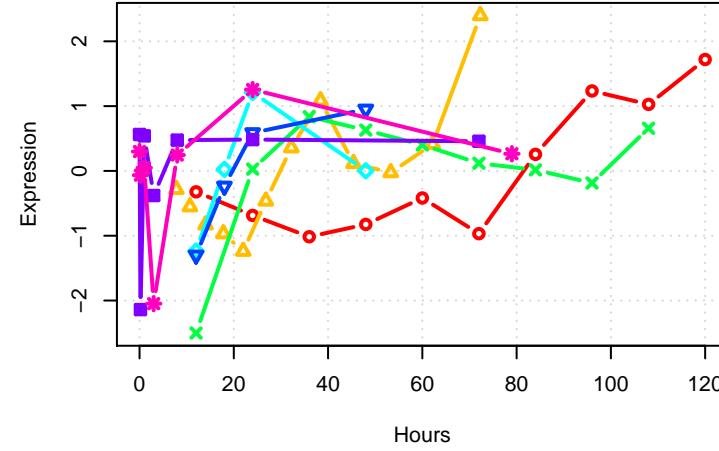
cem1 YER061C
Mitochondrial beta-keto-acyl synthase



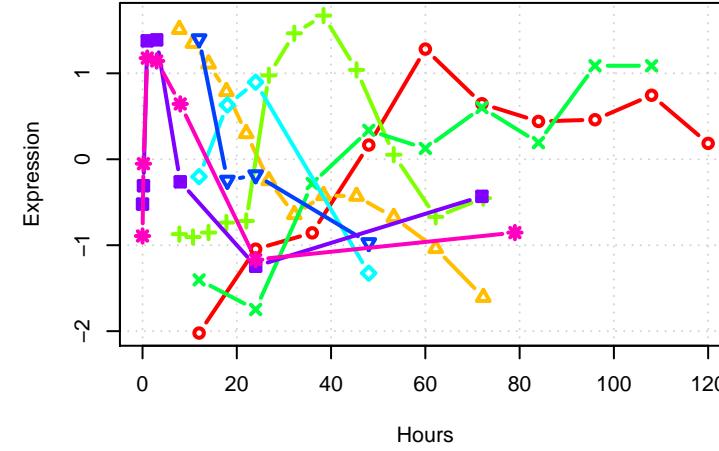
acc1 YNR016C
Acetyl-CoA carboxylase, biotin containing enzyme



hfa1 YMR207C
Mitochondrial acetyl-coenzyme A carboxylase



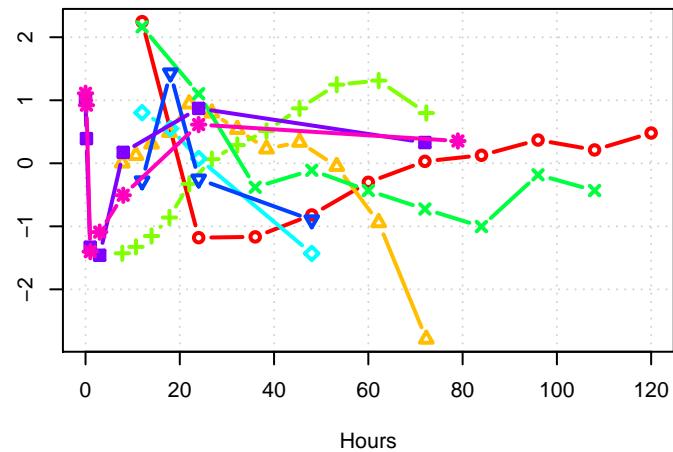
mct1 YOR221C
Predicted malonyl-CoA:ACP transferase



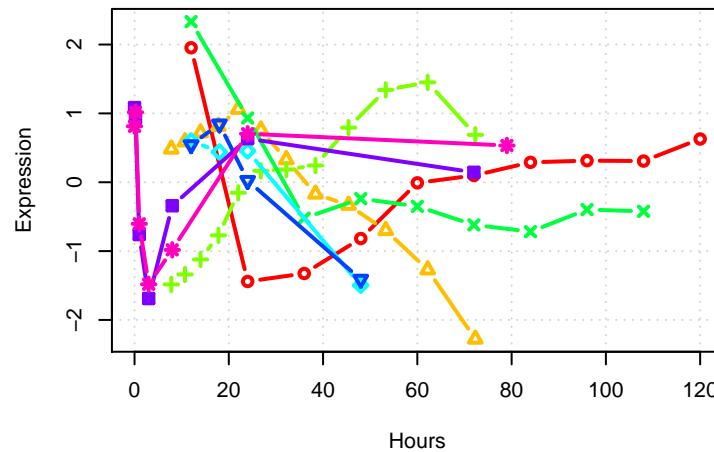
fatty acid elongation

fatty acid elongation

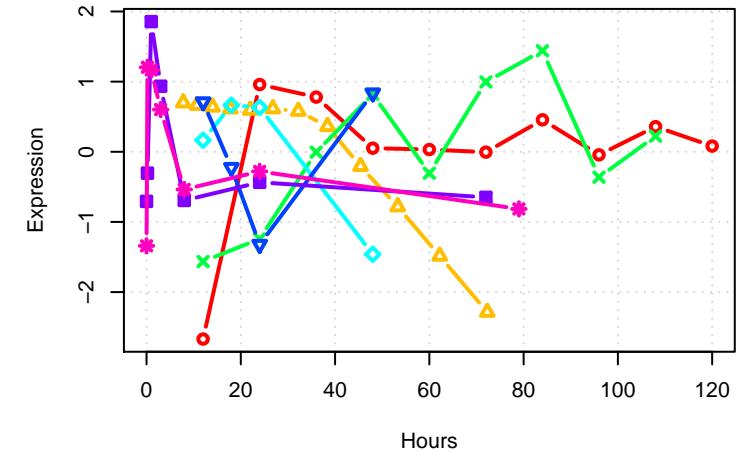
fas1 YKL182W
Beta subunit of fatty acid synthetase



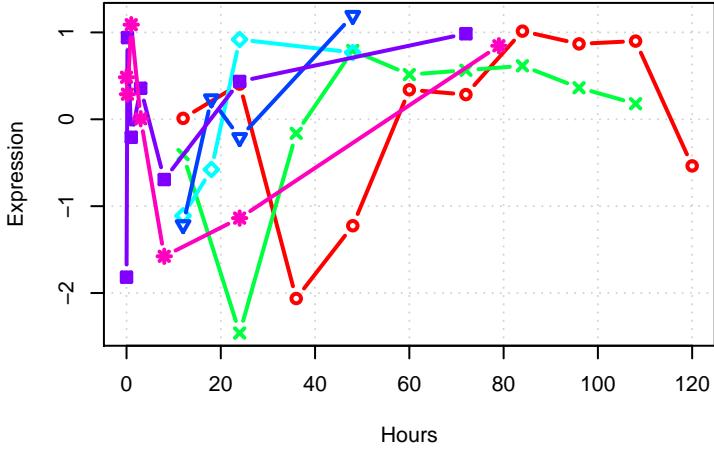
fas2 YPL231W
Alpha subunit of fatty acid synthetase



cem1 YER061C
Mitochondrial beta-keto-acyl synthase

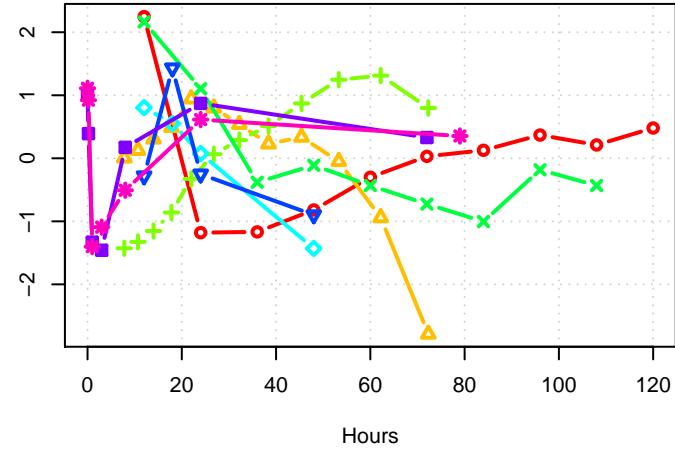


oar1 YKL055C
Mitochondrial 3-oxoacyl-[acyl-carrier-protein] reductase



myristate biosynthesis

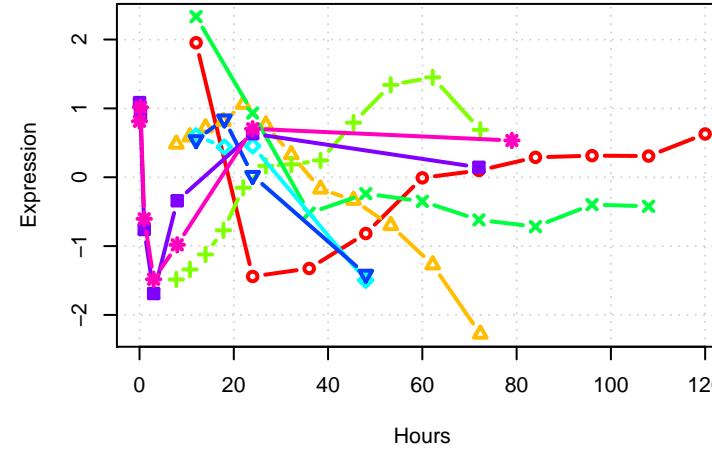
fas1 YKL182W
Beta subunit of fatty acid synthetase



myristate biosynthesis

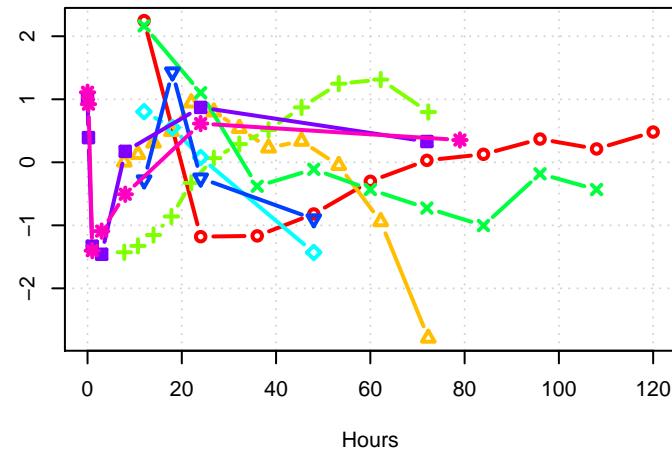
fas2 YPL23 W

Alpha subunit of fatty acid synthetase

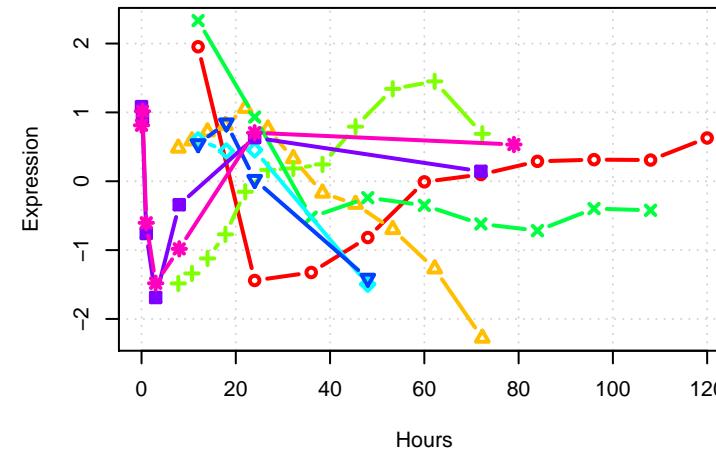


palmitate biosynthesis

fas1 YKL182W
Beta subunit of fatty acid synthetase

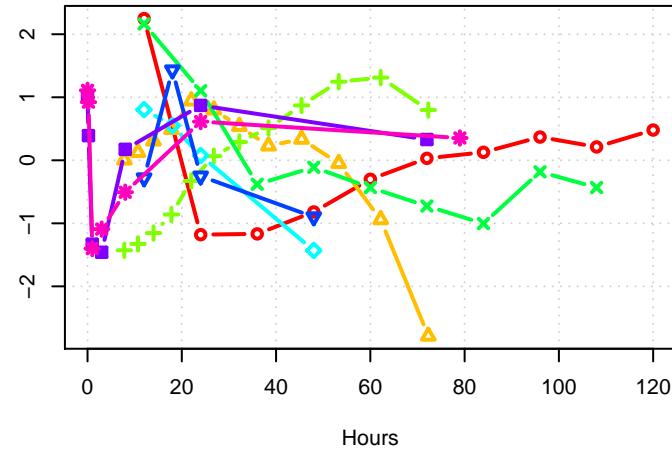


palmitate biosynthesis
fas2 YPL233W
Alpha subunit of fatty acid synthetase



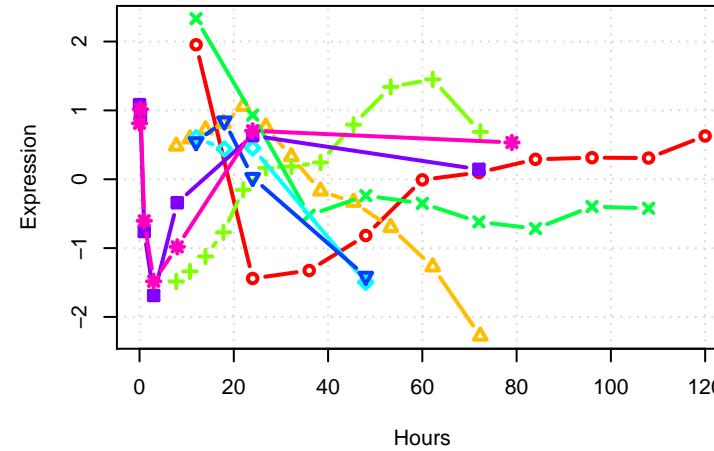
stearate biosynthesis

fas1 YKL182W
Beta subunit of fatty acid synthetase



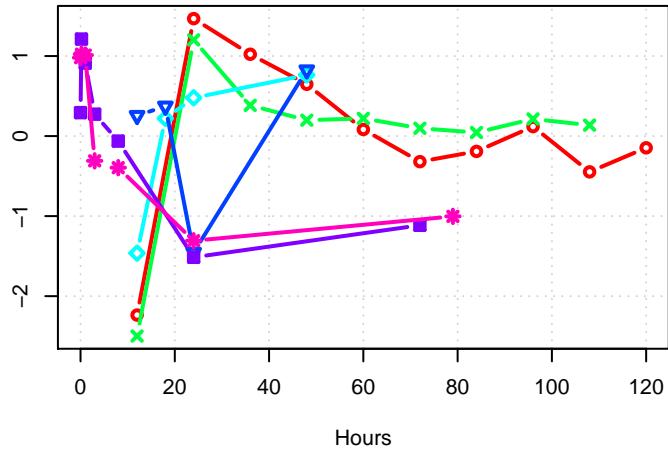
stearate biosynthesis

fas2 YPL231W
Alpha subunit of fatty acid synthetase



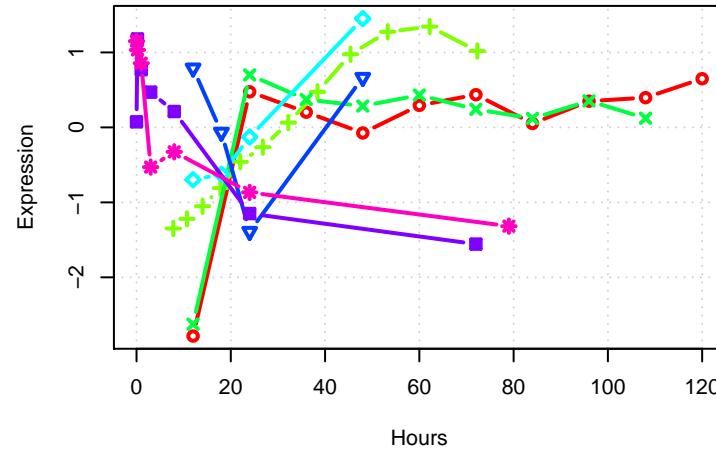
fatty acid oxidation pathway

fox2 YKR009C
3-hydroxyacyl-CoA dehydrogenase and enoyl-CoA hydratase

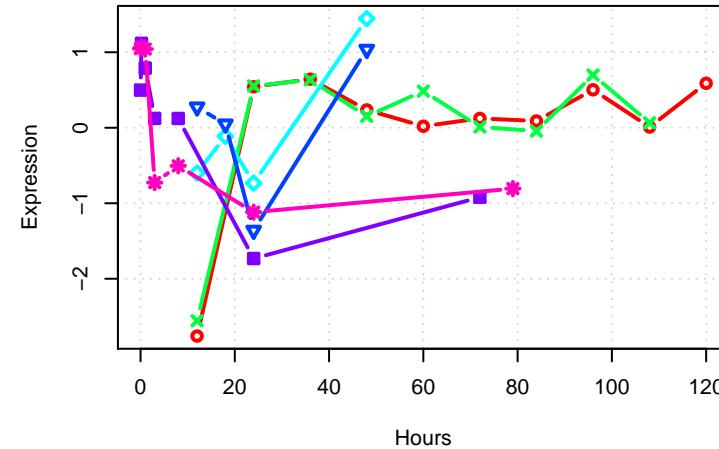


fatty acid oxidation pathway

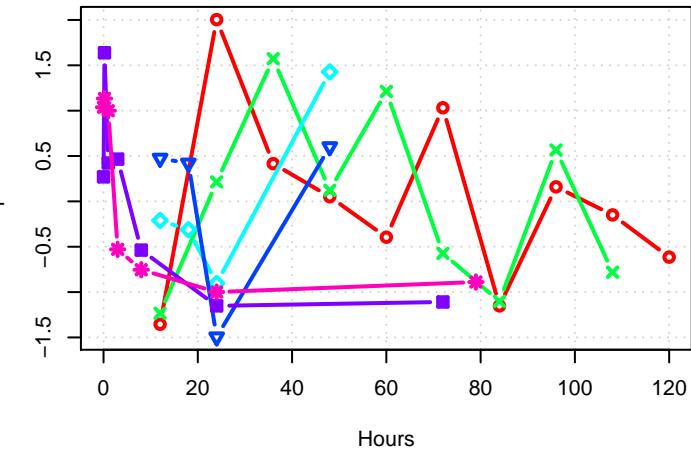
pox1 YIL160C
3-ketoacyl-CoA thiolase with broad chain length specificity



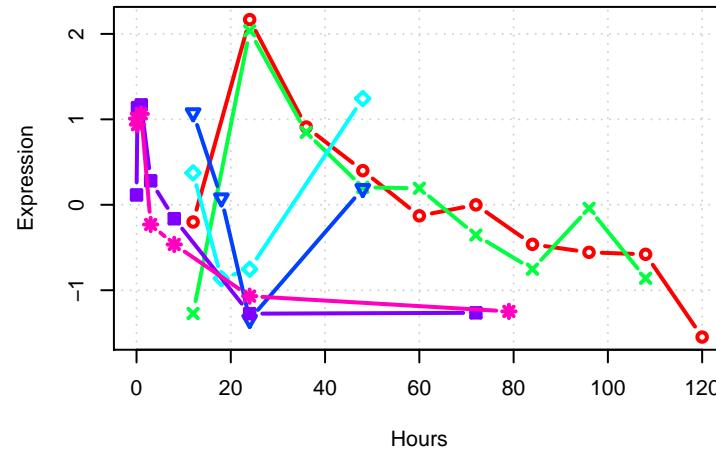
pox1 YGL205W
Fatty-acyl coenzyme A oxidase



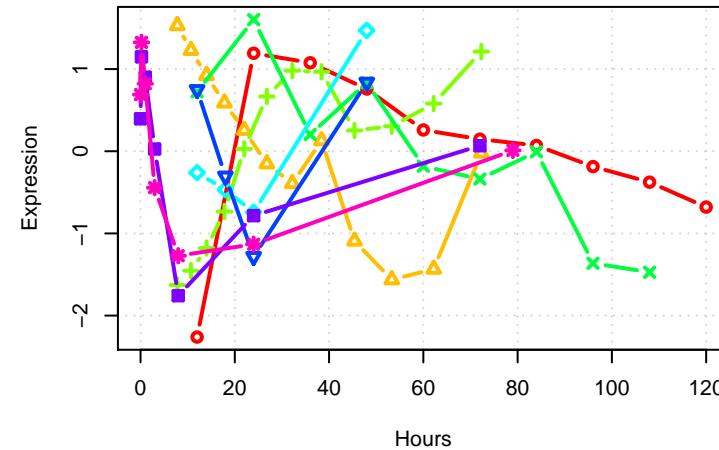
dci1 YOR180C
Peroxisomal protein



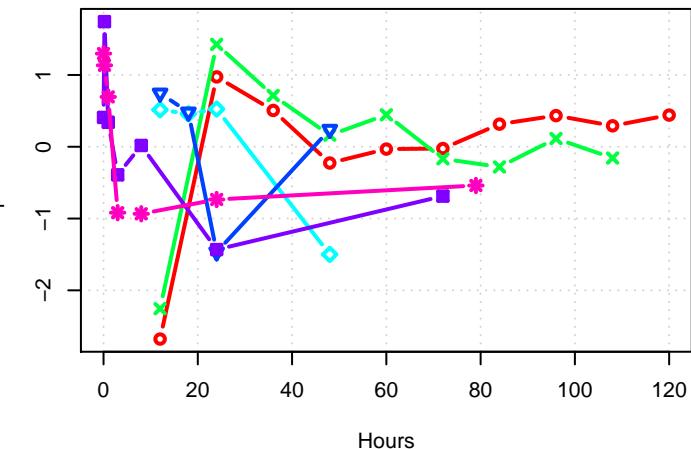
eci1 YLR284C
Peroxisomal delta3, delta2-enoyl-CoA isomerase



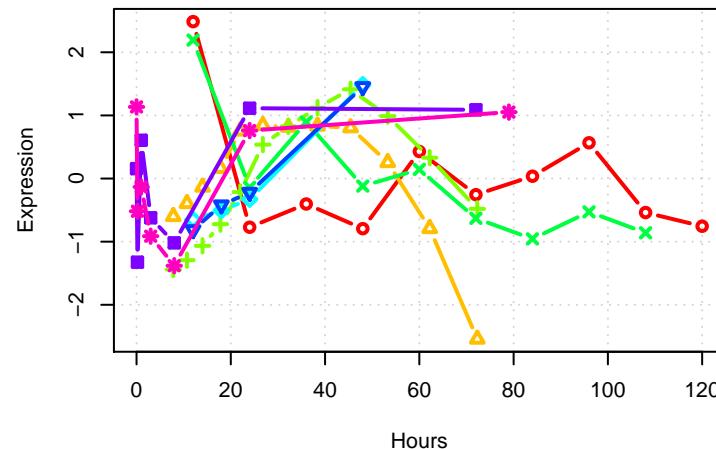
faa1 YOR317W
Long chain fatty acyl-CoA synthetase



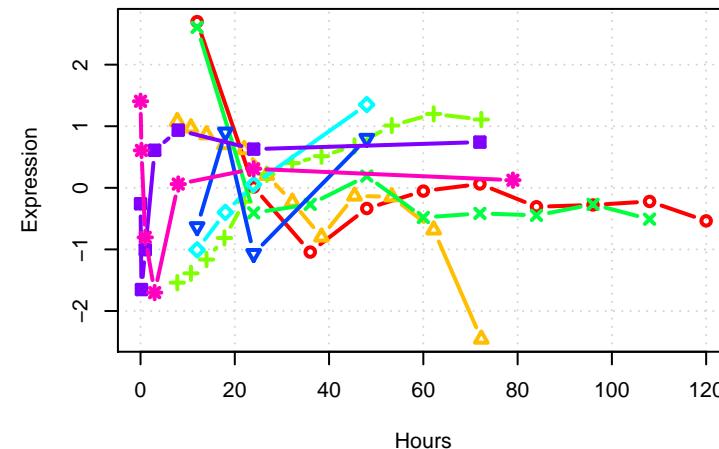
faa2 YER015W
Medium chain fatty acyl-CoA synthetase



faa3 YIL009W
Long chain fatty acyl-CoA synthetase

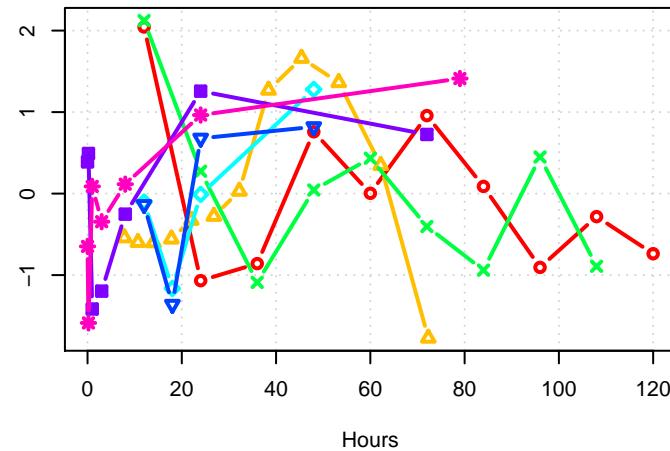


faa4 YMR246W
Long chain fatty acyl-CoA synthetase



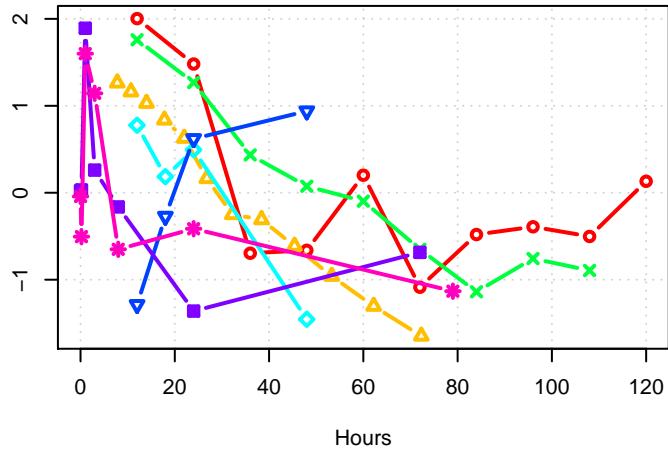
fat1 YBR041W
Very long chain fatty acyl-CoA synthetase and fatty acid transporter

fatty acid oxidation pathway

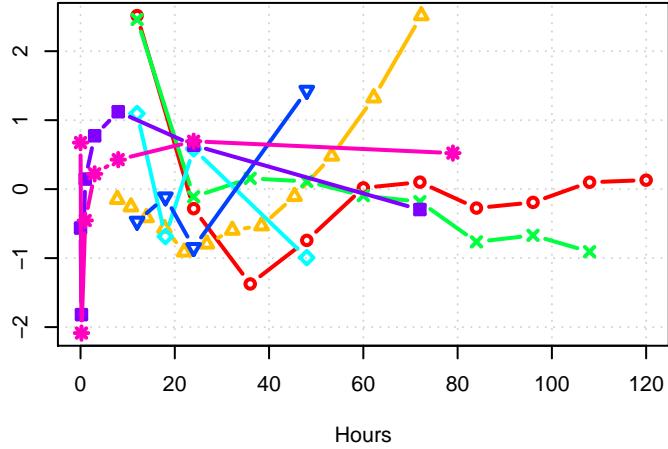


folate biosynthesis II

abz2 YMR289W
Aminodeoxychorismate lyase (4-amino-4-deoxychorismate lyase)

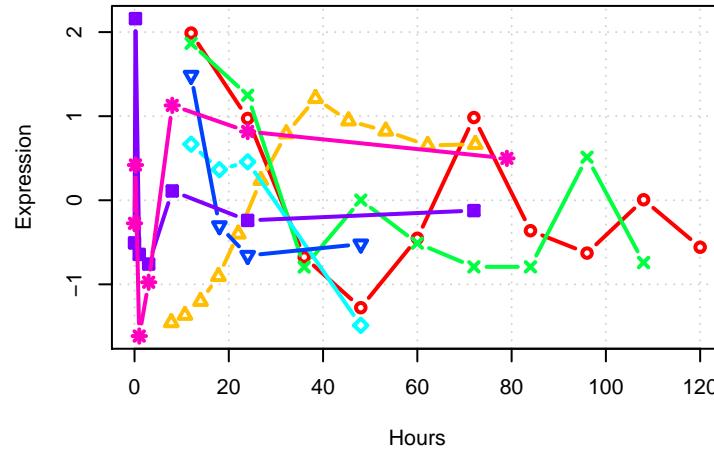


dfr1 YOR236W
Dihydrofolate reductase involved in tetrahydrofolate biosynthesis

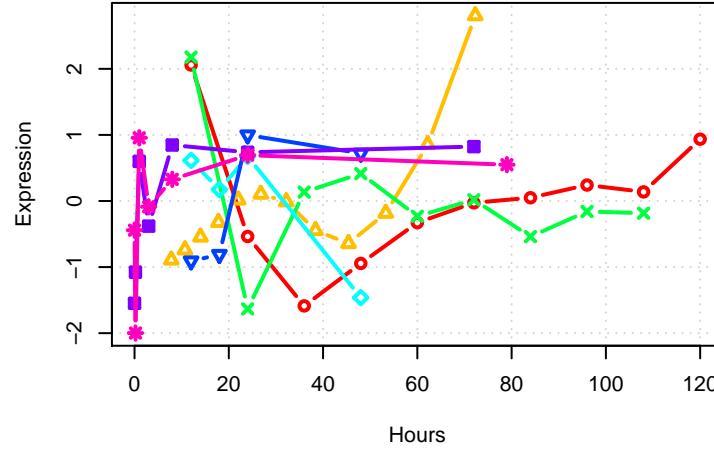


folate biosynthesis II

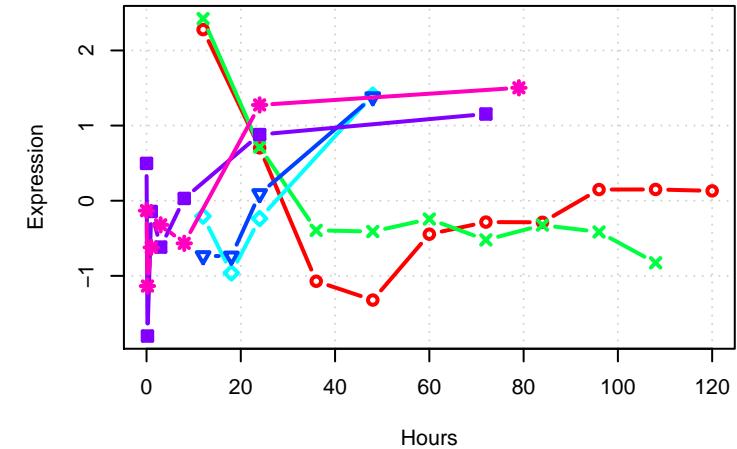
abz1 YNR033W
Para-aminobenzoate (PABA) synthase



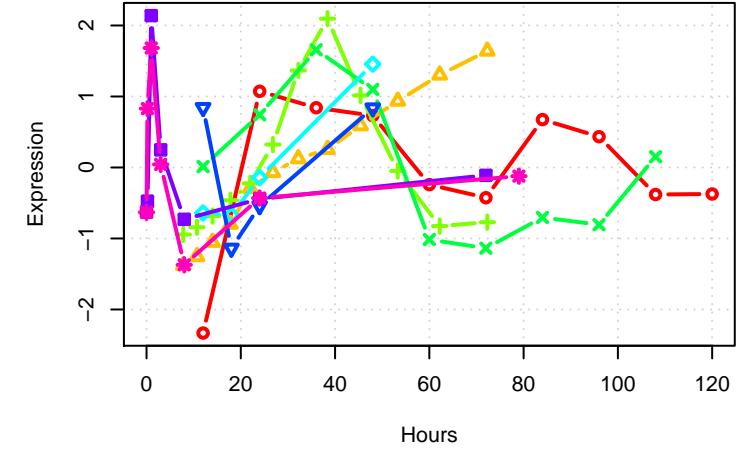
fol3 YMR113W
Dihydrofolate synthetase, involved in folic acid biosynthesis



fol1 YNL256W
Multifunctional enzyme of the folic acid biosynthesis pathway

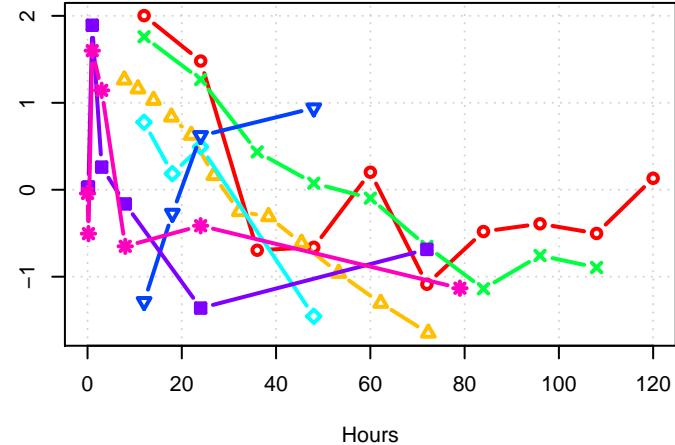


fol2 YGR267C
GTP-cyclohydrolase I, catalyzes first step in folic acid biosynthesis



p–aminobenzoate biosynthesis

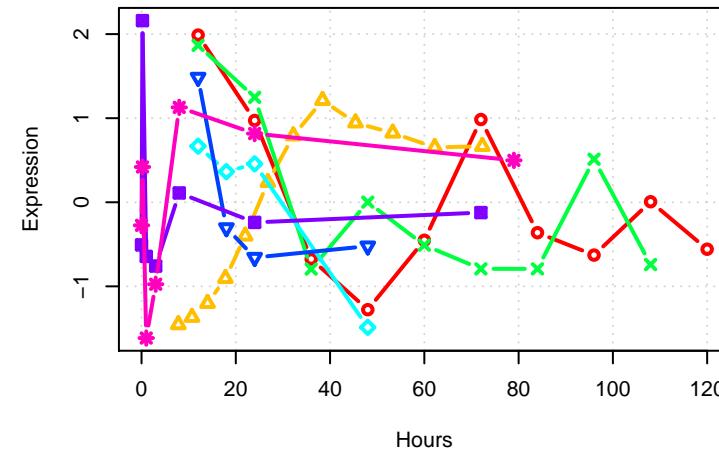
abz2 YMR289W
Aminodeoxychorismate lyase (4-amino-4-deoxychorismate lyase)



p-aminobenzoate biosynthesis

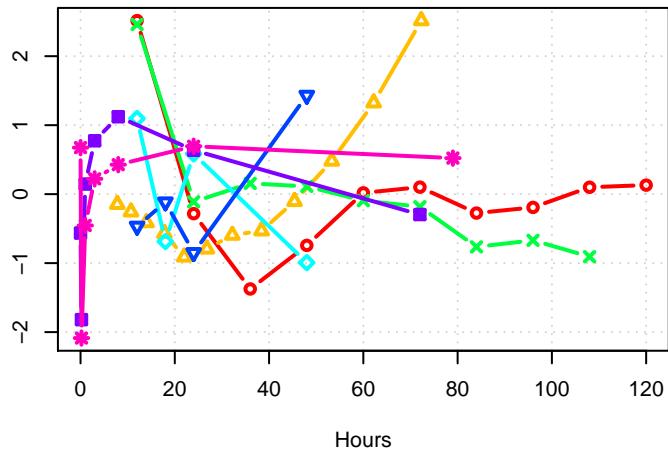
ab21 YNR035W

Para-aminobenzoate (PABA) synthase

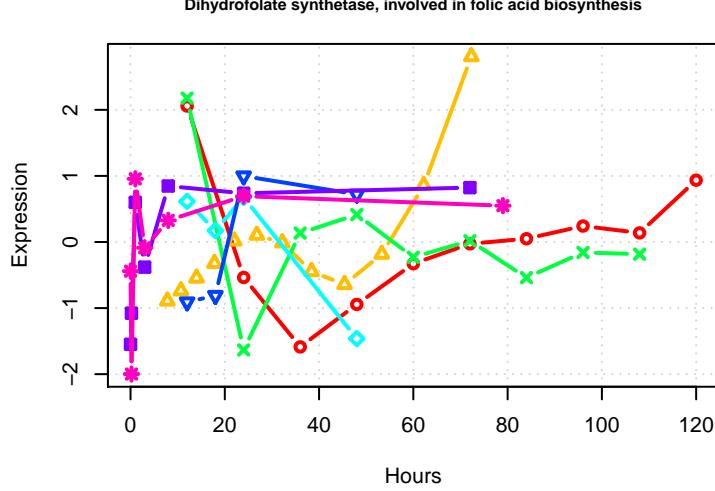


folate polyglutamylation

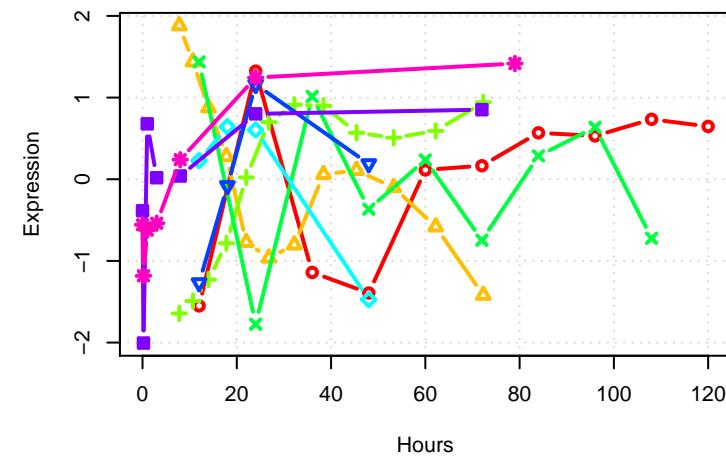
dfr1 YOR236W
Dihydrofolate reductase involved in tetrahydrofolate biosynthesis



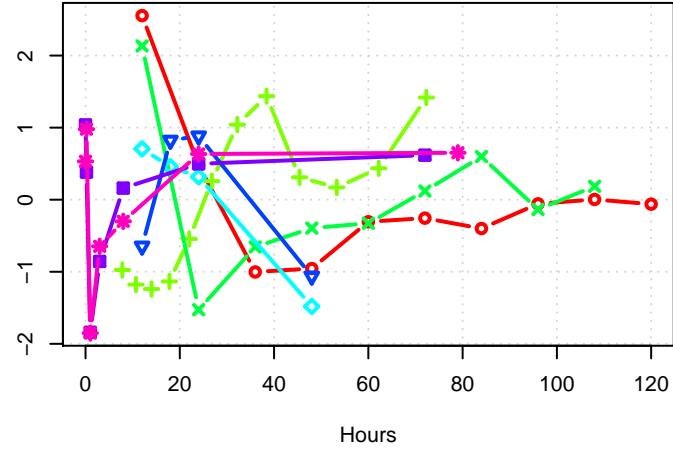
folate polyglutamylase
for TMR15W



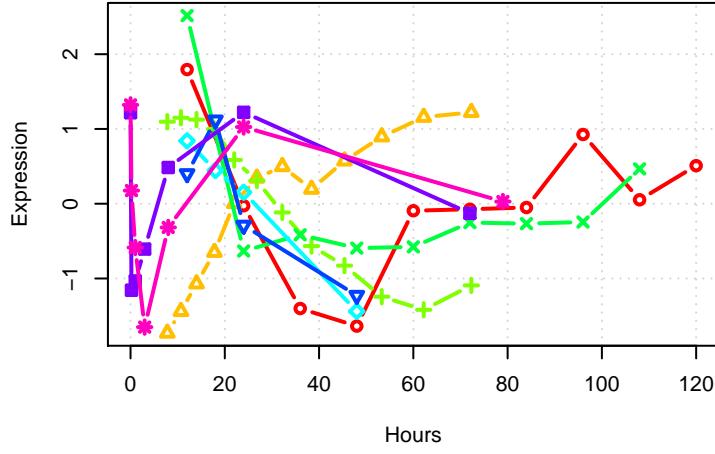
ade3 YGR204W
Cytoplasmic trifunctional enzyme C1-tetrahydrofolate synthase



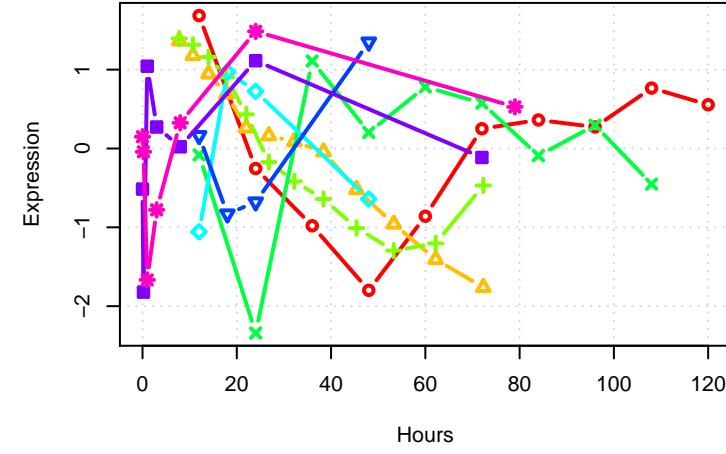
mis1 YBR084W
Mitochondrial C1-tetrahydrofolate synthase



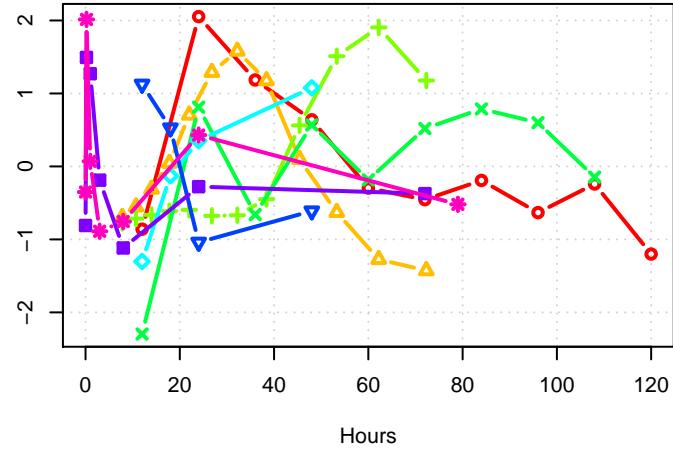
shm1 YBR263W
Mitochondrial serine hydroxymethyltransferase



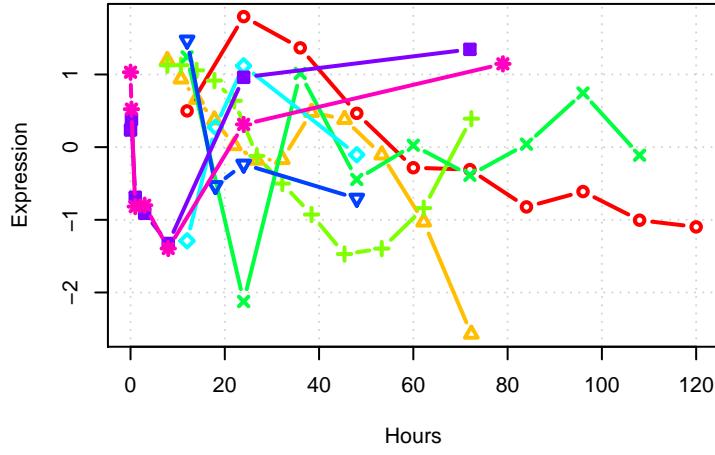
shm2 YLR058C
Cytosolic serine hydroxymethyltransferase



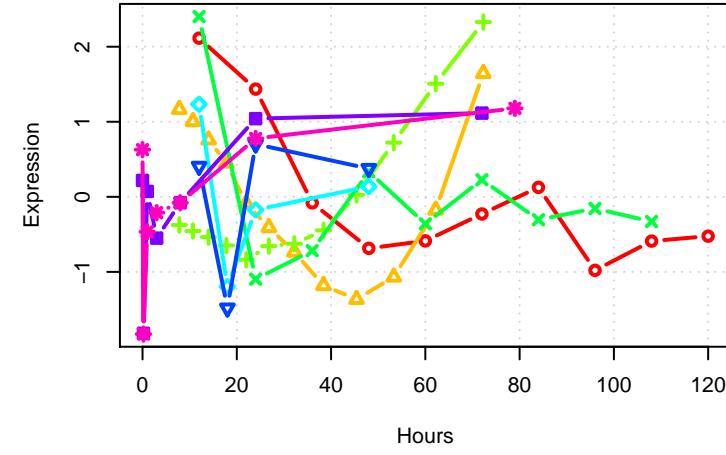
met12 YPL023C
Protein with MTHFR activity in vitro



met13 YGL125W
Major isozyme of methylenetetrahydrofolate reductase

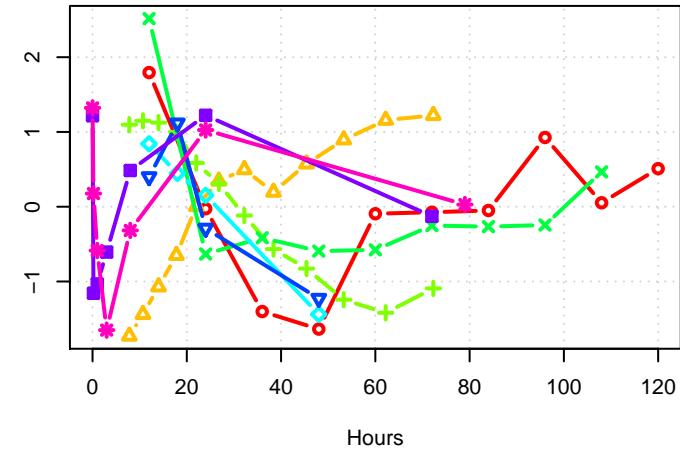


met7 YOR241W
Folylpolyglutamate synthetase

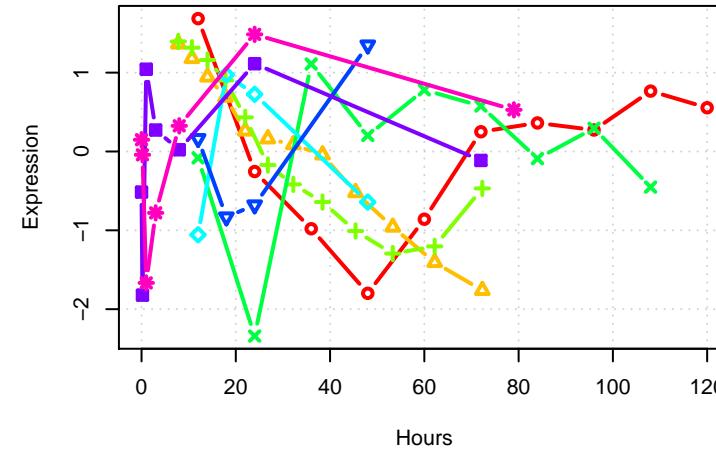


glycine biosynthesis from serine

shm1 YBR263W
Mitochondrial serine hydroxymethyltransferase

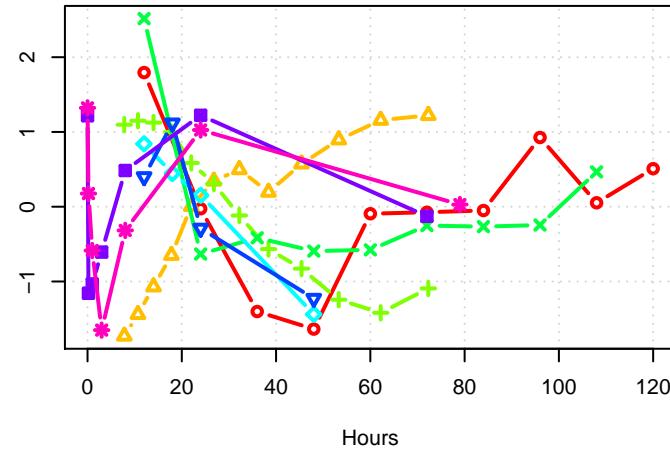


glycine biosynthesis from serine
shm2 YLR056C
Cytosolic serine hydroxymethyltransferase

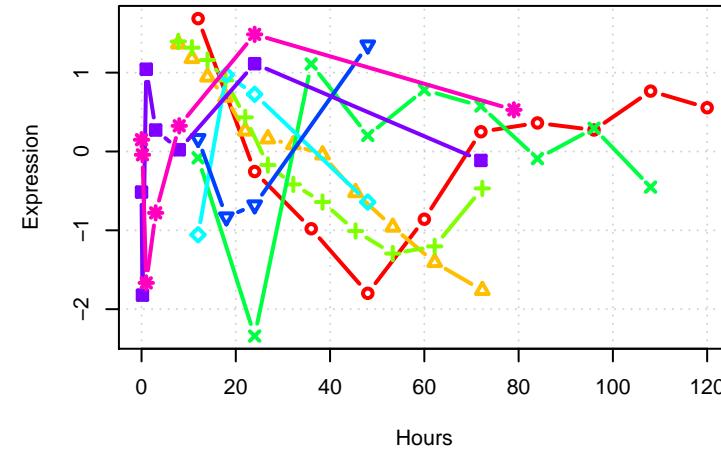


serine biosynthesis from glyoxylate

shm1 YBR263W
Mitochondrial serine hydroxymethyltransferase

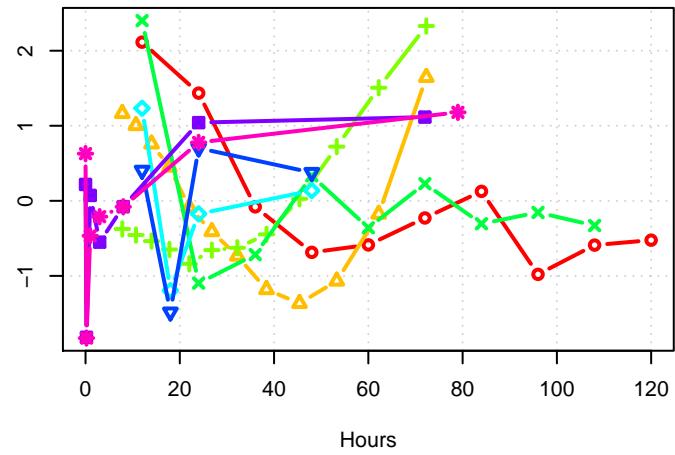


serine biosynthesis from glyoxylate
shm2 YLR058C
Cytosolic serine hydroxymethyltransferase



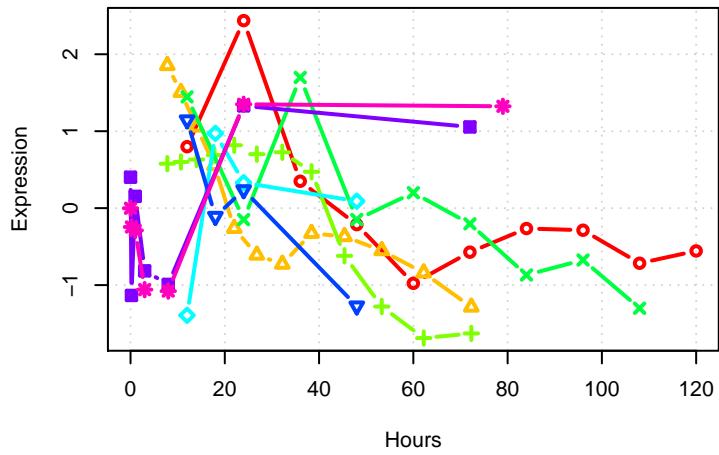
methionine biosynthesis

met7 YOR241W
Folylpolyglutamate synthetase

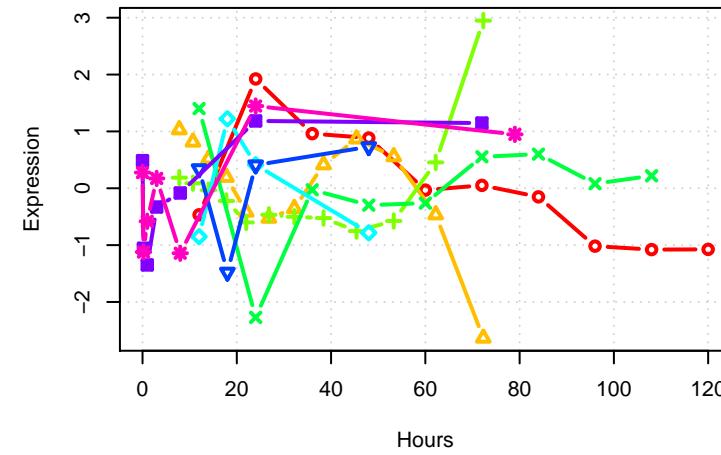


methionine biosynthesis

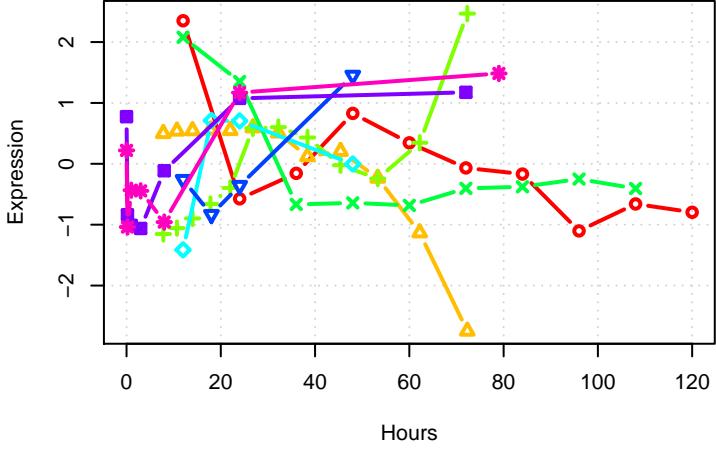
met7 YER091C
Cobalamin-independent methionine synthase



met1 YLR180W
S-adenosylmethionine synthetase



met2 YDR502C
S-adenosylmethionine synthetase

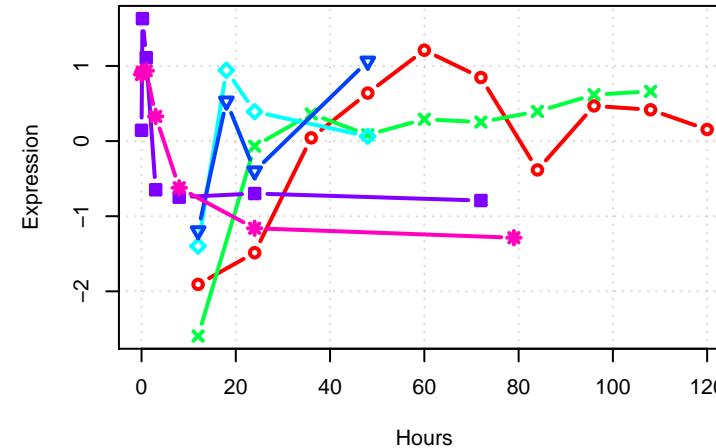
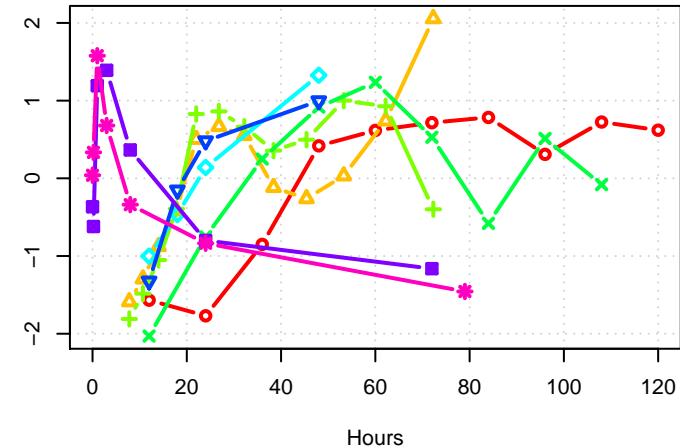


formaldehyde oxidation II (glutathione-dependent)

formaldehyde oxidation II (glutathione-dependent)

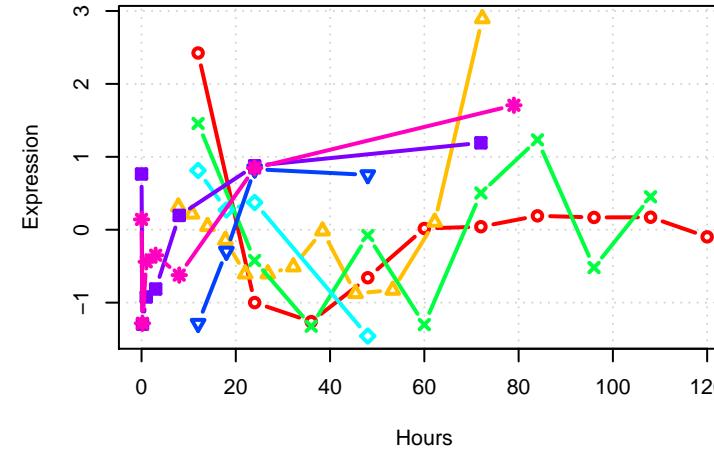
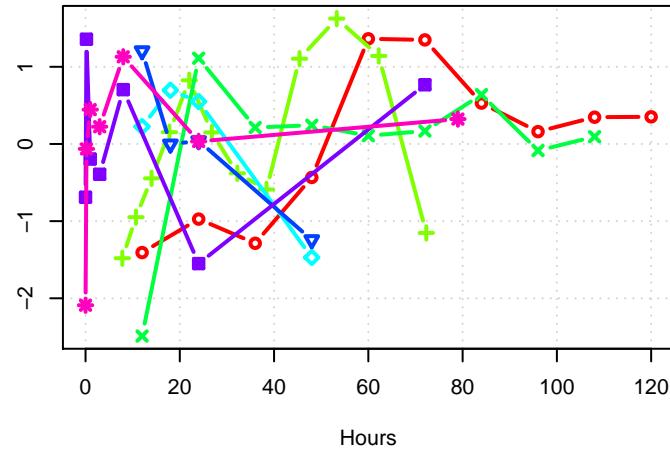
sfa1 YDL168W
Bifunctional alcohol dehydrogenase and formaldehyde dehydrogenase

fdh1 Ycr388C
NAD(+)–dependent formate dehydrogenase



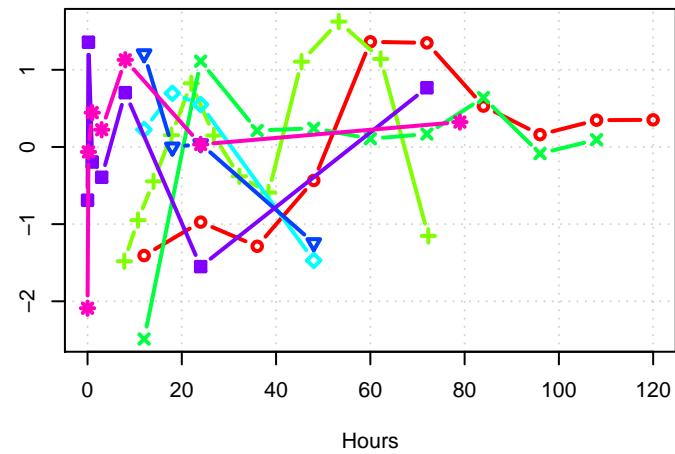
fructose degradation

hxk1 YFR053C
Hexokinase isoenzyme 1



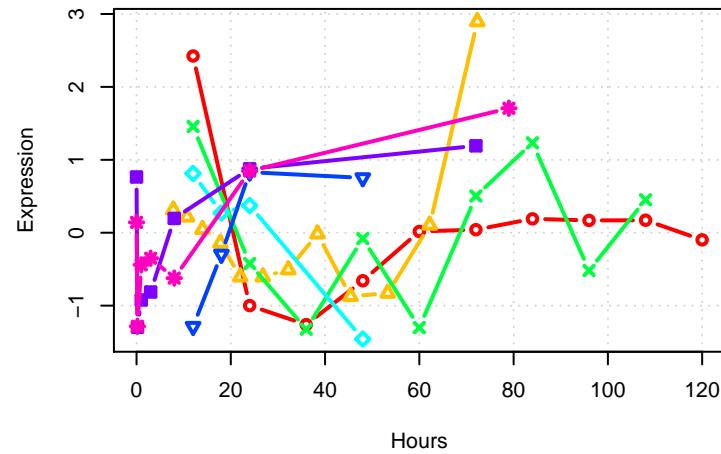
glucose-6-phosphate biosynthesis

hxk1 YFR053C
Hexokinase isoenzyme 1

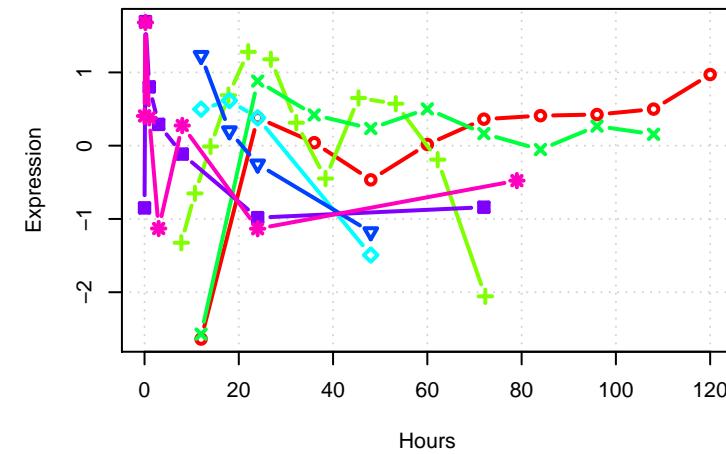


glucose-6-phosphate biosynthesis

hxk2 YGL253W
Hexokinase isoenzyme 2

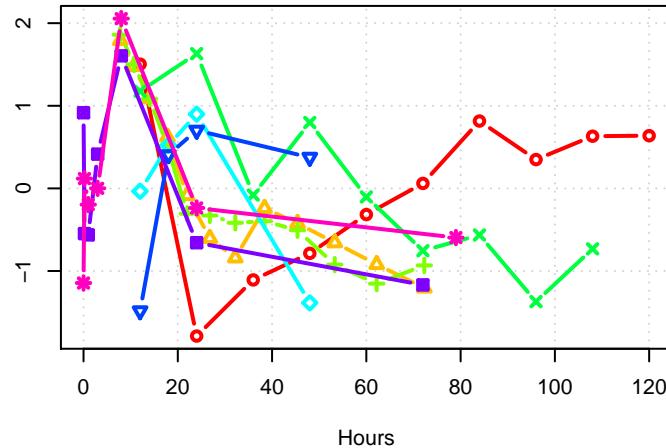


glk1 YCL040W
Glucokinase

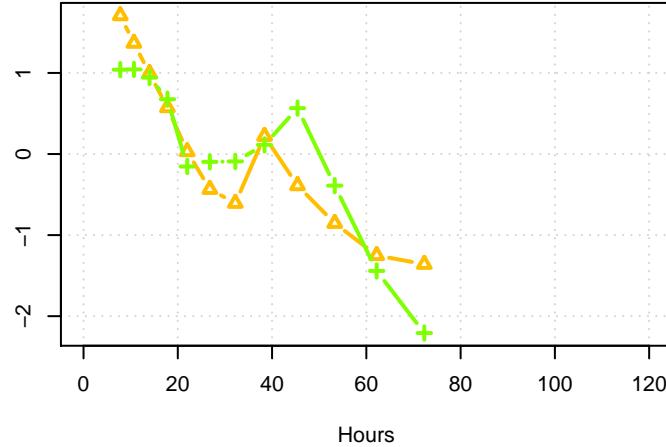


glycolysis

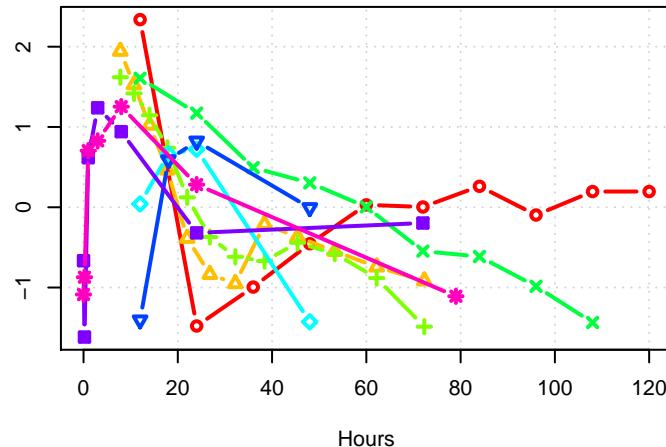
fba1 YKL060C
Fructose 1,6-bisphosphate aldolase



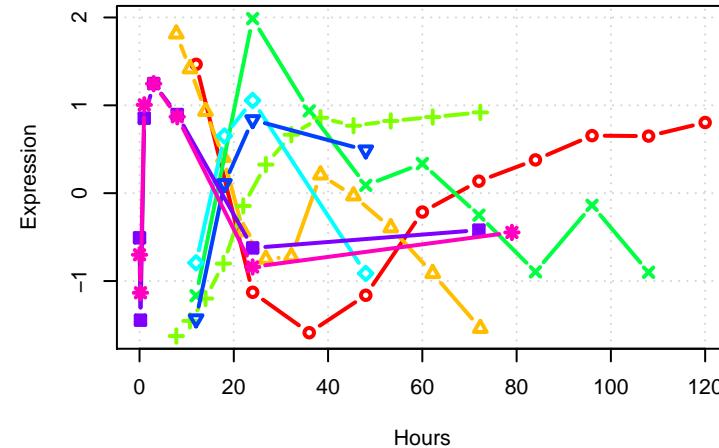
tdh2 YJR009C
Glyceraldehyde-3-phosphate dehydrogenase (GAPDH), isozyme 2



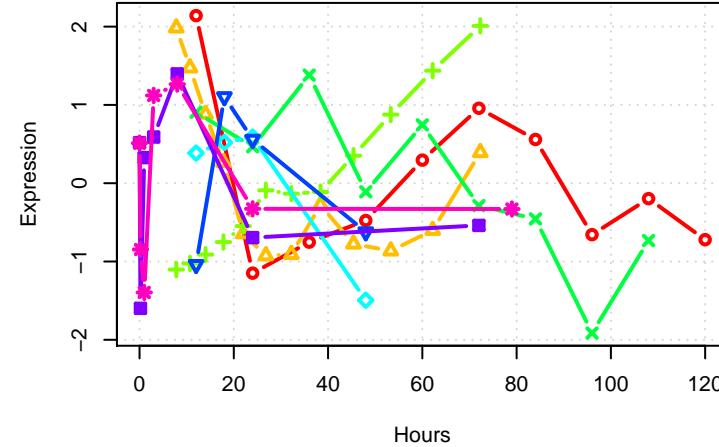
gpm1 YKL152C
Tetrameric phosphoglycerate mutase



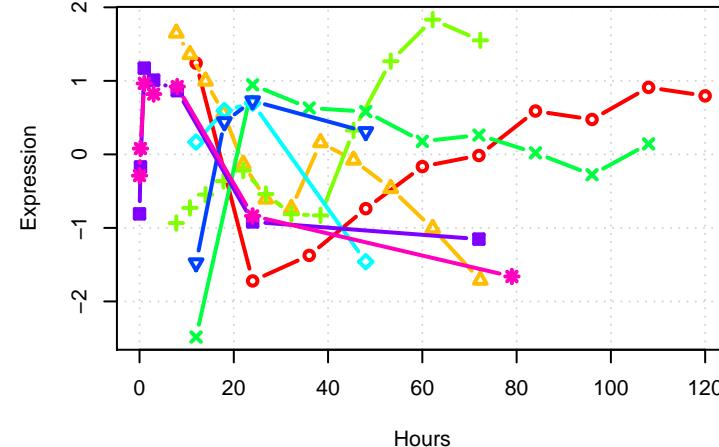
pgk1 YJR196C
Glycolytic enzyme phosphoglucomutase



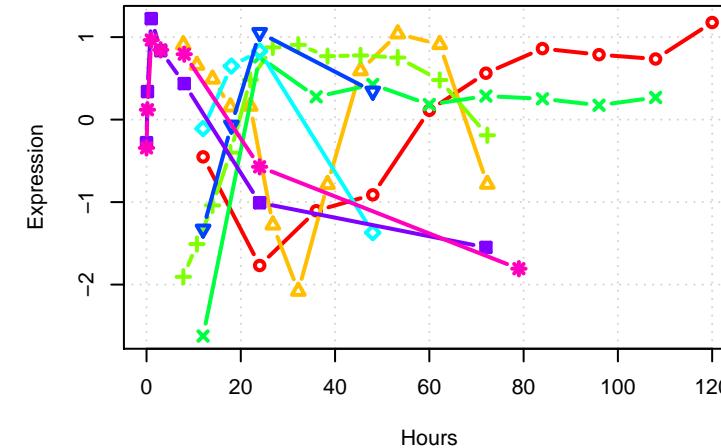
tdh3 YGR192C
Glyceraldehyde-3-phosphate dehydrogenase (GAPDH), isozyme 3



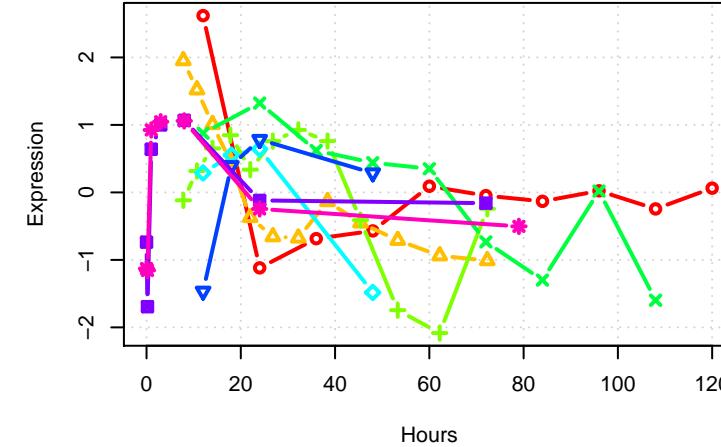
eno1 YGR254W
Enolase I, a phosphopyruvate hydratase



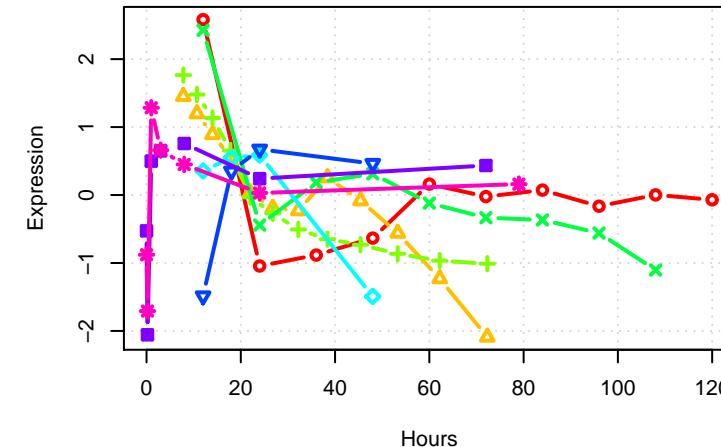
tdh1 YJL052W
Glyceraldehyde-3-phosphate dehydrogenase (GAPDH), isozyme 1



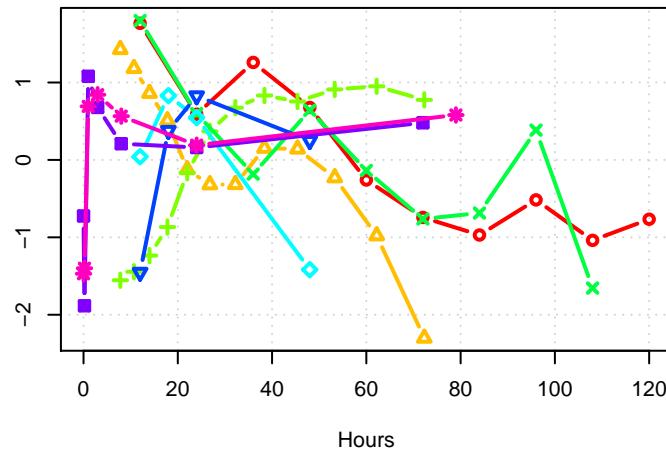
pgk1 YCR012W
3-phosphoglycerate kinase



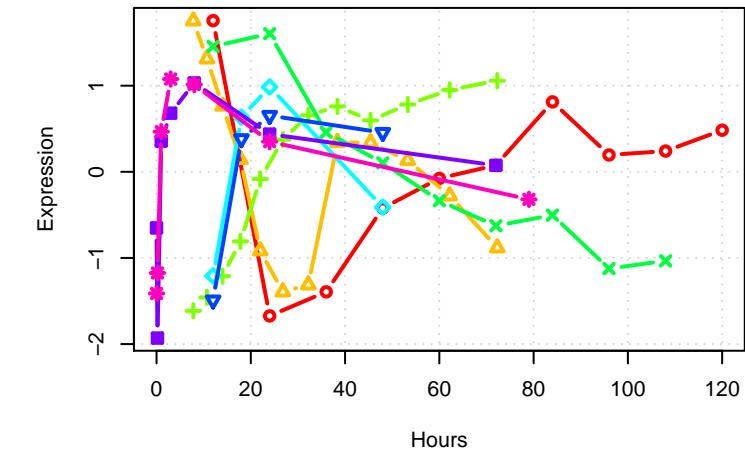
eno2 YHR174W
Enolase II, a phosphopyruvate hydratase



pfk1 YGR240C
Alpha subunit of heterooctameric phosphofructokinase

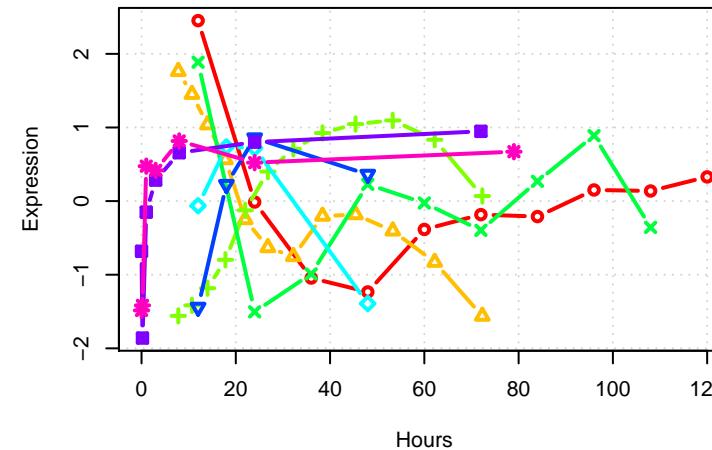
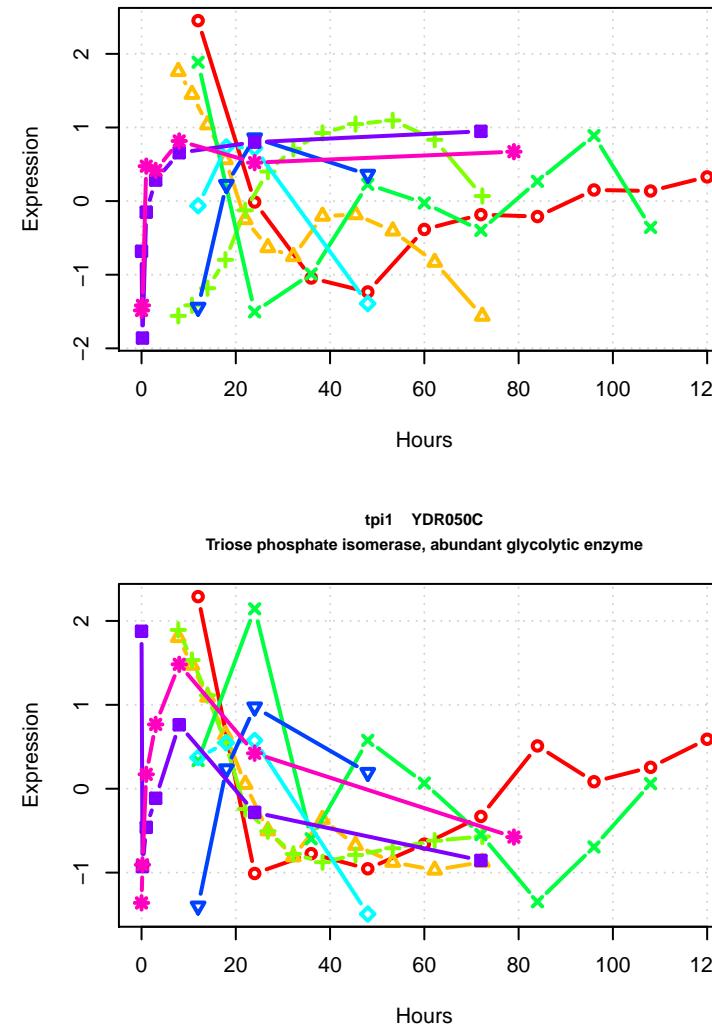


pyk2 YOR347C
Pyruvate kinase



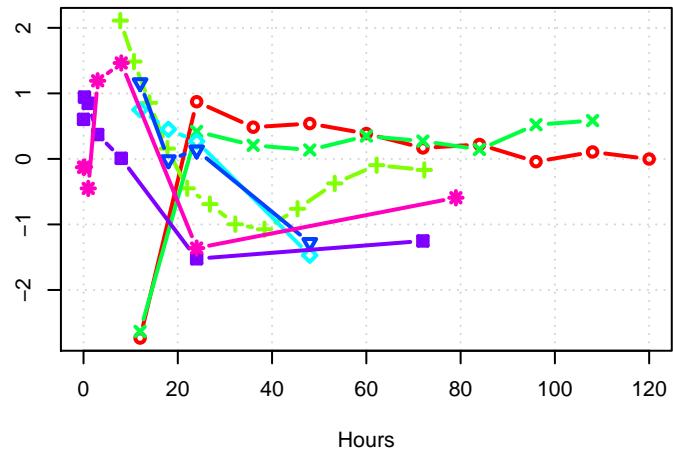
pyk2 YOR347C
Pyruvate kinase

tpi1 YDR050C
Triose phosphate isomerase, abundant glycolytic enzyme

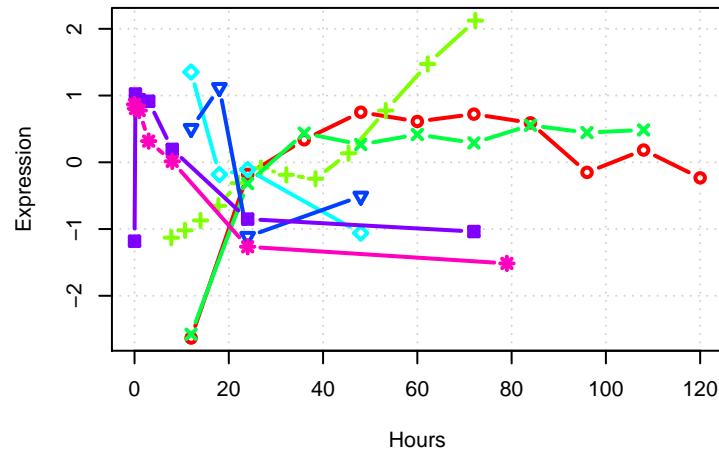


glyoxylate cycle

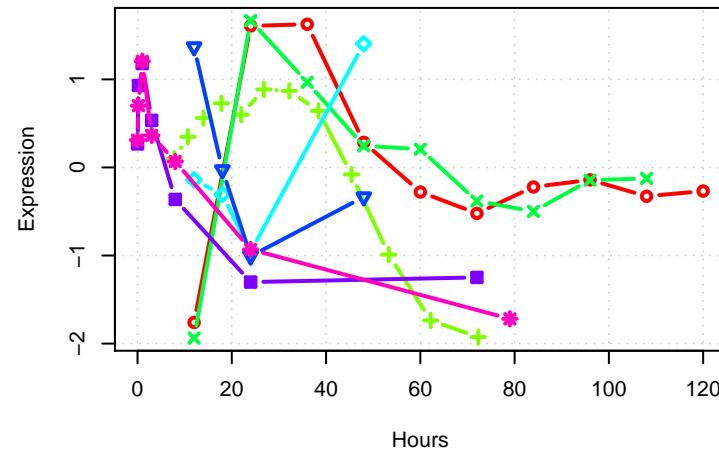
mdh1 YKL085W
Mitochondrial malate dehydrogenase



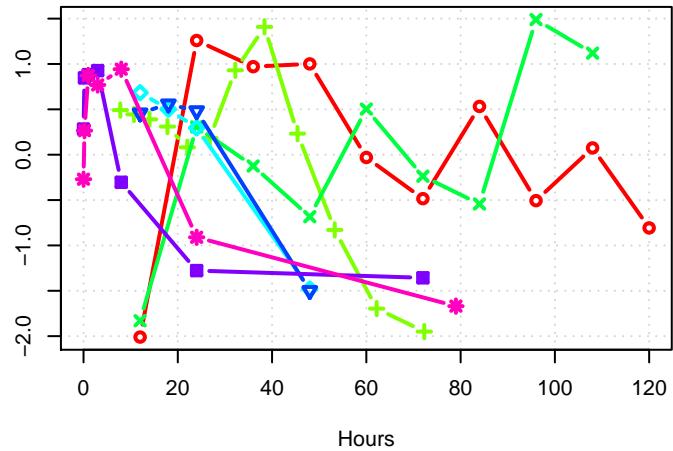
glyoxylate cycle
mdh2 YOL126w
Cytoplasmic malate dehydrogenase



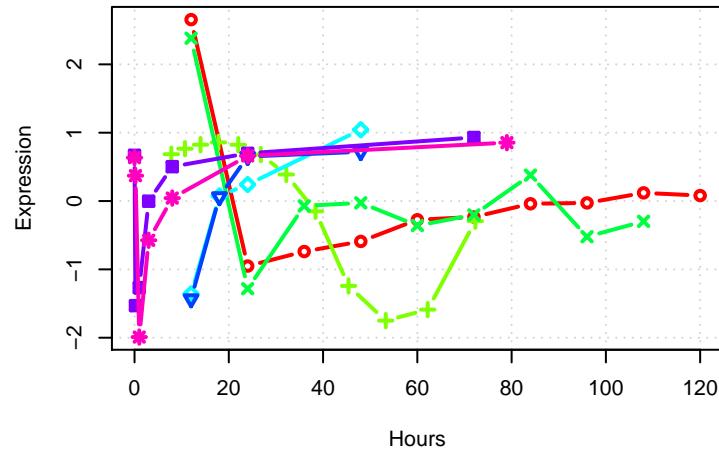
mdh3 YDL078C
Peroxisomal malate dehydrogenase



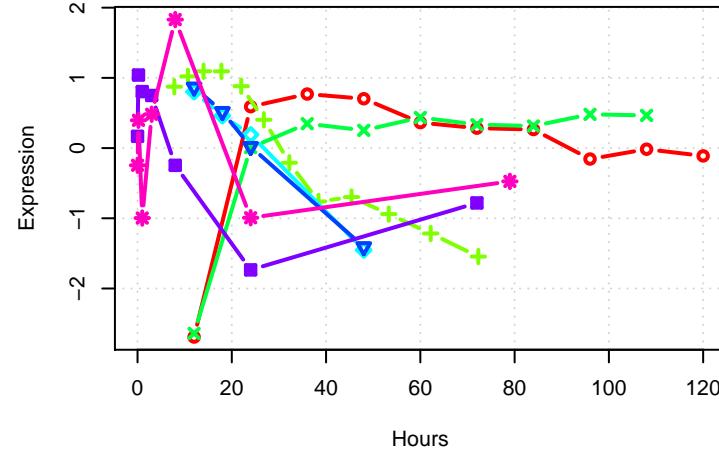
aco1 YLR304C
Aconitase



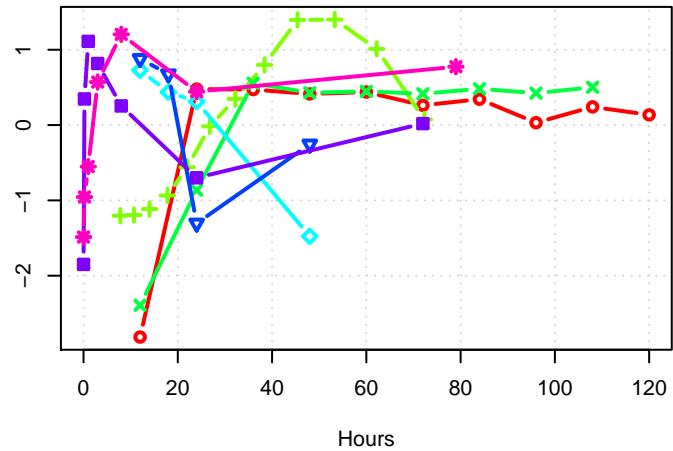
aco2 YJL200C
Putative mitochondrial aconitase isozyme



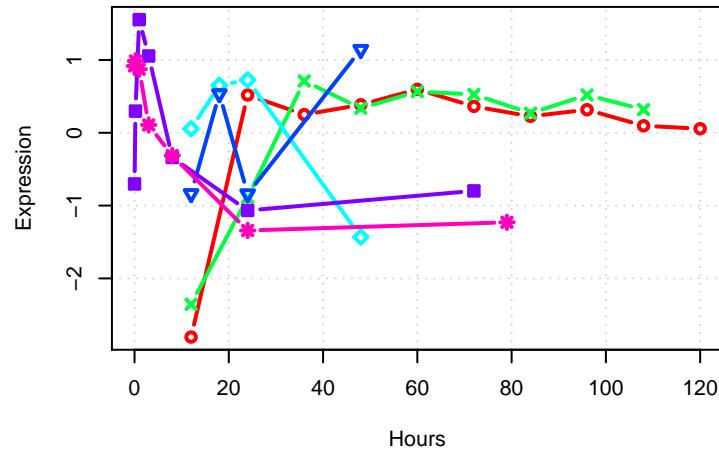
cit1 YNR001C
Citrate synthase



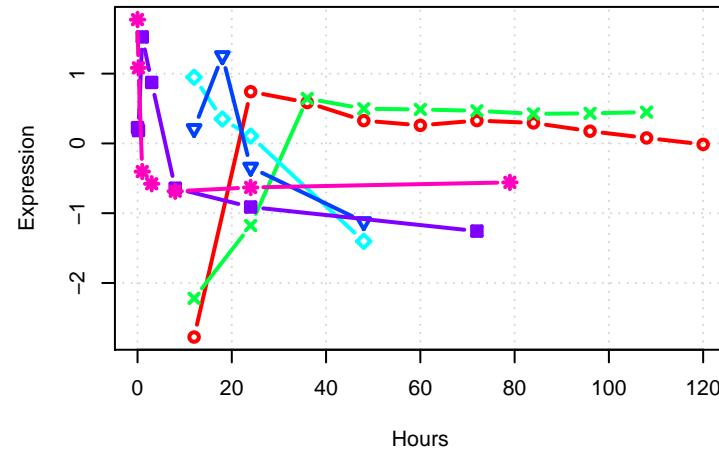
cit2 YCR005C
Citrate synthase, peroxisomal isozyme involved in glyoxylate cycle



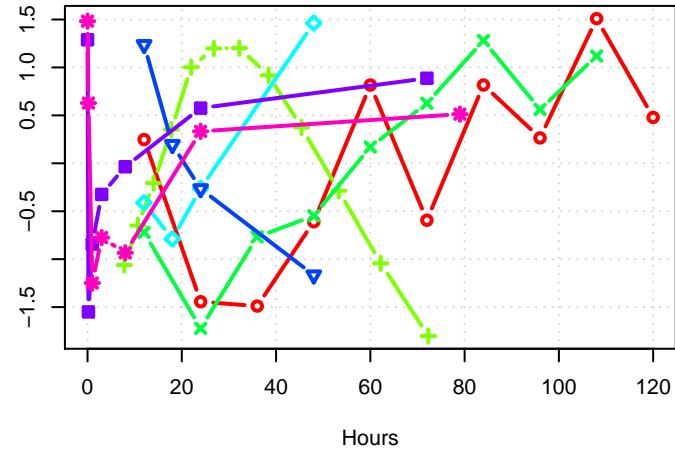
cit3 YPR001W
Dual specificity mitochondrial citrate and methylcitrate synthase



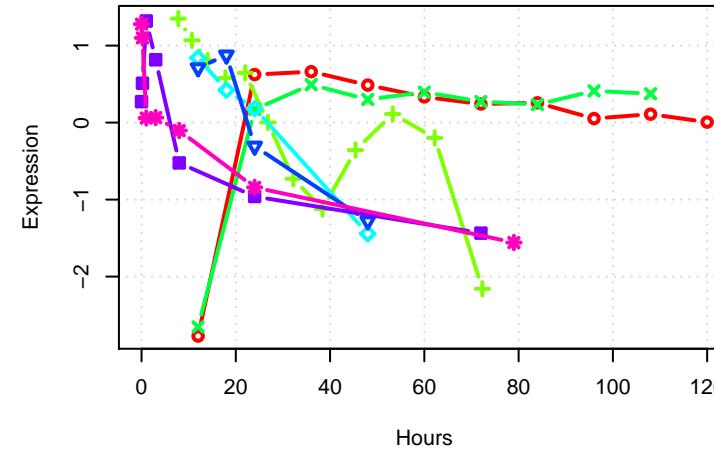
icl1 YER065C
Isocitrate lyase



dal7 YIR031C
Malate synthase

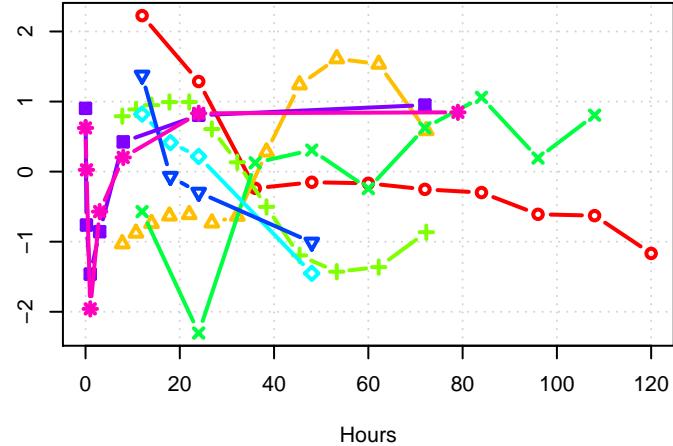


glyoxylate cycle^{mist} YNL117W
Malate synthase, enzyme of the glyoxylate cycle

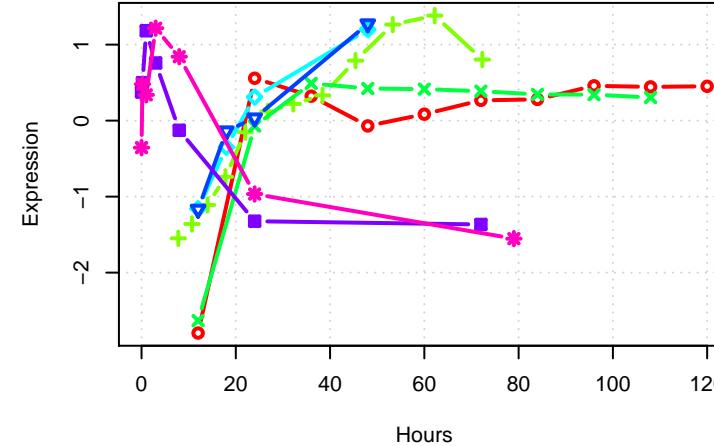


glutamate biosynthesis from ammonia

gdh1 YOR375C
NADP(+)-dependent glutamate dehydrogenase



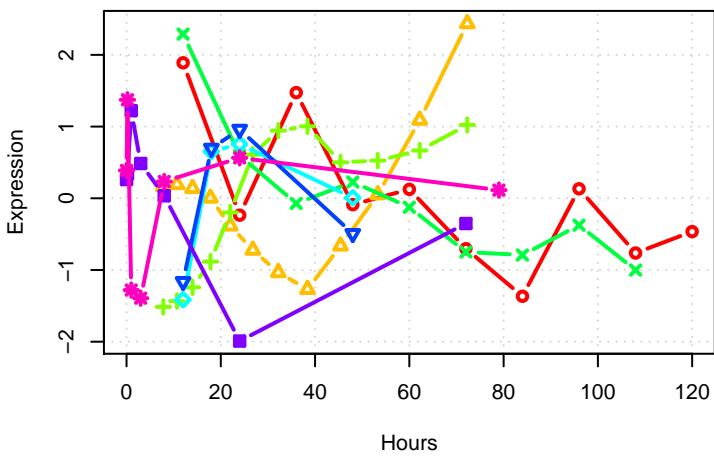
gdn3 YAL062W
NADP(+)-dependent glutamate dehydrogenase



glutamate biosynthesis from glutamine

glutamate biosynthesis from glutamine

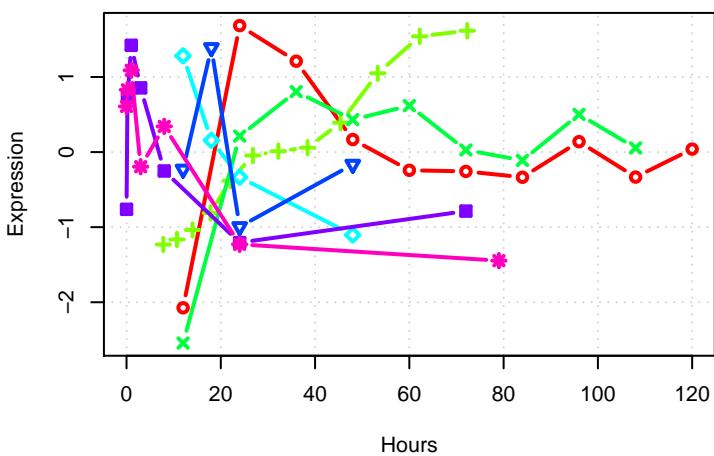
glt1 YDL171C
NAD(+)–dependent glutamate synthase (GOGAT)



glutamate degradation IX

glutamate degradation IX

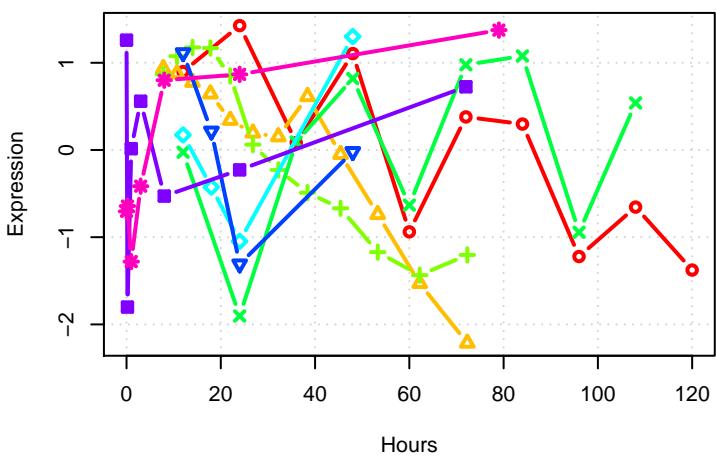
gdh2 YDL215C
NAD(+)–dependent glutamate dehydrogenase



glutamine biosynthesis

glutamine biosynthesis

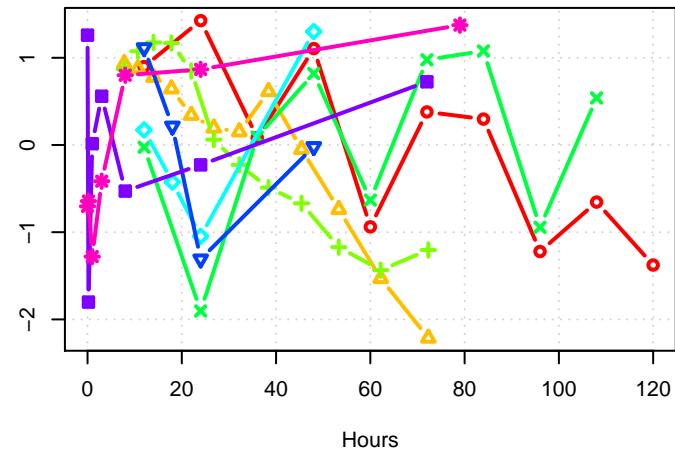
gln1 YPR035W
Glutamine synthetase (GS)



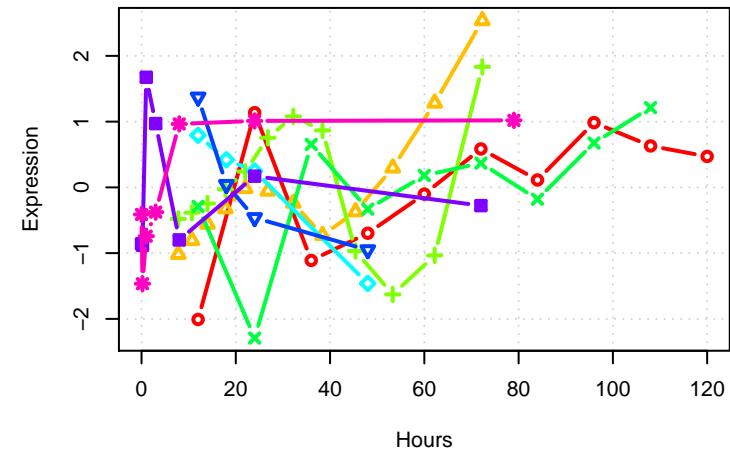
superpathway of glutamate biosynthesis

superpathway of glutamate biosynthesis

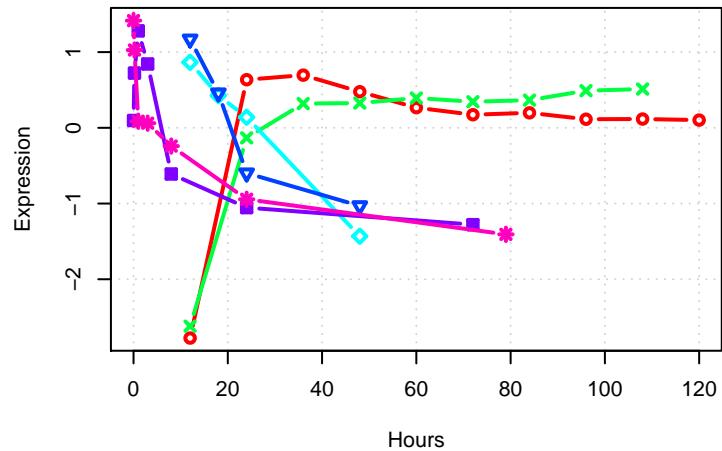
gln1 YPR035W
Glutamine synthetase (GS)



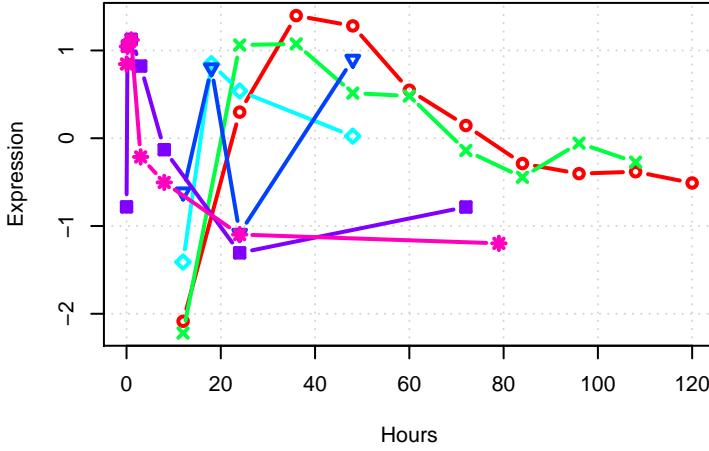
idp1 YDL066W
Mitochondrial NADP-specific isocitrate dehydrogenase



idp2 YLR174W
Cytosolic NADP-specific isocitrate dehydrogenase

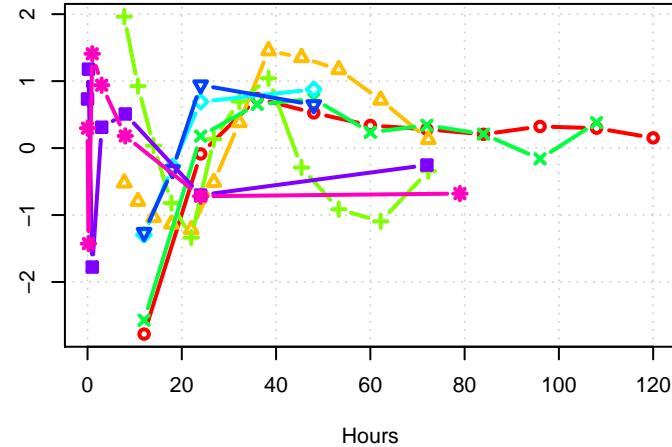


idp3 YNL009W
Peroxisomal NADP-dependent isocitrate dehydrogenase



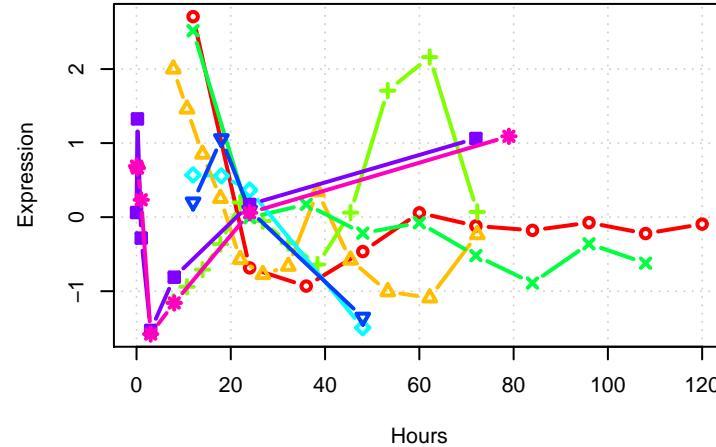
glutathione biosynthesis

gsh1 YJL101C
Gamma glutamylcysteine synthetase



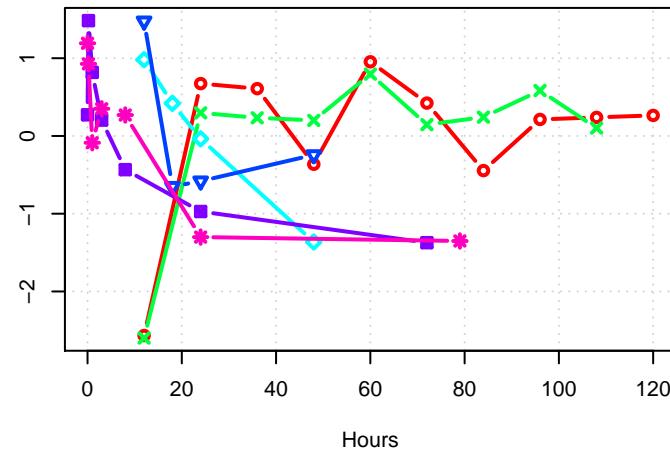
glutathione biosynthesis

gsh2 YOL049W
Glutathione synthetase

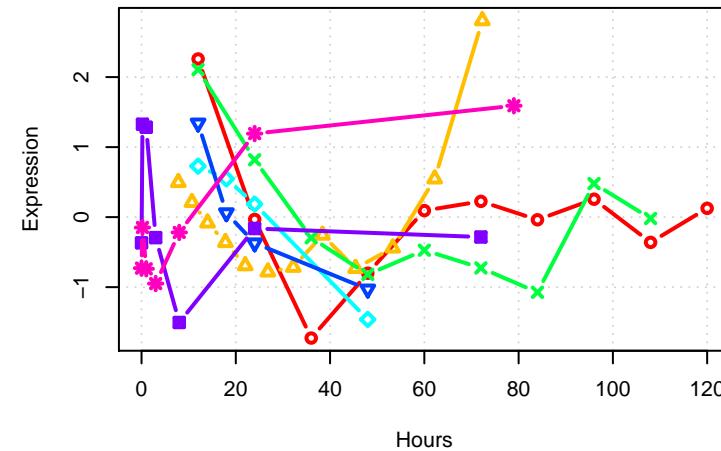


glutathione degradation

ecm38 YLR299W
Gamma-glutamyltranspeptidase



glutathione degradation
aug1 YFR044C
Cys-Gly metallo-di-peptidase

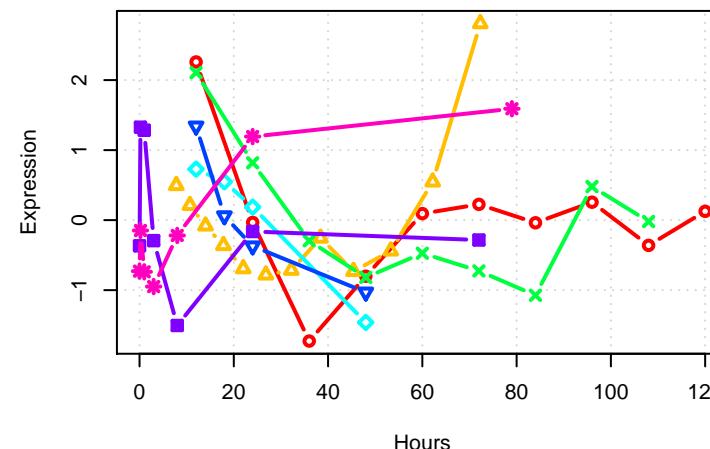
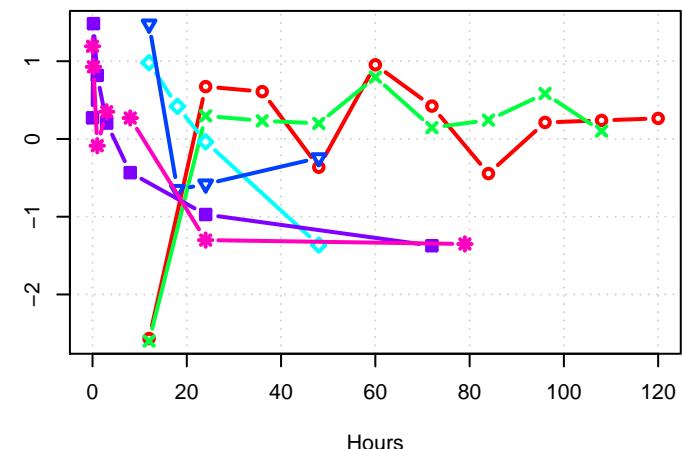


uperpathway of glutathione metabolism (truncated γ-glutamyl cycle

superpathway of glutathione metabolism (truncated & gamma;-glutamyl cycle)

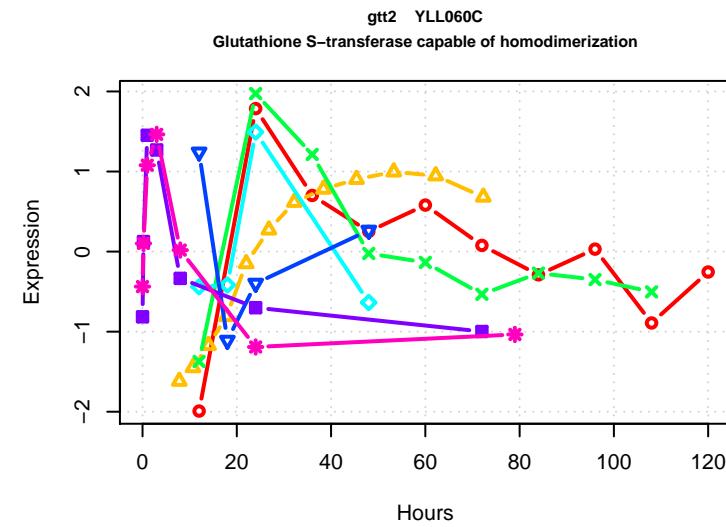
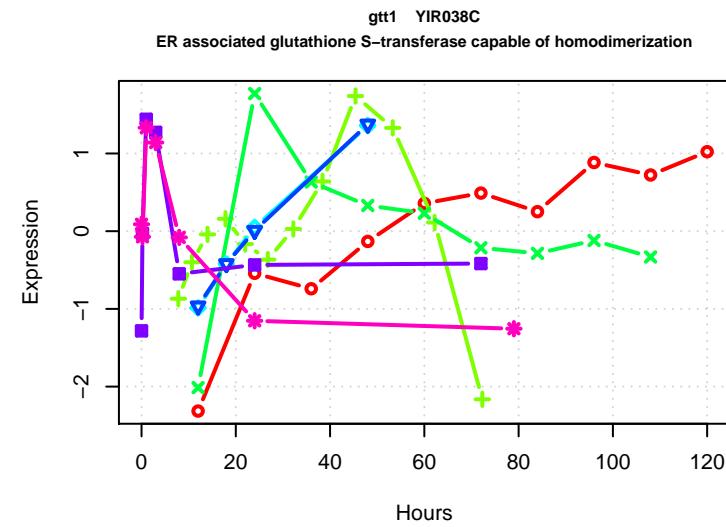
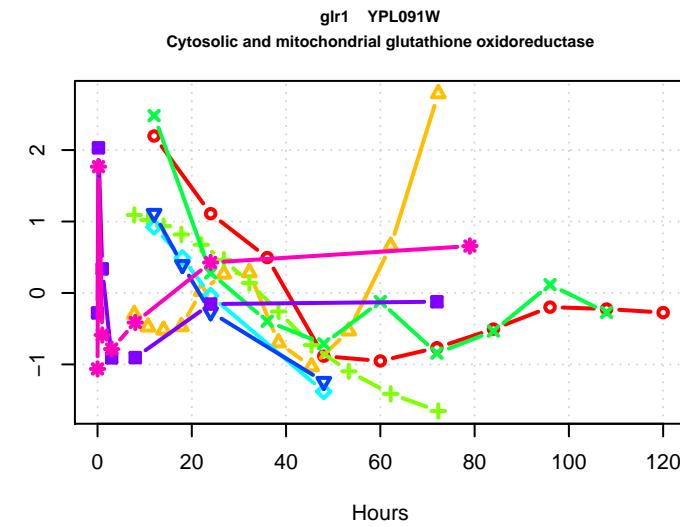
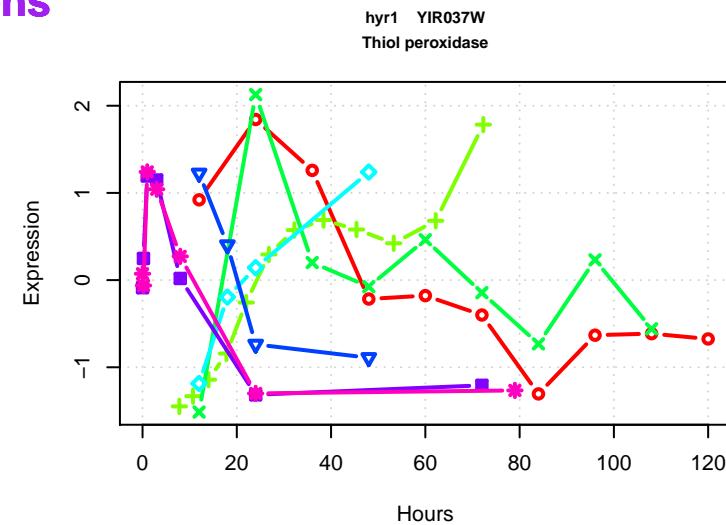
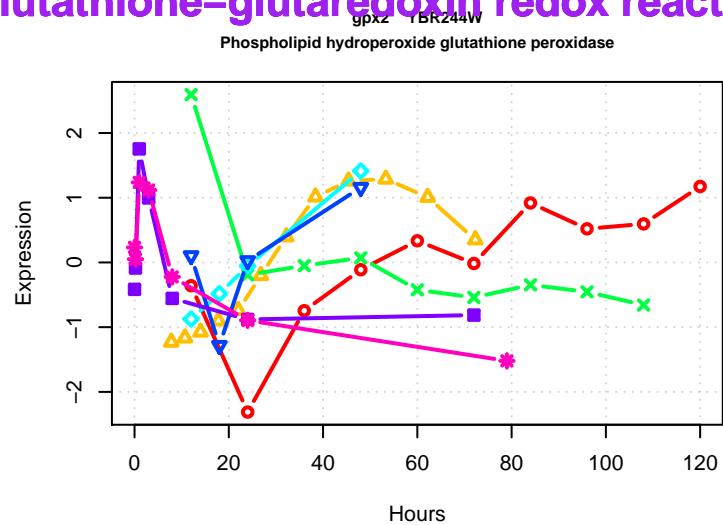
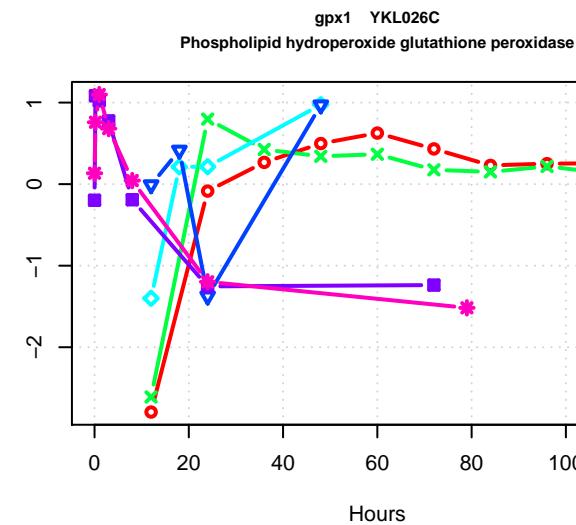
ecm38 YLR299W
Gamma-glutamyltranspeptidase

aug1 YFR044C
Cys-Gly metallo-di-peptidase



glutathione–glutaredoxin redox reactions

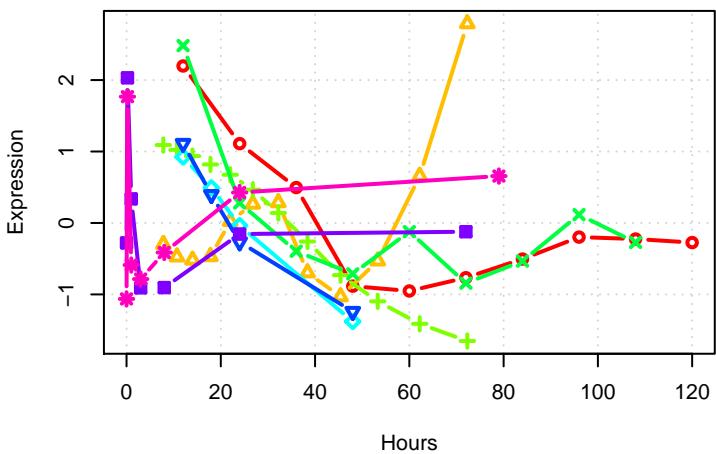
glutathione-glutaredoxin redox reactions



glutathione–glutaredoxin system

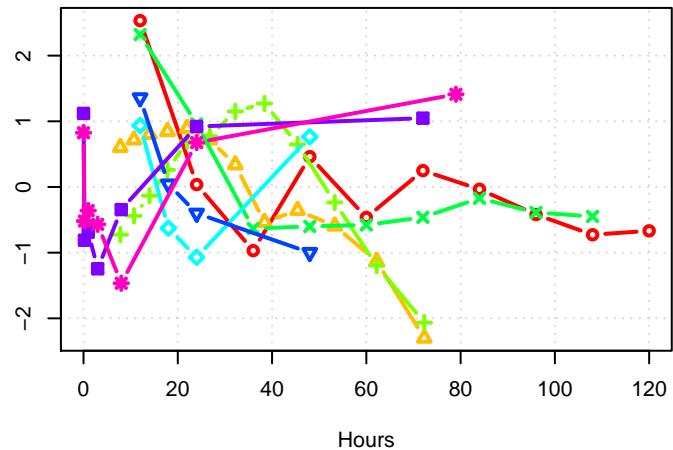
glr1 YPL091W
Cytosolic and mitochondrial glutathione oxidoreductase

glutathione–glutaredoxin system



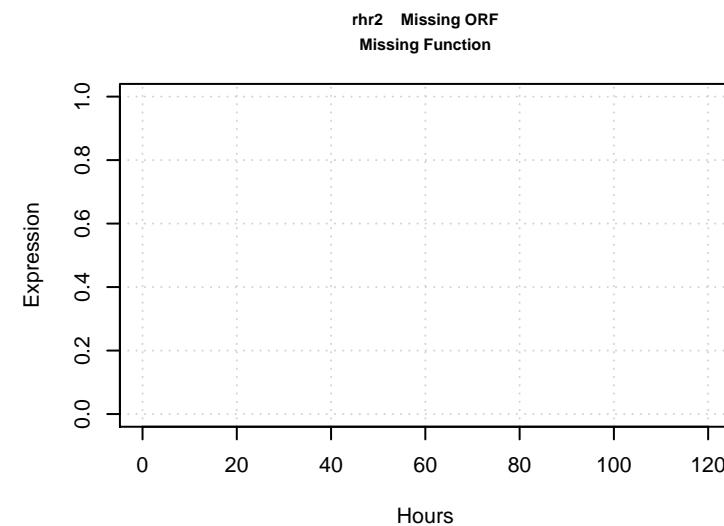
glycerol biosynthesis

cds1 YBR029C
Phosphatidate cytidylyltransferase (CDP-diglyceride synthetase)

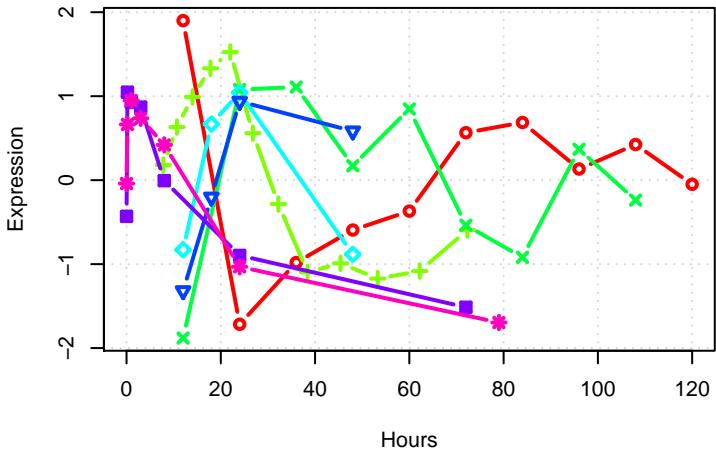


glycerol biosynthesis

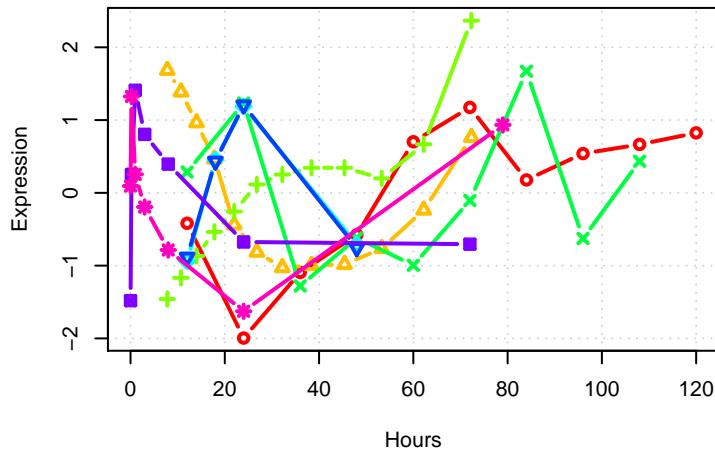
hor2 missing ORF
Missing Function



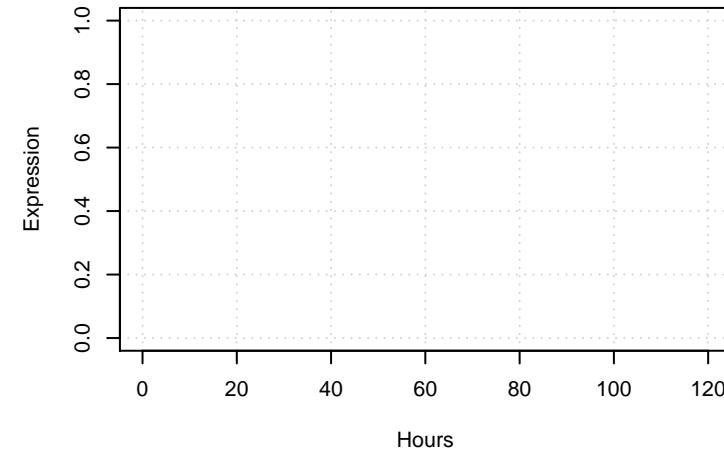
gpd1 YDL022W
NAD-dependent glycerol-3-phosphate dehydrogenase



gpd2 YOL059W
NAD-dependent glycerol 3-phosphate dehydrogenase



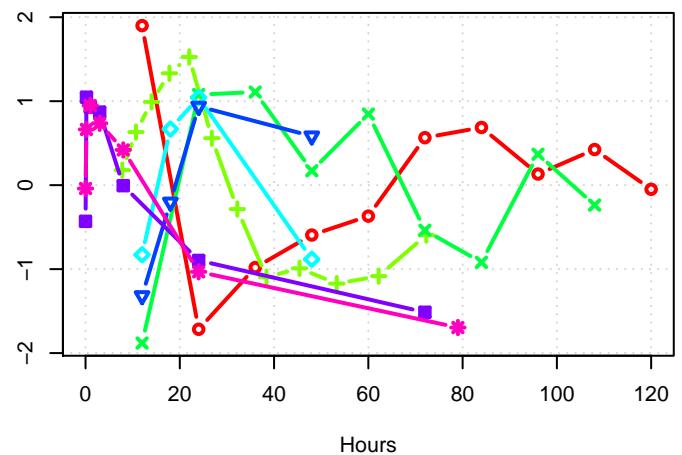
rhr2 Missing ORF
Missing Function



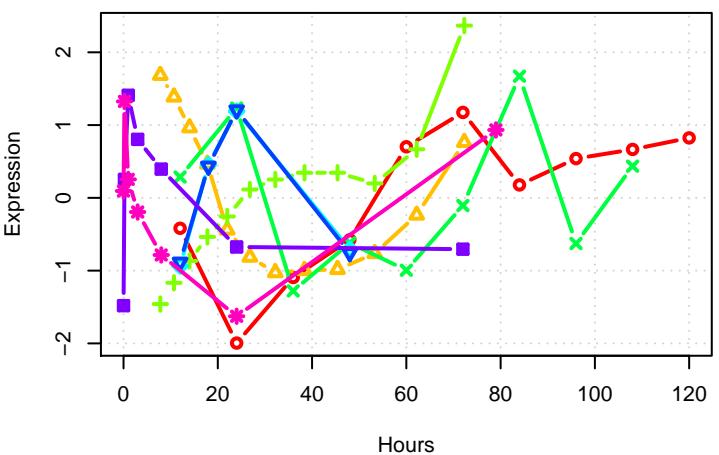
phosphatidate biosynthesis II (the glycerol–3–phosphate pathway)

phosphatidate biosynthesis II (the glycerol-3-phosphate pathway)

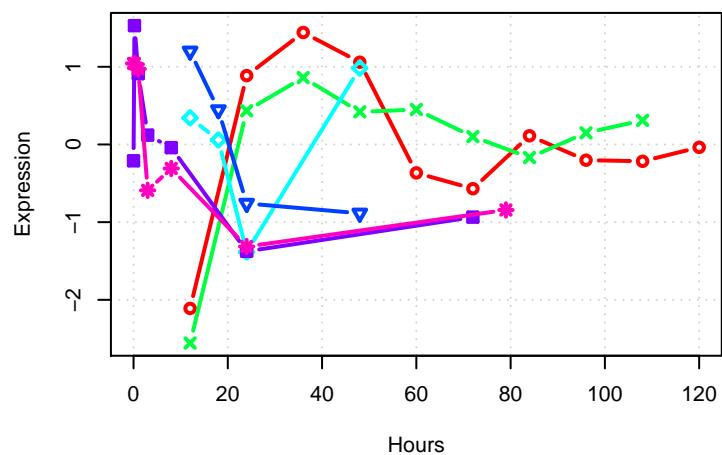
gpd1 YDL022W
NAD-dependent glycerol-3-phosphate dehydrogenase



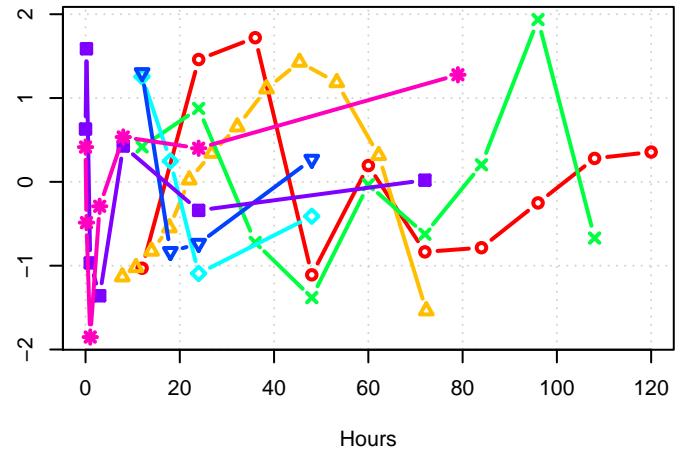
gpd2 YGL059W
NAD-dependent glycerol 3-phosphate dehydrogenase



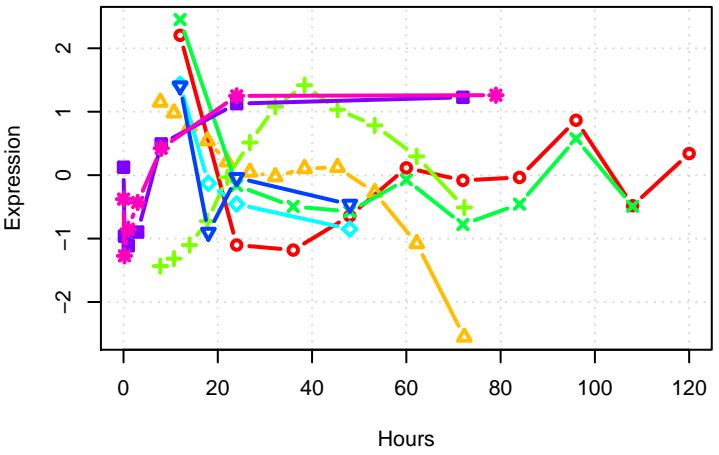
gpt2 YKR067W
Glycerol-3-phosphate/dihydroxyacetone phosphate sn-1 acyltransferase



sct1 YBL011W
Glycerol 3-phosphate/dihydroxyacetone phosphate sn-1 acyltransferase

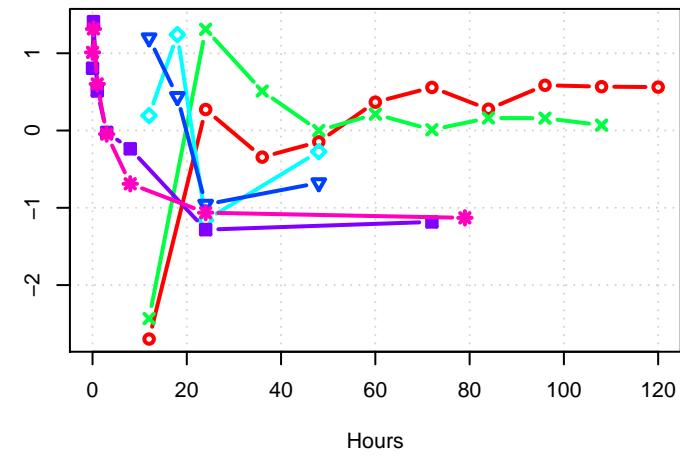


slc1 YDL052C
1-acyl-sn-glycerol-3-phosphate acyltransferase



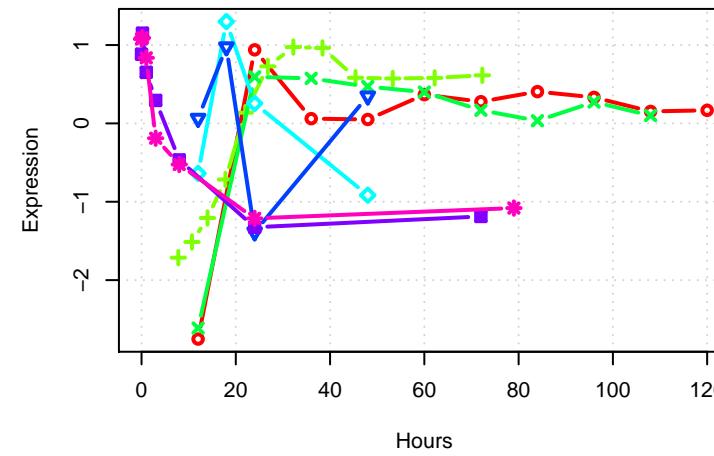
glycerol degradation

gut1 YHL032C
Glycerol kinase



glycerol degradation

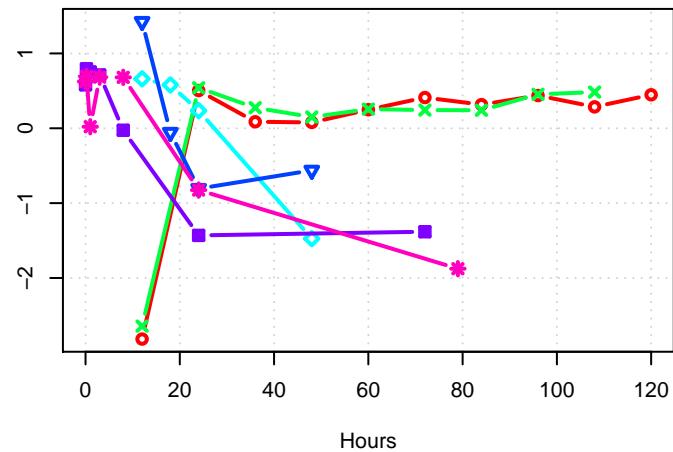
gut2 YIL155C
Mitochondrial glycerol-3-phosphate dehydrogenase



glycine biosynthesis from glyoxylate

glycine biosynthesis from glyoxylate

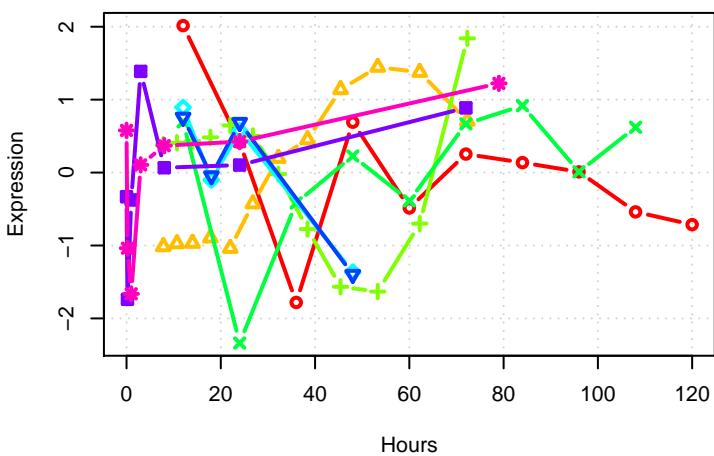
agx1 YFL030W
Alanine:glyoxylate aminotransferase (AGT)



glycine biosynthesis from threonine

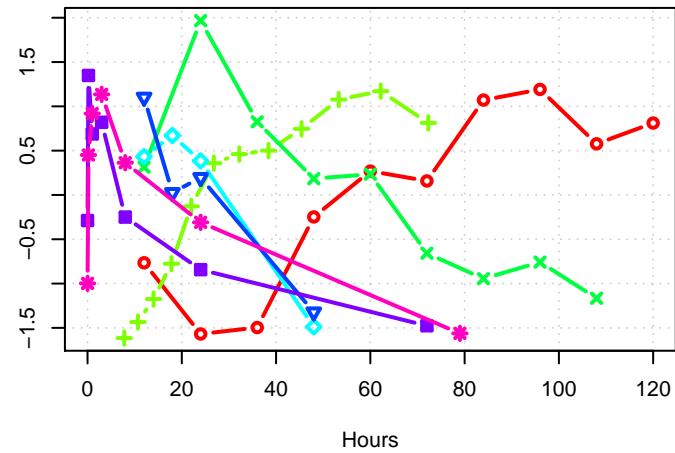
glycine biosynthesis from threonine

gly1 YEL046C
Threonine aldolase



glycogen catabolism

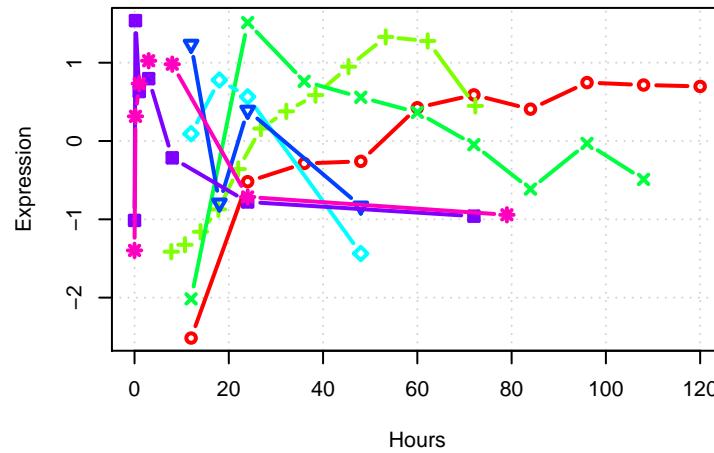
gph1 YPR160W
Glycogen phosphorylase required for the mobilization of glycogen



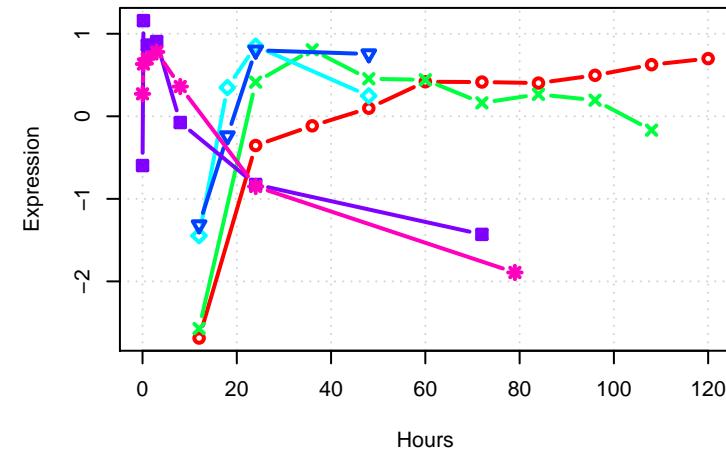
glycogen catabolism

gdb1 YPK184W

Glycogen debranching enzyme



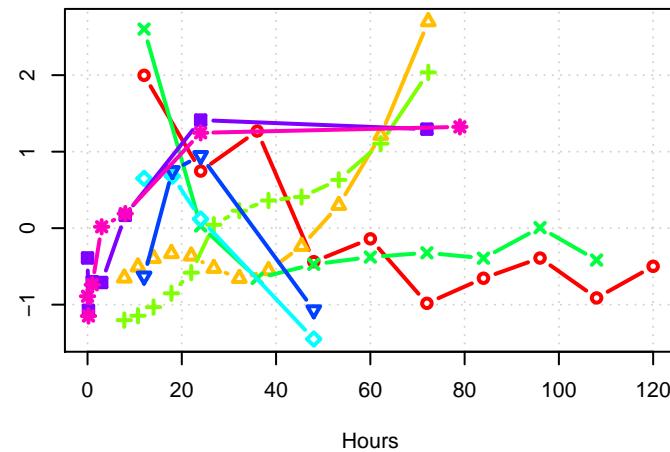
sga1 YIL099W
Intracellular sporulation-specific glucoamylase



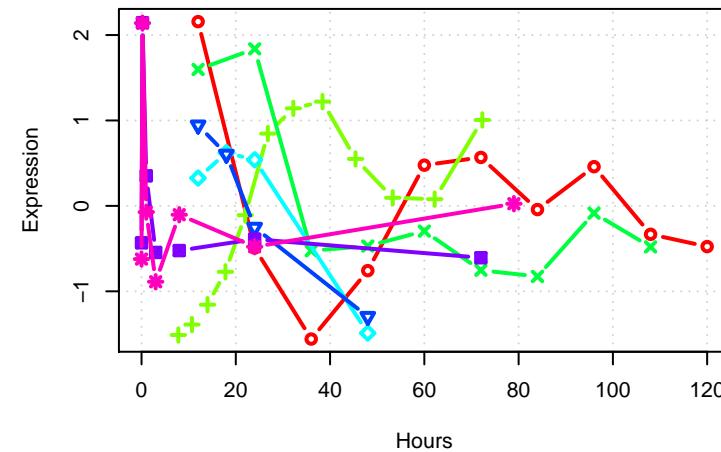
heme biosynthesis

heme biosynthesis

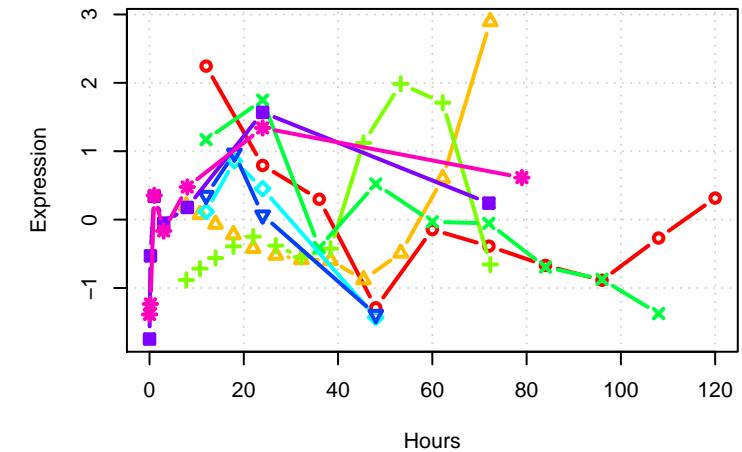
hem13 YDR044W
Coproporphyrinogen III oxidase



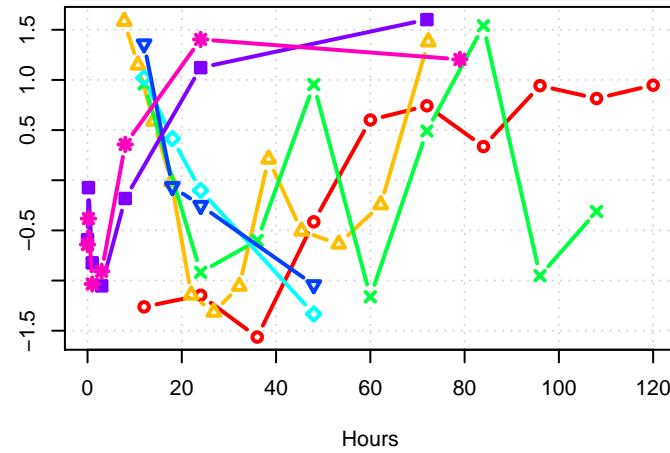
hem15 YOR178W
Ferrochelatase



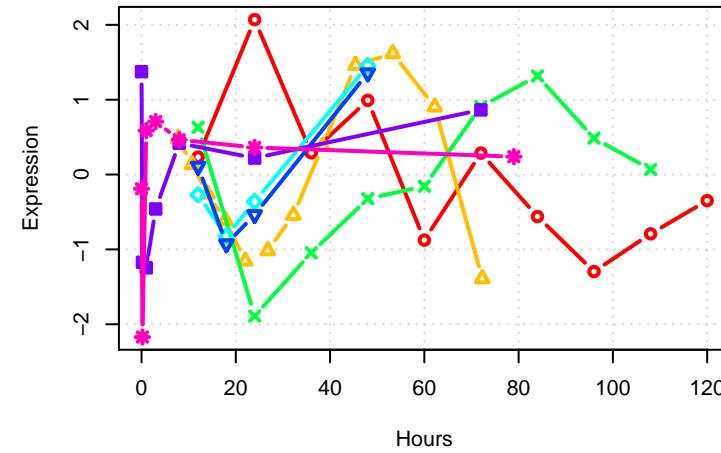
hem14 YER014W
Protoporphyrinogen oxidase



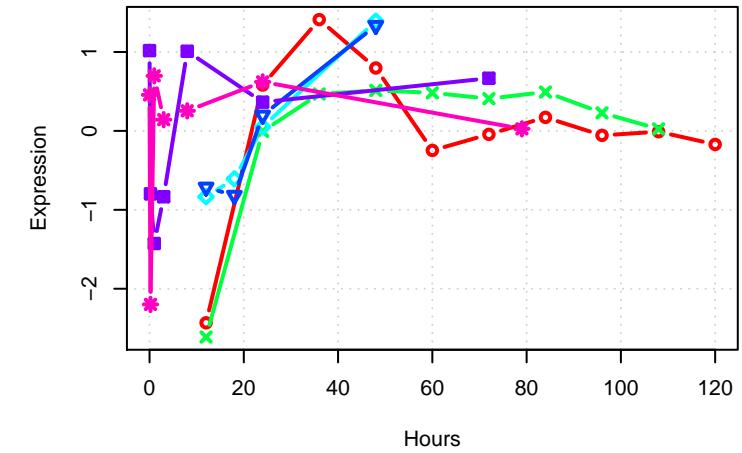
hem12 YDR047W
Uroporphyrinogen decarboxylase



met8 YBR213W
Bifunctional dehydrogenase and ferrochelatase

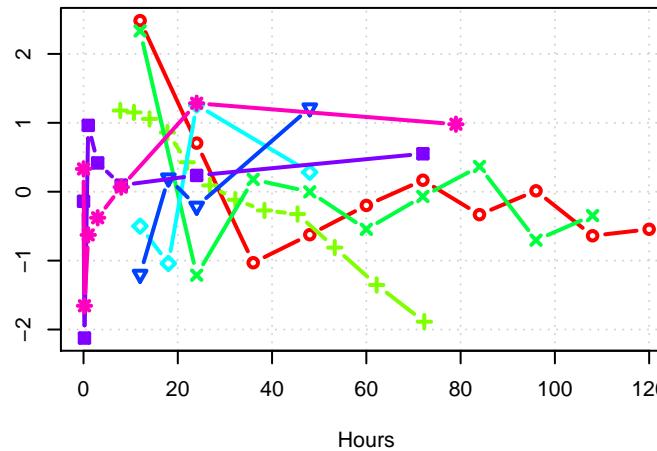


met1 YKR069W
S-adenosyl-L-methionine uroporphyrinogen III transmethylase



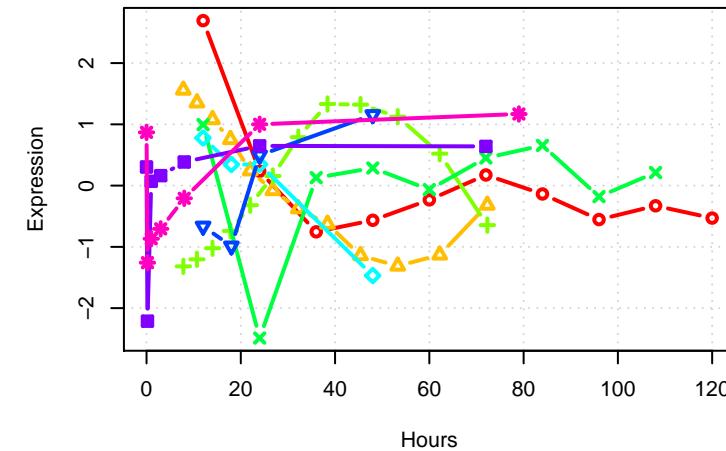
histidine biosynthesis

his7 YBR248C
Imidazole glycerol phosphate synthase

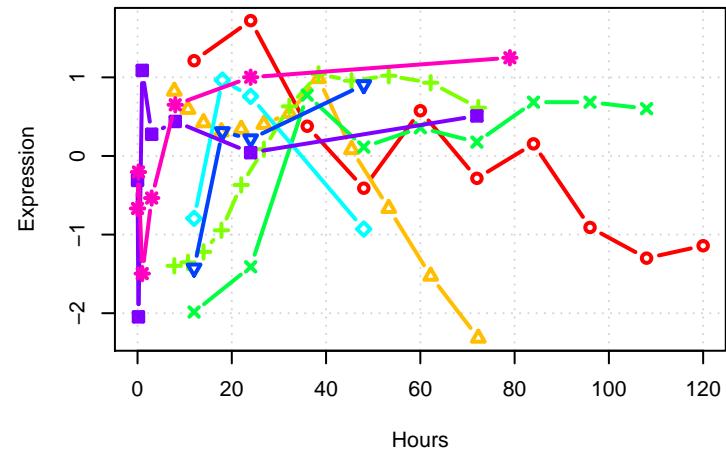


histidine biosynthesis

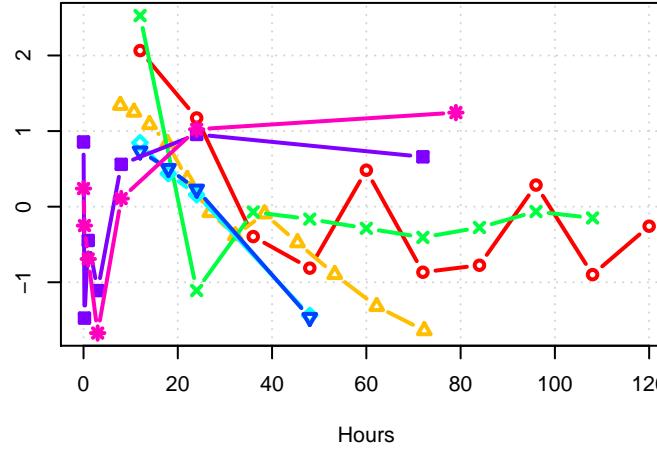
ATP phosphoribosyltransferase



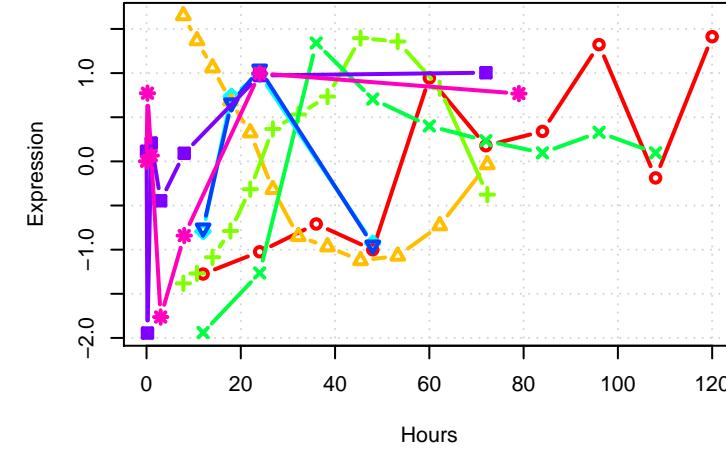
his4 YCL030C
Multifunctional enzyme containing phosphoribosyl-ATP pyrophosphatase



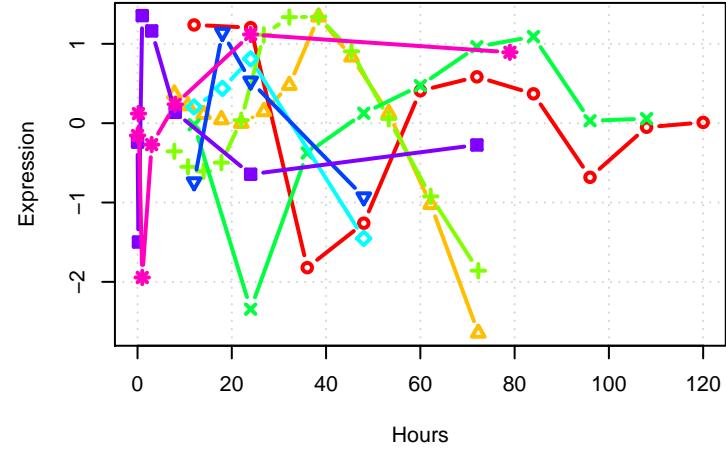
his2 YFR025C
Histidinolphosphatase



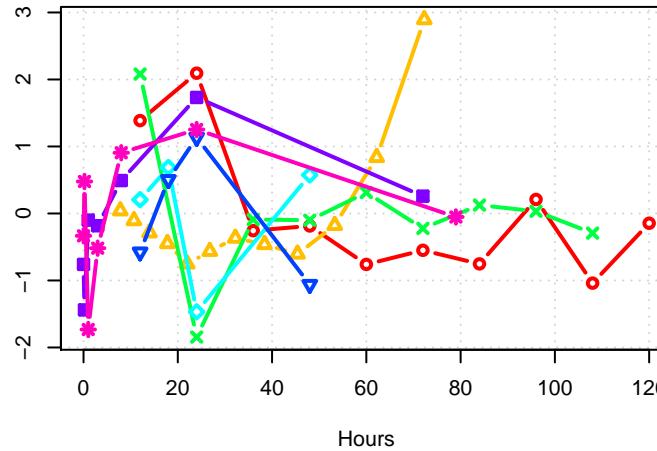
his5 YIL116W
Histidinol-phosphate aminotransferase



his3 YOR202W
Imidazoglycerol-phosphate dehydratase



his6 YIL020C
Enzyme that catalyzes the fourth step in the histidine pathway

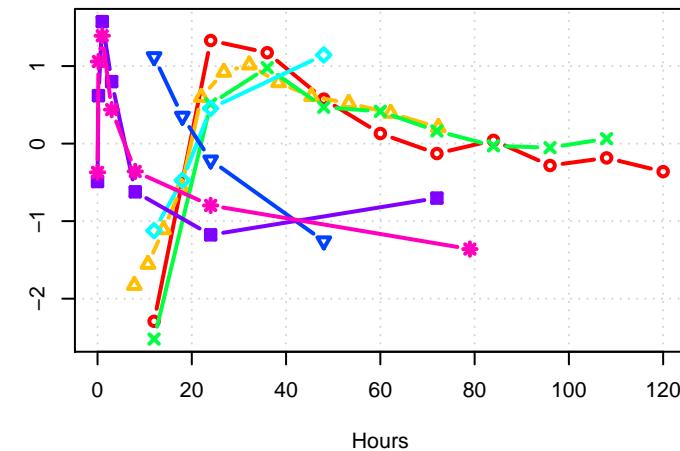


homocysteine and cysteine interconversion

homocysteine and cysteine interconversion

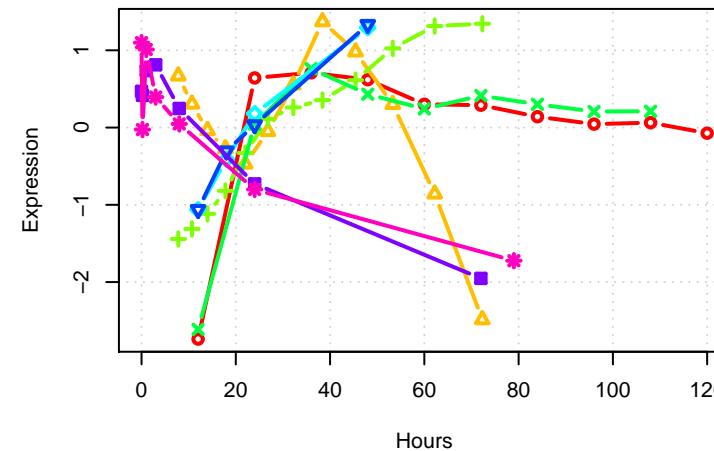
str2 YJR130C

Cystathione gamma-synthase, converts cysteine into cystathionine



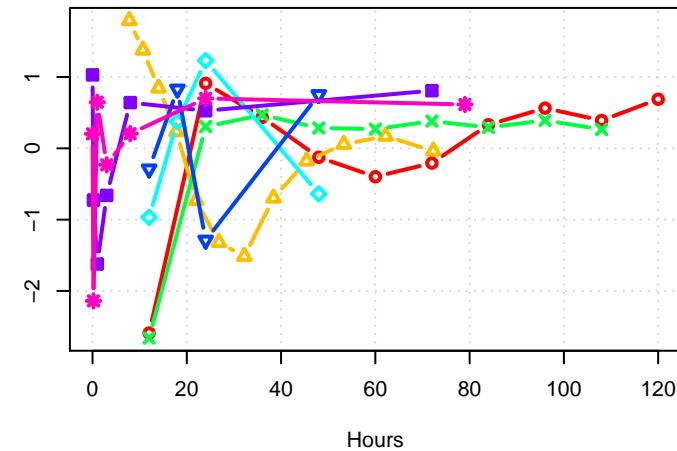
str3 YGL184C

Peroxisomal cystathionine beta-lyase



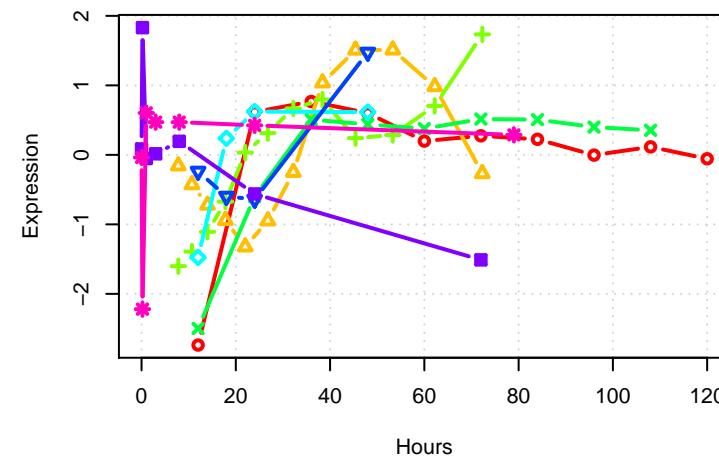
homocysteine biosynthesis

met17 YLR303W
O-acetyl homoserine-O-acetyl serine sulfhydrylase



homocysteine biosynthesis

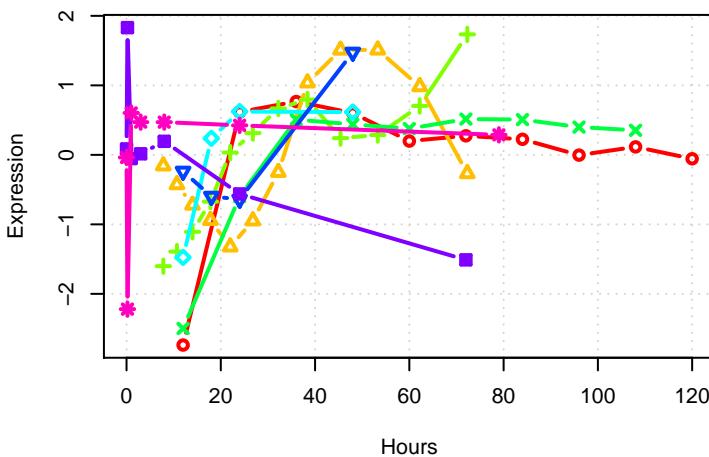
met2 YNL277W
L-homoserine-O-acetyltransferase



superpathway of sulfur amino acid biosynthesis

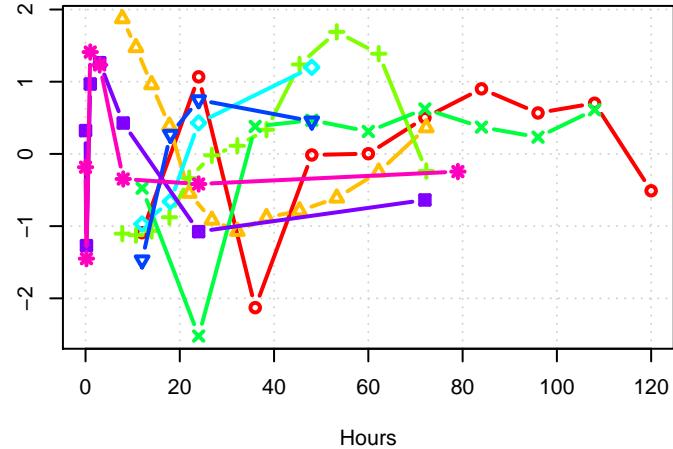
superpathway of sulfur amino acid biosynthesis

met2 YNL277W
L-homoserine-O-acetyltransferase



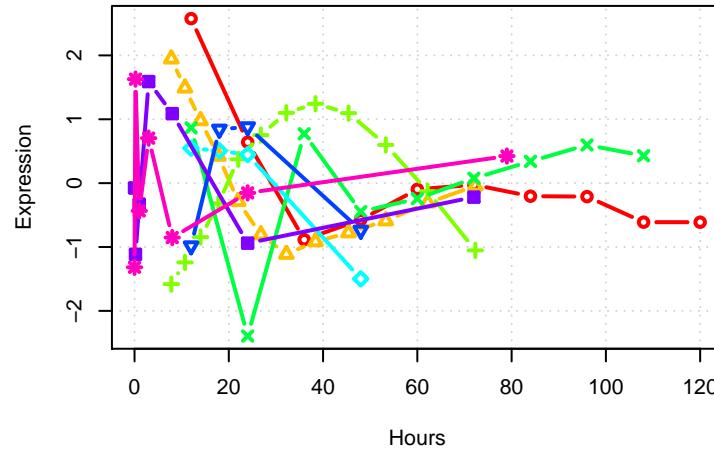
homoserine biosynthesis

hom3 YER052C
Aspartate kinase (L-aspartate 4-P-transferase)

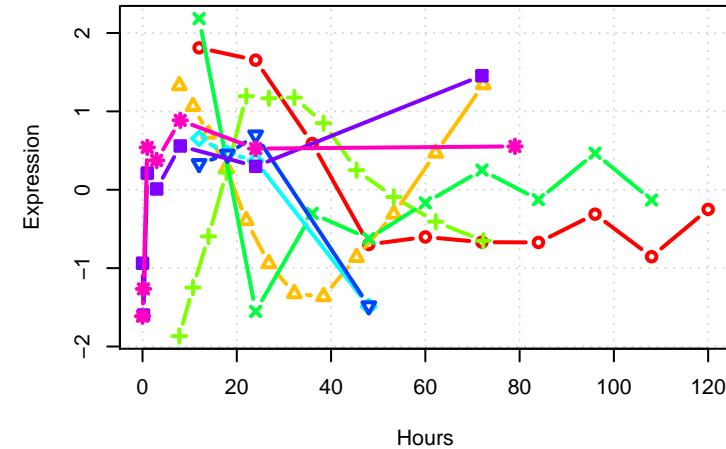


homoserine biosynthesis

hom2 YDR156W
Aspartic beta semi-aldehyde dehydrogenase

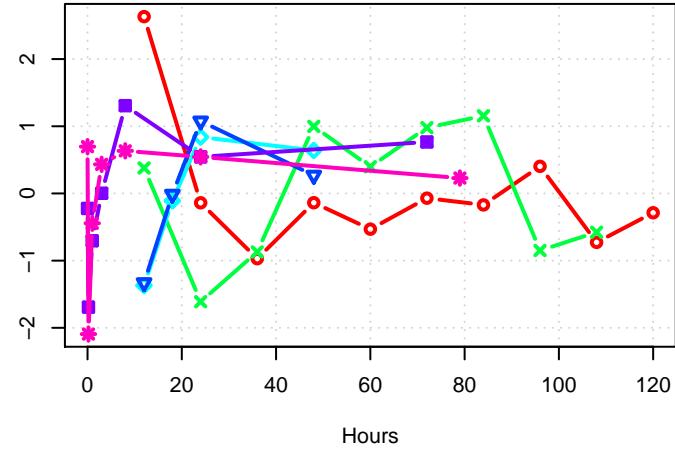


hom6 YJR139C
Homoserine dehydrogenase (L-homoserine:NADP oxidoreductase)



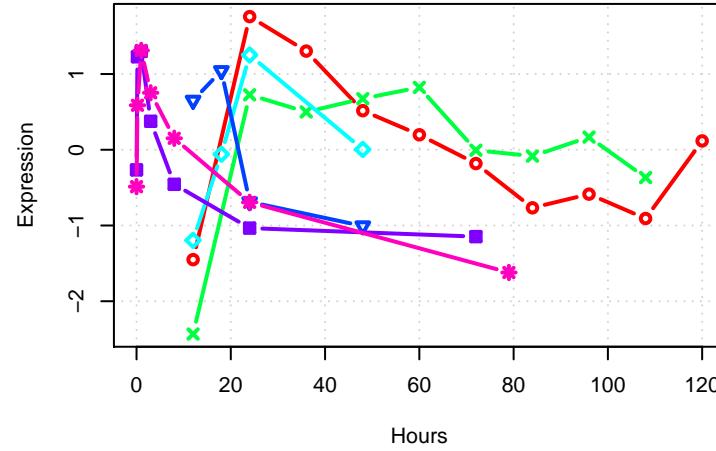
< i > myo</i>-inositol biosynthesis

inm1 YHR046C
Inositol monophosphatase

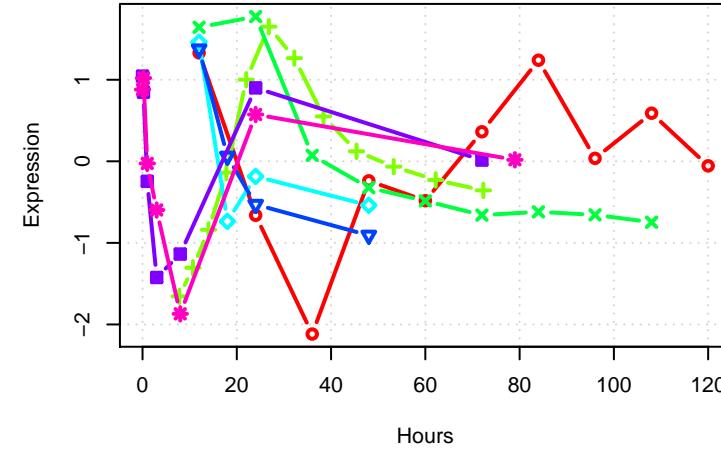


myo–inositol biosynthesis

inm2 YDR287W
Inositol monophosphatase

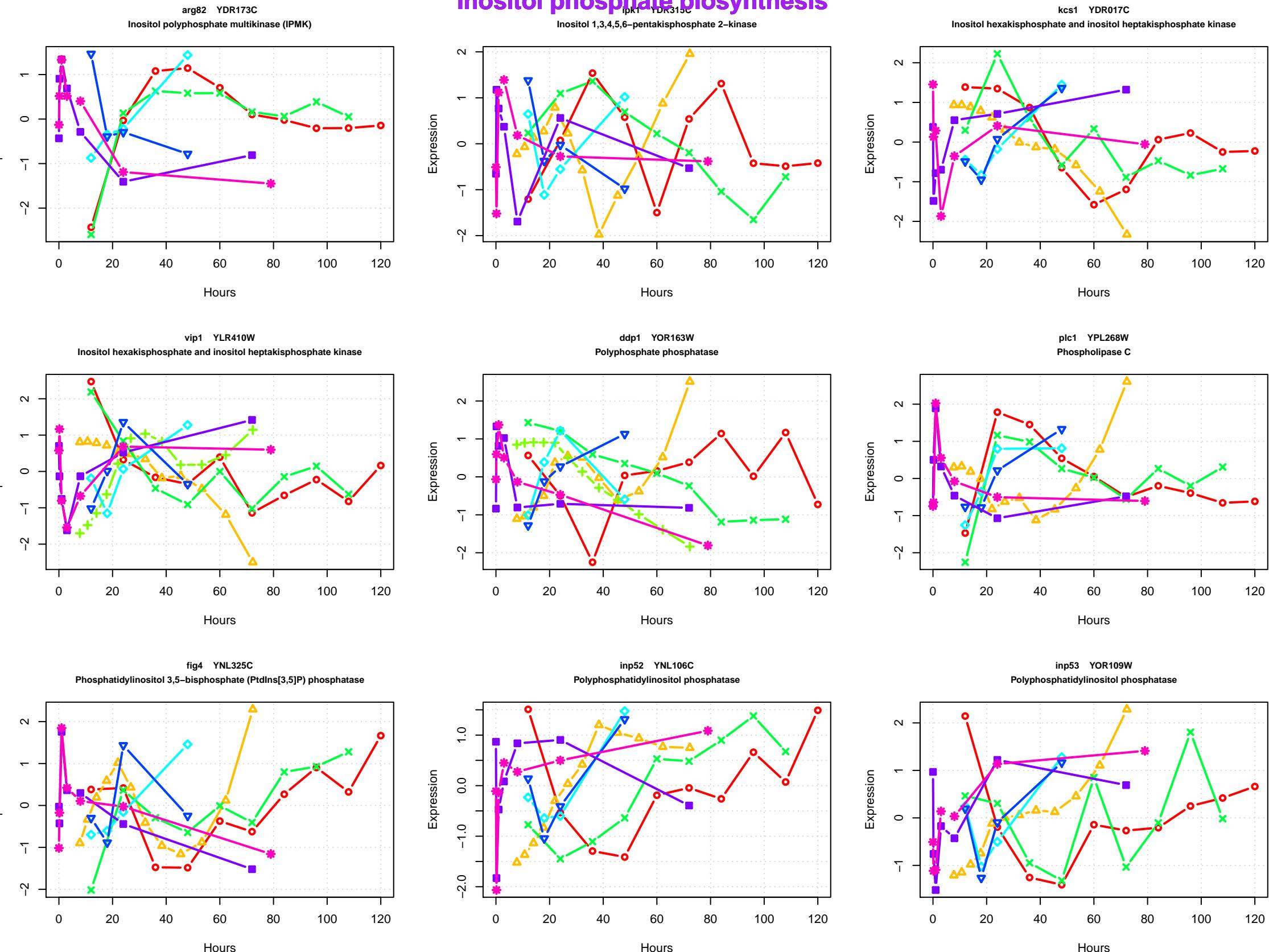


ino1 YJL153C
Inositol-3-phosphate synthase

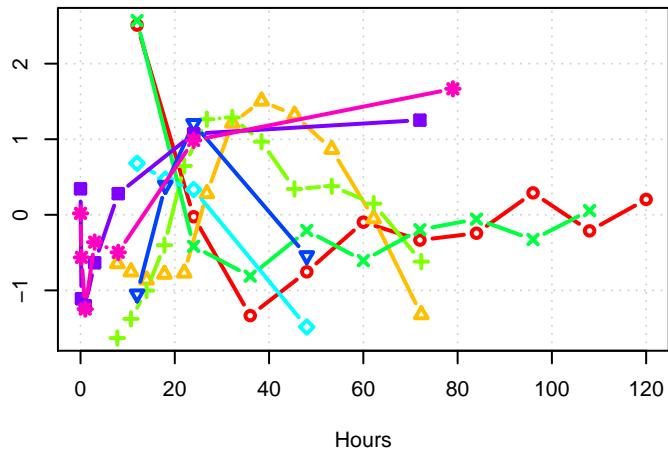


inositol phosphate biosynthesis

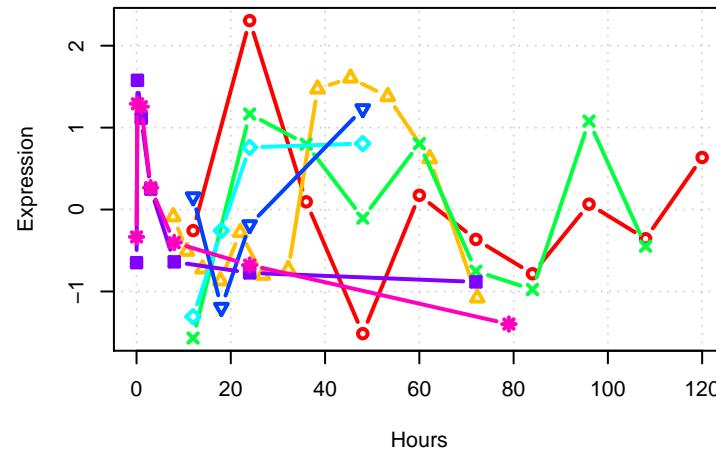
inositol phosphate biosynthesis



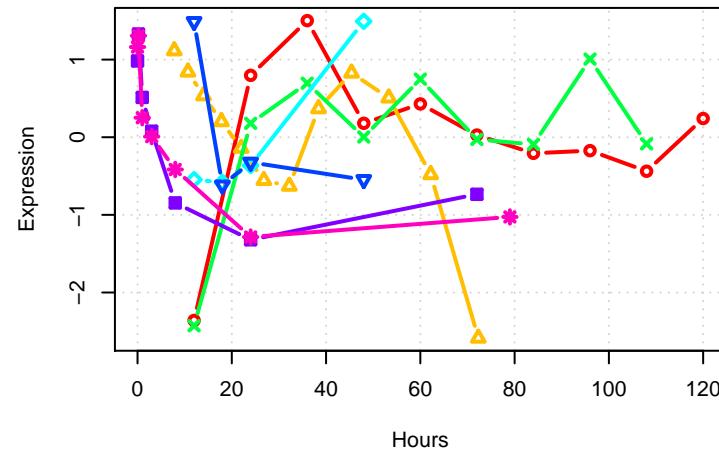
sac1 YKL212W
Phosphatidylinositol phosphate (PtdInsP) phosphatase



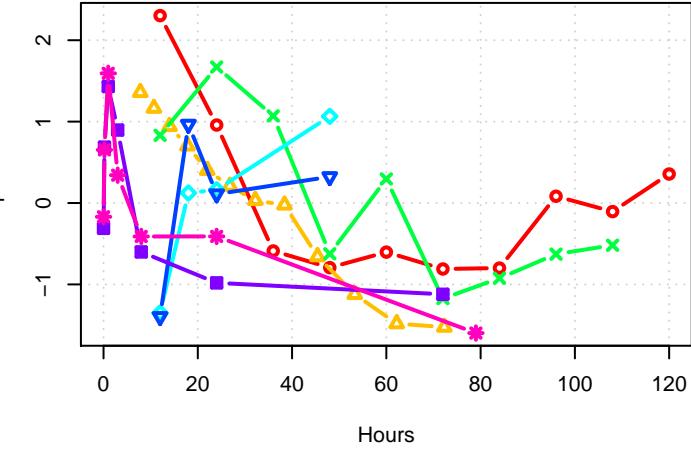
vps34 YLR240W
Phosphatidylinositol (PI) 3-kinase that synthesizes PI-3-phosphate



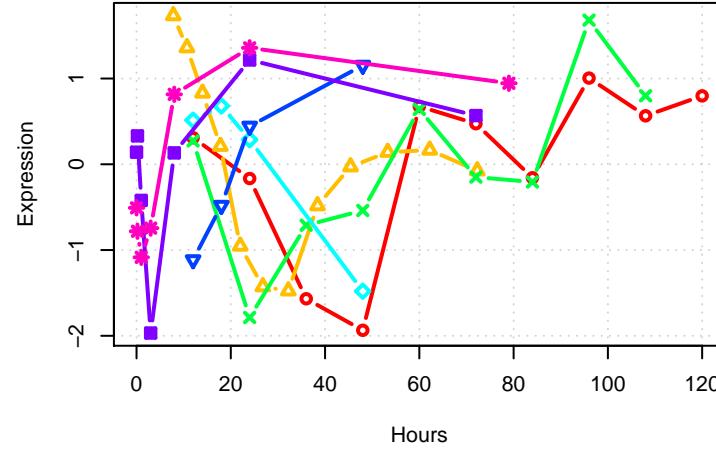
lsb6 YJL100W
Type II phosphatidylinositol 4-kinase



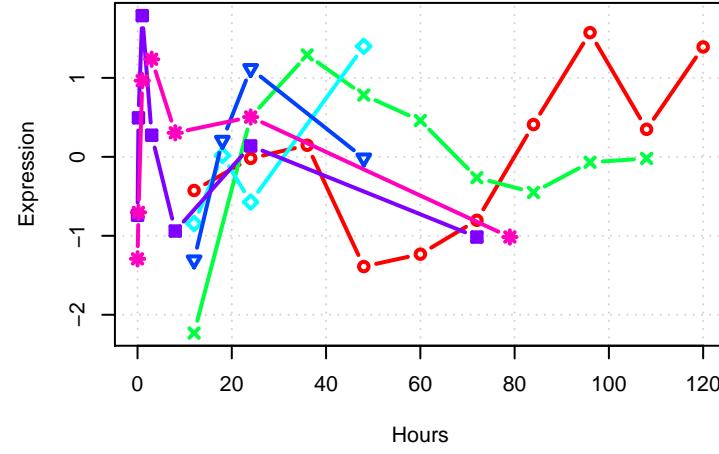
pik1 YNL267W
Phosphatidylinositol 4-kinase



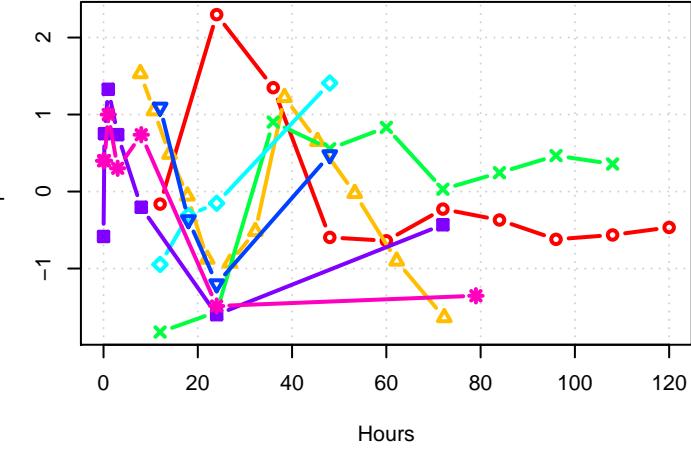
stt4 YLR305C
Phosphatidylinositol-4-kinase



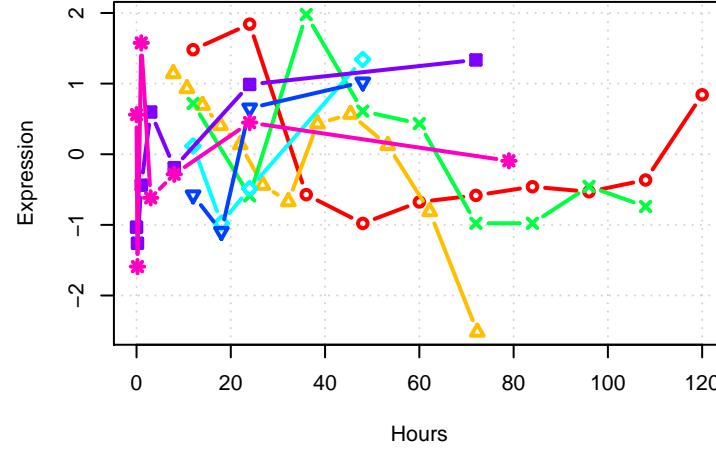
fab1 YFR019W
1-phosphatidylinositol-3-phosphate 5-kinase



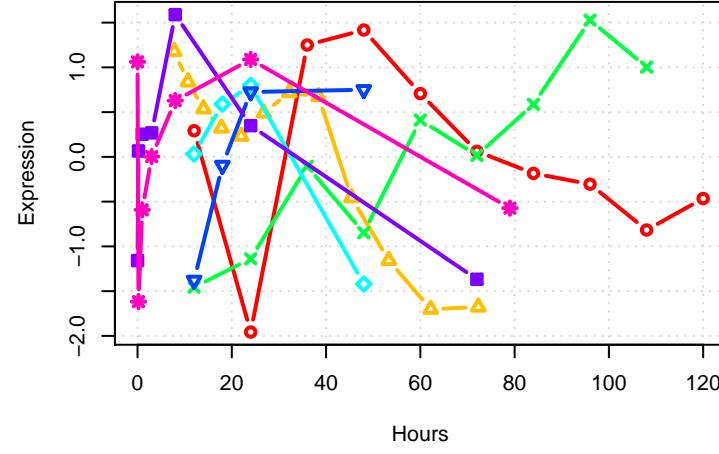
mss4 YDR208W
Phosphatidylinositol-4-phosphate 5-kinase



ymr1 YJR110W
Phosphatidylinositol 3-phosphate (PI3P) phosphatase

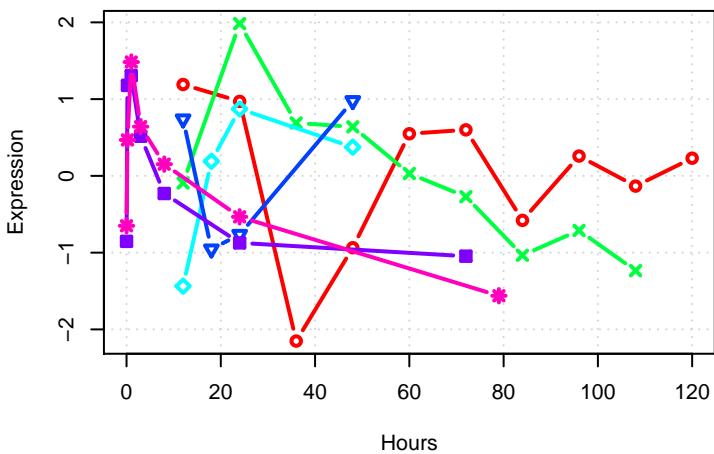


inp51 YIL002C
Phosphatidylinositol 4,5-bisphosphate 5-phosphatase



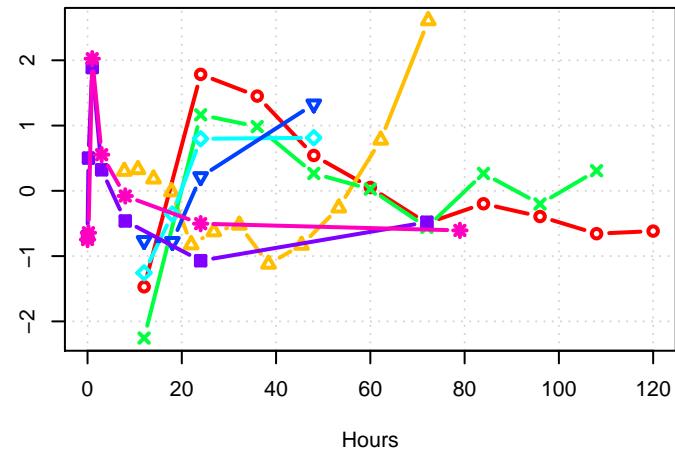
inositol phosphate biosynthesis

inp54 YOL065C
Phosphatidylinositol 4,5-bisphosphate 5-phosphatase

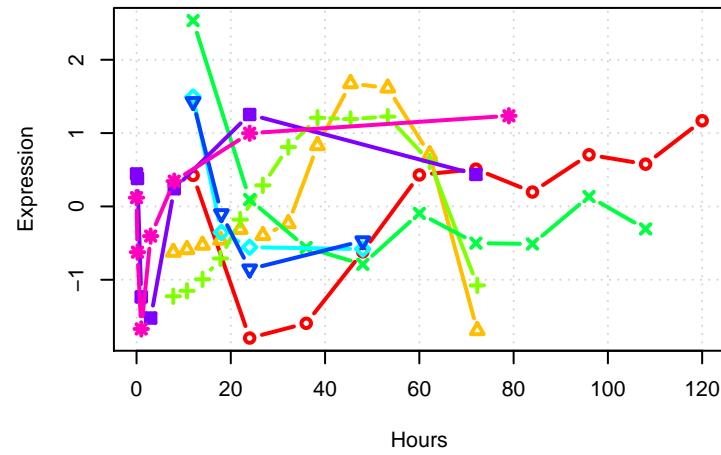


phospholipids degradation

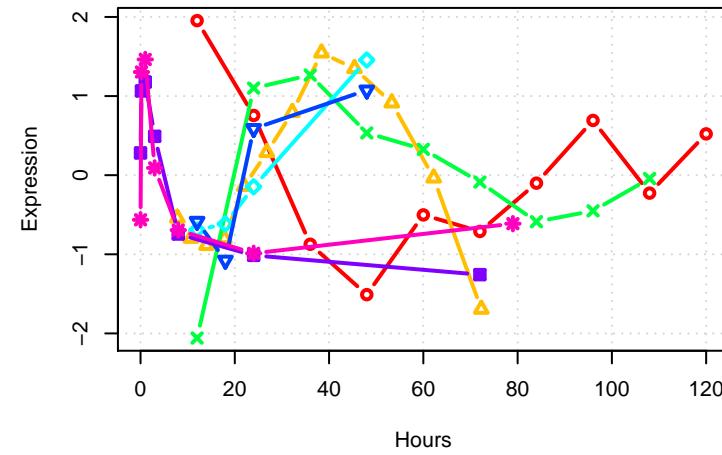
plc1 YPL268W
Phospholipase C



phospholipids degradation
isc1 YER019W
Inositol phosphosphingolipid phospholipase C

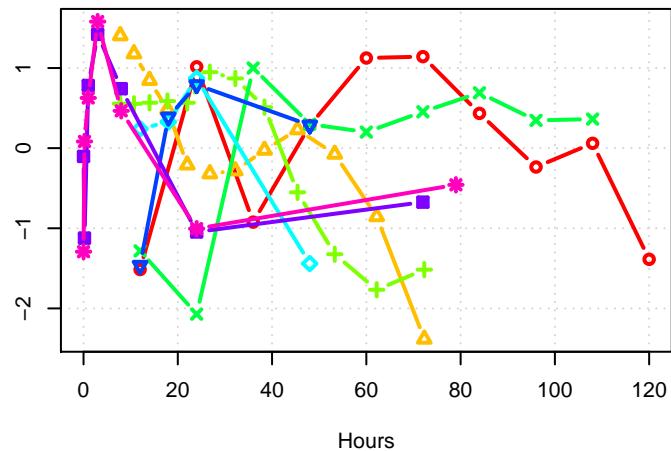


spo14 YKR031C
Phospholipase D



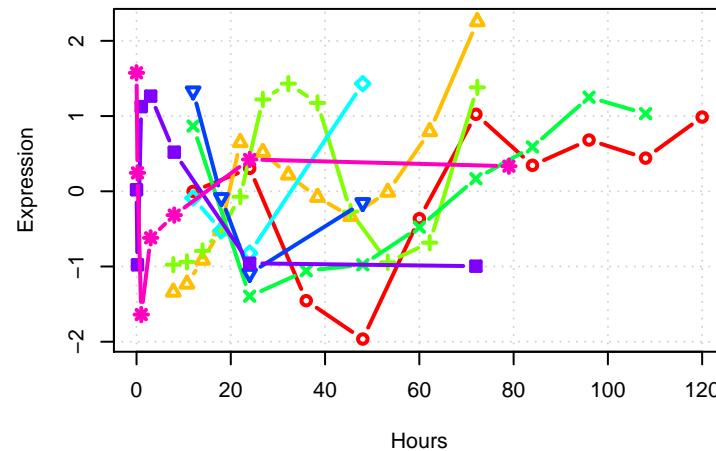
leucine biosynthesis

ilv2 YMR108W
Acetolactate synthase

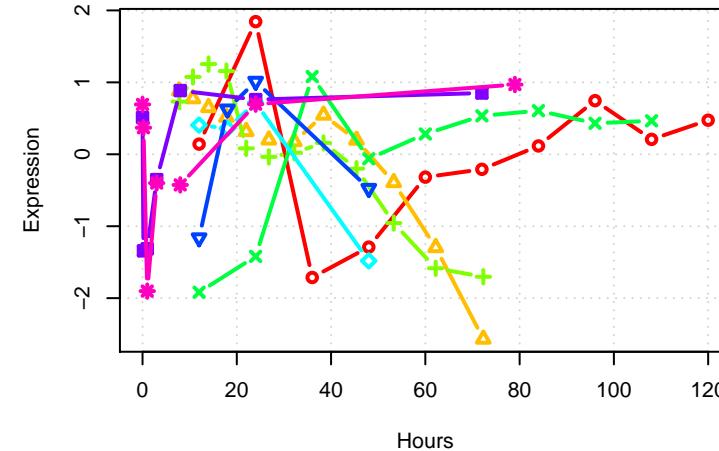


leucine biosynthesis

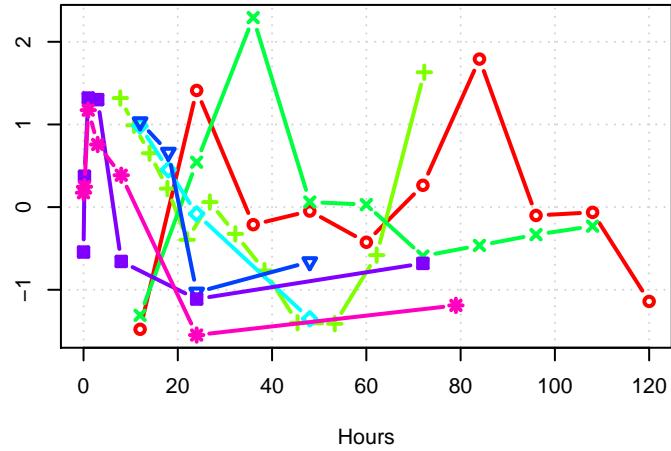
ilv6 YCL099C
Regulatory subunit of acetolactate synthase



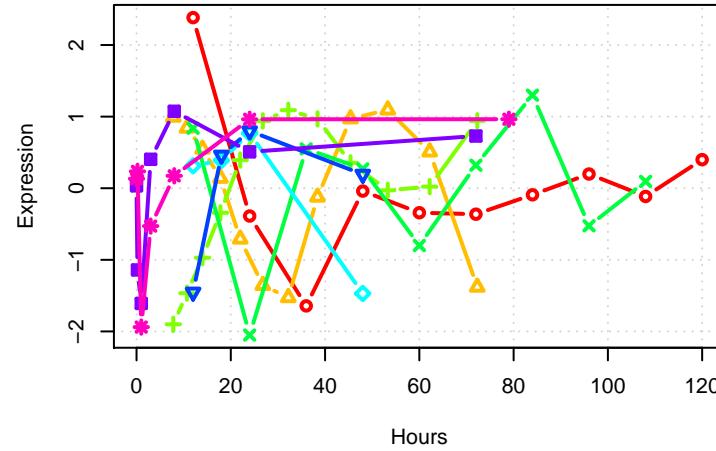
bat1 YHR208W
Mitochondrial branched-chain amino acid (BCAA) aminotransferase



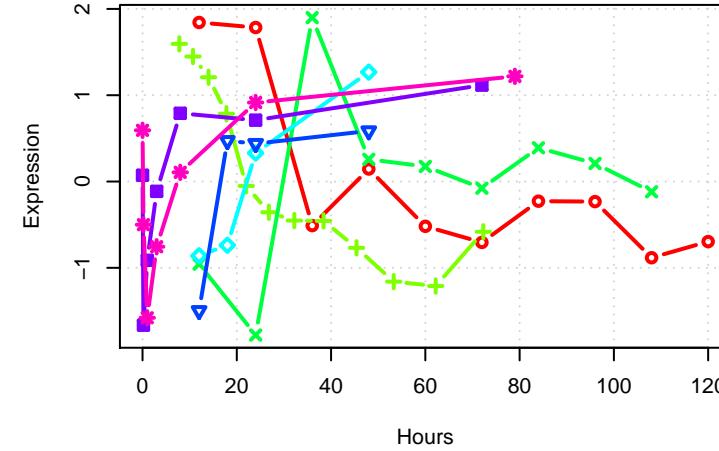
bat2 YJR148W
Cytosolic branched-chain amino acid (BCAA) aminotransferase



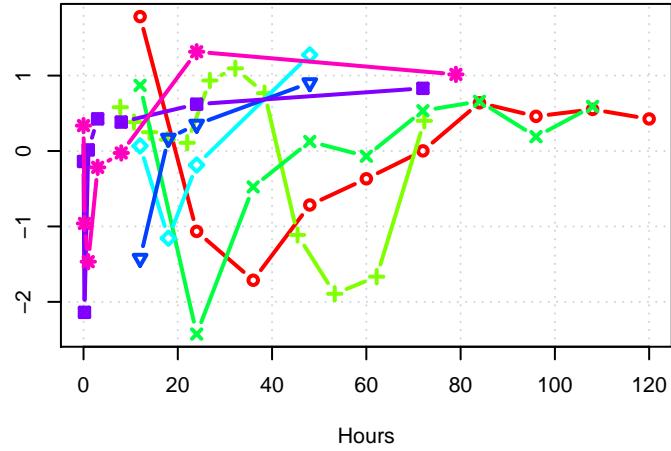
ilv3 YJR016C
Dihydroxyacid dehydratase



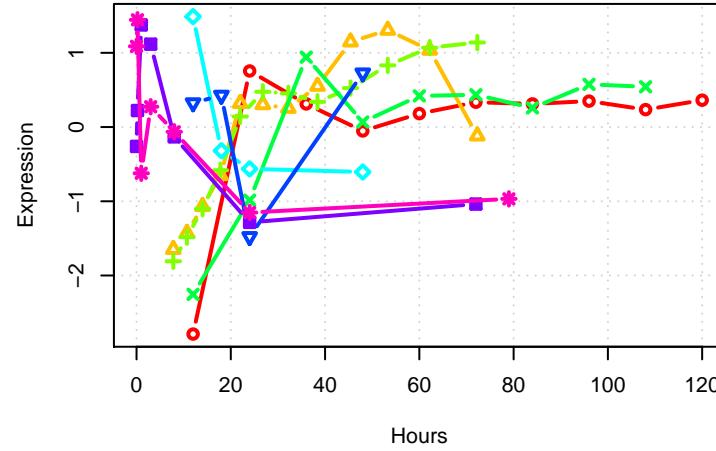
ilv5 YLR355C
Acetohydroxyacid reductoisomerase and mtDNA binding protein



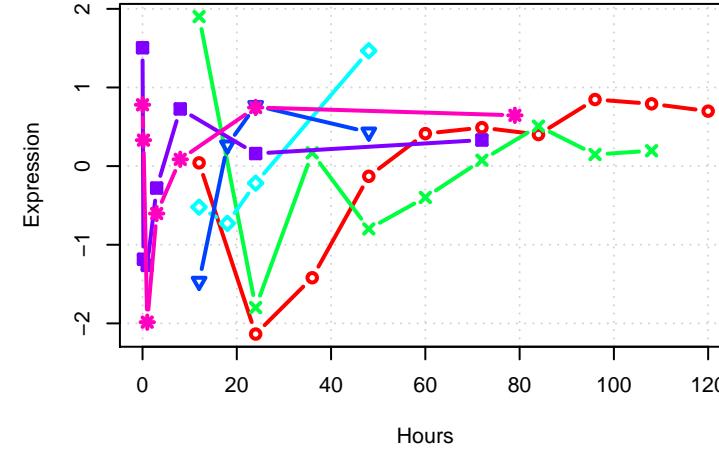
ilv1 YER086W
Threonine deaminase, catalyzes first step in isoleucine biosynthesis



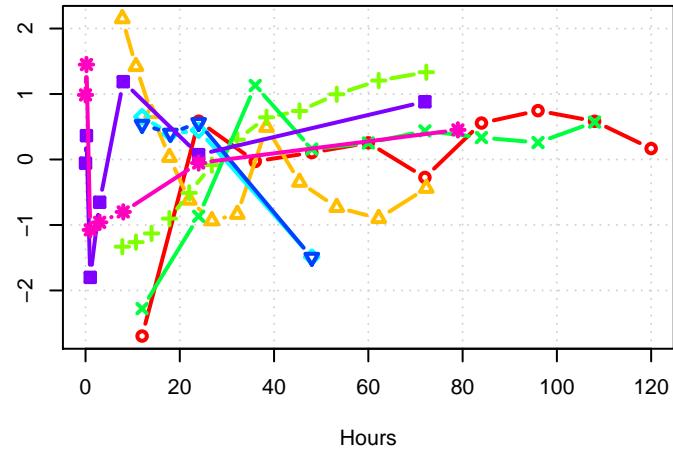
ile4 YNL104C
Alpha-isopropylmalate synthase (2-isopropylmalate synthase)



ile9 YOR108W
Alpha-isopropylmalate synthase II (2-isopropylmalate synthase)

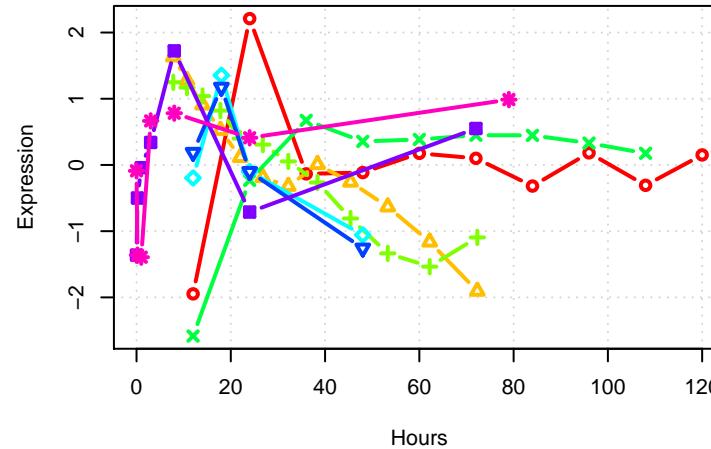


leu1 YGL009C
Isopropylmalate isomerase



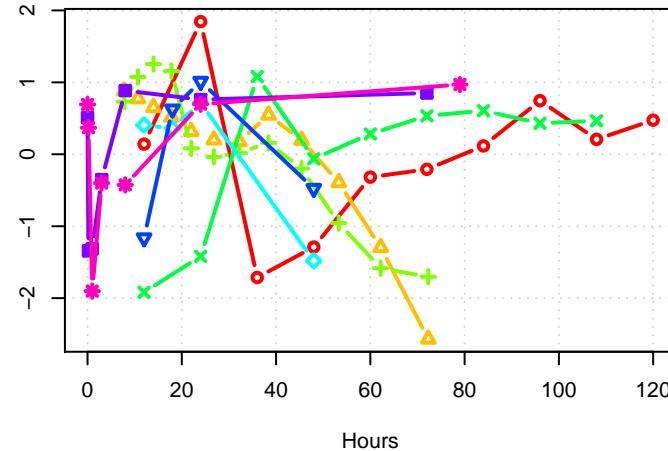
leucine biosynthesis

leu2 YCL018W
Beta-isopropylmalate dehydrogenase (IMDH)



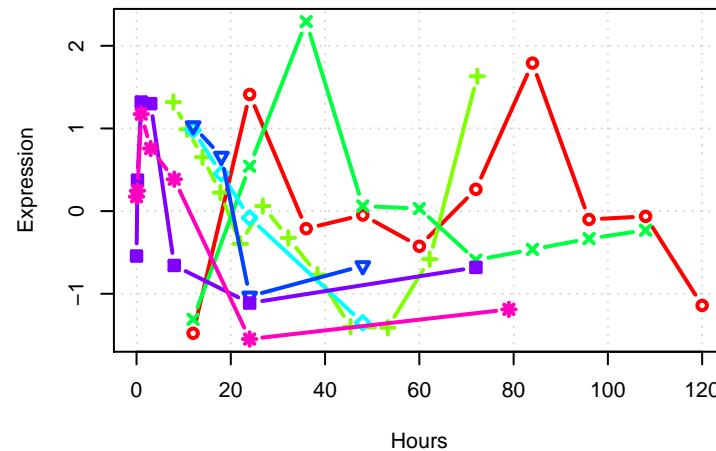
methionine salvage pathway

bat1 YHR208W
Mitochondrial branched-chain amino acid (BCAA) aminotransferase

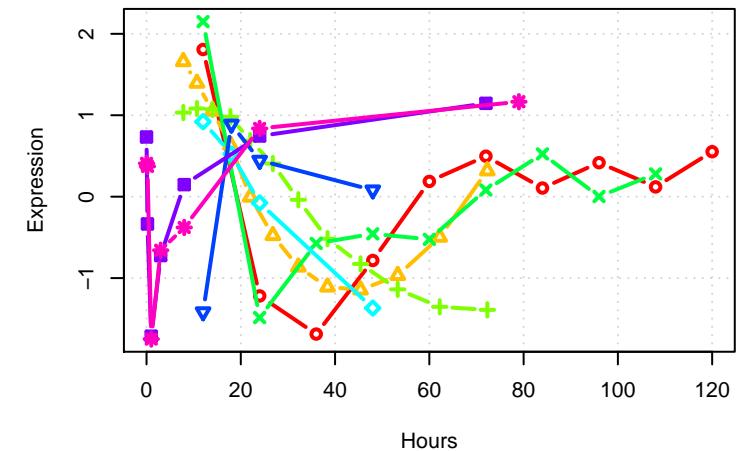


methionine salvage pathway

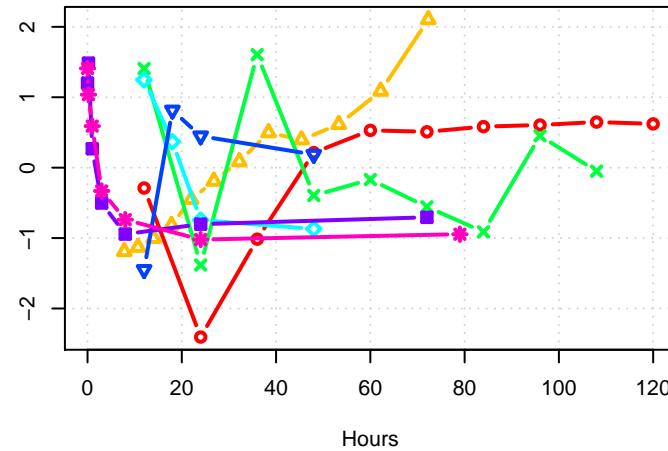
bat2 YJR1431
Cytosolic branched-chain amino acid (BCAA) aminotransferase



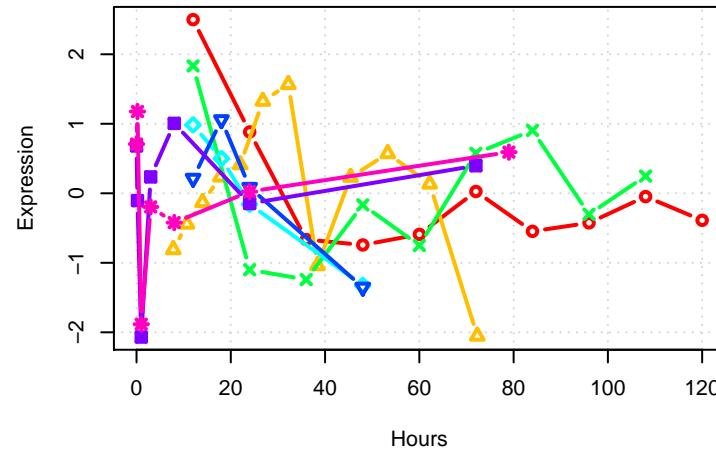
aro8 YGL202W
Aromatic aminotransferase I



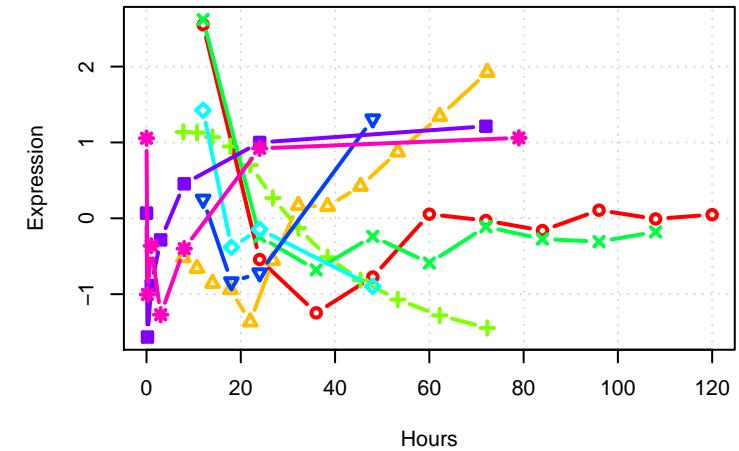
aro9 YHR137W
Aromatic aminotransferase II



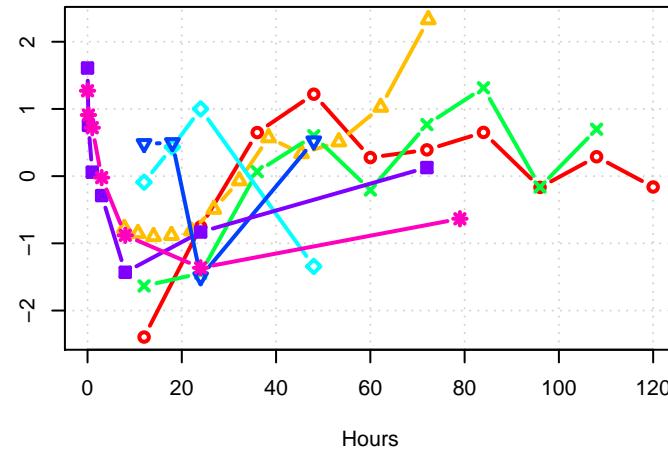
meu1 YLR017W
Methylthioadenosine phosphorylase (MTAP)



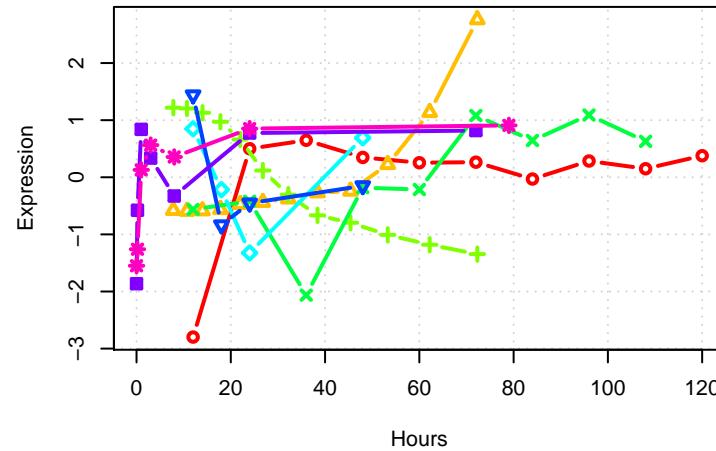
mri1 YPR118W
5'-methylthioribose-1-phosphate isomerase



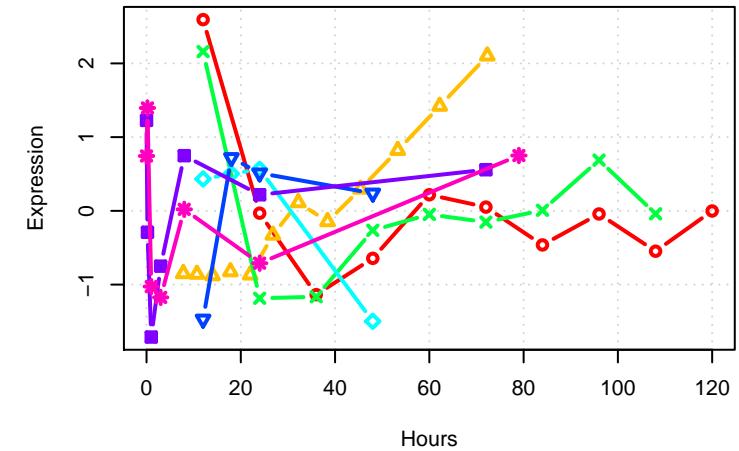
adi1 YMR009W
Acireductone dioxygenase involved in methionine salvage pathway



utr4 YEL038W
Protein with sequence similarity to acireductone synthases



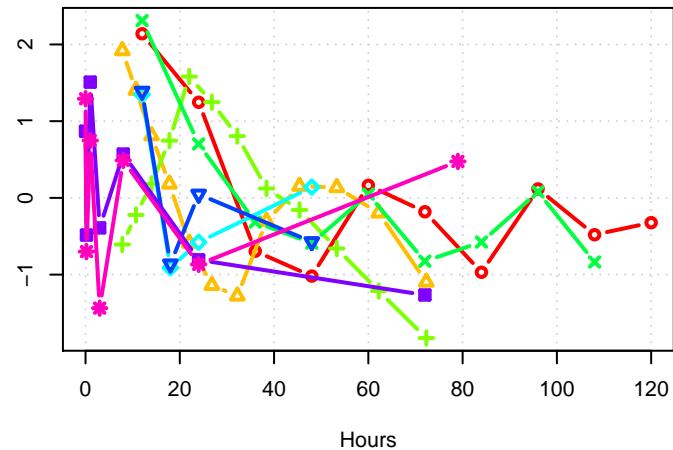
mde1 YJR024C
5'-methylthioribulose-1-phosphate dehydratase



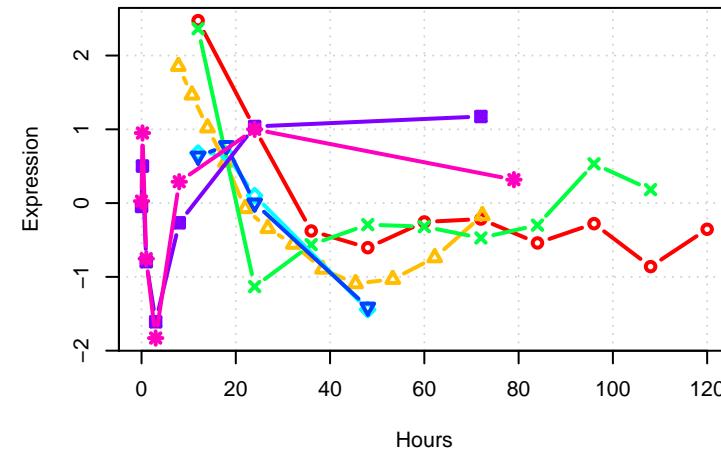
lipid-linked oligosaccharide biosynthesis

lipid-linked oligosaccharide biosynthesis

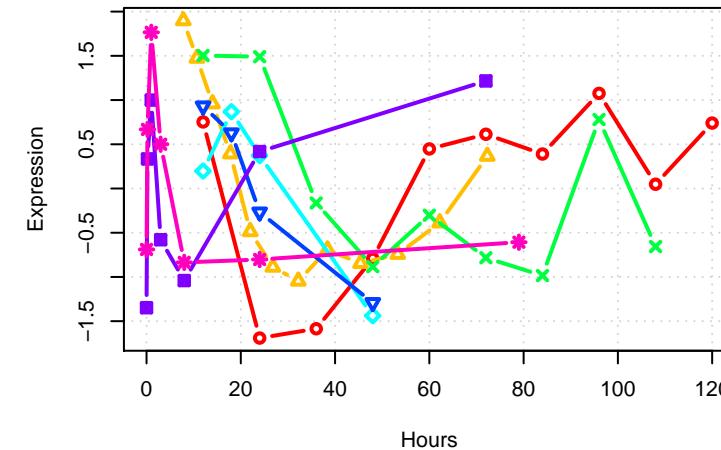
alg11 YNL048W
Alpha-1,2-mannosyltransferase



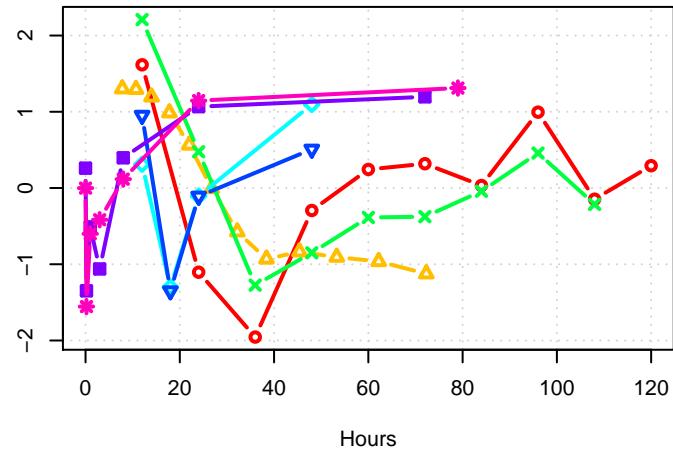
alg2 YGL063C
Mannosyltransferase in the N-linked glycosylation pathway



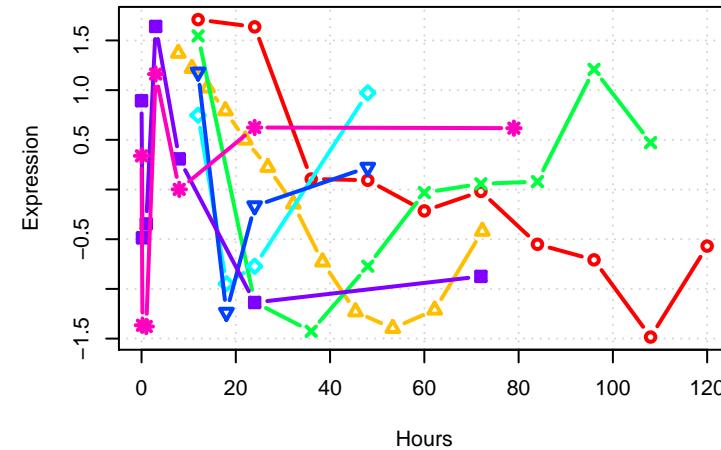
alg6 YOR002W
Alpha-1,3 glucosyltransferase



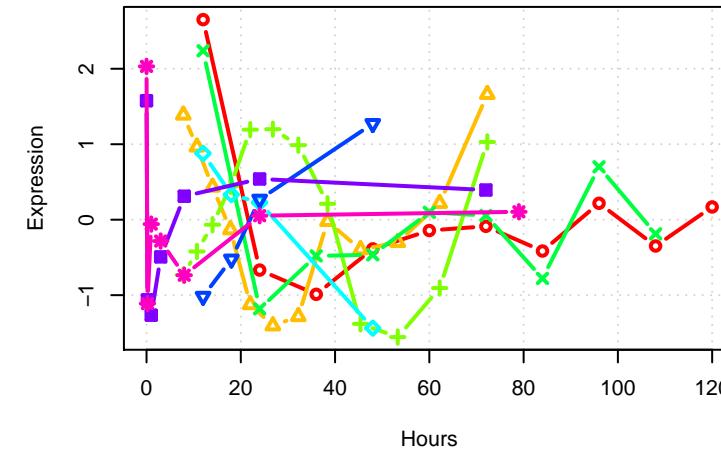
alg8 YOR067C
Glucosyl transferase



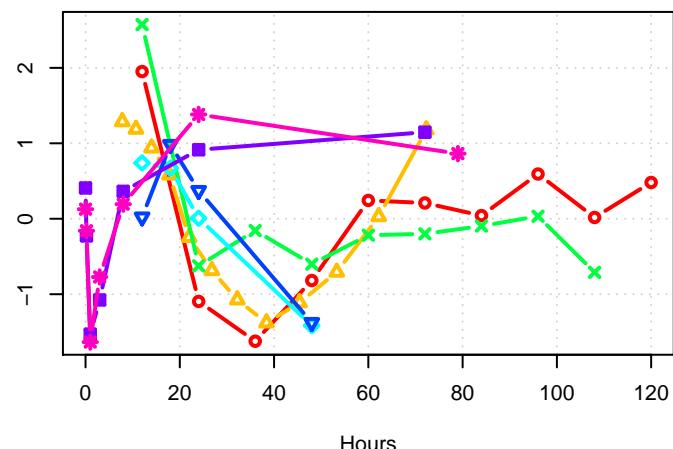
die2 YGR227W
Dolichyl-phosphoglucose-dependent alpha-1,2-glucosyltransferase



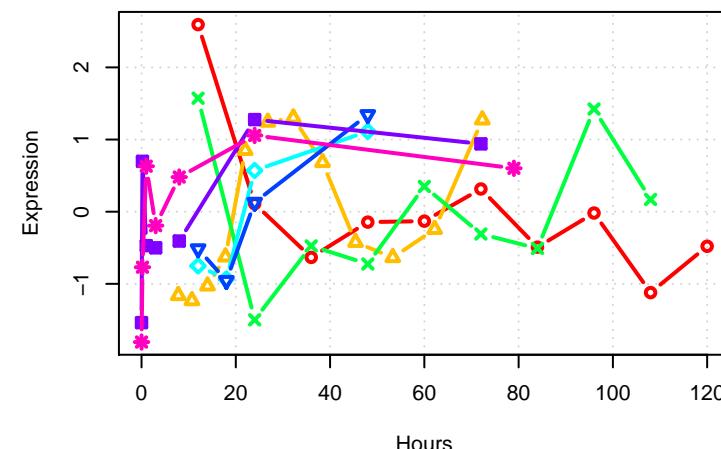
alg12 YNR030W
Alpha-1,6-mannosyltransferase localized to the ER



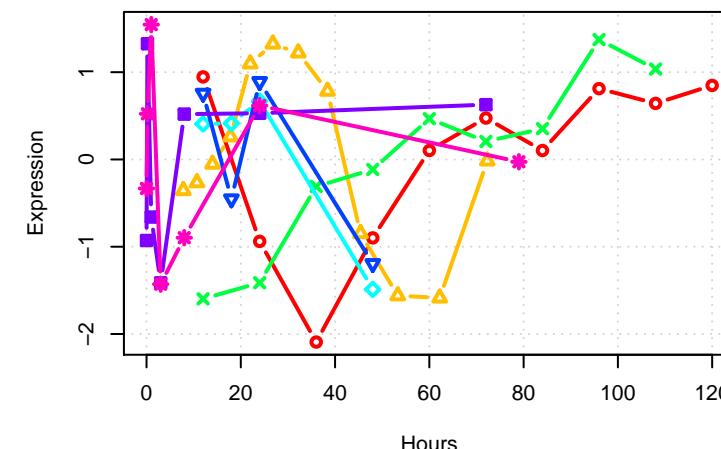
alg3 YBL082C
Dolichol-P-Man dependent alpha(1-3) mannosyltransferase



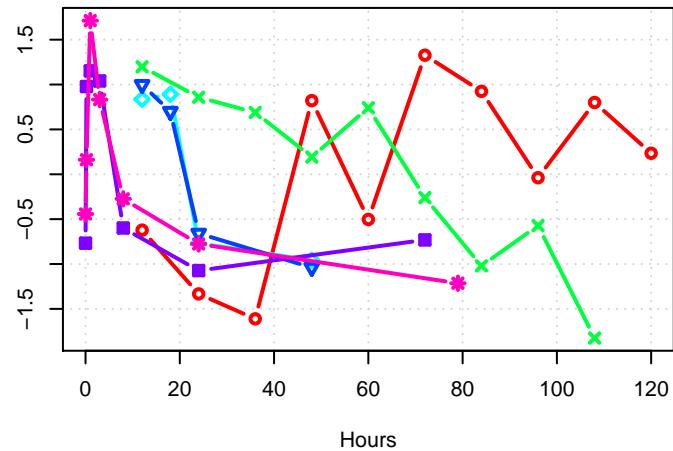
alg9 YNL219C
Mannosyltransferase, involved in N-linked glycosylation



alg1 YBR110W
Mannosyltransferase

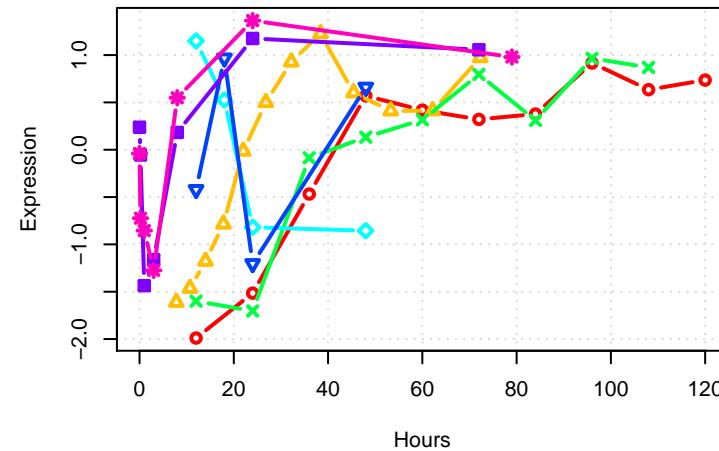


alg13 YGL047W
Catalytic component of UDP-GlcNAc transferase

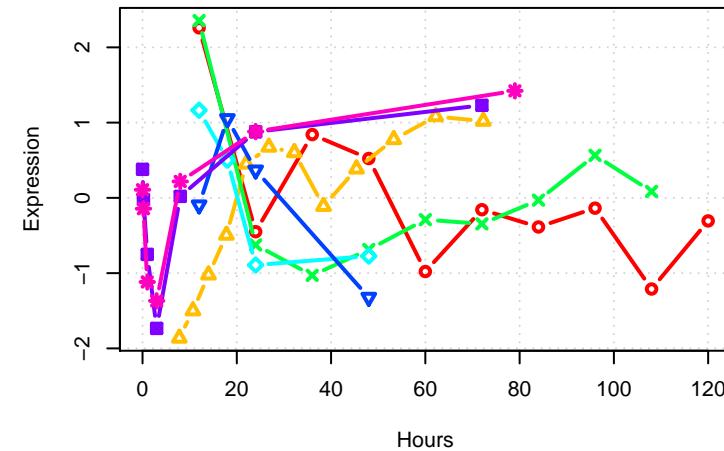


lipid-linked oligosaccharide biosynthesis

alg14 YBR070C
Component of UDP-GlcNAc transferase



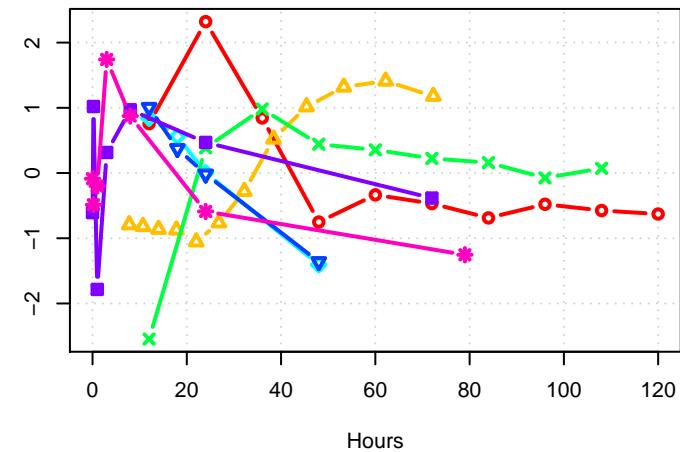
alg7 YBR243C
UDP-N-acetyl-glucosamine-1-P transferase



L-serine degradation

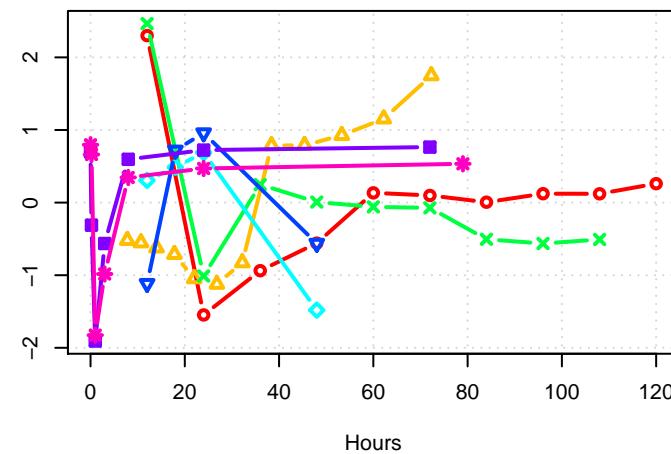
L-serine degradation

cha1 YCL064C
Catabolic L-serine (L-threonine) deaminase

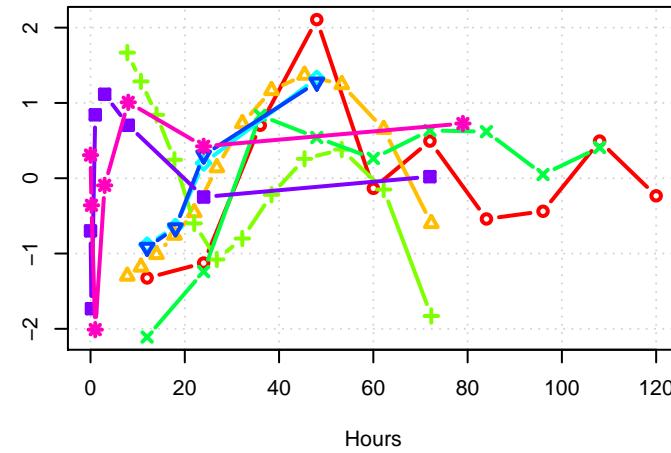


lysine biosynthesis

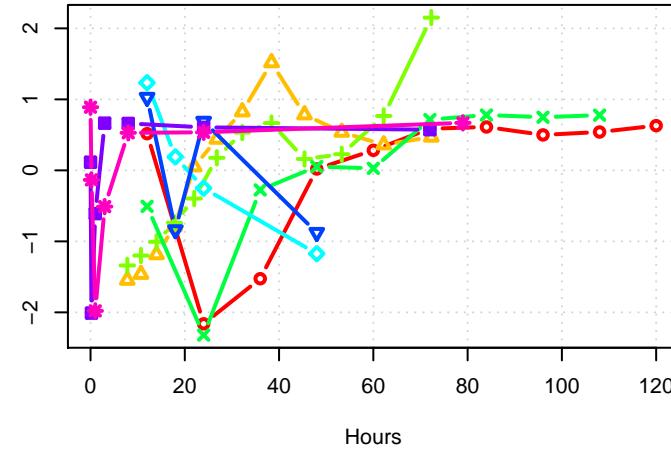
lys9 YNR050C
Saccharopine dehydrogenase (NAD⁺, L-glutamate-forming)



lys20 YDL182W
Homocitrate synthase isozyme and functions in DNA repair

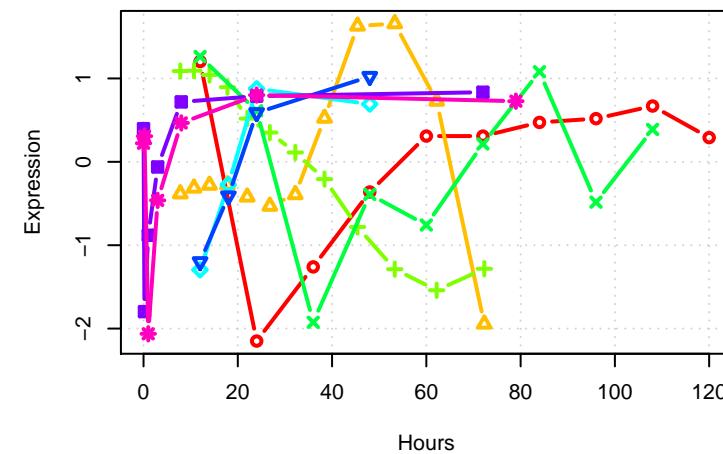


lys1 YIR034C
Saccharopine dehydrogenase (NAD⁺, L-lysine-forming)

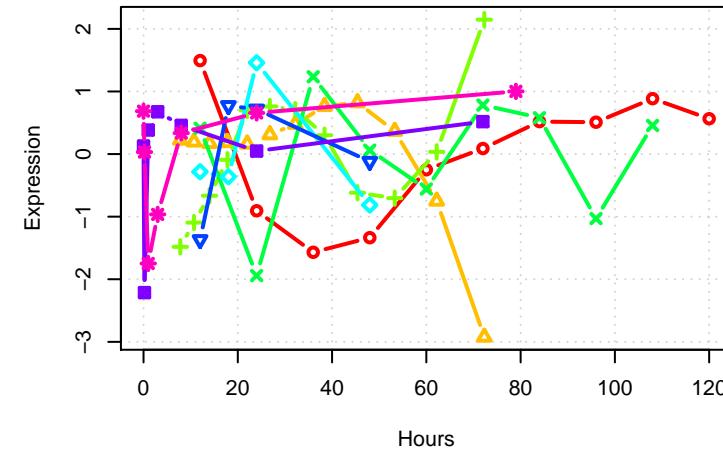


lysine biosynthesis

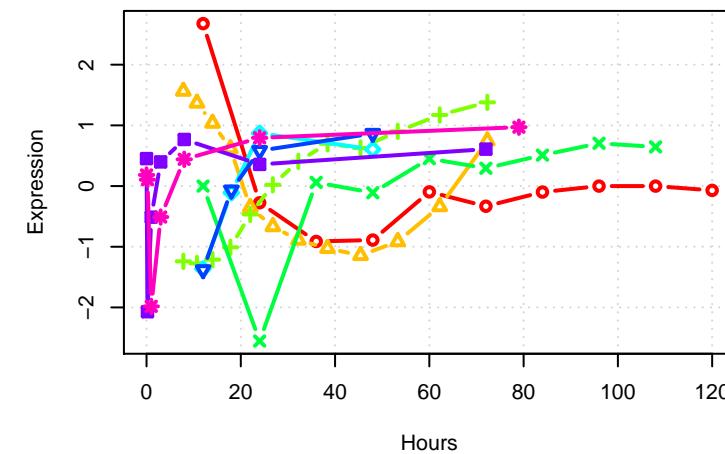
lys4 YDR234W
Homoaconitase



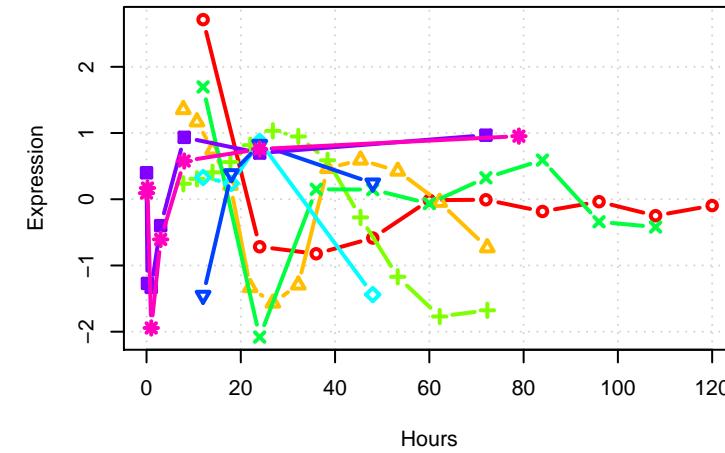
lys21 YDL131W
Homocitrate synthase isozyme



lys2 YBR115C
Alpha amino adipate reductase

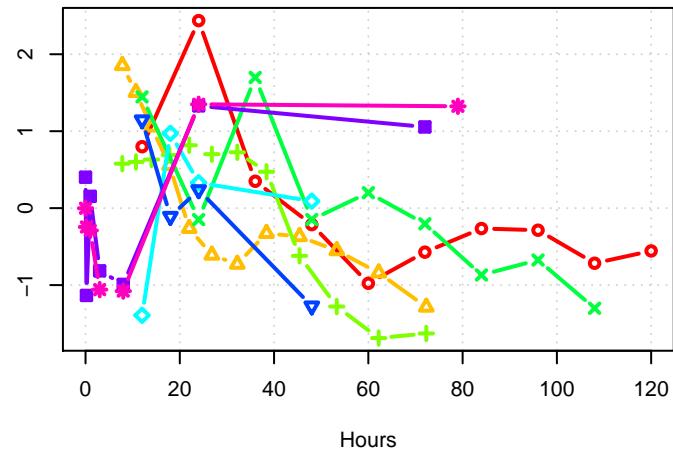


lys12 YIL094C
Homo-isocitrate dehydrogenase



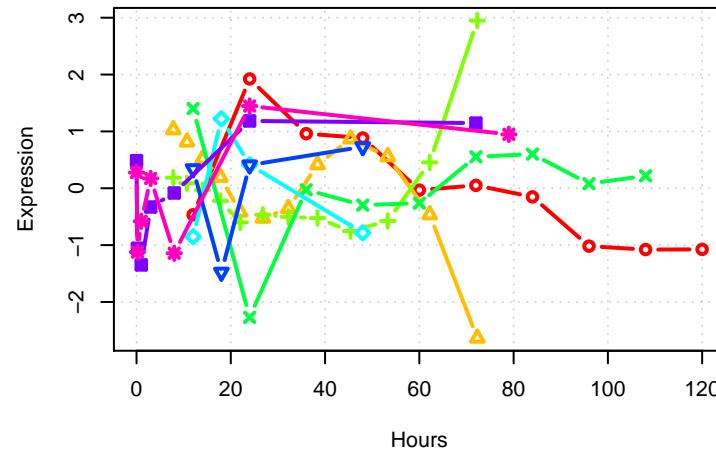
S–adenosylmethionine cycle

met6 YER091C
Cobalamin-independent methionine synthase

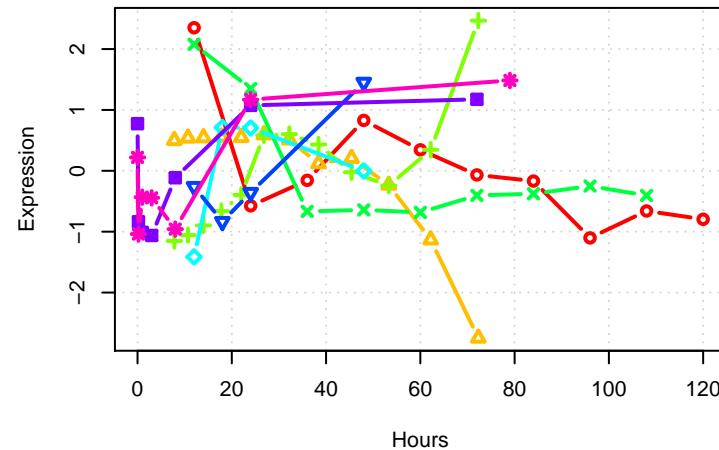


S-adenosylmethionine cycle

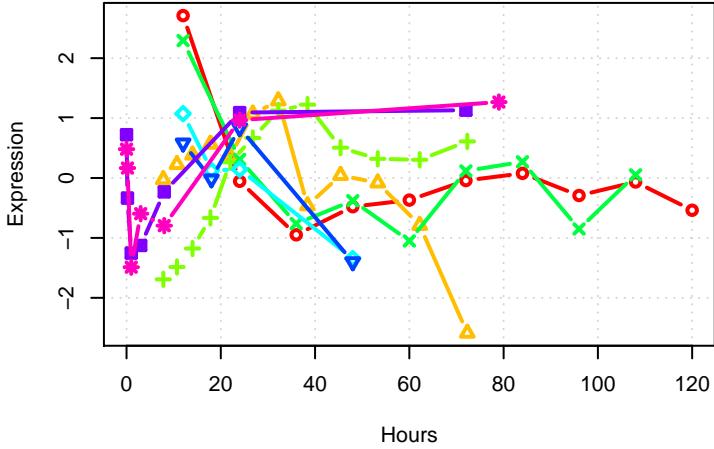
sam1 YLR180W
S-adenosylmethionine synthetase



sam2 YDR502C
S-adenosylmethionine synthetase



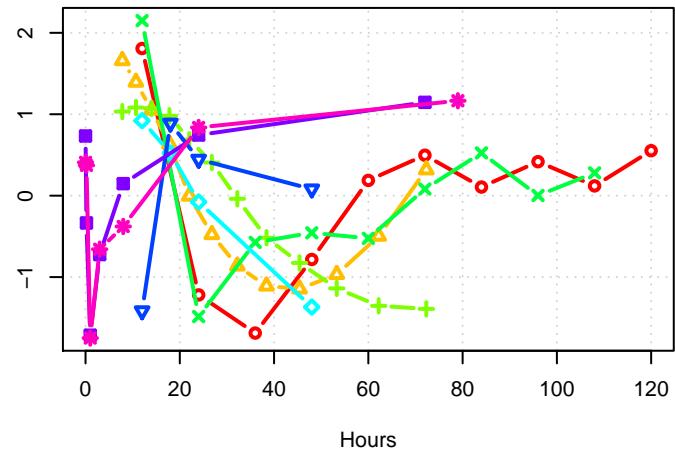
sah1 YER043C
S-adenosyl-L-homocysteine hydrolase



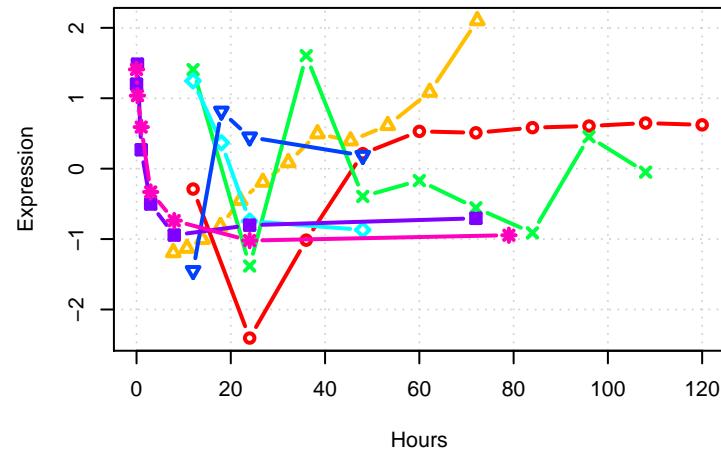
phenylalanine biosynthesis

phenylalanine biosynthesis

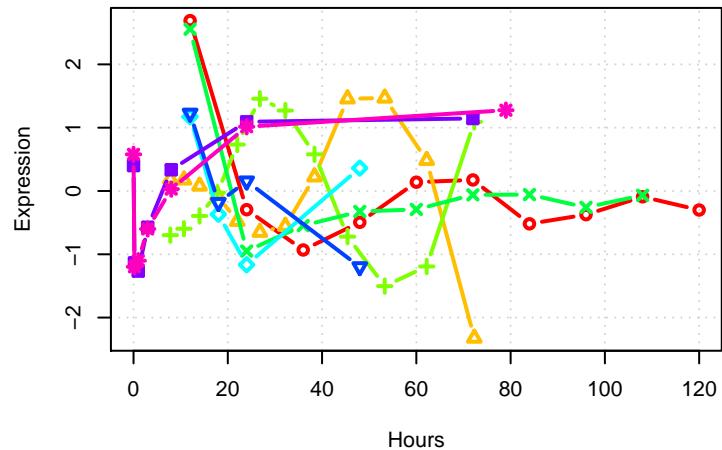
aro8 YGL202W
Aromatic aminotransferase I



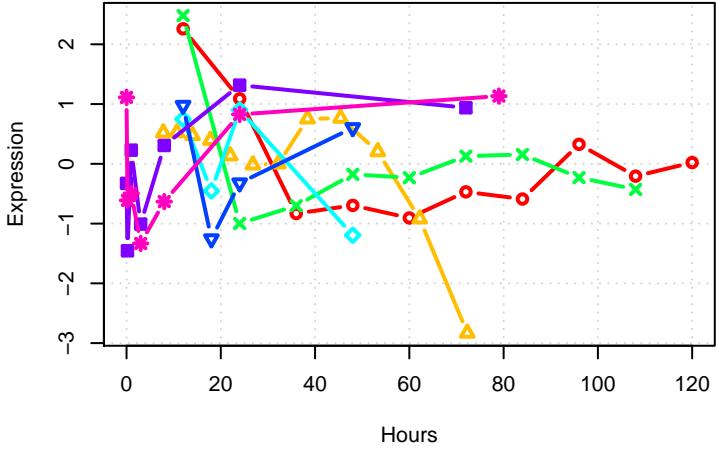
aro9 Ynr137W
Aromatic aminotransferase II



aro7 YPR060C
Chorismate mutase

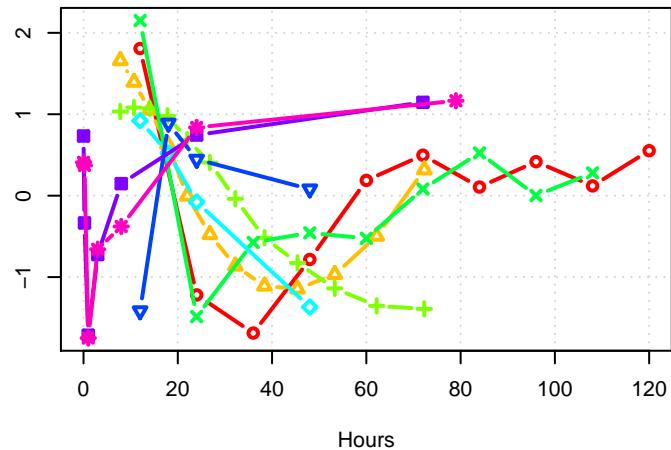


pha2 YNL316C
Prephenate dehydratase



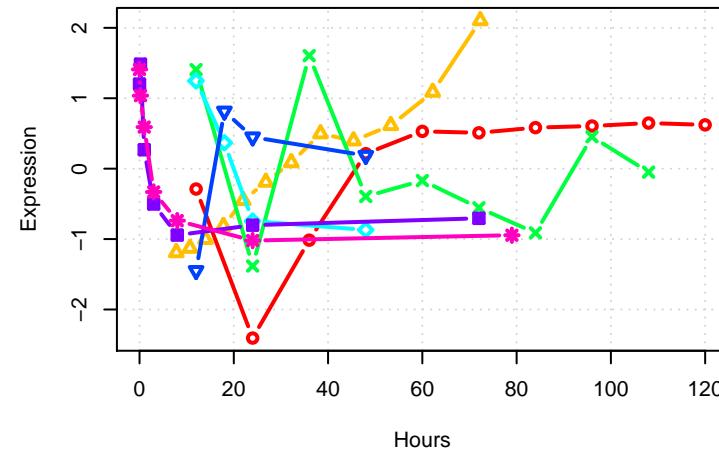
tyrosine biosynthesis

aro8 YGL202W
Aromatic aminotransferase I

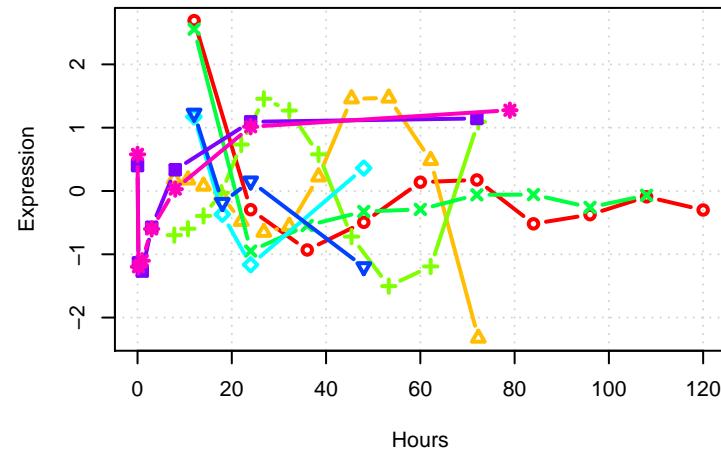


tyrosine biosynthesis

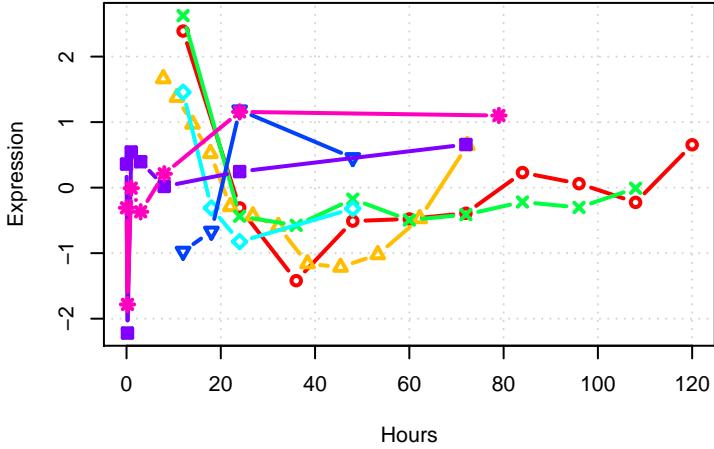
aro9 Yhr137W
Aromatic aminotransferase II



aro7 YPR060C
Chorismate mutase

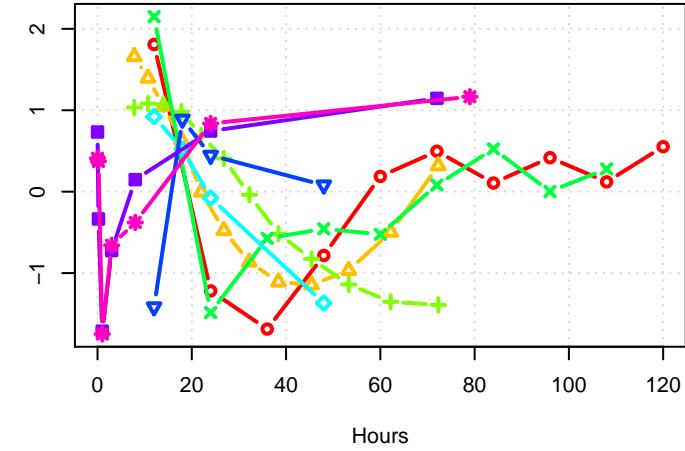


tyr1 YBR166C
Prephenate dehydrogenase involved in tyrosine biosynthesis

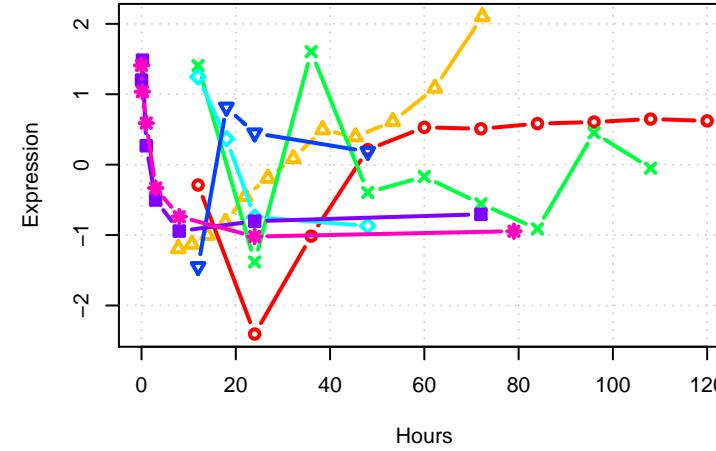


tyrosine degradation

aro8 YGL202W
Aromatic aminotransferase I



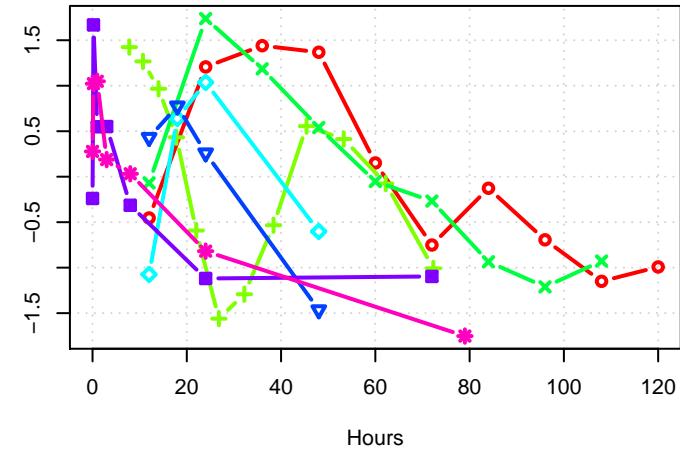
tyrosine degradation



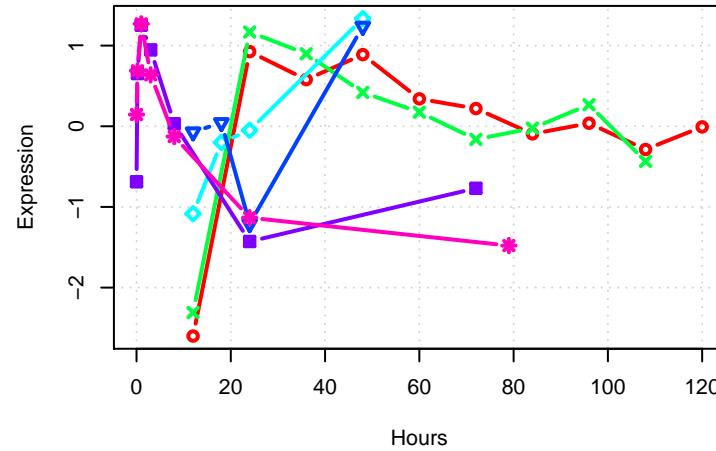
methylglyoxal catabolism

methylglyoxal catabolism

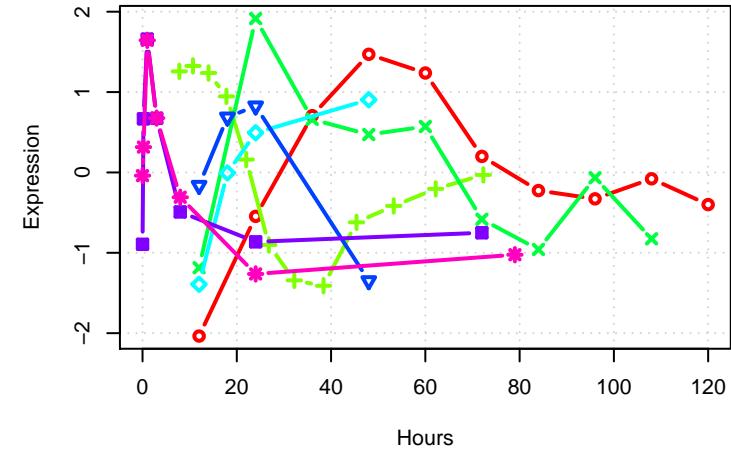
glo2 YDR272W
Cytoplasmic glyoxalase II



glo4 YOR040W
Mitochondrial glyoxalase II

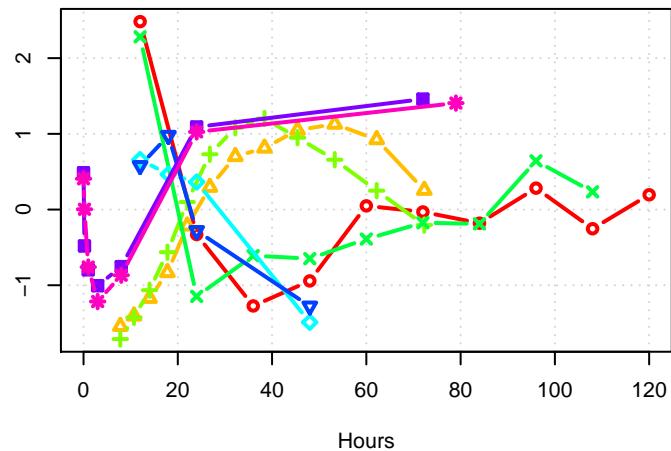


glo1 YML004C
Monomeric glyoxalase I



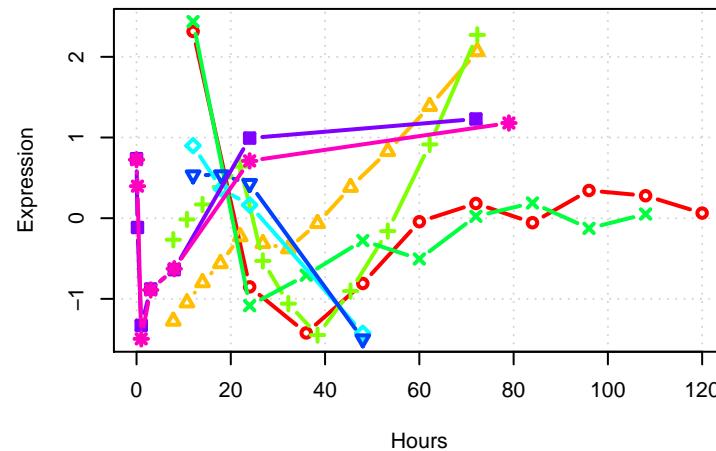
mevalonate pathway

erg10 YPL028W
Acetyl-CoA C-acetyltransferase (acetoacetyl-CoA thiolase)

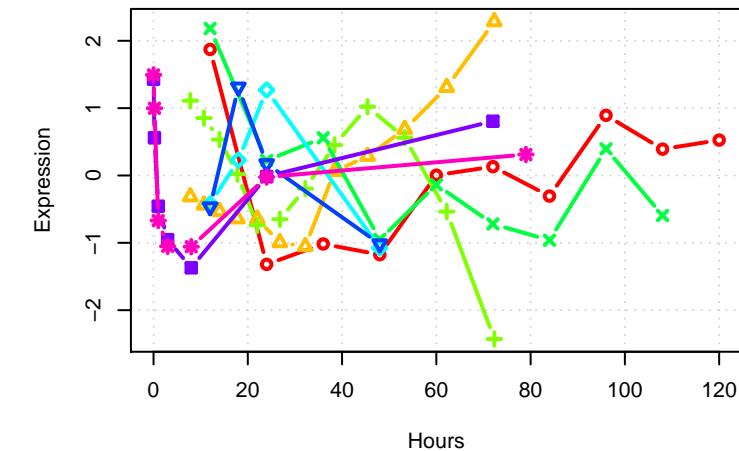


mevalonate pathway

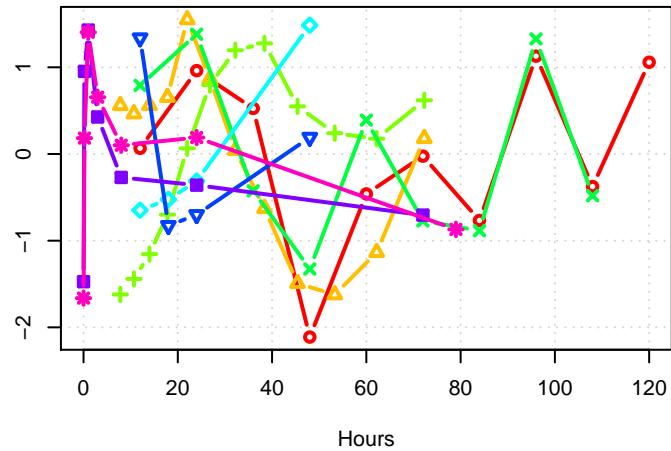
mvd1 YNL045W
Mevalonate pyrophosphate decarboxylase



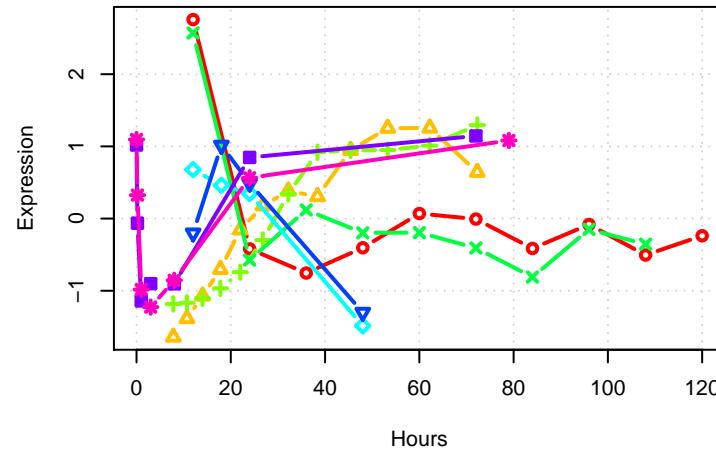
hmg1 YML075C
HMG-CoA reductase



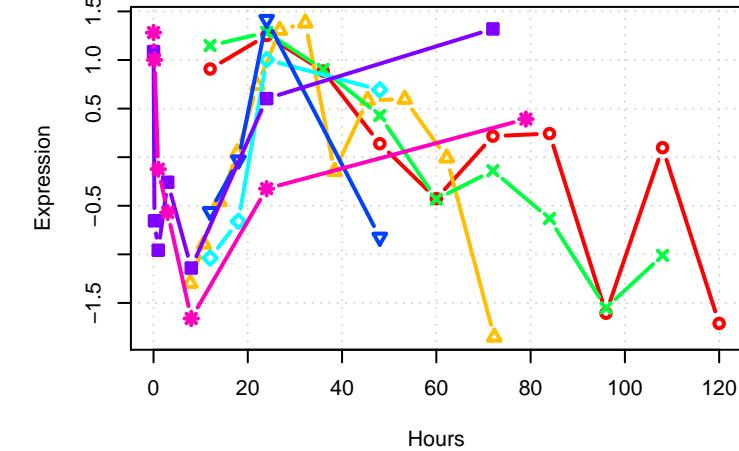
hmg2 YLR450W
HMG-CoA reductase



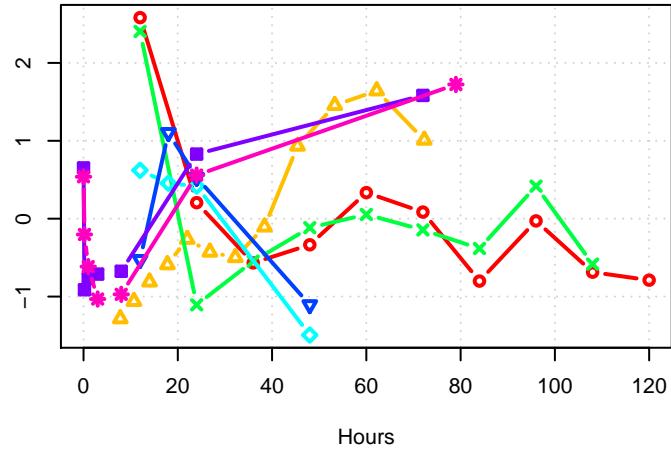
erg13 YML126C
3-hydroxy-3-methylglutaryl-CoA (HMG-CoA) synthase



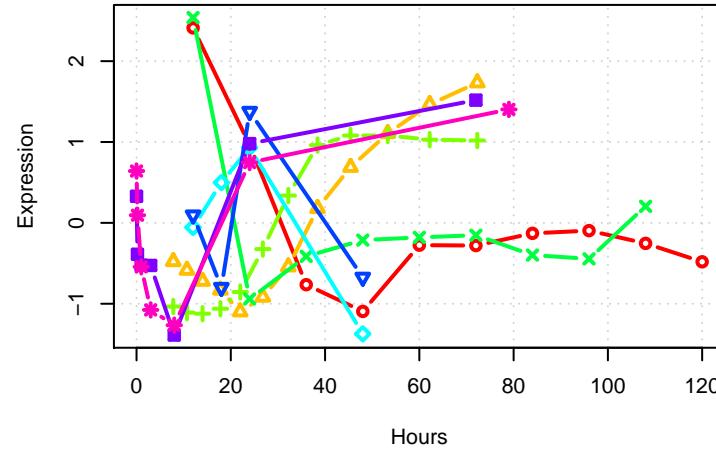
idi1 YPL117C
Isopentenyl diphosphate:dimethylallyl diphosphate isomerase



erg12 YMR208W
Mevalonate kinase

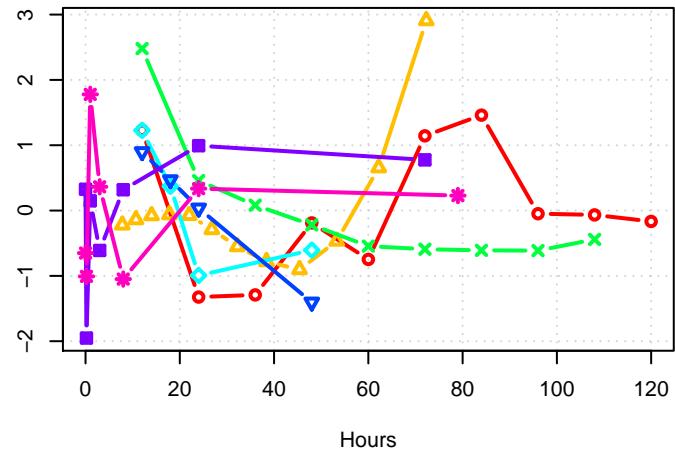


erg8 YMR220W
Phosphomevalonate kinase



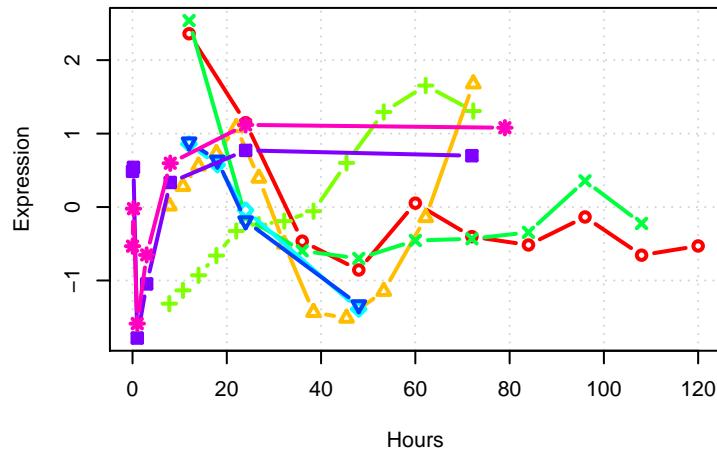
nicotinate riboside salvage pathway I

nrk1 YNL129W
Nicotinamide riboside kinase

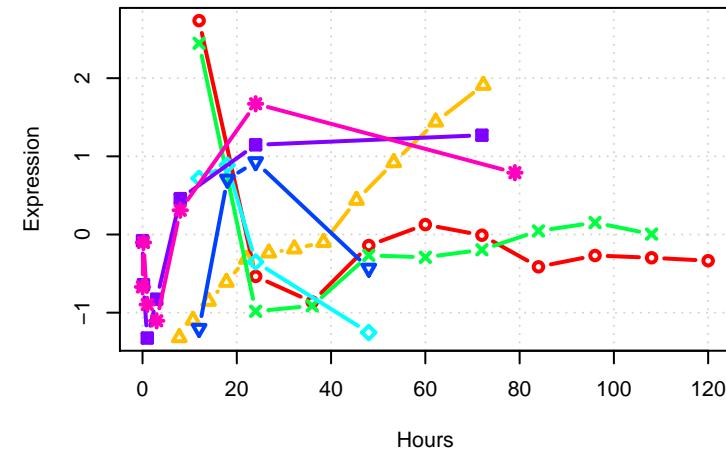


nicotinate riboside salvage pathway I

pnp1 YLR209C
Purine nucleoside phosphorylase



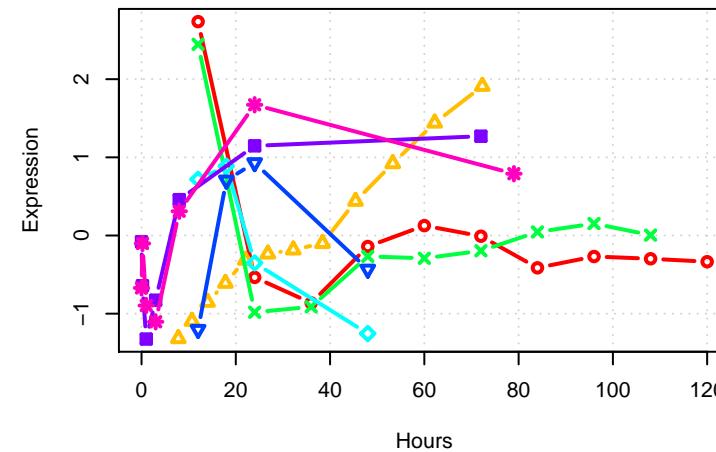
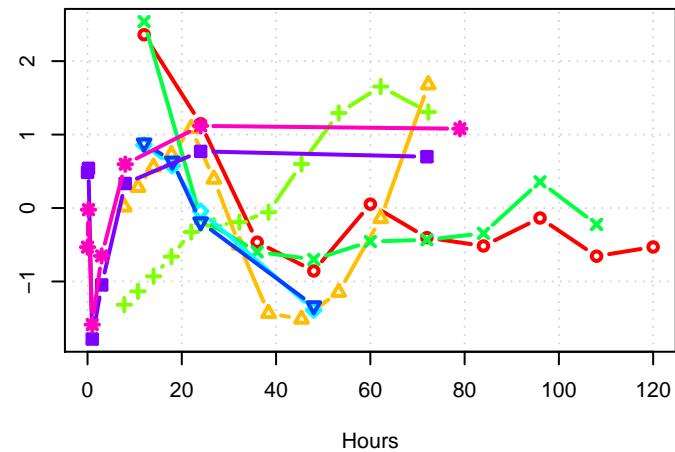
urh1 YDR400W
Uridine nucleosidase (uridine-cytidine N-ribohydrolase)



nicotinamide riboside salvage pathway II

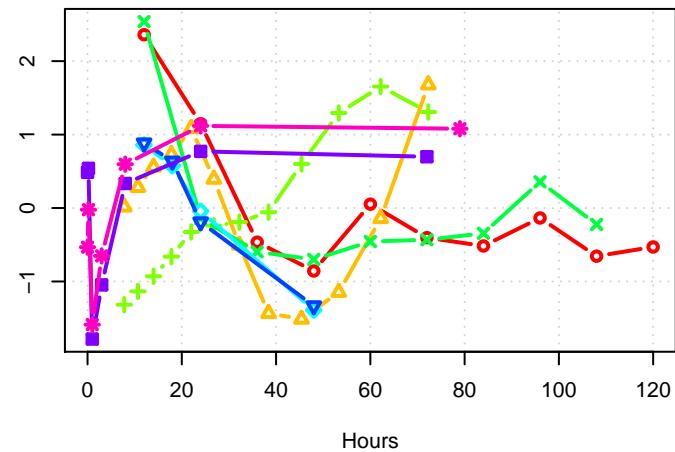
pnp1 YLR209C
Purine nucleoside phosphorylase

nicotinamide riboside salvage pathway II

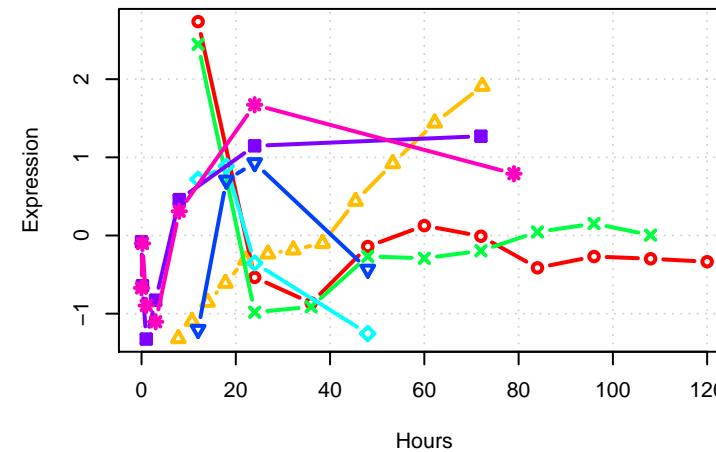


nicotinate riboside salvage pathway II

pnp1 YLR209C
Purine nucleoside phosphorylase



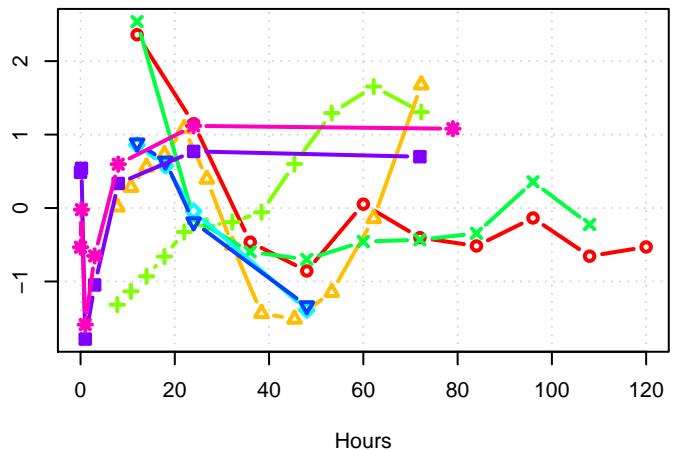
umt1 YDR400W
Uridine nucleosidase (uridine-cytidine N-ribohydrolase)



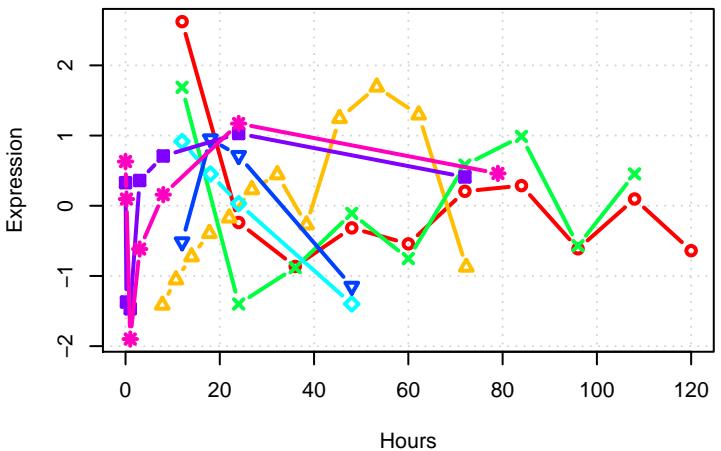
salvage pathways of adenine, hypoxanthine and their nucleosides

salvage pathways of adenine, hypoxanthine and their nucleosides

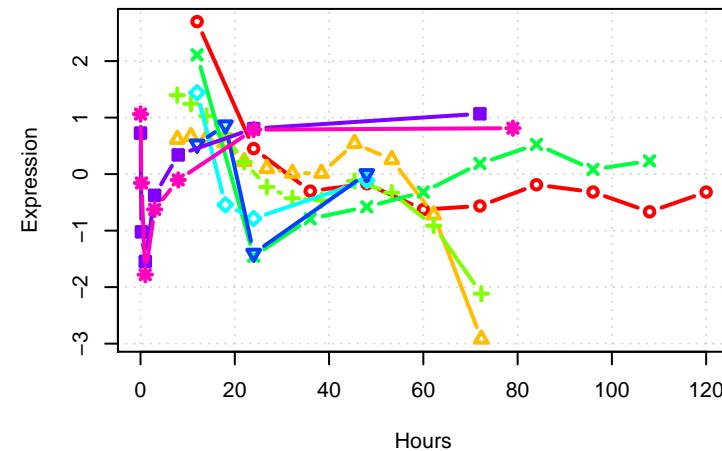
pnp1 YLR209C
Purine nucleoside phosphorylase



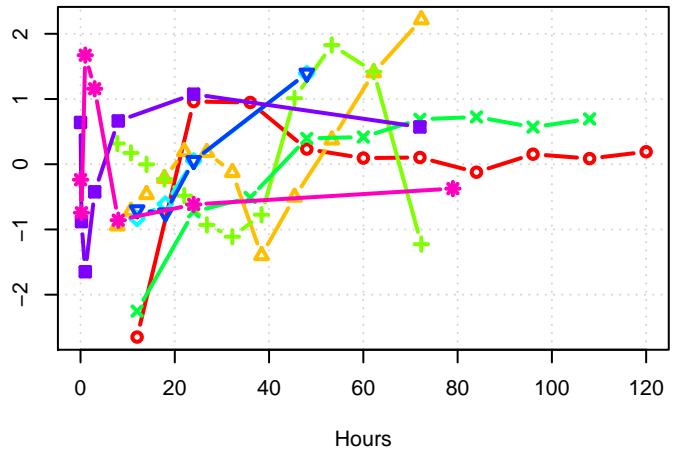
ado1 YNL141W
Adenosine deaminase (adenine aminohydrolase)



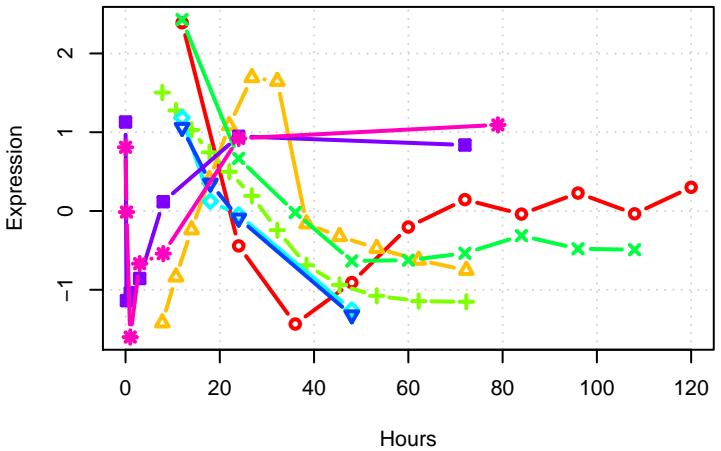
apt1 YML022W
Adenine phosphoribosyltransferase



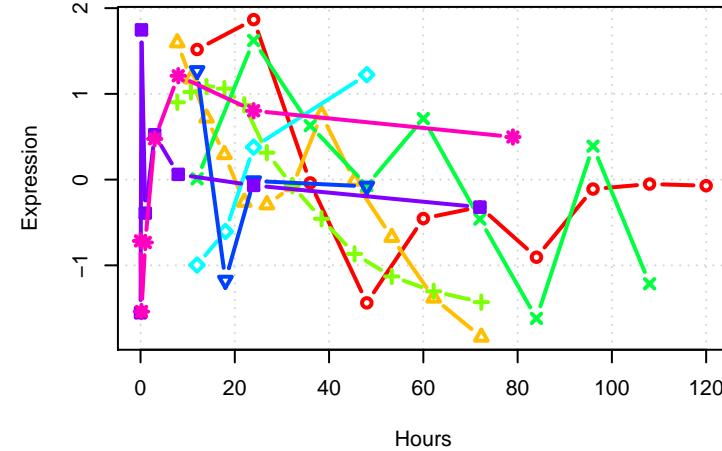
apt2 YDR441C
Potential adenine phosphoribosyltransferase



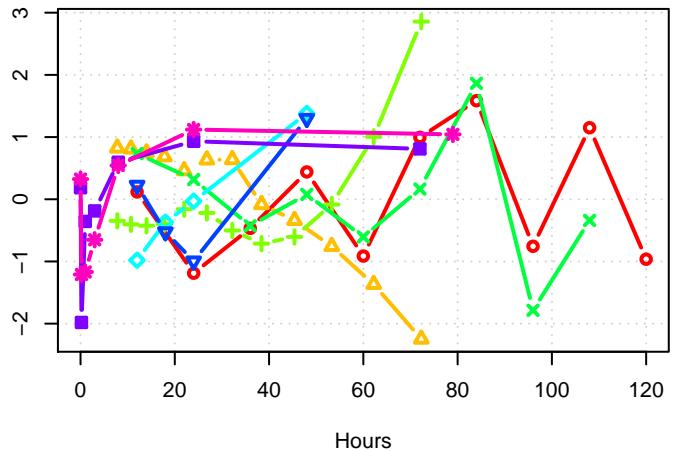
ado1 YJR105W
Adenosine kinase



amd1 YML035C
AMP deaminase



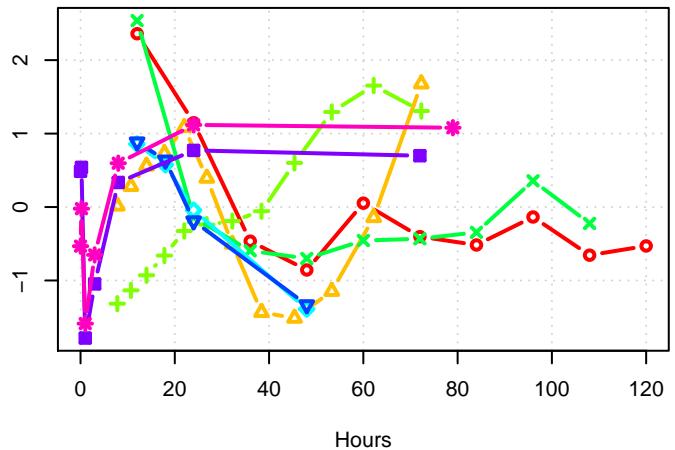
hpt1 YDR399W
Dimeric hypoxanthine–guanine phosphoribosyltransferase



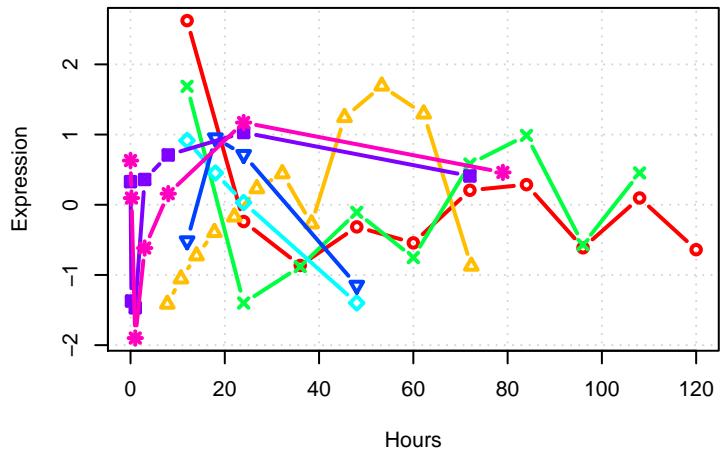
salvage pathways of purines and their nucleosides

salvage pathways of purines and their nucleosides

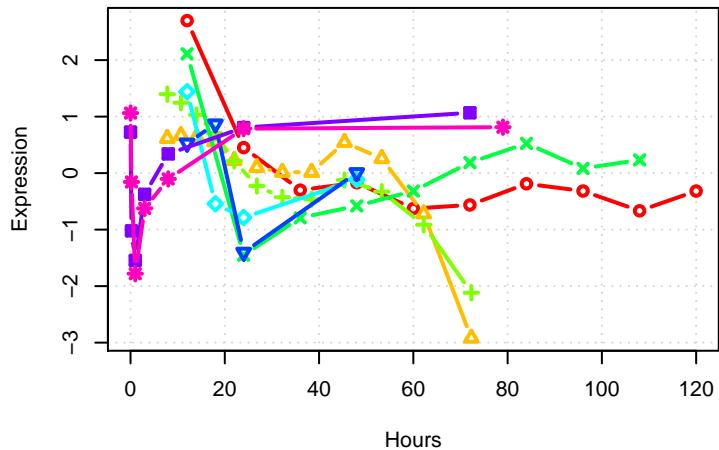
pnp1 YLR209C
Purine nucleoside phosphorylase



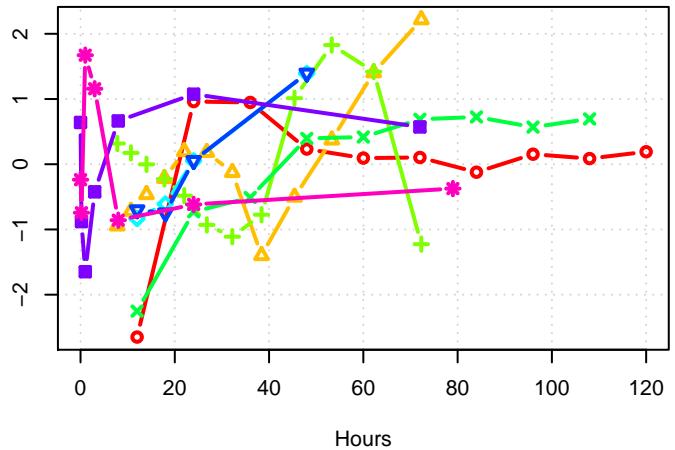
aah1 YNL141W
Adenine deaminase (adenine aminohydrolase)



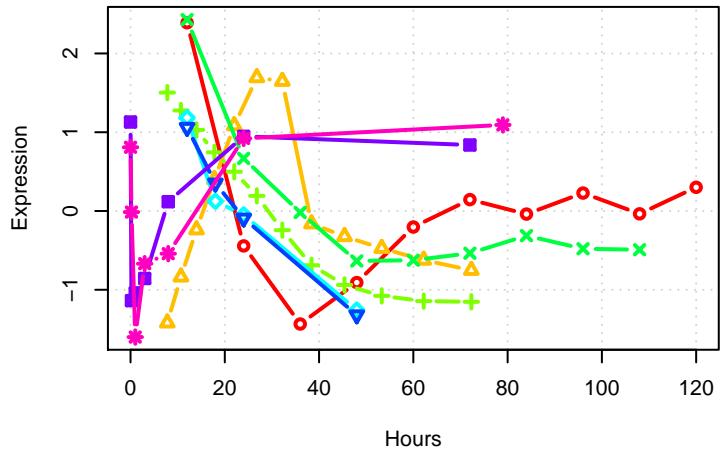
apt1 YML022W
Adenine phosphoribosyltransferase



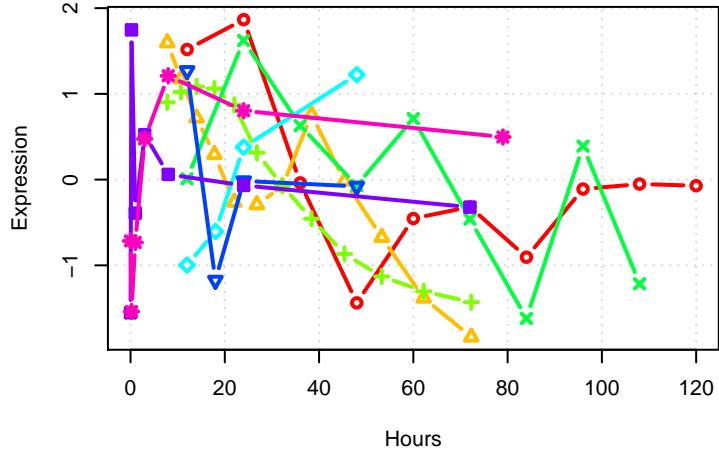
apt2 YDR441C
Potential adenine phosphoribosyltransferase



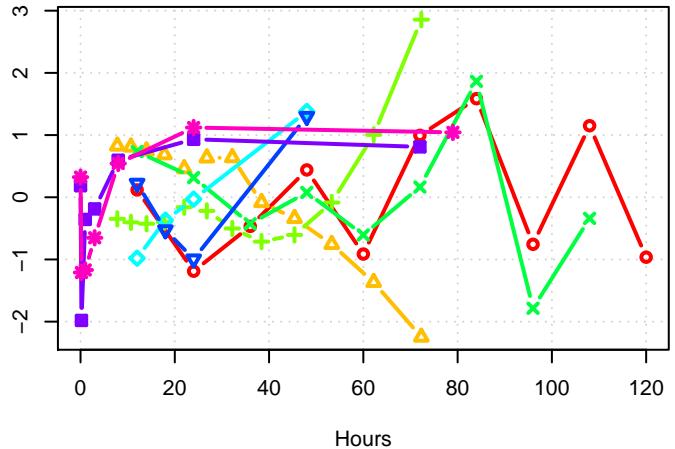
ado1 YJR105W
Adenosine kinase



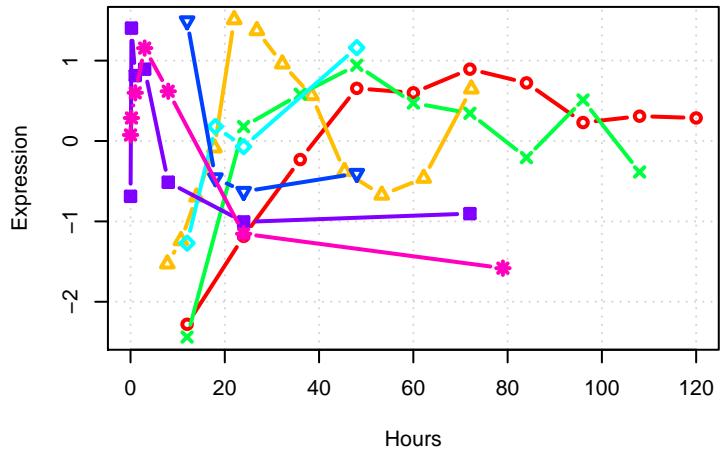
amd1 YML035C
AMP deaminase



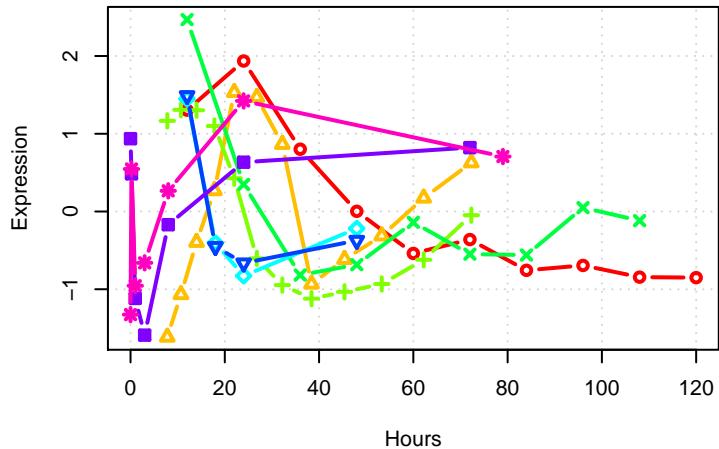
hpt1 YDR399W
Dimeric hypoxanthine–guanine phosphoribosyltransferase



gud1 YDL238C
Guanine deaminase



xpt1 YJR133W
Xanthine–guanine phosphoribosyl transferase

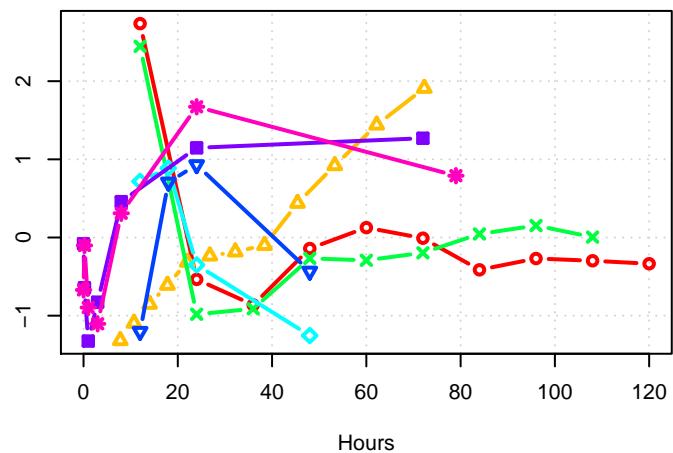


salvage pathways of pyrimidine deoxyribonucleotides

salvage pathways of pyrimidine deoxyribonucleotides

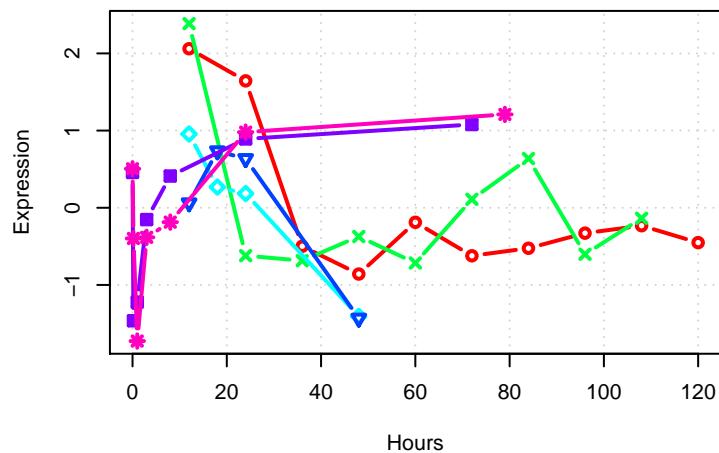
urh1 YDR400W

Uridine nucleosidase (uridine-cytidine N-ribohydrolase)



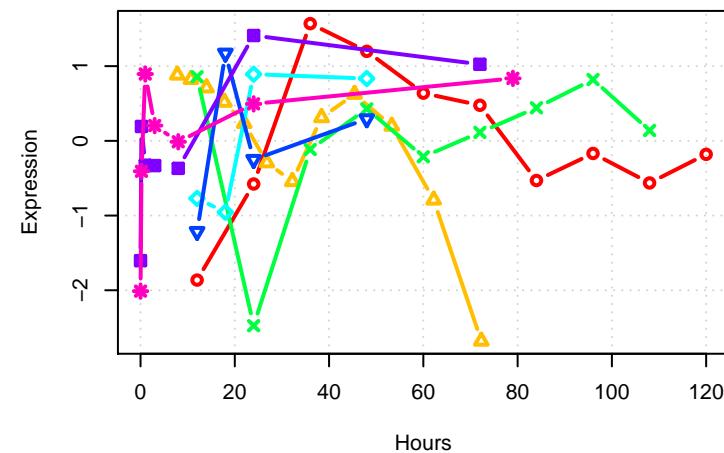
urk1 YNR012W

Uridine/cytidine kinase



cdd1 YLR245C

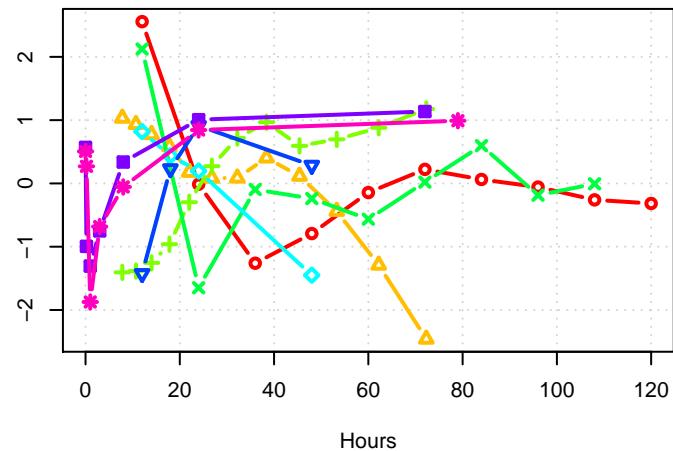
Cytidine deaminase



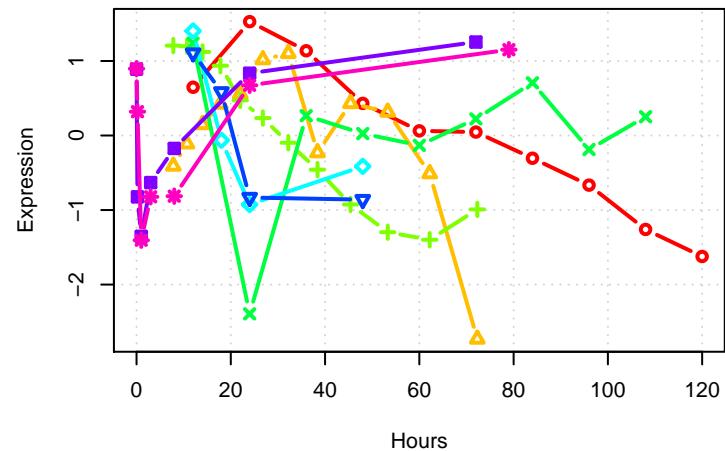
non-oxidative branch of the pentose phosphate pathway

non-oxidative branch of the pentose phosphate pathway

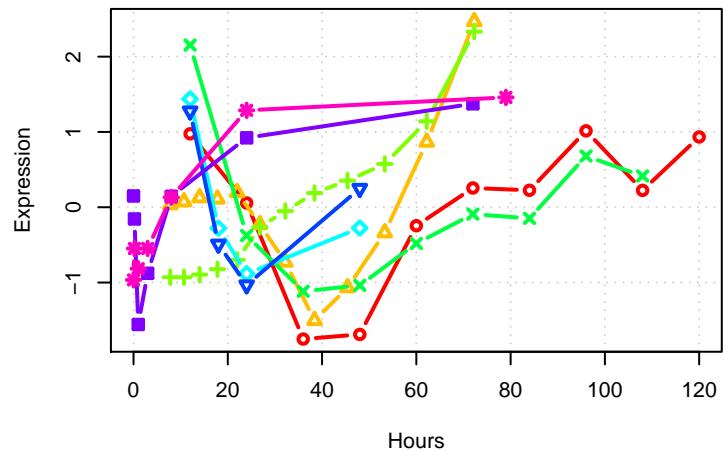
tkl1 YPR074C
Transketolase



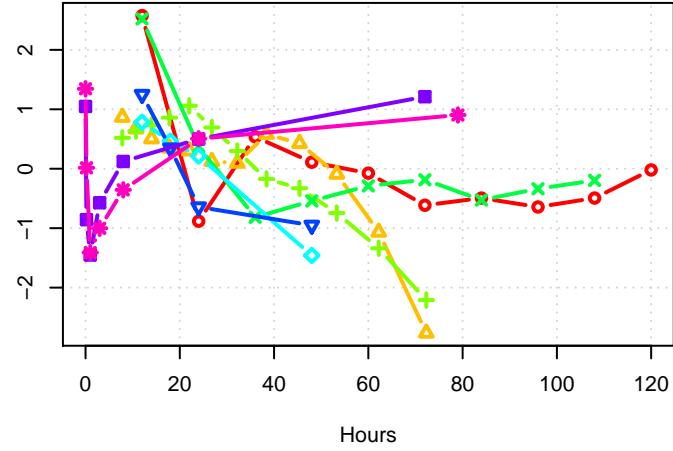
rki1 YOR055C
Ribose-5-phosphate ketol-isomerase



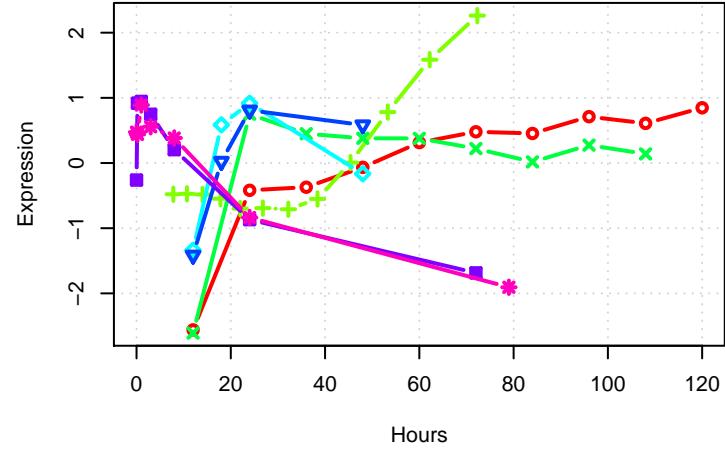
rpe1 YJL121C
D-ribulose-5-phosphate 3-epimerase



tal1 YLR354C
Transaldolase, enzyme in the non-oxidative pentose phosphate pathway



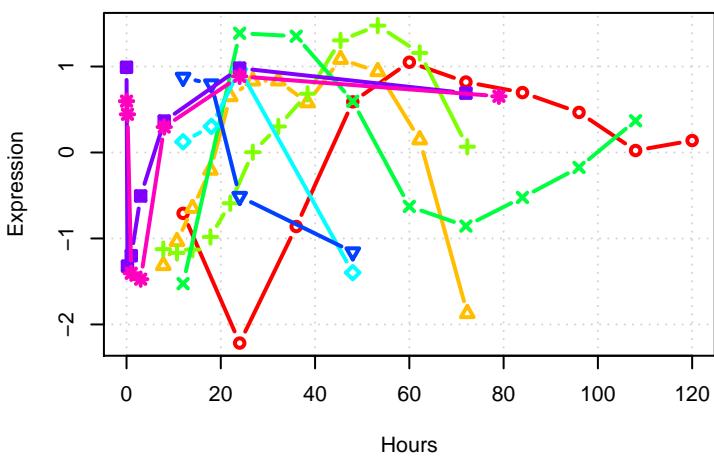
tkl2 YBR117C
Transketolase



oleate biosynthesis

oleate biosynthesis

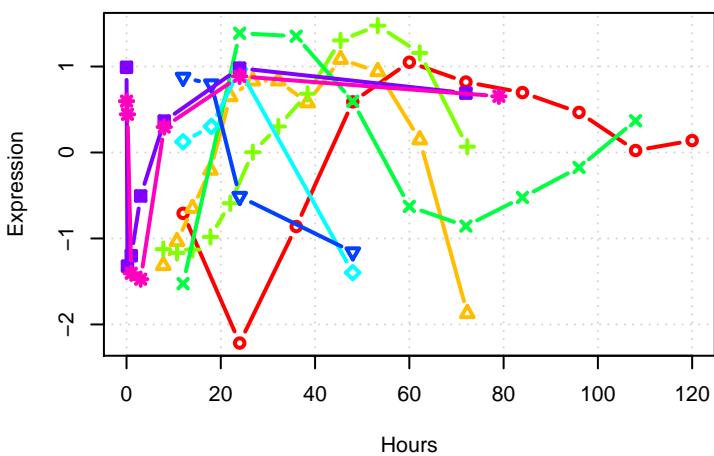
ole1 YGL055W
Delta(9) fatty acid desaturase



palmitoleate biosynthesis

palmitoleate biosynthesis

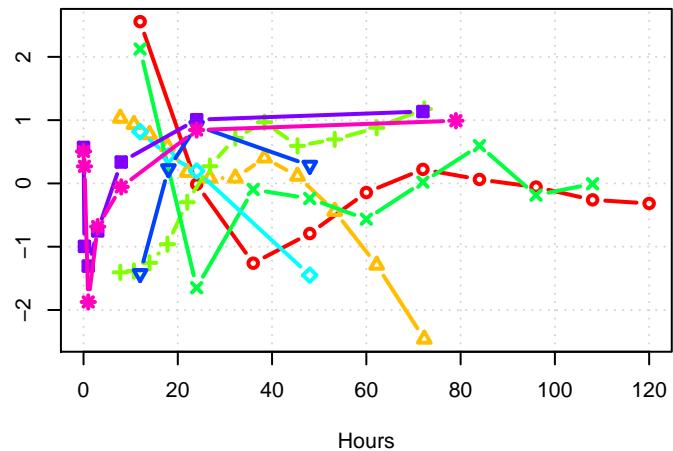
ole1 YGL055W
Delta(9) fatty acid desaturase



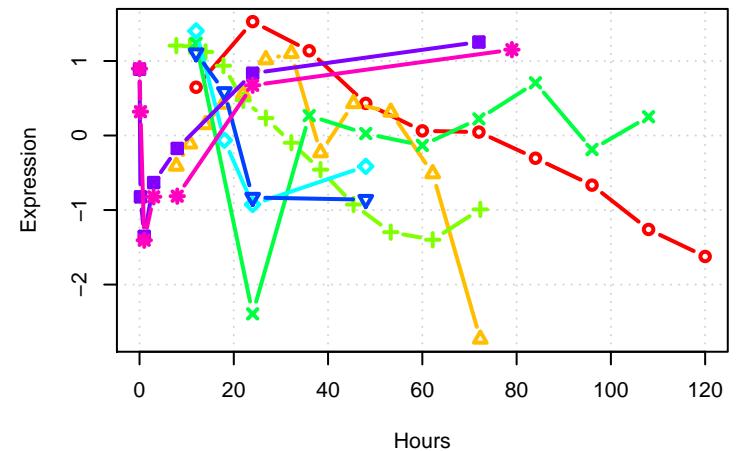
oxidative branch of the pentose phosphate pathway

oxidative branch of the pentose phosphate pathway

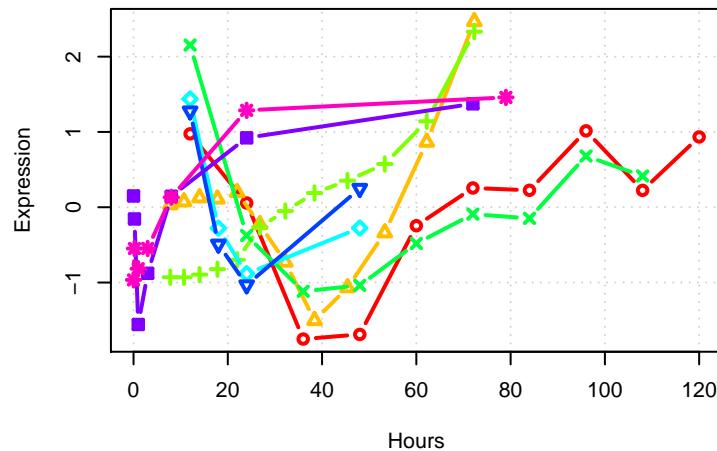
tkl1 YPR074C
Transketolase



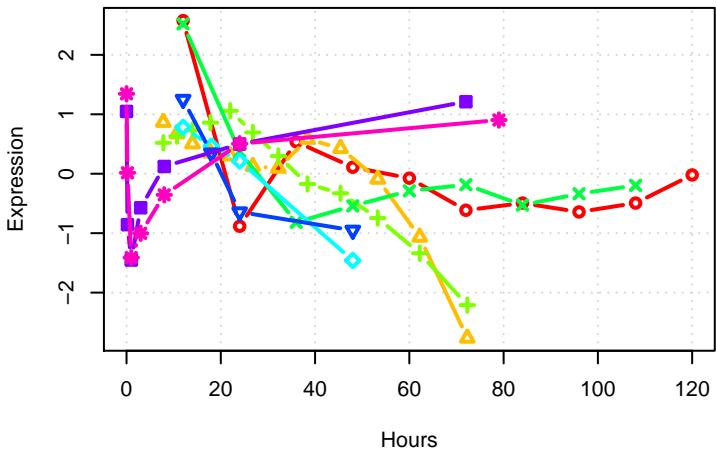
rki1 YOR095C
Ribose-5-phosphate ketol-isomerase



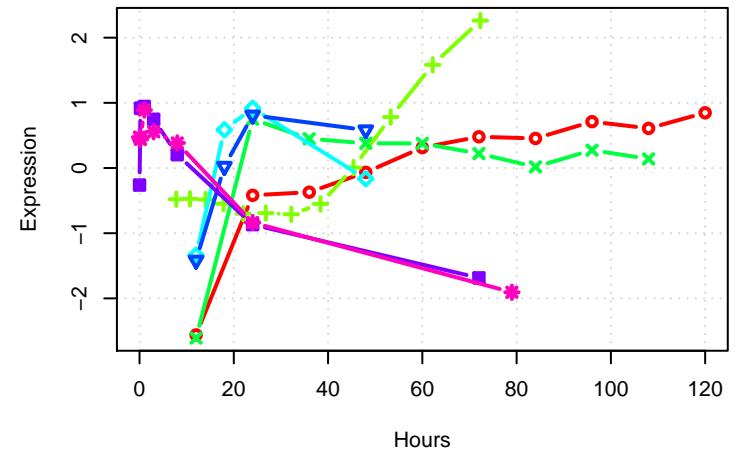
rpe1 YJL121C
D-ribulose-5-phosphate 3-epimerase



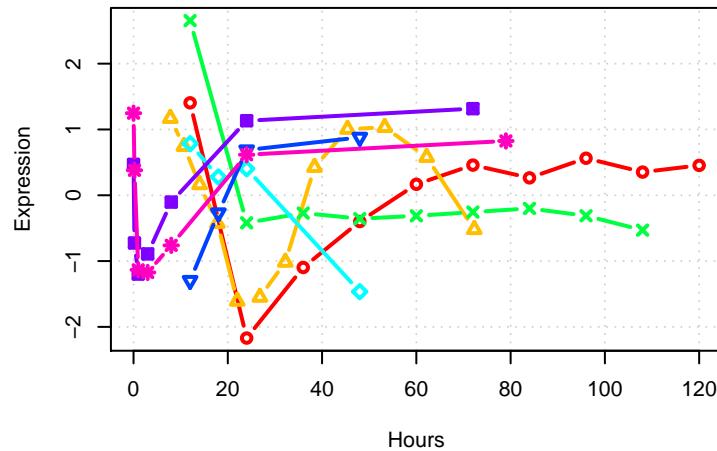
tal1 YLR354C
Transaldolase, enzyme in the non-oxidative pentose phosphate pathway



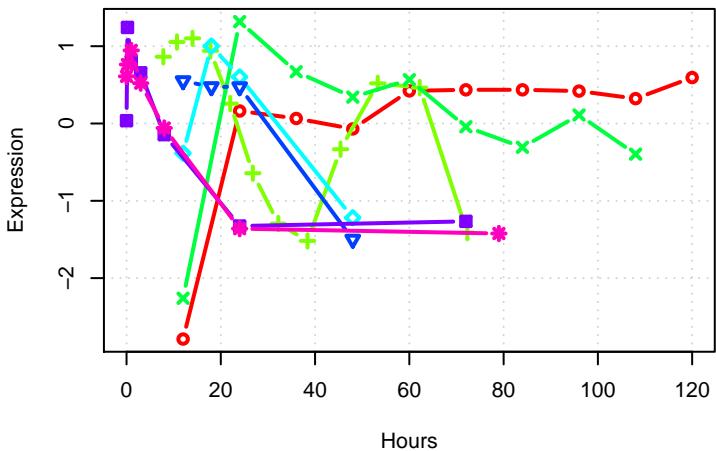
tkl2 YBR117C
Transketolase



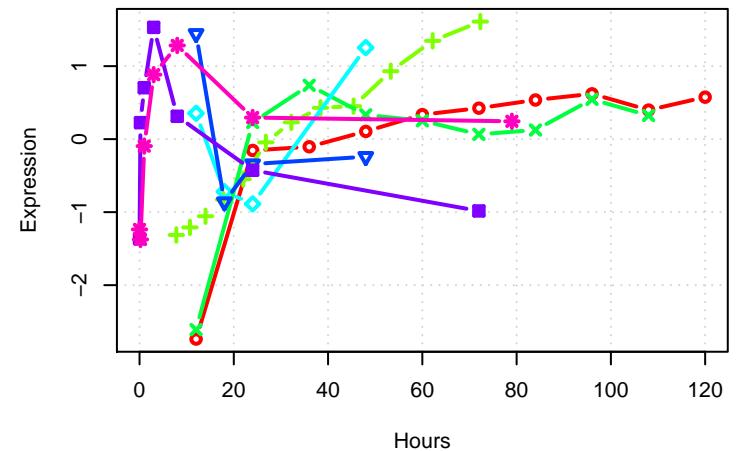
sol3 YHR163W
6-phosphogluconolactonase



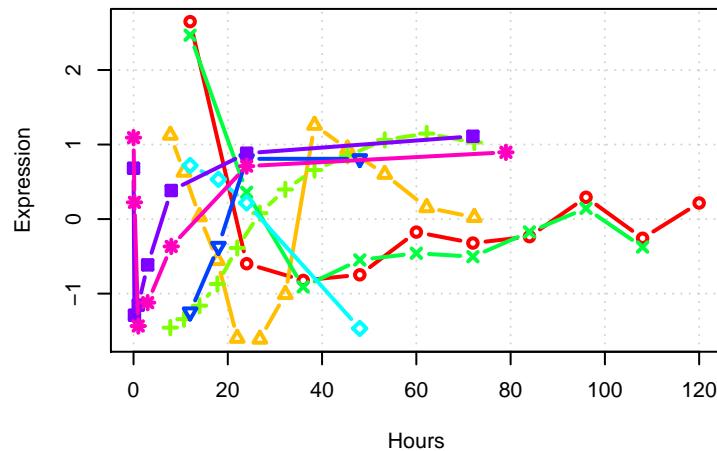
sol4 YGR248W
6-phosphogluconolactonase



zwf1 YNL241C
Glucose-6-phosphate dehydrogenase (G6PD)

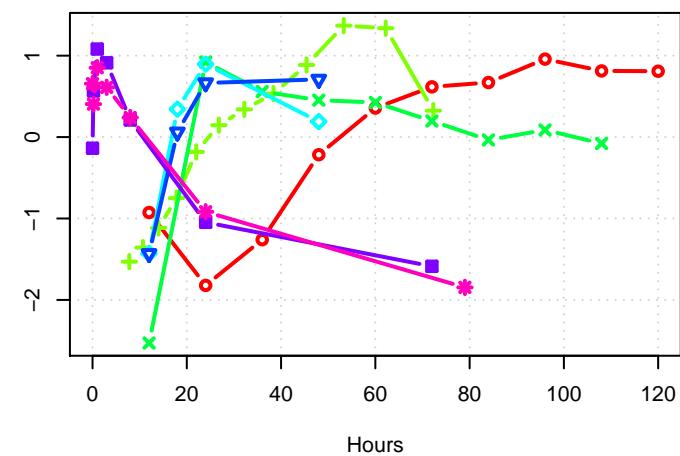


gnd1 YHR183W
6-phosphogluconate dehydrogenase (decarboxylating)



oxidative branch of the pentose phosphate pathway

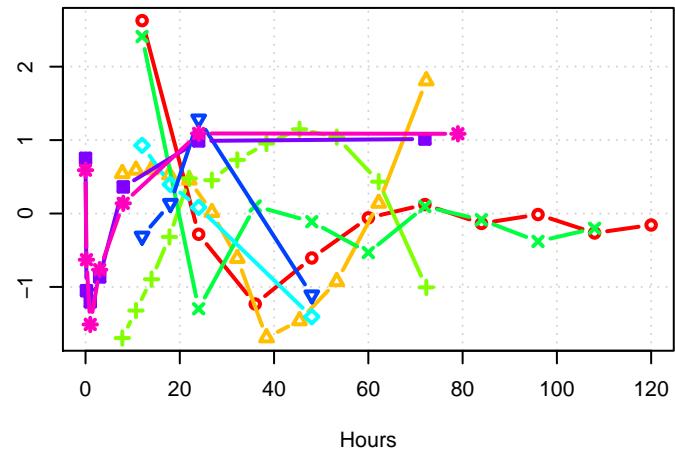
gnd2 YGR256W
6-phosphogluconate dehydrogenase (decarboxylating)



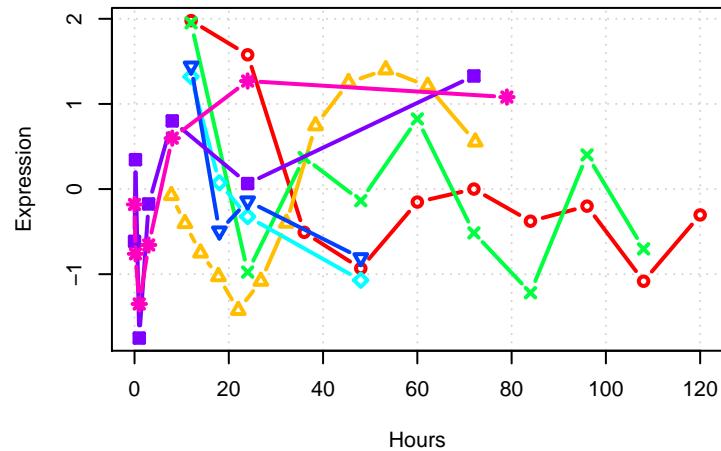
pantothenate and coenzyme A biosynthesis

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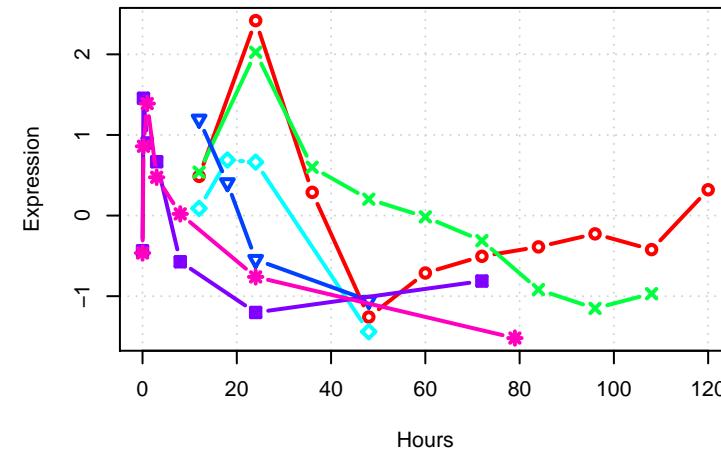
pan5 YHR063C
2-dehydropantoate 2-reductase



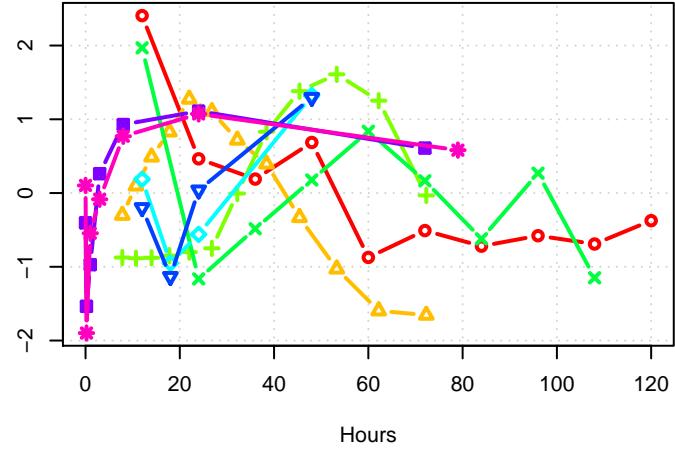
ecm31 YBR176W
Ketopantoate hydroxymethyltransferase



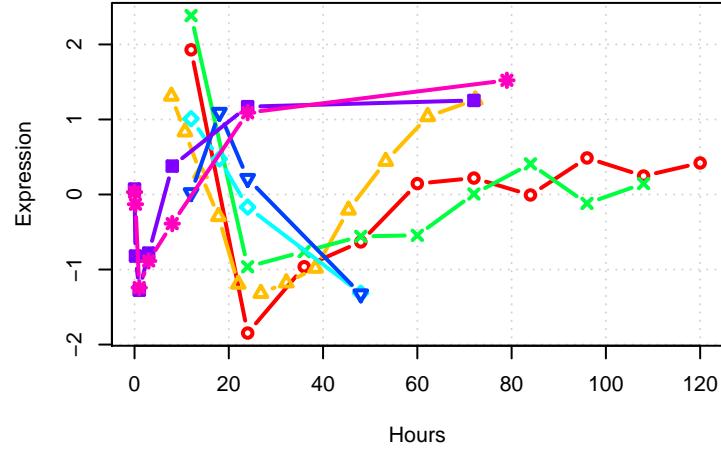
cab5 YDR196C
Subunit of the CoA-Synthesizing Protein Complex (CoA-SPC)



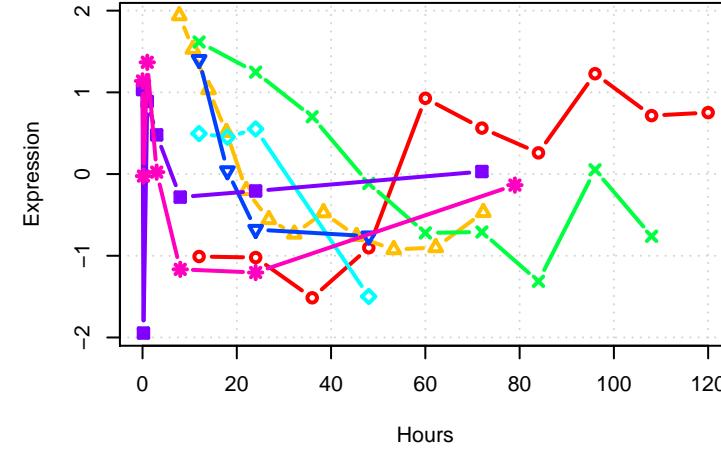
cab4 YGR277C
Subunit of the CoA-Synthesizing Protein Complex (CoA-SPC)



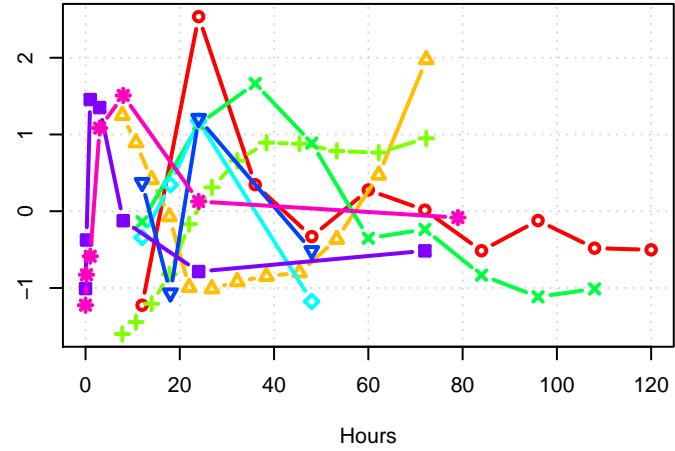
pan6 YIL145C
Pantothenate synthase



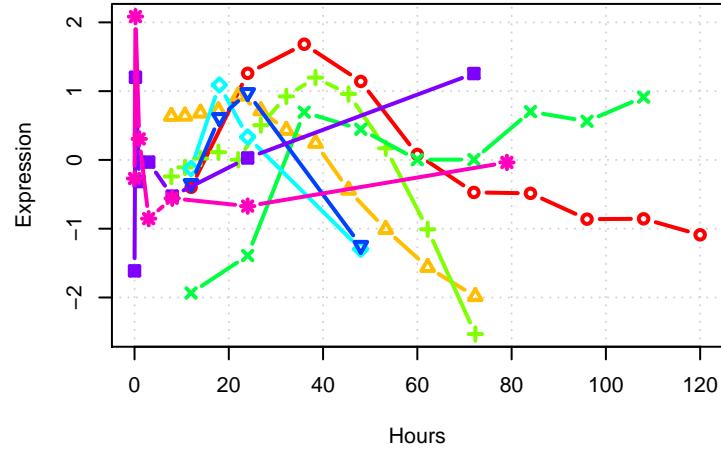
cab1 YDR531W
Pantothenate kinase, ATP:D-pantothenate 4'-phosphotransferase



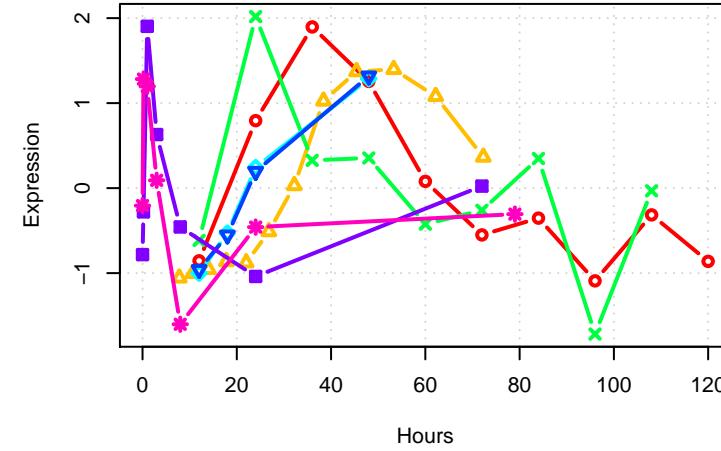
cab2 YIL083C
Subunit of the CoA-Synthesizing Protein Complex (CoA-SPC)



cab3 YKL088W
Subunit of PPCDC and CoA-SPC complexes involved in CoA biosynthesis



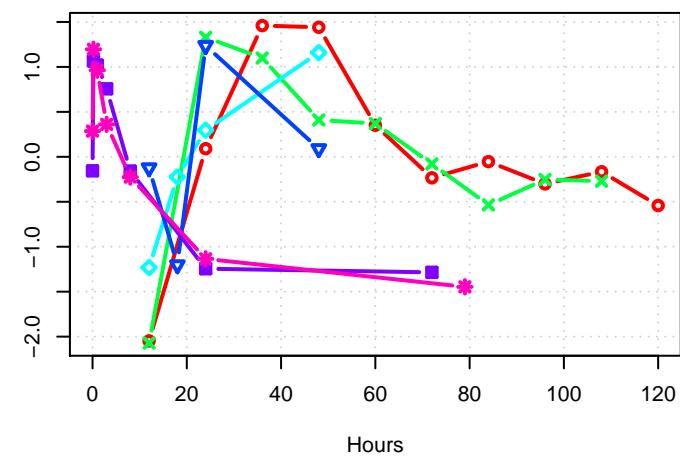
sis2 YKR072C
Negative regulatory subunit of protein phosphatase 1 (Ppz1p)



pantothenate and coenzyme A biosynthesis

vhs3 YOR054C

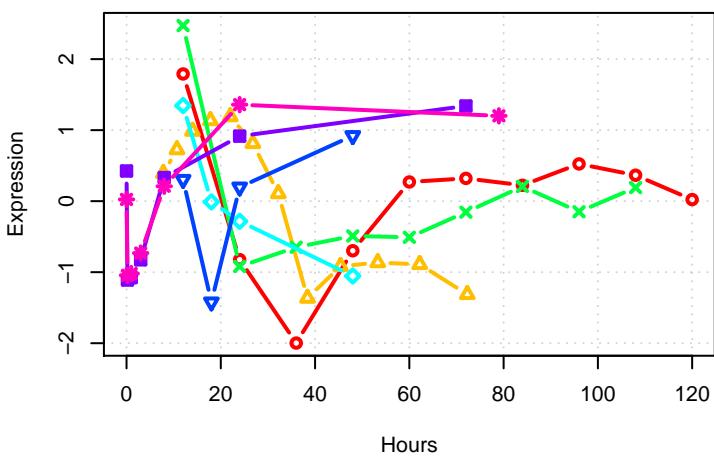
Negative regulatory subunit of protein phosphatase 1 Ppz1p



periplasmic NAD degradation

periplasmic NAD degradation

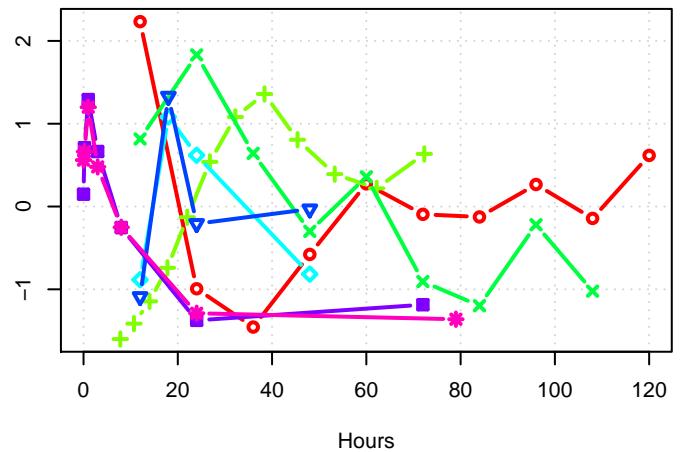
npy1 YGL067W
NADH diphosphatase (pyrophosphatase)



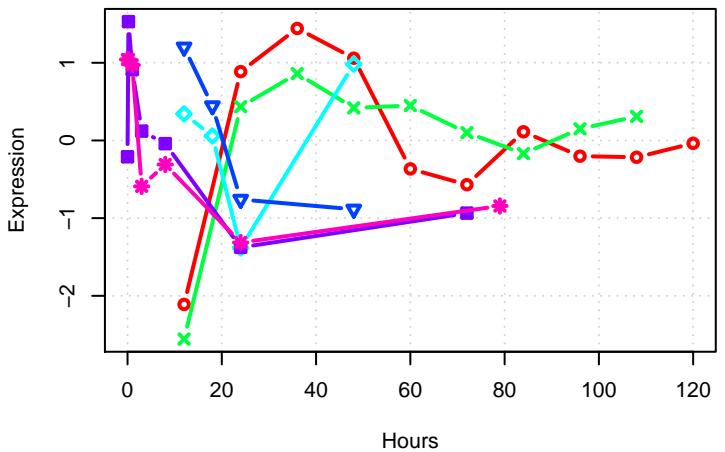
phosphatidate biosynthesis I (the dihydroxyacetone pathway)

phosphatidate biosynthesis I (the dihydroxyacetone pathway)

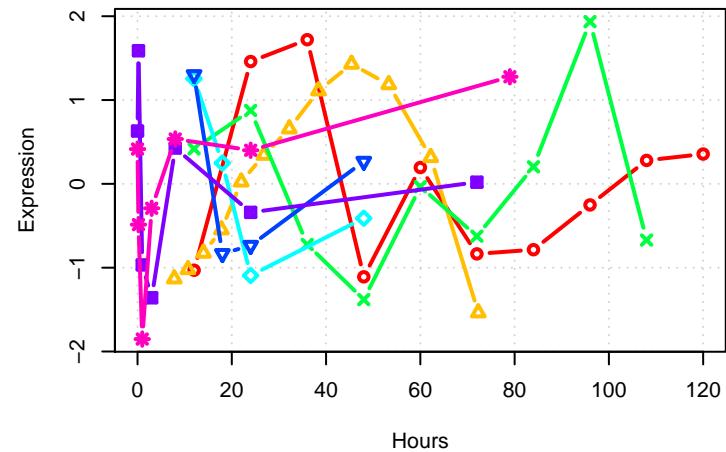
ayr1 YIL124W
Bifunctional triacylglycerol lipase and 1-acyl DHAP reductase



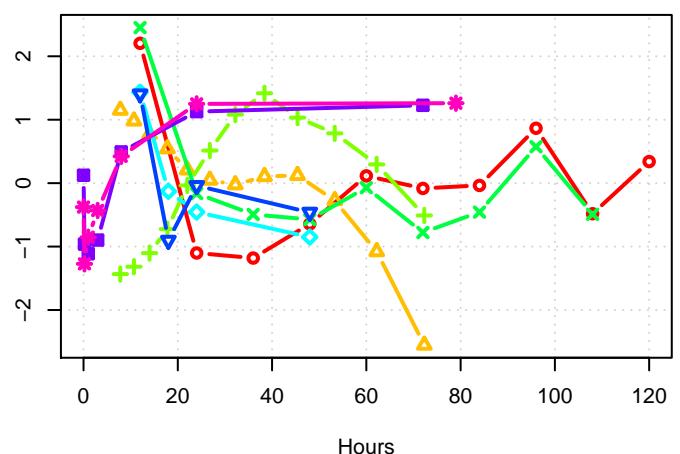
gp2 YKR067W
Glycerol-3-phosphate/dihydroxyacetone phosphate sn-1 acyltransferase



sct1 YBL011W
Glycerol 3-phosphate/dihydroxyacetone phosphate sn-1 acyltransferase

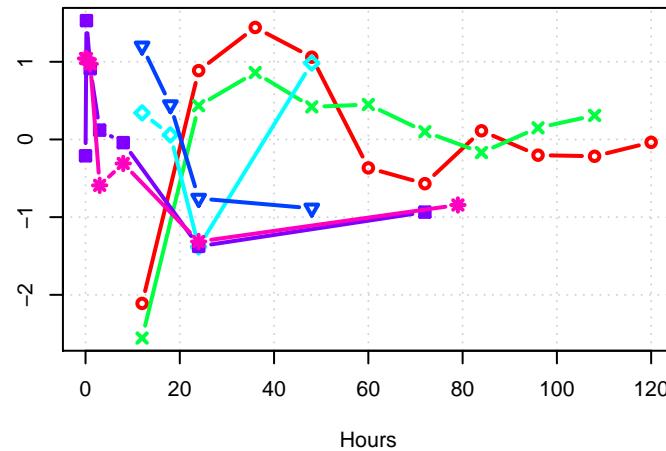


slc1 YDL052C
1-acyl-sn-glycerol-3-phosphate acyltransferase

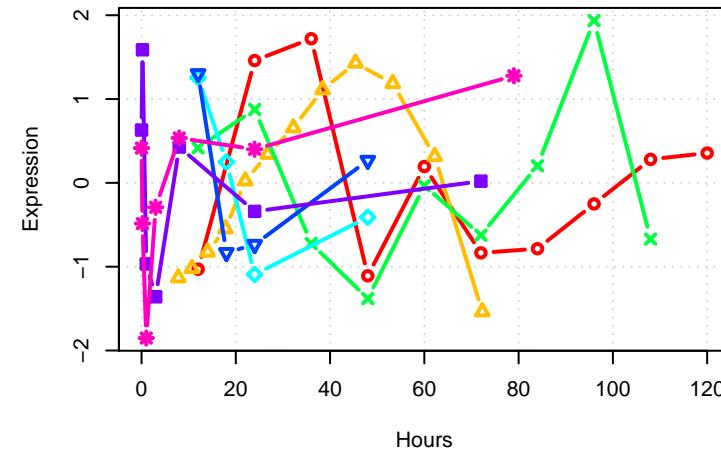


triglyceride biosynthesis

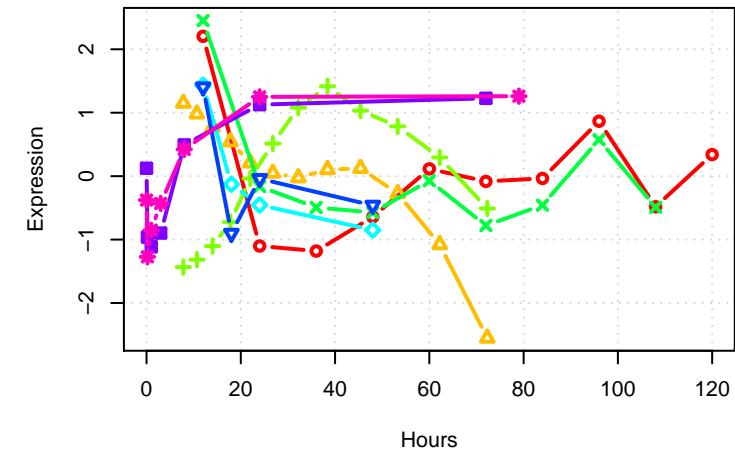
gpt2 YKR067W
Glycerol-3-phosphate/dihydroxyacetone phosphate sn-1 acyltransferase



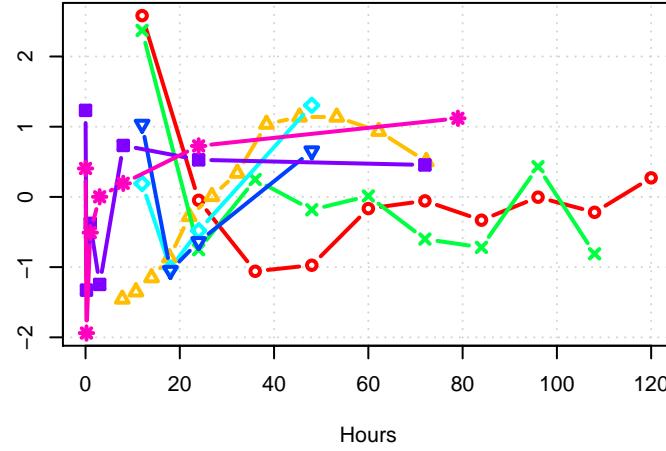
triglyceride biosynthesis
sct1 YBL011W
Glycerol 3-phosphate/dihydroxyacetone phosphate sn-1 acyltransferase



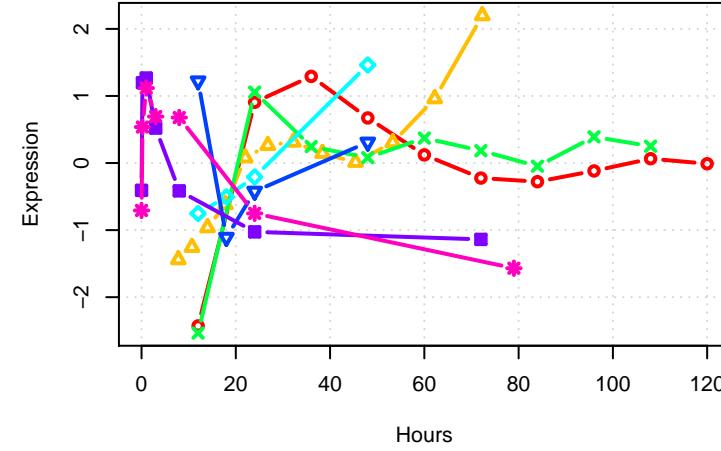
slc1 YDL052C
1-acyl-sn-glycerol-3-phosphate acyltransferase



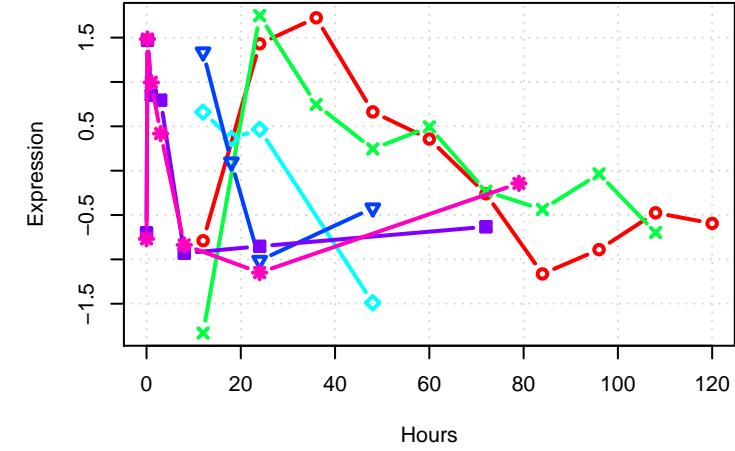
iro1 YNR008W
Acyltransferase that catalyzes diacylglycerol esterification



dga1 YOR245C
Diacylglycerol acyltransferase



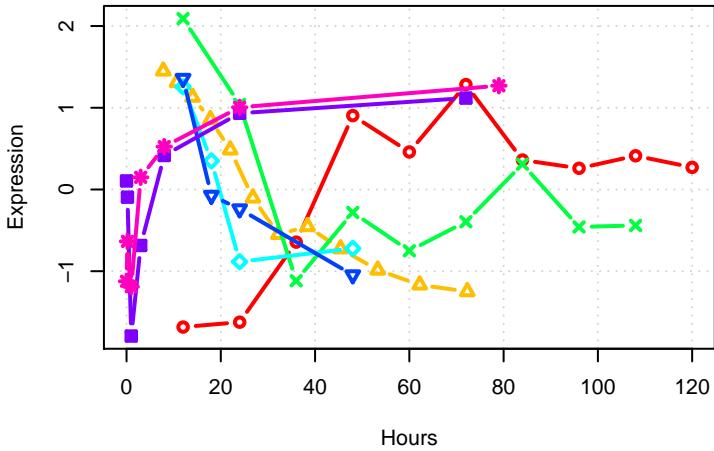
pah1 YMR165C
Mg2+-dependent phosphatidate (PA) phosphatase



phosphatidylinositol biosynthesis

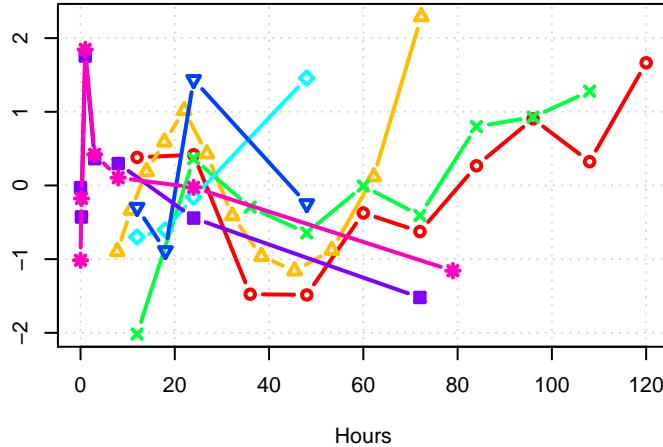
phosphatidylinositol biosynthesis

pis1 YPR113W
Phosphatidylinositol synthase



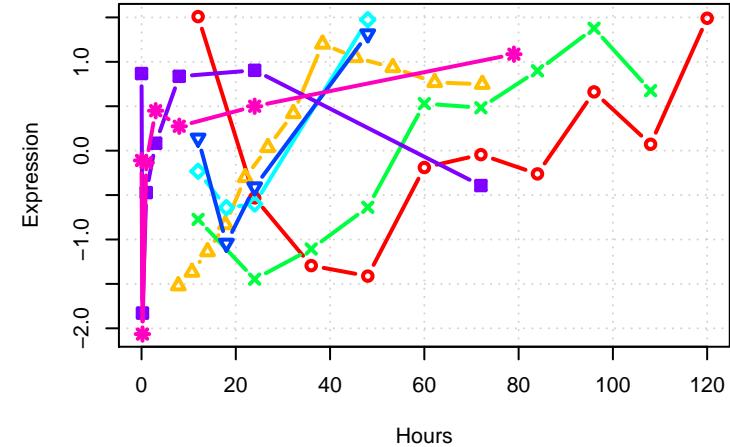
phosphatidylinositol phosphate biosynthesis

fig4 YNL325C
Phosphatidylinositol 3,5-bisphosphate (PtdIns[3,5]P) phosphatase

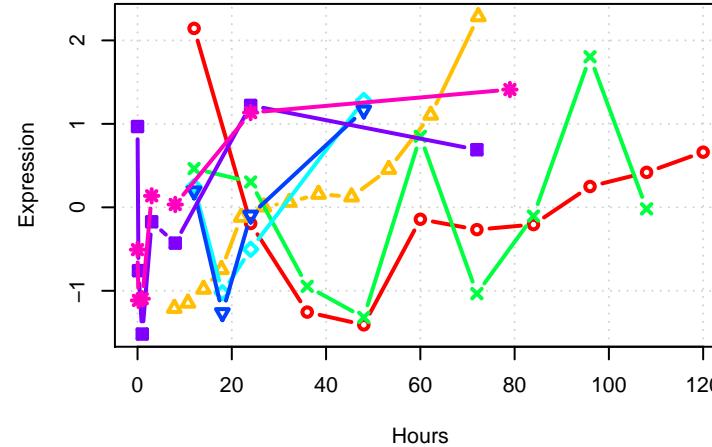


phosphatidylinositol phosphate biosynthesis

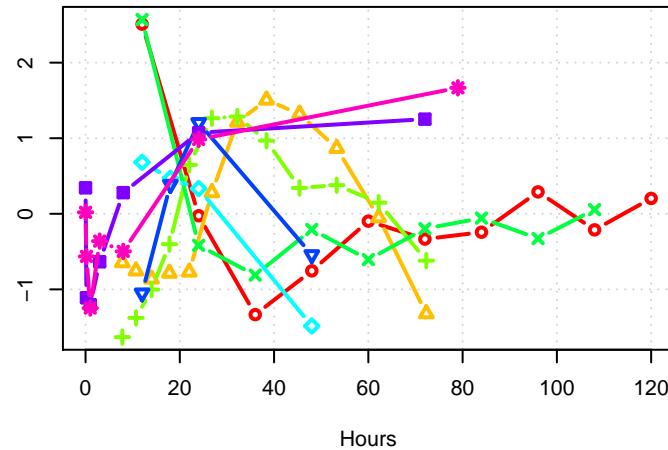
inps2 YNL106C
Polyphosphatidylinositol phosphatase



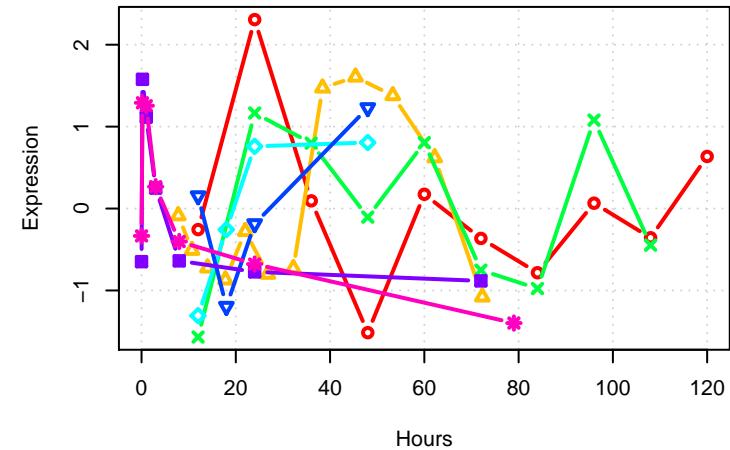
inp53 YOR109W
Polyphosphatidylinositol phosphatase



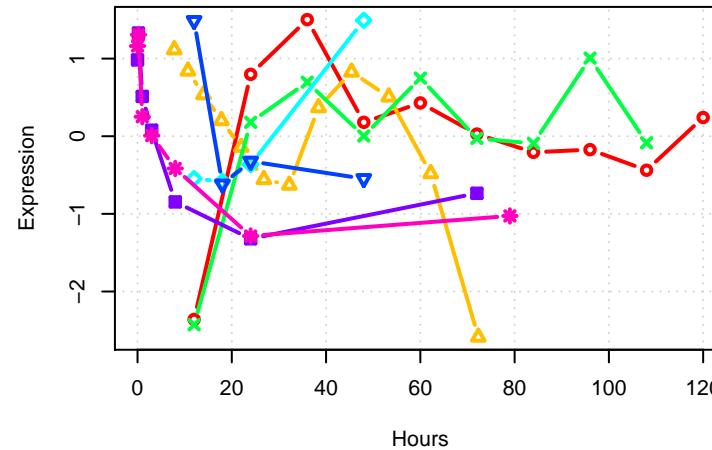
sac1 YKL212W
Phosphatidylinositol phosphate (PtdInsP) phosphatase



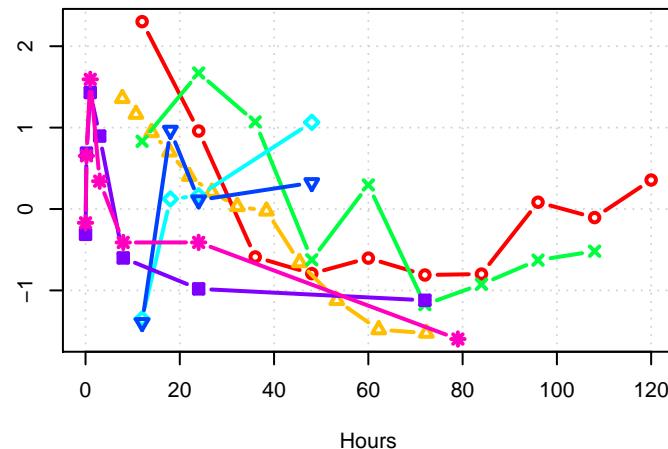
vps34 YLR240W
Phosphatidylinositol (PI) 3-kinase that synthesizes PI-3-phosphate



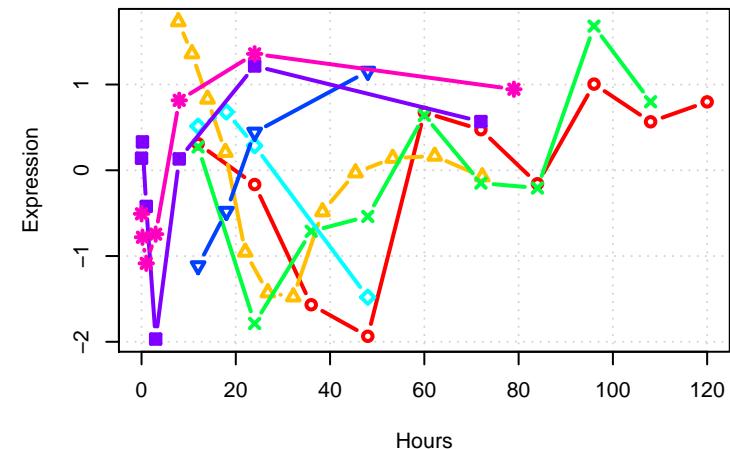
lsb6 YJL100W
Type II phosphatidylinositol 4-kinase



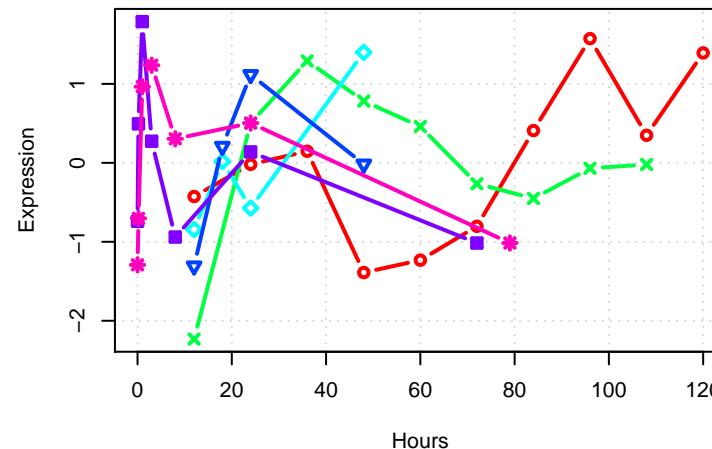
pik1 YNL267W
Phosphatidylinositol 4-kinase



stt4 YLR305C
Phosphatidylinositol-4-kinase

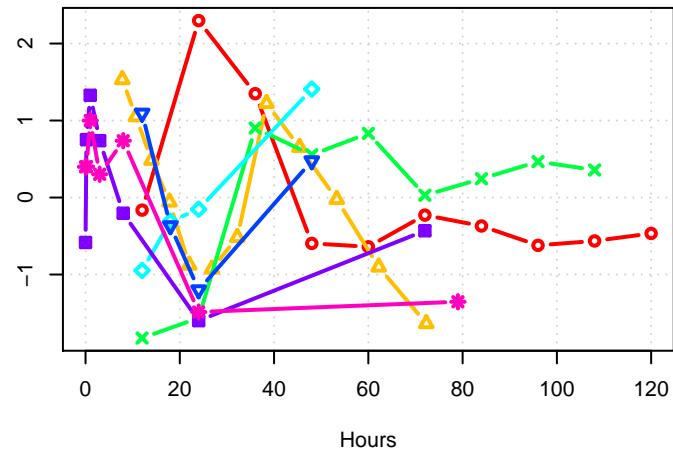


fab1 YFR019W
1-phosphatidylinositol-3-phosphate 5-kinase

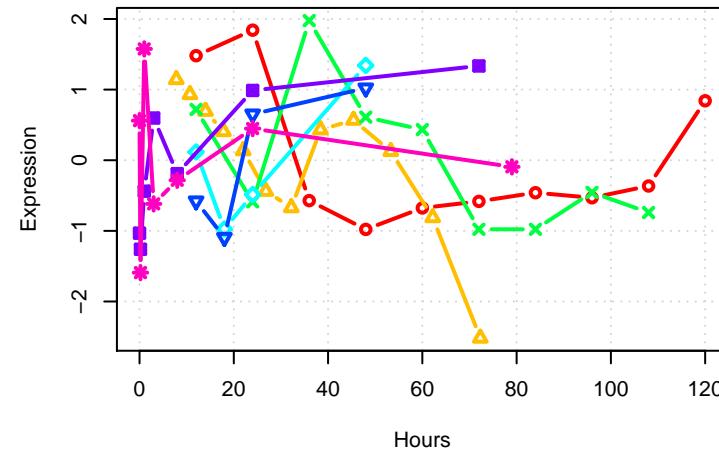


phosphatidylinositol phosphate biosynthesis

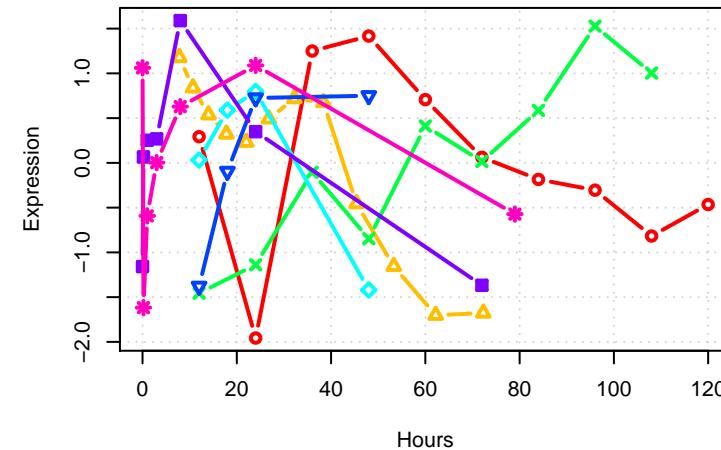
mss4 YDR208W
Phosphatidylinositol-4-phosphate 5-kinase



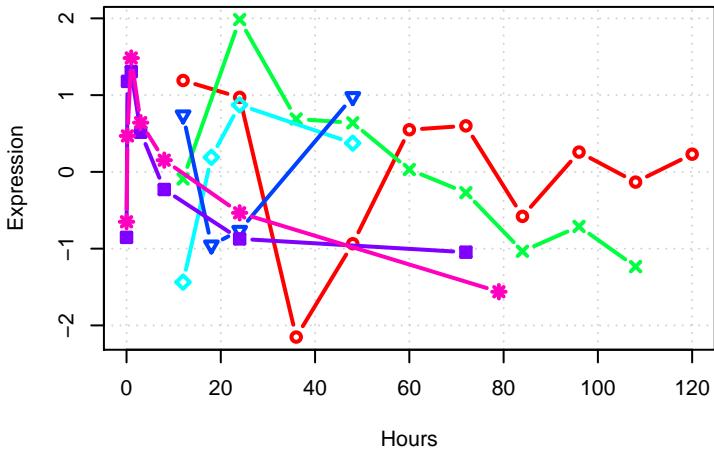
Phosphatidylinositol 3-phosphate (PI3P) phosphatase



inp51 YIL002C
Phosphatidylinositol 4,5-bisphosphate 5-phosphatase

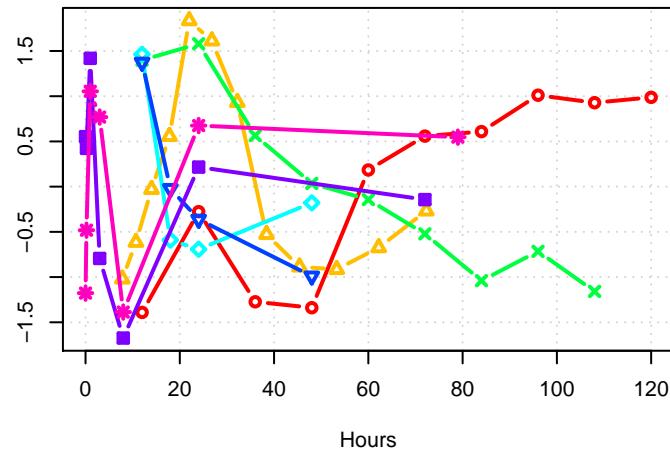


inp54 YOL065C
Phosphatidylinositol 4,5-bisphosphate 5-phosphatase



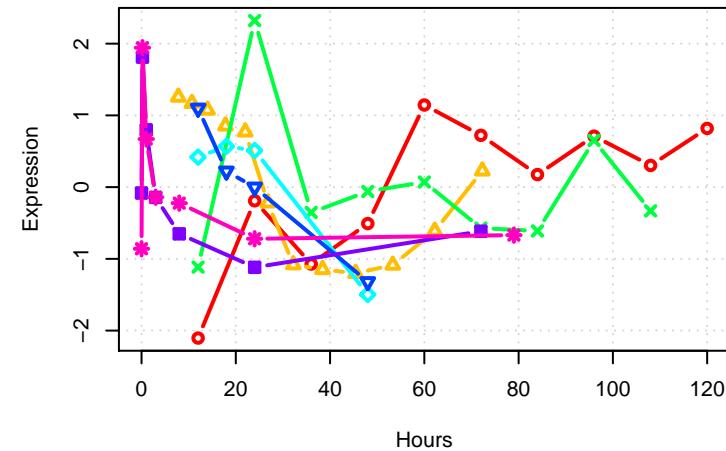
phospholipid biosynthesis

opi3 YJR073C
Methylene-fatty-acyl-phospholipid synthase

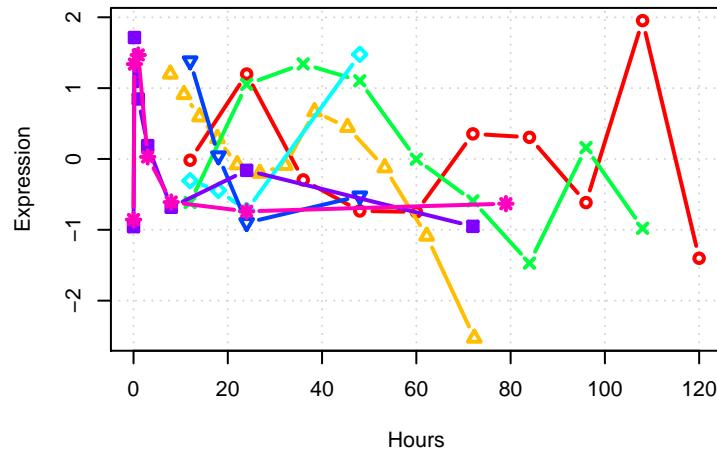


phospholipid biosynthesis

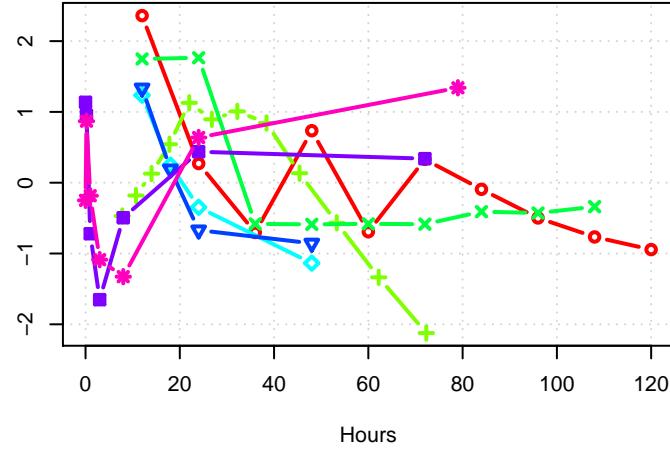
ctd1 YDL142C
Cardiolipin synthase



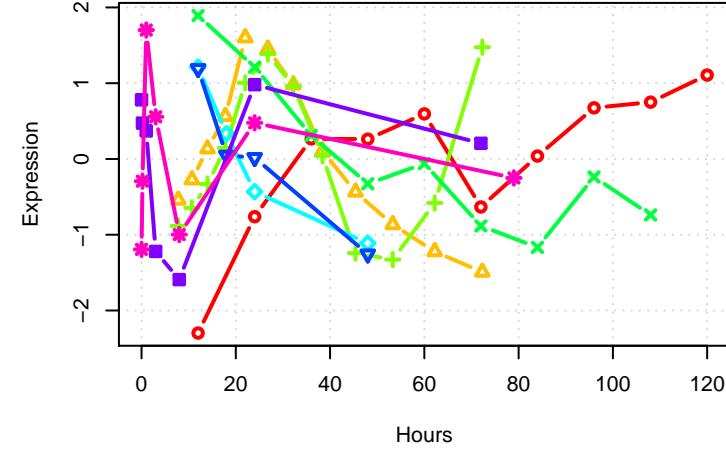
pgs1 YCL004W
Phosphatidylglycerolphosphate synthase



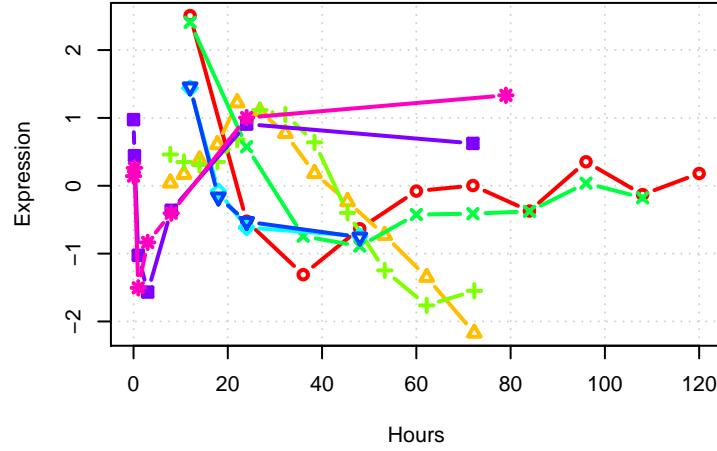
cho1 YER026C
Phosphatidylserine synthase



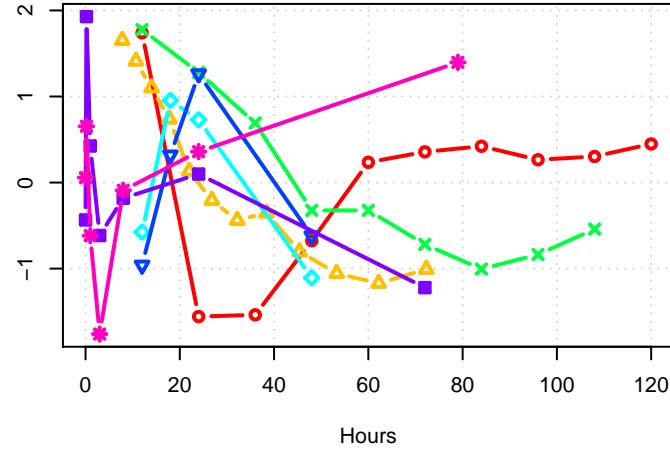
cho2 YGR157W
Phosphatidylethanolamine methyltransferase (PEMT)



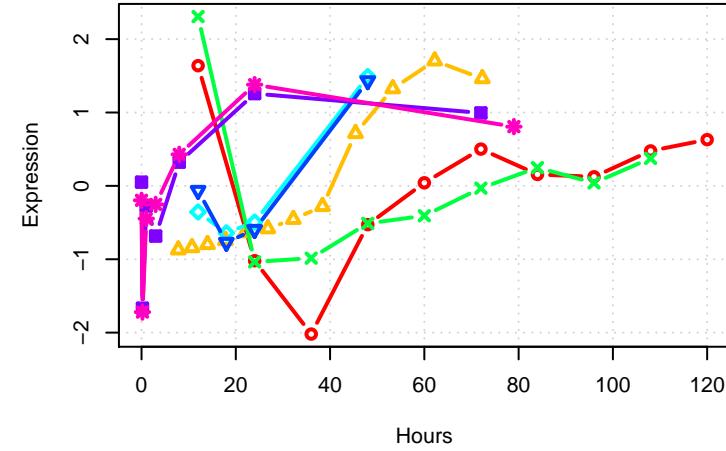
psd1 YNL169C
Phosphatidylserine decarboxylase of the mitochondrial inner membrane



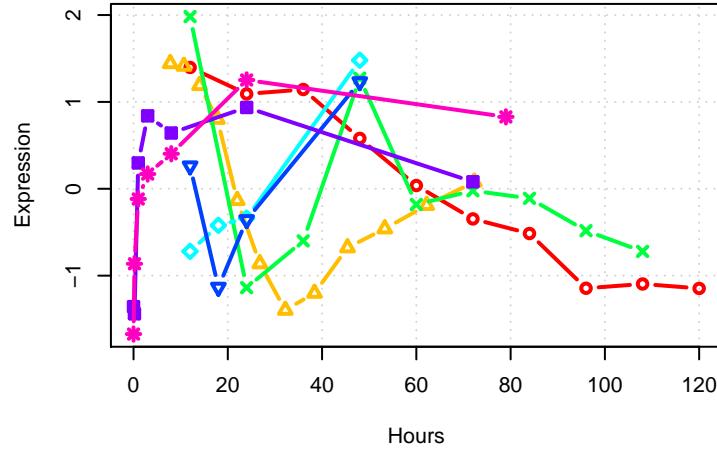
psd2 YGR170W
Phosphatidylserine decarboxylase of the Golgi and vacuolar membranes



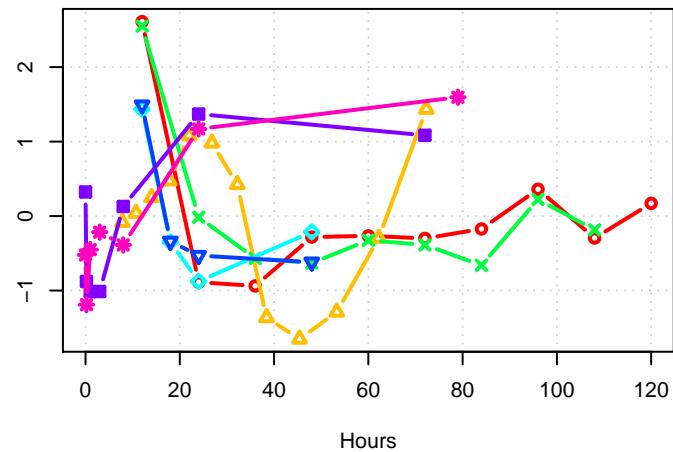
eki1 YDR147W
Ethanolamine kinase



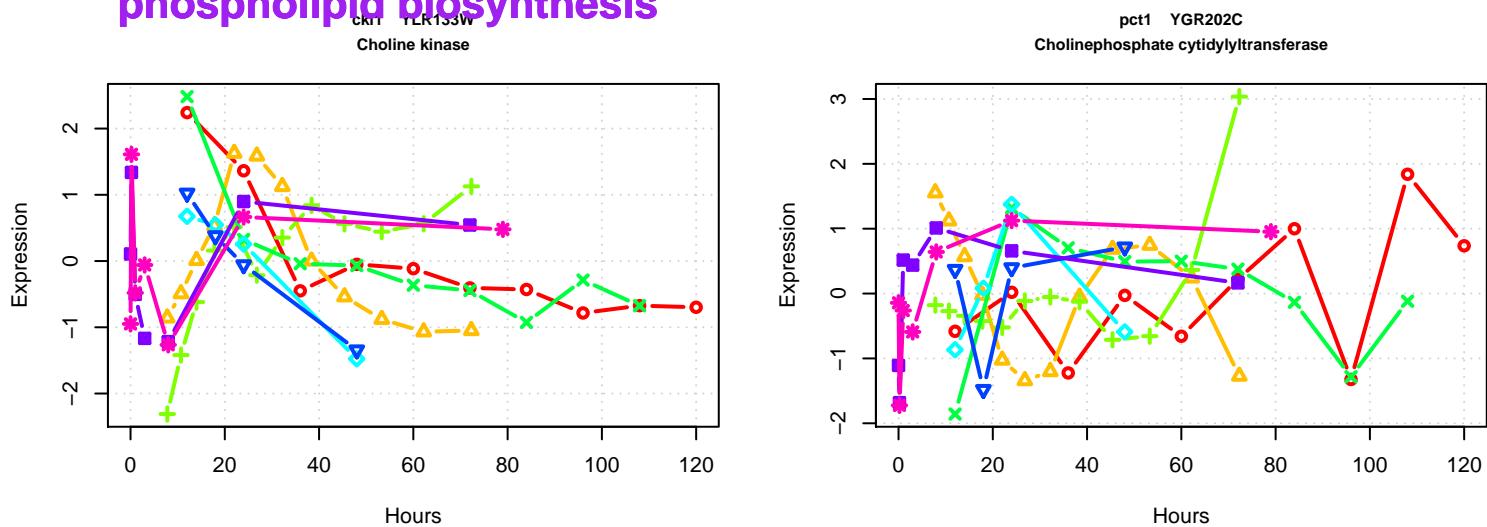
ect1 YGR007W
Ethanolamine-phosphate cytidylyltransferase



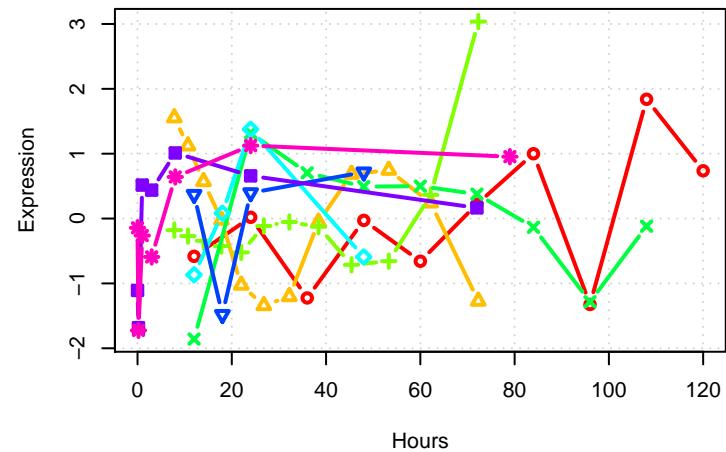
ept1 YHR123W
sn-1,2-diacylglycerol ethanolamine- and cholinephosphotransferase



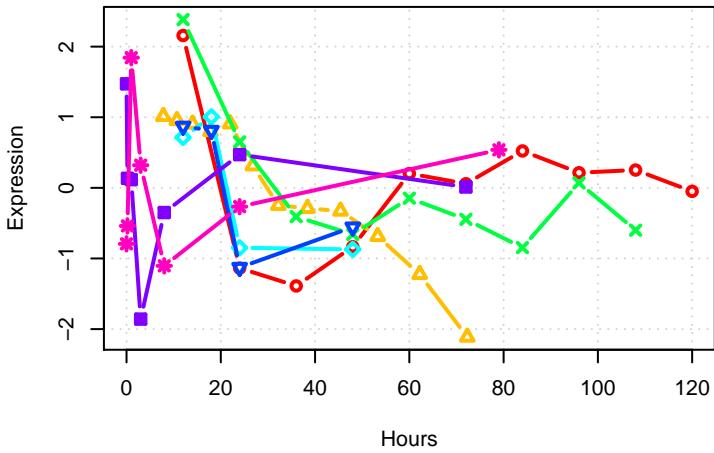
phospholipid biosynthesis



pct1 YGR202C
Cholinephosphate cytidylyltransferase



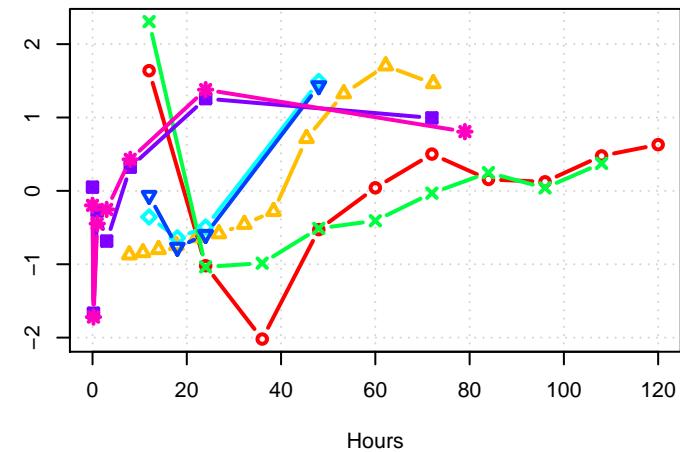
cpt1 YNL130C
Cholinephosphotransferase



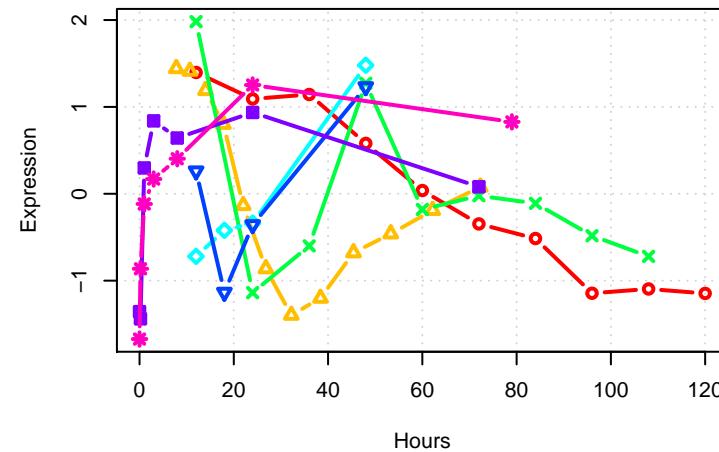
phospholipid biosynthesis II (Kennedy pathway)

phospholipid biosynthesis II (Kennedy pathway)

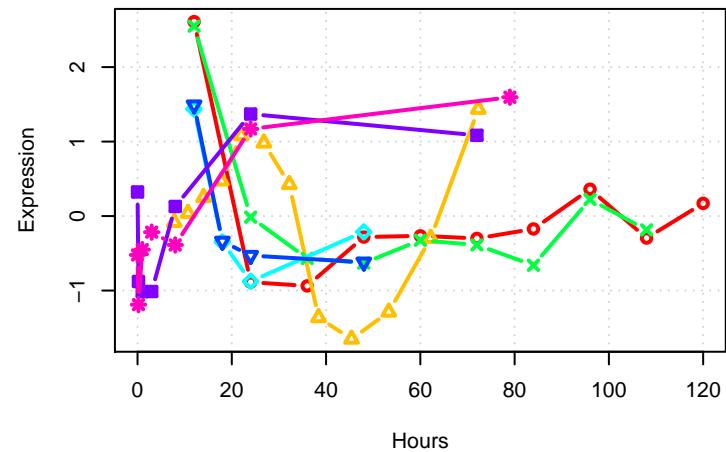
eki1 YDR147W
Ethanolamine kinase



ect1 YGR007W
Ethanolamine–phosphate cytidylyltransferase



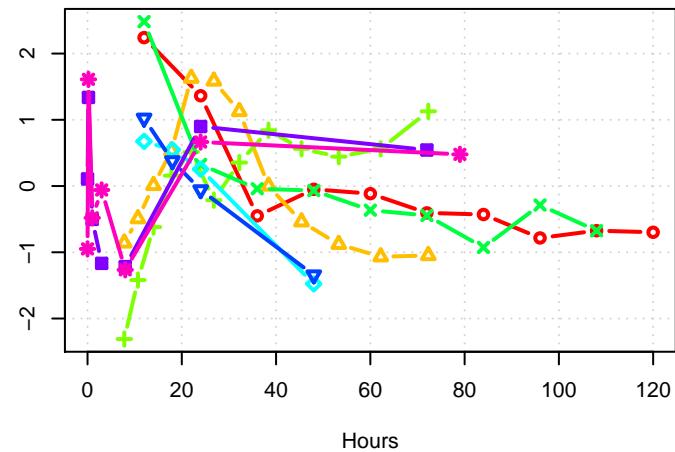
ept1 YHR123W
sn-1,2-diacylglycerol ethanolamine– and cholinephosphotransferase



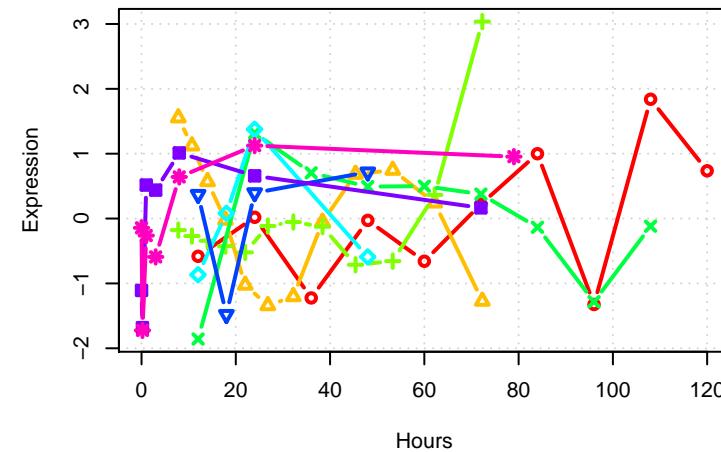
phospholipid biosynthesis (Kennedy pathway)

phospholipid biosynthesis (Kennedy pathway)

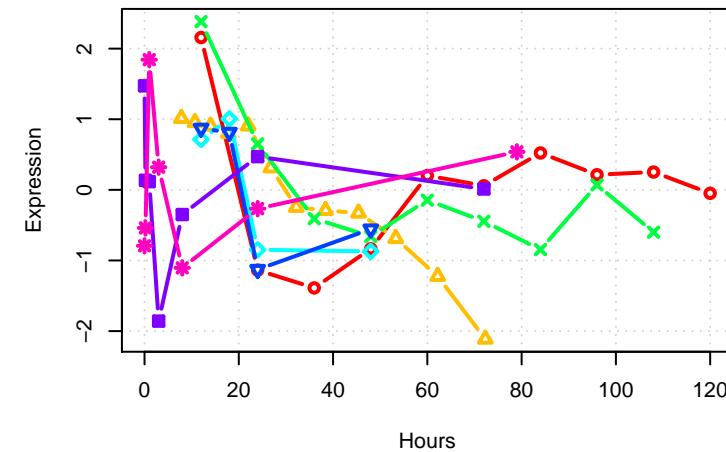
ck1 YLR133W
Choline kinase



pct1 YGR202C
Cholinephosphate cytidylyltransferase

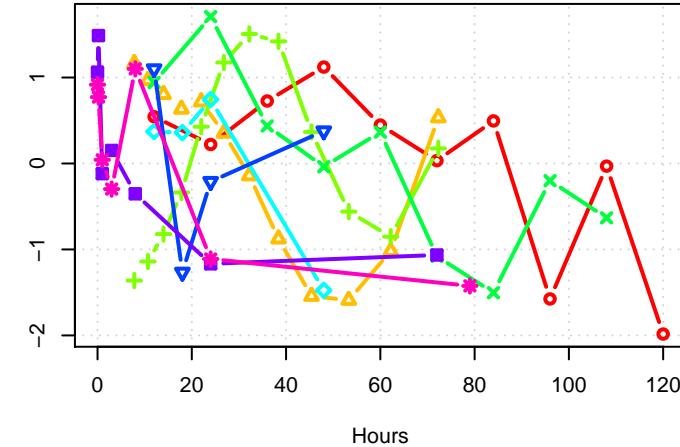


cpt1 YNL130C
Cholinephotransferase



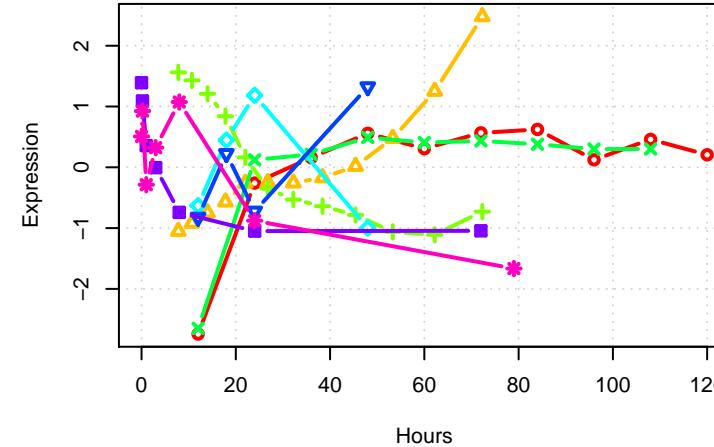
proline utilization

put2 YHR037W
Delta-1-pyrroline-5-carboxylate dehydrogenase



proline utilization

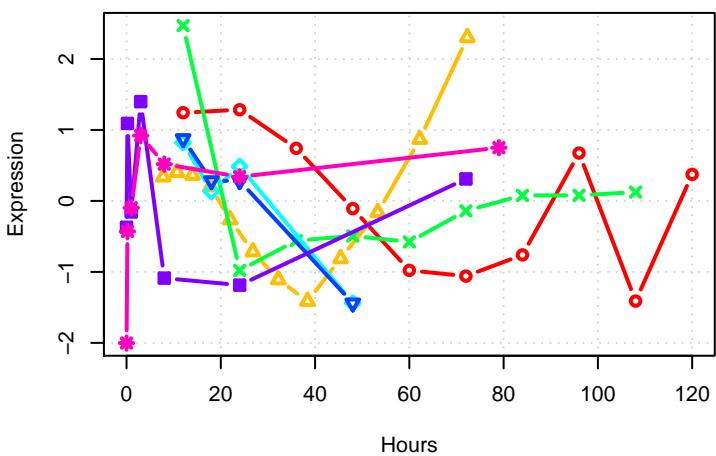
put1 YLR142W
Proline oxidase



putrescine biosynthesis

putrescine biosynthesis

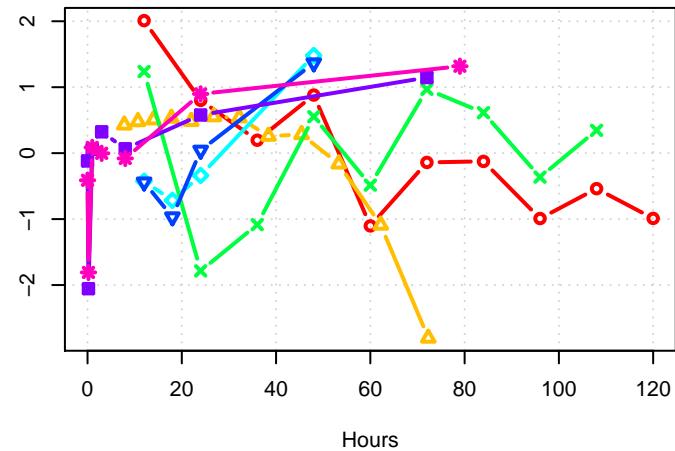
spe1 YKL184W
Ornithine decarboxylase



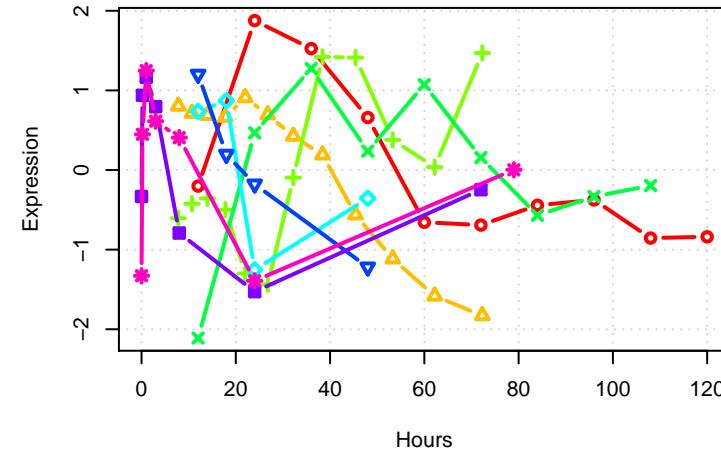
pyridoxal 5'-phosphate salvage pathway

bud16 YEL029C
Putative pyridoxal kinase

pyridoxal 5'-phosphate salvage pathway



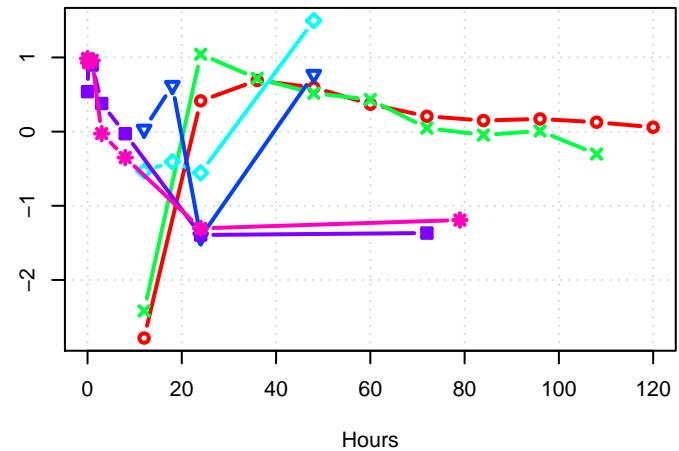
pox3 YBR035C
Pyridoxine (pyridoxamine) phosphate oxidase



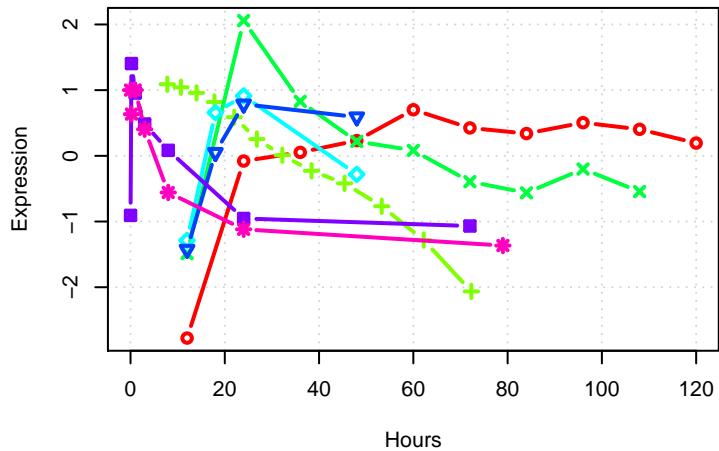
removal of superoxide radicals

removal of superoxide radicals

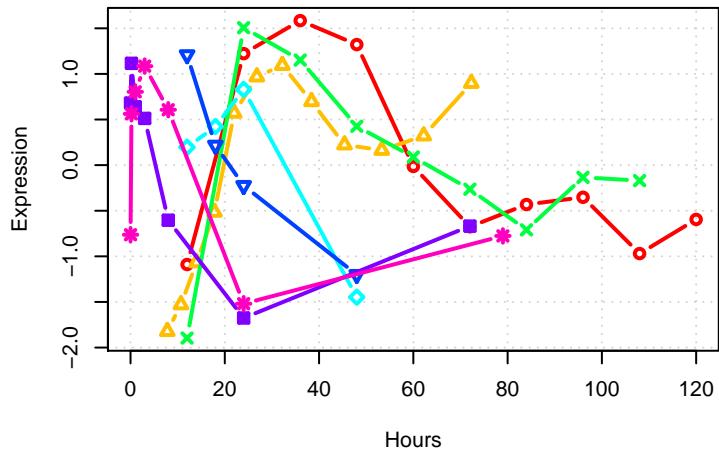
cta1 YDR256C
Catalase A



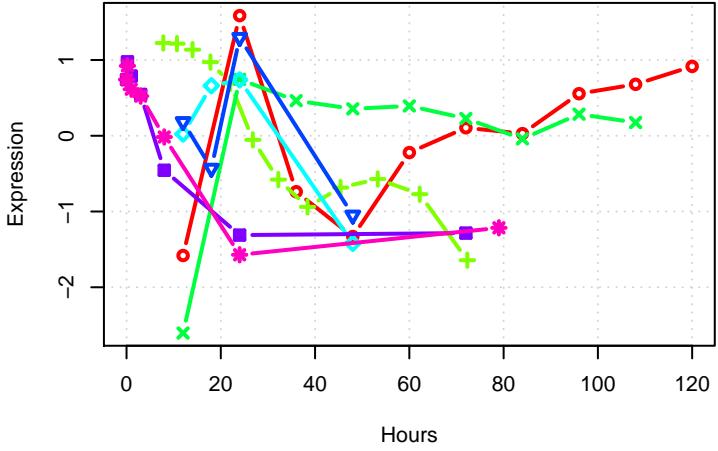
ctt1 YGR068W
Cytosolic catalase T



sod1 YJR104C
Cytosolic copper–zinc superoxide dismutase

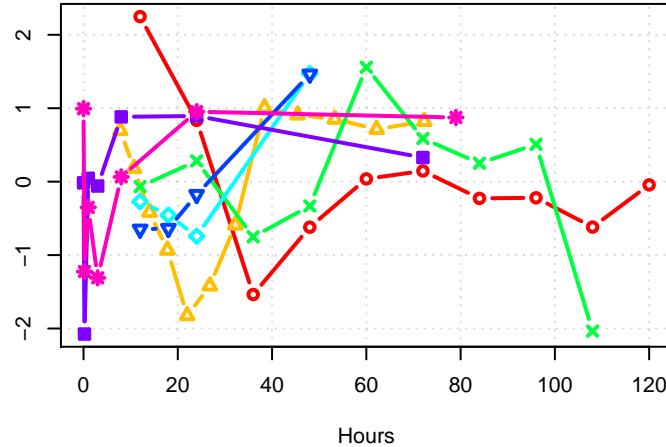


sod2 YHR008C
Mitochondrial manganese superoxide dismutase



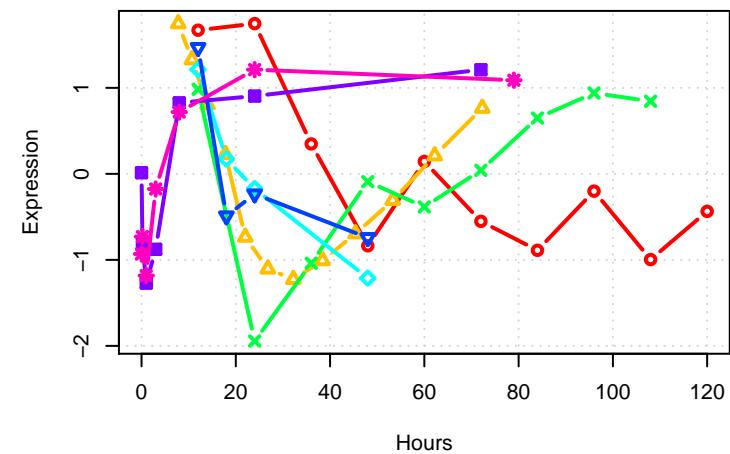
riboflavin, FMN and FAD biosynthesis

rib2 YOL066C
Bifunctional DRAP deaminase tRNA:pseudouridine synthase

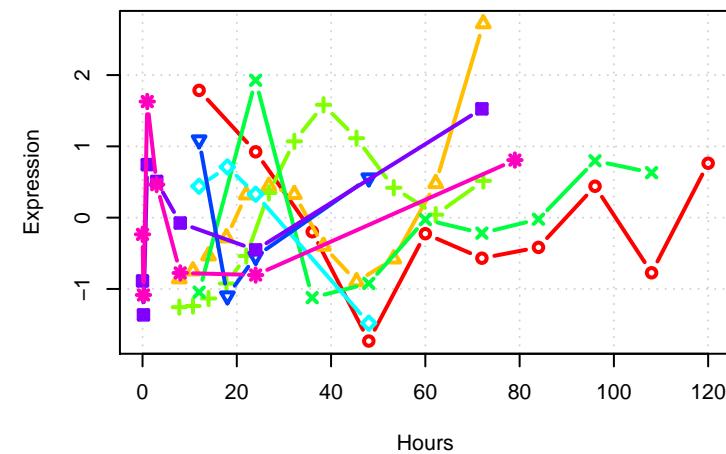


riboflavin, FMN and FAD biosynthesis

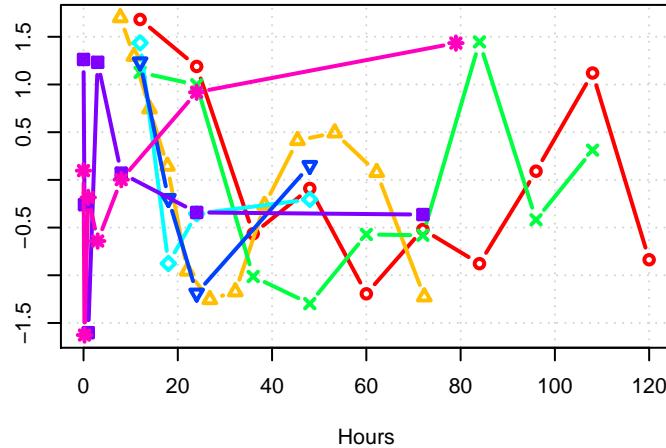
rib3 YDR487C
3,4-dihydroxy-2-butaneone-4-phosphate synthase (DHBP synthase)



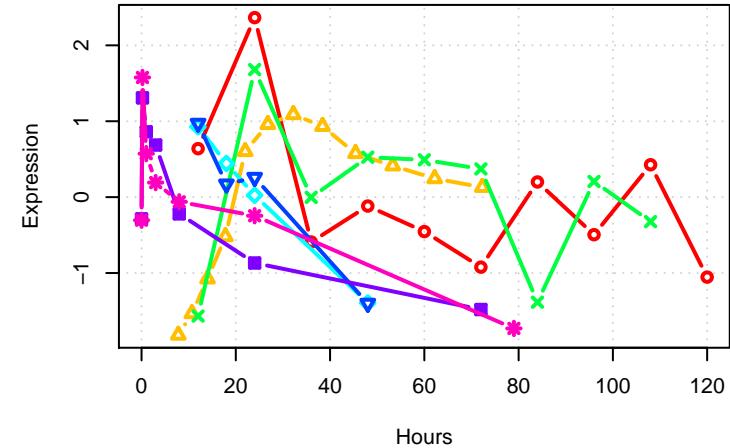
rib4 YOL143C
Lumazine synthase (DMRL synthase)



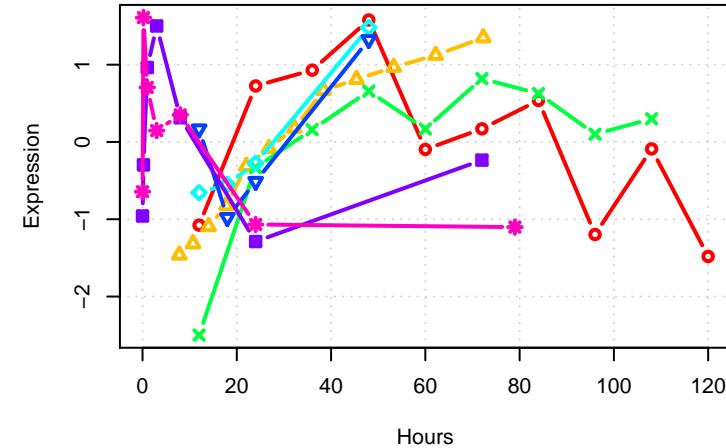
rib7 YBR153W
Diaminohydroxyphosphoribosylaminopyrimidine deaminase



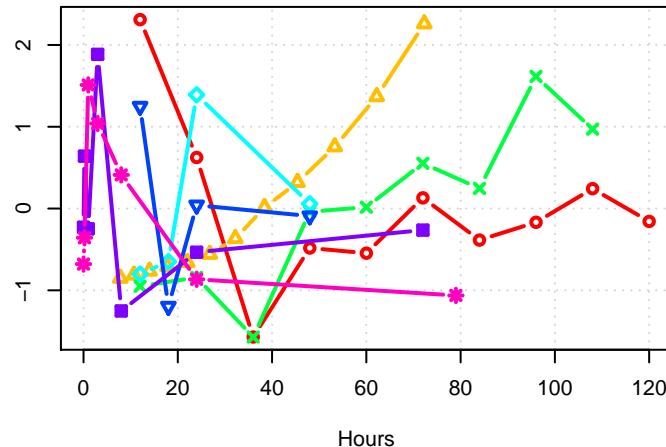
fad1 YDL045C
Flavin adenine dinucleotide (FAD) synthetase



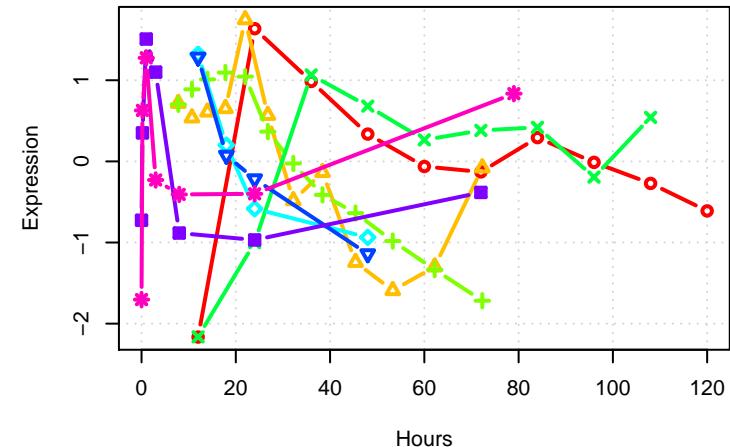
rib1 YBL033C
GTP cyclohydrolase II



fmn1 YDR236C
Riboflavin kinase, produces riboflavin monophosphate (FMN)

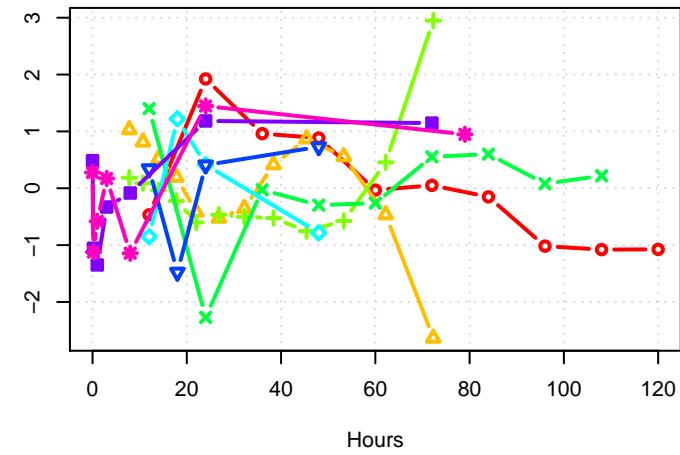


rib5 YBR256C
Riboflavin synthase



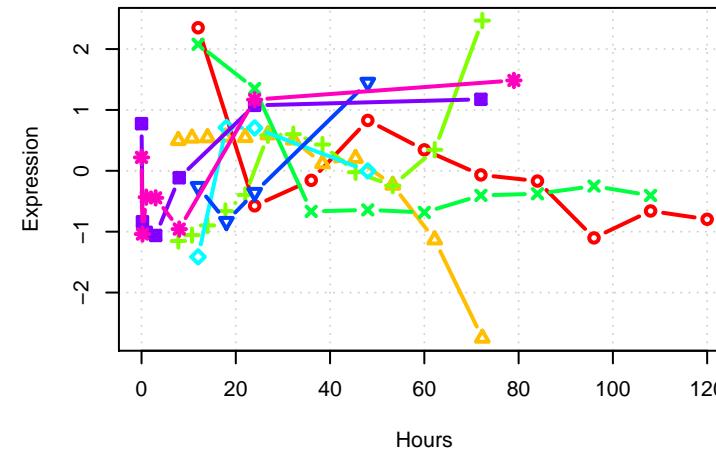
S-adenosylmethionine biosynthesis

YLR180W
S-adenosylmethionine synthetase



S-adenosylmethionine biosynthesis

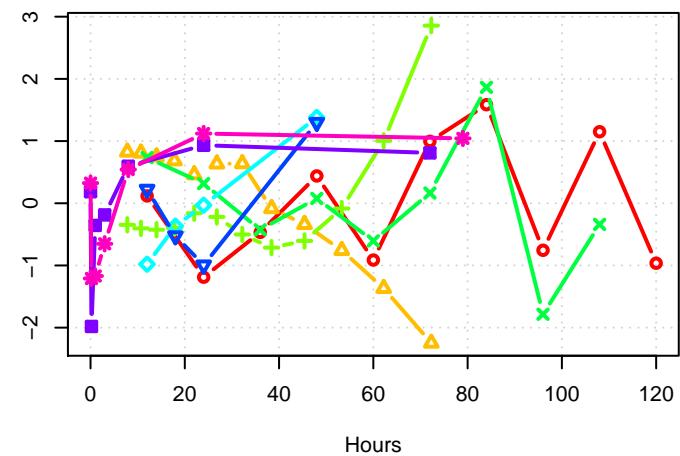
YDR502C
S-adenosylmethionine synthetase



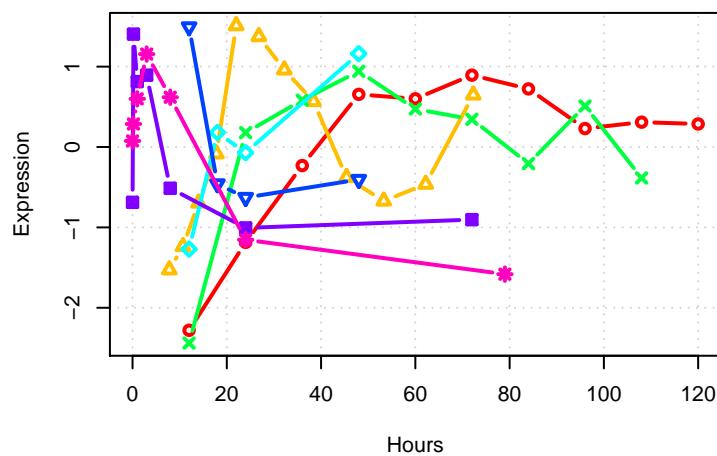
salvage pathways of guanine, xanthine and their nucleosides

salvage pathways of guanine, xanthine and their nucleosides

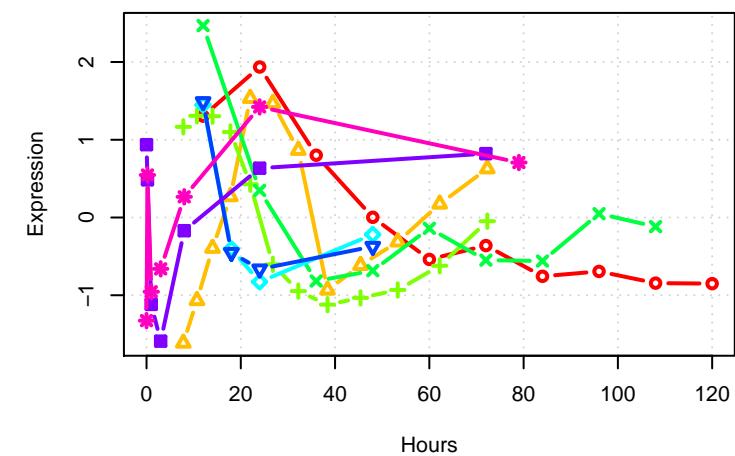
hpt1 YDR399W
Dimeric hypoxanthine–guanine phosphoribosyltransferase



gdd1 YDL235C
Guanine deaminase



xpt1 YJR133W
Xanthine–guanine phosphoribosyl transferase

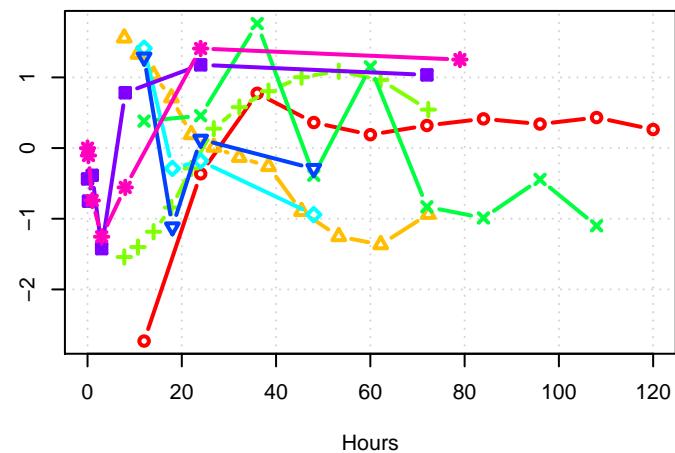


serine biosynthesis from 3–phosphoglycerate

serine biosynthesis from 3-phosphoglycerate

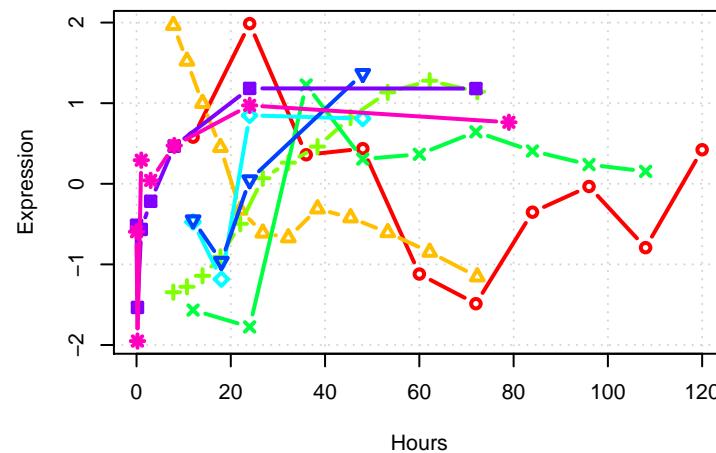
ser3 YER081W

3-phosphoglycerate dehydrogenase and alpha-ketoglutarate reductase



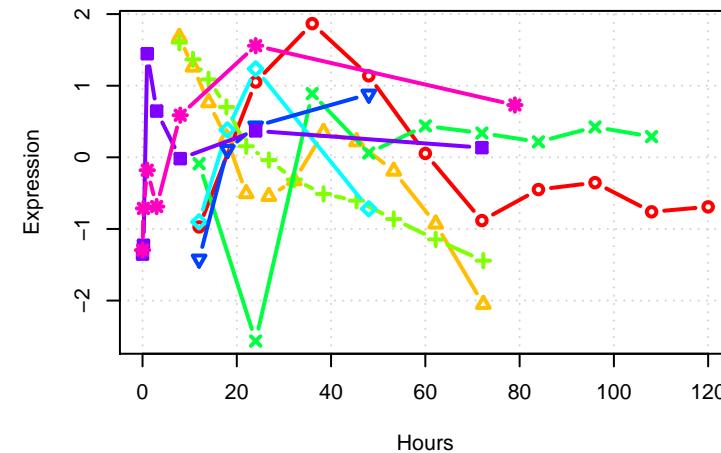
ser35 YIL074C

3-phosphoglycerate dehydrogenase and alpha-ketoglutarate reductase



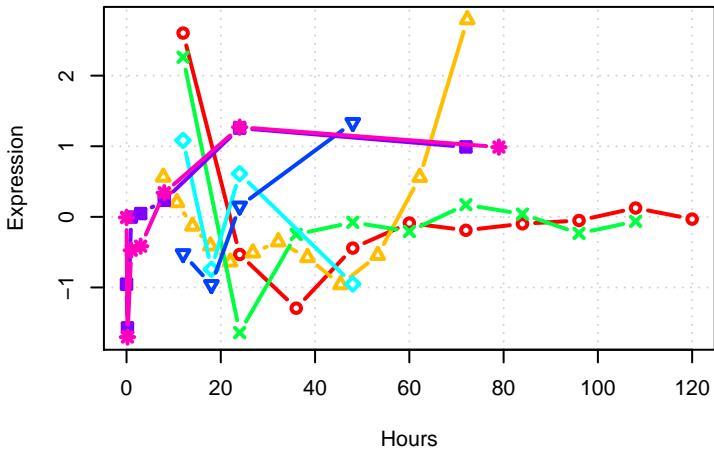
ser1 YOR184W

3-phosphoserine aminotransferase



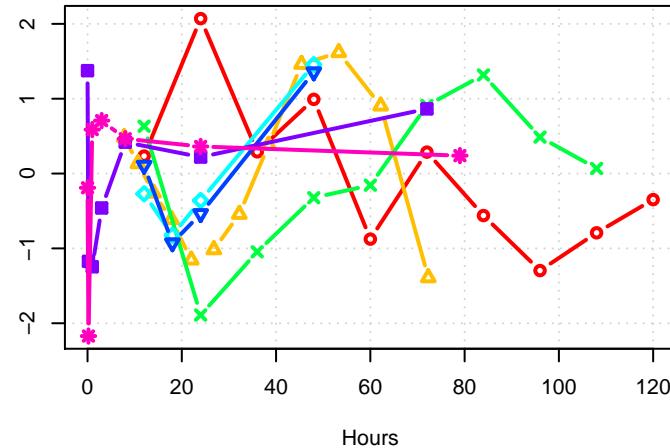
ser2 YGR208W

Phosphoserine phosphatase of the phosphoglycerate pathway

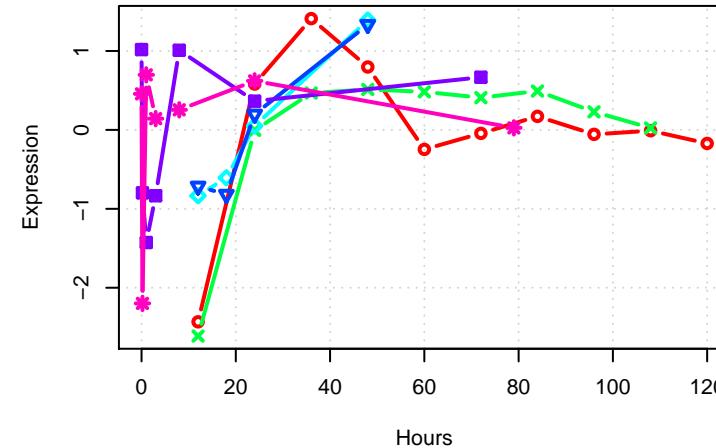


siroheme biosynthesis

met8 YBR213W
Bifunctional dehydrogenase and ferrochelatase



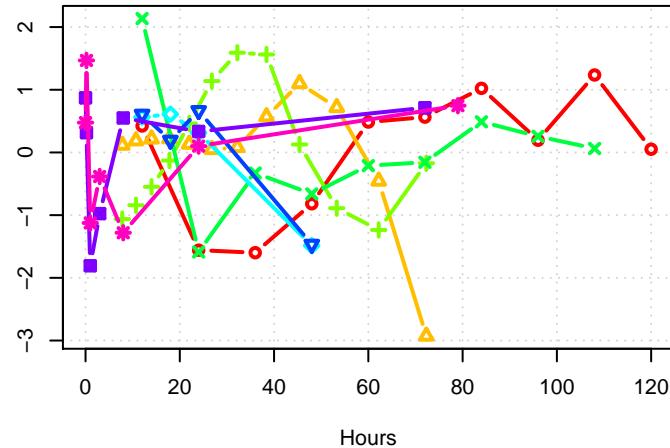
siroheme biosynthesis met1 YKR063W
S-adenosyl-L-methionine uroporphyrinogen III transmethylase



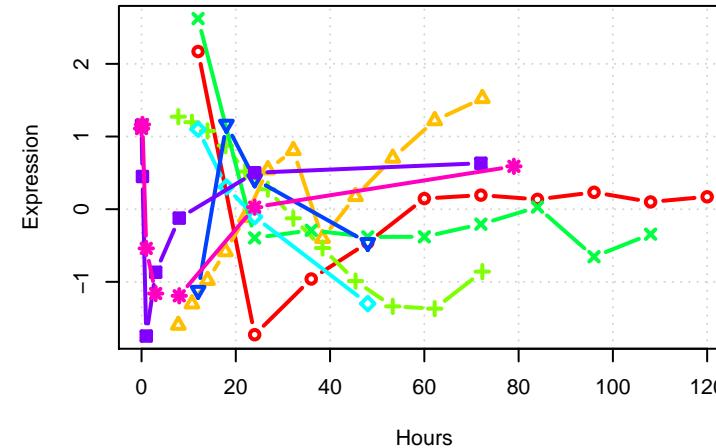
spermidine and methylthioadenosine biosynthesis

spermidine and methylthioadenosine biosynthesis

spe2 YOL052C
S-adenosylmethionine decarboxylase



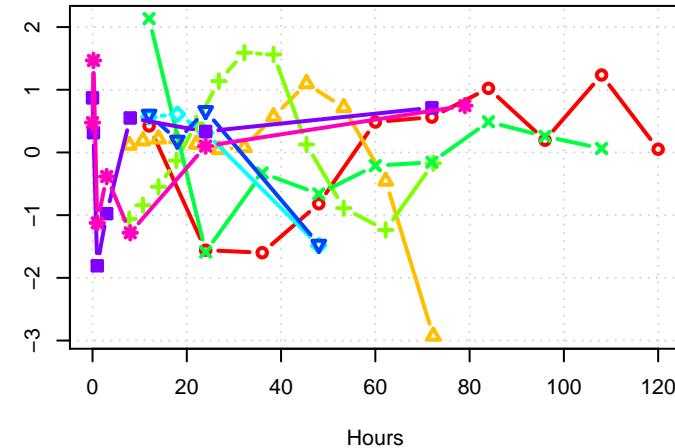
spc3 YPR069C
Spermidine synthase



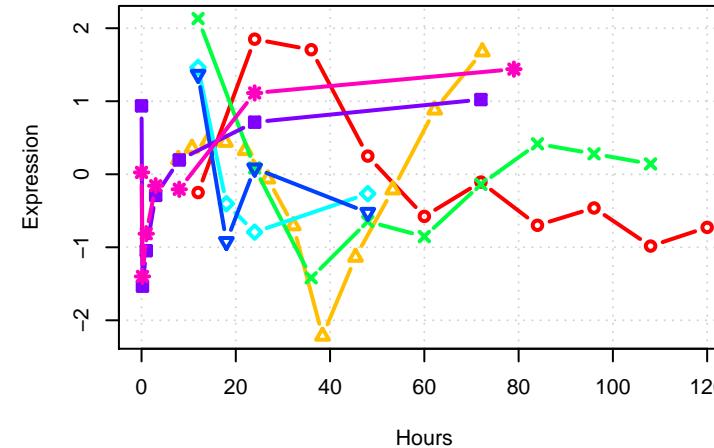
spermine and methylthioadenosine biosynthesis

spermine and methylthioadenosine biosynthesis

spe2 YOL052C
S-adenosylmethionine decarboxylase

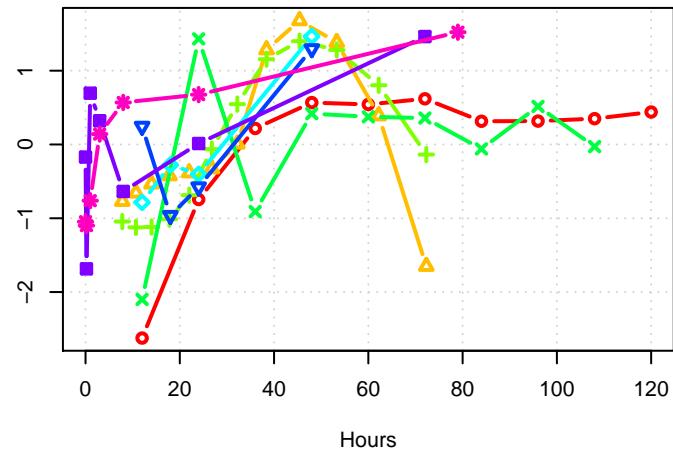


spe4 TLR145C
Spermine synthase



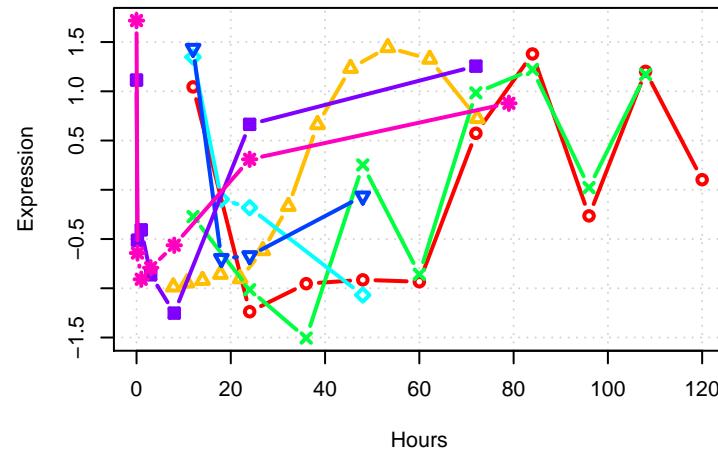
sphingolipid metabolism

scs7 YMR272C
Sphingolipid alpha-hydroxylase

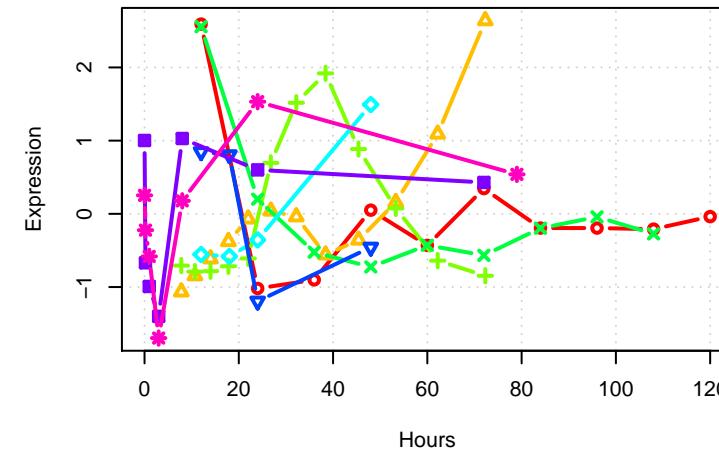


sphingolipid metabolism

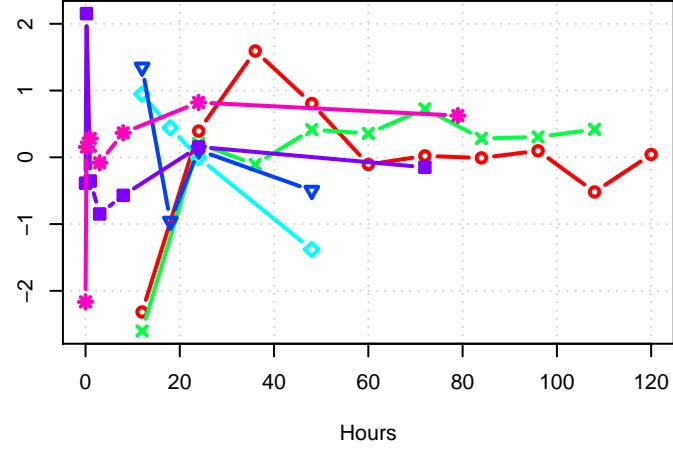
ipt1 YDR072C
Inositolphosphotransferase



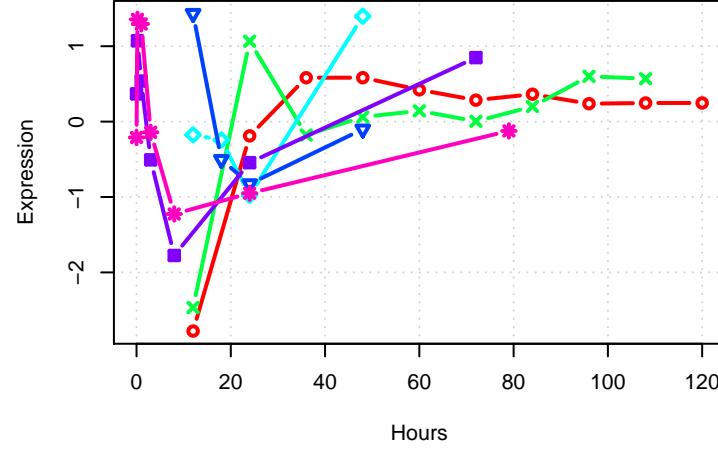
tsc10 YBR265W
3-ketosphinganine reductase



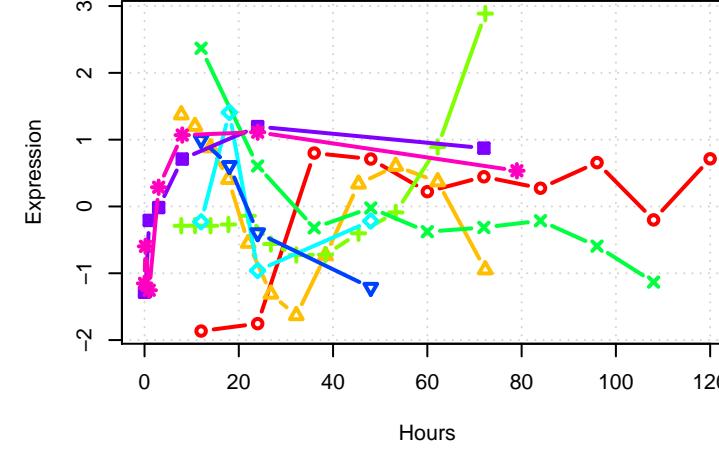
ydc1 YPL087W
Alkaline dihydroceramidase, involved in sphingolipid metabolism



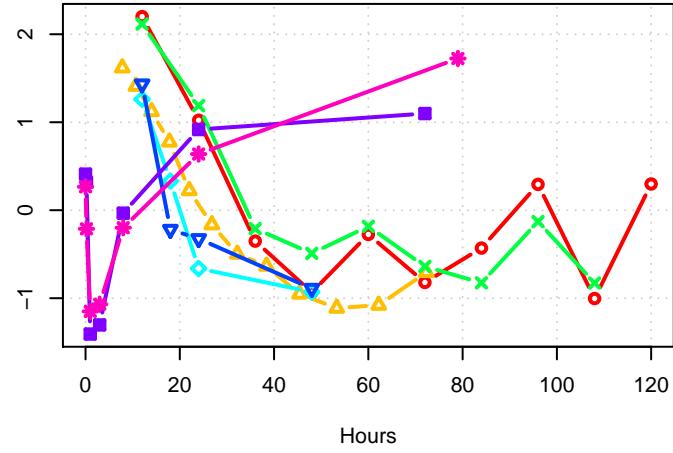
ypc1 YBR183W
Alkaline ceramidase



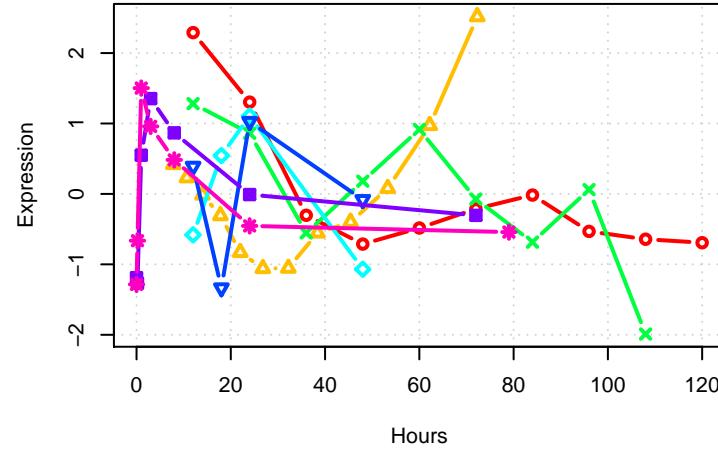
lac1 YKL008C
Ceramide synthase component



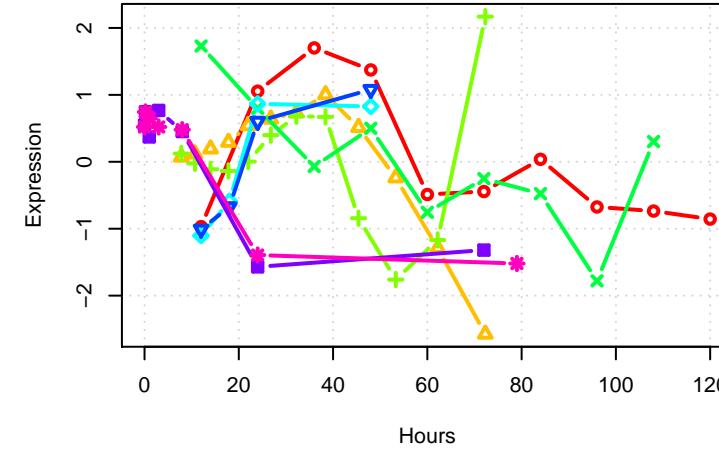
lag1 YHL003C
Ceramide synthase component



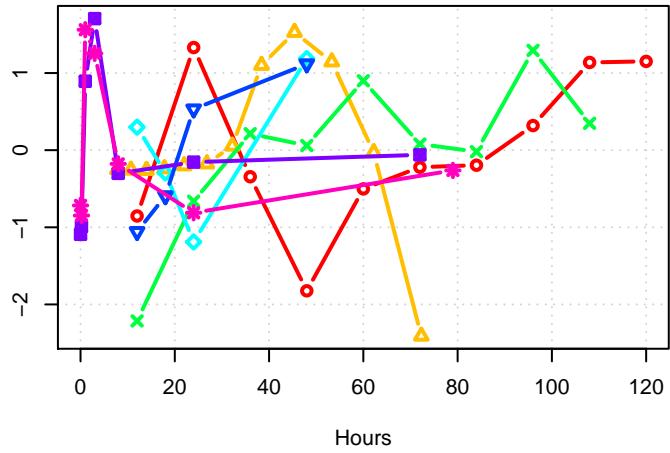
lip1 YMR298W
Ceramide synthase subunit



lcbl YOR171C
Sphingoid long-chain base kinase

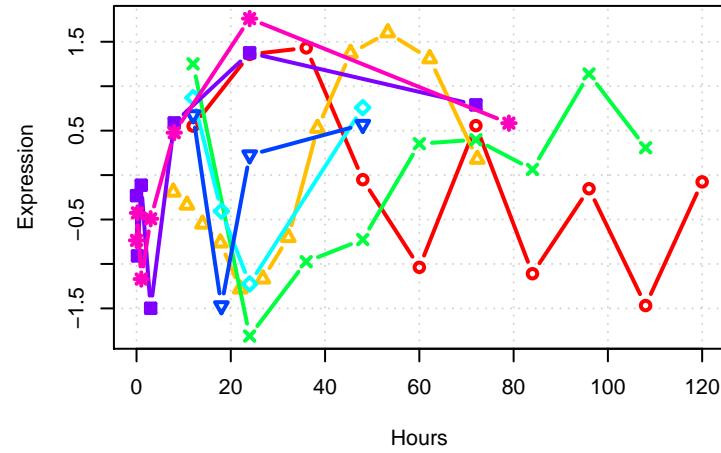


lcb5 YLR260W
Minor sphingoid long-chain base kinase

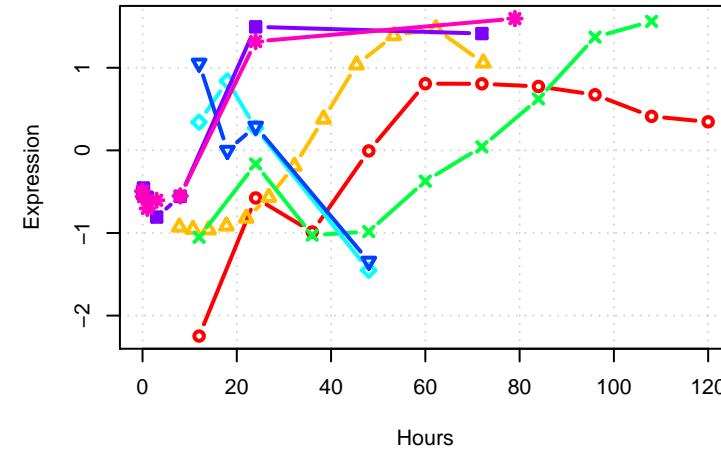


sphingolipid metabolism

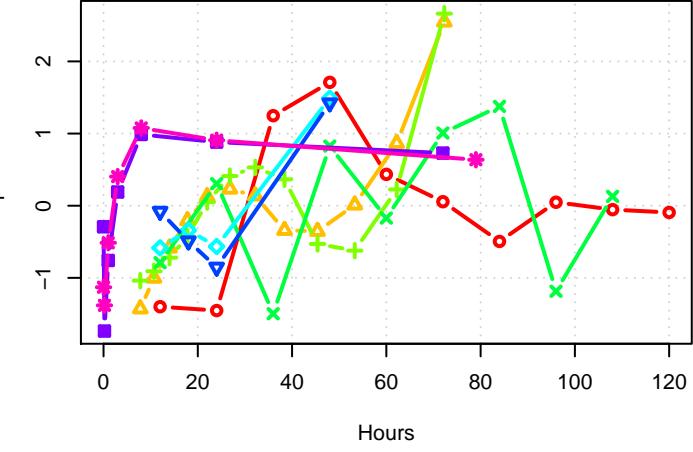
lcb5 YJL134W
Long-chain base-1-phosphate phosphatase



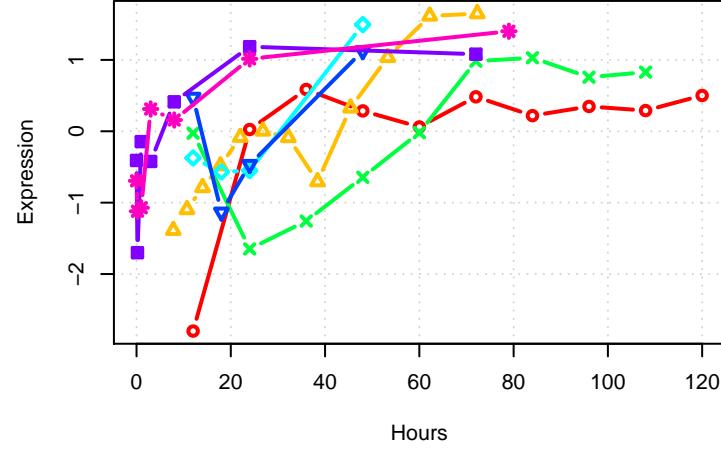
ysr3 YKR053C
Dihydroshingosine 1-phosphate phosphatase



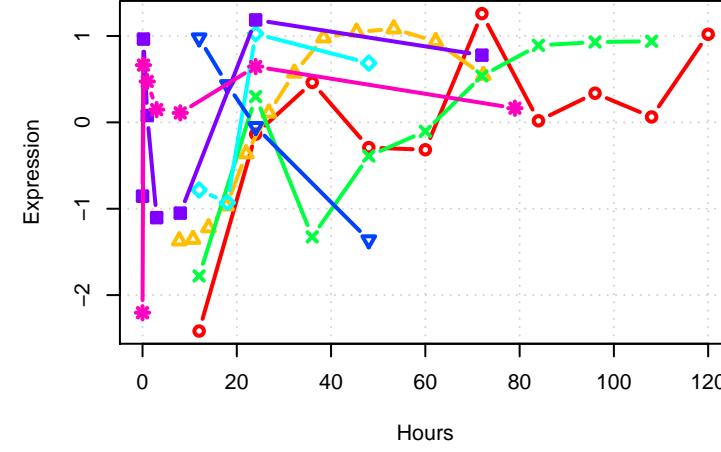
sur2 YDR297W
Sphinganine C4-hydroxylase



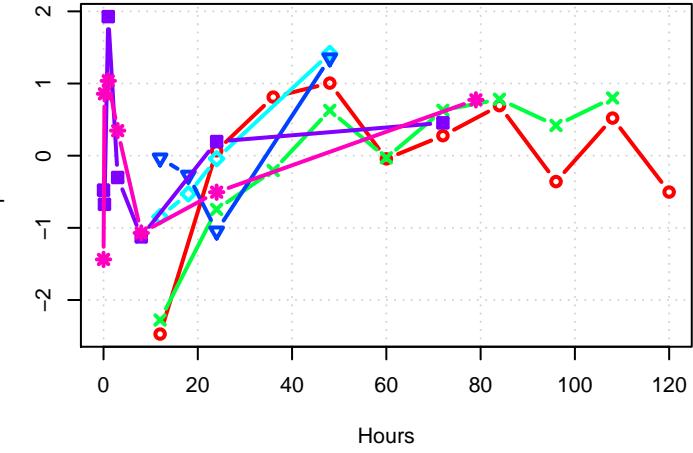
aur1 YKL004W
Phosphatidylinositol:ceramide phosphoinositol transferase



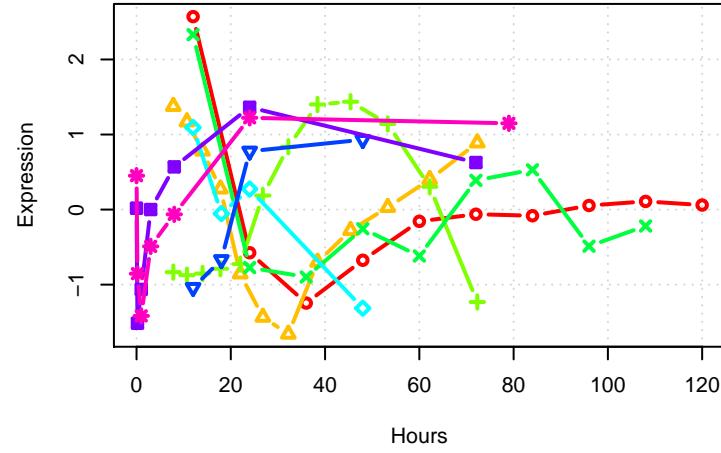
csg2 YBR036C
Endoplasmic reticulum membrane protein



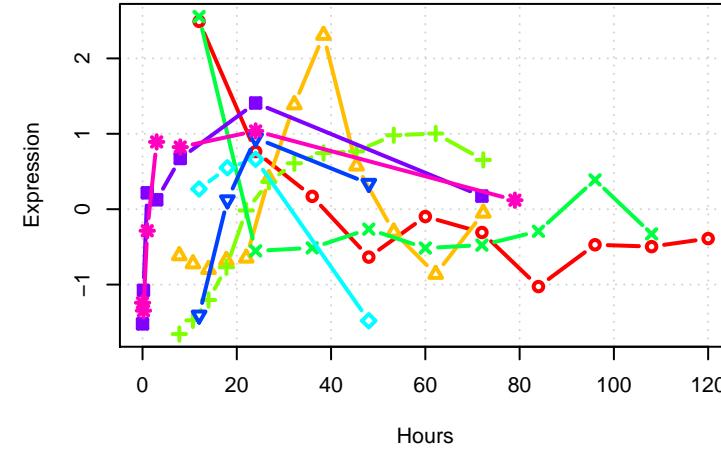
sur1 YPL057C
Mannosylinositol phosphorylceramide (MIPC) synthase catalytic subunit



lcb1 YMR296C
Component of serine palmitoyltransferase

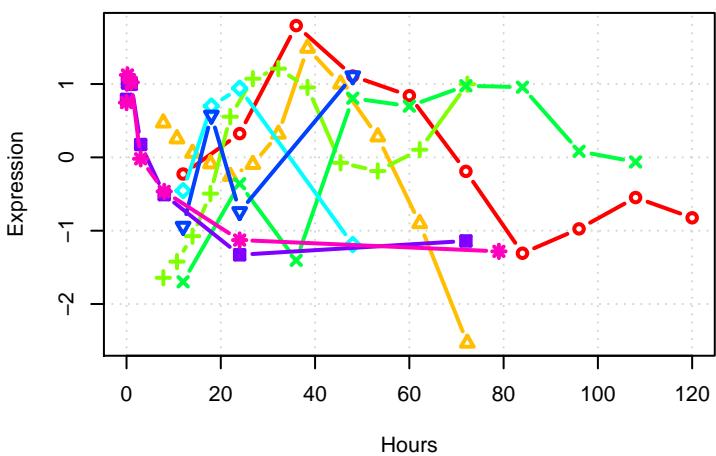


lcb2 YDR062W
Component of serine palmitoyltransferase



sphingolipid metabolism

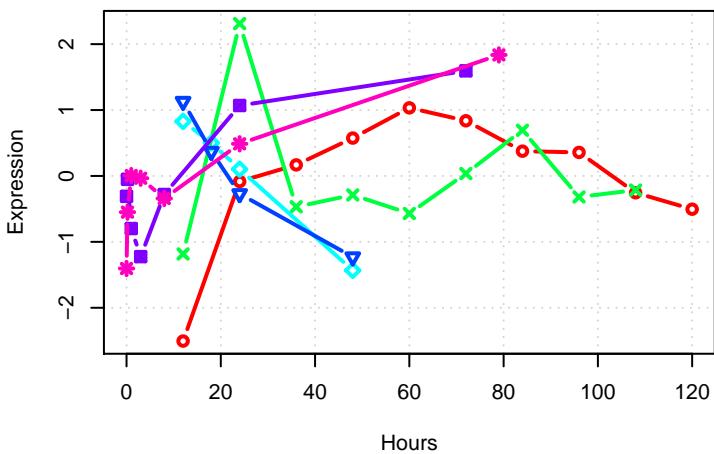
dpl1 YDR294C
Dihydroceramide phosphate lyase



sucrose degradation

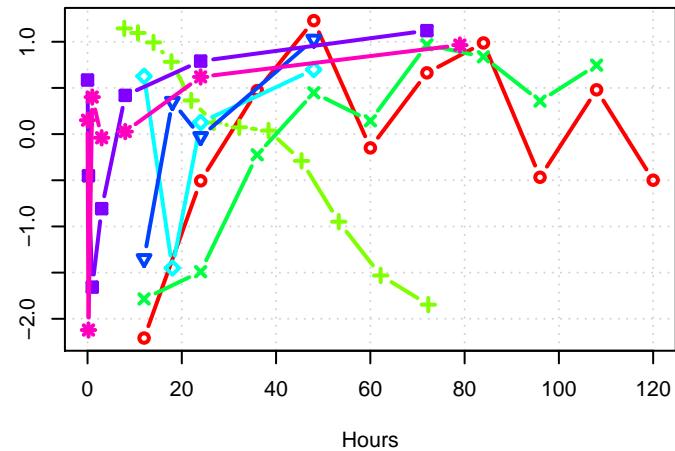
sucrose degradation

suc2 YIL162W
Invertase



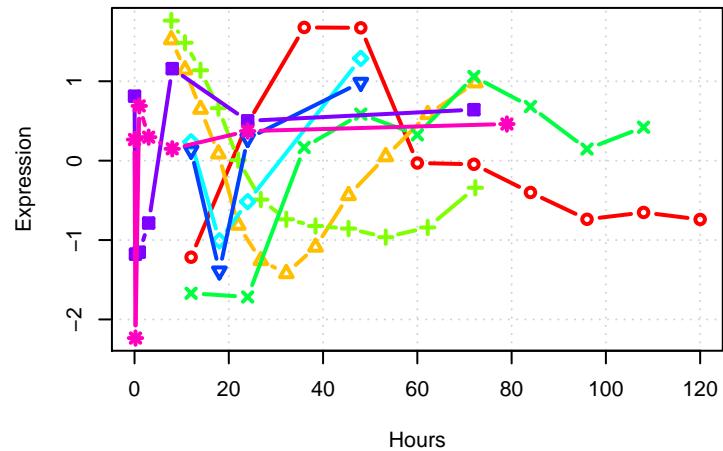
sulfate assimilation pathway

met14 YKL001C
Adenylylsulfate kinase

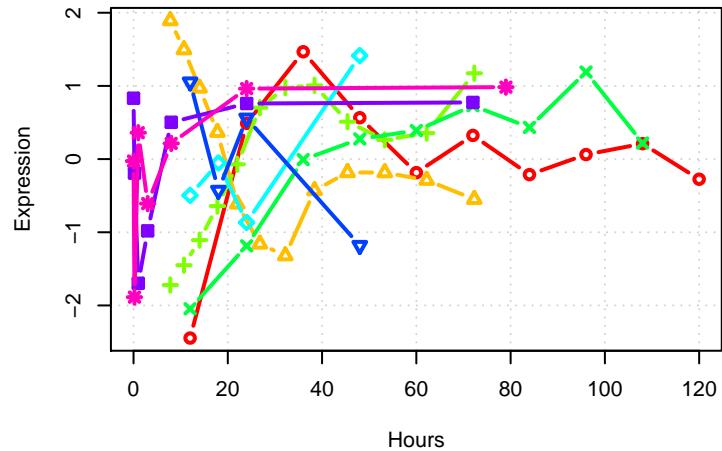


sulfate assimilation pathway

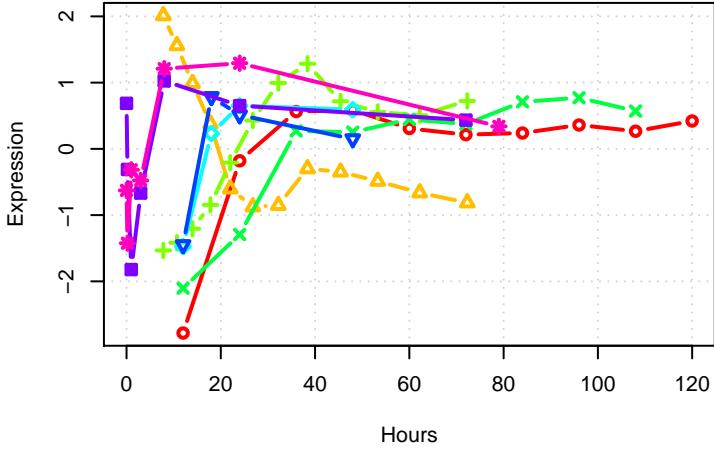
met10 YPR107C
3'-phosphoadenylylsulfate reductase



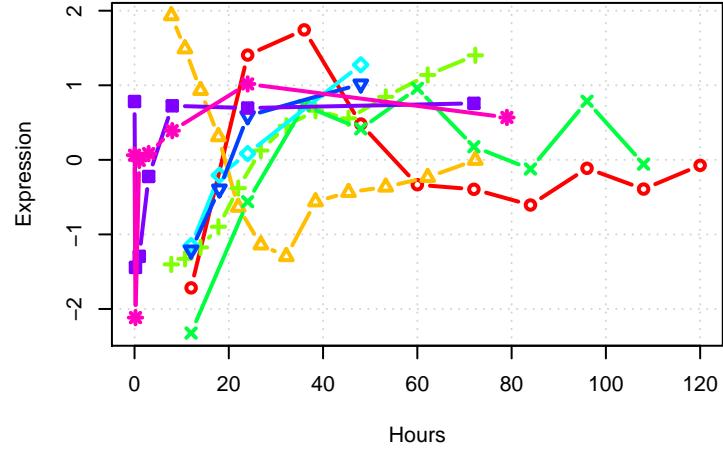
met3 YJR010W
ATP sulfurylase



met10 YFR030W
Subunit alpha of assimilatory sulfite reductase



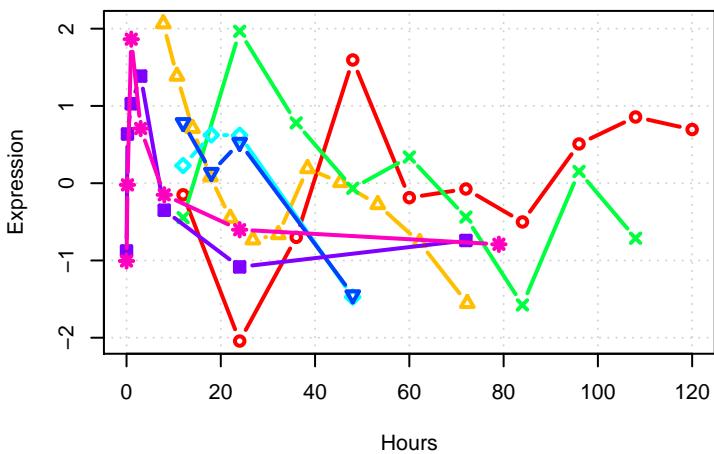
met5 YJR137C
Sulfite reductase beta subunit



superpathway of purine biosynthesis and salvage pathways

superpathway of purine biosynthesis and salvage pathways

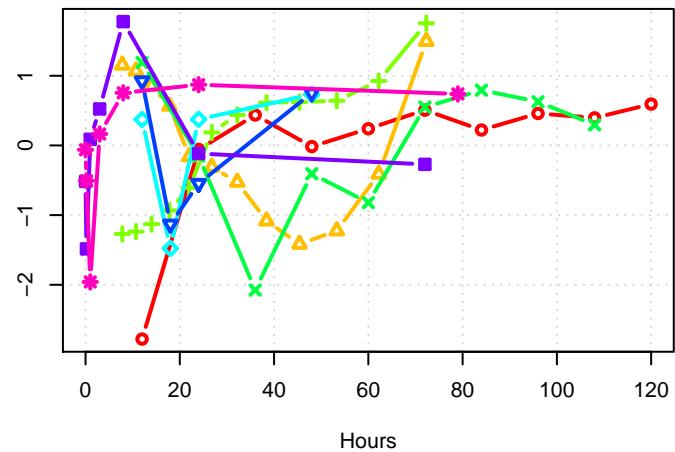
isn1 YOR155C
Inosine 5'-monophosphate (IMP)-specific 5'-nucleotidase



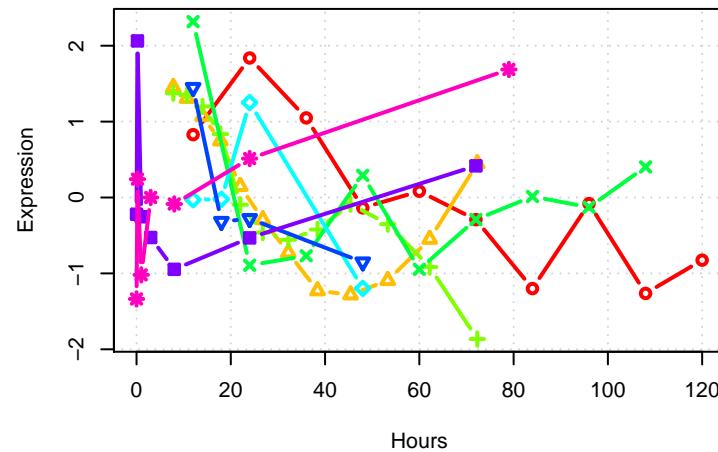
tetrapyrrole biosynthesis

tetrapyrrole biosynthesis

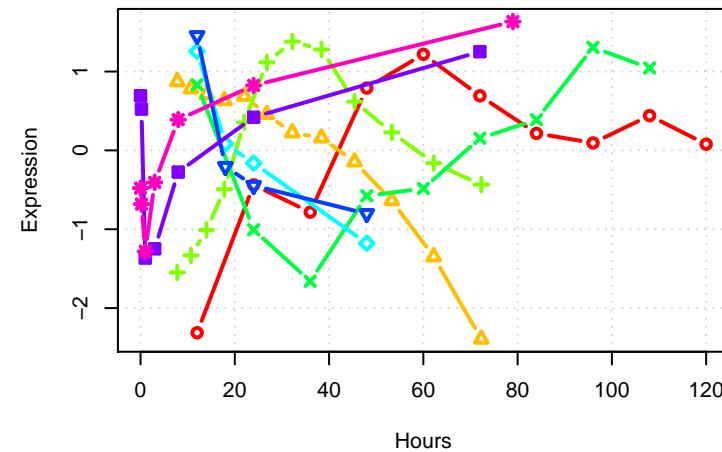
hem1 YDR232W
5-aminolevulinate synthase



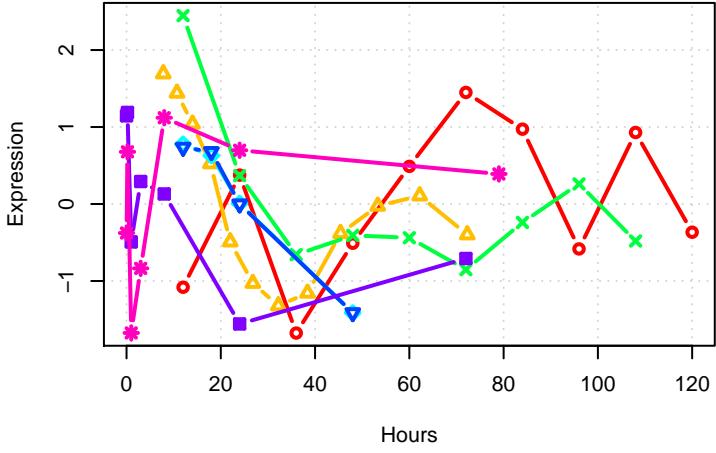
hem3 YDE205
Porphobilinogen deaminase



hem2 YGL040C
Aminolevulinate hydratase

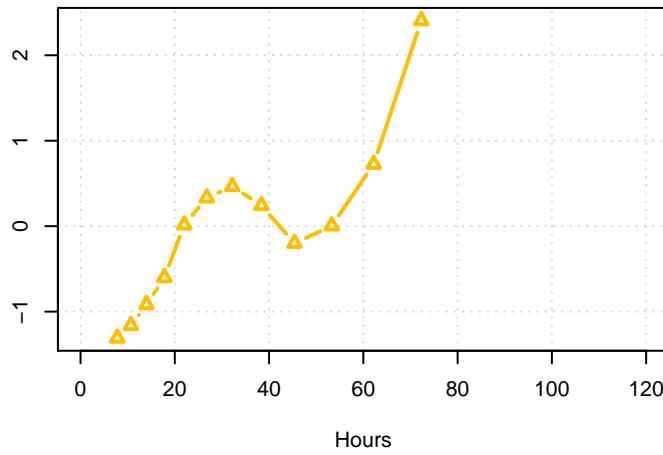


hem4 YOR278W
Uroporphyrinogen III synthase

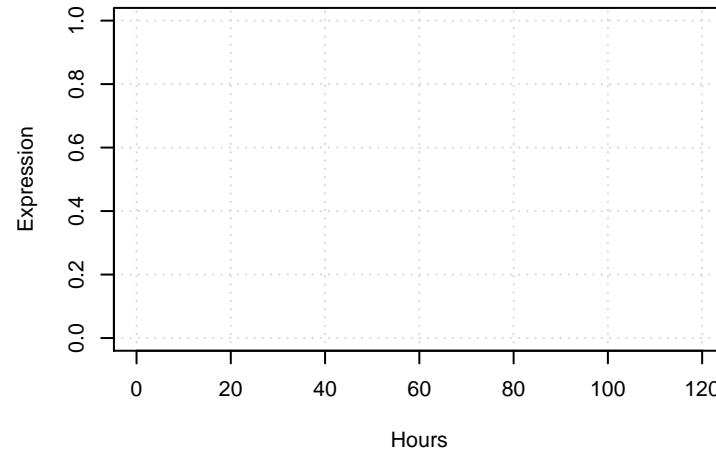


thiamine biosynthesis

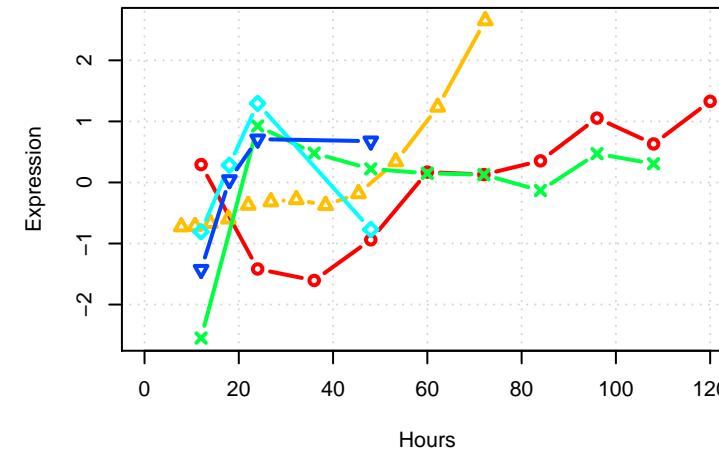
thi11 YJR156C
Protein involved in synthesis of the thiamine precursor HMP



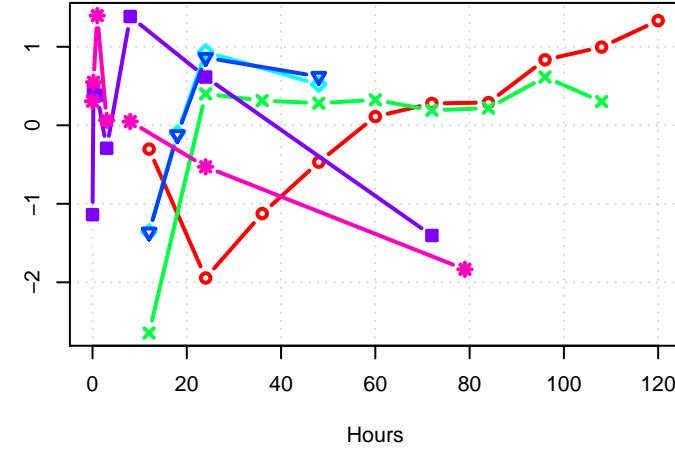
thiamine biosynthesis
thi12 YNL322W
Protein involved in synthesis of the thiamine precursor HMP



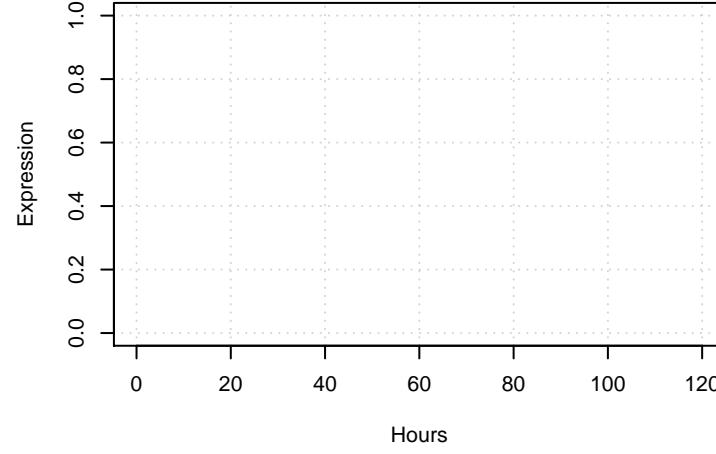
thi13 YDL244W
Protein involved in synthesis of the thiamine precursor HMP



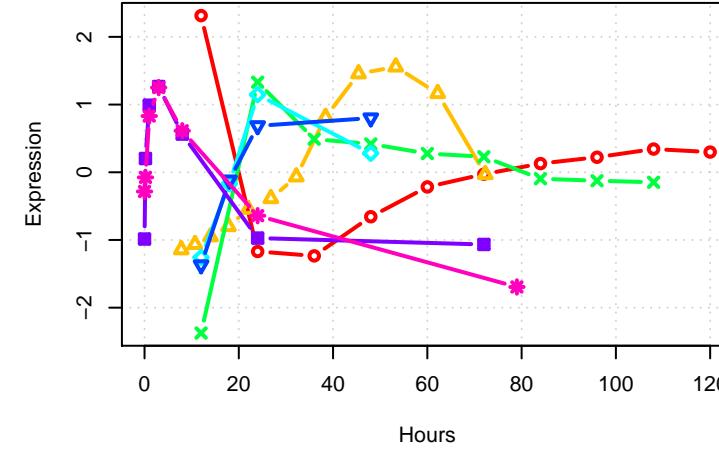
thi4 YGR144W
Thiazole synthase



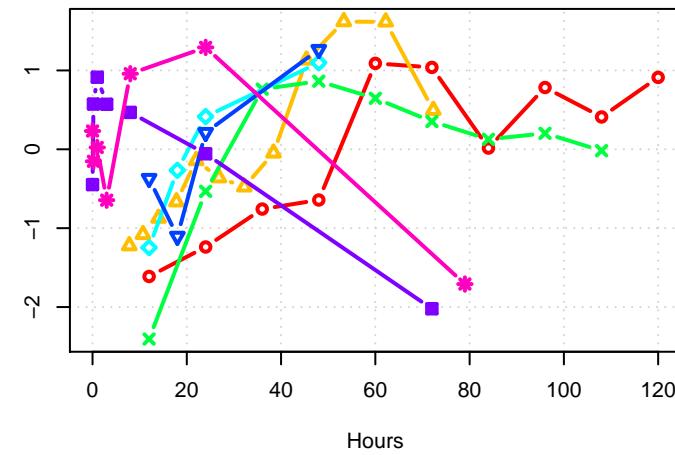
thi5 YFL058W
Protein involved in synthesis of the thiamine precursor HMP



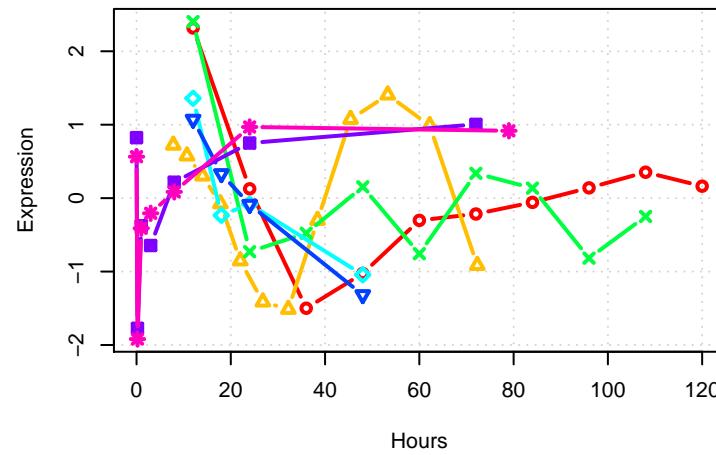
thi20 YOL055C
Trifunctional enzyme of thiamine biosynthesis, degradation and salvage



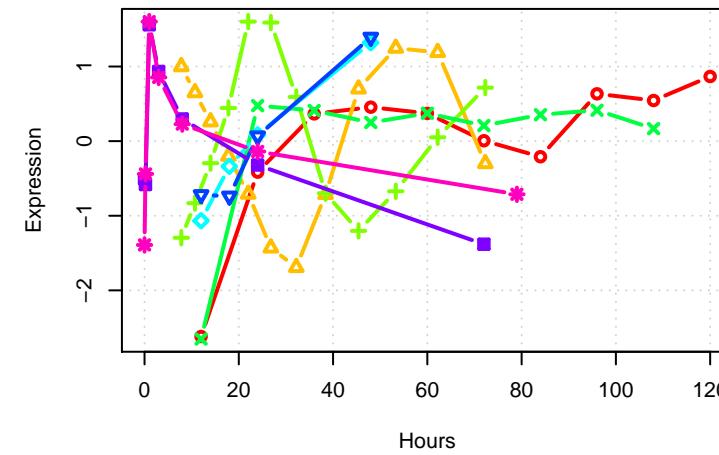
thi21 YPL258C
Hydroxymethylpyrimidine (HMP) and HMP-phosphate kinase



thi80 YOR143C
Thiamine pyrophosphokinase

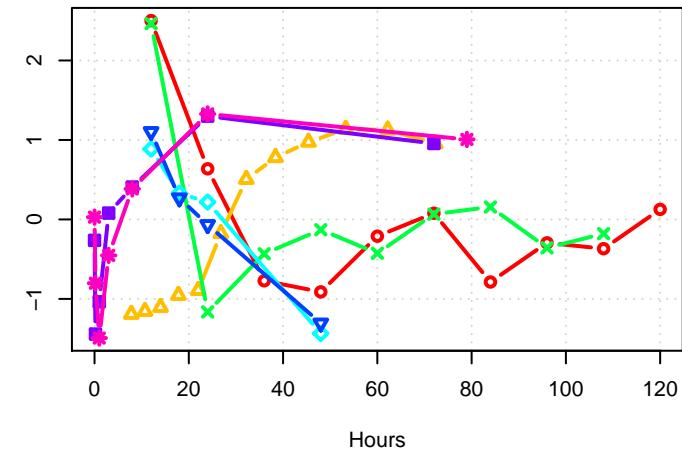


thi6 YPL214C
Thiamine-phosphate diphosphorylase and hydroxyethylthiazole kinase

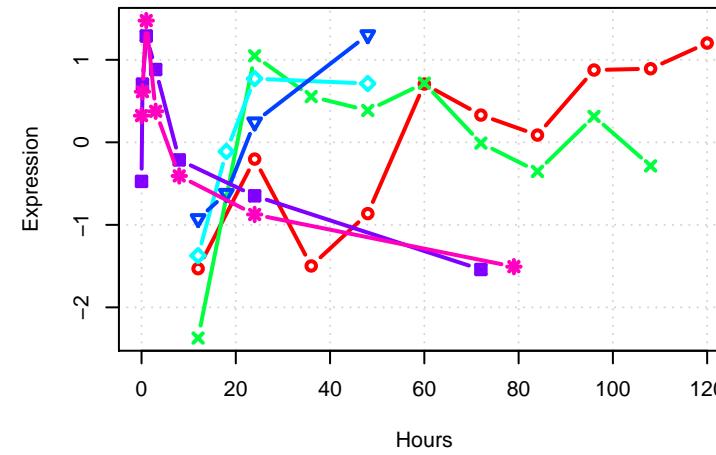


thioredoxin system

trr1 YDR353W
Cytoplasmic thioredoxin reductase

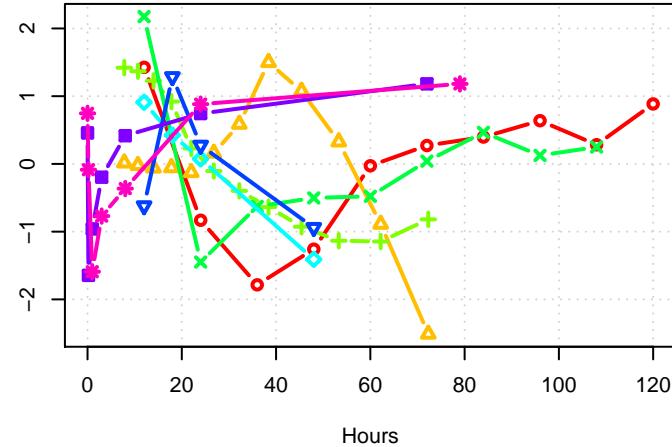


trr2 YHR106W
Mitochondrial thioredoxin reductase



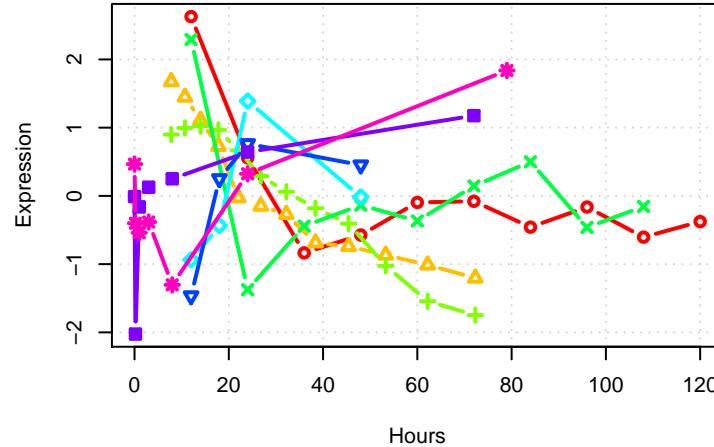
threonine biosynthesis

thr1 YHR025W
Homoserine kinase



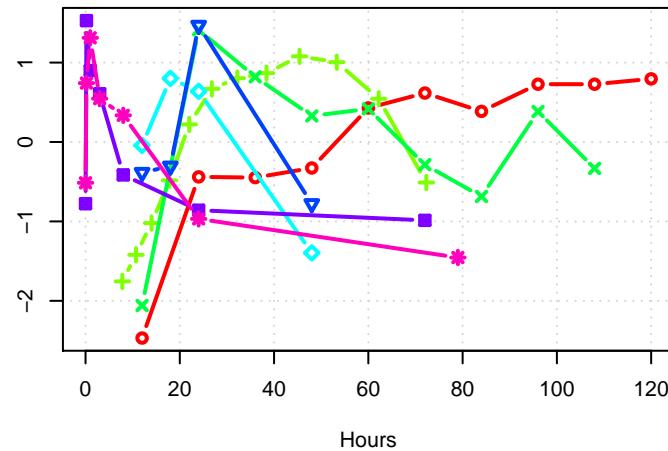
threonine biosynthesis

thr4 YCR053W
Threonine synthase

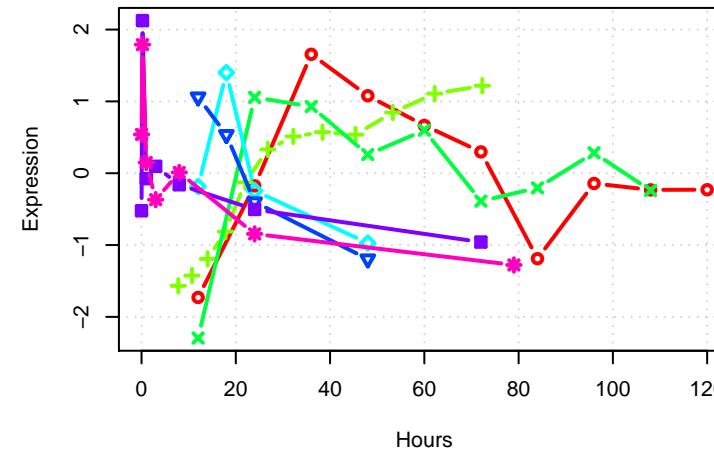


trehalose biosynthesis

tps1 YBR126C
Synthase subunit of trehalose-6-P synthase/phosphatase complex

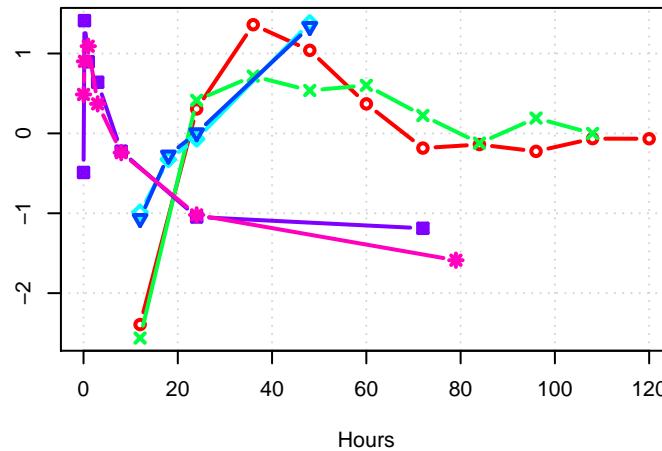


trehalose biosynthesis
tps2 YDR077W
Phosphatase subunit of the trehalose-6-P synthase/phosphatase complex



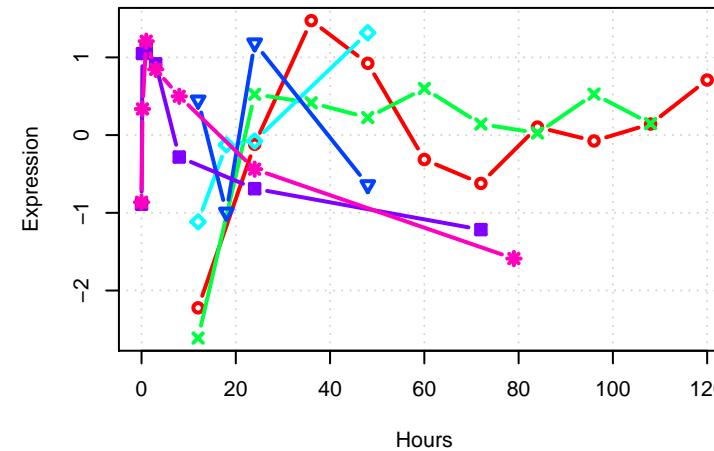
trehalose degradation

ath1 YPR026W
Acid trehalase required for utilization of extracellular trehalose



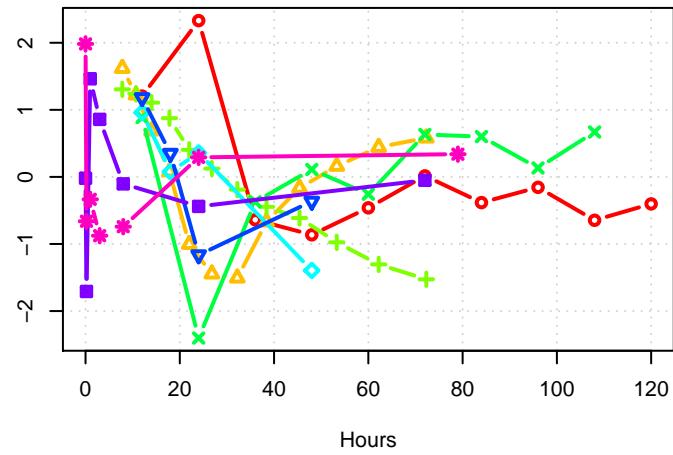
trehalose degradation

nth1 YDR001C
Neutral trehalase, degrades trehalose



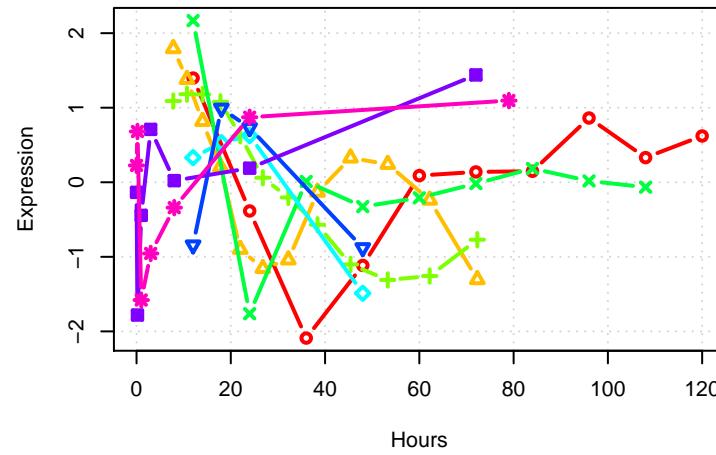
tryptophan biosynthesis

trp4 YDR354W
Anthranoate phosphoribosyl transferase

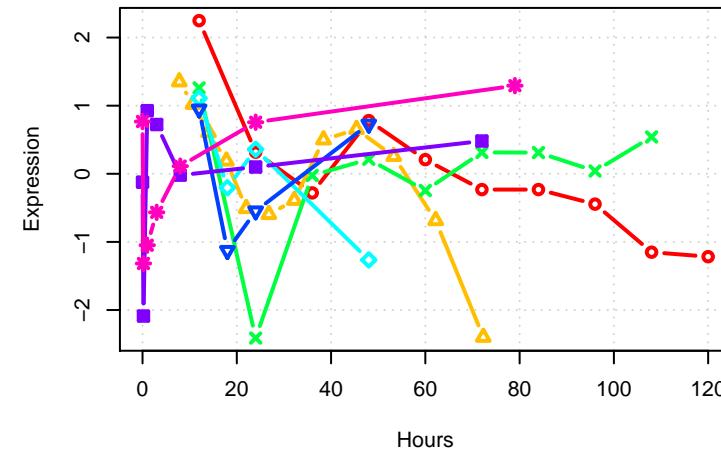


tryptophan biosynthesis

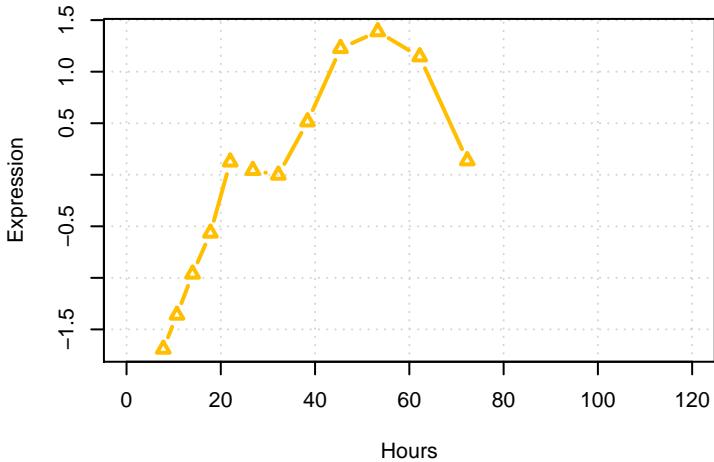
trp2 YER050W
Anthranoate synthase



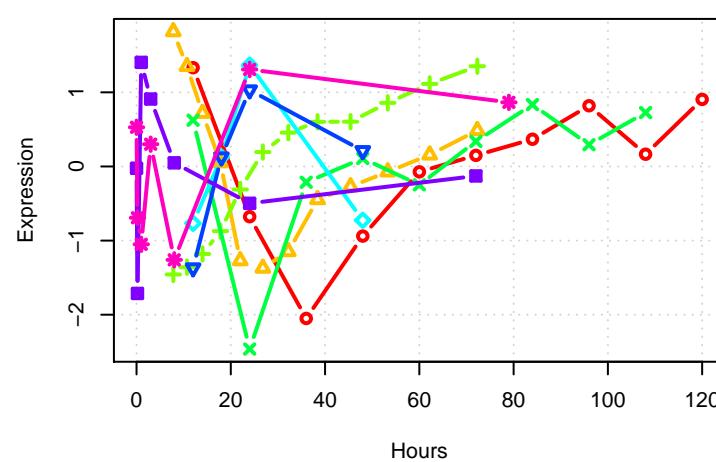
trp3 YKL211C
Indole-3-glycerol-phosphate synthase



trp1 YDR007W
Phosphoribosylanthranilate isomerase



trp5 YGL026C
Tryptophan synthase

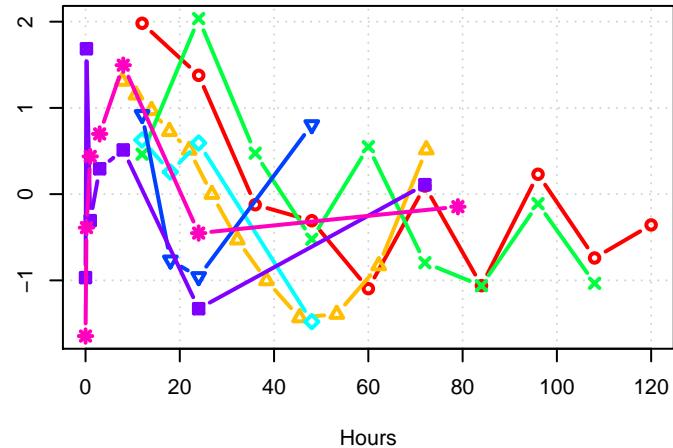


ubiquinone biosynthesis from 4–hydroxybenzoate

ubiquinone biosynthesis from 4-hydroxybenzoate

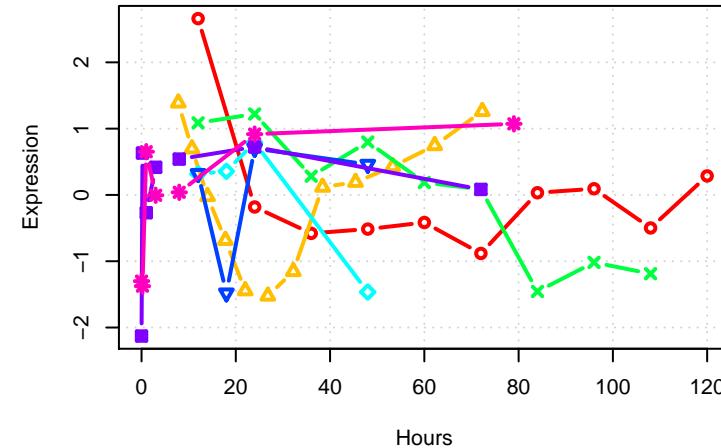
cat5 YOR125C

Protein required for ubiquinone (Coenzyme Q) biosynthesis



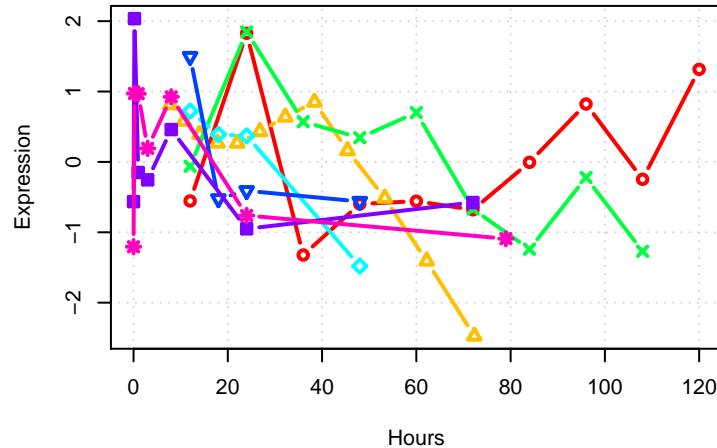
coq6 YGR255C

Flavin-dependent monooxygenase involved in ubiquinone biosynthesis



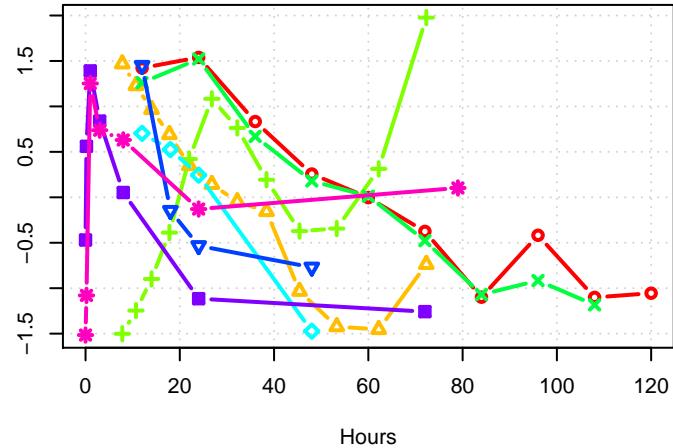
coq3 YOL096C

O-methyltransferase



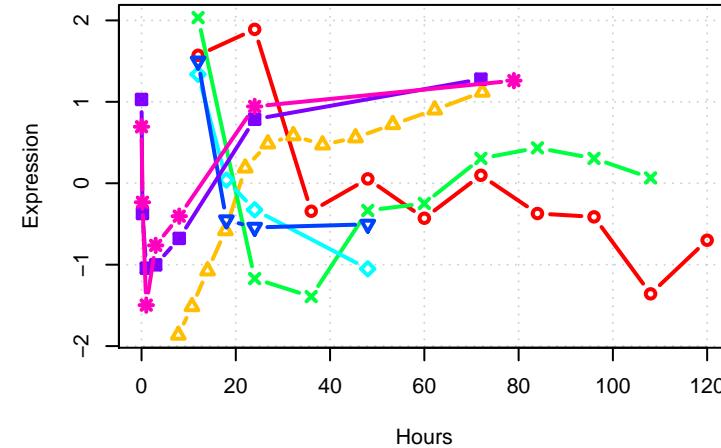
coq5 YML110C

2-hexaprenyl-6-methoxy-1,4-benzoquinone methyltransferase



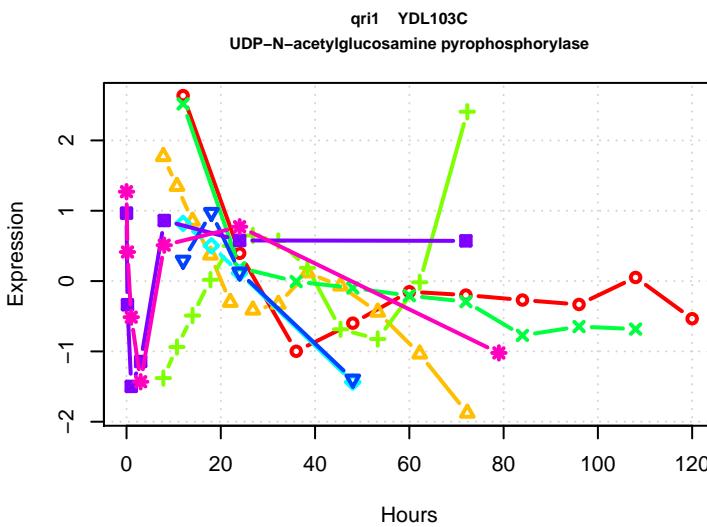
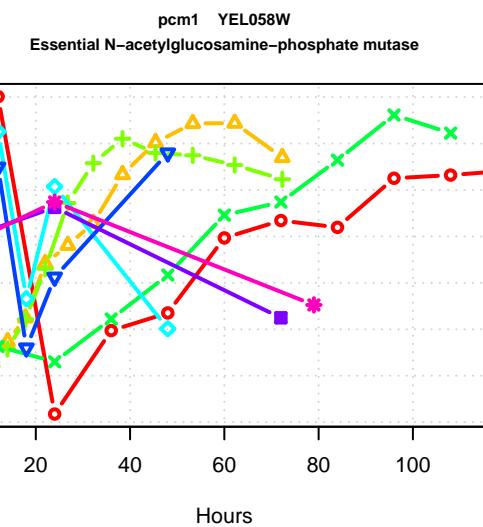
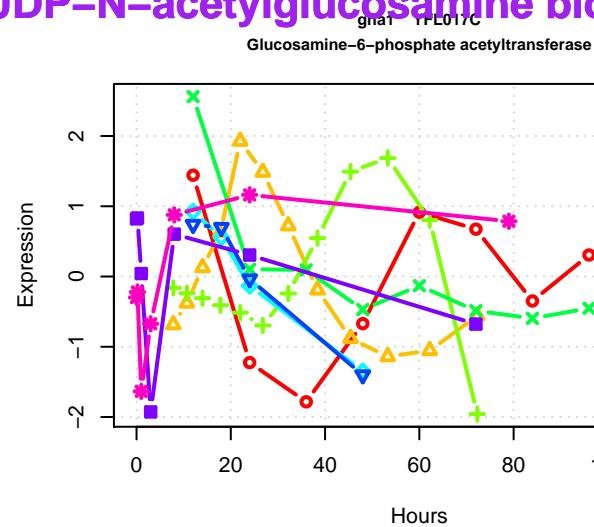
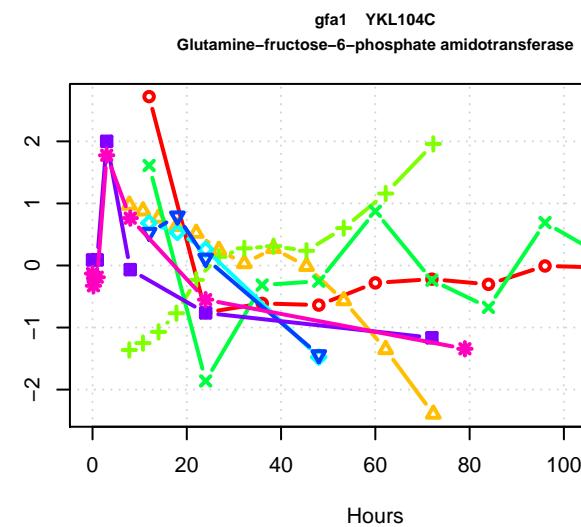
coq2 YNR041C

Para hydroxybenzoate polypropenyl transferase



UDP–N–acetylglucosamine biosynthesis

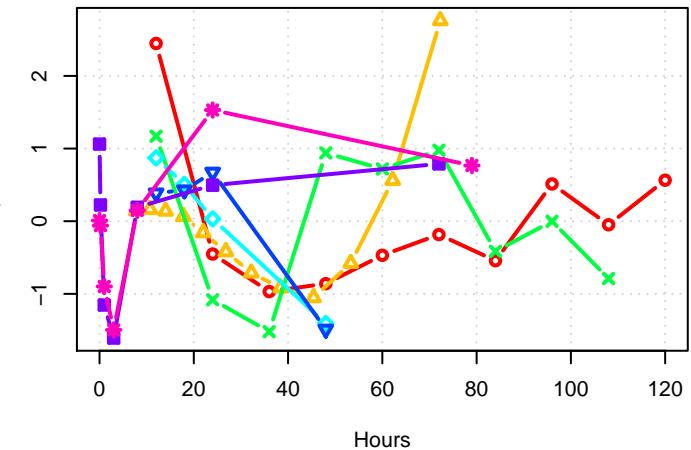
UDP-N-acetylglucosamine biosynthesis



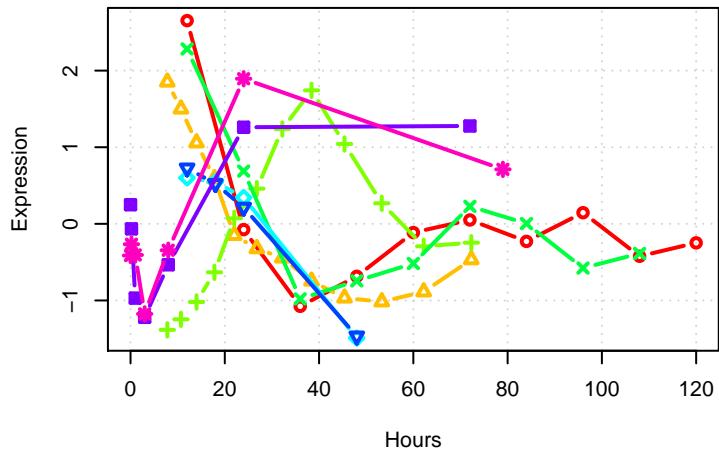
very long chain fatty acid biosynthesis

very long chain fatty acid biosynthesis

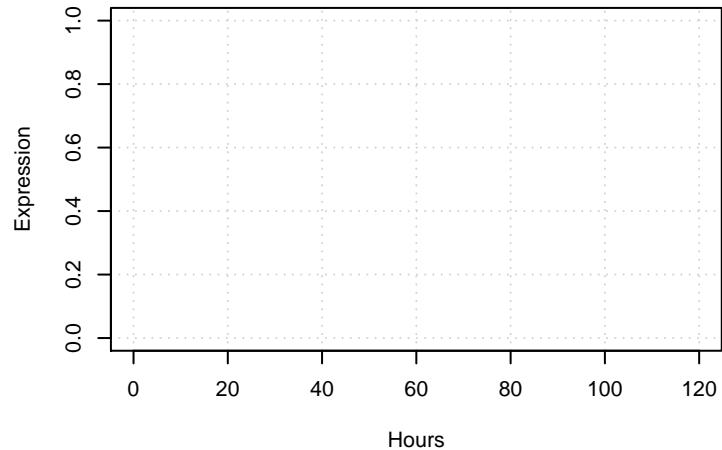
ifa38 YBR159W
Microsomal beta-keto-reductase



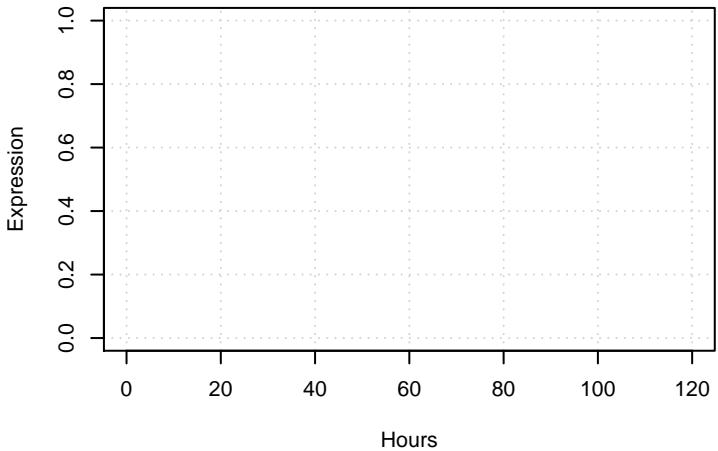
tsc13 YDL075C
Enoyl reductase



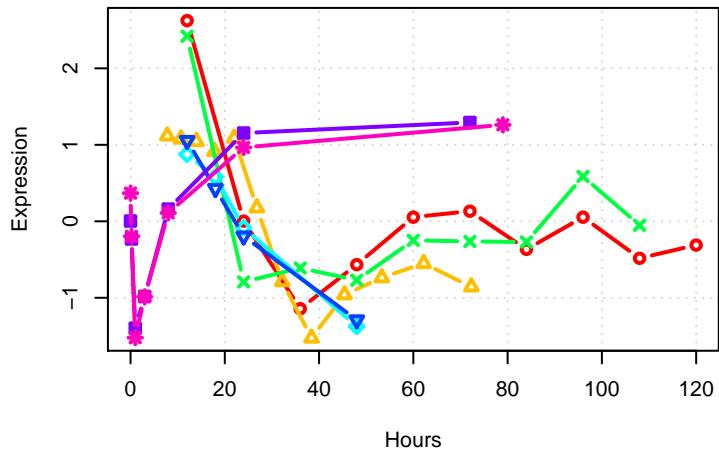
fen1 Missing ORF
Missing Function



sur4 Missing ORF
Missing Function

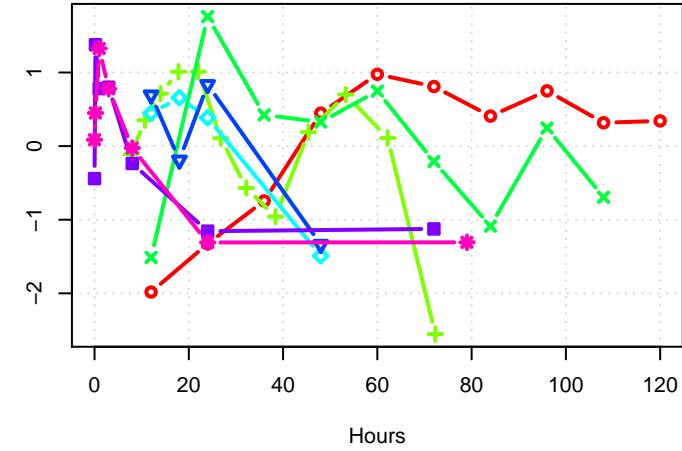


phs1 YJL097W
Essential 3-hydroxyacyl-CoA dehydratase of the ER membrane



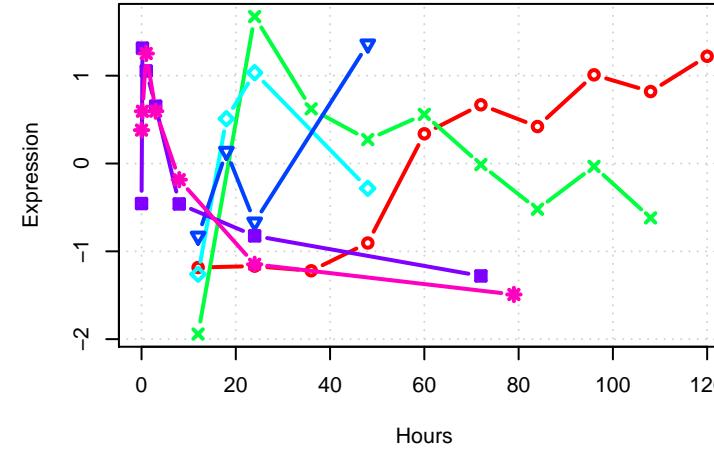
xylose metabolism

gre3 YHR104W
Aldose reductase



xylose metabolism

xyI2 YLR070C
Xylitol dehydrogenase



xylulose degradation

xks1 YGR194C
Xylulokinase

xylulose degradation

