

Additional information

Spatial-temporal regulation of fatty alcohol biosynthesis in yeast

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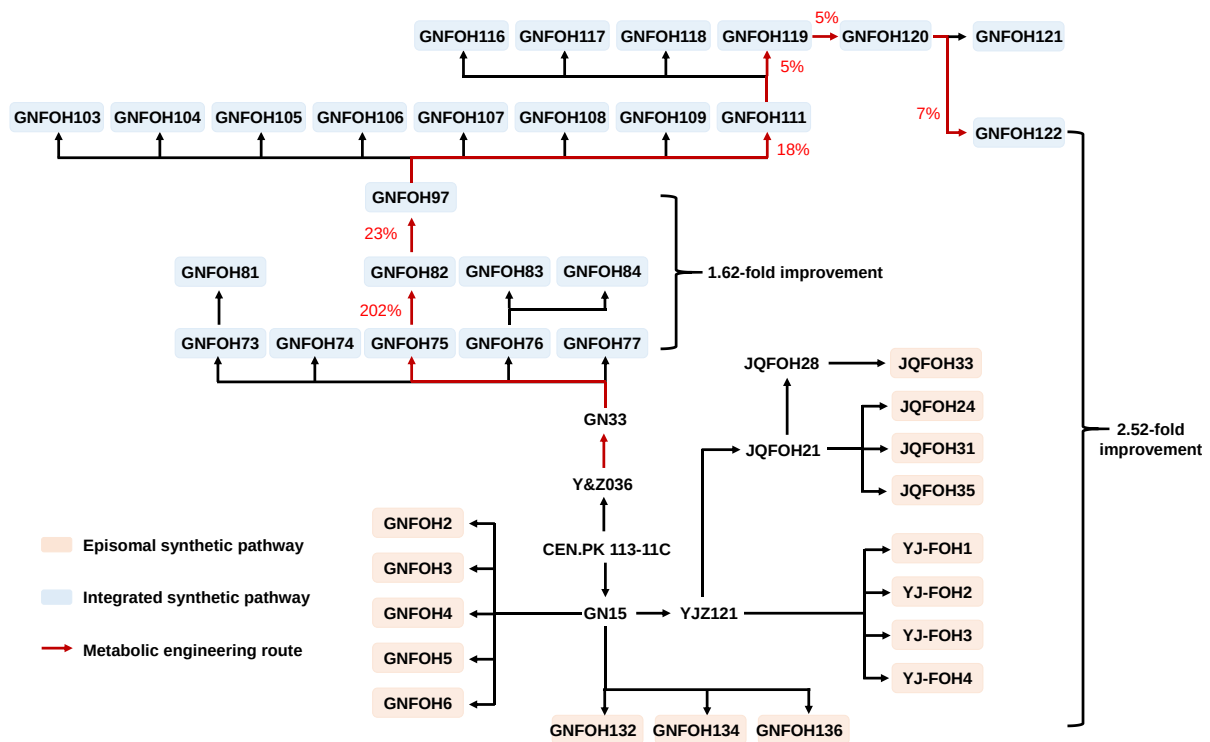
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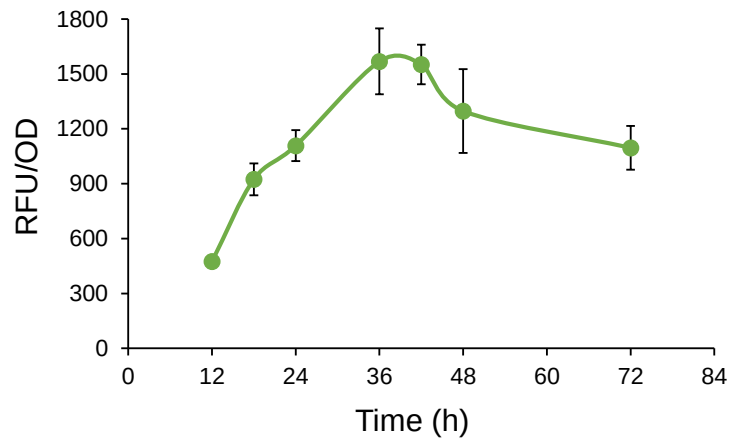
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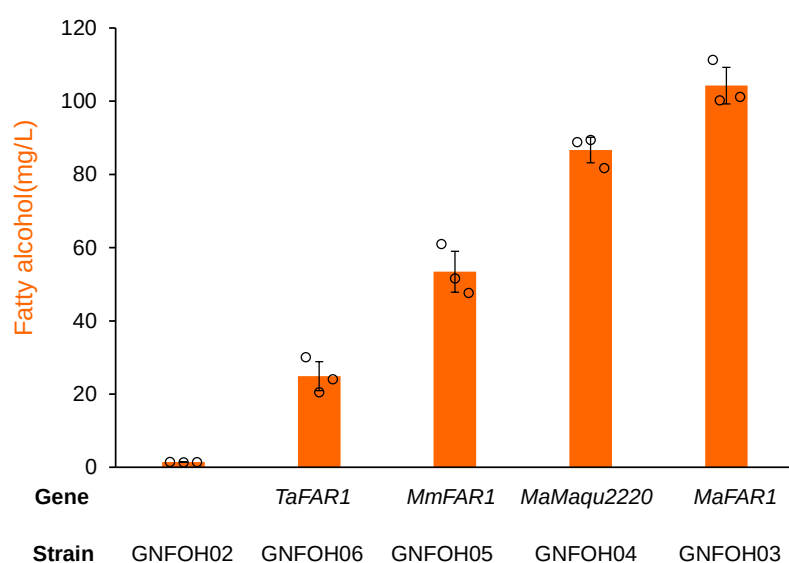


Additional file Figure 1 Flowchart of yeast strain construction for fatty alcohol production. *S. cerevisiae* strain was constructed for fatty alcohol production with either episomal synthetic pathway (plasmids), or integrated synthetic pathway (genome). Numbers in red indicated titer improvement from each metabolic engineering modification. In particular, the fatty acid/acyl-CoA responsive promoters improved fatty alcohol biosynthesis by 1.62-fold (strain GNFFOH73 vs GNFOH97), and strain GNFOH120 with enhanced peroxisomal supply of acyl-CoA and NADPH (+1 mM H₂O₂) had a 2.52-fold higher titer than the starting strain GNFOH136.

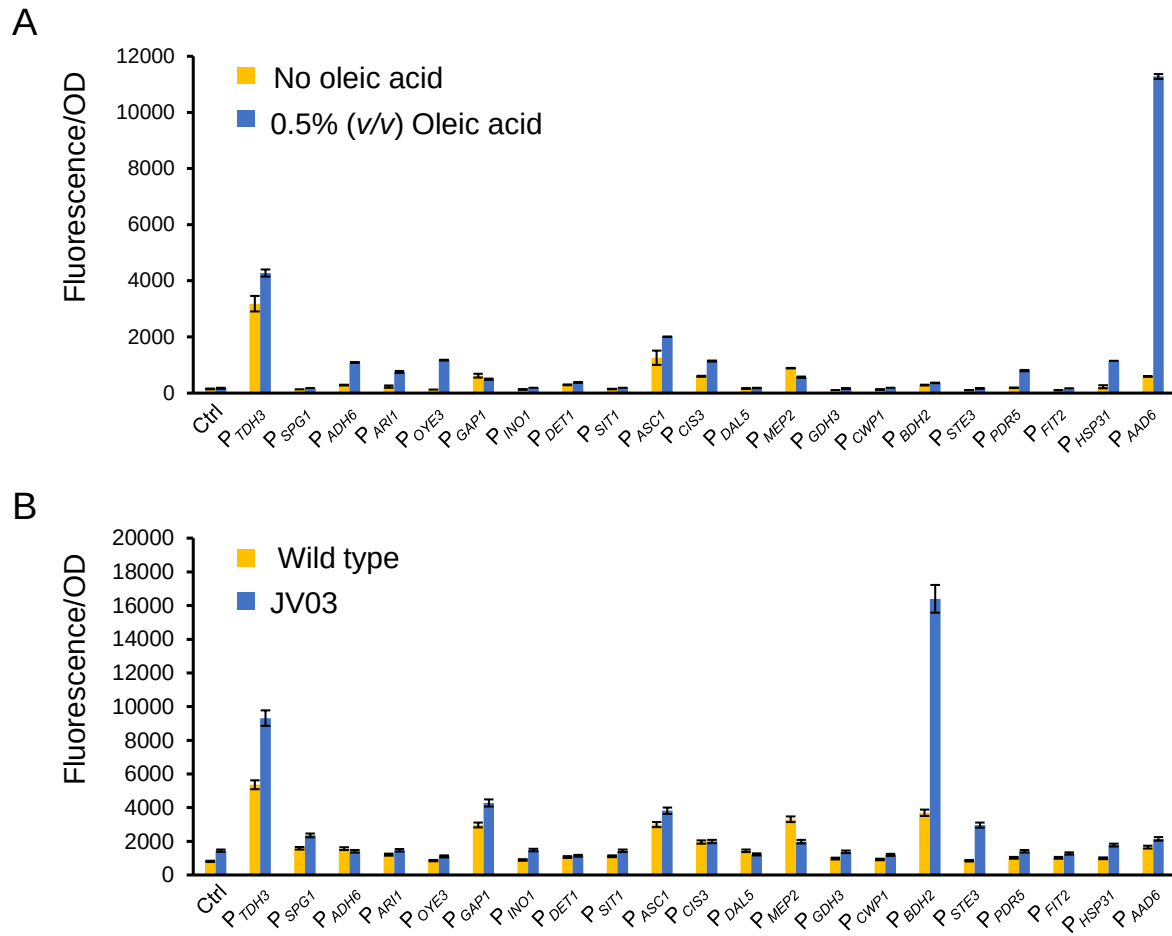


Additional file Figure S2 Changes in fluorescence intensity with time of GFP under control of promoter

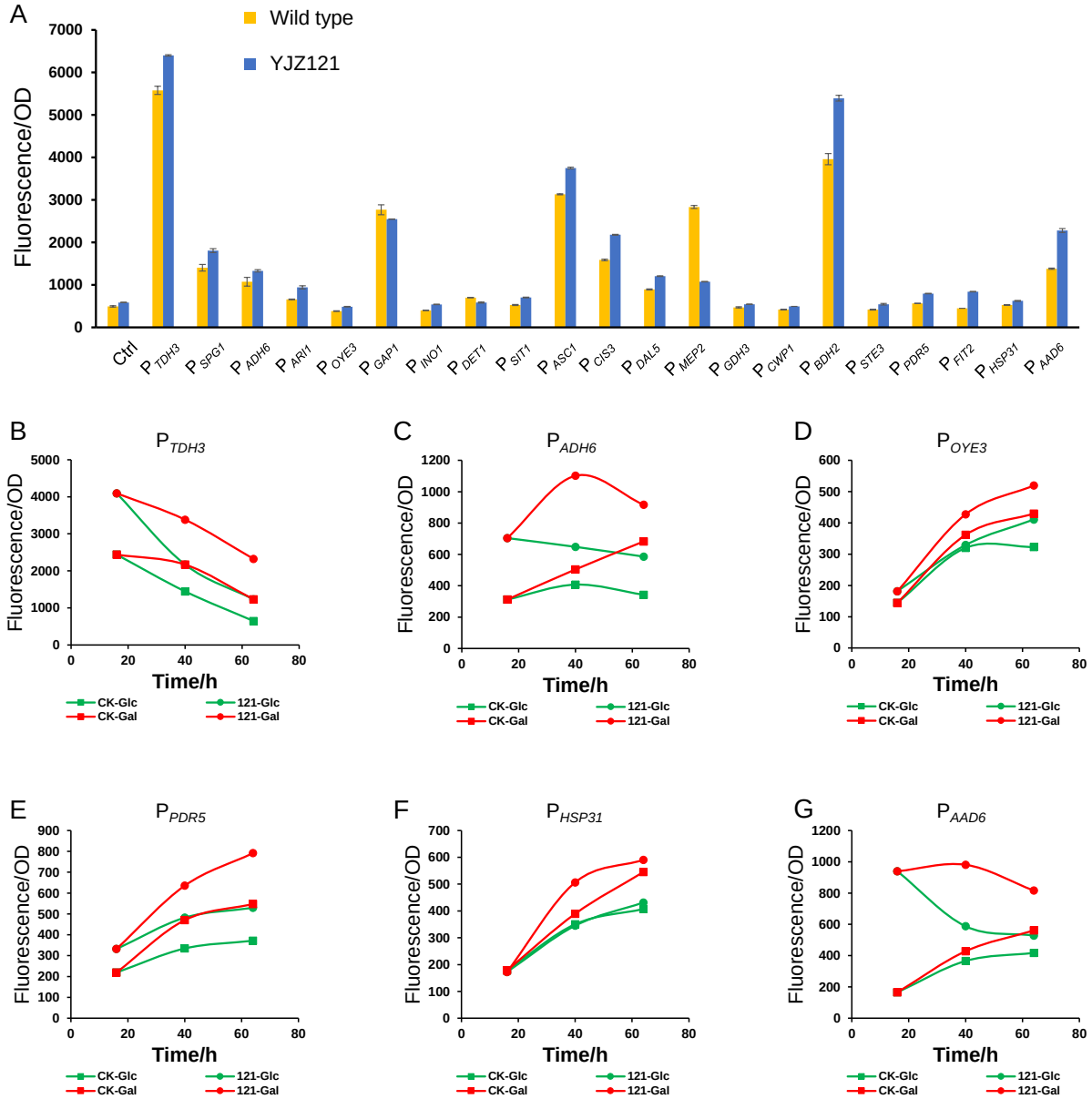
P_{GALL10} . Strains were cultivated in minimal medium with 20 g/L glucose at 30°C, 220 rpm for 72 h, and samples were taken to measure the fluorescence intensity. Data are presented as mean $\pm$ SD of three biologically independent samples.



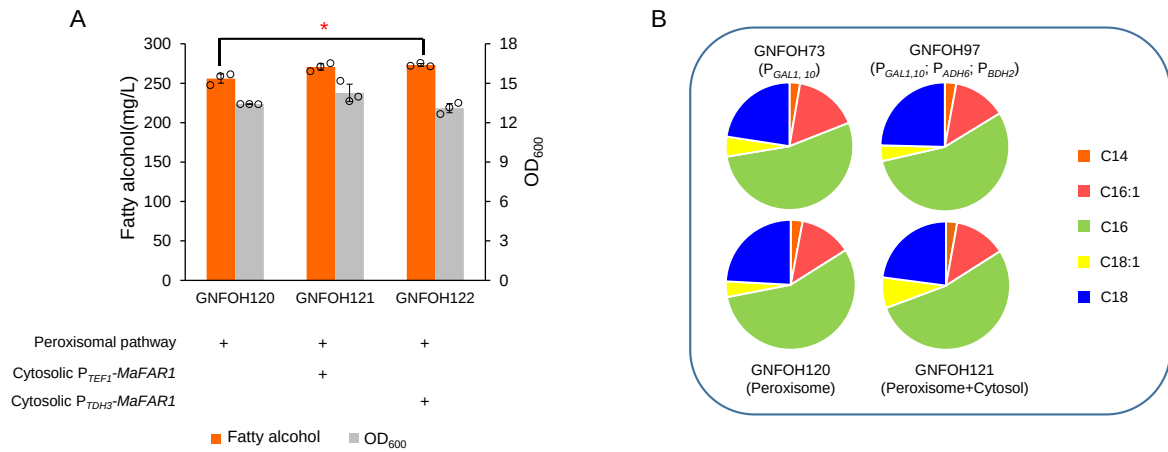
Additional file Figure S3 Fatty alcohol production by fatty acyl-CoA reductase (FAR) from different species. FAR genes from *Tyto alba* (Barn owl) (*TaFAR1*), *Mus musculus* (*MmFAR1*), *Marinobacter aquaeolei* VT8 (*MaMaqu2220*), and *Marinobacter sp. ES-1* (*MaFAR1*) controlled by promoter $P_{GAL1,10}$ were introduced into strain GN15. Engineered strains were cultivated in minimal medium with 20 g/L glucose at 30°C, 220 rpm for 96 h, and fatty alcohol was quantified to evaluate these FAR genes. FAR genes assembled on plasmid backbone pESC, and Control contained an empty plasmid. Data are presented as mean $\pm$ SD of three biologically independent samples with displayed data-points.



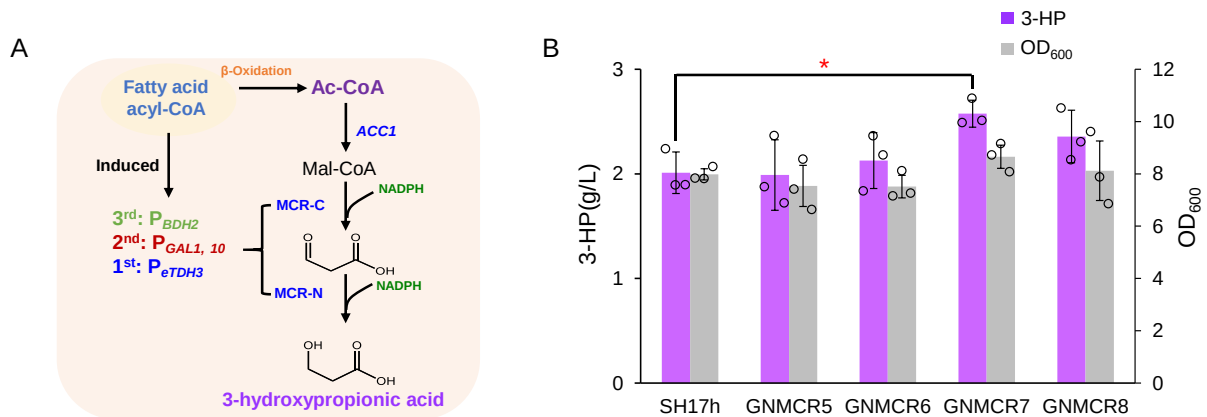
Additional file Figure S4 Promoter characterization that responds to exogenous fatty acid and endogenous acyl-CoA based on transcriptional data. **A** Promoters that responded to exogenous FFA. GFP under control of diverse promoters was expressed in wild-type, and cultivated in minimal media with, or without 0.5% (v/v) oleic acid. **B** Promoters that responded to endogenous acyl-CoA. GFP under control of diverse promoters was expressed in wild-type, and acyl-CoA producing strain JV03 [1], respectively. Data are presented as mean $\pm$ SD of three biologically independent samples.



Additional file Figure S5 Promoter characterization that responds to endogenous fatty acid based on transcriptional data. **A** Promoters that responded to endogenous FFA. GFP under control of diverse promoters was expressed in FFA producing strain. In particular, six promoters, including P_{TDH3} (**B**), P_{ADH6} (**C**), P_{OYE3} (**D**), P_{PDR5} (**E**), P_{HSP31} (**F**), and P_{AAD6} (**G**), was characterized in supplemented carbon sources. Engineered strains were initially cultivated in minimal medium containing 20 g/L, and 20 g/L glucose, or galactose, were supplemented at 16 h to measure the cell growth and fluorescence intensity. Data are presented as mean $\pm$ SD of three biologically independent samples.



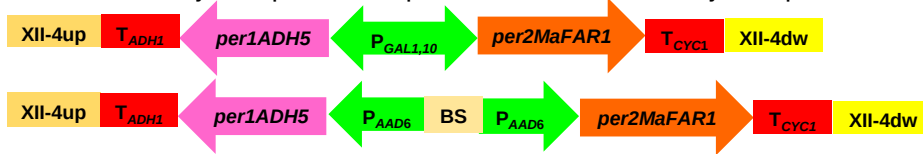
Additional file Figure S6 Coordinated cytosolic and peroxisomal biosynthetic pathways promoted fatty alcohol production. The cytosolic *MaFAR1* was expressed under control of strong constitutive promoters P_{TEF1} and P_{TDH3} , respectively, in strain GNFOH120 with complete peroxisomal biosynthetic pathway of fatty alcohol. **B** The spatio-temporal control strategy via fatty acid/acyl-CoA responsive promoters and cellular compartmentalization did not influence the composition of fatty alcohol, which, however, further utilized the residual cytosolic fatty acid/acyl-CoA in the initial stage of fermentation to slightly achieve higher titer. Data are presented as mean $\pm$ SD of three biologically independent samples with displayed data-points. Red asterisks indicate statistical significance as determined using paired t-test (* $P < 0.05$).



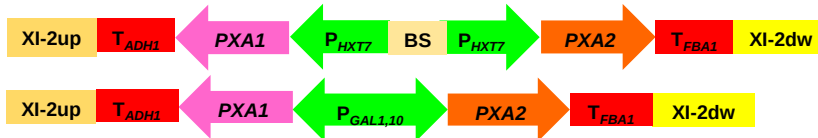
Additional file Figure S7 Fatty acid/acyl-CoA responsive promoters for enhanced 3-hydroxypropionic acid (3-HP) production. **A** Sketch map of biosynthetic pathway of 3-HP. Biosynthesis of 3-HP and fatty alcohol shares the same precursor acetyl-CoA, which is converted to 3-HP by acetyl-CoA carboxylase (*ACC1*) and malonyl-CoA reductase (*MCR*). Accumulation of fatty acids and acyl-CoA activates both β -oxidation to generate acetyl-CoA, and fatty acid/acyl-CoA responsive promoters to express *MCR*. **B** 3-HP biosynthesis controlled by fatty acid/acyl-CoA responsive promoters. Based on the starting 3-HP producing strain (SH17h) with two copies of *MCR* under the control of *P_{TDH3}* and *P_{GAL1, 10}*, respectively, a third copy of *MCR* controlled by fatty acid/acyl-CoA responsive promoters was introduced. SH17h with high-level production of 3-HP as starting strain, GNMCR5, GNMCR6, GNMCR7, GNMCR8 possessed a third copy of *MCR* with *P_{AAD6}*, *P_{ADH6}*, *P_{BDH2}* and *P_{STE3}*, respectively. Data are presented as mean $\pm$ SD of three biologically independent samples with displayed data-points. Red asterisks indicate statistical significance as determined using paired t-test (* $P < 0.05$).

i) Fatty alcohol pathway integrated into XII-4 site.

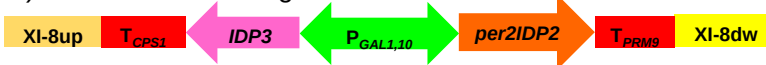
The same site just replaced the promoter and other sites just replaced the homology arms.



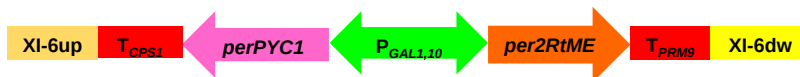
ii) *PXA1* and *PXA2* integrated into XI-2 site.



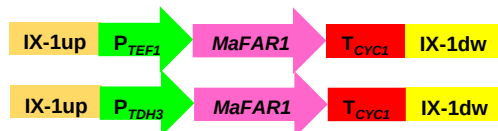
iii) *IDP2* and *IDP3* integrated into XI-8 site.



iv) *PYC1* and *RtME* integrated into XI-8 site.



v) Cytoplasmic fatty alcohol pathway integrated into IX-1 site.

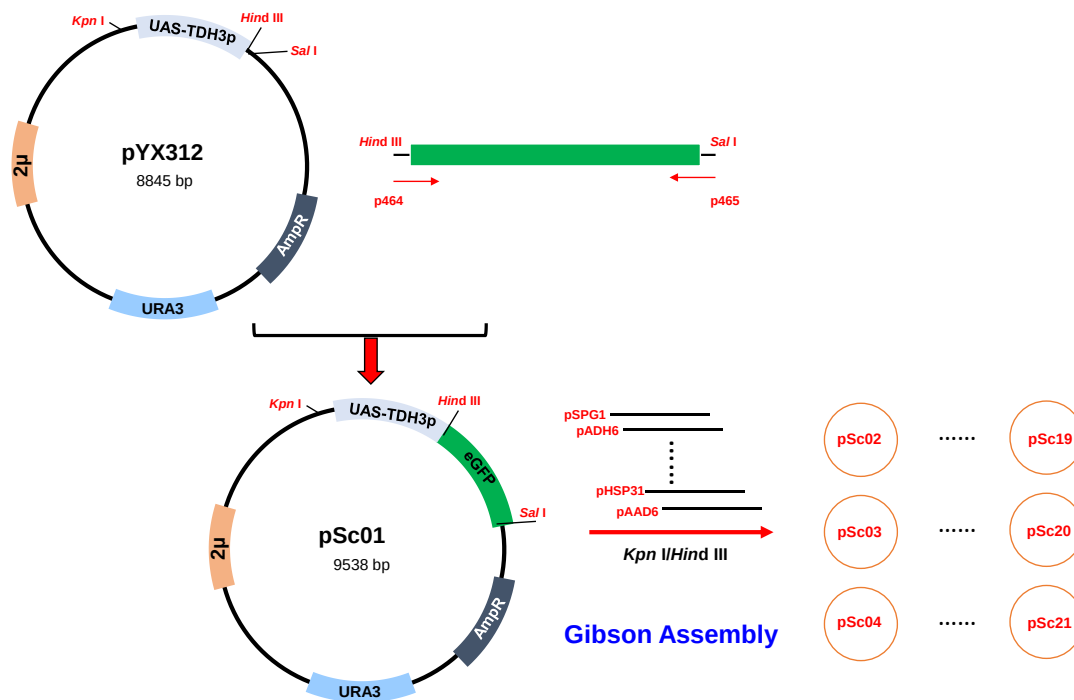


vi) *MCR* integrated into IX-1 site in SH17h.



Additional file Figure S8 Expression cassettes for genetic manipulation by CRISPR/Cas9 in this study.

Expression cassettes were constructed by OE-PCR to fuse the upstream HA, promoter sequence, open reading frame (ORF), terminator and downstream HA, which was subsequently integrated at different neutral sites. In particular, to avoid the failure in OE-PCR due to the same fragment, a blank sequence (BS) was added. The genes targeted to peroxisome by adding the peroxisomal targeting signal (*per1* and *per2*) [2].



Additional file Figure S9 Sketch map of plasmid construction for screening fatty acid/acyl-CoA responsive promoter. Briefly, the fragment eGFP was first inserted into an empty plasmid pYX312 by enzymatic digestion with *Hind* III and *Sal* I and ligation, among which strong constitutive promoter $P_{UAS-TDH3}$ was adopted as positive control, generating pSc01. Subsequently, pSc01 was digested by *Kpn* I and *Hind* III, and the promoter fragments were inserted to obtain a series of plasmids, pSc02~pSc21.

Table S1 Promoter candidates that respond to fatty acid

Gene	Protein	Maximum RPKM	Fold change
<i>SPG1</i>	Protein required for high temperature survival during stationary phase	7500	10
<i>ADH6</i>	NADP-dependent alcohol dehydrogenase	20000	40
<i>ARI1</i>	Carbonyl reductase	1300	32.5
<i>OYE3</i>	NADPH dehydrogenase	20000	35
<i>GAP1</i>	Amino acid permease	22000	30
<i>INO1</i>	Inositol-3-phosphate synthase	19000	15
<i>DET1</i>	Acid phosphatase	3300	5.3
<i>SIT1</i>	Siderophore transporter	4800	17
<i>ASC1</i>	Guanine nucleotide-binding protein subunit beta	10000	40
<i>CIS3</i>	Mannose-containing glycoprotein	6500	30

Note: promoters were screened from CEN.PK 113-11C vs CEN.PK 113-11C in oleate, and CEN.PK 113-11C vs YJZ121 in Figure 3A

Table S2 Promoter candidates that respond to fatty acyl-CoA

Gene	Protein	Maximum RPKM	Fold change
<i>DAL5</i>	Allantoate per2mease	10260	16
<i>MEP2</i>	Ammonium per2mease	32193	12.5
<i>GDH3</i>	NADP(+)-dependent glutamate dehydrogenase	14000	13
<i>CWP1</i>	Cell wall mannoprotein	6246	6.5
<i>BDH2</i>	Medium-chain alcohol dehydrogenase	19574	16
<i>STE3</i>	Receptor for a factor pheromone	1840	33
<i>PDR5</i>	ATP-binding cassette multidrug transporter	27453	11
<i>FIT2</i>	Mannoprotein	5570	24
<i>HSP31</i>	Glutathione-independent methylglyoxalase	10277	28
<i>AAD6</i>	Aryl-alcohol dehydrogenase	10000	35

Note: promoters were screened from CEN.PK 113-11C vs JV03, and JV03 vs JV03 in oleate in Figure 3A.

Table S3 Strains used in this study

Strains	Genotype	Resource
DH5 α	<i>F</i> -, ϕ 80d/ <i>lacZAM15</i> , Δ (<i>lacZYA-argF</i>)U169, <i>deoR</i> , <i>recA1</i> , <i>endA1</i> , <i>hsdR17</i> (<i>rk</i> -, <i>mk</i> +), <i>phoA</i> , <i>supE44</i> , λ -, <i>thi</i> -1, <i>gyrA96</i> , <i>relA1</i>	Takara
CEN.PK 113-11C	wild-type, <i>MATa</i> ; <i>ura3-52</i> ; <i>his3Δ1</i>	K ötter, University of Frankfurt, Germany
GN15	<i>MATa</i> ; <i>MAL2-8c</i> ; <i>SUC2</i> ; <i>his3Δ1</i> ; <i>ura3-52</i> ; <i>XI-5::Cas9</i> ; <i>gal80Δ</i> ; <i>hfd1Δ</i>	This study
GNFOH2	<i>MATa</i> ; <i>MAL2-8c</i> ; <i>SUC2</i> ; <i>his3Δ1</i> ; <i>ura3-52</i> ; <i>XI-5::Cas9</i> ; <i>gal80Δ</i> ; <i>hfd1Δ</i> ; pESC	This study
GNFOH3	<i>MATa</i> ; <i>MAL2-8c</i> ; <i>SUC2</i> ; <i>his3Δ1</i> ; <i>ura3-52</i> ; <i>XI-5::Cas9</i> ; <i>gal80Δ</i> ; <i>hfd1Δ</i> ; pMaFAR1	This study
GNFOH4	<i>MATa</i> ; <i>MAL2-8c</i> ; <i>SUC2</i> ; <i>his3Δ1</i> ; <i>ura3-52</i> ; <i>XI-5::Cas9</i> ; <i>gal80Δ</i> ; <i>hfd1Δ</i> ; pMaMaqu2220	This study
GNFOH5	<i>MATa</i> ; <i>MAL2-8c</i> ; <i>SUC2</i> ; <i>his3Δ1</i> ; <i>ura3-52</i> ; <i>XI-5::Cas9</i> ; <i>gal80Δ</i> ; <i>hfd1Δ</i> ; pMmFAR1	This study
GNFOH6	<i>MATa</i> ; <i>MAL2-8c</i> ; <i>SUC2</i> ; <i>his3Δ1</i> ; <i>ura3-52</i> ; <i>XI-5::Cas9</i> ; <i>gal80Δ</i> ; <i>hfd1Δ</i> ; pTaFAR1	This study
YJZ121	<i>MATa</i> ; <i>ura3-52</i> ; <i>his3Δ1</i> <i>hfd1Δ</i> ; <i>faa1Δ</i> ; <i>faa4Δ</i> <i>gal80Δ</i> ; <i>XI-5:: (P_{TEF1}-Cas9-T_{CYC1})</i>	This study
YJ-FOH1	<i>MATa</i> ; <i>ura3-52</i> ; <i>his3Δ1</i> <i>hfd1Δ</i> ; <i>faa1Δ</i> ; <i>faa4Δ</i> <i>gal80Δ</i> ; <i>XI-5:: (P_{TEF1}-Cas9-T_{CYC1})</i> ; pYX212-(P _{TPI-npgA-T_{FBA1}})+(P _{TDH3-MmCAR-T_{ADH1}})+(P _{HXT7-ADH5-T_{CYC1}})+(P _{TEF1-FacoAR-T_{pyX212}})	This study
YJ-FOH2	<i>MATa</i> ; <i>ura3-52</i> ; <i>his3Δ1</i> <i>hfd1Δ</i> ; <i>faa1Δ</i> ; <i>faa4Δ</i> <i>gal80Δ</i> ; <i>XI-5:: (P_{TEF1}-Cas9-T_{CYC1})</i> ; pYX212-(P _{TPI-npgAper1-T_{FBA1}})+(P _{TDH3-MmCARper2-T_{ADH1}})+(P _{HXT7-ADH5per1-T_{CYC1}})+(P _{TEF1-FacoARper2-T_{pyX212}})	This study
YJ-FOH3	<i>MATa</i> ; <i>ura3-52</i> ; <i>his3Δ1</i> <i>hfd1Δ</i> ; <i>faa1Δ</i> ; <i>faa4Δ</i> <i>gal80Δ</i> ; <i>XI-5:: (P_{TEF1}-Cas9-T_{CYC1})</i> ; pYX212-(P _{GAL3-npgA-T_{FBA1}})+(P _{GAL7-MmCAR-T_{ADH1}})+(P _{GAL10-ADH5-T_{CYC1}})+(P _{GAL1-FacoAR-T_{pyX212}})	This study
YJ-FOH4	<i>MATa</i> ; <i>ura3-52</i> ; <i>his3Δ1</i> <i>hfd1Δ</i> ; <i>faa1Δ</i> ; <i>faa4Δ</i> <i>gal80Δ</i> ; <i>XI-5:: (P_{TEF1}-Cas9-T_{CYC1})</i> ; pYX212-(P _{GAL3-npgAper1-T_{FBA1}})+(P _{GAL7-MmCARper2-T_{ADH1}})+(P _{GAL10-ADH5per1-T_{CYC1}})+(P _{GAL1-FacoARper2-T_{pyX212}})	This study
JQFOH21	<i>MATa</i> ; <i>ura3-52</i> ; <i>his3Δ1</i> <i>hfd1Δ</i> ; <i>faa1Δ</i> ; <i>faa4Δ</i> <i>gal80Δ</i> ; <i>XI-5:: (P_{TEF1}-Cas9-T_{CYC1})</i> ; <i>ura3Δ:: (P_{HXT6-FATP1-T_{ADH1}})=YJZ121</i> <i>ura3Δ:: (P_{HXT6-FATP1-T_{ADH1}})</i>	This study
JQFOH24	<i>MATa</i> ; <i>ura3-52</i> ; <i>his3Δ1</i> <i>hfd1Δ</i> ; <i>faa1Δ</i> ; <i>faa4Δ</i> <i>gal80Δ</i> ; <i>XI-5:: (P_{TEF1}-Cas9-T_{CYC1})</i> ; <i>ura3Δ:: (P_{HXT6-FATP1-T_{ADH1}})</i> ; pAOH22= JQFOH21+ pAOH22	This study
JQFOH28	<i>MATa</i> ; <i>ura3-52</i> ; <i>his3Δ1</i> <i>hfd1Δ</i> ; <i>faa1Δ</i> ; <i>faa4Δ</i> <i>gal80Δ</i> ; <i>XI-5:: (P_{TEF1}-Cas9-T_{CYC1})</i> ; <i>ura3Δ:: (P_{HXT6-FATP1-T_{ADH1}})</i> ; <i>his3Δ1::HIS3-(P_{ADH2-PEX28-T_{HIS3}})= JQFOH21</i> ; <i>his3Δ1::HIS3+(P_{ADH2-PEX28-T_{HIS3}})</i>	This study
JQFOH31	<i>MATa</i> ; <i>ura3-52</i> ; <i>his3Δ1</i> <i>hfd1Δ</i> ; <i>faa1Δ</i> ; <i>faa4Δ</i> <i>gal80Δ</i> ; <i>XI-5:: (P_{TEF1}-Cas9-T_{CYC1})</i> ; <i>ura3Δ:: (P_{HXT6-FATP1-T_{ADH1}})</i> ; <i>his3Δ1::HIS3-(P_{ADH2-PEX7-T_{PRM9}})</i> ; pAOH22= JQFOH21; <i>his3Δ1::HIS3+(P_{ADH2-PEX7-T_{PRM9}})</i> ; pAOH22	This study

JQFOH33	<i>MATa; ura3-52; his3Δ1 hfd1Δ; faa1Δ; faa4Δ gal80Δ; XI-5:: (P_{TEF1}-Cas9-T_{CYC1}); ura3Δ:: (P_{HXT6}-FATP1-T_{ADH1}); his3Δ1::HIS3+(P_{ADH2}-PEX28-T_{HIS3}); pAOH22= JQFOH28+pAOH22</i>	This study
JQFOH35	<i>MATa; ura3-52; his3Δ1 hfd1Δ; faa1Δ; faa4Δ gal80Δ; XI-5:: (P_{TEF1}-Cas9-T_{CYC1}); ura3Δ:: (P_{HXT6}-FATP1-T_{ADH1}); his3Δ1::HIS3-(P_{ADH2}-PEX7-T_{PRM9})-(P_{ADH2}-PEX28-T_{HIS3}); pAOH22= JQFOH24; his3Δ1::HIS3+(P_{ADH2}-PEX7-T_{PRM9})+(P_{ADH2}-PEX28-T_{HIS3})</i>	This study
JV03	<i>MATa; MAL2-8c; SUC2; ura3-52; HIS3; are1Δ; dgalΔ; are2Δ; lro1Δ; pox1Δ</i>	Valle-Rodríguez et al., 2014[1]
Y&Z036	<i>MATa; MAL2-8c; SUC2; hfd1Δ; pox1Δ; faa1Δ; faa4Δ; gal80Δ; gal1Δ; gal7Δ; his3Δ::HIS3+(P_{TPI}-MmACL-T_{FBA1})+(P_{TDH3}-RtME-T_{CYC1})+(P_{HXT7}-MDH3-T_{TDH2})+(P_{PGK1}-CTP1-T_{ADH1})+(P_{TEF1}-tesA-T_{HIS3}); ura3Δ::(P_{TPI1}-RtFAS1-T_{FBA1})+(P_{TEF1}-RtFAS2-T_{CYC1})+amdSym; XI-5::P_{TEF1}-Cas9-T_{CYC1}; acc1::P_{TEF1}-ACC1; pyc1::P_{TEF1}-PYC1; XI-4:: (P_{TPI1}-MPC1)+(P_{PGK1}-MPC3-T_{DIT1}); X-2::(P_{GAL1}-AnACLa-T_{CYC1})+(P_{GAL10}-AnACLa-T_{ADH1}); gal10Δ::(P_{TPI1}-RtCIT1-T_{FBA1})+(P_{TDH3}-IDP2-T_{CYC1})+(P_{TEF1}-YHM2-T_{GAL1}); pgi1Δ::(P_{COX9}-PGI1)+(P_{TDH3}-GND1-T_{CYC1})+(P_{HXT7}-TKL1-T_{TDH2})+(P_{PGK1}-TAL1-T_{ADH1})+(P_{TEF1}-ZWF1); idh2Δ:: P_{GSY1}-IDH2</i>	Yu et al., 2018[3]
SCX02	<i>MATa; MAL2-8c; SUC2; hfd1Δ; pox1Δ; faa1Δ; faa4Δ; gal80Δ; gal1Δ; gal7Δ; his3Δ::(P_{TPI}-MmACL-T_{FBA1})+(P_{TDH3}-RtME-T_{CYC1})+(P_{HXT7}-MDH3-T_{TDH2})+(P_{PGK1}-CTP1-T_{ADH1}); ura3Δ::(P_{TPI1}-RtFAS1-T_{FBA1})+(P_{TEF1}-RtFAS2-T_{CYC1})+amdSym; XI-5::P_{TEF1}-Cas9-T_{CYC1}; acc1::P_{TEF1}-ACC1; pyc1::P_{TEF1}-PYC1; XI-4:: (P_{TPI1}-MPC1)+(P_{PGK1}-MPC3-T_{DIT1}); X-2::(P_{GAL1}-AnACLa-T_{CYC1})+(P_{GAL10}-AnACLa-T_{ADH1}); gal10Δ::(P_{TPI1}-RtCIT1-T_{FBA1})+(P_{TDH3}-IDP2-T_{CYC1})+(P_{TEF1}-YHM2-T_{GAL1}); pgi1Δ::(P_{COX9}-PGI1)+(P_{TDH3}-GND1-T_{CYC1})+(P_{HXT7}-TKL1-T_{TDH2})+(P_{PGK1}-TAL1-T_{ADH1})+(P_{TEF1}-ZWF1); idh2Δ:: P_{GSY1}-IDH2=Y&Z036+(his3Δ; tesAΔ)</i>	Cao et al., 2023[4]
PC04	<i>MATa; MAL2-8c; SUC2; hfd1Δ; pox1Δ; gal80Δ; gal1Δ; gal7Δ; his3Δ::(P_{TPI}-MmACL-T_{FBA1})+(P_{TDH3}-RtME-T_{CYC1})+(P_{HXT7}-MDH3-T_{TDH2})+(P_{PGK1}-CTP1-T_{ADH1}); ura3Δ::(P_{TPI1}-RtFAS1-T_{FBA1})+(P_{TEF1}-RtFAS2-T_{CYC1})+amdSym; XI-5::P_{TEF1}-Cas9-T_{CYC1}; acc1::P_{TEF1}-ACC1; pyc1::P_{TEF1}-PYC1; XI-4:: (P_{TPI1}-MPC1)+(P_{PGK1}-MPC3-T_{DIT1}); X-2::(P_{GAL1}-AnACLa-T_{CYC1})+(P_{GAL10}-AnACLa-T_{ADH1}); gal10Δ::(P_{TPI1}-RtCIT1-T_{FBA1})+(P_{TDH3}-IDP2-T_{CYC1})+(P_{TEF1}-YHM2-T_{GAL1}); pgi1Δ::(P_{COX9}-PGI1)+(P_{TDH3}-GND1-T_{CYC1})+(P_{HXT7}-TKL1-T_{TDH2})+(P_{PGK1}-TAL1-T_{ADH1})+(P_{TEF1}-ZWF1); idh2Δ:: P_{GSY1}-IDH2= SCX02+faa1Δ::FAA1; faa4Δ::FAA4;</i>	This study
PC06	<i>MATa; MAL2-8c; SUC2; hfd1Δ; gal80Δ; gal1Δ; gal7Δ; his3Δ:: (P_{TPI}-MmACL-T_{FBA1})+(P_{TDH3}-RtME-T_{CYC1})+(P_{HXT7}-MDH3-T_{TDH2})+(P_{PGK1}-CTP1-T_{ADH1}); ura3Δ::(P_{TPI1}-RtFAS1-T_{FBA1})+(P_{TEF1}-RtFAS2-T_{CYC1})+amdSym; XI-5::P_{TEF1}-Cas9-T_{CYC1}; acc1::P_{TEF1}-ACC1; pyc1::P_{TEF1}-PYC1; XI-4:: (P_{TPI1}-MPC1)+(P_{PGK1}-MPC3-T_{DIT1}); X-2::(P_{GAL1}-AnACLa-T_{CYC1})+(P_{GAL10}-AnACLa-T_{ADH1}); gal10Δ::(P_{TPI1}-RtCIT1-T_{FBA1})+(P_{TDH3}-IDP2-T_{CYC1})+(P_{TEF1}-YHM2-</i>	This study

GN33	T_{GAL1}); $pgi1\Delta::(P_{COX9-PGI1})+(P_{TDH3-GND1-T_{CYC1}})+(P_{tHXT7-TKL1-T_{TDH2}})+(P_{PGK1-TAL1-T_{ADH1}})+(P_{TEF1-ZWF1})$; $idh2\Delta::P_{GSY1-IDH2}=PC04+pox1\Delta::POX1$; <i>MATa</i>; <i>MAL2-8c</i>; <i>SUC2</i>; <i>hfd1Δ</i>; <i>gal80Δ</i>; <i>gal1Δ</i>; <i>gal7Δ</i>; <i>his3Δ::(HIS3-T_{ENO2})</i>)+(P_{ADH2-PEX28-T_{HIS3}}); <i>ura3Δ::(P_{TPII-RtFAS1-T_{FBA1}})</i>+(P_{TEF1-RtFAS2-T_{CYC1}})+<i>amdSym</i>; <i>X1-5::P_{TEF1-Cas9-T_{CYC1}}</i>; <i>acc1::P_{TEF1-ACC1}</i>; <i>pyc1::P_{TEF1-PYC1}</i>; <i>XI-4::(P_{TPII-MPC1})</i>)+(P_{PGK1-MPC3-T_{DIT1}}); <i>X-2::(P_{GAL1-AnACLa-T_{CYC1}})</i>)+(P_{GAL10-AnACLB-T_{ADH1}}); <i>gal10Δ::(P_{TPII-RtCIT1-T_{FBA1}})</i>)+(P_{TDH3-IDP2-T_{CYC1}})+(P_{TEF1-YHM2-T_{GAL1}}); $pgi1\Delta::(P_{COX9-PGI1})+(P_{TDH3-GND1-T_{CYC1}})+(P_{tHXT7-TKL1-T_{TDH2}})+(P_{PGK1-TAL1-T_{ADH1}})+(P_{TEF1-ZWF1})$; $idh2\Delta::P_{GSY1-IDH2}$ <i>MATa</i>; <i>MAL2-8c</i>; <i>SUC2</i>; <i>hfd1Δ</i>; <i>gal80Δ</i>; <i>gal1Δ</i>; <i>gal7Δ</i>; <i>his3Δ::(HIS3-T_{ENO2})</i>)+(P_{ADH2-PEX28-T_{HIS3}}); <i>ura3Δ::(P_{TPII-RtFAS1-T_{FBA1}})</i>+(P_{TEF1-RtFAS2-T_{CYC1}})+<i>amdSym</i>; <i>X1-5::P_{TEF1-Cas9-T_{CYC1}}</i>; <i>acc1::P_{TEF1-ACC1}</i>; <i>pyc1::P_{TEF1-PYC1}</i>; <i>XI-4::(P_{TPII-MPC1})</i>)+(P_{PGK1-MPC3-T_{DIT1}}); <i>X-2::(P_{GAL1-AnACLa-T_{CYC1}})</i>)+(P_{GAL10-AnACLB-T_{ADH1}}); <i>gal10Δ::(P_{TPII-RtCIT1-T_{FBA1}})</i>)+(P_{TDH3-IDP2-T_{CYC1}})+(P_{TEF1-YHM2-T_{GAL1}}); $pgi1\Delta::(P_{COX9-PGI1})+(P_{TDH3-GND1-T_{CYC1}})+(P_{tHXT7-TKL1-T_{TDH2}})+(P_{PGK1-TAL1-T_{ADH1}})+(P_{TEF1-ZWF1})$; $idh2\Delta::P_{GSY1-IDH2}$; <i>VII-2::P_{AAD6-eGFP-T_{ADH1}}</i> = GN33+<i>VII-2::P_{AAD6-eGFP-T_{ADH1}}</i>	This study
GN33-AAD6	<i>MATa</i>; <i>MAL2-8c</i>; <i>SUC2</i>; <i>hfd1Δ</i>; <i>gal80Δ</i>; <i>gal1Δ</i>; <i>gal7Δ</i>; <i>his3Δ::(HIS3-T_{ENO2})</i>)+(P_{ADH2-PEX28-T_{HIS3}}); <i>ura3Δ::(P_{TPII-RtFAS1-T_{FBA1}})</i>+(P_{TEF1-RtFAS2-T_{CYC1}})+<i>amdSym</i>; <i>X1-5::P_{TEF1-Cas9-T_{CYC1}}</i>; <i>acc1::P_{TEF1-ACC1}</i>; <i>pyc1::P_{TEF1-PYC1}</i>; <i>XI-4::(P_{TPII-MPC1})</i>)+(P_{PGK1-MPC3-T_{DIT1}}); <i>X-2::(P_{GAL1-AnACLa-T_{CYC1}})</i>)+(P_{GAL10-AnACLB-T_{ADH1}}); <i>gal10Δ::(P_{TPII-RtCIT1-T_{FBA1}})</i>)+(P_{TDH3-IDP2-T_{CYC1}})+(P_{TEF1-YHM2-T_{GAL1}}); $pgi1\Delta::(P_{COX9-PGI1})+(P_{TDH3-GND1-T_{CYC1}})+(P_{tHXT7-TKL1-T_{TDH2}})+(P_{PGK1-TAL1-T_{ADH1}})+(P_{TEF1-ZWF1})$; $idh2\Delta::P_{GSY1-IDH2}$; <i>VII-2::P_{AAD6-eGFP-T_{ADH1}}</i> = GN33+<i>VII-2::P_{AAD6-eGFP-T_{ADH1}}</i>	This study
GN33-ADH6	<i>MATa</i>; <i>MAL2-8c</i>; <i>SUC2</i>; <i>hfd1Δ</i>; <i>gal80Δ</i>; <i>gal1Δ</i>; <i>gal7Δ</i>; <i>his3Δ::(HIS3-T_{ENO2})</i>)+(P_{ADH2-PEX28-T_{HIS3}}); <i>ura3Δ::(P_{TPII-RtFAS1-T_{FBA1}})</i>+(P_{TEF1-RtFAS2-T_{CYC1}})+<i>amdSym</i>; <i>X1-5::P_{TEF1-Cas9-T_{CYC1}}</i>; <i>acc1::P_{TEF1-ACC1}</i>; <i>pyc1::P_{TEF1-PYC1}</i>; <i>XI-4::(P_{TPII-MPC1})</i>)+(P_{PGK1-MPC3-T_{DIT1}}); <i>X-2::(P_{GAL1-AnACLa-T_{CYC1}})</i>)+(P_{GAL10-AnACLB-T_{ADH1}}); <i>gal10Δ::(P_{TPII-RtCIT1-T_{FBA1}})</i>)+(P_{TDH3-IDP2-T_{CYC1}})+(P_{TEF1-YHM2-T_{GAL1}}); $pgi1\Delta::(P_{COX9-PGI1})+(P_{TDH3-GND1-T_{CYC1}})+(P_{tHXT7-TKL1-T_{TDH2}})+(P_{PGK1-TAL1-T_{ADH1}})+(P_{TEF1-ZWF1})$; $idh2\Delta::P_{GSY1-IDH2}$; <i>VII-2::P_{ADH6-eGFP-T_{ADH1}}</i> = GN33+<i>VII-2::P_{ADH6-eGFP-T_{ADH1}}</i>	This study
GN33-BDH2	<i>MATa</i>; <i>MAL2-8c</i>; <i>SUC2</i>; <i>hfd1Δ</i>; <i>gal80Δ</i>; <i>gal1Δ</i>; <i>gal7Δ</i>; <i>his3Δ::(HIS3-T_{ENO2})</i>)+(P_{ADH2-PEX28-T_{HIS3}}); <i>ura3Δ::(P_{TPII-RtFAS1-T_{FBA1}})</i>+(P_{TEF1-RtFAS2-T_{CYC1}})+<i>amdSym</i>; <i>X1-5::P_{TEF1-Cas9-T_{CYC1}}</i>; <i>acc1::P_{TEF1-ACC1}</i>; <i>pyc1::P_{TEF1-PYC1}</i>; <i>XI-4::(P_{TPII-MPC1})</i>)+(P_{PGK1-MPC3-T_{DIT1}}); <i>X-2::(P_{GAL1-AnACLa-T_{CYC1}})</i>)+(P_{GAL10-AnACLB-T_{ADH1}}); <i>gal10Δ::(P_{TPII-RtCIT1-T_{FBA1}})</i>)+(P_{TDH3-IDP2-T_{CYC1}})+(P_{TEF1-YHM2-T_{GAL1}}); $pgi1\Delta::(P_{COX9-PGI1})+(P_{TDH3-GND1-T_{CYC1}})+(P_{tHXT7-TKL1-T_{TDH2}})+(P_{PGK1-TAL1-T_{ADH1}})+(P_{TEF1-ZWF1})$; $idh2\Delta::P_{GSY1-IDH2}$; <i>VII-2::P_{BDH2-eGFP-T_{ADH1}}</i> = GN33+<i>VII-2::P_{BDH2-eGFP-T_{ADH1}}</i>	This study
GN33-STE3	<i>MATa</i>; <i>MAL2-8c</i>; <i>SUC2</i>; <i>hfd1Δ</i>; <i>gal80Δ</i>; <i>gal1Δ</i>; <i>gal7Δ</i>; <i>his3Δ::(HIS3-T_{ENO2})</i>)+(P_{ADH2-PEX28-T_{HIS3}}); <i>ura3Δ::(P_{TPII-RtFAS1-T_{FBA1}})</i>+(P_{TEF1-RtFAS2-T_{CYC1}})+<i>amdSym</i>; <i>X1-5::P_{TEF1-Cas9-T_{CYC1}}</i>; <i>acc1::P_{TEF1-ACC1}</i>; <i>pyc1::P_{TEF1-PYC1}</i>; <i>XI-4::(P_{TPII-MPC1})</i>)+(P_{PGK1-MPC3-T_{DIT1}}); <i>X-2::(P_{GAL1-AnACLa-T_{CYC1}})</i>)+(P_{GAL10-AnACLB-T_{ADH1}}); <i>gal10Δ::(P_{TPII-RtCIT1-T_{FBA1}})</i>)+(P_{TDH3-IDP2-T_{CYC1}})+(P_{TEF1-YHM2-T_{GAL1}}); $pgi1\Delta::(P_{COX9-PGI1})+(P_{TDH3-GND1-T_{CYC1}})+(P_{tHXT7-TKL1-T_{TDH2}})+(P_{PGK1-TAL1-T_{ADH1}})+(P_{TEF1-ZWF1})$; $idh2\Delta::P_{GSY1-IDH2}$; <i>VII-2::P_{STE3-eGFP-T_{ADH1}}</i> = GN33+<i>VII-2::P_{STE3-eGFP-T_{ADH1}}</i>	This study
GN33-	<i>MATa</i>; <i>MAL2-8c</i>; <i>SUC2</i>; <i>hfd1Δ</i>; <i>gal80Δ</i>; <i>gal1Δ</i>; <i>gal7Δ</i>; <i>his3Δ::(HIS3-T_{ENO2})</i>)+(P_{ADH2-PEX28-T_{HIS3}}); <i>ura3Δ::(P_{TPII-RtFAS1-T_{FBA1}})</i>+(P_{TEF1-RtFAS2-T_{CYC1}})+<i>amdSym</i>; <i>X1-5::P_{TEF1-Cas9-T_{CYC1}}</i>; <i>acc1::P_{TEF1-ACC1}</i>; <i>pyc1::P_{TEF1-PYC1}</i>; <i>XI-</i>	

GAL1,10	T_{ENO2})+(P_{ADH2}-PEX28-T_{HIS3}); <i>ura3Δ</i>::(P_{TPII}-RtFAS1-T_{FBA1})+(P_{TEF1}-RtFAS2-T_{CYC1})+<i>amdSym</i>; <i>X1-5</i>::P_{TEF1}-Cas9-T_{CYC1}; <i>acc1</i>::P_{TEF1}-ACC1; <i>pyc1</i>::P_{TEF1}-PYC1; <i>XI-4</i>::(P_{TPII}-MPC1)+(P_{PGK1}-MPC3-T_{DIT1}); <i>X-2</i>::(P_{GAL1}-AnACLa-T_{CYC1})+(P_{GAL10}-AnACLb-T_{ADH1}); <i>gal10Δ</i>::(P_{TPII}-RtCIT1-T_{FBA1})+(P_{TDH3}-IDP2-T_{CYC1})+(P_{TEF1}-YHM2-T_{GAL1}); <i>pgi1Δ</i>::(P_{COX9}-PGI1)+(P_{TDH3}-GND1-T_{CYC1})+(P_{IHX7}-TKL1-T_{TDH2})+(P_{PGK1}-TAL1-T_{ADH1})+(P_{TEF1}-ZWF1); <i>idh2Δ</i>::P_{GSY1}-IDH2; <i>VII-2</i>::P_{GAL1,10}-eGFP-T_{ADH1}=GN33+<i>VII-2</i>::P_{GAL1,10}-eGFP-T_{ADH1} <i>MATa</i>; <i>MAL2-8c</i>; <i>SUC2</i>; <i>hfd1Δ</i>; <i>gal80Δ</i>; <i>gal1Δ</i>; <i>gal7Δ</i>; <i>his3Δ</i>::(HIS3-T_{ENO2})+(P_{ADH2}-PEX28-T_{HIS3}); <i>ura3Δ</i>::(P_{TPII}-RtFAS1-T_{FBA1})+(P_{TEF1}-RtFAS2-T_{CYC1})+<i>amdSym</i>; <i>X1-5</i>::P_{TEF1}-Cas9-T_{CYC1}; <i>acc1</i>::P_{TEF1}-ACC1; <i>pyc1</i>::P_{TEF1}-PYC1; <i>XI-4</i>::(P_{TPII}-MPC1)+(P_{PGK1}-MPC3-T_{DIT1}); <i>X-2</i>::(P_{GAL1}-AnACLa-T_{CYC1})+(P_{GAL10}-AnACLb-T_{ADH1}); <i>gal10Δ</i>::(P_{TPII}-RtCIT1-T_{FBA1})+(P_{TDH3}-IDP2-T_{CYC1})+(P_{TEF1}-YHM2-T_{GAL1}); <i>pgi1Δ</i>::(P_{COX9}-PGI1)+(P_{TDH3}-GND1-T_{CYC1})+(P_{IHX7}-TKL1-T_{TDH2})+(P_{PGK1}-TAL1-T_{ADH1})+(P_{TEF1}-ZWF1); <i>idh2Δ</i>::P_{GSY1}-IDH2; <i>XII-4</i>::(T_{ADH1}-<i>per1ADH5</i>-P_{GAL1,10}-<i>per2MaFAR1</i>-T_{CYC1})=GN33+<i>XII-4</i>::(T_{ADH1}-<i>per1ADH5</i>-P_{GAL1,10}-<i>per2MaFAR1</i>-T_{CYC1}) <i>MATa</i>; <i>MAL2-8c</i>; <i>SUC2</i>; <i>hfd1Δ</i>; <i>gal80Δ</i>; <i>gal1Δ</i>; <i>gal7Δ</i>; <i>his3Δ</i>::(HIS3-T_{ENO2})+(P_{ADH2}-PEX28-T_{HIS3}); <i>ura3Δ</i>::(P_{TPII}-RtFAS1-T_{FBA1})+(P_{TEF1}-RtFAS2-T_{CYC1})+<i>amdSym</i>; <i>X1-5</i>::P_{TEF1}-Cas9-T_{CYC1}; <i>acc1</i>::P_{TEF1}-ACC1; <i>pyc1</i>::P_{TEF1}-PYC1; <i>XI-4</i>::(P_{TPII}-MPC1)+(P_{PGK1}-MPC3-T_{DIT1}); <i>X-2</i>::(P_{GAL1}-AnACLa-T_{CYC1})+(P_{GAL10}-AnACLb-T_{ADH1}); <i>gal10Δ</i>::(P_{TPII}-RtCIT1-T_{FBA1})+(P_{TDH3}-IDP2-T_{CYC1})+(P_{TEF1}-YHM2-T_{GAL1}); <i>pgi1Δ</i>::(P_{COX9}-PGI1)+(P_{TDH3}-GND1-T_{CYC1})+(P_{IHX7}-TKL1-T_{TDH2})+(P_{PGK1}-TAL1-T_{ADH1})+(P_{TEF1}-ZWF1); <i>idh2Δ</i>::P_{GSY1}-IDH2; <i>XII-4</i>::(P_{AAD6}-<i>per1ADH5</i>-T_{ADH1})+(P_{AAD6}-<i>per2MaFAR1</i>-T_{CYC1})=GN33+<i>XII-4</i>::(P_{AAD6}-<i>per1ADH5</i>-T_{ADH1})+(P_{AAD6}-<i>per2MaFAR1</i>-T_{CYC1}) <i>MATa</i>; <i>MAL2-8c</i>; <i>SUC2</i>; <i>hfd1Δ</i>; <i>gal80Δ</i>; <i>gal1Δ</i>; <i>gal7Δ</i>; <i>his3Δ</i>::(HIS3-T_{ENO2})+(P_{ADH2}-PEX28-T_{HIS3}); <i>ura3Δ</i>::(P_{TPII}-RtFAS1-T_{FBA1})+(P_{TEF1}-RtFAS2-T_{CYC1})+<i>amdSym</i>; <i>X1-5</i>::P_{TEF1}-Cas9-T_{CYC1}; <i>acc1</i>::P_{TEF1}-ACC1; <i>pyc1</i>::P_{TEF1}-PYC1; <i>XI-4</i>::(P_{TPII}-MPC1)+(P_{PGK1}-MPC3-T_{DIT1}); <i>X-2</i>::(P_{GAL1}-AnACLa-T_{CYC1})+(P_{GAL10}-AnACLb-T_{ADH1}); <i>gal10Δ</i>::(P_{TPII}-RtCIT1-T_{FBA1})+(P_{TDH3}-IDP2-T_{CYC1})+(P_{TEF1}-YHM2-T_{GAL1}); <i>pgi1Δ</i>::(P_{COX9}-PGI1)+(P_{TDH3}-GND1-T_{CYC1})+(P_{IHX7}-TKL1-T_{TDH2})+(P_{PGK1}-TAL1-T_{ADH1})+(P_{TEF1}-ZWF1); <i>idh2Δ</i>::P_{GSY1}-IDH2; <i>XII-4</i>::(P_{ADH6}-<i>per1ADH5</i>-T_{ADH1})+(P_{ADH6}-<i>per2MaFAR1</i>-T_{CYC1})=GN33+<i>XII-4</i>::(P_{ADH6}-<i>per1ADH5</i>-T_{ADH1})+(P_{ADH6}-<i>per2MaFAR1</i>-T_{CYC1}) <i>MATa</i>; <i>MAL2-8c</i>; <i>SUC2</i>; <i>hfd1Δ</i>; <i>gal80Δ</i>; <i>gal1Δ</i>; <i>gal7Δ</i>; <i>his3Δ</i>::(HIS3-T_{ENO2})+(P_{ADH2}-PEX28-T_{HIS3}); <i>ura3Δ</i>::(P_{TPII}-RtFAS1-T_{FBA1})+(P_{TEF1}-RtFAS2-T_{CYC1})+<i>amdSym</i>; <i>X1-5</i>::P_{TEF1}-Cas9-T_{CYC1}; <i>acc1</i>::P_{TEF1}-ACC1; <i>pyc1</i>::P_{TEF1}-PYC1; <i>XI-4</i>::(P_{TPII}-MPC1)+(P_{PGK1}-MPC3-T_{DIT1}); <i>X-2</i>::(P_{GAL1}-AnACLa-T_{CYC1})+(P_{GAL10}-AnACLb-T_{ADH1}); <i>gal10Δ</i>::(P_{TPII}-RtCIT1-T_{FBA1})+(P_{TDH3}-IDP2-T_{CYC1})+(P_{TEF1}-YHM2-T_{GAL1}); <i>pgi1Δ</i>::(P_{COX9}-PGI1)+(P_{TDH3}-GND1-T_{CYC1})+(P_{IHX7}-TKL1-T_{TDH2})+(P_{PGK1}-TAL1-T_{ADH1})+(P_{TEF1}-ZWF1); <i>idh2Δ</i>::P_{GSY1}-IDH2; <i>XII-4</i>::(P_{BDH2}-<i>per1ADH5</i>-T_{ADH1})+(P_{BDH2}-<i>per2MaFAR1</i>-T_{CYC1})=GN33+<i>XII-4</i>::(P_{BDH2}-<i>per1ADH5</i>-T_{ADH1})+(P_{BDH2}-<i>per2MaFAR1</i>-T_{CYC1}) <i>MATa</i>; <i>MAL2-8c</i>; <i>SUC2</i>; <i>hfd1Δ</i>; <i>gal80Δ</i>; <i>gal1Δ</i>; <i>gal7Δ</i>; <i>his3Δ</i>::(HIS3-T_{ENO2})+(P_{ADH2}-PEX28-T_{HIS3}); <i>ura3Δ</i>::(P_{TPII}-RtFAS1-T_{FBA1})+(P_{TEF1}-RtFAS2-T_{CYC1})+<i>amdSym</i>; <i>X1-5</i>::P_{TEF1}-Cas9-T_{CYC1}; <i>acc1</i>::P_{TEF1}-ACC1; <i>pyc1</i>::P_{TEF1}-PYC1; <i>XI-4</i>::(P_{TPII}-MPC1)+(P_{PGK1}-MPC3-T_{DIT1}); <i>X-2</i>::(P_{GAL1}-AnACLa-T_{CYC1})+(P_{GAL10}-AnACLb-T_{ADH1}); <i>gal10Δ</i>::(P_{TPII}-RtCIT1-T_{FBA1})+(P_{TDH3}-IDP2-T_{CYC1})+(P_{TEF1}-YHM2-T_{GAL1}); <i>pgi1Δ</i>::(P_{COX9}-PGI1)+(P_{TDH3}-GND1-T_{CYC1})+(P_{IHX7}-TKL1-T_{TDH2})+(P_{PGK1}-TAL1-T_{ADH1})+(P_{TEF1}-ZWF1); <i>idh2Δ</i>::P_{GSY1}-IDH2; <i>XII-4</i>::(P_{STE3}-<i>per1ADH5</i>-T_{ADH1})+(P_{STE3}-<i>per2MaFAR1</i>
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GNFOH81 *MATa; MAL2-8c; SUC2; hfd1Δ; gal80Δ; gal1Δ; gal7Δ; his3Δ:: (HIS3-T_{ENO2}) + (P_{ADH2}-PEX28-T_{HIS3}); ura3Δ:: (P_{TPH1}-RtFAS1-T_{FBA1}) + (P_{TEF1}-RtFAS2-T_{CYC1}) + amdSym; X1-5:: (P_{TEF1}-Cas9-T_{CYC1}); acc1:: (P_{TEF1}-ACC1); pyc1:: (P_{TEF1}-PYC1); XI-4:: (P_{TPH1}-MPC1) + (P_{PGK1}-MPC3-T_{DIT1}); X-2:: (P_{GAL1}-AnACLa-T_{CYC1}) + (P_{GAL10}-AnACLa-T_{ADH1}); gal10Δ:: (P_{TPH1}-RtCIT1-T_{FBA1}) + (P_{TDH3}-IDP2-T_{CYC1}) + (P_{TEF1}-YHM2-T_{GAL1}); *pgi1Δ:: (P_{COX9}-PGI1) + (P_{TDH3}-GND1-T_{CYC1}) + (P_{UHT7}-TKL1-T_{TDH2}) + (P_{PGK1}-TAL1-T_{ADH1}) + (P_{TEF1}-ZWF1); *idh2Δ:: P_{GSY1}-IDH2; XII-4:: (T_{ADH1}-per1ADH5-P_{GAL1,10}-per2MaFAR1-T_{CYC1}); VII-2:: (T_{ADH1}-per1ADH5-P_{GAL1,10}-per2MaFAR1-T_{CYC1}) = GNFOH73 + VII-2:: (T_{ADH1}-per1ADH5-P_{GAL1,10}-per2MaFAR1-T_{CYC1})***

This study

GNFOH82 *MATa; MAL2-8c; SUC2; hfd1Δ; gal80Δ; gal1Δ; gal7Δ; his3Δ:: (HIS3-T_{ENO2}) + (P_{ADH2}-PEX28-T_{HIS3}); ura3Δ:: (P_{TPH1}-RtFAS1-T_{FBA1}) + (P_{TEF1}-RtFAS2-T_{CYC1}) + amdSym; X1-5:: (P_{TEF1}-Cas9-T_{CYC1}); acc1:: (P_{TEF1}-ACC1); pyc1:: (P_{TEF1}-PYC1); XI-4:: (P_{TPH1}-MPC1) + (P_{PGK1}-MPC3-T_{DIT1}); X-2:: (P_{GAL1}-AnACLa-T_{CYC1}) + (P_{GAL10}-AnACLa-T_{ADH1}); gal10Δ:: (P_{TPH1}-RtCIT1-T_{FBA1}) + (P_{TDH3}-IDP2-T_{CYC1}) + (P_{TEF1}-YHM2-T_{GAL1}); *pgi1Δ:: (P_{COX9}-PGI1) + (P_{TDH3}-GND1-T_{CYC1}) + (P_{UHT7}-TKL1-T_{TDH2}) + (P_{PGK1}-TAL1-T_{ADH1}) + (P_{TEF1}-ZWF1); *idh2Δ:: P_{GSY1}-IDH2; XII-4:: (P_{ADH6}-per1ADH5-T_{ADH1}) + (P_{ADH6}-per2MaFAR1-T_{CYC1}); VII-2:: (T_{ADH1}-per1ADH5-P_{GAL1,10}-per2MaFAR1-T_{CYC1}) = GNFOH75 + VII-2:: (T_{ADH1}-per1ADH5-P_{GAL1,10}-per2MaFAR1-T_{CYC1})***

This study

GNFOH83 *MATa; MAL2-8c; SUC2; hfd1Δ; gal80Δ; gal1Δ; gal7Δ; his3Δ:: (HIS3-T_{ENO2}) + (P_{ADH2}-PEX28-T_{HIS3}); ura3Δ:: (P_{TPH1}-RtFAS1-T_{FBA1}) + (P_{TEF1}-RtFAS2-T_{CYC1}) + amdSym; X1-5:: (P_{TEF1}-Cas9-T_{CYC1}); acc1:: (P_{TEF1}-ACC1); pyc1:: (P_{TEF1}-PYC1); XI-4:: (P_{TPH1}-MPC1) + (P_{PGK1}-MPC3-T_{DIT1}); X-2:: (P_{GAL1}-AnACLa-T_{CYC1}) + (P_{GAL10}-AnACLa-T_{ADH1}); gal10Δ:: (P_{TPH1}-RtCIT1-T_{FBA1}) + (P_{TDH3}-IDP2-T_{CYC1}) + (P_{TEF1}-YHM2-T_{GAL1}); *pgi1Δ:: (P_{COX9}-PGI1) + (P_{TDH3}-GND1-T_{CYC1}) + (P_{UHT7}-TKL1-T_{TDH2}) + (P_{PGK1}-TAL1-T_{ADH1}) + (P_{TEF1}-ZWF1); *idh2Δ:: P_{GSY1}-IDH2; XII-4:: (P_{BDH2}-per1ADH5-T_{ADH1}) + (P_{BDH2}-per2MaFAR1-T_{CYC1}); VII-2:: (T_{ADH1}-per1ADH5-P_{GAL1,10}-per2MaFAR1-T_{CYC1}) = GNFOH76 + VII-2:: (T_{ADH1}-per1ADH5-P_{GAL1,10}-per2MaFAR1-T_{CYC1})***

This study

GNFOH84 *MATa; MAL2-8c; SUC2; hfd1Δ; gal80Δ; gal1Δ; gal7Δ; his3Δ:: (HIS3-T_{ENO2}) + (P_{ADH2}-PEX28-T_{HIS3}); ura3Δ:: (P_{TPH1}-RtFAS1-T_{FBA1}) + (P_{TEF1}-RtFAS2-T_{CYC1}) + amdSym; X1-5:: (P_{TEF1}-Cas9-T_{CYC1}); acc1:: (P_{TEF1}-ACC1); pyc1:: (P_{TEF1}-PYC1); XI-4:: (P_{TPH1}-MPC1) + (P_{PGK1}-MPC3-T_{DIT1}); X-2:: (P_{GAL1}-AnACLa-T_{CYC1}) + (P_{GAL10}-AnACLa-T_{ADH1}); gal10Δ:: (P_{TPH1}-RtCIT1-T_{FBA1}) + (P_{TDH3}-IDP2-T_{CYC1}) + (P_{TEF1}-YHM2-T_{GAL1}); *pgi1Δ:: (P_{COX9}-PGI1) + (P_{TDH3}-GND1-T_{CYC1}) + (P_{UHT7}-TKL1-T_{TDH2}) + (P_{PGK1}-TAL1-T_{ADH1}) + (P_{TEF1}-ZWF1); *idh2Δ:: P_{GSY1}-IDH2; XII-4:: (P_{BDH2}-per1ADH5-T_{ADH1}) + (P_{BDH2}-per2MaFAR1-T_{CYC1}); VII-2:: (P_{ADH6}-per1ADH5-T_{ADH1}) + (P_{ADH6}-per2MaFAR1-T_{CYC1}) = GNFOH76 + VII-2:: (P_{ADH6}-per1ADH5-T_{ADH1}) + (P_{ADH6}-per2MaFAR1-T_{CYC1})***

This study

GNFOH97 *MATa; MAL2-8c; SUC2; hfd1Δ; gal80Δ; gal1Δ; gal7Δ; his3Δ:: (HIS3-T_{ENO2}) + (P_{ADH2}-PEX28-T_{HIS3}); ura3Δ:: (P_{TPH1}-RtFAS1-T_{FBA1}) + (P_{TEF1}-RtFAS2-T_{CYC1}) + amdSym; X1-5:: (P_{TEF1}-Cas9-T_{CYC1}); acc1:: (P_{TEF1}-ACC1); pyc1:: (P_{TEF1}-PYC1); XI-4:: (P_{TPH1}-MPC1) + (P_{PGK1}-MPC3-T_{DIT1}); X-2:: (P_{GAL1}-AnACLa-T_{CYC1}) + (P_{GAL10}-AnACLa-T_{ADH1}); gal10Δ:: (P_{TPH1}-RtCIT1-T_{FBA1}) + (P_{TDH3}-IDP2-T_{CYC1}) + (P_{TEF1}-YHM2-T_{GAL1}); *pgi1Δ:: (P_{COX9}-PGI1) + (P_{TDH3}-GND1-T_{CYC1}) + (P_{UHT7}-TKL1-T_{TDH2}) + (P_{PGK1}-TAL1-T_{ADH1}) + (P_{TEF1}-ZWF1); *idh2Δ:: P_{GSY1}-IDH2; XII-4:: (P_{ADH6}-per1ADH5-T_{ADH1}) + (P_{ADH6}-per2MaFAR1-T_{CYC1})***

This study

	T_{CYC1}); VII-2:: (T_{ADH1}-per1ADH5-$P_{GAL1,10}$-per2MaFAR1-T_{CYC1});VIII-2::(P_{BDH2}-per1ADH5-T_{ADH1})+ (P_{BDH2}-per2MaFAR1-T_{CYC1})= GNFOH82+ VIII-2::(P_{BDH2}-per1ADH5-T_{ADH1})+ (P_{BDH2}-per2MaFAR1-T_{CYC1})	
GNFOH103	MATa; MAL2-8c; SUC2; <i>hfd1Δ</i>; <i>gal80Δ</i>; <i>gal1Δ</i>; <i>gal7Δ</i>; <i>his3Δ</i>::(<i>HIS3</i>-T_{ENO2})+(P_{ADH2}-PEX28-T_{HIS3}); <i>ura3Δ</i>::(P_{TPI1}-RtFAS1-T_{FBA1})+ (P_{TEF1}-RtFAS2-T_{CYC1})+<i>amdSym</i>; X1-5::P_{TEF1}-Cas9-T_{CYC1}; <i>acc1</i>::P_{TEF1}-ACC1; <i>pyc1</i>::P_{TEF1}-PYC1; XI-4:: (P_{TPI1}-MPC1)+(P_{PGK1}-MPC3-T_{DIT1}); X-2::(P_{GAL1}-AnACLa-T_{CYC1})+(P_{GAL10}-AnACLB-T_{ADH1}); <i>gal10Δ</i>::(P_{TPI1}-RtCIT1-T_{FBA1})+(P_{TDH3}-IDP2-T_{CYC1})+(P_{TEF1}-YHM2-T_{GAL1}); <i>pgi1Δ</i>::(P_{COX9}-PGI1)+(P_{TDH3}-GND1-T_{CYC1})+(P_{iHXT7}-TKL1-T_{TDH2})+(P_{PGK1}-TAL1-T_{ADH1})+(P_{TEF1}-ZWF1); <i>idh2Δ</i>::P_{GSY1}-IDH2;XII-4:: (P_{ADH6}-per1ADH5-T_{ADH1})+(P_{ADH6}-per2MaFAR1-T_{CYC1}); VII-2:: (T_{ADH1}-per1ADH5-$P_{GAL1,10}$-per2MaFAR1-T_{CYC1});VIII-2::(P_{BDH2}-per1ADH5-T_{ADH1})+ (P_{BDH2}-per2MaFAR1-T_{CYC1});XI-6::($P_{GAL1,10}$-per2RtME-T_{PRM9})= GNFOH97+XI-6::($P_{GAL1,10}$-per2RtME-T_{PRM9})	This study
GNFOH104	MATa; MAL2-8c; SUC2; <i>hfd1Δ</i>; <i>gal80Δ</i>; <i>gal1Δ</i>; <i>gal7Δ</i>; <i>his3Δ</i>::(<i>HIS3</i>-T_{ENO2})+(P_{ADH2}-PEX28-T_{HIS3}); <i>ura3Δ</i>::(P_{TPI1}-RtFAS1-T_{FBA1})+ (P_{TEF1}-RtFAS2-T_{CYC1})+<i>amdSym</i>; X1-5::P_{TEF1}-Cas9-T_{CYC1}; <i>acc1</i>::P_{TEF1}-ACC1; <i>pyc1</i>::P_{TEF1}-PYC1; XI-4:: (P_{TPI1}-MPC1)+(P_{PGK1}-MPC3-T_{DIT1}); X-2::(P_{GAL1}-AnACLa-T_{CYC1})+(P_{GAL10}-AnACLB-T_{ADH1}); <i>gal10Δ</i>::(P_{TPI1}-RtCIT1-T_{FBA1})+(P_{TDH3}-IDP2-T_{CYC1})+(P_{TEF1}-YHM2-T_{GAL1}); <i>pgi1Δ</i>::(P_{COX9}-PGI1)+(P_{TDH3}-GND1-T_{CYC1})+(P_{iHXT7}-TKL1-T_{TDH2})+(P_{PGK1}-TAL1-T_{ADH1})+(P_{TEF1}-ZWF1); <i>idh2Δ</i>::P_{GSY1}-IDH2;XII-4:: (P_{ADH6}-per1ADH5-T_{ADH1})+(P_{ADH6}-per2MaFAR1-T_{CYC1}); VII-2:: (T_{ADH1}-per1ADH5-$P_{GAL1,10}$-per2MaFAR1-T_{CYC1});VIII-2::(P_{BDH2}-per1ADH5-T_{ADH1})+(P_{BDH2}-per2MaFAR1-T_{CYC1});XI-6::(T_{CPS1}-per2PYC1-$P_{GAL1,10}$-per2RtME-T_{PRM9})= GNFOH97+XI-6::(T_{CPS1}-per2PYC1-$P_{GAL1,10}$-per2RtME-T_{PRM9})	This study
GNFOH105	MATa; MAL2-8c; SUC2; <i>hfd1Δ</i>; <i>gal80Δ</i>; <i>gal1Δ</i>; <i>gal7Δ</i>; <i>his3Δ</i>::(<i>HIS3</i>-T_{ENO2})+(P_{ADH2}-PEX28-T_{HIS3}); <i>ura3Δ</i>::(P_{TPI1}-RtFAS1-T_{FBA1})+ (P_{TEF1}-RtFAS2-T_{CYC1})+<i>amdSym</i>; X1-5::P_{TEF1}-Cas9-T_{CYC1}; <i>acc1</i>::P_{TEF1}-ACC1; <i>pyc1</i>::P_{TEF1}-PYC1; XI-4:: (P_{TPI1}-MPC1)+(P_{PGK1}-MPC3-T_{DIT1}); X-2::(P_{GAL1}-AnACLa-T_{CYC1})+(P_{GAL10}-AnACLB-T_{ADH1}); <i>gal10Δ</i>::(P_{TPI1}-RtCIT1-T_{FBA1})+(P_{TDH3}-IDP2-T_{CYC1})+(P_{TEF1}-YHM2-T_{GAL1}); <i>pgi1Δ</i>::(P_{COX9}-PGI1)+(P_{TDH3}-GND1-T_{CYC1})+(P_{iHXT7}-TKL1-T_{TDH2})+(P_{PGK1}-TAL1-T_{ADH1})+(P_{TEF1}-ZWF1); <i>idh2Δ</i>::P_{GSY1}-IDH2;XII-4:: (P_{ADH6}-per1ADH5-T_{ADH1})+(P_{ADH6}-per2MaFAR1-T_{CYC1}); VII-2:: (T_{ADH1}-per1ADH5-$P_{GAL1,10}$-per2MaFAR1-T_{CYC1});VIII-2::(P_{BDH2}-per1ADH5-T_{ADH1})+(P_{BDH2}-per2MaFAR1-T_{CYC1});XI-6::(P_{GAL7}-MDH3-T_{ENO2})+(T_{CPS1}-PYC1-$P_{GAL1,10}$-RtME-T_{PRM9})=GNFOH97+XI-6::(P_{GAL7}-MDH3-T_{ENO2})+ (T_{CPS1}-per2PYC1-$P_{GAL1,10}$-per2RtME-T_{PRM9})	This study
GNFOH106	MATa; MAL2-8c; SUC2; <i>hfd1Δ</i>; <i>gal80Δ</i>; <i>gal1Δ</i>; <i>gal7Δ</i>; <i>his3Δ</i>::(<i>HIS3</i>-T_{ENO2})+(P_{ADH2}-PEX28-T_{HIS3}); <i>ura3Δ</i>::(P_{TPI1}-RtFAS1-T_{FBA1})+ (P_{TEF1}-RtFAS2-T_{CYC1})+<i>amdSym</i>; X1-5::P_{TEF1}-Cas9-T_{CYC1}; <i>acc1</i>::P_{TEF1}-ACC1; <i>pyc1</i>::P_{TEF1}-PYC1; XI-4:: (P_{TPI1}-MPC1)+(P_{PGK1}-MPC3-T_{DIT1}); X-2::(P_{GAL1}-AnACLa-T_{CYC1})+(P_{GAL10}-AnACLB-T_{ADH1}); <i>gal10Δ</i>::(P_{TPI1}-RtCIT1-T_{FBA1})+(P_{TDH3}-IDP2-	This study

	$T_{CYC1})+(P_{TEF1-YHM2-T_{GAL1}});$ $pgi1\Delta::(P_{COX9-PGI1})+(P_{TDH3-GND1-T_{CYC1}})+(P_{iHXT7-TKL1-T_{TDH2}})+(P_{PGK1-TAL1-T_{ADH1}})+(P_{TEF1-ZWF1});$ $idh2\Delta::P_{GSY1-IDH2};XII-4::(P_{ADH6-per1ADH5-T_{ADH1}})+(P_{ADH6-per2MaFAR1-T_{CYC1}});$ $VII-2::(T_{ADH1-per1ADH5-P_{GAL1,10-per2MaFAR1-T_{CYC1}}});VIII-2::(P_{BDH2-per1ADH5-T_{ADH1}})+(P_{BDH2-per2MaFAR1-T_{CYC1}});XI-8:(P_{GAL1,10-per2IDP2-T_{PRM9}})=GNFOH97+XI-8:(P_{GAL1,10-per2IDP2-T_{PRM9}})$	
GNFOH107	$MATa; MAL2-8c; SUC2; hfd1\Delta; gal80\Delta; gal1\Delta; gal7\Delta; his3\Delta::(HIS3-T_{ENO2})+(P_{ADH2-PEX28-T_{HIS3}});$ $ura3\Delta::(P_{TPI1-RtFAS1-T_{FBA1}})+(P_{TEF1-RtFAS2-T_{CYC1}})+amdSym;$ $X1-5::P_{TEF1-Cas9-T_{CYC1}};$ $acc1::P_{TEF1-ACC1};$ $pyc1::P_{TEF1-PYC1};$ $XI-4::(P_{TPI1-MPC1})+(P_{PGK1-MPC3-T_{DIT1}});$ $X-2::(P_{GAL1-AnACLa-T_{CYC1}})+(P_{GAL10-AnACLa-T_{ADH1}});$ $gal10\Delta::(P_{TPI1-RtCIT1-T_{FBA1}})+(P_{TDH3-IDP2-T_{CYC1}})+(P_{TEF1-YHM2-T_{GAL1}});$ $pgi1\Delta::(P_{COX9-PGI1})+(P_{TDH3-GND1-T_{CYC1}})+(P_{iHXT7-TKL1-T_{TDH2}})+(P_{PGK1-TAL1-T_{ADH1}})+(P_{TEF1-ZWF1});$ $idh2\Delta::P_{GSY1-IDH2};XII-4::(P_{ADH6-per1ADH5-T_{ADH1}})+(P_{ADH6-per2MaFAR1-T_{CYC1}});$ $VII-2::(T_{ADH1-per1ADH5-P_{GAL1,10-per2MaFAR1-T_{CYC1}}});$ $VIII-2::(P_{BDH2-per1ADH5-T_{ADH1}})+(P_{BDH2-per2MaFAR1-T_{CYC1}});XI-8::(P_{GAL1,10-IDP3-T_{CPS1}})=GNFOH97+XI-8::(P_{GAL1,10-IDP3-T_{CPS1}})$	This study
GNFOH108	$MATa; MAL2-8c; SUC2; hfd1\Delta; gal80\Delta; gal1\Delta; gal7\Delta; his3\Delta::(HIS3-T_{ENO2})+(P_{ADH2-PEX28-T_{HIS3}});$ $ura3\Delta::(P_{TPI1-RtFAS1-T_{FBA1}})+(P_{TEF1-RtFAS2-T_{CYC1}})+amdSym;$ $X1-5::P_{TEF1-Cas9-T_{CYC1}};$ $acc1::P_{TEF1-ACC1};$ $pyc1::P_{TEF1-PYC1};$ $XI-4::(P_{TPI1-MPC1})+(P_{PGK1-MPC3-T_{DIT1}});$ $X-2::(P_{GAL1-AnACLa-T_{CYC1}})+(P_{GAL10-AnACLa-T_{ADH1}});$ $gal10\Delta::(P_{TPI1-RtCIT1-T_{FBA1}})+(P_{TDH3-IDP2-T_{CYC1}})+(P_{TEF1-YHM2-T_{GAL1}});$ $pgi1\Delta::(P_{COX9-PGI1})+(P_{TDH3-GND1-T_{CYC1}})+(P_{iHXT7-TKL1-T_{TDH2}})+(P_{PGK1-TAL1-T_{ADH1}})+(P_{TEF1-ZWF1});$ $idh2\Delta::P_{GSY1-IDH2};XII-4::(P_{ADH6-per1ADH5-T_{ADH1}})+(P_{ADH6-per2MaFAR1-T_{CYC1}});$ $VII-2::(T_{ADH1-per1ADH5-P_{GAL1,10-per2MaFAR1-T_{CYC1}}});$ $VIII-2::(P_{BDH2-per1ADH5-T_{ADH1}})+(P_{BDH2-per2MaFAR1-T_{CYC1}});XI-8::(T_{CPS1-IDP3-P_{GAL1,10-per2IDP2-T_{PRM9}}})=GNFOH97+XI-8::(T_{CPS1-IDP3-P_{GAL1,10-per2IDP2-T_{PRM9}}})$	This study
GNFOH109	$MATa; MAL2-8c; SUC2; hfd1\Delta; gal80\Delta; gal1\Delta; gal7\Delta; his3\Delta::(HIS3-T_{ENO2})+(P_{ADH2-PEX28-T_{HIS3}});$ $ura3\Delta::(P_{TPI1-RtFAS1-T_{FBA1}})+(P_{TEF1-RtFAS2-T_{CYC1}})+amdSym;$ $X1-5::P_{TEF1-Cas9-T_{CYC1}};$ $acc1::P_{TEF1-ACC1};$ $pyc1::P_{TEF1-PYC1};$ $XI-4::(P_{TPI1-MPC1})+(P_{PGK1-MPC3-T_{DIT1}});$ $X-2::(P_{GAL1-AnACLa-T_{CYC1}})+(P_{GAL10-AnACLa-T_{ADH1}});$ $gal10\Delta::(P_{TPI1-RtCIT1-T_{FBA1}})+(P_{TDH3-IDP2-T_{CYC1}})+(P_{TEF1-YHM2-T_{GAL1}});$ $pgi1\Delta::(P_{COX9-PGI1})+(P_{TDH3-GND1-T_{CYC1}})+(P_{iHXT7-TKL1-T_{TDH2}})+(P_{PGK1-TAL1-T_{ADH1}})+(P_{TEF1-ZWF1});$ $idh2\Delta::P_{GSY1-IDH2};XII-4::(P_{ADH6-per1ADH5-T_{ADH1}})+(P_{ADH6-per2MaFAR1-T_{CYC1}});$ $VII-2::(T_{ADH1-per1ADH5-P_{GAL1,10-per2MaFAR1-T_{CYC1}}});VIII-2::(P_{BDH2-per1ADH5-T_{ADH1}})+(P_{BDH2-per2MaFAR1-T_{CYC1}});$ $XI-3::(P_{GAL2-FAA2-T_{ADH1}})=GNFOH97+XI-3::(P_{GAL2-FAA2-T_{ADH1}})$	This study
GNFOH111	$MATa; MAL2-8c; SUC2; hfd1\Delta; gal80\Delta; gal1\Delta; gal7\Delta; his3\Delta::(HIS3-T_{ENO2})+(P_{ADH2-PEX28-T_{HIS3}});$ $ura3\Delta::(P_{TPI1-RtFAS1-T_{FBA1}})+(P_{TEF1-RtFAS2-T_{CYC1}})+amdSym;$ $X1-5::P_{TEF1-Cas9-T_{CYC1}};$ $acc1::P_{TEF1-ACC1};$ $pyc1::P_{TEF1-}$	This study

	<i>PYC1</i>; <i>XI-4::</i>(<i>P_{TPH1}-MPC1</i>)+(<i>P_{PGK1}-MPC3-T_{DIT1}</i>); <i>X-2::</i>(<i>P_{GAL1}-AnACLa-T_{CYC1}</i>)+(<i>P_{GAL10}-AnACLa-T_{ADH1}</i>); <i>gal10Δ::</i>(<i>P_{TPH1}-RtCIT1-T_{FBA1}</i>)+(<i>P_{TDH3}-IDP2-T_{CYC1}</i>)+(<i>P_{TEF1}-YHM2-T_{GAL1}</i>); <i>pgi1Δ::</i>(<i>P_{COX9}-PGI1</i>)+(<i>P_{TDH3}-GND1-T_{CYC1}</i>)+(<i>P_{HXT7}-TKL1-T_{TDH2}</i>)+(<i>P_{PGK1}-TAL1-T_{ADH1}</i>)+(<i>P_{TEF1}-ZWF1</i>); <i>idh2Δ::</i><i>P_{GSY1}-IDH2</i>; <i>XII-4::</i> (<i>P_{ADH6}-per1ADH5-T_{ADH1}</i>)+(<i>P_{ADH6}-per2MaFAR1-T_{CYC1}</i>); <i>VII-2::</i> (<i>T_{ADH1}-per1ADH5-P_{GAL1,10}-per2MaFAR1-T_{CYC1}</i>); <i>VIII-2::</i>(<i>P_{BDH2}-per1ADH5-T_{ADH1}</i>)+ (<i>P_{BDH2}-per2MaFAR1-T_{CYC1}</i>); <i>XI-2::</i>(<i>P_{HXT7}-PXA1-T_{ADH1}</i>)+(<i>P_{HXT7}-PXA2-T_{FBA1}</i>)=GNFOH97+<i>XI-2::</i>(<i>P_{HXT7}-PXA1-T_{ADH1}</i>)+ (<i>P_{HXT7}-PXA2-T_{FBA1}</i>)	
GNFOH116	<i>MATa</i>; <i>MAL2-8c</i>; <i>SUC2</i>; <i>hfd1Δ</i>; <i>gal80Δ</i>; <i>gal1Δ</i>; <i>gal7Δ</i>; <i>his3Δ::</i>(<i>HIS3-T_{ENO2}</i>)+(<i>P_{ADH2}-PEX28-T_{HIS3}</i>); <i>ura3Δ::</i>(<i>P_{TPH1}-RtFAS1-T_{FBA1}</i>)+ (<i>P_{TEF1}-RtFAS2-T_{CYC1}</i>)+<i>amdSym</i>; <i>X1-5::</i><i>P_{TEF1}-Cas9-T_{CYC1}</i>; <i>acc1::</i><i>P_{TEF1}-ACC1</i>; <i>pyc1::</i><i>P_{TEF1}-PYC1</i>; <i>XI-4::</i>(<i>P_{TPH1}-MPC1</i>)+(<i>P_{PGK1}-MPC3-T_{DIT1}</i>); <i>X-2::</i>(<i>P_{GAL1}-AnACLa-T_{CYC1}</i>)+(<i>P_{GAL10}-AnACLa-T_{ADH1}</i>); <i>gal10Δ::</i>(<i>P_{TPH1}-RtCIT1-T_{FBA1}</i>)+(<i>P_{TDH3}-IDP2-T_{CYC1}</i>)+(<i>P_{TEF1}-YHM2-T_{GAL1}</i>); <i>pgi1Δ::</i>(<i>P_{COX9}-PGI1</i>)+(<i>P_{TDH3}-GND1-T_{CYC1}</i>)+(<i>P_{HXT7}-TKL1-T_{TDH2}</i>)+(<i>P_{PGK1}-TAL1-T_{ADH1}</i>)+(<i>P_{TEF1}-ZWF1</i>); <i>idh2Δ::</i><i>P_{GSY1}-IDH2</i>; <i>XII-4::</i> (<i>P_{ADH6}-per1ADH5-T_{ADH1}</i>)+(<i>P_{ADH6}-per2MaFAR1-T_{CYC1}</i>); <i>VII-2::</i> (<i>T_{ADH1}-per1ADH5-P_{GAL1,10}-per2MaFAR1-T_{CYC1}</i>); <i>VIII-2::</i>(<i>P_{BDH2}-per1ADH5-T_{ADH1}</i>)+ (<i>P_{BDH2}-per2MaFAR1-T_{CYC1}</i>); <i>XI-2::</i>(<i>P_{HXT7}-PXA1-T_{ADH1}</i>)+(<i>P_{HXT7}-PXA2-T_{FBA1}</i>); <i>XI-3::</i>(<i>P_{GAL2}-FAA2-T_{ADH1}</i>)=GNFOH111+ <i>XI-3::</i>(<i>P_{GAL2}-FAA2-T_{ADH1}</i>)	This study
GNFOH117	<i>MATa</i>; <i>MAL2-8c</i>; <i>SUC2</i>; <i>hfd1Δ</i>; <i>gal80Δ</i>; <i>gal1Δ</i>; <i>gal7Δ</i>; <i>his3Δ::</i>(<i>HIS3-T_{ENO2}</i>)+(<i>P_{ADH2}-PEX28-T_{HIS3}</i>); <i>ura3Δ::</i>(<i>P_{TPH1}-RtFAS1-T_{FBA1}</i>)+ (<i>P_{TEF1}-RtFAS2-T_{CYC1}</i>)+<i>amdSym</i>; <i>X1-5::</i><i>P_{TEF1}-Cas9-T_{CYC1}</i>; <i>acc1::</i><i>P_{TEF1}-ACC1</i>; <i>pyc1::</i><i>P_{TEF1}-PYC1</i>; <i>XI-4::</i>(<i>P_{TPH1}-MPC1</i>)+(<i>P_{PGK1}-MPC3-T_{DIT1}</i>); <i>X-2::</i>(<i>P_{GAL1}-AnACLa-T_{CYC1}</i>)+(<i>P_{GAL10}-AnACLa-T_{ADH1}</i>); <i>gal10Δ::</i>(<i>P_{TPH1}-RtCIT1-T_{FBA1}</i>)+(<i>P_{TDH3}-IDP2-T_{CYC1}</i>)+(<i>P_{TEF1}-YHM2-T_{GAL1}</i>); <i>pgi1Δ::</i>(<i>P_{COX9}-PGI1</i>)+(<i>P_{TDH3}-GND1-T_{CYC1}</i>)+(<i>P_{HXT7}-TKL1-T_{TDH2}</i>)+(<i>P_{PGK1}-TAL1-T_{ADH1}</i>)+(<i>P_{TEF1}-ZWF1</i>); <i>idh2Δ::</i><i>P_{GSY1}-IDH2</i>; <i>XII-4::</i> (<i>P_{ADH6}-per1ADH5-T_{ADH1}</i>)+(<i>P_{ADH6}-per2MaFAR1-T_{CYC1}</i>); <i>VII-2::</i> (<i>T_{ADH1}-per1ADH5-P_{GAL1,10}-per2MaFAR1-T_{CYC1}</i>); <i>VIII-2::</i>(<i>P_{BDH2}-per1ADH5-T_{ADH1}</i>)+ (<i>P_{BDH2}-per2MaFAR1-T_{CYC1}</i>); <i>XI-2::</i>(<i>P_{HXT7}-PXA1-T_{ADH1}</i>)+(<i>P_{HXT7}-PXA2-T_{FBA1}</i>); <i>XI-8::</i>(<i>T_{CPS1}-IDP3-P_{GAL1,10}-per2IDP2-T_{PRM9}</i>)=GNFOH111+ <i>XI-8::</i>(<i>T_{CPS1}-IDP3-P_{GAL1,10}-per2IDP2-T_{PRM9}</i>)	This study
GNFOH118	<i>MATa</i>; <i>MAL2-8c</i>; <i>SUC2</i>; <i>hfd1Δ</i>; <i>gal80Δ</i>; <i>gal1Δ</i>; <i>gal7Δ</i>; <i>his3Δ::</i>(<i>HIS3-T_{ENO2}</i>)+(<i>P_{ADH2}-PEX28-T_{HIS3}</i>); <i>ura3Δ::</i>(<i>P_{TPH1}-RtFAS1-T_{FBA1}</i>)+ (<i>P_{TEF1}-RtFAS2-T_{CYC1}</i>)+<i>amdSym</i>; <i>X1-5::</i><i>P_{TEF1}-Cas9-T_{CYC1}</i>; <i>acc1::</i><i>P_{TEF1}-ACC1</i>; <i>pyc1::</i><i>P_{TEF1}-PYC1</i>; <i>XI-4::</i>(<i>P_{TPH1}-MPC1</i>)+(<i>P_{PGK1}-MPC3-T_{DIT1}</i>); <i>X-2::</i>(<i>P_{GAL1}-AnACLa-T_{CYC1}</i>)+(<i>P_{GAL10}-AnACLa-T_{ADH1}</i>); <i>gal10Δ::</i>(<i>P_{TPH1}-RtCIT1-T_{FBA1}</i>)+(<i>P_{TDH3}-IDP2-T_{CYC1}</i>)+(<i>P_{TEF1}-YHM2-T_{GAL1}</i>); <i>pgi1Δ::</i>(<i>P_{COX9}-PGI1</i>)+(<i>P_{TDH3}-GND1-T_{CYC1}</i>)+(<i>P_{HXT7}-TKL1-T_{TDH2}</i>)+(<i>P_{PGK1}-TAL1-T_{ADH1}</i>)+(<i>P_{TEF1}-ZWF1</i>); <i>idh2Δ::</i><i>P_{GSY1}-IDH2</i>; <i>XII-4::</i> (<i>P_{ADH6}-per1ADH5-T_{ADH1}</i>)+(<i>P_{ADH6}-per2MaFAR1-T_{CYC1}</i>); <i>VII-2::</i> (<i>T_{ADH1}-per1ADH5-P_{GAL1,10}-per2MaFAR1-T_{CYC1}</i>); <i>VIII-2::</i>(<i>P_{BDH2}-per1ADH5-T_{ADH1}</i>)+ (<i>P_{BDH2}-per2MaFAR1-T_{CYC1}</i>); <i>XI-2::</i>(<i>P_{HXT7}-PXA1-T_{ADH1}</i>)+(<i>P_{HXT7}-PXA2-T_{FBA1}</i>)	This study

	$T_{ADH1})+(P_{HXT7-PXA2-T_{FBA1}});XI-6::(P_{GAL1,10-per2RtME-T_{PRM9}})=$ $GNFOH111+XI-6::(P_{GAL1,10-per2RtME-T_{PRM9}})$	
GNFOH119	<i>MATa; MAL2-8c; SUC2; hfd1Δ; gal80Δ; gal1Δ; gal7Δ; his3Δ::(HIS3-T_{ENO2})+(P_{ADH2-PEX28-T_{HIS3}}); ura3Δ::(P_{TPI1-RtFAS1-T_{FBA1}})+(P_{TEF1-RtFAS2-T_{CYC1}})+amdSym; X1-5::P_{TEF1-Cas9-T_{CYC1}}; acc1::P_{TEF1-ACC1}; pyc1::P_{TEF1-PYC1}; XI-4::(P_{TPI1-MPC1})+(P_{PGK1-MPC3-T_{DIT1}}); X-2::(P_{GAL1-AnACLa-T_{CYC1}})+(P_{GAL10-AnACLa-T_{ADH1}}); gal10Δ::(P_{TPI1-RtCIT1-T_{FBA1}})+(P_{TDH3-IDP2-T_{CYC1}})+(P_{TEF1-YHM2-T_{GAL1}}); pgilΔ::(P_{COX9-PGI1})+(P_{TDH3-GND1-T_{CYC1}})+(P_{HXT7-TKL1-T_{TDH2}})+(P_{PGK1-TAL1-T_{ADH1}})+(P_{TEF1-ZWF1}); idh2Δ::P_{GSY1-IDH2};XII-4:: (P_{ADH6-per1ADH5-T_{ADH1}})+(P_{ADH6-per2MaFAR1-T_{CYC1}}); VII-2:: (T_{ADH1-per1ADH5-P_{GAL1,10-per2MaFAR1-T_{CYC1}}});VIII-2::(P_{BDH2-per1ADH5-T_{ADH1}})+(P_{BDH2-per2MaFAR1-T_{CYC1}}); XI-2::(P_{HXT7-PXA1-T_{ADH1}})+(P_{HXT7-PXA2-T_{FBA1}}); XI-6::(T_{CPS1-per2PYC1-P_{GAL1,10-per2RtME-T_{PRM9}}})=GNFOH111+XI-6::(T_{CPS1-per2PYC1-P_{GAL1,10-per2RtME-T_{PRM9}}})</i>	This study
GNFOH120	<i>MATa; MAL2-8c; SUC2; hfd1Δ; gal80Δ; gal1Δ; gal7Δ; his3Δ::(HIS3-T_{ENO2})+(P_{ADH2-PEX28-T_{HIS3}}); ura3Δ::(P_{TPI1-RtFAS1-T_{FBA1}})+(P_{TEF1-RtFAS2-T_{CYC1}})+amdSym; X1-5::P_{TEF1-Cas9-T_{CYC1}}; acc1::P_{TEF1-ACC1}; pyc1::P_{TEF1-PYC1}; XI-4::(P_{TPI1-MPC1})+(P_{PGK1-MPC3-T_{DIT1}}); X-2::(P_{GAL1-AnACLa-T_{CYC1}})+(P_{GAL10-AnACLa-T_{ADH1}}); gal10Δ::(P_{TPI1-RtCIT1-T_{FBA1}})+(P_{TDH3-IDP2-T_{CYC1}})+(P_{TEF1-YHM2-T_{GAL1}}); pgilΔ::(P_{COX9-PGI1})+(P_{TDH3-GND1-T_{CYC1}})+(P_{HXT7-TKL1-T_{TDH2}})+(P_{PGK1-TAL1-T_{ADH1}})+(P_{TEF1-ZWF1}); idh2Δ::P_{GSY1-IDH2};XII-4:: (P_{ADH6-per1ADH5-T_{ADH1}})+(P_{ADH6-per2MaFAR1-T_{CYC1}}); VII-2:: (T_{ADH1-per1ADH5-P_{GAL1,10-per2MaFAR1-T_{CYC1}}});VIII-2::(P_{BDH2-per1ADH5-T_{ADH1}})+(P_{BDH2-per2MaFAR1-T_{CYC1}}); XI-2::(P_{HXT7-PXA1-T_{ADH1}})+(P_{HXT7-PXA2-T_{FBA1}}); XI-6::(T_{CPS1-per2PYC1-P_{GAL1,10-per2RtME-T_{PRM9}}}); XI-8::(T_{CPS1-IDP3-P_{GAL1,10-per2IDP2-T_{PRM9}}})=GNFOH119+ XI-8::(T_{CPS1-IDP3-P_{GAL1,10-per2IDP2-T_{PRM9}}})</i>	This study
GNFOH121	<i>MATa; MAL2-8c; SUC2; hfd1Δ; gal80Δ; gal1Δ; gal7Δ; his3Δ::(HIS3-T_{ENO2})+(P_{ADH2-PEX28-T_{HIS3}}); ura3Δ::(P_{TPI1-RtFAS1-T_{FBA1}})+(P_{TEF1-RtFAS2-T_{CYC1}})+amdSym; X1-5::P_{TEF1-Cas9-T_{CYC1}}; acc1::P_{TEF1-ACC1}; pyc1::P_{TEF1-PYC1}; XI-4::(P_{TPI1-MPC1})+(P_{PGK1-MPC3-T_{DIT1}}); X-2::(P_{GAL1-AnACLa-T_{CYC1}})+(P_{GAL10-AnACLa-T_{ADH1}}); gal10Δ::(P_{TPI1-RtCIT1-T_{FBA1}})+(P_{TDH3-IDP2-T_{CYC1}})+(P_{TEF1-YHM2-T_{GAL1}}); pgilΔ::(P_{COX9-PGI1})+(P_{TDH3-GND1-T_{CYC1}})+(P_{HXT7-TKL1-T_{TDH2}})+(P_{PGK1-TAL1-T_{ADH1}})+(P_{TEF1-ZWF1}); idh2Δ::P_{GSY1-IDH2};XII-4:: (P_{ADH6-per1ADH5-T_{ADH1}})+(P_{ADH6-per2MaFAR1-T_{CYC1}}); VII-2:: (T_{ADH1-per1ADH5-P_{GAL1,10-per2MaFAR1-T_{CYC1}}});VIII-2::(P_{BDH2-per1ADH5-T_{ADH1}})+(P_{BDH2-per2MaFAR1-T_{CYC1}}); XI-2::(P_{HXT7-PXA1-T_{ADH1}})+(P_{HXT7-PXA2-T_{FBA1}}); XI-6::(T_{CPS1-per2PYC1-P_{GAL1,10-per2RtME-T_{PRM9}}}); XI-8::(T_{CPS1-IDP3-P_{GAL1,10-per2IDP2-T_{PRM9}}});IX-1::P_{TEF1-MaFAR1-T_{CYC1}} =GNFOH120+IX-1::P_{TEF1-MaFAR1-T_{CYC1}}</i>	This study
GNFOH122	<i>MATa; MAL2-8c; SUC2; hfd1Δ; gal80Δ; gal1Δ; gal7Δ; his3Δ::(HIS3-T_{ENO2})+(P_{ADH2-PEX28-T_{HIS3}}); ura3Δ::(P_{TPI1-RtFAS1-T_{FBA1}})+(P_{TEF1-RtFAS2-}</i>	This study

	T_{CYC1})+<i>amdSym</i>; <i>X1-5::P_{TEF1}-Cas9-T_{CYC1}</i>; <i>acc1::P_{TEF1}-ACC1</i>; <i>pyc1::P_{TEF1}-PYC1</i>; <i>X1-4::(P_{TPI1}-MPC1)+(P_{PGK1}-MPC3-T_{DIT1})</i>; <i>X-2::(P_{GAL1}-AnACLa-T_{CYC1})+(P_{GAL10}-AnACLa-T_{ADH1})</i>; <i>gal10Δ::(P_{TPI1}-RtCIT1-T_{FBA1})+(P_{TDH3}-IDP2-T_{CYC1})+(P_{TEF1}-YHM2-T_{GAL1})</i>; <i>pgi1Δ::(P_{COX9}-PGI1)+(P_{TDH3}-GND1-T_{CYC1})+(P_{HXT7}-TKL1-T_{TDH2})+(P_{PGK1}-TAL1-T_{ADH1})+(P_{TEF1}-ZWF1)</i>; <i>idh2Δ::P_{GSY1}-IDH2</i>; <i>XII-4::(P_{ADH6}-per1ADH5-T_{ADH1})+(P_{ADH6}-per2MaFAR1-T_{CYC1})</i>; <i>VII-2::(T_{ADH1}-per1ADH5-P_{GAL1,10}-per2MaFAR1-T_{CYC1})</i>; <i>VIII-2::(P_{BDH2}-per1ADH5-T_{ADH1})+(P_{BDH2}-per2MaFAR1-T_{CYC1})</i>; <i>XI-2::(P_{HXT7}-PXA1-T_{ADH1})+(P_{HXT7}-PXA2-T_{FBA1})</i>; <i>XI-6::(T_{CPS1}-per2PYC1-P_{GAL1,10}-per2RtME-T_{PRM9})</i>; <i>XI-8::(T_{CPS1}-IDP3-P_{GAL1,10}-per2IDP2-T_{PRM9})</i>; <i>IX-1::P_{TDH3}-MaFAR1-T_{CYC1}</i> =GNFOH120+<i>IX-1::P_{TDH3}-MaFAR1-T_{CYC1}</i>	
GNFOH132	<i>MATa</i>; <i>MAL2-8c</i>; <i>SUC2</i>; <i>his3Δ1</i>; <i>ura3-52</i>; <i>X1-5::Cas9</i>; <i>gal80Δ</i>; <i>hfd1Δ</i>; pYX212=GN15+ pYX212	This study
GNFOH134	<i>MATa</i>; <i>MAL2-8c</i>; <i>SUC2</i>; <i>his3Δ1</i>; <i>ura3-52</i>; <i>X1-5::Cas9</i>; <i>gal80Δ</i>; <i>hfd1Δ</i>; pAOH22=GN15+ pAOH22	This study
GNFOH136	<i>MATa</i>; <i>MAL2-8c</i>; <i>SUC2</i>; <i>his3Δ1</i>; <i>ura3-52</i>; <i>X1-5::Cas9</i>; <i>gal80Δ</i>; <i>hfd1Δ</i>; per2-pYX212-MaFAR1=GN15+ per2-pYX212-MaFAR1 <i>MATa</i>; <i>MAL2-8c</i>; <i>SUC2</i>; <i>ura3Δ</i>; <i>hfd1Δ</i>; <i>gal80Δ</i>; <i>gal1Δ</i>; <i>gal7Δ</i>; <i>tesAΔ</i>; <i>his3Δ::(P_{TPI1}-MmACL-T_{FBA1})+(P_{TDH3}-RtME-T_{CYC1})+(P_{HXT7}-MDH3-T_{TDH2})+(P_{PGK1}-CTP1-T_{HIS3})</i>; <i>X1-5::P_{TEF1}-Cas9-T_{CYC1}</i>; <i>acc1::P_{TEF1}-ACC1</i>; <i>pyc1::P_{TEF1}-PYC1</i>; <i>X1-4::(P_{TPI1}-MPC1)+(P_{PGK1}-MPC3-T_{DIT1})</i>; <i>X1-2::(P_{GAL1}-AnACLa-T_{CYC1})+(P_{GAL10}-AnACLa-T_{ADH1})</i>; <i>gal10Δ::(P_{TPI1}-RtCIT1-T_{FBA1})+(P_{TDH3}-IDP2-T_{CYC1})+(P_{TEF1}-YHM2-T_{GAL1})</i>; <i>pgi1Δ::(P_{COX9}-PGI1)+(P_{TDH3}-GND1-T_{CYC1})+(P_{HXT7}-TKL1-T_{TDH2})+(P_{PGK1}-TAL1-T_{ADH1})+(P_{TEF1}-ZWF1)</i>; <i>idh2Δ::P_{GSY1}-IDH2</i>; <i>XI-1::P_{GAL7}-MCRN-T_{DIT1}</i>; <i>P_{FAS1}::P_{HXT1}</i>; <i>XII-3::P_{TDH3}-MCRN-T_{FBA1}+T_{DIT1}-MCRC-P_{TDH3}</i>; <i>his3::HIS3</i>; <i>XII-5::T_{FBA1}-MCRC-P_{GAL1,10}-MCRC-T_{DIT1}</i>	This study
SH17h	<i>MATa</i>; <i>MAL2-8c</i>; <i>SUC2</i>; <i>ura3Δ</i>; <i>hfd1Δ</i>; <i>gal80Δ</i>; <i>gal1Δ</i>; <i>gal7Δ</i>; <i>tesAΔ</i>; <i>his3Δ::(P_{TPI1}-MmACL-T_{FBA1})+(P_{TDH3}-RtME-T_{CYC1})+(P_{HXT7}-MDH3-T_{TDH2})+(P_{PGK1}-CTP1-T_{HIS3})</i>; <i>X1-5::P_{TEF1}-Cas9-T_{CYC1}</i>; <i>acc1::P_{TEF1}-ACC1</i>; <i>pyc1::P_{TEF1}-PYC1</i>; <i>X1-4::(P_{TPI1}-MPC1)+(P_{PGK1}-MPC3-T_{DIT1})</i>; <i>X1-2::(P_{GAL1}-AnACLa-T_{CYC1})+(P_{GAL10}-AnACLa-T_{ADH1})</i>; <i>gal10Δ::(P_{TPI1}-RtCIT1-T_{FBA1})+(P_{TDH3}-IDP2-T_{CYC1})+(P_{TEF1}-YHM2-T_{GAL1})</i>; <i>pgi1Δ::(P_{COX9}-PGI1)+(P_{TDH3}-GND1-T_{CYC1})+(P_{HXT7}-TKL1-T_{TDH2})+(P_{PGK1}-TAL1-T_{ADH1})+(P_{TEF1}-ZWF1)</i>; <i>idh2Δ::P_{GSY1}-IDH2</i>; <i>XI-1::P_{GAL7}-MCRN-T_{DIT1}</i>; <i>P_{FAS1}::P_{HXT1}</i>; <i>XII-3::P_{TDH3}-MCRN-T_{FBA1}+T_{DIT1}-MCRC-P_{TDH3}</i>; <i>his3::HIS3</i>; <i>XII-5::T_{FBA1}-MCRC-P_{GAL1,10}-MCRC-T_{DIT1}</i>	Yu et al., 2022[5]
GNMCR5	<i>MATa</i>; <i>MAL2-8c</i>; <i>SUC2</i>; <i>ura3Δ</i>; <i>hfd1Δ</i>; <i>gal80Δ</i>; <i>gal1Δ</i>; <i>gal7Δ</i>; <i>tesAΔ</i>; <i>his3Δ::(P_{TPI1}-MmACL-T_{FBA1})+(P_{TDH3}-RtME-T_{CYC1})+(P_{HXT7}-MDH3-T_{TDH2})+(P_{PGK1}-CTP1-T_{HIS3})</i>; <i>X1-5::P_{TEF1}-Cas9-T_{CYC1}</i>; <i>acc1::P_{TEF1}-ACC1</i>; <i>pyc1::P_{TEF1}-PYC1</i>; <i>X1-4::(P_{TPI1}-MPC1)+(P_{PGK1}-MPC3-T_{DIT1})</i>; <i>X1-2::(P_{GAL1}-AnACLa-T_{CYC1})+(P_{GAL10}-AnACLa-T_{ADH1})</i>; <i>gal10Δ::(P_{TPI1}-RtCIT1-T_{FBA1})+(P_{TDH3}-IDP2-T_{CYC1})+(P_{TEF1}-YHM2-T_{GAL1})</i>; <i>pgi1Δ::(P_{COX9}-PGI1)+(P_{TDH3}-GND1-T_{CYC1})+(P_{HXT7}-TKL1-T_{TDH2})+(P_{PGK1}-TAL1-T_{ADH1})+(P_{TEF1}-ZWF1)</i>; <i>idh2Δ::P_{GSY1}-IDH2</i>; <i>XI-1::P_{GAL7}-MCRN-T_{DIT1}</i>; <i>P_{FAS1}::P_{HXT1}</i>; <i>XII-3::P_{TDH3}-MCRN-T_{FBA1}+T_{DIT1}-MCRC-P_{TDH3}</i>; <i>his3::HIS3</i>; <i>XII-5::T_{FBA1}-MCRC-P_{GAL1,10}-MCRC-T_{DIT1}</i>; <i>IX-1::P_{AAD6}-MCRN-T_{TDH2}+T_{DIT1}</i>	This study

MCRC-P_{AAD6} = SH17h+ IX-1:: P_{AAD6}-MCRN-T_{TDH2}+T_{DIT1}-MCRC-P_{AAD6}

GNMCR6	MATa; MAL2-8c; SUC2; ura3Δ; hfd1Δ; gal80Δ; gal1Δ; gal7Δ; tesAΔ; his3Δ:: (P_{TPI}-MmACL-T_{FBA1}) + (P_{TDH3}-RtME-T_{CYC1}) + (P_{thXT7}-MDH3-T_{TDH2}) + (P_{PGK1}-CTP1-T_{HIS3}); X1-5:: P_{TEF1}-Cas9-T_{CYC1}; acc1:: P_{TEF1}-ACC1; pyc1:: P_{TEF1}-PYC1; X1-4:: (P_{TPII}-MPC1) + (P_{PGK1}-MPC3-T_{DIT1}); X1-2:: (P_{GAL1}-AnACLa-T_{CYC1}) + (P_{GAL10}-AnACLB-T_{ADH1}); gal10Δ:: (P_{TPII}-RtCIT1-T_{FBA1}) + (P_{TDH3}-IDP2-T_{CYC1}) + (P_{TEF1}-YHM2-T_{GAL1}); pgi1Δ:: (P_{COX9}-PGI1) + (P_{TDH3}-GND1-T_{CYC1}) + (P_{thXT7}-TKL1-T_{TDH2}) + (P_{PGK1}-TAL1-T_{ADH1}) + (P_{TEF1}-ZWF1); idh2Δ:: P_{GSY1}-IDH2; XI-1:: P_{GAL7}-MCRN-T_{DIT1}; P_{FAS1}:: P_{HXT1}; XII-3:: P_{TDH3}-MCRN-T_{FBA1} + T_{DIT1}-MCRC-P_{TDH3}; his3:: HIS3; XII-5:: T_{FBA1}-MCRC-P_{GAL1,10}-MCRC-T_{DIT1}; IX-1:: P_{ADH6}-MCRN-T_{TDH2}+T_{DIT1}-MCRC-P_{ADH6} = SH17h+ IX-1:: P_{ADH6}-MCRN-T_{TDH2}+T_{DIT1}-MCRC-P_{ADH6}	This study
GNMCR7	MATa; MAL2-8c; SUC2; ura3Δ; hfd1Δ; gal80Δ; gal1Δ; gal7Δ; tesAΔ; his3Δ:: (P_{TPI}-MmACL-T_{FBA1}) + (P_{TDH3}-RtME-T_{CYC1}) + (P_{thXT7}-MDH3-T_{TDH2}) + (P_{PGK1}-CTP1-T_{HIS3}); X1-5:: P_{TEF1}-Cas9-T_{CYC1}; acc1:: P_{TEF1}-ACC1; pyc1:: P_{TEF1}-PYC1; X1-4:: (P_{TPII}-MPC1) + (P_{PGK1}-MPC3-T_{DIT1}); X1-2:: (P_{GAL1}-AnACLa-T_{CYC1}) + (P_{GAL10}-AnACLB-T_{ADH1}); gal10Δ:: (P_{TPII}-RtCIT1-T_{FBA1}) + (P_{TDH3}-IDP2-T_{CYC1}) + (P_{TEF1}-YHM2-T_{GAL1}); pgi1Δ:: (P_{COX9}-PGI1) + (P_{TDH3}-GND1-T_{CYC1}) + (P_{thXT7}-TKL1-T_{TDH2}) + (P_{PGK1}-TAL1-T_{ADH1}) + (P_{TEF1}-ZWF1); idh2Δ:: P_{GSY1}-IDH2; XI-1:: P_{GAL7}-MCRN-T_{DIT1}; P_{FAS1}:: P_{HXT1}; XII-3:: P_{TDH3}-MCRN-T_{FBA1} + T_{DIT1}-MCRC-P_{TDH3}; his3:: HIS3; XII-5:: T_{FBA1}-MCRC-P_{GAL1,10}-MCRC-T_{DIT1}; IX-1:: P_{BDH2}-MCRN-T_{TDH2}+T_{DIT1}-MCRC-P_{BDH2} = SH17h+ IX-1:: P_{BDH2}-MCRN-T_{TDH2}+T_{DIT1}-MCRC-P_{BDH2}	This study
GNMCR8	MATa; MAL2-8c; SUC2; ura3Δ; hfd1Δ; gal80Δ; gal1Δ; gal7Δ; tesAΔ; his3Δ:: (P_{TPI}-MmACL-T_{FBA1}) + (P_{TDH3}-RtME-T_{CYC1}) + (P_{thXT7}-MDH3-T_{TDH2}) + (P_{PGK1}-CTP1-T_{HIS3}); X1-5:: P_{TEF1}-Cas9-T_{CYC1}; acc1:: P_{TEF1}-ACC1; pyc1:: P_{TEF1}-PYC1; X1-4:: (P_{TPII}-MPC1) + (P_{PGK1}-MPC3-T_{DIT1}); X1-2:: (P_{GAL1}-AnACLa-T_{CYC1}) + (P_{GAL10}-AnACLB-T_{ADH1}); gal10Δ:: (P_{TPII}-RtCIT1-T_{FBA1}) + (P_{TDH3}-IDP2-T_{CYC1}) + (P_{TEF1}-YHM2-T_{GAL1}); pgi1Δ:: (P_{COX9}-PGI1) + (P_{TDH3}-GND1-T_{CYC1}) + (P_{thXT7}-TKL1-T_{TDH2}) + (P_{PGK1}-TAL1-T_{ADH1}) + (P_{TEF1}-ZWF1); idh2Δ:: P_{GSY1}-IDH2; XI-1:: P_{GAL7}-MCRN-T_{DIT1}; P_{FAS1}:: P_{HXT1}; XII-3:: P_{TDH3}-MCRN-T_{FBA1} + T_{DIT1}-MCRC-P_{TDH3}; his3:: HIS3; XII-5:: T_{FBA1}-MCRC-P_{GAL1,10}-MCRC-T_{DIT1}; IX-1:: P_{STE3}-MCRN-T_{TDH2}+T_{DIT1}-MCRC-P_{STE3} = SH17h+ IX-1:: P_{STE3}-MCRN-T_{TDH2}+T_{DIT1}-MCRC-P_{STE3}	This study

Table S4 Plasmids used in this study.

gRNA plasmids			
Name	Marker	Targeted gene	20 bp spacer
pgRNA-hfd1	<i>Amp^R, ScURA3</i>	<i>HFD1</i>	TTTGACCTAATATTCTACAC/AGGGTAAA ATCATTCCAATA
PgRNA- <i>KanMX</i>	<i>Amp^R, ScURA3</i>	<i>KanMX</i>	TCTTTCCAGACTTGTTCAAC/TACCCATG GTTGTTTATGTT
pgRNAVII-2	<i>Amp^R, ScURA3</i>	neutral sites	TGGGATTTCACAACACTATTGA/TGAGCGTA ATATGAATGTGA
pgRNAVIII-2	<i>Amp^R, ScURA3</i>	neutral sites	GAGGACAGCGTGAATCACAA/TCAATAG ACACTGAAATGTA
pgRNAXII-4	<i>Amp^R, ScURA3</i>	neutral sites	ATTTGTACAATTCCCCATTA/GTTACCCGC GCTATTTTCACA
pgRNAIX-1	<i>Amp^R, ScURA3</i>	neutral sites	GCGGGTTCTCTTAGTAAATG/CTTACCGA CAATGATGTGAG
pgRNAXI-2	<i>Amp^R, ScURA3</i>	neutral sites	ACAAGACTAGGCCAAAAGCCA/ACCAGTT GATCAGTTGAGGG
pgRNAXI-3	<i>Amp^R, ScURA3</i>	neutral sites	GATATGTCTCTAATTTTGG/CCATTTTATT TTTGAGGATT
pgRNAXI-6	<i>Amp^R, ScURA3</i>	neutral sites	AAACTTACCGAATTGTAGCG/TAGTAAAT ACAACACTATTGGA
pgRNAXI-8	<i>Amp^R, ScURA3</i>	neutral sites	TACTATCAGTAACACGACAA/GATGAAAT AGCCTCAGTTAC
Expression plasmids			
Name	Description		
pESC	2 μm, AmpR, <i>HIS3</i> , <i>P_{GAL1,10}</i> , <i>T_{CYC1}</i> , <i>T_{ADH1}</i>		
pYX212	2 μm, AmpR, <i>URA3</i> , <i>P_{TPI}</i> , <i>T_{pYX212}</i>		
pAOH9	pYX212-(<i>P_{TPI}</i> - <i>npgA</i> - <i>T_{FBA1}</i>)+(P _{TDH3} - <i>MmCAR</i> - <i>T_{ADH1}</i>)+(Pt _{HXT7} - <i>ADH5</i> - <i>T_{CYC1}</i>)+(P _{TEF1} - <i>FacoAR</i> - <i>T_{pYX212}</i>)		
pAOH20	pYX212-(<i>P_{TPI}</i> - <i>npgAper21</i> - <i>T_{FBA1}</i>)+(P _{TDH3} - <i>MmCARper22</i> - <i>T_{ADH1}</i>)+(Pt _{HXT7} - <i>ADH5per21</i> - <i>T_{CYC1}</i>)+(P _{TEF1} - <i>FacoARper22</i> - <i>T_{pYX212}</i>)		
pAOH21	pYX212-(<i>P_{GAL3}</i> - <i>npgA</i> - <i>T_{FBA1}</i>)+(P _{GAL7} - <i>MmCAR</i> - <i>T_{ADH1}</i>)+(PGAL10- <i>ADH5</i> - <i>T_{CYC1}</i>)+(P _{GAL1} - <i>FacoAR</i> - <i>T_{pYX212}</i>)		
pAOH22	pYX212-(<i>P_{GAL3}</i> - <i>npgAper21</i> - <i>T_{FBA1}</i>)+(P _{GAL7} - <i>MmCARper22</i> - <i>T_{ADH1}</i>)+(PGAL10- <i>ADH5per21</i> - <i>T_{CYC1}</i>)+(P _{GAL1} - <i>FacoARper22</i> - <i>T_{pYX212}</i>)		
PMaFAR1	pESC-(<i>P_{GAL1}</i> - <i>MaFAR1</i> - <i>T_{CYC1}</i>)		
pMaMaqu2220	pESC-(<i>P_{GAL1}</i> - <i>MaMaqu2220</i> - <i>T_{CYC1}</i>)		
pMmFAR1	pESC-(<i>P_{GAL1}</i> - <i>MmFAR1</i> - <i>T_{CYC1}</i>)		
pTaFAR1	pESC-(<i>P_{GAL1}</i> - <i>TaFAR1</i> - <i>T_{CYC1}</i>)		
pYX212- MaFAR1	pYX212-(<i>P_{GAL1}</i> - <i>MaFAR1</i> - <i>T_{CYC1}</i>)		
per2-pYX212- MaFAR1	pYX212-(<i>P_{GAL1}</i> - <i>per2MaFAR1</i> - <i>T_{CYC1}</i>)+(<i>P_{GAL10}</i> - <i>per21ADH5</i> - <i>T_{ADH1}</i>)		
Plasmids for screening responsive promoters			
pYX312	ori, fl ori, 2μ, Amp ^R , URA3, P _{UAS-TDH3}		

pSC01	pYX312-eGFP at <i>Hind</i> III/ <i>Sal</i> I
pSC02	pYX312-P _{SPG1} -eGFP
pSC03	pYX312-P _{ADH6} -eGFP
pSC04	pYX312-P _{ARI1} -eGFP
pSC05	pYX312-P _{OYE3} -eGFP
pSC06	pYX312-P _{GAP1} -eGFP
pSC07	pYX312-P _{INO1} -eGFP
pSC08	pYX312-P _{DET1} -eGFP
pSC09	pYX312-P _{SIT1} -eGFP
pSC10	pYX312-P _{ASC1} -eGFP
pSC11	pYX312-P _{CIS3} -eGFP
pSC12	pYX312-P _{DAL5} -eGFP
pSC13	pYX312-P _{MEP2} -eGFP
pSC14	pYX312-P _{GDH3} -eGFP
pSC15	pYX312-P _{CWP1} -eGFP
pSC16	pYX312-P _{BDH2} -eGFP
pSC17	pYX312-P _{STE3} -eGFP
pSC18	pYX312-P _{PDR5} -eGFP
pSC19	pYX312-P _{FIT2} -eGFP
pSC20	pYX312-P _{HSP31} -eGFP
pSC21	pYX312-P _{AAD6} -eGFP

Table S5 Primers used in this study.

Primer	Primer name	Sequence (5'-3')
Primers for gRNA plasmid construction		
P1	Grna-R1	GCGGTTAGCTCCTTCGGTCCTCCGATCGTTGTCAG AAGTAAGTTGGCCGCAGTGTTATC
P2	Grna-R2	GATAACACTGCGGCCAACTTACTTCTGACAACGAT CGGAGGACCGAAGGAGCTAACCGC
P3	Backbone	GATCATTATCTTTCACTGCGGAGAAG
P4	gRNA-F1/2	AACTTCTCCGCAGTGAAAGATAAATGATC <u>20 bp</u> <u>spacer</u> GTTTTAGAGCTAGAAATAG
Primers for donor DNA construction		
pJQ45	HIS3-F	CTCTTGGCCTCCTCTAGTACACTC
pJQ46	HIS3-R	CAGAAAAGACTAATAATTCTTAGTTAAAAGCACTC TACATAAGAACACCTTTGGTGGAG
pJQ47	T _{ENO2} -F	AGTGCTTTTAACTAAGAATTATTAGTC
pJQ48	T _{ENO2} -R	AGGTATCATCTCCATCTCCCATATG
pJQ49	T _{PRM9} -F	AGTGATATGCATATGGGAGATGGAGATGATACCTAT TTTCAACATCGTATTTTCCGAAG
pJQ50	T _{PRM9} -R	ACAGAAGACGGGAGACACTAGCAC
pJQ51	PEX7-F	GTAAAGTTGTGTGCTAGTGTCTCCCGTCTTCTGTTC AACCTAAGCCGTTCCATAC
pJQ52	PEX7-R	CTATCAACTATTAACCTATATCGTAATACACACAAAAT GCTCAGATATCATATGCAAGG
pJQ53	P _{ADH2} -F	TTTGTGTGTATTACGATATAGTTAATAG
pJQ54	P _{ADH2} -R	TTAATATCTTAACTGATAGTTTGATCAAAGGG
pJQ55	P _{ADH2}	CCCTTTGATCAAACCTATCAGTTAAGATATTAAGCAA AACGTAGGGGCAAACAAACGG
pJQ56	PEX28-F	CTATCAACTATTAACCTATATCGTAATACACACAAAAT GAGTGAGACCAGCTCAAGTCCG
pJQ57	PEX28-R	TATATATCGTATGCTGCAGCTTTAAATAATCGGTGTC TTATGCTACTGGTGTTCATTC
pJQ58	T _{HIS3} -F	GACACCGATTATTTAAAGCTGCAGC
pJQ59	T _{HIS3} -R	CTGTTATTTCTGGCACTTCTTGGTTTCC
pJQ60	PEX7	CTATCAACTATTAACCTATATCGTAATACACACAAAA CAGAAGACGGGAGACACTAGCAC
pJQ61	PEX28	CAACTATTAACCTATATCGTAATACACACAAAGACAC CGATTATTTAAAGCTGCAGC
P5	HFD1up-F	AGAGAAGCTAGATTATCATTACAGCAGC
P6	HFD1up-R	ACATGTTGGTGATAAATTACTATGGCTATGG
P7	HFD1dw-F	ACCATAGCCATAGTAATTTATCACCAACATGTCGCT CATTGTTCTTCCCTGAACGTAATG
P8	HFD1dw-R	TGTCTCCGAATCGTTCAGACATT
P9	HFD1-JDF	CCTTCAAAGGACATCATTGCCGATTATC
P10	HFD1-JDR	GTAGACAGGCAAATATCCCTCCACC
P11	HIS3up-F	CTCTTGGCCTCCTCTAGTACACTC
P12	HIS3up-R	CAGAAAAGACTAATAATTCTTAGTTAAAAGCACTC TACATAAGAACACCTTTGGTGGAG
P13	T _{ENO2} -F	AGTGCTTTTAACTAAGAATTATTAGTC
P14	T _{ENO2} -R	AACGATTTTCCGTTTGTGTTGCCCTACGTTTGGAG GTATCATCTCCATCTCCCATATG
P15	P _{ADH2} -F	GCAAAACGTAGGGGCAAACAAACGG

P16	P _{ADH2} -R	ATTGTTGCCGCATGCATCCTTG
P17	PEX28-F	CTATCAACTATTAACATATATCGTAATACACACAAAAT GAGTGAGACCAGCTCAAGTCGC
P18	PEX28-R	TATATATCGTATGCTGCAGCTTTAAATAATCGGTGTC TTATGCTACTGGTGTTCATTC
P19	HIS3dw-F	GACACCGATTATTTAAAGCTGCAGC
P20	HIS3dw-R	CTGTTATTTCTGGCACTTCTTGGTTTTCC
P21	XII-4up-F	GATAAGGCCCGCATGGTTTC
P22	XII-4up-R	CTATCGCTGAACAGGAACCTTAAGTAG
P23	T _{ADH1} -R-XII-4up	GTAGCTACTTAAGTTCTTGTTCAGCGATAGGAGCG ACCTCATGCTATACCTGAG
P24	T _{CYC1} -R	GGAGGGGAGGGTACACCAAATTCCACCTCTCTTCG AGCGTCCCAAAACC
P25	XII-4dw-F	AGAGGTGGAATTTGGTGTACCC
P26	XII-4dw-R	CTTCCGACTCTGTTGTTTCCTATTG
P27	per1ADH5-R	CTATATCATTTTCAATAGCGATTTTAAATATGCCTTC GCAAGTCATTCCTG
P28	P _{AAD6} -F	TCACTTGCGAGCCAGTAACCAG
P29	P _{AAD6} -R	A TTA AAAAATCGCTATTGAAAATGATATAG
P30	P _{AAD6} -R2	CTCACCACCTGATACCTGGCGCTTTGTCATATTAAA AATCGCTATTGAAAATGATATAG
P31	BS-F1	TAGGAGTCTGGTTACTGGCTGCAAGTGA
P32	BS-R1	AGGAGTCTGGTTACTGGCTGCAAGTGACCATTCGC CATTCAGGCTGC
P33	MaFAR1-F	ATGACAAAGCGCCAGGTATCAG
P34	per1ADH5-R-P _{AAD6}	TTCAACACAACAACAAGAAAAGCCAAAATCATGC CTTCGCAAGTCATTCCTG
P35	P _{ADH6} -F	CCATGGAGTGTTCTTGTATCCGTC
P36	P _{ADH6} -R	GATTTTGGCTTTTCTTGTGTTGTGTTG
P37	BS-F2	TGATGACGGATACAAGAACA CTCCATGGTATCTCG AGCTCAGCTAGCTAACTG
P38	BS-R2	GATGACGGATACAAGAACA CTCCATGGCCATTCGC CATTCAGGCTGC
P39	P _{ADH6} -R-MaFAR1	CTCACCACCTGATACCTGGCGCTTTGTCATGATTTT GGCTTTTCTTGTGTTGTGTTG
P40	per1ADH5-R-P _{BDH2}	TAACAATAAATTCATTGAACATATTTCAGAATGCCT TCGCAAGTCATTCCTG
P41	P _{BDH2} -F	GTACGTTGCAGGAGCACGC
P42	P _{BDH2} -R	TCTGAAATATGTTCAATGAATTTATTGTTATTC
P43	BS-F3	ATGGGCGTGCTCCTGCAACGTACTATCTCGAGCTC AGCTAGCTAACTG
P44	BS-R3	CCATGGGCGTGCTCCTGCAACGTACCCATTCGCCAT TCAGGCTGC
P45	P _{BDH2} -R-MaFAR1	CCACCTGATACCTGGCGCTTTGTCATTCTGAAATAT GTTCAATGAATTTATTGTTATTC
P46	Per1ADH5-R-P _{STE3}	TAGGAAAGGCCAAAATACTATCAAAATTTTCATGCCT TCGCAAGTCATTCCTG
P47	P _{STE3} -F	ATTTTGTGAAAATAGTATAAAGAGTGCAATG
P48	P _{STE3} -R	GAAAATTTTGATAGTATTTTGCCTTTCCTAC
P49	BS-F4	TGCACTCTTTATACTATTTTCAACAAAATTATCTCGA GCTCAGCTAGCTAACTG

P50	BS-R4	TTGCACTCTTTATACTATTTTCAACAAAATCCATTCCG CCATTCCAGGCTGC
P51	P _{STE3} -R-MaFAR1	CACCACCTGATACCTGGCGCTTTGTCATGAAAATTT TGATAGTATTTTGCCTTTCCTAC
P52	XII-4-JDF	CGTGTTTCGTACCTGATGACGTATC
P53	XII-4-JDR	TGGAGGAATAGCCGCTCCC
P42	VII-2up-F	GCCGGTGTAAGGGTCGAC
P43	VII-2upR-T _{ADH1}	GGTCAGGTTGCTTTCTCAGGTATAGCATGAGGTCG CTCGTGACAGCTGCTGGAGCC
P44	T _{ADH1} -F-VII-2up	CAAACACCAATTGGTTTATTATTCTCTTTTCTTCAAT TATAATCAGTACAATAATGGCTCCAGCAGCTGTCAC GAGCGACCTCATGCTATACCTGAG
P45	T _{CYC1} -R-VII-2dw	CTAGTTTATTATTACCTGAGGTATAAGAAAATGACA CAAATATTGGTAAACGGTGATCAGGCTTGGTGGAA GCCTTCGAGCGTCCCAAAACCTTC
P46	VII-2dw-F-T _{CYC1}	CTTGAGAAGGTTTTGGGACGCTCGAAGGCTTCCAC CAAGCCTGATCAC
P47	VII-2dw-R	CTCCGGTATTACTCGAGCCCG
P48	VII-2-JDF	GGTCCATAGTAGCCAAGTGCATTC
P49	VII-2-JDR	GATTCCGCGCTTCCACCAC
P50	VIII-2up-F	GCGCCTTACCAACTTGGCC
P51	VIII-2upR-T _{ADH1}	CTTTCTCAGGTATAGCATGAGGTCGCTCGACCTAAC AAAAGAACCTTTATTAACAATG
P52	T _{ADH1} -R	GAGCGACCTCATGCTATACCTGAG
P53	BS-F	TATCTCGAGCTCAGCTAGCTAACTG
P54	BS-R	CCATTCGCCATTCAGGCTGC
P55	T _{CYC1} -R	CTTCGAGCGTCCCAAAACCTTC
P56	VIII-2-JDF	CGGAGGGTGATCATCAGCTACG
P57	VIII-2-JDR	GGTGTCGTGATCGTTACCTATGC
P58	XI-6up-F	CCTCCTAAAGCTCGGTAAAGGGAAC
P59	XI-6upR	GATAAAAGCATTCACTGCCCGC
P60	XI-6upF-P _{GAL7}	TTCCTGCGGGCAGTGAATGCTTTTATCTTTGCCAGC TACTATCCTTCTTGAAAATATG
P61	P _{GAL7} -R	TTTTGAGGGAATATTCAACTGTTTTTTTTTATCATGT TG
P62	P _{GAL7} -MDH3-F	TAAAAAAAACAGTTGAATATTCCTCAAAAATGG TCAAAGTCGCAATTCTTGG
P63	MDH3-R-T _{ENO2}	AAAGACTAATAATTCTTAGTTAAAAGCACTTCATAG CTTGGAAGAGTCTAGGATGAAAC
P64	T _{ENO2} -F	AGTGCTTTTAACTAAGAATTATTAGTCTTTTCTGC
P65	T _{ENO2} -R	AGGTATCATCTCCATCTCCCATATGC
P66	T _{CPS1} -R-T _{ENO2}	TGCATATGGGAGATGGAGATGATACCTATTTGACAC TTGATTTGACACTTCTTTTTTTT
P67	T _{CPS1} -F-PYC1	AAACTATCGCAGGCAAAATCTAAACTATGAGCGCA ATGATTGAATAGTCAAAGATTTTT
P68	PYC1-R-per2	TCATAGTTTAGATTTTGCCTGCGATAGTTTTACAGC GGCAGAACCACCACCTGCCTTAGTTTCAACAGGAA

		CTTGG
P69	PYC1-F-P _{GAL1,10}	GTAAGAATTTTTGAAAATTCAATATAACAAAATGTC GCAAAGAAAATTCGCCG
P70	P _{GAL1,10} -F	TTTGTATATTGAATTTTCAAAAATTCTTACTTTTTT TTTGG
P71	P _{GAL1,10} -R	TTTGTATAGTTTTTCTCCTTGACGTTAAAGTATAG
P72	RtME-F-P _{GAL1,10}	CTTTAACGTCAAGGAGAAAAAACTATACAAAATGC CTGCTCATTTTGCCC
P73	RtME-R-per2	TCATAGTTTAGATTTTGCCTGCGATAGTTTACAGC GGCAGAACCACCACCTTGTGCTTGTGTTCTGCTT CTAATAATGG
P74	PRM9t-F-RtME	AAACTATCGCAGGCAAAATCTAAACTATGAACAGA AGACGGGAGACACTAGC
P75	T _{PRM9} -F	ACAGAAGACGGGAGACACTAGC
P76	T _{PRM9} -R	ATTTTCAACATCGTATTTTCCGAAGCG
P77	XI6-dwF-T _{PRM9}	CAACGCTTCGAAAATACGATGTTGAAAATGCTAA GGCGAGAAAAGTCTG
P78	XI-6dw-R	CAACCATAGTGGCCAATTTTGACAC
P79	T _{CPS1} -R-XI-6up	CTTCCTGCGGGCAGTGAATGCTTTTATCATTTGACA CTTGATTTGACACTTCTTTTTTT
P80	T _{CPS1} -F-P _{GAL1,10}	TAAGAATTTTTGAAAATTCAATATAACAAAGCGCA ATGATTGAATAGTCAAAGATTTTT
P81	XI-6-JDF	GTGGTCCAAGCTTCGCTGTG
P82	XI-6-JDR	GGCCACCGACACTGTACTG
P83	XI-8up-F	CAGCTTCCCCTGACTTCGATG
P84	XI-8upR-T _{CPS1}	TAAAAAAAAAAGAAGTGTCAAATCAAGTGTCAA ATCTGCAACCCTTCGATTGCAATC
P85	T _{CPS1} -F	GCGCAATGATTGAATAGTCAAAGATTTT
P86	T _{CPS1} -R	ATTTGACACTTGATTTGACACTTCTTTTTT
P87	IDP3-R-T _{CPS1}	AAAAATCTTTGACTATTCAATCATTGCGCTTATAGTT TGCACATACCTTTCTTGTCTTC
P88	IDP3-F-P _{GAL1,10}	AGAATTTTTGAAAATTCAATATAACAAAATGAGTAA AATTAAAGTTGTTTCATCCCATCG
P89	IDP2-F-P _{GAL1,10}	CTTTAACGTCAAGGAGAAAAAACTATACAAAATGA CAAAGATTAAGGTAGCTAACCCC
P90	IDP2-R-per2	TTATAGTTTAGATTTTGCCTGCGATAGTTTACAGCG GCAGAACCACCACCCAATGCAGCTGCCTCGAAC
P91	T _{PRM9} -F-IDP2	AAACTATCGCAGGCAAAATCTAAACTATAAACAGA AGACGGGAGACACTAGC
P92	XI-8-dwF-T _{PRM9}	CAACGCTTCGAAAATACGATGTTGAAAATGGCAT ATCGTTACCGCCTTTTGC
P93	XI-8-dwR	TCTCGCAGTAGAGGTAATTCACGATC
P94	XI-8up-R-P _{GAL1,10}	TAAGAATTTTTGAAAATTCAATATAACAAACTGCAA

		CCCTTCGATTGCAATC
P95	XI-8-dwF-P _{GAL1,10}	CTTTAACGTCAAGGAGAAAAAACTATACAAAGGCA TATCGTTACCGCCTTTTG
P96	XI-8-JDF	AGAAGTGCCTCCTCGAGGATC
P97	XI-8-JDR	CCGCGCTATTTAGTAGGCTACTAC
P98	XI-3up-F	GAAGCATCGGTTTCAGATCGAGC
P99	XI-3up-R-P _{GAL2}	CCCTGGTCCGTAAACCTCCTTGGATTAGGGCAACC AACTTTTTTGCTGGC
P100	P _{GAL2} -F	CTAATCCAAGGAGGTTTACGGACC
P101	P _{GAL2} -R	TATGAAAGAATTATTTTTTTTATTATGTTAATC
P102	FAA2-F-P _{GAL2}	TAACATAATAAAAAAAATAATTCTTTCATAATGGCC GCTCCAGATTATGC
P103	FAA2-R-T _{ADH1}	ATAAAAATCATAAATCATAAGAAATTCGCCTAAAGC TTTTCTGTCTTGACTAGTGAAC
P104	T _{ADH1} -F	GCGAATTTCTTATGATTIATGATTTTTATT
P105	T _{ADH1} -R	GCATATCTACAATTGGGTGAAATGG
P106	XI-3dw-F-T _{ADH1}	GCTCCCCATTTACCCCAATTGTAGATATGCACATGG AACTCCACAGAACTTGC
P107	XI-3dw-R	GATAGGACAGGAGCGATAGGAAAAG
P108	XI-2up-F	CACGGCCTCCTTACTAGCTG
P109	XI-2up-R-T _{ADH1}	CTCCCCATTTACCCCAATTGTAGATATGCCTGTTGA GTTACACCCCGCG
P110	PXA1-R-T _{ADH1}	AATAAAAATCATAAATCATAAGAAATTCGCTCAAAT AATTTCAAGCTTTTCCCGTAGC
P111	PXA1-F-P _{HXT7}	ACAAAAAGTTTTTTTAATTTTAATCAAAAAATGTCA ACAACATTAGCAGCACC
P112	P _{HXT7} -F	GATTGTTCCATACGGCTCCGTC
P113	P _{HXT7} -R	TTTTTGATTAAAAATTAAAAAACTTTTTG
P114	BS-F5	CAGCCTCTGACGGAGCCGTATGGAACAATCTATCT CGAGCTCAGCTAGCTAACTG
P115	BS-R5	CAGCCTCTGACGGAGCCGTATGGAACAATCCCATT CGCCATTCAGGCTGC
P116	PXA2-F-P _{HXT7}	ACAAAAAGTTTTTTTAATTTTAATCAAAAAATGATC TCAACAGCTTCTGCATTTTATC
P117	PXA2-R-T _{FBA1}	AAAAAACTATATCAATTAATTTGAATTAACCTTACCT CTCCTTTCCTTCTTCCTTTTTTG
P118	T _{FBA1} -F	GTAAATTCAAATTAATTGATATAGTTTTTT
P119	T _{FBA1} -R	AGTAAGCTACTATGAAAGACTTTACAAAG
P120	XI-2dw-F-T _{FBA1}	CTTTGTAAAGTCTTTCATAGTAGCTTACTAAGTTTA GATGTAGGTTTTAGCGGTAAC
P121	XI-2dw-R	ATGAGCATTTGCTCACCTTCCTG
P122	XI-2-JDF	GGGTTCTAGAAGTGCCCTTTGAG
P123	XI-2-JDR	AGGAACCGAGGCACGGAAAC

P124	IX-1up-F	GTTTCGCCATAGCCATGTGCC
P125	IX-1up-R	GAGGCACAATTTTATGACCGCG
P126	P _{TDH3} -F- IX-1up	AAAACACGCGGTCATAAAATTGTGCCTCTCGAGTT TATCATTATCAATACTGCCATTTC
P127	P _{TDH3} -R-MaFAR1	CACCACCTGATACCTGGCGCTTTGTCATTTTGTGTTG TTTATGTGTGTTTATTTCGAAACT
P128	MaFAR1-F	ATGACAAAGCGCCAGGTATCAG
P129	IX-1dw-F- T _{CYC1}	TTGCTTGAGAAGGTTTTGGGACGCTCGAAGGGTCA AGCAGTGAGGAAGAAAGATCG
P130	IX-1dw-R	GTCCACAGTAAAATCGTTCAGGCC
P131	P _{TEF1} -F-IX-1up	AAACACGCGGTCATAAAATTGTGCCTCATAGCTTC AAAATGTTTCTACTCCTTTTTTAC
P132	P _{TEF1} -R-MaFAR1	ACCACCTGATACCTGGCGCTTTGTCATTTTGTAAATT AAAACCTTAGATTAGATTGCTAT
P133	P _{AAD6} -F-IX-1up	GAAAACACGCGGTCATAAAATTGTGCCTCTCACTT GCAGCCAGTAACCAG
P134	P _{AAD6} -R-ScMCRN	CCGGCCAACCTACCAGTTCCAGACATTTTTATTAAA AATCGCTATTGAAAATGATATAG
P135	ScMCRN-F	ATGTCTGGAAGTGGTAGGTTGGC
P136	ScMCRN-R-T _{TDH2}	CATTAAAGTAACTTAAGGAGTTAAATTTAAATATTA GCTGGGATATTCAAGGTAATCTC
P137	T _{TDH2} -F	ATTTAACTCCTTAAGTTACTTTAATGATTAG
P138	T _{TDH2} -R	GCGAAAAGCCAATTAGTGTGATAC
P139	T _{DIT1} -R-T _{TDH2}	CACTTAGTATCACACTAATTGGCTTTTCGCGTTACT CCGCAACGCTTTTCTG
P140	T _{DIT1} -F	TAAAGTAAGAGCGCTACATTGGTCTACC
P141	ScMCRC-R-T _{DIT1}	AAGGTAGACCAATGTAGCGCTCTTACTTTATTAGAC AGTGATAGCTCTTCCTCTATGG
P142	ScMCRC-F	AAAAATGTCTGCTACCACTGGTGCTAG
P143	P _{AAD6} -R-ScMCRC	ACCTAGCACCAGTGGTAGCAGACATTTTTATTAAA AATCGCTATTGAAAATGATATAGAAGAG
P144	P _{AAD6} -F-IX-1dw	CTGCCGATCTTTCTTCCTCACTGCTTGACCTCACTT GCAGCCAGTAACCAG
P145	IX-1dw-F	GGTCAAGCAGTGAGGAAGAAAGATC
P146	IX-1dw-R	GTCCACAGTAAAATCGTTCAGGCC
P147	P _{ADH6} -F-IX-1up	CGAAAACACGCGGTCATAAAATTGTGCCTCCCATG GAGTGTTCTTGTATCCGTC
P148	P _{ADH6} -R-ScMCRN	TCCGGCCAACCTACCAGTTCCAGACATTTTTGATTT TGGCTTTTCTTGTTGTTGTGTTG
P149	P _{ADH6} -R-ScMCRC	AGACCTAGCACCAGTGGTAGCAGACATTTTTGATT TTGGCTTTTCTTGTTGTTGTGTTG
P150	P _{ADH6} -F-IX-1dw	CTGCCGATCTTTCTTCCTCACTGCTTGACCCCATGG AGTGTTCTTGTATCCGTC

P151	P _{BDH2} -F-IX-1up	CGAAAACACGCGGTCATAAAATTGTGCCTCGTACG TTGCAGGAGCACGC
P152	P _{BDH2} -R-ScMCRN	TTCCGGCCAACCTACCAGTTCCAGACATTTTGTCTG AAATATGTTCAATGAATTTATTGTTATTC
P153	ScMCRC-R-Kozak	CAAAATGTCTGCTACCACTGGTGCTAG
P154	P _{BDH2} -R-ScMCRC	GCAGACCTAGCACCAGTGGTAGCAGACATTTTGTG TGAAATATGTTCAATGAATTTATTGTTATTC
P155	P _{BDH2} -F-IX-1dw	CTGCCGATCTTCTTCCTCACTGCTTGACCGTACGT TGCAGGAGCACGC
P156	P _{STE3} -F-IX-1up	AAACACGCGGTCATAAAATTGTGCCTCATTTTGTG AAAATAGTATAAAGAGTGCAATG
P157	P _{STE3} -R-ScMCRN	TTCCGGCCAACCTACCAGTTCCAGACATTTTGTAA AATTTTGATAGTATTTTGCCTTTCCTAC
P158	P _{STE3} -R-ScMCRC	CAGACCTAGCACCAGTGGTAGCAGACATTTTGTAA AATTTTGATAGTATTTTGCCTTTCCTAC
P159	P _{STE3} -F-IX-1dw	CCGATCTTCTTCCTCACTGCTTGACCATTTTGTG AAAATAGTATAAAGAGTGCAATG
P160	IX-1-JDF	GCCAATGACTGCAAATACGTTCG
P161	IX-1-JDR	CCCTGAAGCCACAACCACTAC
Primers for screening responsive promoters		
P162	eGFP-F	CCC <a><u>aagctt</u> ATGGTGAGCAAGGGCGAGG
P163	eGFP-R	ACGC <a><u>gtcgac</u> TTACTTGTACAGCTCGTCCATGCC
P164	P _{SPG1} -F	AAGGGAACAAAAGCTGGTACACCAAAACCGTCGA GACAAG
P165	P _{SPG1} -R	CCTCGCCCTTGCTCACCATATTCAGTAAACTTTGTT TGAATTTTATGC
P166	P _{ADH6} -F	AAGGGAACAAAAGCTGGTACCCATGGAGTGTTCTT GTATC
P167	P _{ADH6} -R	CCTCGCCCTTGCTCACCATAGATTTTGGCTTTTCTT GTTG
P168	P _{ARI1} -F	AAGGGAACAAAAGCTGGTACCAGAAGTATTCACC TCCAAAC
P169	P _{ARI1} -R	CCTCGCCCTTGCTCACCATAAATTATTACTTTTTTAA GTCTGTTTAGC
P170	P _{OYE3} -F	AAGGGAACAAAAGCTGGTACCGGTTGGATCCTCA CTTG
P171	P _{OYE3} -R	CCTCGCCCTTGCTCACCATACTTCTAAATTTAAACT TCGCTATACTG
P172	P _{GAP1} -F	AAGGGAACAAAAGCTGGTACAAAGTTAAAAGAAA CTTTCTCATAC
P173	P _{GAP1} -R	CCTCGCCCTTGCTCACCATATTTTATTCTTTTTTTT TGTTTCTTATAAATG
P174	P _{INO1} -F	AAGGGAACAAAAGCTGGTACGGGAACGGGGGAA AAGGTC
P175	P _{INO1} -R	CCTCGCCCTTGCTCACCATATGTTACTTCTTTTTCAC TGGAATAAAGG
P176	P _{DET1} -F	AAGGGAACAAAAGCTGGTACGAACATGAAGTCAT TAAGTAGAC
P177	P _{DET1} -R	CCTCGCCCTTGCTCACCATATTCTTTTACTAATACTC TGAGTTATTC

P178	P _{SIT1} -F	AAGGGAACAAAAGCTGGTACGTGCAGACTAATGA AAAAG
P179	P _{SIT1} -R	CCTCGCCCTTGCTCACCATATATGGAAAAATTTTCG TACTGG
P180	P _{ASC1} -F	AAGGGAACAAAAGCTGGTACAAATGTTGCTAAATT GGAGG
P181	P _{ASC1} -R	CCTCGCCCTTGCTCACCATAATTTTCACTTTTATTACT TTAGTGTG
P182	P _{CIS3} -F	AAGGGAACAAAAGCTGGTACAAACGCGTCTAATTA TGG
P183	P _{CIS3} -R	CCTCGCCCTTGCTCACCATAATTTAGATGTAAGTTTA GCGAG
P184	P _{DAL5} -F	AAGGGAACAAAAGCTGGTACCCATATCTTCAGTGA GGATAAC
P185	P _{DAL5} -R	CCTCGCCCTTGCTCACCATACTTGAATTTTTTTTTTT ACACTATTTG
P186	P _{MEP2} -F	AAGGGAACAAAAGCTGGTACCTGTTAATATTTAAA TTTCTGCTAGTC
P187	P _{MEP2} -R	CCTCGCCCTTGCTCACCATATGTTGATAATTGTATTGT AATATATTAAGTATG
P188	P _{GDH3} -F	AAGGGAACAAAAGCTGGTACTAAAAACCGTCAAG GCATTTATC
P189	P _{GDH3} -R	CCTCGCCCTTGCTCACCATAATTTTACTTTTTACCTT TTCTTTTCG
P190	P _{CWP1} -F	AAGGGAACAAAAGCTGGTACTCCTCACTACAATTG CCC
P191	P _{CWP1} -R	CCTCGCCCTTGCTCACCATATATTGTTTTTGAGAC TTTCGTAG
P192	P _{BDH2} -F	AAGGGAACAAAAGCTGGTACGTACGTTGCAGGAG CACG
P193	P _{BDH2} -R	CCTCGCCCTTGCTCACCATATCTGAAATATGTTCAA TGAATTTATTGTTATTCTTATTG
P194	P _{STE3} -F	AAGGGAACAAAAGCTGGTACATTTTGTTGAAAATA GTATAAAGAGTG
P195	P _{STE3} -R	CCTCGCCCTTGCTCACCATAGAAAATTTTGATAGTA TTTTGCC
P196	P _{PDR5} -F	AAGGGAACAAAAGCTGGTACCGTTAACGTAAATAT GTCTTC
P197	P _{PDR5} -R	CCTCGCCCTTGCTCACCATAATTTTGCTAAAGTCTT TCGAAC
P198	P _{FIT2} -F	AAGGGAACAAAAGCTGGTACACGCAAGACAACAG GCAAAATAATTC
P199	P _{FIT2} -R	CCTCGCCCTTGCTCACCATATATTATTGTTTTGTGAT GGCTTTATGATAGAC
P200	P _{HSP31} -F	AAGGGAACAAAAGCTGGTACATGTACCAGTATGTA ATATTATATCAAG
P201	P _{HSP31} -R	CCTCGCCCTTGCTCACCATATATAAATTTGTTTGAGT TTTATCTGTG
P202	P _{AAD6} -F	AAGGGAACAAAAGCTGGTACTCACTTGCAGCCAG TAAC
P203	P _{AAD6} -R	CCTCGCCCTTGCTCACCATAATTAAAAATCGCTATT GAAAATGATATAG

Note: Bold and underlined sequences are 20 bp gRNA spacer and enzyme restriction sites.

Table S6 Codon optimized genes used in this study.

Gene	Sequence (5'-3')
<i>MaFAR1</i>	ATGACAAAGCGCCAGGTATCAGGTGGTGAGGCCAGCAGCCGTGTCCTTGAGCAGCTAC GTGGCAAGAAGGTCCTAATCACTGGCACGACGGGATTCCTAGGAAAGGTCGTGCTTGA GAAGTTGATACGCGCAGTGCCGGACATAGGAGGCATCTACCTGTTGATCCGTGGAAACA AACGTCATCCAAACGCGCGCTCGAGGTTTCTAAATGAGATAGCAACATCATCAGTATTTG ATAGATTAAGAGAAGCTGATACAGAAGCTTTCGACGCATTCTTGGAGGATAGAATTCATT GTGTAACAGGTGAAGTAACAGAACCTGGTTTTGGTTTAGGTGAACCTGCTTGTAGAAAG CTGGCCATGGAATTAGATGCTGTAATTAATTCAGCGGCAAGCGTTAACTTTCGCGAAGA GCTGGATAAAGCTCTGACGATAAACACCCTATGCTTGGAGAACATAGCTCAATTAGCTAG AATGAATCCTGCTTTAGCTGTATTACAAGTATCAACATGTTATGTAAATGGTATGAATTCA GGTCAAGTAGCTGAAGCTGTAATTAAACCTGCTGGTGAAGCTATTCCGCAGAGCCCGGA GGGATACTACGAGATCGAGGACTTGGTCCGTCTCCTACACGACAAGATTGAGGACGTTT GGTCGCGTTACACTGGCAAGGCGCTGGAGAAGAAGCTTGTTGAATTAGGTATTAGAGA AGCTAATAGATATGGTTGGTCAGATACATATACATTTACAAAGTGGCTGGGTGAACAATT ATTAATGAAAGCTTTACAAGGTAGATCATTAACAATTGTAAGACCTTCAATTATTGAATCA GCTTTAGAAGAACCTGCTCCTGGTTGGATTGAAGGTGTAAAGGTGCGCAGATGCTATTATA CTCGCCTATGCTAGAGAGAAGGTTACCTTATTTCTGGTAAGCGGTCTGGTATTATTGATG TAATTCCTGTAGATTTAGTAGCTAATGCTATTATTATGGGTTTAGCTGAAGCTTTAGCTGA ACCTGGTGAACAACATATTTATCAATGTTGTTTCAGGTGGGTCCAACCCAGTAACACTGG GCCAATTTATCGACCACCTAATGGAGGAGTCTAAGACGAACTACGCGGCATACGACCAC TTGTTCTACAGGCAACCTTCAAAGCCATTTGTTGCCGTAAATAGAGGTTTATTTGATTTA GTAGTCTCCGGCGTGCGACTTCCATTGTCAATCACTGACCGAGTCCTCAAATTACTAGG GAACTCTCGAGACCTAAAGTGGCTACGCAACCTGGACACCACGCAATCCCTTGCAACT ATATTTGGATTCTATACAGCGCCAGACTACGTGTTCCGGAACGATAGATTACAAGATTTA GCTGAAAGAATGGGTCAAACAGACAAGGCACTCTTCCCAGTAGATCCTAAAGCTATCG ACTGGCAGCACTACCTTCGGAAGATCCACCTCGCAGGCTTGAACCGGTACGCGTTGAA AGAAAGAAAGGTGTACTCTTTAAAGAGTTCTAGACAAAGAAAGAAGGCGGCATGA

ATGGCTATTCAACAAGTACATCATGCTGACACTAGCTCGTCTAAAGTACTGGGTCAGCTT
CGAGGCAAACGTGTGCTGATCACGGGAACCACTGGTTTCTTGGGCAAAGTAGTTCTAG
AACGCTTAATTCGAGCGGTGCCAGACATCGGCGCGATATACCTCCTCATCAGAGGTAATA
AGCGGCACCCTGATGCTAGATCAAGATTCCTTGAGGAGATCGCCACATCATCAGTATTTG
ATAGATTAAGAGAAGCTGATTCAGAAGGTTTCGACGCCTTCCTAGAGGAGCGTATCCAT
TGTGTAACAGGTGAAGTAACAGAAGCTGGTTTCGGGATAGGTCAAGAAGATTATAGAA
AGCTGGCGACAGAATTAGATGCTGTAATTAATTCAGCAGCGAGCGTTAACTTTAGGGAA
GAGCTTGACAAGGCGCTGGCAATCAACACTCTTTGCCTACGAAACATAGCGGGCATGGT
AGATTTAAATCCTAAATTAGCTGTATTACAAGTATCAACATGTTATGTAAATGGTATGAAT
TCAGGTCAAGTAACAGAATCAGTAATTAAACCTGCTGGTGAAGCTGTACCGCGAAGCCC
AGATGGTTTCTACGAGATCGAGGAGCTAGTTAGGCTACTCCAGGACAAGATCGAGGACG
TGCAGGCACGGTACTCCGGCAAGGTATTGGAGCGTAAACTCGTGGATTTAGGTATTAGA
GAAGCTAATAGATATGGTTGGTCCGACACCTACACGTTACCAAATGGCTGGGCGAGCA
GCTACTCATGAAGGCCCTTAACGGGCGGACGCTTACCATATTAAGACCTTCAATTATTGA
ATCAGCTTTAGAAGAACCTGCTCCTGGTTGGATTGAAGGTGTAAAGGTTGCAGATGCTA
TTATACTTGCGTATGCTAGAGAGAAGGTCACGTTATTTCTGGTAAGCGCAGTGGAATAA
TCGACGTCATACCCGTGGACCTCGTGGCAAACAGTATCATCCTTTCTTTAGCTGAAGCTT
TAGGTGAACCTGGTAGAAGAAGAATTTATCAATGTTGTTTCAGGTGGTGGTAATCCTATTT
CATTAGGTGAATTTATTGATCATTAAATGGCCGAGAGCAAAGCCAATTACGCCGCCTACG
ACCACTTGTTCTACCGGCAGCCCAGCAAACCATTCTAGCTGTAAACCGGGGCCCTGTTC
GACCTAGTTATCTCTGGCGTTTCGGCTCCCGCTTTCGTTGACTGACAGGGTCTTGAAACT
GTTGGGCAACAGTAGGGACCTAAAGATGCTGCGGAACCTAGACACTACTCAATCTCTTG
CCACCATCTTTGGCTTCTATACGGCTCCCGATTACATATTCGCTAACGATGAATTAATGGC
TTTAGCTAATAGAATGGGTGAAGTAGATAAAGGGTTGTTTCCTGTTGACGCACGGCTTAT
AGACTGGGAGCTTTACCTGCGGAAGATCCACTTGGCAGGGTTGAACCGTTACGCCCTCA
AGGAGCGCAAGGTTTATTCCTTAAAGACTGCCAGACAAAGAAAGAAGGCCGCCTGA

<i>MmFAR1</i>	ATGGTTAGCATACCGGAGTACTACGAGGGAAAGAACATTCTACTTACCGGCGCAACCGG ATTCCTCGGCAAGGTGCTTCTTGAGAAGCTGTTACGTTCTGCCCCGCGCTTAACAGTG TCTATGTATTAGTAAGACAGAAGGCGGGCCAGACTCCGCAGGAGCGGGTTGAGGAGAT CTTATCCAGCAAATTATTTGACCGCCTCAGGGACGAGAACCCGGACTTTCGGGAGAAGA TCATAGCAATAAACTCTGAGCTTACTCAGCCAAAGCTTGCCTTGTCTGAGGAGGACAAG GAGATAATCATCGACTCTACCAACGTTATCTTCCACTGCGCGGCGACGGTGCGATTCAAC GAGAACCCTTCGTGACGCAGTGCAGCTGAACGTCATCGCGACCCGGCAGTTGATATTACT CGCGCAGCAGATGAAGAACTTAGAGGTCTTTATGCACGTCTCTACTGCATACGCCTACT GCAACAGAAAGCACATCGATGAAGTAGTATATCCTCCTCCTGTAGATCCTAAGAAGCTTA TCGATTCATTAGAGTGGATGGACGACGGCCTCGTCAACGACATAACACCAAAGCTGATT GGCGACCGACCGAACACCTACATCTACACGAAGGCACTGGCTGAATATGTAGTACAACA AGAAGGTGCTAAATTAAATGTAGCTATTGTAAGACCTTCAATTGTAGGTGCTTCATGGAA AGAACCTTTCAGGCTGGATTGATAATTTCAACGGCCCTTCAGGTTTATTTATTGCTGC TGGTAAAGGTATCTTGCGAACAATGAGAGCTTCAAATAATGCTTTAGCTGATTTAGTACC TGTAGATGTAGTAGTAAATACATCATTAGCTGCTGCTTGGTACAGTGGCGTGAATCGTCC ACGTAATATAATGGTATATAATTGCACAACAGGTTCAACAAATCCTTTCCACTGGGGTGA AGTTGGAGACTACCTGAACCACAGCTTCAAGATGAACCCACTAAACCAGGTCTTTCGA CACCCCTTATGTCAAATTCTGCTCAAACAACCTGATGTTGCATTATTGGAAAGGTGTAAAG CACACGGTACCTGCTTTATTATTAGATTTAGCTTTAAGATTAAACAGGGCAGAAGCCTTGG ATGATGAAGACTATCACTCGGCTACACAAGGCAATGGTCTTCCTTGAGTACTTTACCTCT AACTCTTGGGTTTGGAACACCGACAACGTTAACATGCTTATGAACCAGCTGAACCCGGA GGATAAGAAGACATTCAATATCGACGTTAGGCAGCTGCACTGGGCAGAGTACATAGAGA ACTACTGCATGGGAACTAAGAAGTACGTATTAAATGAAGAGATGTGCGGCCTTCCGGCA GCCCCGAAAGCACTTAAACAAGCTCCGTAACATCCGTTACGGCTTTAATACTATCCTGGTA ATCCTAATCTGGCGAATCTTCATCGCCCGCTCCCAGATGGCCCGGAATATATGGTATTTG TCGTTTCTCTGTGCTACAAGTTTCTAAGCTATTTCCGTGCATCATCAACAATGAGATATTG A
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<i>TaFAR1</i>	ATGGTTAGCATACCCGAGTACTACGAGGGTAAGAACATCCTGCTCACGGGCGCAACCGG ATTTATGGGTAAGGTTCTCCTCGAGAAGCTTCTGCGTTCTTGCCCAAAGGTGAAGGCGG TTTATGTATTAGTAAGACATAAAGCTGGTCAGACTCCGGAGGCAAGGATCGAAGAAATC ACTAATTGCAAGTTGTTTCGACCGGCTCCGCGACGAGCAGCCCGACTTTAAAGCAAAGAT AATCGTGATAACGAGTGAGTTGACTCAGCCAGAGCTGGACTTGAGCGAGCCAATAAAG GAGAAGCTCATAGAACGAATAAACATCATCTTCCACTGCGCTGCTACAGTAAGATTTAAT GAAACATTAAGAGACGCCGTTTCAGCTCAACGTCCTGCAACCCAGCAGTTGCTGTTTCT CGCGCAGAGGATGAAGAACTTAGAGGTCTTCATGCACGTCTCGACGGCATAACGCGTACT GCAACCGGAAACAGATTGAGGAGATCGTTTACCCTCCTCCTGTAGATCCTAAGAAGCTT ATAGACAGCTTAGAGTGATGGACGACGGGTTGGTTAACGACATAACTCCTAAACTCAT CGGCGACCGTCCGAACACTTACACTTACACCAAGGCGTTGGCTGAATATGTAGTACAAC AAGAAGGTGCTAAATTAAATACAGCTATTATTAGACCTTCAATTGTAGGTGCTTCATGGA AAGAACCTTTCCCGGGCTGGATCGATAATTTCAACGGGCCTTCAGGTTTATTTATTGCTG CTGGTAAAGGTATCCTAAGGACAATGAGAGCTTCAAATTCAGCTGTAGCTGATTTAGTAC CTGTAGATGTAGTAGTAAATACAACATTAGCTGCTGCTTGGTATTCAGGTGTAAATAGAC CTAGAAATGTAATGATTTATAATTGTACAACAGGTGGTACAAACCCGTTTCATTGGGGGG AAGTCGGCTACCACATAAACCTAAACTTTAAGATCAATCCCTTGGAGAACGCGGTAAGA CATCCTAATTGTTCAATTACAATCAAATCCTTTATTACATCAATATTGGACAGCGGTTAGCC ACACCATGCCCCGCTTTCTGCTAGACCTGCTGCTACGACTTACAGGACACAAGCCATGG ATGATGAAGACCATCACTCGGTTGCACAAGGCAATGATGTTGCTAGAGTACTTTACCAG CAACAGCTGGATCTGGAACACGGAGAACATGACTATGCTGATGAACCAGCTAAACCCA GAGGATAAGAAGACTTTCAATTTGACGTTCCGGCAGCTCCATTGGGCAGAGTACATGGA GAACTACTGTATGGGTACTAAGAAGTACGTGTTAAATGAAGAGATGTCTGGCCTCCCAG CCGCCCCGTAAACATCTAAACAAGTTGCGTAACATCCGTTACGGATTTAATACTGTCCTAG TGATCTTGATCTGGAGGATATTCATCGCCAGGTCTCAGATGGCACGTAACATATGGTACT TTGTGGTATCTCTTTGCTACAAGTTTCTCTCTTATTTCCGGGCCTCATCAACAATGAGATA TTGA
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MCRN	ATGTCTGGAAC TGGTAGGTTGGCCGGAAGATCGCTTTGATCACCGGAGGAGCCGGAA ATATCGGAAGTGAATTGACTAGAAGATTCTTGGCCGAGGGAGCTACTGTTATCATCTCTG GTAGGAACAGAGCTAAGTTGACCGCCTTGGCTGAAAGAATGCAAGCTGAGGCCGGTGT CCCAGCTAAAAGGATCGACCTTGAGGTCATGGACGGTCTGACCCAGTTGCTGTTAGAG CTGGTATCGAAGCTATTGTTGCTAGACACGGTCAGATTGACATTCTTGTCAATAACGCCG GTTCTGCCGGAGCCCAAAGGAGATTGGCCGAGATCCCACTTACCGAAGCTGAATTGGG TCCCGGTGCTGAAGAAACCTTGCACGCCAGTATCGCCAATCTTTTGGGAATGGGTGGC ACCTTATGAGGATTGCTGCCCCTCATATGCCAGTCGGATCTGCTGTCATCAACGTCAGTA CCATCTTTTCTAGGGCCGAGTATTACGGTAGGATCCCATACGTTACCCCAAAGGCCGCCT TGAATGCTTTTGTCTCAACTTGCCGCCAGAGAGTTGGGTGCCAGAGGTATTAGGGTTAAC ACCATCTTCCCCGGTCCAATCGAGAGTGATAGAATCAGAACCGTCTTCCAAAGGATGGA CCAGTTGAAAGGTAGGCCAGAAGGAGACACCGCCCATCATTTCTTGAACACCATGAGG CTTTGTAGAGCCAACGACCAAGGTGCCCTTGAAAGGAGATTCCCTTCTGTGCGAGATGT TGCTGATGCTGCCGTCTTCCTTGCCCTCTGCCGAATCTGCCGCCCTTTCTGGTGAGACCAT CGAGGTCACCCATGGTATGGAGCTTCCAGCTTGTAGTGAGACTAGTCTTCTTGCTAGAA CCGACTTGAGAACTATCGACGCCAGTGGAAGAACCACCTTGATCTGTGCCGGAGACCA AATCGAGGAGGTCATGGCCCTTACTGGTATGCTTAGGACTTGTGGAAGTGAGGTTATCAT CGGTTTTAGAAAGTGCTGCCGCTCTTGCCCAGTTCGAGCAAGCCGTTAATGAGAGTAGGA GGTTGGCTGGAGCCGACTTCACCCCTCCTATTGCCCTTCCTTTGGACCCAAGAGACCCA GCCACCATCGATGCCGTCTTTGACTGGGCTGGTGAGAATACTGGTGGTATTCACGCCGC TGTATCTTGCCAGCTACCAGTCACGAACCAGCTCCATGCGTTATTGAGGTCGATGACGA GAGGGTCTTGAAC TTTTGGCCGACGAAATCACCGGTACCATCGTCATTGCTTCTAGGTT GGCTAGATACTGGCAAAGTCAGAGACTTACCCCCGGTGCTAGGGCTAGGGGTCCTAGGG TCATCTTCTTGTCTAACGGTGCCGACCAGAACGGAACGTCTACGGAAGGATCCAGAGT GCCGCCATCGGTCAGCTTATTAGAGTCTGGAGACATGAGGCCGAATTGGACTATCAGAG AGCCTCTGCTGCTGGTGACCATGTTTTGCCACCAGTTTGGGCCAACCAGATCGTTAGAT TCGCCAATAGAAGTCTTGAAGGATTGGAGTTCGCTTGTGCTTGGACTGCCCAGCTTTTG CACAGTCAGAGGCACATCAATGAGATTACCTTGAATATCCCAGCTAATATTTAA
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MCRC	ATGTCTGCTACCACTGGTGCTAGGTCTGCTTCTGTCCGGTTGGGCTGAGTCTTTGATCGGT TTGCACCTTGGAAGATCGCCCTTATCACCGGAGGATCTGCCGGTATTGGTGGTCAGAT CGGTAGGCTTTTGGCTTTGAGTGGAGCTAGAGTCATGTTGGCTGCTAGAGATAGACATA AGCTTGAGCAGATGCAAGCCATGATCCAGTCTGAGCTTGCCGAGGTCGGATACACTGAC GTCGAGGACAGAGTCCATATTGCCCCGGTTGCGACGTCAGTAGTGAAGCCCAACTTGC CGACTTGGTCGAAAGGACCCTTTCTGCCTTTGGAACCGTCGACTATTTGATCAACAATG CCGGTATTGCCGGTGTGGAAGAAATGGTCATCGACATGCCAGTCGAGGGATGGAGGCA CACCTTGTTTGCCAACTTGATTAGTAATTATTCTTTGATGAGGAAGCTTGCCCCACTTATG AAGAAGCAAGGTTCTGGTTATATTCTTAATGTCAGTTCTTATTTCCGGTGGAGAGAAGGAC GCCGCCATTCCATACCCAAATAGGGCTGACTACGCCGTTAGTAAGGCTGGACAGAGAGC CATGGCTGAAGTCTTTGCTAGATTCTTGGGTCCAGAGATCCAGATCAATGCCATCGCCCC CGGTCCAGTTGAGGGAGATAGACTTAGGGGAACTGGTGAAAGGCCCGGTCTTTTCGCT AGGAGGGCTAGACTTATCCTTGAGAATAAGAGGCTTAACGAACCTTCACGCCGCTCTTAT CGCTGCTGCCAGAACCGATGAGAGGAGTATGCACGAGTTGGTCGAATTGCTTTTGCCAA ACGACGTTGCCGCCTTGGAACAGAATCCAGCTGCCCCAACTGCTCTTAGGGAGTTGGCT AGAAGGTTTAGAAGTGAAGGAGATCCAGCCGCTCTTCTAGTTCTGCTTTGCTTAATAG ATCTATCGCCGCCAAGCTTTTGGCCAGACTTCACAACGGTGGATACGTTTTGCCAGCCG ACATCTTCGCTAACTTGCCAAACCCACCAGACCCTTTCTTCACCAGAGCCCAAATCGAT AGAGAGGCTAGAAAGGTTAGAGACGGTATCATGGGAATGTTGTACTTGCAGAGGATGCC AACCGAATTTGATGTTGCCATGGCTACCGTTTACTACTTGGCTGATAGGGTCGTCTCTGG TGAAACCTTCCATCCAAGTGGAGGTTTGAGGTACGAGAGGACCCCAACCGGAGGAGAG CTTTTCGGTCTTCCTTCTCCAGAGAGGTTGGCCGAATTGGTCGGTTCTACCGTCTACCTT ATTGGAGAGCACTTGACCGAACATTTGAATTTGCTTGCTAGAGCCTACCTTGAAAGGTA CGGAGCCAGACAAGTTGTTATGATCGTCGAAACCGAGACTGGAGCTGAGACCATGAGG AGACTTCTTCACGACCACGTTGAGGCTGGAAGATTGATGACCATCGTCGCTGGAGACCA GATTGAGGCTGCCATCGACCAAGCTATCACTAGATATGGAAGACCCGGTCCAGTTGTCT GTACTCCTTTTCCAGACCTCTTCCAACCGTCCCTTTGGTCGGTAGGAAGGATAGTACTGG TCTACCGTCTTGAGTGAGGCCGAATTCGCCGAACCTTTGCGAACACCAACTTACCCACCA TTTCAGAGTCGCTAGATGGATTGCTCTTAGTGATGGTGCCAGACTTGCTTTGGTCACTCC AGAAACCACCGCCACCAGTACCACCGAACAGTTCGCCTTGCCAACTTCATCAAGACT ACCTTGACGCTTTACCGCCACTATTGGAGTTGAGTCTGAAAGGACCGCCAGAGGAT CTTGATCAACCAAGTTGACCTTACCAGAAGGGCTAGGGCCGAGGAACCTAGAGATCCT CACGAAAGGCAGCAAGAAGCTTGAGAGGTTATCGAGGCCGTCTTTTGGTTACTGCTC CTTTGCCTCCAGAAGCCGATACCAGATATGCTGGAAGGATCCATAGAGGAAGAGCTATC ACTGTCTAA
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