Supplementary Figures and Legends

Figure S1: Competitive fitness, growth curves, and representative flow cytometry profiles for all 49 long-lived strains examined

Figure S2: Competitive fitness control experiments
a) Heat map representing the relative fitness of strains initially inoculated with different ratios of WT/mutant by volume. Green indicates relative fitness < 0 (outcompeted by wild type), red indicates relative fitness > 0. Statistical significance was determined at week 3.
b) Heat map as in (a) for the random mutants chosen for this study.

Figure S3: Translation mutants have decreased mean cell size
a) Representative forward scatter graphs for sample strains.
b) Strains which showed a significant difference in mean cell size from wild type by forward scatter.

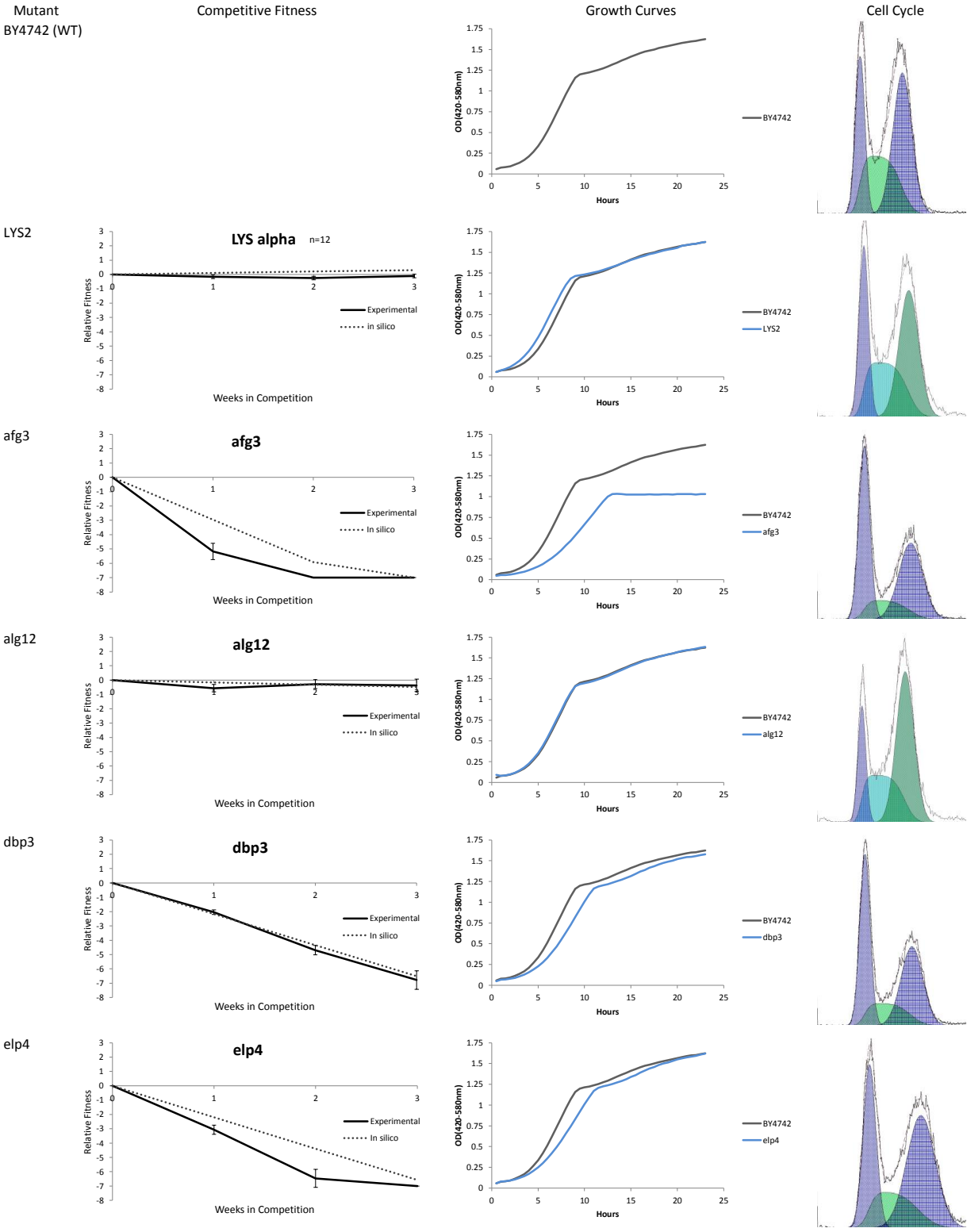
Figure S4: Long lived mutants found to be diploid
a) Representative flow cytometry profiles of log phase SYTOX Green stained yeast.
b) Replicative lifespans of remade *rpl20bΔ*. The number of mother cells is shown in (), mean lifespan in [].

Figure S5: Long lifespan has negligible fitness benefit. Graph values are from an in silico simulation of a WT mutant (RLS=26) in competition with a mutant with equal doubling time but much greater lifespan (RLS=52)

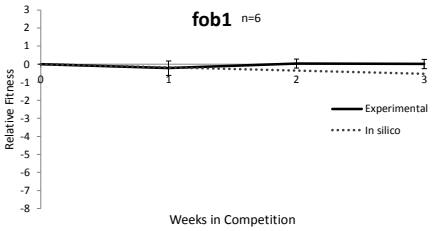
Figure S6: Heat map representing the relative fitness of all strains tested in this study. Green indicates relative fitness < 0 (outcompeted by wild type), red indicates relative fitness > 0. Statistical significance was determined at week 3.

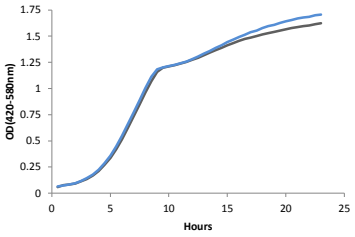
Table S1: Competitive fitness and growth rate data of randomly tested strains
a) Relative fitness data for randomly tested strains. n=3 and error values are in s.e.m. *p < 0.05, **p <0.01
b) Maximal growth rates for randomly tested strains. n=3 and error values are in s.e.m.

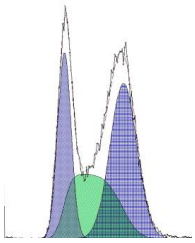
Figure S1


Mutant
Competitive Fitness
Growth Curves
Cell Cycle
BY4742 (WT)
LYS2
LYS alpha n=12
afg3
afg3
alg12
alg12
dbp3
dbp3
elp4
elp4
Relative Fitness
Weeks in Competition
Experimental
in silico
In silico
OD(420-580nm)
Hours
BY4742
LYS2
afg3
alg12
dbp3
elp4

fob1







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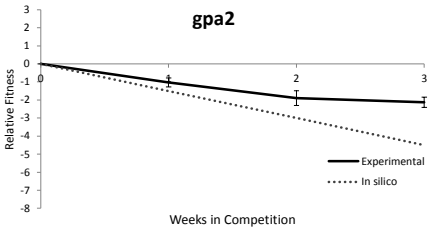

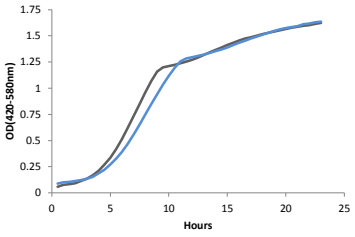

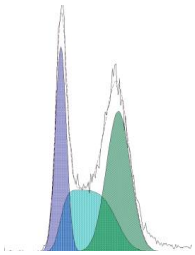

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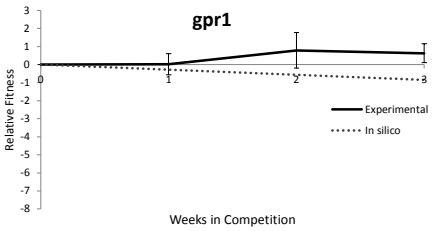

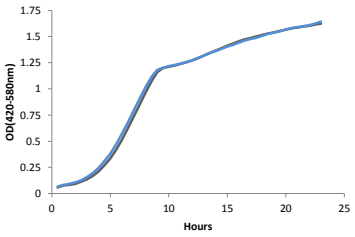

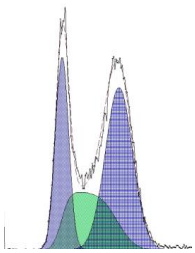

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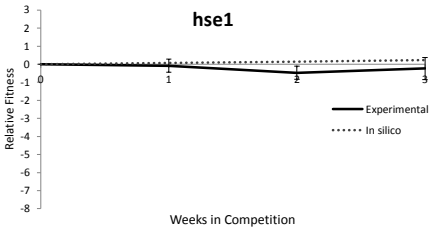

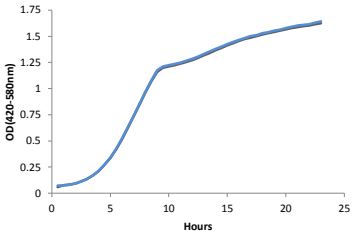

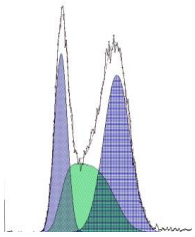

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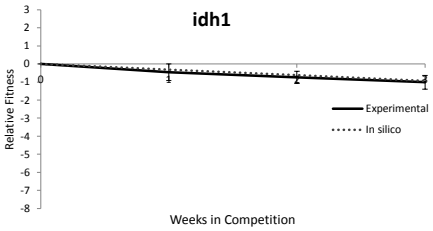

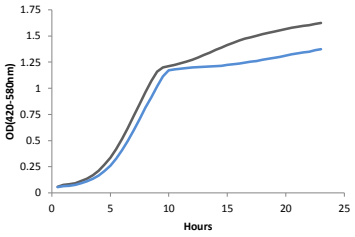

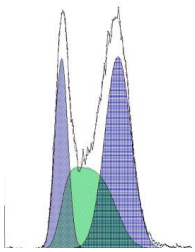

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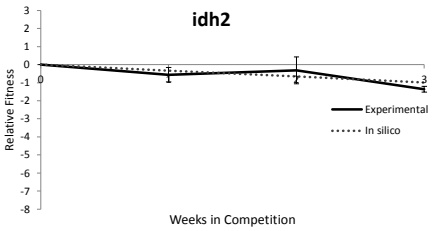

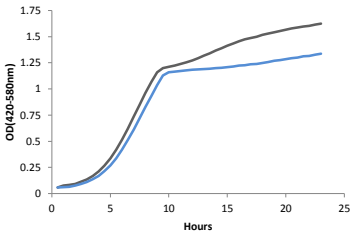

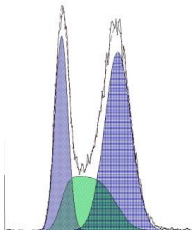

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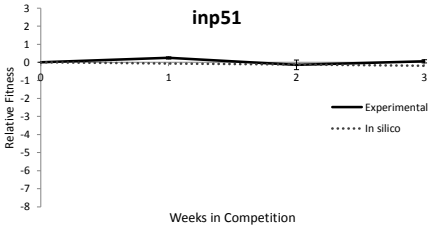

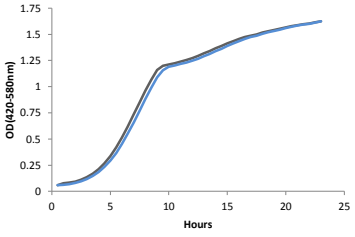

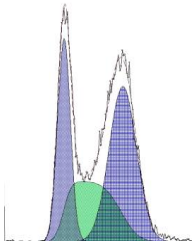

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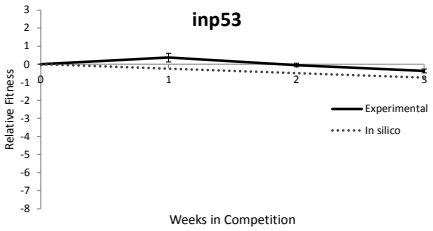

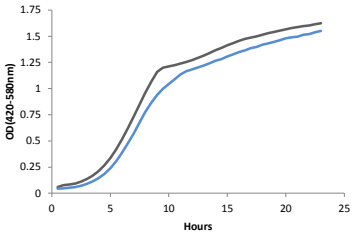

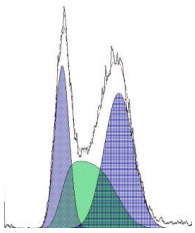

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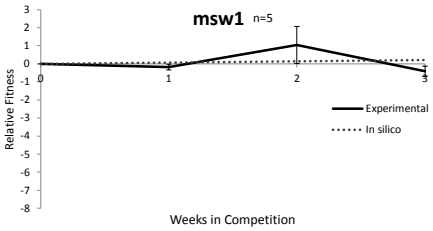

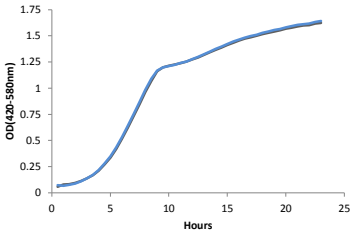

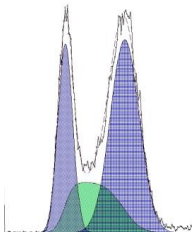

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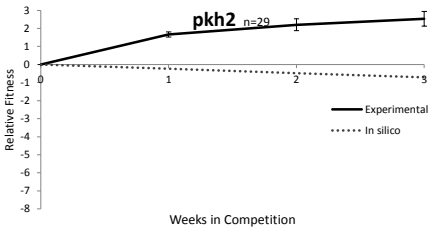

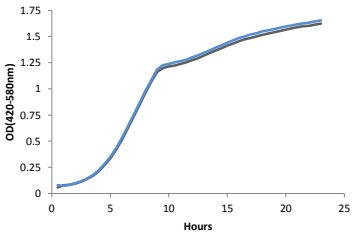

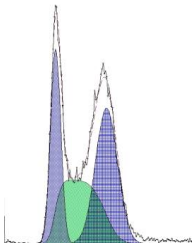

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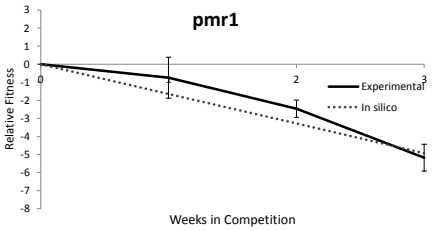

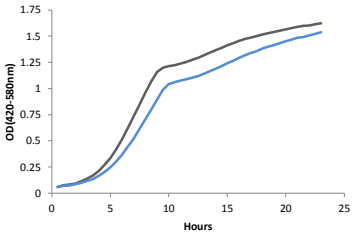

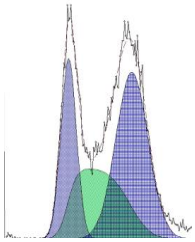

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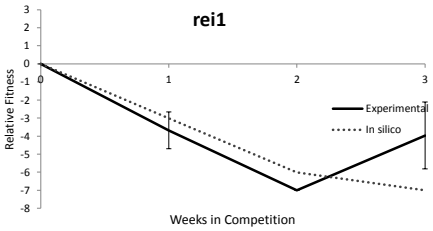

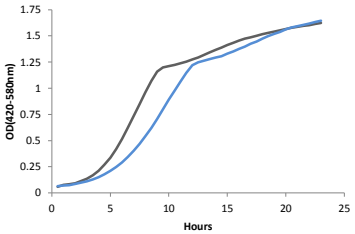

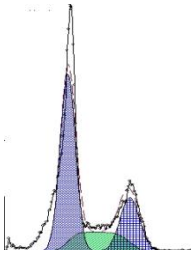

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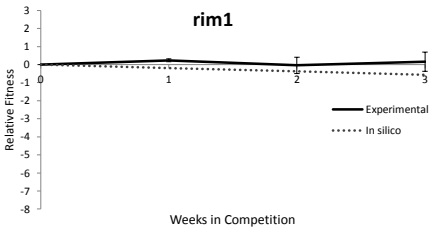

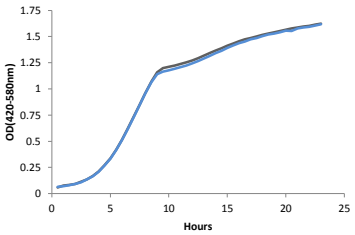

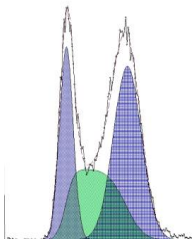

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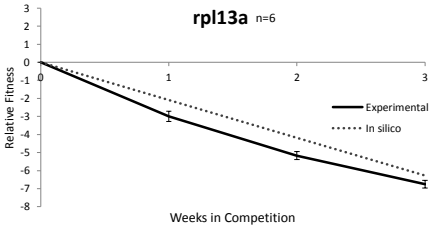

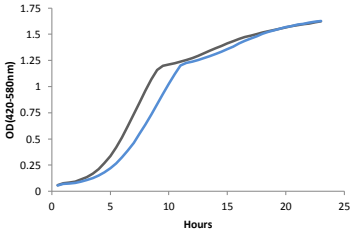

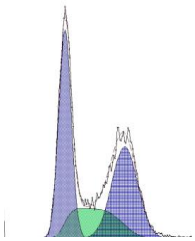

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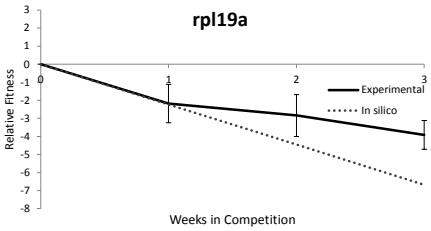

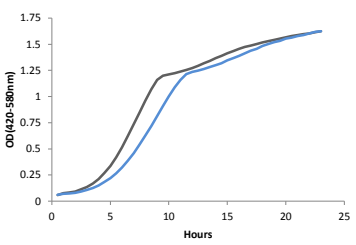

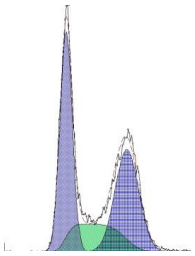

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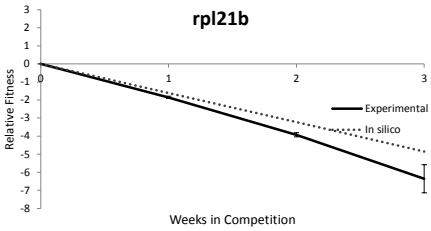

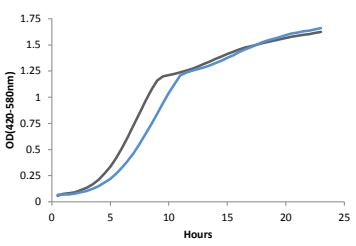

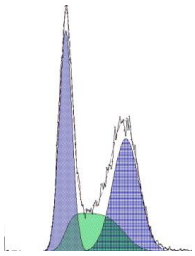

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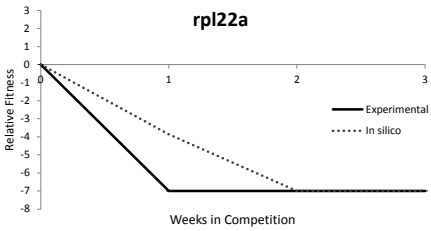

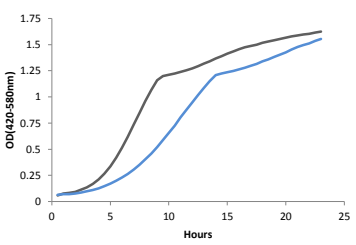

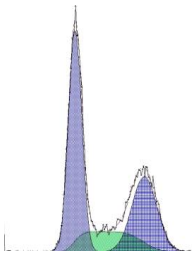

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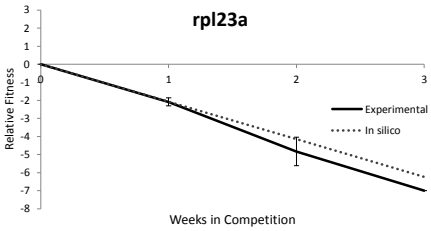

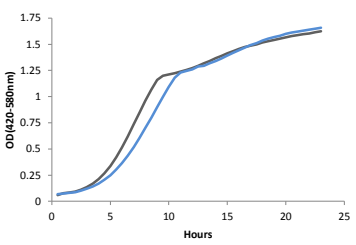

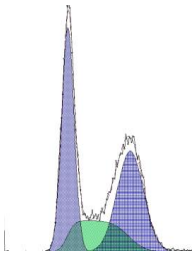

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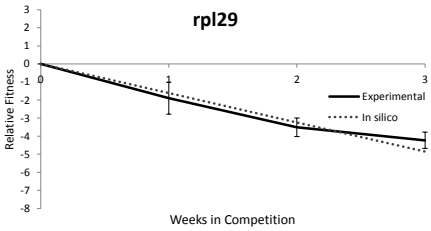

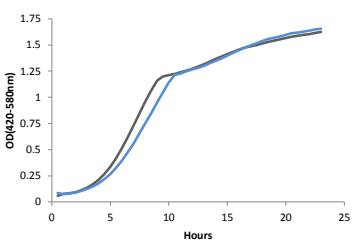

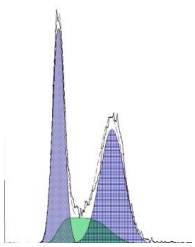

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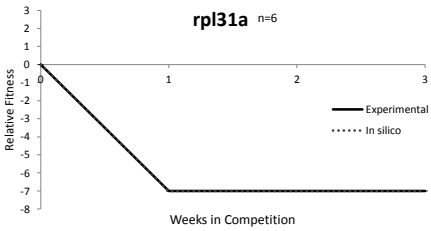

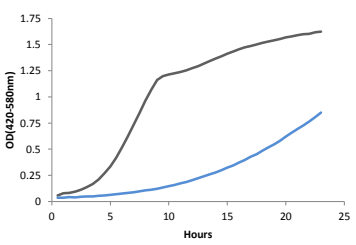

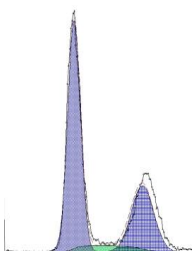

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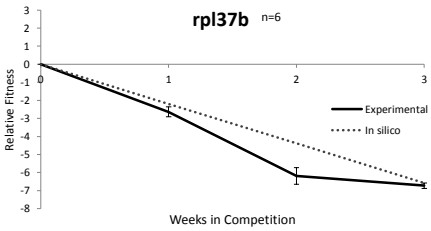

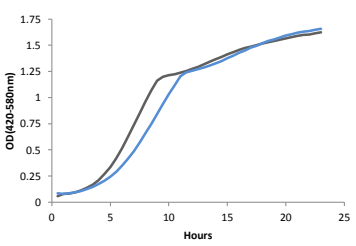

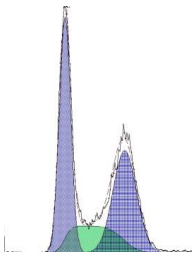

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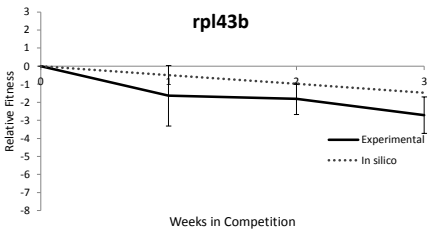

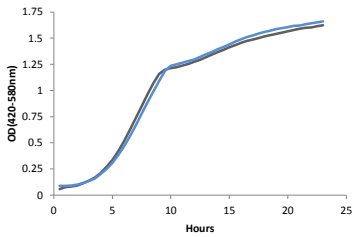

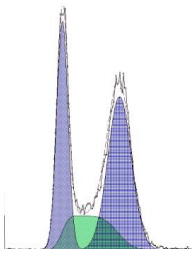

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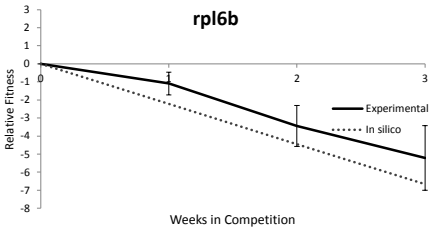

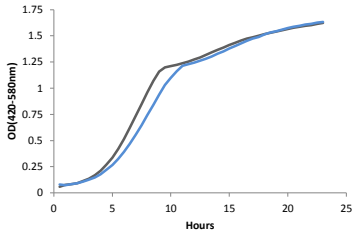

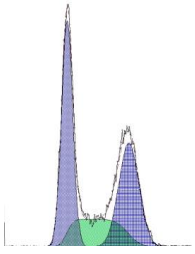

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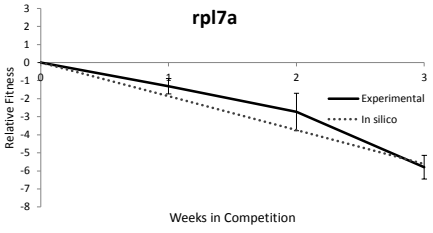

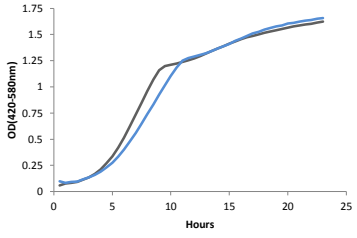

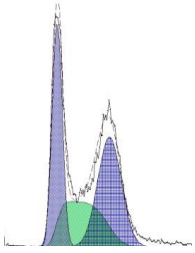

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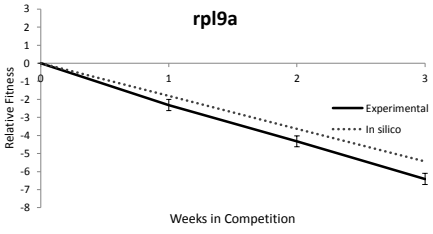

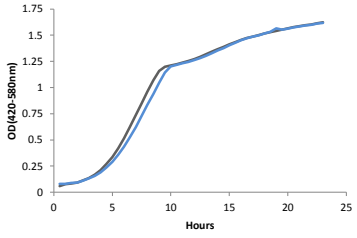

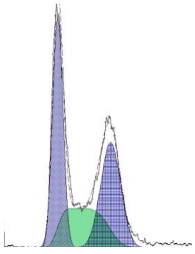

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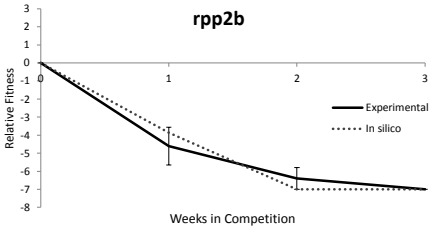

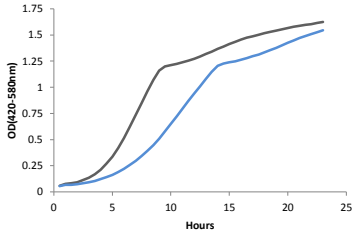

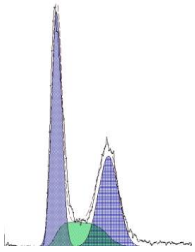

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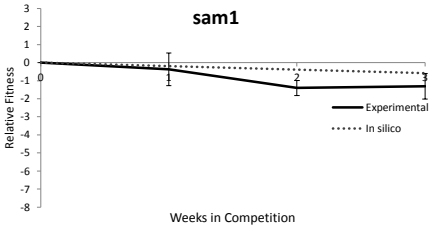

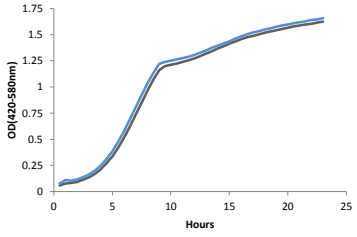

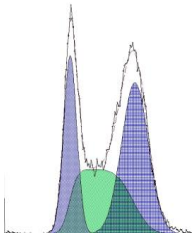

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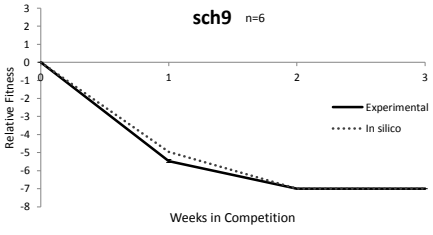

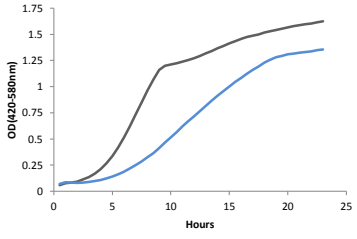

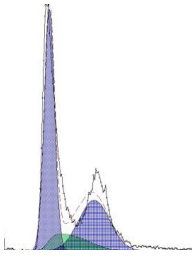

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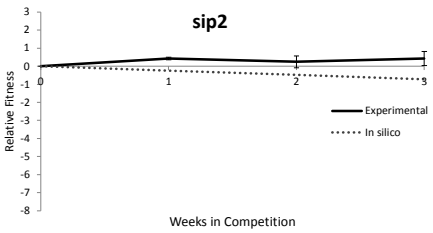

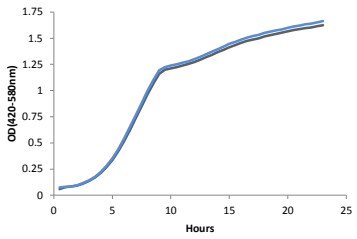

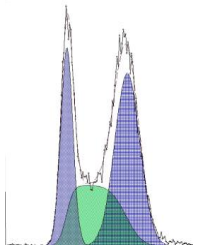

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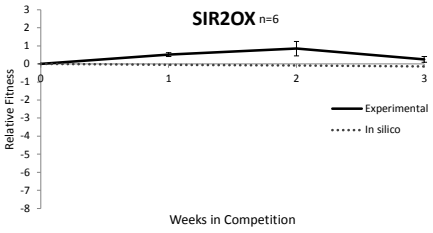

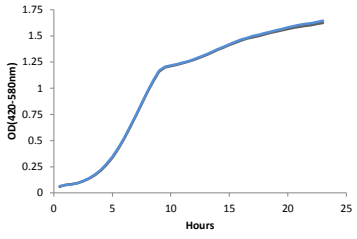

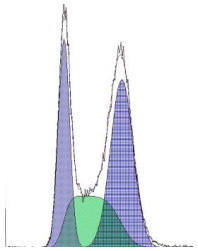

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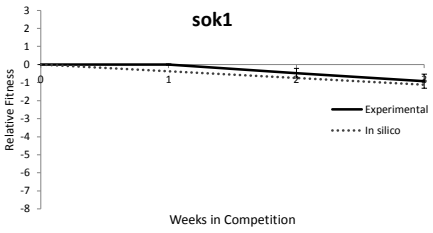

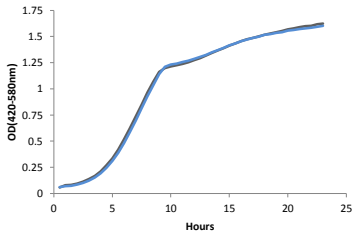

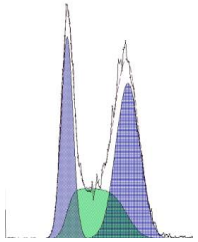

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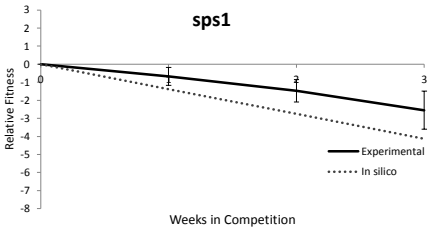

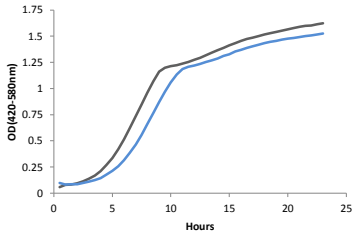

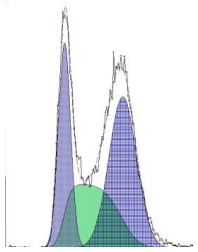

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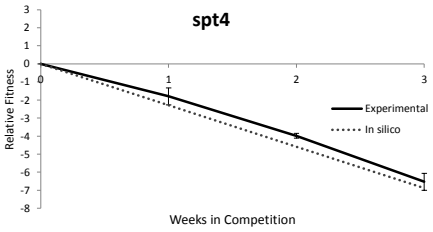

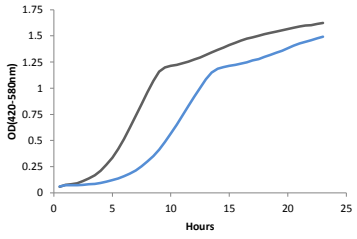

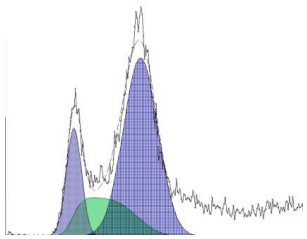

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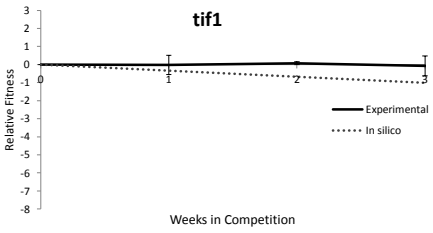

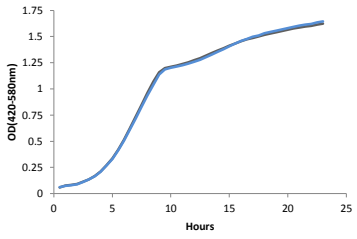

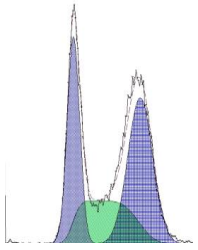

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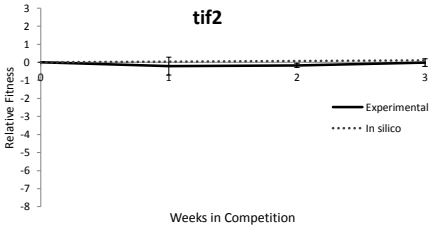

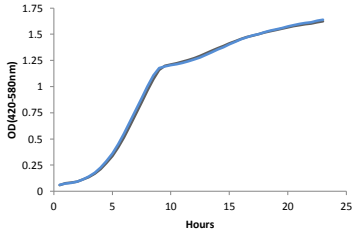

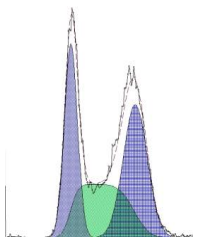

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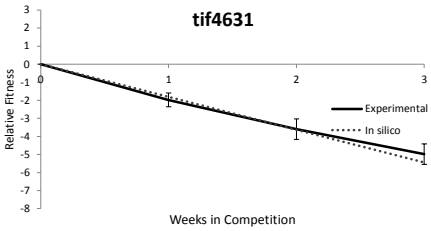
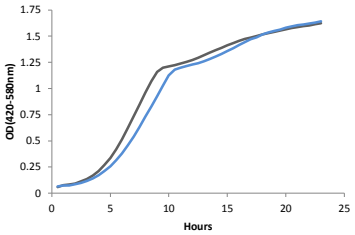
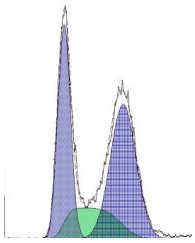
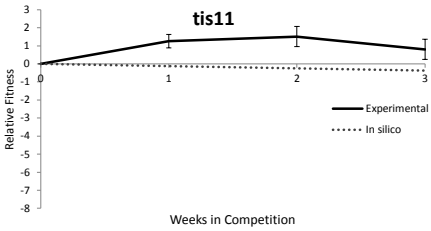
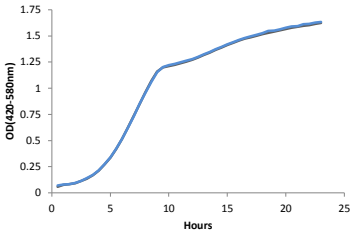


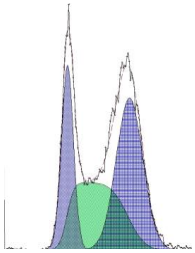




tis11







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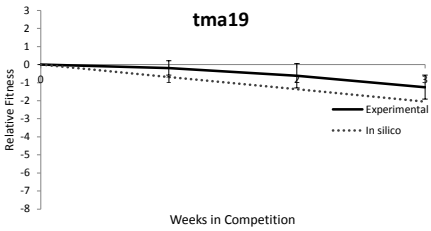

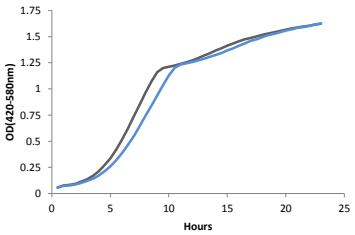

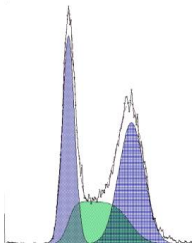

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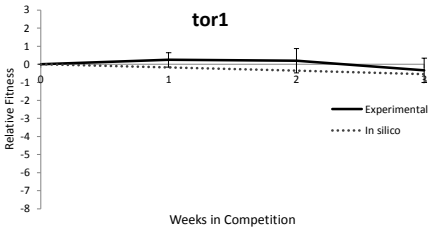

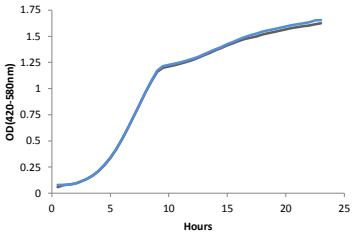

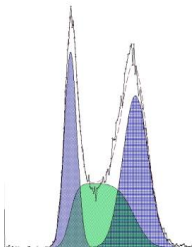

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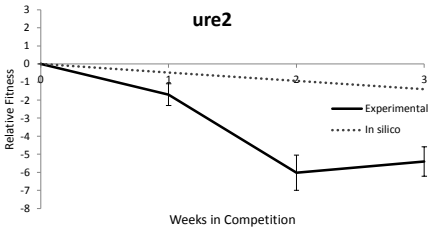
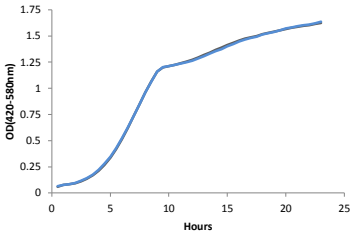
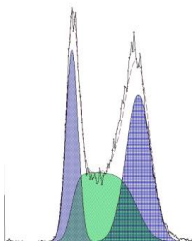
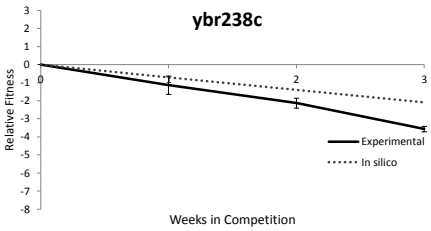
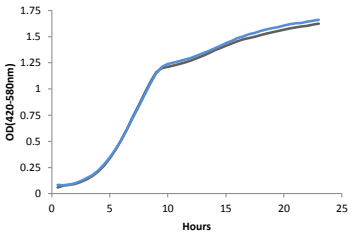


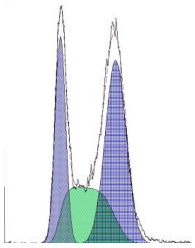




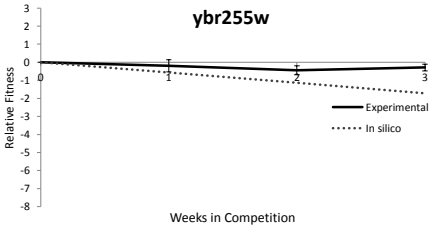
ybr238c

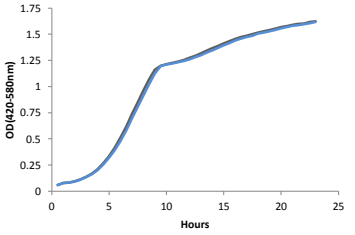


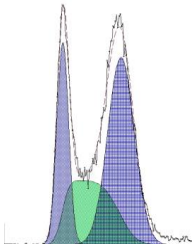




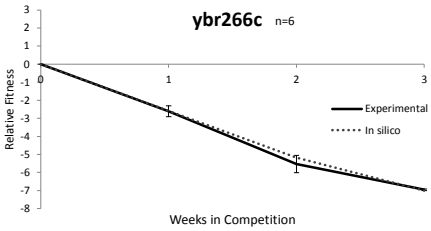
ybr255w

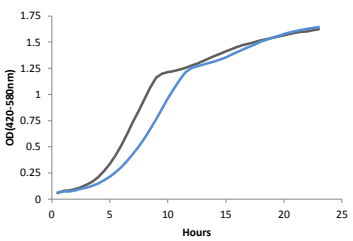


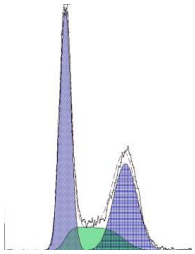




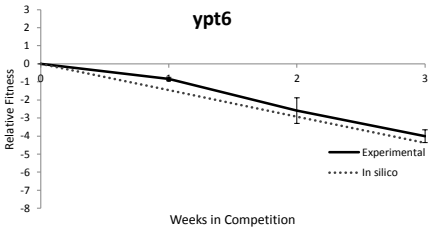
ybr266c

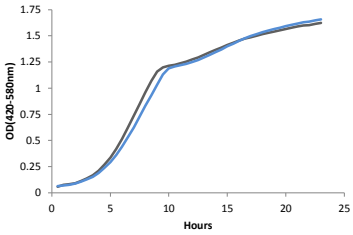






ypt6





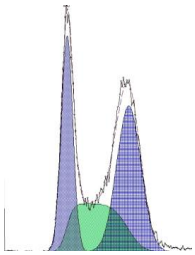


Figure S2

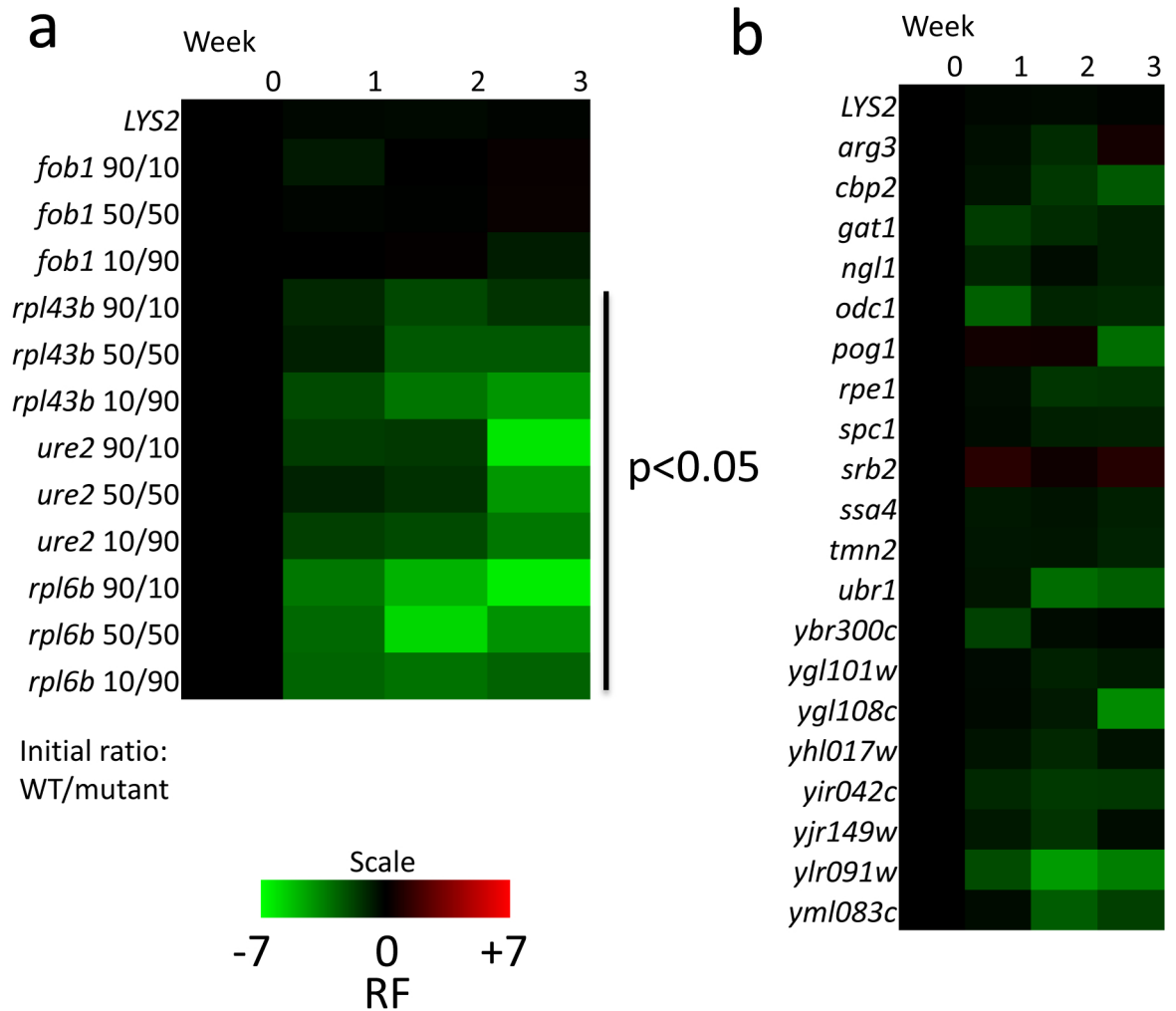
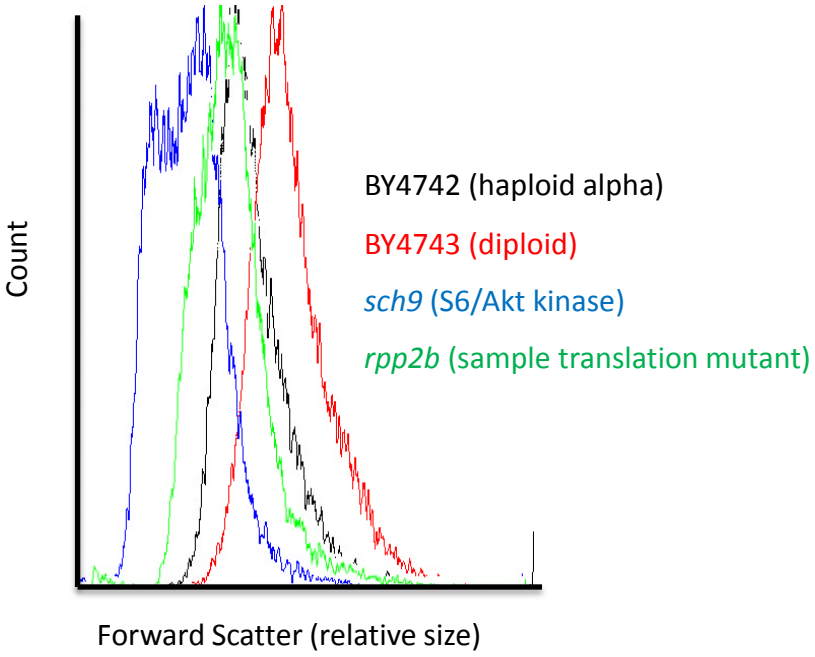

a
Week
0
1
2
3
LYS2
fob1 90/10
fob1 50/50
fob1 10/90
rpl43b 90/10
rpl43b 50/50
rpl43b 10/90
ure2 90/10
ure2 50/50
ure2 10/90
rpl6b 90/10
rpl6b 50/50
rpl6b 10/90
p<0.05
Initial ratio:
WT/mutant
Scale
-7
0
+7
RF
b
Week
0
1
2
3
LYS2
arg3
cbp2
gat1
ngl1
odc1
pog1
rpe1
spc1
srb2
ssa4
tmn2
ubr1
ybr300c
ygl101w
ygl108c
yhl017w
yir042c
yjr149w
ylr091w
yml083c

Figure S3

a


Count
BY4742 (haploid alpha)
BY4743 (diploid)
sch9 (S6/Akt kinase)
rpp2b (sample translation mutant)
Forward Scatter (relative size)

b

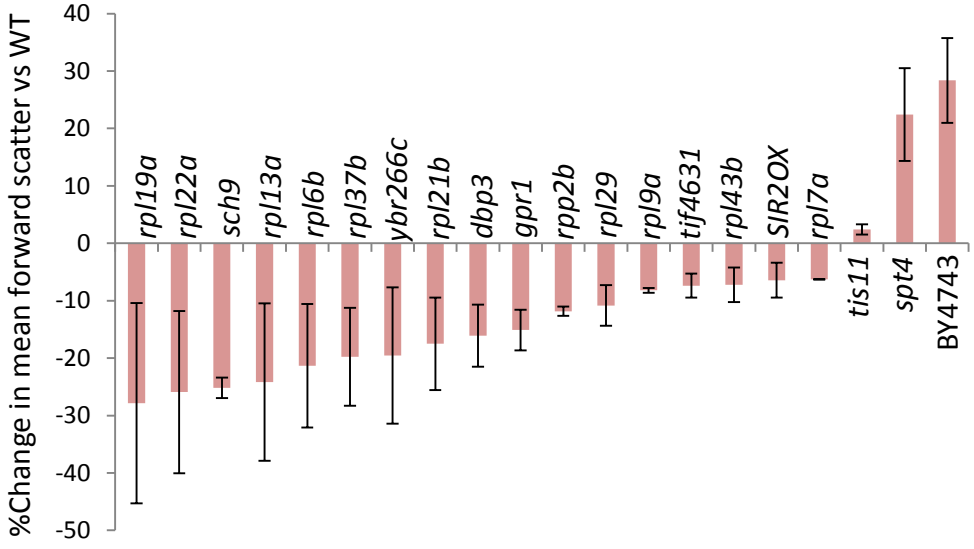
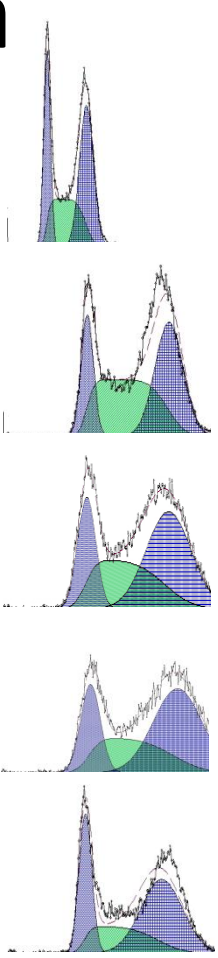

%Change in mean forward scatter vs WT
40
30
20
10
0
-10
-20
-30
-40
-50
rpl19a
rpl22a
sch9
rpl13a
rpl6b
rpl37b
ybr266c
rpl21b
dbp3
gpr1
rpp2b
rpl29
rpl9a
tif4631
rpl43b
SIR2OX
rpl7a
tis11
spt4
BY4743

Figure S4

a



BY4742
(haploid)

BY4743
(diploid)

adh1
(*alpha*
collection)

rom2
(*alpha*
collection)

rpl20b
(*alpha*
collection)

b

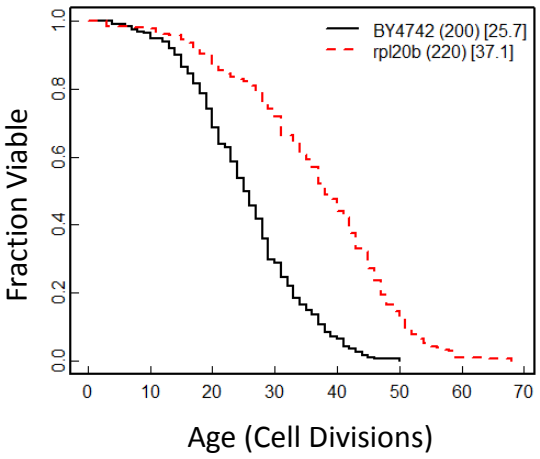


Figure S5

a

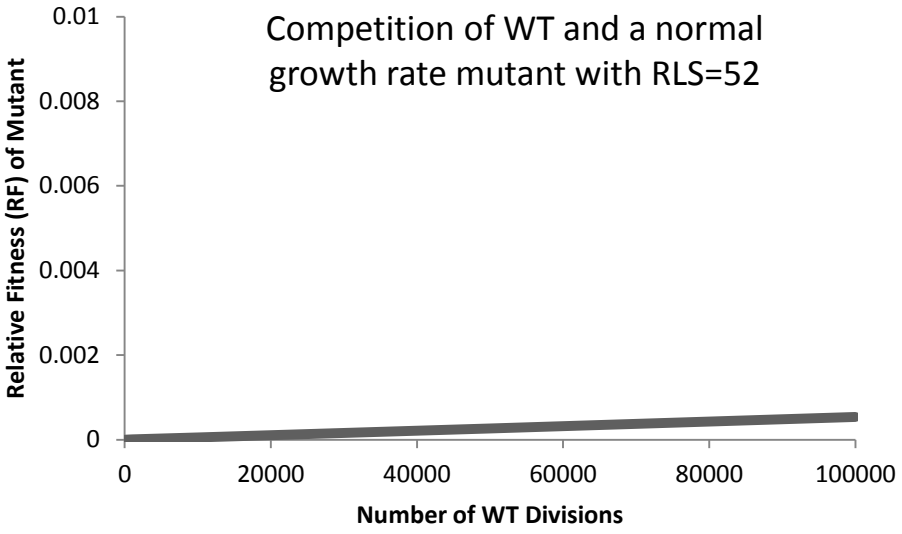

Competition of WT and a normal growth rate mutant with RLS=52
Relative Fitness (RF) of Mutant
0.01
0.008
0.006
0.004
0.002
0
0
20000
40000
60000
80000
100000
Number of WT Divisions

Figure S6

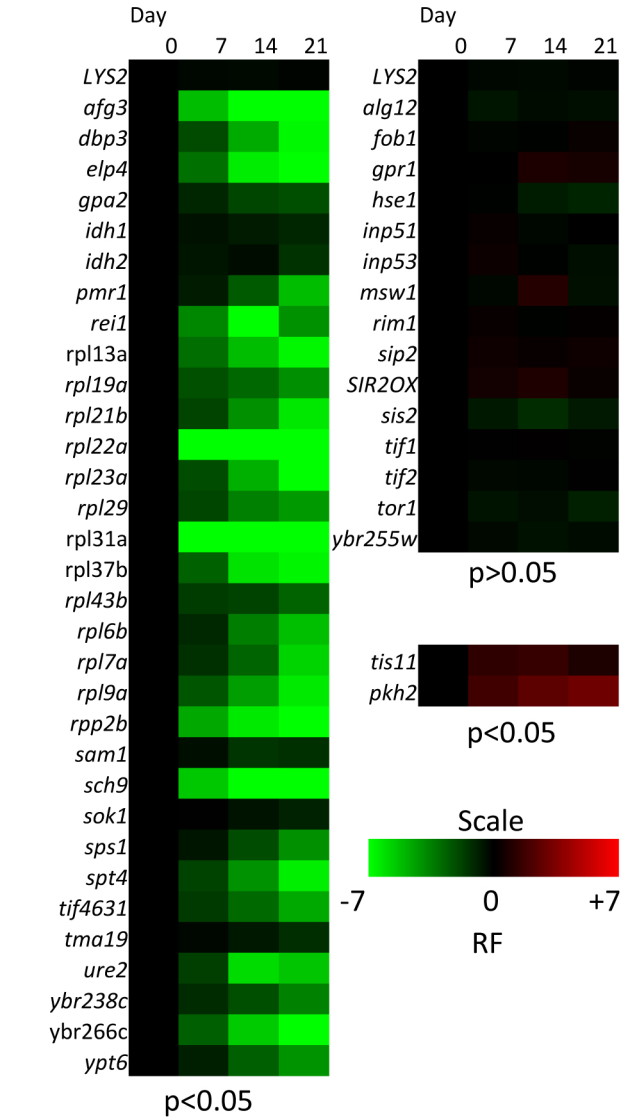

Day
0 7 14 21
LYS2
afg3
dbp3
elp4
gpa2
idh1
idh2
pmr1
rei1
rpl13a
rpl19a
rpl21b
rpl22a
rpl23a
rpl29
rpl31a
rpl37b
rpl43b
rpl6b
rpl7a
rpl9a
rpp2b
sam1
sch9
sok1
sps1
spt4
tif4631
tma19
ure2
ybr238c
ybr266c
ypt6
p<0.05
Day
0 7 14 21
LYS2
alg12
fob1
gpr1
hse1
inp51
inp53
msw1
rim1
sip2
SIR2OX
sis2
tif1
tif2
tor1
ybr255w
p>0.05
tis11
pkh2
p<0.05
Scale
-7
0
+7
RF

Table S1: Competitive fitness and growth rate data of randomly tested strains

Strain	Relative Fitness (RF)			
arg3	-1.37	±	1.08	*
cbp2	-2.42	±	0.81	**
gat1	-0.82	±	0.39	*
ngl1	-0.82	±	0.40	*
odc1	-1.08	±	0.14	**
pog1	-0.57	±	1.20	
rpe1	-2.58	±	0.62	**
spc1	-0.87	±	0.16	*
srb2	0.99	±	0.30	**
ssa4	-0.44	±	0.20	
tmn2	-0.92	±	0.15	**
ubr1	-2.57	±	1.72	**
ybr300c	-0.11	±	0.24	
ygl101w	-0.46	±	0.10	
ygl108c	-1.05	±	1.43	
yhl017w	-0.45	±	0.61	
yir042c	-1.48	±	0.17	**
yjr148w	-0.96	±	0.47	*
ylr091w	-4.86	±	0.71	**
yml083c	-1.72	±	0.09	**

Strain	Doubling Time (min)			
mnt3	85.8	±	0.5	**
gpb1	87.7	±	0.6	*
ymr306c-a	91	±	1.6	
vps30	91	±	0.3	
rck2	91.5	±	0.9	
yhl017w	91.7	±	0.7	
ygr176w	91.7	±	1.2	
yml037c	91.7	±	0.2	
tmn2	91.9	±	0.2	
yml083c	92.1	±	0.3	
ygr203w	92.1	±	1.5	
scs22	92.3	±	3.8	
tax4	92.6	±	0.5	
agp1	92.6	±	2.1	
fkh2	92.7	±	1.2	
mlc2	92.8	±	0.9	
ynl092w	92.8	±	0.8	
vhs1	92.8	±	1	
git1	92.9	±	0.9	
ngl1	92.9	±	0.2	
cos6	92.9	±	1.2	
yhr182w	93	±	1.3	
ies1	93.1	±	0.4	
yip3	93.1	±	2.1	
bbc1	93.1	±	0.1	

Strain	Doubling Time (min)			
ubr1	93.1	±	0.3	
ssa1	93.2	±	0.2	
nap1	93.5	±	1.1	
ydl156w	93.5	±	2.5	
hir3	93.6	±	1.2	
sti1	93.8	±	1.3	*
odc1	94.1	±	1	*
mcm22	94.3	±	0.1	
tms1	94.5	±	2.4	
ytp1	94.9	±	2.7	
yir042c	94.9	±	1.8	
spc1	95.5	±	2.3	*
gat1	95.5	±	2.2	*
ybl036c	96	±	2.2	
atg16	96.6	±	0	**
ygr287c	96.8	±	3.5	
ydr065w	97.5	±	2.9	*
ybr300c	97.6	±	0.2	**
cpr6	97.8	±	1.7	**
rtt103	98.9	±	1.4	**
ade8	99	±	1.6	**
nst1	99.5	±	1.3	**
ccw12	103.8	±	0.1	**
yil110w	111.9	±	0.5	**
bud22	156.6	±	3.7	**
BY4742	91	±	1.3	