

**Table S1 Strain genotypes and strain construction**

Strain name	Genotype	Strain construction or reference
W1588-4C	<i>MATa leu2-3,112 his3-11,15 ura3-1 ade2-1 trp1-1 can1-100 RAD5</i>	Zhao <i>et al.</i> , 1998
JSC52-1	<i>MATa leu2-3,112 his3-11,15 ura3-1 ade2-1 trp1-1 can1-100 RAD5 IV1013217::URA3</i>	Inserted <i>URA3</i> at IV1013217 by transforming W1588-4C with a PCR fragment generated with primers RE HS2 URA3 F and RE HS2 URA3 R using strain JAY291 (Argueso <i>et al.</i> , 2009) as template.
JSC54-1	<i>MATa leu2-3,112 his3-11,15 ura3-1 ade2-1 trp1-1 can1-100 RAD5 IV957578::hphMX4 IV1013217::URA3</i>	Inserted <i>hphMX4</i> at IV957578 by transforming JSC52-1 with a PCR fragment generated with primers RE HS2 HYG F and RE HS2 HYG R using plasmid pAG32 (Goldstein and McCusker, 1999) as template.
EY2-1	<i>MATa leu2-3,112 his3-11,15 ura3-1 ade2-1 trp1-1 can1-100 RAD5 IV957578::hphMX4 IV1013217::URA3 IV1510386::SUP4-o</i>	Inserted <i>SUP4-o</i> at IV1510386 by transforming JSC54-1 with a PCR fragment generated with primers IV 1510386::SUP4-o F and IV 1510386::SUP4-o R using plasmid YCpMP2 (Pierce <i>et al.</i> , 1987) as template.
PSL4	<i>MATα ade2-1 ura3-p gal2 ho::hisG</i>	Lee <i>et al.</i> , 2009
EY3-1	<i>MATα ade2-1 ura3-p gal2 ho::hisG IV1013217::URA3</i>	Inserted <i>URA3</i> at IV1013217 by transforming PSL4 with a PCR fragment generated with primers RE HS2 URA3 F and RE HS2 URA3 R using JAY291 genomic DNA as template.
EY4-2	<i>MATα ade2-1 ura3-p gal2 ho::hisG IV1013217::ura3-e</i>	<i>ura3</i> mutant obtained as a spontaneous 5-FOA <sup>R</sup> isolate of EY3-1.
EY6-4	<i>MATa/MATα leu2-3,112/LEU2 his3-11,15/HIS3 ade2-1/ade2-1 ura3-1/ura3-p trp1-1/TRP1 can1-100/CAN1 GAL2/gal2 ho/ho::hisG IV957578::hphMX4/IV957578 IV1013217::URA3/IV1013217::ura3-e IV1510386::SUP4-o/IV1510386</i>	Cross of EY4-2 and EY2-1.

EY7-3

*MAT $\alpha$ /MAT $\alpha$ ::natMX4 leu2-3,112/LEU2 his3-11,15/HIS3 ade2-1/ade2-1 ura3-1/ura3-p trp1-1/TRP1 can1-100/CAN1 GAL2/gal2 ho/ho::hisG IV957578::hphMX4/IV957578 IV1013217::URA3/IV1013217::ura3-e IV1510386::SUP4-o/IV1510386*

Deletion of *MAT $\alpha$*  from EY6-4 by transforming with the PCR product generated with primers MAT ALPHA NAT F and MAT ALPHA NAT R using the plasmid pAG25 (Goldstein and McCusker, 1999) as a template.

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Haploids W188-4C, JSC52-1, JSC54-1, and EY2-1 are isogenic with W303-1A (Thomas and Rothstein, 1989), except for changes introduced by transformation. Haploids PSL4, EY3-1, and EY4-2 are isogenic with YJM789 (Wei *et al.*, 2007) except for changes introduced by transformation.