

Table S1. Strain list

Strain Name	Relevant genotype	Construction or source	Genotype	Strain background
S288c	Wild type	Mortimer and Johnston 1986	<i>MATα SUC2 gal2 mal2 mel flo1 flo8-1 hap1 ho bio1 bio6</i>	S288c
W1588-4c	Wild type	Zhao <i>et al.</i> 1998	<i>MATα leu2-3,112 his3-11,15 ura3-1 ade2-1 trp1-1 can1-100 RAD5</i>	W303-1A
W303-1A	Wild type	Thomas and Rothstein 1989	<i>MATα leu2-3,112 his3-11,15 ura3-1 ade2-1 trp1-1 can1-100 RAD5</i>	W303-1A
SMY710	Wild type	Aksenova <i>et al.</i> 2013	<i>MATα leu2-Δ1 trp1-Δ63 ura3-52 his3-200 ade2Δ::kanMX</i>	S288c
MV70	Wild type	Vernon <i>et al.</i> 2008	<i>MATα/MATα trp1-1/trp1-1 leu2-3,112/leu2-3,112 his3-11,15/his3-11,15 ura3-1/ura3-1 ade2-1/ade2-1 can1-100/CAN1 hom3-10/HOM3 rad5/RAD5 tel1Δ::kanMX/TEL1 mec1-21/MEC1</i>	W303-1A/ W303-1A
PG308	Wild type	MV70 transformed with PCR fragment amplified from pAG25 using primers Tel1NatF and Tel1NatR.	<i>MATα/MATα trp1-1/trp1-1 leu2-3,112/leu2-3,112 his3-11,15/his3-11,15 ura3-1/ura3-1 ade2-1/ade2-1 can1-100/CAN1 hom3-10/HOM3 rad5/RAD5 tel1Δ::natMX/TEL1 mec1-21/MEC1</i>	W303-1A/ W303-1A
PG309(2)	Wild type	PG308 transformed with PCR fragment amplified from pFA6-kanMXpGAL(x3HA) using primers MRC1pgalF and MRC1pgalR	<i>MATα/MATα trp1-1/trp1-1 leu2-3,112/leu2-3,112 his3-11,15/his3-11,15 ura3-1/ura3-1 ade2-1/ade2-1 can1-100/CAN1 hom3-10/HOM3 rad5/RAD5 tel1Δ::nat/TEL1 mec1-21/MEC1 MRC1/pGAL-MRC1-kanMX</i>	W303-1A/ W303-1A
PG309(2)-4a	<i>tel1Δ</i>	Spore from PG309(2)	<i>MATα RAD5 leu2-3,112 his3-11,15 trp1-1 ade2-1 tel1Δ::natMX</i>	W303-1A
JSC19-1	Wild type	St. Charles and Petes 2013	<i>MATα ade2-1 ura3 gal2 ho::hisG can1Δ::natMX</i>	YJM789
JSC21-1	Wild type	St. Charles and Petes 2013	<i>MATα ura3 gal2 ho::hisG ade2-1 can1Δ::natMX IV1510386::SUP4-o</i>	YJM789
JSC12	Wild type	St. Charles and Petes 2013	<i>MATα leu2-3,112 his3-11,15 ura3-1 ade2-1 trp1-1 can1Δ::natMX RAD5 IV1510386::kanMX-can1-100</i>	W303-1A
SJR3585	Wild type	Spore from diploid PG309(2)-4a x JSC12	<i>MATα RAD5 leu2-3,112 trp1-1 his3-11,15 ura3-1 ade2-1 IV1510386::kanMX-can1-100</i>	W303-1A
SJR3615-4	<i>rnh201Δ</i>	SJR3585 transformed with PCR fragment amplified from pSR955 using primers	<i>MATα leu2-3,112 his3-11,15 trp1-1 ura3-1 ade2-1 RAD5 rnh201Δ::loxP-hphMX-loxP IV1510386::kanMX-can1-100</i>	W303-1A

		RNH2kanF and RNH2kanR		
SJR3625-9B	<i>rnh1Δ</i> <i>rnh201Δ</i>	SJR3615-4 transformed with PCR fragment amplified from pSR879 using primers RNH1kanF and RNH1kanR	<i>MATa leu2-3,112 his3-11,15 trp1-1 ura3-1 ade2-1 RAD5 rnh1Δ::loxP-natMX-loxP rnh201Δ::loxP-hphMX-loxP IV1510386::kanMX-can1-100</i>	W303-1A
SJR3616-3	<i>rnh201Δ</i>	SJR3586 transformed with PCR fragment amplified from pSR955 using primers RNH2kanF and RNH2kanR.	<i>MATa ura3 gal2 ho::hisG ade2-1 can1Δ::natMX rnh201Δ::loxP-hphMX-loxP IV1510386::SUP4-o</i>	YJM789
SJR3626-3	<i>rnh1Δ</i> <i>rnh201Δ</i>	SJR3616-3 transformed with PCR fragment amplified from pUG6 using primers RNH1kanF and RNH1kanR	<i>MATa ura3 gal2 ho::hisG ade2-1 can1Δ::natMX rnh201Δ::loxP-hph-loxP rnh1Δ::loxP-kanMX-loxP IV1510386::SUP4-o</i>	YJM789
YJM799	Wild type	John McCusker	<i>MATa ura3 gal2 ho::hisG</i>	YJM789
YJM790	Wild type	John McCusker	<i>MATa ho::hisG lys2 gal2</i>	YJM789
KOK3	Wild type	W1588-4c transformed with PCR fragment amplified from pUG6 using primers Forward Sequence and Reverse Sequence.	<i>MATa can1-100 trp1-1 ade2-1 his3-11,15 leu2-3,112 ura3Δ::loxP-kanMX-loxP</i>	W303-1A
KO5	<i>rnh1Δ</i> <i>rnh201Δ</i>	SJR3625-9B x SJR3626-3	<i>MATa/MATa ho::hisG/ho::hisG ade2-1/ade2-1 ura3-1/ura3 GAL2/gal2 trp1-1/TRP1 his3-11,15/HIS3 leu2-3,112/LEU2 can1-100/CAN1 rnh201Δ::loxP-hphMX-loxP/rnh201Δ::loxP-hphMX-loxP rnh1Δ::loxP-natMX-loxP/rnh1Δ::loxP-kanMX-loxP IV1510386::kanMX-can1-100/IV1510386::SUP4-o</i>	W303-1A/YJM789
KO30	Wild type	SJR3626-3 x YJM790	<i>MATa/MATa ho::hisG/ho::hisG gal2/gal2 ade2-1/ADE2 URA3/ura3 lys2/LYS2 CAN1/can1Δ::natMX RNH201/rnh201Δ::loxP-hphMX-loxP RNH1/rnh1Δ::loxP-kanMX-loxP IV1510386/IV1510386::SUP4-o</i>	YJM789
KO32	<i>rnh1Δ</i> <i>rnh201Δ</i>	Spore from KO30	<i>MATa can1Δ::natMX ade2-1 ura3 ho::hisG gal2 rnh1::loxP-kanMX-loxP rnh201::loxP-hphMX-loxP</i>	YJM789
KO35	Wild type	JSC19-1 transformed with PCR fragment amplified from S288c using primers IVURA3F and IVURA3R.	<i>MATa ade2-1 ura3 gal2 ho::hisG can1Δ::nat IV1510386::URA3</i>	YJM789

KO36	Wild type	Cre-expressing plasmid pSH47 used to excise the kanMX marker in KOK3	<i>MATa can1-100 trp1-1 ade2-1 his3-11,15 leu2-3,112 ura3Δ::loxP</i>	W303-1A
KO49	Wild type	KO32 x KO35	<i>MATa/MATα ade2-1/ade2-1 ura3/ura3 gal2/gal2 ho::hisG/ho::hisG can1Δ::nat/can1Δ::nat rnh1Δ::loxP-kanMX-loxP/RNH1 rnh201Δ::loxP-hphMX-loxP/RNH201 IV1510386/IV1510386::URA3</i>	YJM789/ YJM789
KO52	Wild type	SJR3625-9B x W303-1B	<i>MATa/MATα leu2-3,112/leu2-3,112 his3-11,15/his3-11,15 trp1-1/trp1-1 ura3-1/ura3-1 ade2-1/ade2-1 CAN1/can1-100 IV1510386::kanMX-can1-100/IV1510386 rnh1Δ::loxP-natMX-loxP/RNH1 rnh201Δ::loxP-hphMX-loxP/RNH201</i>	W303-1A/ W303-1A
KO57	<i>rnh1Δ</i>	Spore of KO49	<i>MATα ade2-1 ura3 gal2 ho::hisG can1Δ::nat IV1510386::URA3 rnh1Δ::loxP-kanMX-loxP</i>	YJM789
KO63	<i>rnh1Δ</i> <i>rnh201Δ</i>	Spore from KO52	<i>MATα leu2-3,112 his3-11,15 trp1-1 ura3-1 ade2-1 can1-100 rnh1Δ::loxP-natMX-loxP rnh201Δ::loxP-hphMX-loxP</i>	W303-1A
KO70	<i>rnh1Δ</i>	Spore of KO52	<i>MATα leu2-3,112 his3-11,15 trp1-1 ura3-1 ade2-1 can1-100 rnh1Δ::loxP-nat-loxP</i>	W303-1A
KO73	<i>rnh1Δ</i>	KO70 x KO57	<i>MATa/MATα HO/ho::hisG ade2-1/ade2-1 ura3-1/ura3 GAL2/gal2 trp1-1/TRP1 his3-11,15/HIS3 leu2-3,112/LEU2 can1-100/CAN1 rnh1Δ::loxP-natMX-loxP/rnh1Δ::loxP-kanMX-loxP IV1510386::URA3/IV1510386</i>	W303-1A/ YJM789
KO75	<i>rnh201Δ</i>	SJR3616-3 x SJR3615-4	<i>MATa/MATα HO/ho::hisG ade2-1/ade2-1 ura3-1/ura3 GAL2/gal2 trp1-1/TRP1 his3-11,15/HIS3 leu2-3,112/LEU2 can1-100/CAN1 rnh201Δ::loxP-hphMX-loxP/rnh201Δ::loxP-hphMX-loxP IV1510386::URA3/IV1510386</i>	W303-1A/ YJM789
KO119	Wild type	YJM799 transformed with transformed with PCR fragment amplified from SMY710 using primers ADE2_XV_F and ADE2_XV_R	<i>MATα ura3 gal2 ho::hisG ade2Δ::kanMX</i>	YJM789
KO124	Wild type	KO119 transformed with transformed with PCR fragment amplified from	<i>MATα ade2Δ::kanMX ura3 ho::hisG gal2 IV1495420::ADE2</i>	YJM789

		S288c using primers IVADE2_3_F and IVADE2_3_R		
KO125	Wild type	KO124 x KO32	<i>MATa/MATα can1Δ::natMX/CAN1 ade2-1/ade2Δ::kanMX ura3/ura3 ho::hisG/ho::hisG gal2/gal2 rnh1Δ::loxP-kanMX-loxP/RNH1 rnh201Δ::loxP-hphMX-loxP/RNH201 IV1495420/IV1495420::ADE2</i>	YJM789/ YJM789
KO127	<i>rnh1Δ rnh201Δ</i>	Spore from KO125	<i>MATα ade2-1 ura3 ho::hisG gal2 can1Δ::natMX rnh1Δ::loxP-kanMX-loxP rnh201Δ::loxP-hphMX-loxP IV1495420::ADE2</i>	YJM789
KO128	<i>rnh1Δ</i>	Spore from KO125	<i>MATα ade2-1 ura3 ho::hisG gal2 can1Δ::natMX rnh1Δ::loxP-kanMX-loxP IV1495420::ADE2</i>	YJM789
KO131	<i>rnh201Δ</i>	Spore from KO125	<i>MATα ade2-1 ura3 ho::hisG gal2 rnh201Δ::loxP-hphMX-loxP IV1495420::ADE2</i>	YJM789
KO132	<i>rnh1Δ rnh201Δ</i>	KO127 x SJR3625-9B	<i>MATa/MATα leu2-3,112/LEU2 his3-11,15/HIS3 trp1-1/TRP1 ura3-1/ura3 ade2-1/ade2-1 rnh1Δ::loxP-natMX-loxP /rnh1Δ::loxP-kanMX-loxP rnh201Δ::loxP-hphMX-loxP/rnh201Δ::loxP-hphMX-loxP ho::hisG/ho::hisG GAL2/gal2 IV1510386::kanMX-can1-100/IV1510386 IV1495420/IV1495420::ADE2</i>	W303-1A/ YJM789
KO135	<i>rnh201Δ</i>	KO130 x SJR3615-4	<i>MATa/MATα leu2-3,112/LEU2 his3-11,15/HIS3 trp1-1/TRP1 ura3-1/ura3 HO/ho::hisG ade2-1/ade2-1 GAL2/gal2 CAN1/can1Δ::natMX IV1510386::kanMX-can1-100/IV1510386 rnh201Δ::loxP-hphMX-loxP/rnh201Δ::loxP-hphMX-loxP IV1495420/IV1495420::ADE2</i>	W303-1A/ YJM789
KO171	Wild type	KOK3 transformed with transformed with PCR fragment amplified from pUG72 using primers KL_URA3_F and KL_URA3_R.	<i>MATa can1-100 trp1-1 ade2-1 his3-11,15 leu2-3,112 ura3Δ::loxP-kanMX-loxP IV1495420::loxP-URA3KI-loxP</i>	W303-1A
KO172	Wild type	KO171 x KO63	<i>MATa/MATα can1-100/can1-100 trp1-1/trp1-1 ade2-1/ade2-1 leu2-3,112/leu2-3,112 his3-11,15/his3-11,15 ura3Δ::loxP-kanMX-loxP/ura3-1 RNH201/rnh201Δ::loxP-hphMX-loxP RNH1/rnh1Δ::loxP-natMX-loxP IV1495420::loxP-URA3KI-loxP/IV1495420</i>	W303-1A/ W303-1A

KO175	<i>rnh1Δ</i> <i>rnh201Δ</i>	Spore from KO172	<i>MATa can1-100 trp1-1 ade2-1 ura3-1 leu2-3,112 his3-11,15 rnh201Δ::loxP-hph-loxP rnh1Δ::loxP-natMX-loxP IV1495420::loxP-URA3KI-loxP</i>	W303-1A
KO176	<i>rnh1Δ</i> <i>rnh201Δ</i>	Spore from KO172	<i>MATα can1-100 trp1-1 ade2-1 leu2-3,112 his3-11,15 ura3-1 rnh201Δ::loxP-hphMX-loxP rnh1Δ::loxP-natMX-loxP IV1495420::loxP-URA3KI-loxP</i>	W303-1A
KO179	<i>rnh201Δ</i>	Spore from KO172	<i>MATa can1-100 trp1-1 ade2-1 ura3-1 leu2-3,112 his3-11,15 rnh201Δ::loxP-hph-loxP IV1495420::loxP-URA3KI-loxP</i>	W303-1A
KO185	<i>rnh1Δ</i>	Spore from KO172	<i>MATa can1-100 trp1-1 ade2-1 ura3-1 leu2-3,112 his3-11,15 rnh1Δ::loxP-natMX-loxP IV1495420::loxP-URA3KI-loxP</i>	W303-1A
KO187	<i>rnh1Δ</i>	KO185 x KO128	<i>MATa/MATα HO/ho::hisG ade2-1/ade2-1 ura3-1/ura3 GAL2/gal2 trp1-1/TRP1 his3-11,15/HIS3 leu2-3,112/LEU2 can1-100/can1Δ::natMX rnh1Δ::loxP-natMX-loxP/rnh1Δ::loxP-kanMX-loxP IV1495420::loxP-URA3KI-loxP/IV1495420::ADE2</i>	W303-1A/ YJM789
KO188	<i>rnh201Δ</i>	KO179 x KO131	<i>MATa/MATα HO/ho::hisG ade2-1/ade2-1 ura3-1/ura3 GAL2/gal2 trp1-1/TRP1 his3-11,15/HIS3 leu2-3,112/LEU2 can1-100/can1Δ::natMX rnh201Δ::loxP-natMX-loxP/rnh201Δ::loxP-kanMX-loxP IV1495420::loxP-URA3KI-loxP/IV1495420::ADE2</i>	W303-1A/ YJM789
KO189	<i>rnh1Δ</i> <i>rnh201Δ</i>	KO175 x KO127	<i>MATa/MATα HO/ho::hisG ade2-1/ade2-1 ura3-1/ura3 GAL2/gal2 trp1-1/TRP1 his3-11,15/HIS3 leu2-3,112/LEU2 can1-100/CAN1 rnh201Δ::loxP-hphMX-loxP/rnh201Δ::loxP-hphMX-loxP rnh1Δ::loxP-natMX-loxP/rnh1Δ::loxP-kanMX-loxP IV1495420::loxP-URA3KI-loxP/IV1495420::ADE2</i>	W303-1A/ YJM789
KO198	Wild type	KO171 x KO124	<i>MATa/MATα HO/ho::hisG ade2-1/ade2Δ::kanMX ura3Δ::loxP-kanMX-loxP/ura3 GAL2/gal2 trp1-1/TRP1 his3-11,15/HIS3 leu2-3,112/LEU2 can1-100/CAN1 IV1495420::loxP-URA3KI-loxP/IV1495420::ADE2</i>	W303-1A/ YJM789
KO200	<i>pol2-M644L</i>	<i>pol2-M644L</i> introduced into KO36 by two-step allele replacement using Agel-digested p173- <i>pol2-M644L</i>	<i>MATa can1-100 trp1-1 ade2-1 his3-11,15 leu2-3,112 ura3Δ::loxP pol2-M644L</i>	W303-1A
KO201	Wild type	KO200 x KO176	<i>MATa/MATα can1-100/can1-100 trp1-1/trp1-1 ade2-1/ade2-1 his3-11,15/his3-11,15 leu2-3,112/leu2-3,112</i>	W303-1A/ W303-1A

			<i>ura3Δ::loxP/ura3-1 pol2-M644L/POL2 RNH1/rnh1Δ::loxP-natMX-loxP rnh201Δ::loxP-hphMX-loxP/RNH201 IV1495420/IV1495420::ADE2</i>	
KO204	<i>rnh201Δ pol2-M644L</i>	Spore from KO201	<i>MATa can1-100 trp1-1 ade2-1 his3-11,15 leu2-3,112 ura3-1 pol2-M644L rnh201Δ::loxP-hphMX-loxP IV1495420::loxP-URA3K.L-loxP</i>	W303-1A
KO207	<i>rnh201Δ pol2-M644L</i>	<i>pol2-M644L</i> introduced into KO131 by two-step allele replacement using <i>Agel</i> -digested p173- <i>pol2-M644L</i>	<i>MATa ade2-1 can1Δ::natMX ura3 ho::hisG gal2 pol2-M644L rnh201Δ::loxP-hphMX-loxP IV1495420::ADE2</i>	YJM789
KO213	<i>pol2-M644L</i>	KO124 after two-step transplacement using <i>Agel</i> -digested p173- <i>pol2-M644L</i>	<i>MATa ade2Δ::kanMX ura3 ho::hisG gal2 IV1495420::ADE2 pol2-M644L</i>	YJM789
KO214	Wild type	KO207 x KO32	<i>MATa/MATa can1Δ::natMX/CAN1 ade2-1/ade2-1 ura3/ura3 ho::hisG/ho::hisG gal2/gal2 rnh1Δ::loxP-kanMX-loxP/RNH1 rnh201Δ::loxP-hphMX-loxP/RNH201 POL2/pol2M644L IV1495420/IV1495420::ADE2</i>	YJM789/ YJM789
KO218	<i>rnh201Δ pol2-M644L</i>	Spore from KO214	<i>MATa ade2-1 ura3 gal2 ho::hisG pol2-M644L can1::ΔnatMX rnh201Δ::loxP-hphMX-loxP IV1495420::ADE2</i>	YJM789
KO234	<i>pol2-M644L/pol2-M644L</i>	KO213 x KO200	<i>MATa/MATa HO/ho::hisG ade2-1/ade2-1 ura3-1/ura3 GAL2/gal2 trp1-1/TRP1 his3-11,15/HIS3 leu2-3,112/LEU2 can1-100/CAN1 pol2-M644L/pol2-M644L IV1495420::loxP-URA3KI-loxP/IV1495420::ADE2</i>	W303-1A/ YJM789
KO244	<i>rnh201Δ pol2-M644L</i>	KO218 x KO204	<i>MATa/MATa HO/ho::hisG ade2-1/ade2-1 ura3-1/ura3 GAL2/gal2 trp1-1/TRP1 his3-11,15/HIS3 leu2-3,112/LEU2 can1-100/can1Δ::natMX rnh201Δ::loxP-hphMX-loxP/rnh201Δ::loxP-hphMX-loxP pol2-M644L/pol2-M644L IV1495420::loxP-URA3KI-loxP/IV1495420::ADE2</i>	W303-1A/ YJM789