## Supplementary File 1—Yeast strains

Strain Genotype Used in figures

*MATa ho::LYS2 lys2 leu2 nuc1∆::LEU2 VMA1-103 trp1::hisG* S1, 2

MJL3617 ---- -------- ---- ---- ----------- -------- ----------

*MAT ho::LYS2 lys2 leu2 nuc1∆::LEU2 VMA1-103 trp1::hisG*

*arg4Δ(eco47III-hpaI) ura3::Ty1 his4’-URA3-[arg4-VRS103]-‘his4*

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*arg4Δ(eco47III-hpaI) ura3::Ty1 his4::natMX-[arg4-VRS]-KlTRP1*

*MATa ho::LYS2 lys2 leu2 nuc1∆::LEU2 VMA1-103 trp1::hisG* S1, 2

MJL3627 ---- -------- ---- ---- ----------- -------- -----------

*MAT ho::LYS2 lys2 leu2 nuc1∆::LEU2 VMA1-103 trp1::hisG*

*arg4Δ(eco47III-hpaI) ura3::Ty1-[arg4-VRS103]-URA3*

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*arg4Δ(eco47III-hpaI) ura3::natMX-[arg4-VRS]-KlTRP1*

*pCUP1-VDE-kanMX-pCUP1-CUP1* 1, 2, S2, 3, S3-1, S3-2

MJL3618 MJL3617 + -------------------------- 4, S4-1, 5, S5-1

*CUP1*

*pCUP1-VDE-kanMX-pCUP1-CUP1* 1, 2, S2, 3, S3-1, S3-2

MJL3624 MJL3627 + -------------------------- 4, S4-1, 5, S5-1

*CUP1*

*sae2∆::hphMX* S1

MJL3645 MJL3617 + ------------

*sae2∆::hphMX*

*sae2∆::hphMX* S1

MJL3643 MJL3627 + ------------

*sae2∆::hphMX*

Strain Genotype Used in figures

*pCUP1-VDE-hphMX-pCUP1-CUP1 mlh3Δ::kanMX* 3, S3-1, S3-2, 4, S4-1

MJL3670 MJL3617 + -------------------------- ------------

*CUP1 mlh3Δ::kanMX*

*pCUP1-VDE-hphMX-pCUP1-CUP1 mlh3Δ::kanMX* 3, S3-1, S3-2, 4, S4-1

MJL3669 MJL3627 + -------------------------- -------------

*CUP1 mlh3Δ::kanMX*

*pCUP1-VDE-hphMX-pCUP1-CUP1 yen1∆::hphMX slx1Δ::natMX* 3, S3-1, S3-2, 4, S4-1

MJL3729 MJL3617 + -------------------------- ------------ ------------

*CUP yen1∆::hphMX slx1Δ::URA3*

*kanMX-pCLB2-3HA-MMS4*

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*kanMX-pCLB2-3HA-MMS4*

*pCUP1-VDE-hphMX-pCUP1-CUP1 yen1∆::hphMX slx1Δ::natMX* 3, S3-1, S3-2, 4, S4-1

MJL3728 MJL3627 + -------------------------- ------------ ------------

*CUP yen1∆::hphMX slx1Δ::URA3*

*kanMX-pCLB2-3HA-MMS4*

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*kanMX-pCLB2-3HA-MMS4*

*pCUP1-VDE-hphMX-pCUP1-CUP1 mlh3Δ::kanMX* 3, S3-1, S3-2

MJL3726 MJL3617 + -------------------------- ------------

*CUP1 mlh3Δ::kanMX*

*pCLB2-3HA-MMS4::kanMX slx1Δ::natMX yen1∆::hphMX*

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*pCLB2-3HA-MMS4::kanMX slx1Δ::URA3 yen1∆::hphMX*

*pCUP1-VDE-hphMX-pCUP1-CUP1 mlh3Δ::kanMX* 3, S3-1, S3-2

MJL3725 MJL3627 + -------------------------- ------------

*CUP1 mlh3Δ::kanMX*

*pCLB2-3HA-MMS4::kanMX slx1Δ::natMX yen1∆::hphMX*

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*pCLB2-3HA-MMS4::kanMX slx1Δ::URA3 yen1∆::hphMX*

Strain Genotype Used in figures

*pCUP1-VDE-kanMX-pCUP1-CUP1 pch2::URA3* 4, S4-1, S4-2

MJL3806 MJL3617 + -------------------------- -----------

*pCUP1-CUP1 pch2::URA3*

*pCUP1-VDE-kanMX-pCUP1-CUP1 pch2::URA3* 4, S4-1, S4-2

MJL3803 MJL3627 + -------------------------- -----------

*pCUP1-CUP1 pch2::URA3*

*pCUP1-VDE-kanMX-pCUP1-CUP1 pch2::URA3 mlh3Δ::kanMX* 4, S4-1, S4-2

MJL3804 MJL3617 + -------------------------- ---------- ------------

*pCUP1-CUP1 pch2::URA3 mlh3Δ::kanMX*

*pCUP1-VDE-kanMX-pCUP1-CUP1 pch2::URA3 mlh3Δ::kanMX* 4, S4-1, S4-2

MJL3805 MJL3627 + -------------------------- ---------- ------------

*pCUP1-CUP1 pch2::URA3 mlh3Δ::kanMX*

*pCUP1-VDE-kanMX-pCUP1-CUP1 pch2::URA3 yen1∆::hphMX*  4, S4-1, S4-2

MJL3866 MJL3617 + -------------------------- ---------- ------------

*pCUP1-CUP1 pch2::URA3 yen1∆::hphMX*

*slx1Δ::natMX pCLB2-3HA-MMS4::kanMX*

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*slx1Δ::natMX* *pCLB2-3HA-MMS4::kanMX*

*pCUP1-VDE-kanMX-pCUP1-CUP1 pch2::URA3 yen1∆::hphMX*  4, S4-1, S4-2

MJL3858 MJL3627 + -------------------------- ---------- ------------

*pCUP1-CUP1 pch2::URA3 yen1∆::hphMX*

*slx1Δ::natMX pCLB2-3HA-MMS4::kanMX*

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*slx1Δ::natMX* *pCLB2-3HA-MMS4::kanMX*

*pCUP1-VDE-kanMX-pCUP1-CUP1 spo11-Y135F-HA3-his6::kanMX* 5, S5-1, S5-2

MJL3606 MJL3617 + -------------------------- ---------------------------

*pCUP1-CUP1 spo11-Y135F-HA3-his6::kanMX*

Strain Genotype Used in figures

*pCUP1-VDE-kanMX-pCUP1-CUP1 spo11-Y135F-HA3-his6::kanMX* 5, S5-1, S5-2

MJL3605 MJL3627 + -------------------------- ---------------------------

*pCUP1-CUP1 spo11-Y135F-HA3-his6::kanMX*

*pCUP1-VDE-hphMX-pCUP1-CUP1 mlh3Δ::kanMX* 5B, S5-1, S5-2

MJL3697 MJL3617 + -------------------------- -------------

*CUP1 mlh3Δ::kanMX*

*spo11-Y135F-HA3-his6::kanMX*

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*spo11-Y135F-HA3-his6::kanMX*

*pCUP1-VDE-hphMX-pCUP1-CUP1 mlh3Δ::kanMX* 5C, S5-1, S5-2

MJL3696 MJL3627 + -------------------------- -------------

*CUP1 mlh3Δ::kanMX*

*spo11-Y135F-HA3-his6::kanMX*

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*spo11-Y135F-HA3-his6::kanMX*

*pCUP1-VDE-hphMX-pCUP1-CUP1 yen1∆::hphMX slx1Δ::natMX* 5B, S5-1, S5-2

MJL3731 MJL3617 + --------------------------- ------------ -------------

*CUP1 yen1∆::hphMX slx1Δ::URA3*

*pCLB2-3HA-MMS4::kanMX spo11-Y135F-HA3-his6::kanMX*

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*pCLB2-3HA-MMS4::kanMX spo11-Y135F-HA3-his6::kanMX*

*pCUP1-VDE-hphMX-pCUP1-CUP1 yen1∆::hphMX slx1Δ::natMX* 5C, S5-1, S5-2

MJL3730 MJL3627 + -------------------------- ------------ ------------

*CUP1 yen1∆::hphMX slx1Δ::URA3*

*pCLB2-3HA-MMS4::kanMX spo11-Y135F-HA3-his6::kanMX*

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*pCLB2-3HA-MMS4::kanMX spo11-Y135F-HA3-his6::kanMX*

**Supplementary File 1—Yeast Strains.** The *ura3::Ty* allele contains a Ty element near a *Rsa*I site in *URA3* coding sequences (T.-C. Wu and M. Lichten, unpublished observations).  *his4’-URA3-[arg4-VRS103]-‘his4* and *ura3::Ty-[arg4-VRS103]-URA3* inserts are identical to inserts in MJL1077 and MJL1094 (Wu & Lichten 1995) except that they contain the *arg4-VRS103* allele (see Materials and Methods). In *his4::natMX-[arg4-VRS]-KlTRP1*, *natMX* sequences (Goldstein & McCusker 1999) replace sequences from chromosome V coordinate 66033 to +483bp downstream of *URA3* and *K. lactis* *TRP1* sequences (Stark & Milner 1989) replace sequences from +350bp downstream of *ARG4* to chromosome V coordinate 67716; in *ura3::natMX-[arg4-VRS]-KlTRP1*, *natMX* sequences (Goldstein & McCusker 1999) replace sequences from chromosome III coordinate 115943 to +483bp downstream of *URA3* and *K. lactis* *TRP1* sequences (Stark & Milner 1989) replace sequences from +356bp downstream of *ARG4* to chromosome III coordinate 116919 (all yeast genome coordinates from Saccharomyces Genome Database build #R64-2-1). *pCUP1-VDE-kanMX-pCUP1-CUP1* contains plasmid pMJ920 (see Materials and Methods) integrated at the *CUP1* locus; in *pCUP1-VDE-hphMX-pCUP1-CUP1*, the G418-resistance module is replaced by a hygromycin-resistance module (Goldstein & McCusker 1999). The following alleles have been previously described: *kanMX-pCLB2-3HA-MMS4* (Jessop et al. 2006); *spo11-Y135F-HA3-his6::kanMX* (Kee & Keeney 2002). *mlh3∆::kanMX*, *slx1∆::natMX* and *slx1∆::URA3* and *yen1∆::hphMX* were constructed by an exact replacement of the relevant coding sequences by the indicated drug-resistance module (Goldstein & McCusker 1999) or by *URA3* coding sequences. *pch2::URA3* was constructed by replacing the wild type *PCH2* locus with the *pch2::URA3* allele from pSS52 (San-Segundo & Roeder 1999) where the +266 to +1741 coding region of *PCH2* (*Acc*I-*Bam*HI fragment) has been replaced with a *URA3* fragment (*Cla*I-*Bam*HI).

## References

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