APPENDIX

Stabilization of the metaphase spindle by Cdc14 is required for recombinational DNA repair.

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Appendix Tables

Appendix Table S1. Genotypes of strains used in this study.

Strain	Genotype	Reference
AC40	*MAT*a *leu2 ura3 his3 trp1 ade2 cdc14-1*-GFP::KanMX4	L. Aragón
AC224	*MAT*a-inc HOΔ *hml*::ADE1 *hmr*::ADE1 *ade1-100 leu2-3,112 lys5* trp1::hisG *ura3-52* ade3::GAL::HO arg5,6::*MAT*a::HPH	J. Haber
AC243	*MAT*α HOΔ *ade1-100 leu2,3-112 lys5 ura3-52* trp::hisG *hml*::ADE1 *hmr*::ADE1 ade3::GAL-HO	J. Haber
AC244	*MAT*a HOΔ *ade1-100 leu2,3-112 lys5 ura3-52* trp::hisG *HML*α *hmr*::ADE1 ade3::GAL-HO	J. Haber
AC245	*MAT*α HOΔ *ade1-100 leu2,3-112 lys5 ura3-52* trp::hisG *hml*::ADE1 *hmr*::ADE1 ade3::GAL-HO *cdc14-1*-GFP::KanMX4	This Study
AC248	*MAT*a HOΔ *ade1-100 leu2,3-112 lys5 ura3-52* trp::hisG *HML*α *hmr*::ADE1 ade3::GAL-HO *cdc14-1*-GFP::KanMX4	This Study
AC263	*MAT*a HOΔ *HML*α *HMR*a *leu2-3,112 his3-11,15 ade2-1 can1-100 ura3-1 trp1-1* bar1::hisG ade3::GAL::HO	J. Haber
AC265	*MAT*a HOΔ *HML*α *HMR*a *leu2-3,112 his3-11,15 ade2-1 can1-100 ura3-1 trp1-1* bar1::hisG ade3::GAL::HO *cdc14-1*-GFP::KanMX4	This Study
AC277	*MAT*a-inc HOΔ *hml*::ADE1 *hmr*::ADE1 *ade1-100 leu2-3,112 lys5* trp1::hisG *ura3-52* ade3::GAL::HO arg5,6::*MAT*a::HPH *cdc14-1*-GFP::KanMX4	This Study
AC379	*MAT*α HOΔ *ade1-100 leu2,3-112 lys5 ura3-52* trp::hisG *hml*::ADE1 *hmr*::ADE1 ade3::GAL-HO DDC2-GFP::KanMX4 CNM67-RFP::Nat	This Study
AC417	*MAT*α HOΔ *ade1-100 leu2,3-112 lys5 ura3-52* trp::hisG *hml*::ADE1 *hmr*::ADE1 ade3::GAL-HO DDC2-RFP::Nat CDC14-YFP::HPH CNM67-CFP::KanMX4	This Study
AC427	*MAT*α HOΔ *ade1-100 leu2,3-112 lys5 ura3-52* trp::hisG *hml*::ADE1 *hmr*::ADE1 ade3::GAL-HO *cdc14-1*-YFP::HPH DDC2-RFP::Nat CNM67-CFP::KanMX4	This Study
AC449	*MAT*α HOΔ *ade1-100 leu2,3-112 lys5 ura3-52* trp::hisG *hml*::ADE1 *hmr*::ADE1 ade3::GAL-HO DDC2-RFP::Nat CDC14-YFP::HPH NUF2-CFP::KanMX4	This Study
AC450	*MAT*α HOΔ *ade1-100 leu2,3-112 lys5 ura3-52* trp::hisG *hml*::ADE1 *hmr*::ADE1 ade3::GAL-HO DDC2-RFP::Nat *cdc14-1*-YFP::HPH NUF2-CFP::KanMX4	This Study
AC525	*MAT*a HOΔ *ade1-100 leu2,3-112 lys5 ura3-52* trp1::hisG *hml*::ADE1 *hmr*::ADE1 ade3::GAL-HO *cdc14-1*-GFP::KanMX4 SPC110-RFP::Nat	This Study
AC527	*MAT*a HOΔ *ade1-100 leu2,3-112 lys5 ura3-52* trp1::hisG *hml*::ADE1 *hmr*::ADE1 ade3::GAL-HO SPC110-RFP::Nat CDC14-GFP::KanMX4	This Study
AC582	*MAT*α HOΔ *ade1-100 leu2,3-112 lys5 ura3-52* trp::hisG *hml*::ADE1 *hmr*::ADE1 ade3::GAL-HO DDC2-GFP::KanMX4 CDC14-RFP::Nat NET1-6HA::HPH	This Study
AC603	*MAT*a-inc HOΔ *hml*::ADE1 *hmr*::ADE1 *ade1-100 leu2-3,112 lys5* trp1::hisG *ura3-52* ade3::GAL::HO arg5,6::*MAT*a::HPH *spc110-220*::URA3	This Study
AC606	*MAT*α HOΔ *ade1-100 leu2,3-112 lys5 ura3-52* trp::hisG *hml*::ADE1 *hmr*::ADE1 ade3::GAL-HO DDC2-RFP::Nat CDC14-YFP::HPH CNM67-CFP::KanMX4 *spc110-220*::URA3	This Study
AC612	*MAT*a HOΔ *ade1-100 leu2,3-112 lys5 ura3-52* trp1::hisG *hml*::ADE1 *hmr*::ADE1 ade3::GAL-HO SPC110-RFP::Nat CDC14-9Myc::HPH TUB1-GFP::TRP1	This Study
AC613	*MAT*a HOΔ *ade1-100 leu2,3-112 lys5 ura3-52* trp1::hisG *hml*::ADE1 *hmr*::ADE1 ade3::GAL-HO *cdc14-1*-9Myc::HPH SPC110-RFP::Nat TUB1-GFP::TRP1	This Study
AC614	*MAT*a *ade2-1 ura3-1 his3-11,15 trp1-1 can1-100* ade3::pGAL::HO HOcs::KanMX4 near PES4 (ARS604) *hml*::OropRS *hmr*::ampr matHOcs::pBR bar1::TRP DDC2-GFP::HPH SPC110-RFP::Nat	This Study
AC616	*MAT*a *ade2-1 ura3-1 his3-11,15 trp1-1 can1-100* ade3::pGAL::HO HOcs::KanMX4 near PES4 (ARS604) *hml*::OropRS *hmr*::ampr bar1::URA3 leu2::TRP1::HOcs trp1::LEU2::HOcs DDC2-GFP::HPH SPC110-RFP::Nat	This Study
AC689	*MAT*a HOΔ *ade1-100 leu2,3-112 lys5 ura3-52* trp1::hisG *hml*::ADE1 *hmr*::ADE1 ade3::GAL-HO SPC110-6HA::Nat CDC14-GFP::KanMX4	This Study
AC691	*MAT*a HOΔ *ade1-100 leu2,3-112 lys5 ura3-52* trp1::hisG *hml*::ADE1 *hmr*::ADE1 ade3::GAL-HO *cdc14-1*-GFP::KanMX4 SPC110-6HA::Nat	This Study
AC693	*MAT*a HOΔ *ade1-100 leu2,3-112 lys5 ura3-52* trp1::hisG *hml*::ADE1 *hmr*::ADE1 ade3::GAL-HO SPC110-S36-91A::TRP-6HA::Nat CDC14-GFP::KanMX4	This Study
AC714	*MAT*a HOΔ *ade1-100 leu2,3-112 lys5 ura3-52* trp1::hisG *hml*::ADE1 *hmr*::ADE1 ade3::GAL-HO SPC110-S36-91A::TRP-RFP::Nat CDC14-GFP::KanMX4	This Study
AC727	*MAT*a-inc HOΔ *hml*::ADE1 *hmr*::ADE1 *ade1-100 leu2-3,112 lys5* trp1::hisG *ura3-52* ade3::GAL::HO arg5,6::*MAT*a::HPH SPC110-S36-91A::TRP	This Study
AC751	*MAT*α HOΔ *ade1-100 leu2,3-112 lys5 ura3-52* trp::hisG *hml*::ADE1 *hmr*::ADE1 ade3::GAL-HO DDC2-GFP::KanMX4 CDC14-RFP::Nat SPC110-3HA::HPH	This Study
AC753	*MAT*α HOΔ *ade1-100 leu2,3-112 lys5 ura3-52* trp::hisG *hml*::ADE1 *hmr*::ADE1 ade3::GAL-HO DDC2-GFP::KanMX4 *esp1ts*::LEU CDC14-RFP::Nat SPC110-3HA::HPH	This Study

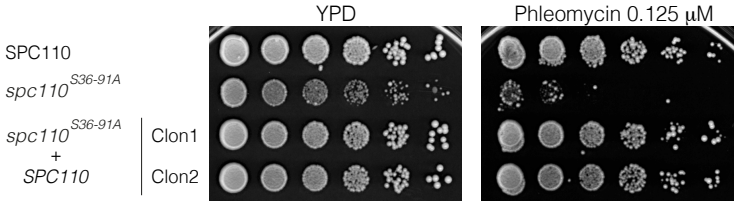
AC851	*MAT*a HOΔ *ade1-100 leu2,3-112 lys5 ura3-52* trp1::hisG *hml*::ADE1 *hmr*::ADE1 ade3::GAL-HO SPC110-RFP::Nat CDC14-9Myc::HPH NUF2-GFP::KanMX4	This Study
AC853	*MAT*a HOΔ *ade1-100 leu2,3-112 lys5 ura3-52* trp1::hisG *hml*::ADE1 *hmr*::ADE1 ade3::GAL-HO SPC110-RFP::Nat *cdc14-1*-9Myc::HPH NUF2-GFP::KanMX4	This Study
AC875	*MAT*a HOΔ *ade1-100 leu2,3-112 lys5 ura3-52* trp1::hisG *hml*::ADE1 *hmr*::ADE1 ade3::GAL-HO SPC110-RFP::Nat CDC14-9Myc::HPH DDC2-GFP::KanMX4	This Study
AC878	*MAT*a HOΔ *ade1-100 leu2,3-112 lys5 ura3-52* trp1::hisG *hml*::ADE1 *hmr*::ADE1 ade3::GAL-HO SPC110-S36-91A::TRP-RFP::Nat CDC14-9Myc::HPH DDC2-GFP::KanMX4	This Study
AC944	*MAT*a *ade2-1* trp1Δ2 *can1-100 leu2-3,112 his3-11,15 ura3-52* NET1-6HA::HPH	This Study
AC973	*MAT*a HOΔ *ade1-100 leu2,3-112 lys5 ura3-52* trp1::hisG *hml*::ADE1 *hmr*::ADE1 ade3::GAL-HO SPC110-RFP::Nat CDC14-9Myc::HPH DYN1-GFP::KanMX4	This Study
AC975	*MAT*a HOΔ *ade1-100 leu2,3-112 lys5 ura3-52* trp1::hisG *hml*::ADE1 *hmr*::ADE1 ade3::GAL-HO SPC110-S36-91A::TRP-RFP::Nat CDC14-9Myc::HPH DYN1-GFP::KanMX4	This Study
AC991	*MAT*a HOΔ *ade1-100 leu2,3-112 lys5 ura3-52* trp1::hisG *hml*::ADE1 *hmr*::ADE1 ade3::GAL-HO SPC110-RFP::Nat CDC14-9Myc::HPH RAD52-GFP::KanMX4	This Study
AC995	*MAT*α HOΔ *ade1-100 leu2,3-112 lys5 ura3-52* trp::hisG *hml*::ADE1 *hmr*::ADE1 ade3::GAL-HO CNM67-RFP::Nat CDC14-GFP::KanMX4 DDC2-CFP::TRP	This Study
AC996	*MAT*a HOΔ *ade1-100 leu2,3-112 lys5 ura3-52* trp1::hisG *hml*::ADE1 *hmr*::ADE1 ade3::GAL-HO *cdc14-1*-9Myc::HPH SPC110-RFP::Nat DYN1-GFP::KanMX4	This Study
AC998	*MAT*α HOΔ *ade1-100 leu2,3-112 lys5 ura3-52* trp::hisG *hml*::ADE1 *hmr*::ADE1 ade3::GAL-HO DDC2-CFP::KanMX4 CDC14-YFP::HPH CNM67-RFP::Nat	This Study
AC1005	*MAT*a HOΔ *ade1-100 leu2,3-112 lys5 ura3-52* trp1::hisG *hml*::ADE1 *hmr*::ADE1 ade3::GAL-HO SPC110-RFP::Nat CDC14-9Myc::HPH MPS3-GFP::KanMX4	This Study
AC1008	*MAT*a HOΔ *ade1-100 leu2,3-112 lys5 ura3-52* trp1::hisG *hml*::ADE1 *hmr*::ADE1 ade3::GAL-HO *cdc14-1*-9Myc::HPH SPC110-RFP::Nat MPS3-GFP::KanMX4	This Study
AC1018	*MAT*α HOΔ *ade1-100 leu2,3-112 lys5 ura3-52* trp::hisG *hml*::ADE1 *hmr*::ADE1 ade3::GAL-HO DDC2-GFP::KanMX4 CNM67-RFP::Nat *sml1Δ*::HPH	This Study
AC1040	*MAT*α HOΔ *ade1-100 leu2,3-112 lys5 ura3-52* trp::hisG *hml*::ADE1 *hmr*::ADE1 ade3::GAL-HO DDC2-GFP::KanMX4 CNM67-RFP::Nat *sml1Δ*::HPH *rad53Δ*::URA3	This Study
AC1056	*MAT*α HOΔ *ade1-100 leu2,3-112 lys5 ura3-52* trp::hisG *hml*::ADE1 *hmr*::ADE1 ade3::GAL-HO CDC14-9Myc::HPH DDC2-YFP::KanMX4 pRS316-*MPS3*-RFP-URA3 *mps3Δ*::Nat	This Study
AC1058	*MAT*α HOΔ *ade1-100 leu2,3-112 lys5 ura3-52* trp::hisG *hml*::ADE1 *hmr*::ADE1 ade3::GAL-HO CDC14-9Myc::HPH DDC2-YFP::KanMX4 pRS316-*mps3Δ2-64*-RFP-URA3 *mps3Δ*::Nat	This Study
AC1060	*MAT*α HOΔ *ade1-100 leu2,3-112 lys5 ura3-52* trp::hisG *hml*::ADE1 *hmr*::ADE1 ade3::GAL-HO CDC14-9Myc::HPH DDC2-YFP::KanMX4 pRS316-*mps3Δ75-150*-RFP-URA3 *mps3Δ*::Nat	This Study
AC1062	*MAT*α HOΔ *ade1-100 leu2,3-112 lys5 ura3-52* trp::hisG *hml*::ADE1 *hmr*::ADE1 ade3::GAL-HO *cdc14-1*-9Myc::HPH DDC2-YFP::KanMX4 pRS316-*MPS3*-RFP-URA3 *mps3Δ*::Nat	This Study
AC1064	*MAT*α HOΔ *ade1-100 leu2,3-112 lys5 ura3-52* trp::hisG *hml*::ADE1 *hmr*::ADE1 ade3::GAL-HO *cdc14-1*-9Myc::HPH DDC2-YFP::KanMX4 pRS316- *mps3Δ2-64*-RFP-URA3 *mps3Δ*::Nat	This Study
AC1066	*MAT*α HOΔ *ade1-100 leu2,3-112 lys5 ura3-52* trp::hisG *hml*::ADE1 *hmr*::ADE1 ade3::GAL-HO *cdc14-1*-9Myc::HPH DDC2-YFP::KanMX4 pRS316- *mps3Δ75-150*-RFP-URA3 *mps3Δ*::Nat	This Study
AC1074	MAT::HIS3 *ade2-1* bar1::LEU2 *trp1-1* LYS2 RAD5 RAD52-CFP ura3::3xURA3-tetOx112 I-SceI(ura3-1) his3-11,15::YFP-LacI-his3-x leu2-3,112::LacO-LEU2 HO-iYCL018W(leu2-3,112) TetI-RFP(iYGL119W) *cdc14-1*-9Myc::HPH CNM67-GFP::KanMX4 pAC59(Gal-I-SceI-ADE2)	This Study
AC1077	MAT::HIS3 *ade2-1* bar1::LEU2 *trp1-1* LYS2 RAD5 RAD52-CFP ura3::3xURA3-tetOx112 I-SceI(ura3-1) his3-11,15::YFP-LacI-his3-x leu2-3,112::LacO-LEU2 HO-iYCL018W(leu2-3,112) TetI-RFP(iYGL119W) CDC14-9Myc::HPH CNM67-GFP::KanMX4 pAC59(Gal-I-SceI-ADE2)	This Study
AC1086	MATa HOΔ *ade1-100 leu2,3-112 lys5 ura3-52* trp1::hisG *hml*::ADE1 *hmr*::ADE1 ade3::GAL-HO CDC14-GFP::KanMX4 Net1-6HA::HPH	This Study
AC1095	*MAT*a-inc HOΔ *hml*::ADE1 *hmr*::ADE1 *ade1-100 leu2-3,112 lys5* trp1::hisG *ura3-52* ade3::GAL::HO arg5,6::*MAT*a::HPH SPC110-S36-91A::TRP pRS306-*SPC110*::URA3	This Study
AC1200	*MAT*a HOΔ *ade1-100 leu2,3-112 lys5 ura3-52* trp1::hisG *hml*::ADE1 *hmr*::ADE1 ade3::GAL-HO SPC110-S36-91D::TRP-RFP::Nat CDC14-9Myc::HPH DDC2-GFP::KanMX4	This Study
AC1204	*MAT*a-inc HOΔ *hml*::ADE1 *hmr*::ADE1 *ade1-100 leu2-3,112 lys5* trp1::hisG *ura3-52* ade3::GAL::HO arg5,6::*MAT*a::HPH SPC110-S36-91D::TRP	This Study
AC1216	*MAT*a HOΔ *ade1-100 leu2,3-112 lys5 ura3-52* trp1::hisG *hml*::ADE1 *hmr*::ADE1 ade3::GAL-HO SPC110-S36-91D::TRP-6HA::Nat CDC14-GFP::KanMX4	This Study

Appendix Table S2. Oligonucleotides used for probes synthesis.

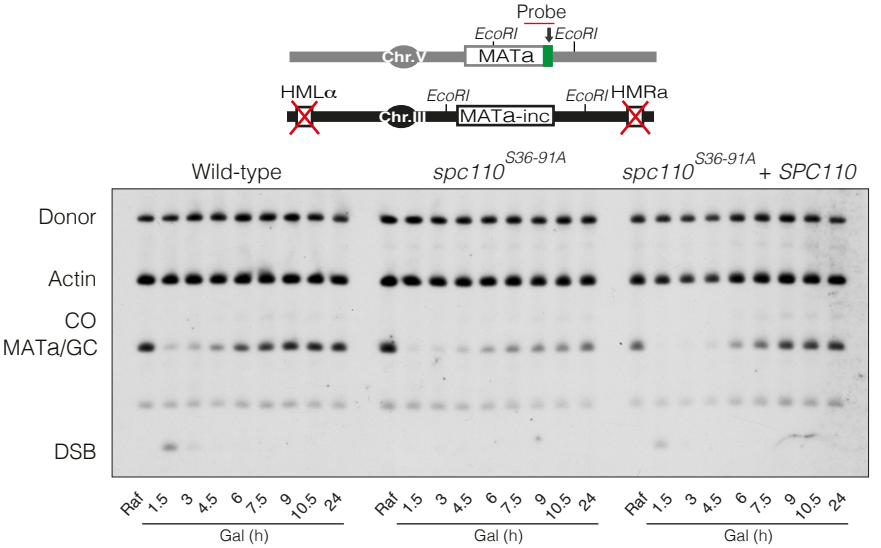
Name	Sequence	Used in
Mata Distal 1	CATGCGGTTCACATGACTTTTGAC	*MAT*a-distal probe
Mata Distal 2	AGGATGCCCTTGTTTTGTTTACTG	*MAT*a-distal probe
Mata Only 1	TTTGTTCTTTCGGGGAAACTG	*MAT*a probe
Mata Only 2	GTACAAACACATCTTCCCAATA	*MAT*a probe
His3 probe 1	GAGCAGAAAGCCCTAGTAAAG	His3 probe
His3 probe 2	TAAGAACACCTTTGGTGGAGG	His3 probe
Act1 probe 1	CGAACAAGAAATGCAAACCGC	Actin probe
Act1 probe 2	CTTGTGGTGAACGATAGATGG	Actin probe

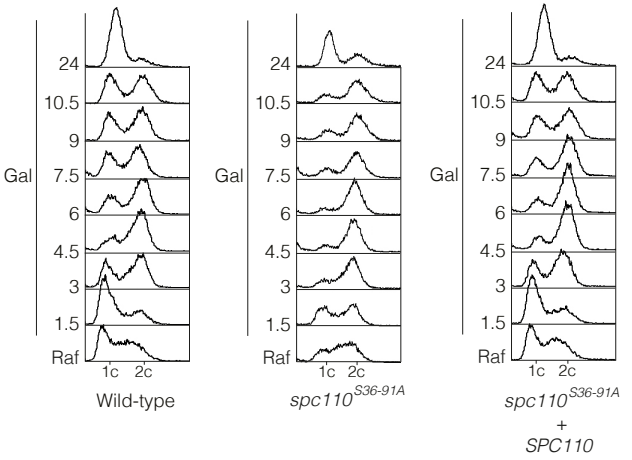
Appendix Figure S1

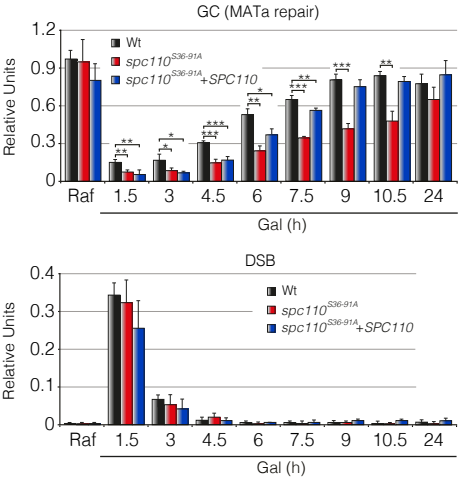
A



B







Appendix Figure S1. The DNA repair defects of *spc110*$^{S36\text{-}91A}$ cells are complemented when a wild-type copy of *SPC110* is expressed.

A) Grow sensitivity to phleomycin of a wild-type strain, an *spc110*$^{S36\text{-}91A}$ mutant, and two different clones of *spc110*$^{S36\text{-}91A}$ expressing a wild-type copy of *SPC110* under its own promoter. Ten-fold serial dilutions from overnight cultures were plated onto YPD or YPD containing 0.125 μM of phleomycin at 30ºC.

B) Southern blot analysis of a wild-type, an *spc110*$^{S36\text{-}91A}$ mutant, and an *spc110*$^{S36\text{-}91A}$ mutant expressing a wild-type copy of *SPC110*. Overnight cultures of cells harbouring the inter-chromosomal gene conversion assay were induced by adding galactose at 32ºC to express the HO endonuclease. Samples were collected at the depicted time-points, DNA extracted and digested with *EcoRI*. Blots were probed with *MATa*-only and *ACT1* probes. FACS profiles for DNA content are included. Graphs show the average values for gene conversion, DSB induction and crossover *vs* non-crossover ratio. All data were normalized using the actin signal as loading control. Graphs represent the mean ± S.D. from three independent experiments. *P* values were calculated using a 2-tailed unpaired Student *t* test. **P*≤0.05; ***P*≤0.01; ****P*≤0.001.

Data information: DSB, double-strand break. Raf, raffinose. Gal, galactose. GC, gene conversion. CO, crossover.