

Supplementary Material

The fission yeast MRN complex tethers dysfunctional telomeres for NHEJ repair

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Supplementary figure 1. The reduced amount of telomere fusions detected in *nbs1Δ rap1Δ* cells is not due to shorter telomeres.

NotI-digested genomic DNA was analyzed by pulsed-field gel electrophoresis followed by Southern blot analysis using a non-telomere probe for the terminal fragments of chromosomes I and II (LMIC probe). End chromosomal fusions are also detected using this probe in *ctp1Δ rap1Δ*, but not *nbs1Δ rap1Δ*, G1-arrested cells. Non-specific, non-telomere bands are indicated by an asterisk. Please note that lanes come from the same Southern blot and that only irrelevant lanes have been removed in the interest of clarity. Full-sized source images of the original scans can be found as an online supplement to this paper.

Supplementary figure 2. Rad3 and Tel1 PI3-kinases are dispensable for unprotected *taz1Δ* and *rap1Δ* NHEJ telomere fusions.

Southern blot analysis using a non-telomere probe for the terminal fragments of chromosomes I and II (LMIC bands) shows that the reduced detection of telomere fusions of *rad3Δ tel1Δ taz1Δ* or *rad3Δ tel1Δ rap1Δ* triple mutants in PFGE (shown in fig. 3c) is due to the loss of telomere sequences in these strains. Asterisks depict non-specific, non-telomere bands. Please note that lanes come from the same Southern blot and that only irrelevant lanes have been removed in the interest of clarity. Full-sized source images of the original scans can be found as an online supplement to this paper.

Supplementary figure 3. PCR confirmation of colonies transformed with of two unlinked DNA fragments.

A- PCR reactions performed with Leu2F and KanF. B- PCR reactions performed with Leu2R and KanF. Lanes: 1- HyperLadder I; 2 to 6- cells resulting from co-transformation of digested pKan1 plasmid and *LEU2* fragment; 7- untransformed cells; 8- cells transformed with digested pKan1 plasmid alone. Please note that lanes come from the same Southern blot and that only irrelevant lanes have been removed in the interest of clarity. Full-sized source images of the original scans can be found as an online supplement to this paper.

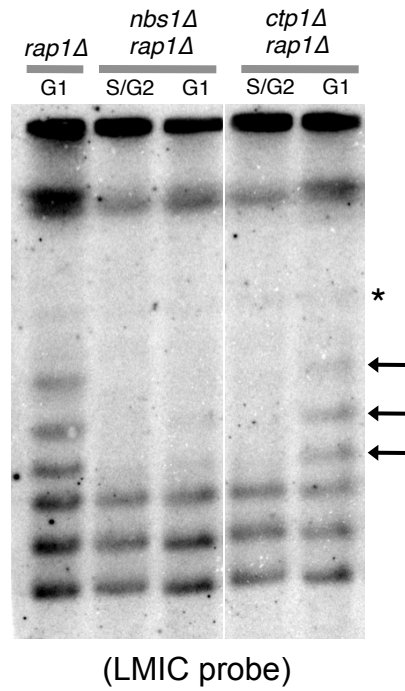
Supplementary figure 4. The ability of *rad32* mutants to join two independent DNA fragments *in vivo* is not correlated with their DNA damage sensitivity.

The nuclease-dead *rad32-D65N* and the dimerization-impaired *rad32-L77K* and *rad32-L154D* alleles are mildly sensitive to DNA damage and partially retain the DNA repair ability of the MRN complex. Ten-fold serial spots were made, and cells were subjected to UV irradiation, hydroxyurea (HU), and camptothecin (CPT) at the indicated doses. Plates were photographed after a 4-day incubation at 32°C.

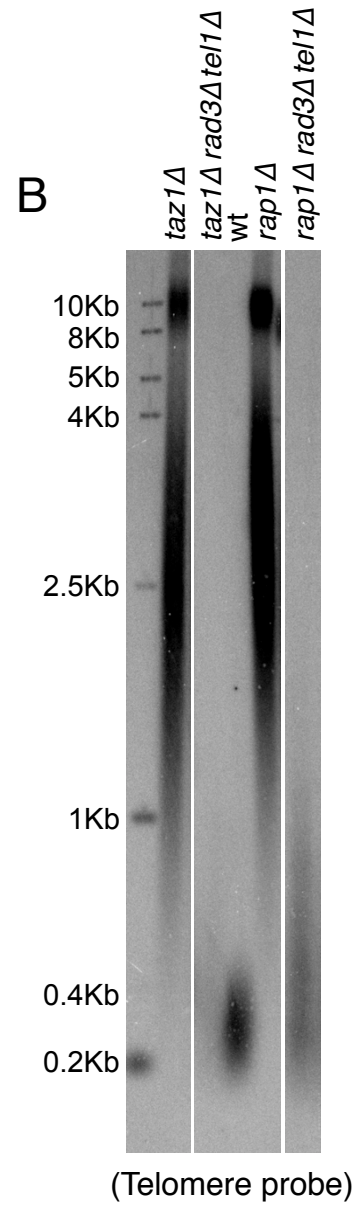
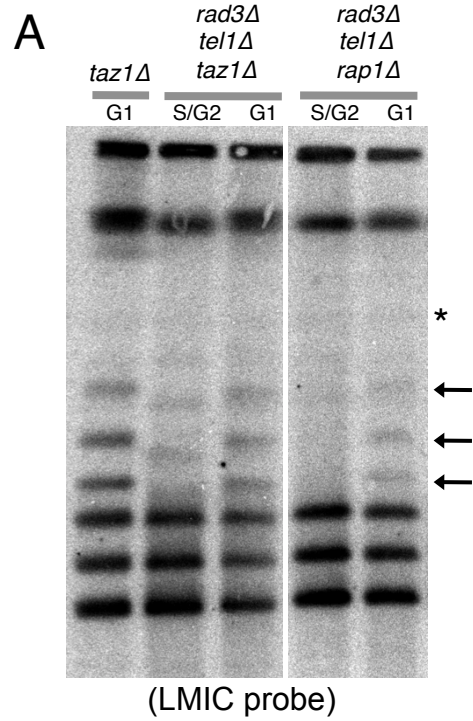
Supplementary figure 5. MRN is dispensable to process incompatible plasmid DNA ends.

NHEJ plasmid repair assays were performed in strains from the indicated genotypes as described in Figure 5 except that the cut vector was simultaneously digested with KpnI and BglII thus generating non-cohesive ends. The results are plotted as the ratio of the number of transformants obtained with linearized plasmid over those transformed with uncut plasmid. A minimum of 3 independent experiments was performed. Error bars represent 2xSEM.

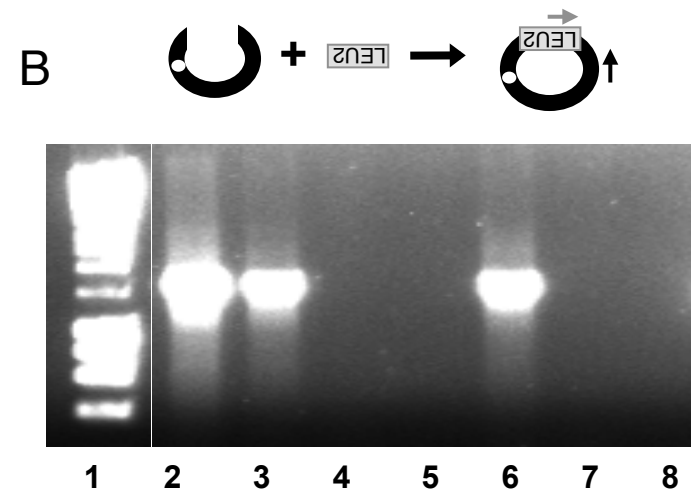
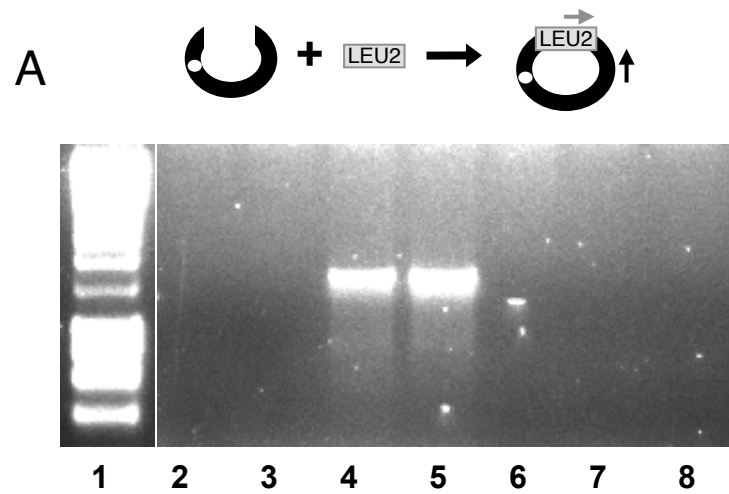
Supplementary Figure 1



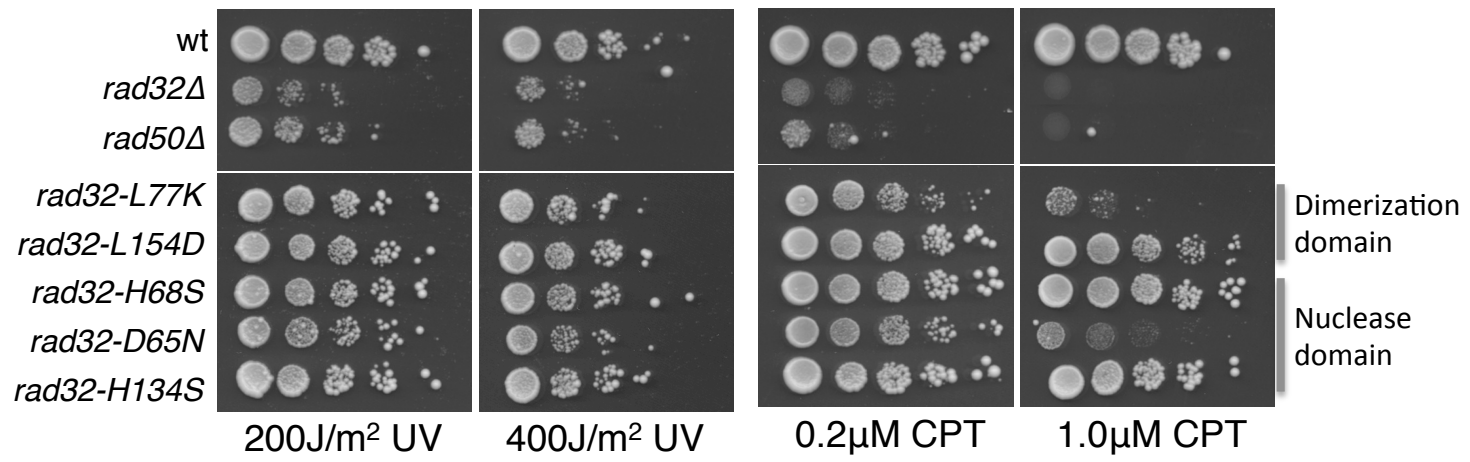
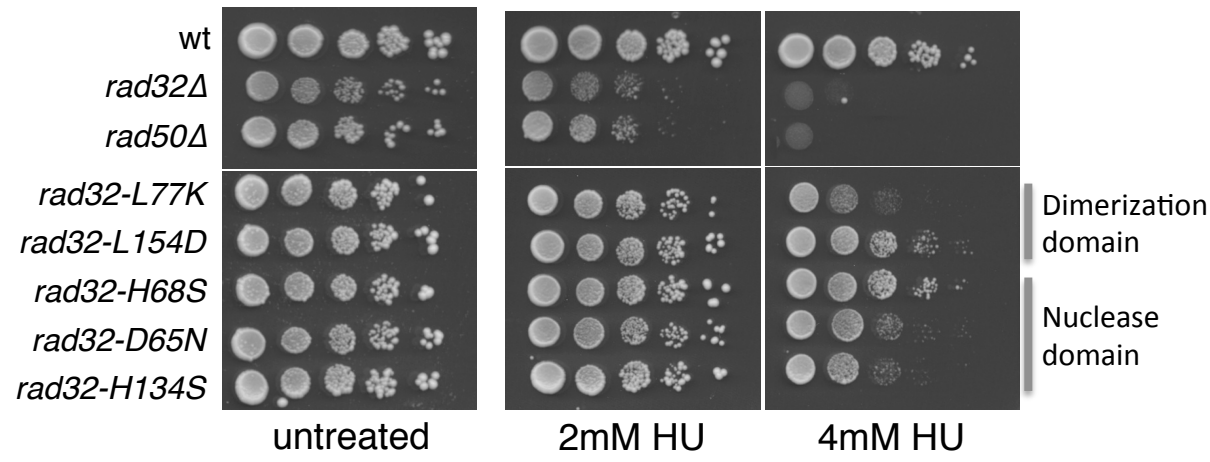
Supplementary Figure 2



Supplementary Figure 3



Supplementary Figure 4



Supplementary Figure 5

