Supplemental figure legends

Figure S1. Sequence of XRCC2 mutant cDNAs. The four *XRCC2* cDNAs were re-sequenced in each orientation to confirm the nature of the gene product. DNA sequence (red) beginning at codon 45 (amino acid sequences in blue) for each cDNA is shown. The del G53 K54 cDNA is interrupted to align sequence either side of the deletion with the other cDNAs.

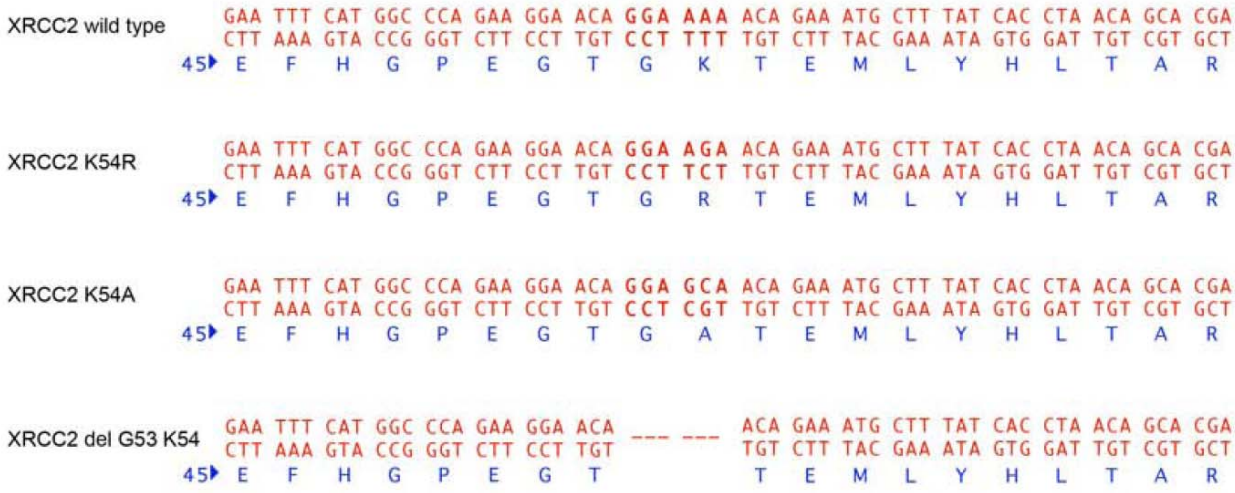
Figure S2. Southern blot analysis of long tract gene conversions. Southern analysis of long tract gene conversions reported in **Figures 3** and **6. A.** Schematic of the rearrangements identified within the reporter with restriction maps. **B.** Representative Southern blot analysis of genomic DNA from two distinct BSD-resistant (LTGC) clones. Genomic DNA was analyzed by use of two parallel restriction digests: PstI alone (P); and PstI + I-SceI (P/I), with use of a *GFP* probe. The empty arrowhead marks the expected migration (at ~5.9 kb) of the *GFP*-hybridizing band from an unrearranged parental reporter following digestion with PstI alone. Note that, in the two clones shown, the PstI-digested fragments migrate slower than 5.9 kb, indicating that the reporter has been rearranged during LTGC. The two lanes on the left show an "early termination" LTGC clone; note the absence of an I-SceI site in the rearranged reporter. The two lanes on the right show a "*GFP* triplication" clone; note the presence of an I-SceI site in the third *GFP* copy, revealed as a 1.3 kb band (filled arrowhead), released by addition of I-SceI to the PstI digest.

Figure S3. Transient expression of *hXRCC3* rescues gene conversion defect in irs1SF *XRCC3*$^{-/-}$ cells. I-SceI induced HR in irs1SF HR16, HR70 and HR7, transiently co-transfected with I-SceI expression vector and either empty vector (grey bars) or h*XRCC3* expression plasmid (black bars).

Figure S4. XRCC3 specifically restores HR to irs1SF cells. Frequency of I-SceI induced HR in irs1SF HR16 cells, co-transfected with I-SceI and either empty vector, wt h*XRCC3*, wt h*Rad51* or other wt*Rad51* paralog expression plasmids.

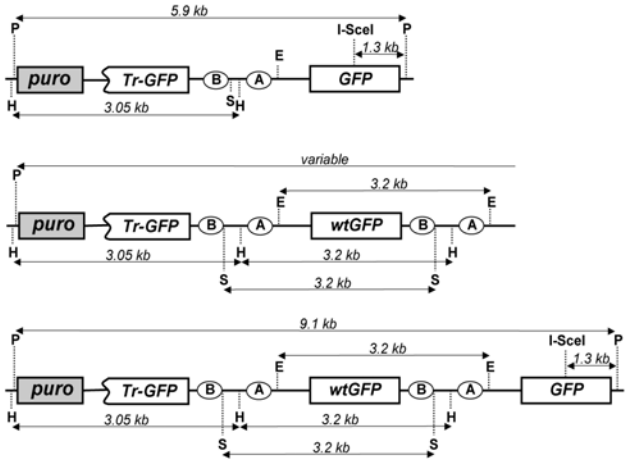
Figure S5. Lysine 113 but not threonine 241 is required for efficient XRCC3 HR function.

I-SceI induced HR in irs1SF HR16 cells transiently transfected with control empty vector, wt*XRCC3* or the indicated *XRCC3* mutant expression plasmids.

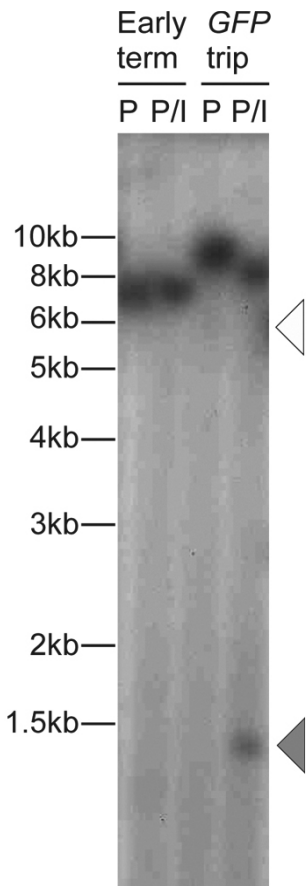


Supplementary Fig. 1

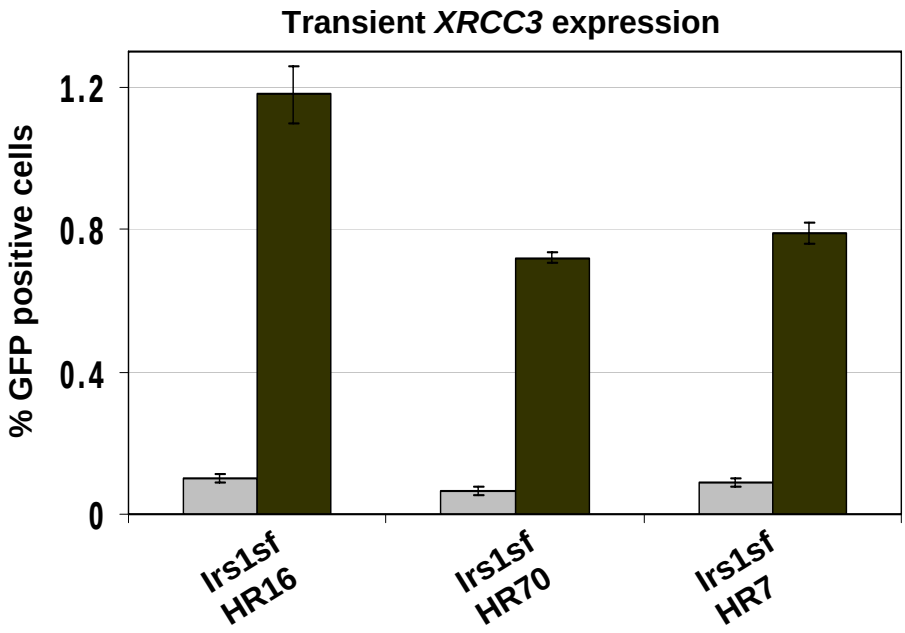
A



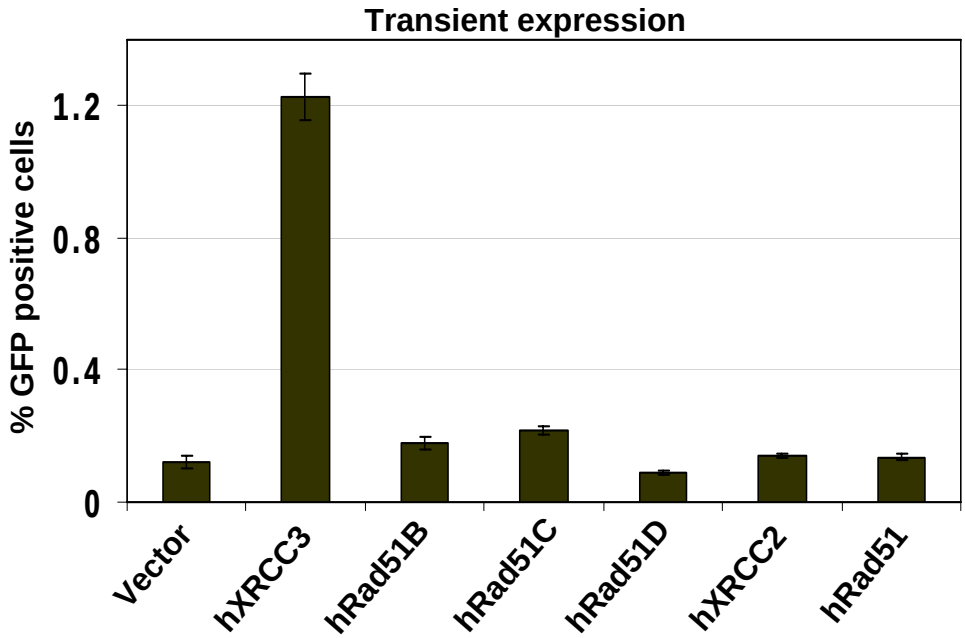
B



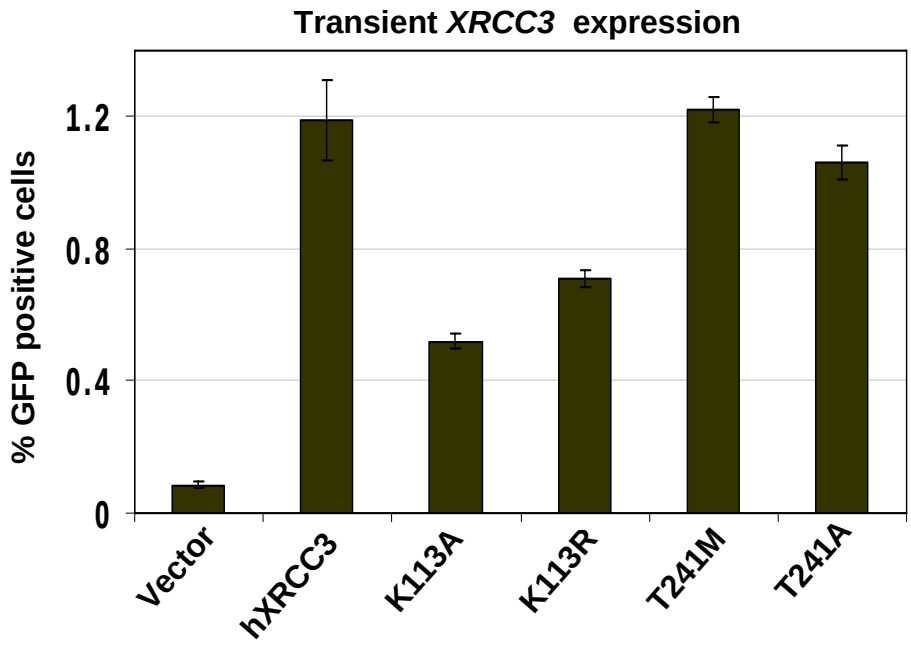
Supplementary Fig. 2



Supplementary Fig. 3



Supplementary Fig. 4



Supplementary Fig. 5