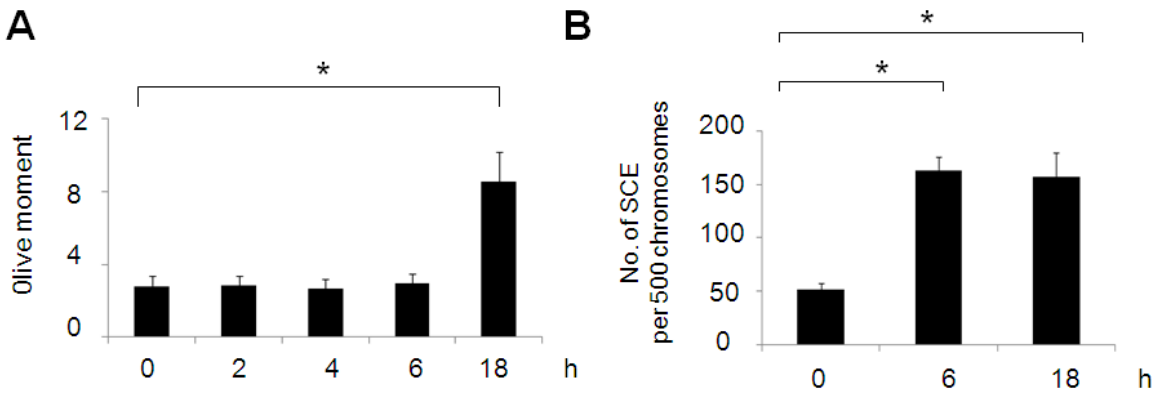

Fig.S1 SCE occurs following stalled or collapsed DNA replication forks in MDA-MB-231 cells. (**A**) The Comet assay was conducted in MDA-MB-231 cells treated with 2 mM HU at indicated time points. At least 150 cells were analyzed for each treatment. Results were expressed by the Olive moment. *p* values were calculated by Student's *t* test (* $p<0.05$). The data shown is from three independent experiments with standard errors. (**B**) The frequencies of SCE in MDA-MB-231 cells with or without HU treatment at indicated time points. The mitotic cells were prepared according to a standard procedure (see materials and methods). Histograms show the frequency of SCE per 500 chromosomes with at least 20-40 metaphase cells being counted. The data shown is the result from three independent experiments.

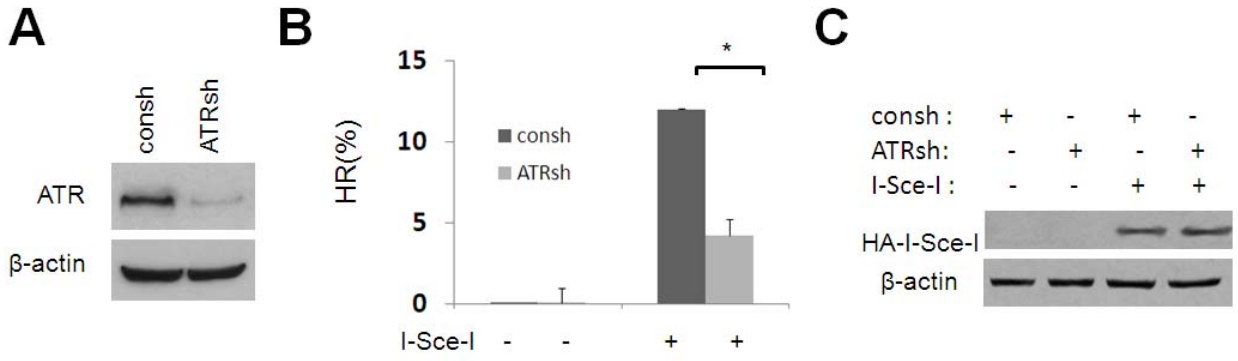

Fig. S2 ATR-deficient cells show a significant reduction in HR mediated by short tract gene conversion in H1299 cells. (**A**) ATR knockdown by ATRsh. Lysates were prepared from H1299 cells after 72-h infection with ATRsh or consh. (**B**) The induction of HR by overexpression of I-Sce-I was measured by dual-color flow cytometric detection of GFP-positive cells. H1299/DR-GFP cells were infected with consh or ATRsh, then subsequently treated with and without infection of the adenoviral I-Sce-I expression construct (Ad-SceI-NG). The HR frequencies in cells depleted of ATR are shown in comparison to cells with intact ATR expression. Results are means from three independent experiments, with standard errors shown (* p <0.01). (**C**) The expression of HA-tagged I-Sce-I endonuclease was monitored by Western blot using anti-HA antibody. H1299/DR-GFP cells with or without ATR depletion were infected with and without Ad-SceI-NG, and whole cell lysate was prepared at 48-h following Ad-SceI-NG infections.

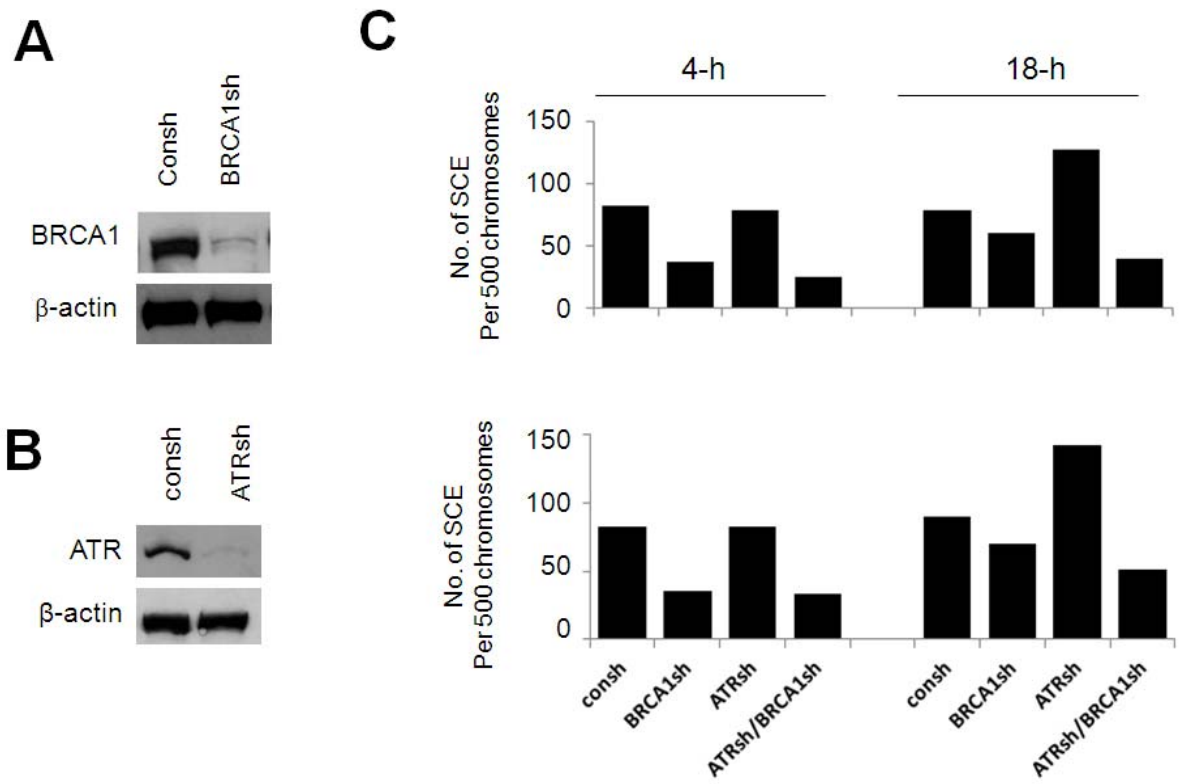

Fig.S3. The role of BRCA1 in promotion of SCE following replication fork collapse is enhanced by ATR depletion in MDA-MB-231 cells. (A) BRCA1 knockdown via BRCA1sh in MDA-MB-231 cells. (**B**) ATR knockdown via shRNA targeting ATR (ATRsh) in MDA-MB-231 cells. (**C**) BRCA1 knockdown led to a decreased frequency of SCE induced by 4-h HU treatment, which is independent of ATR. In contrast, BRCA1 knockdown led to a more profound decrease in frequency of SCE induced by 18-h HU treatment in cells depleted of ATR compared to cells with intact ATR expression. The experimental procedure is similar to that described in **Fig.3.** Histograms show the frequencies of SCE per 500 chromosomes with at least 20-40 metaphase cells being counted. The data shown is the result from two independent experiments.

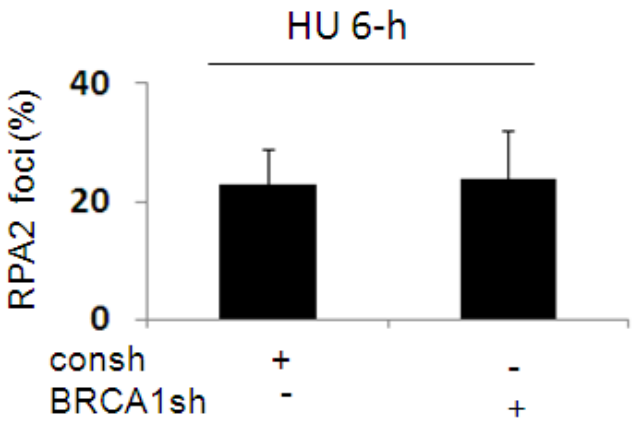

Fig. S4. BRCA1 depletion has no effect on RPA2 foci following replication fork stalling. RPA2 foci induced by 6-h HU treatment in MCF7 cells with or without BRCA1 depletion. Cells were scored positive when 10 nuclear foci were visible. Results are means from three independent experiments, with standard errors shown (p>0.05). p values were calculated by Student's t test.

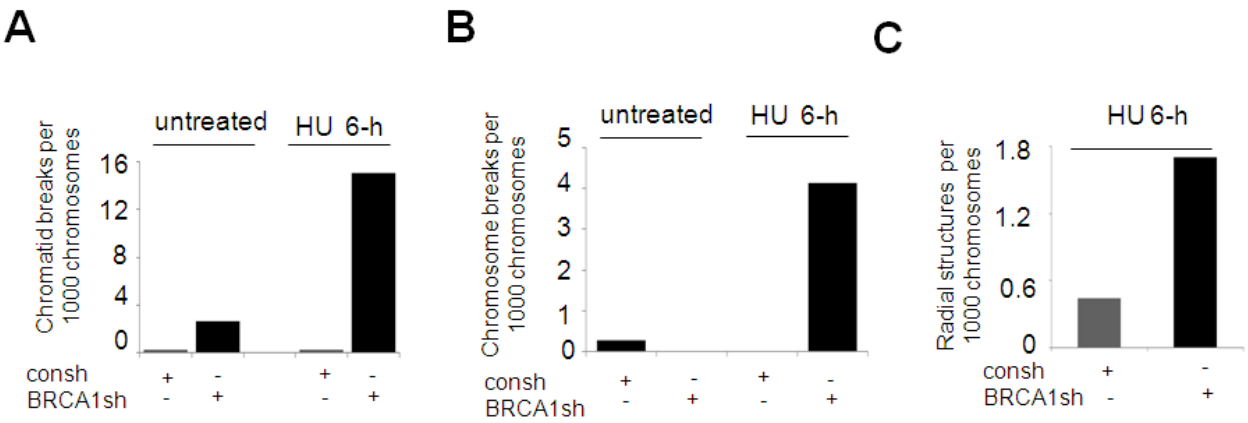

Fig. S5 BRCA1 knockdown leads to increased frequencies of chromosomes aberrations following replication fork stalling. (A–C) Frequencies of chromatid breaks (**A**) and chromosome breaks (**B**) and radial structure (**C)** in MCF7 cells. 40-50 metaphases for each sample were analyzed. The data shown is from one of two independent experiments.