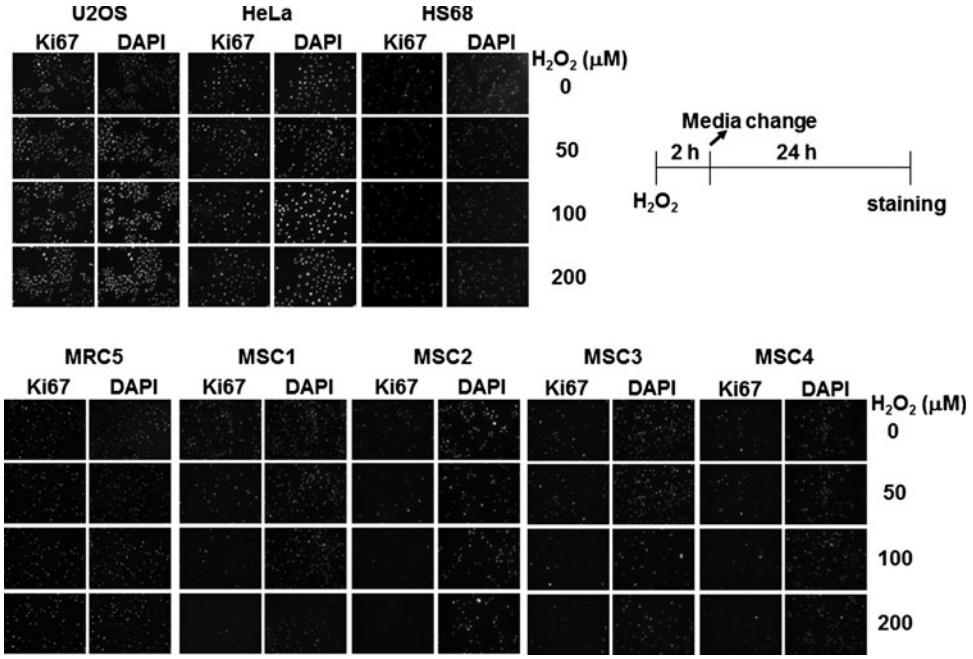
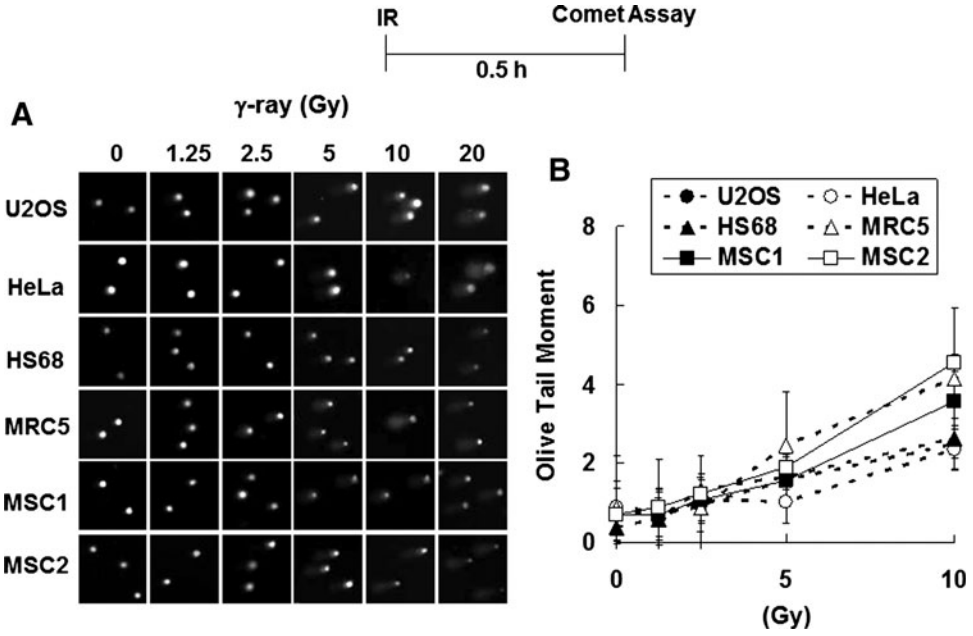
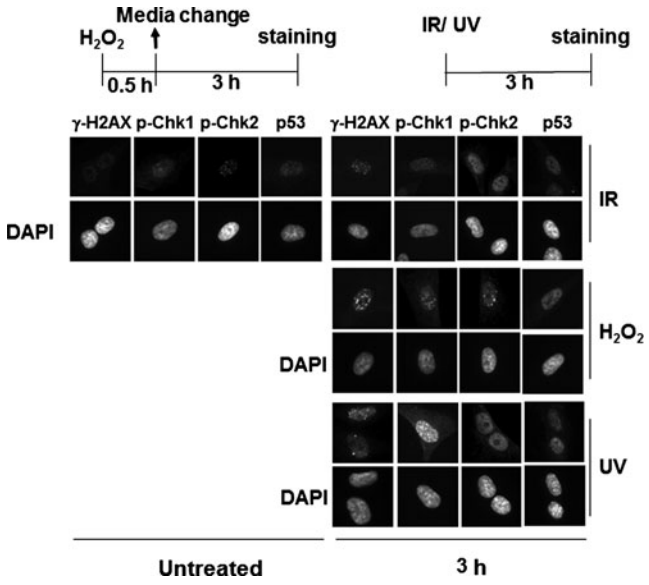
Supplementary Data



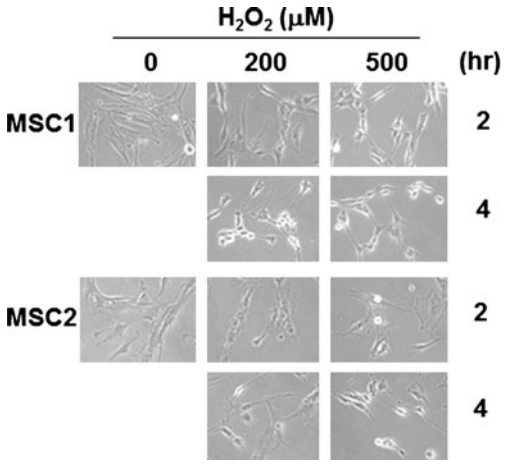
SUPPLEMENTARY FIG. S1. Hydrogen peroxide inhibits proliferation of hUCB-MSCs. Cells treated with hydrogen peroxide, as described in Fig. 1, were immunostained with anti-Ki-67 antibody. DAPI staining was used to visualize the nuclei. Cells were imaged under a fluorescent microscope. MSCs, mesenchymal stem cells; hUCB-MSCs, human umbilical cord blood–derived MSCs.



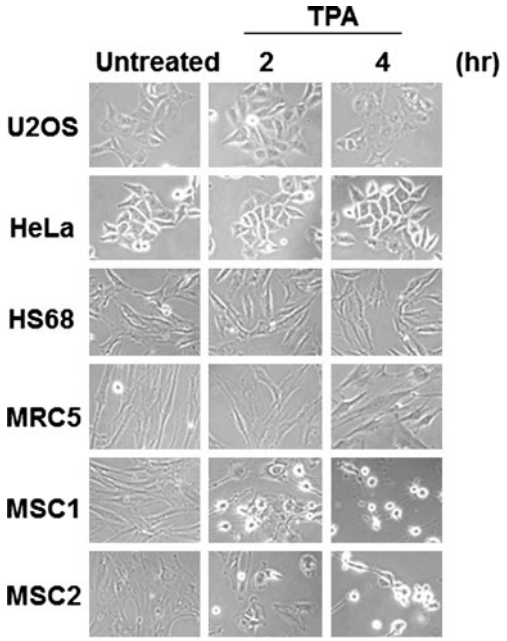
SUPPLEMENTARY FIG. S2. DNA damage generated by ionizing radiation. **(A)** Cells irradiated with γ-rays were analyzed using the comet assay immediately after irradiation. **(B)** Olive tail moments were measured as described in Fig. 2. *P* value was >0.05.



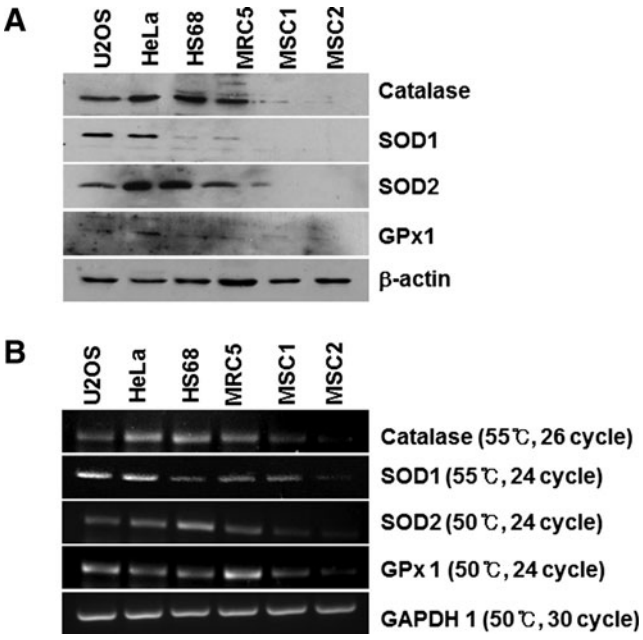
SUPPLEMENTARY FIG. S3. DNA damage signaling proteins activated in hUCB-MSCs. MSC1 cells were treated with 10 Gy of γ-radiation, 200 μM of hydrogen peroxide, or 10 J/m^2 of ultraviolet radiation. Three hours after the treatment, the cells were immunostained with relevant antibodies, as described in Materials and Methods. Nuclei were visualized by DAPI staining.



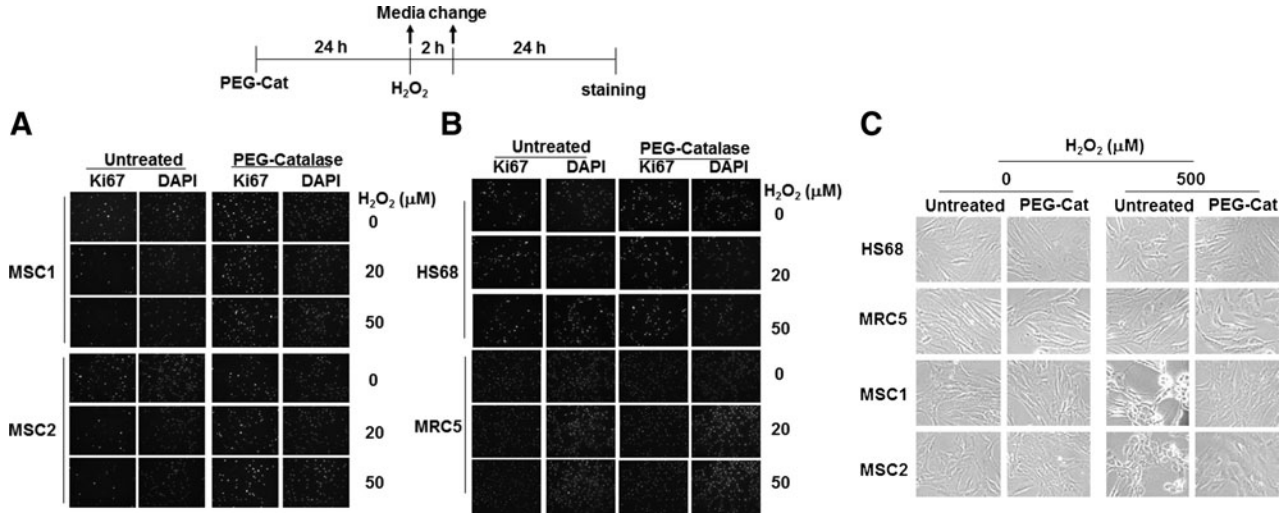
SUPPLEMENTARY FIG. S4. Hydrogen peroxide induces cell death in hUCB-MSCs. Cells treated with the indicated concentrations of hydrogen peroxide for 2 or 4 h were imaged using phase-contrast microscopy.



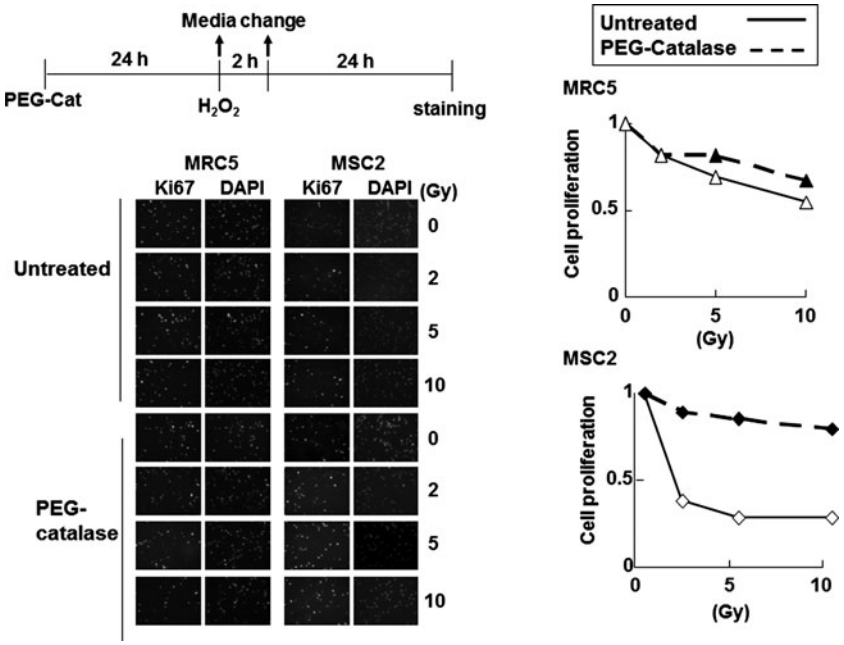
SUPPLEMENTARY FIG. S5. TPA causes cell death in hUCB-MSCs. Cells treated with 10 μM of TPA for 2 or 4 h were imaged using phase-contrast microscopy. TPA, phorbol-12-myristate-13-acetate.



SUPPLEMENTARY FIG. S6. Low antioxidant protein levels in hUCB-MSCs are due to low gene expression levels. Immunoblotting with the relevant antibodies **(A)** and RT-PCR **(B)** were performed as described in Fig. 5 and Materials and Methods. SOD1, superoxide dismutase 1; SOD2, superoxide dismutase 2; GPx1, glutathione peroxidase 1; RT-PCR, reverse transcriptase-polymerase chain reaction.



SUPPLEMENTARY FIG. S7. Exogenously added antioxidant increases resistance of hUCB-MSCs to oxidative stress. **(A, B)** hUCB-MSCs (MSC1 and MSC2) and human fibroblast cells (MRC5 and HS68) were preincubated with 200 U/mL of PEG-catalase, washed, and then incubated in fresh medium containing the indicated concentration of hydrogen peroxide for 2 h. Next, the washed cells were grown in fresh medium for 24 h and then immunostained with anti-Ki-67 antibody. **(C)** The cells were treated as described in Fig. 6C and imaged using phase-contrast microscopy. PEG-catalase, polyethylene glycol–conjugated catalase; PEG-Cat, PEG-catalase.



SUPPLEMENTARY FIG. S8. Increased antioxidant activity confers resistance to ionizing radiation in hUCB-MSCs. Human fibroblast cells (MRC5) and hUCB-MSCs (MSC2) pretreated with 200 U/mL of PEG-catalase were irradiated with the indicated doses of ionizing radiation. One day after irradiation, the cells were immunostained using the Ki-67 antibody.