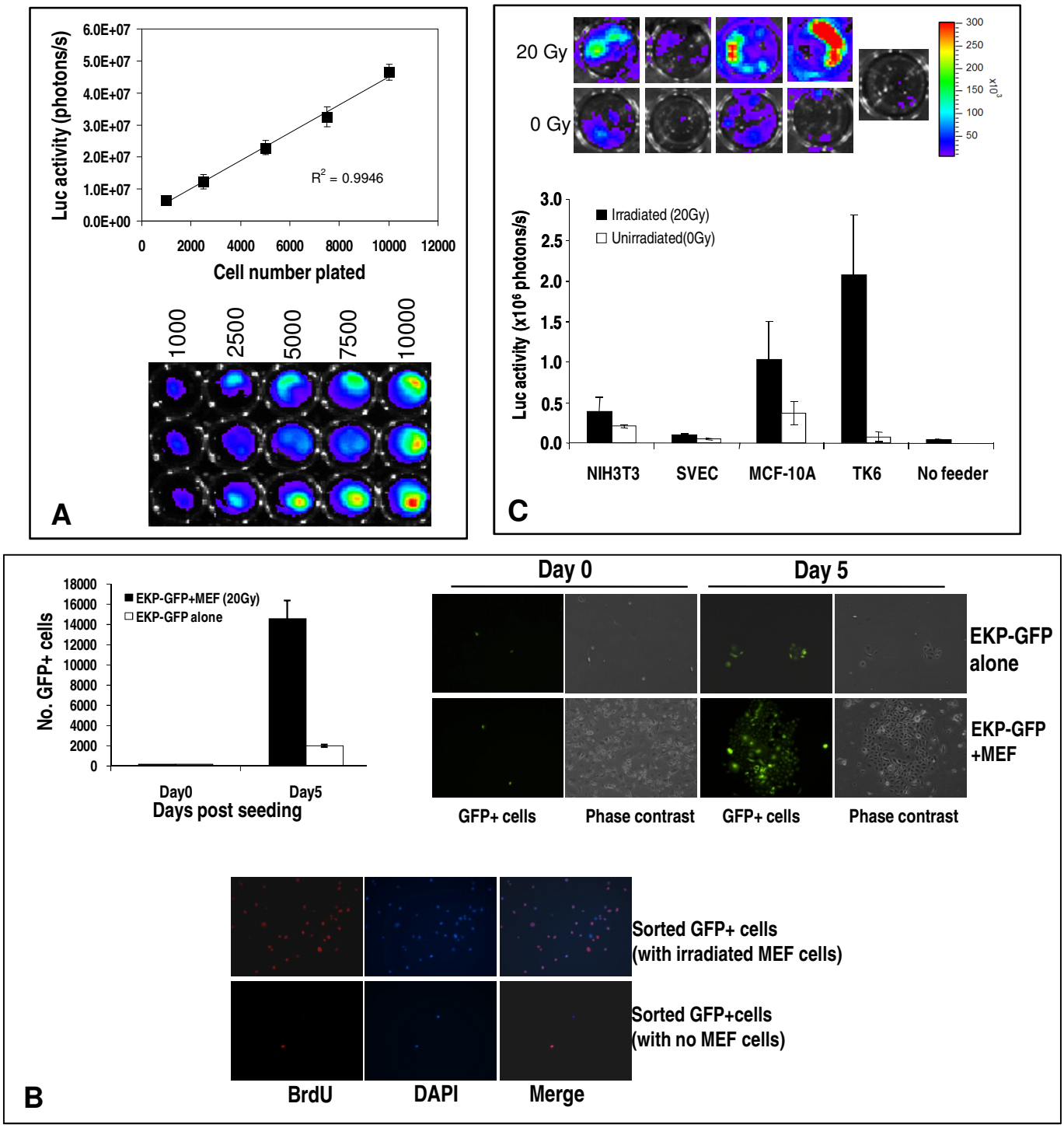

Figure S1. A) Linearity of measured bioluminescence vs EKP-Fluc cell numbers. EKP-Fluc cells were plated in 96 well plates in triplicates in different cell numbers. They were then imaged by use of the IVIS200 imaging system. Top panel, luc activities plotted against cell numbers. There is very good linearity (R^2=0.99). Lower panel, an image of the plated EKP-Fluc cells. **B**). Verification of EKP-GFP cellular proliferation. About 200 EKP-GFP cells were seeded either alone or onto 4x10^4 MEF (cells irradiated with 20 Gy x-rays) in 24-well plates. On days 0 and 5, cells in different wells were sorted through a flow cytometer and GFP+ cells were enumerated (n=3). Shown were numbers in different wells (**top left**). Shown in the **top right** panel were photos of total and GPF+ cells right before sorting. **Lower panel**: some of the cells were labeled with BrdU (20μM) for 24hrs on day 4 and sorted on day 5. Sorted GFP+ cells were placed into a 24-well plate and allowed to attach for 4 hrs. These cells were then stained (using anti-BrdU antibodies) for BrdU incorporation following standard protocols. DAPI was used to stain all cellular nuclei. **C**) Quantification of EKP-Fluc progenitor cell growth stimulated by lethally irradiated cells were conducted for different cell types with (20 Gy) or without irradiation (0 Gy) following the same protocols as described in Figure 1A and Methods section. In brief, feeder cells were treated with radiation (0 or 20 Gy) and plated into 24-well plates at 4x10^4 cells/well. About 200 EKP-Fluc cells were then seeded into the feeder cells. Serial monitoring of bioluminescence were carried out by use of the IVIS200 instrument. Shown was relative cellular growth as represented by luciferase activities at the end of 5 days. In all cases, EKP-Fluc cells showed significant growth advantage when grown together with lethally irradiated cells ($P<0.05$, n=4, t-test).

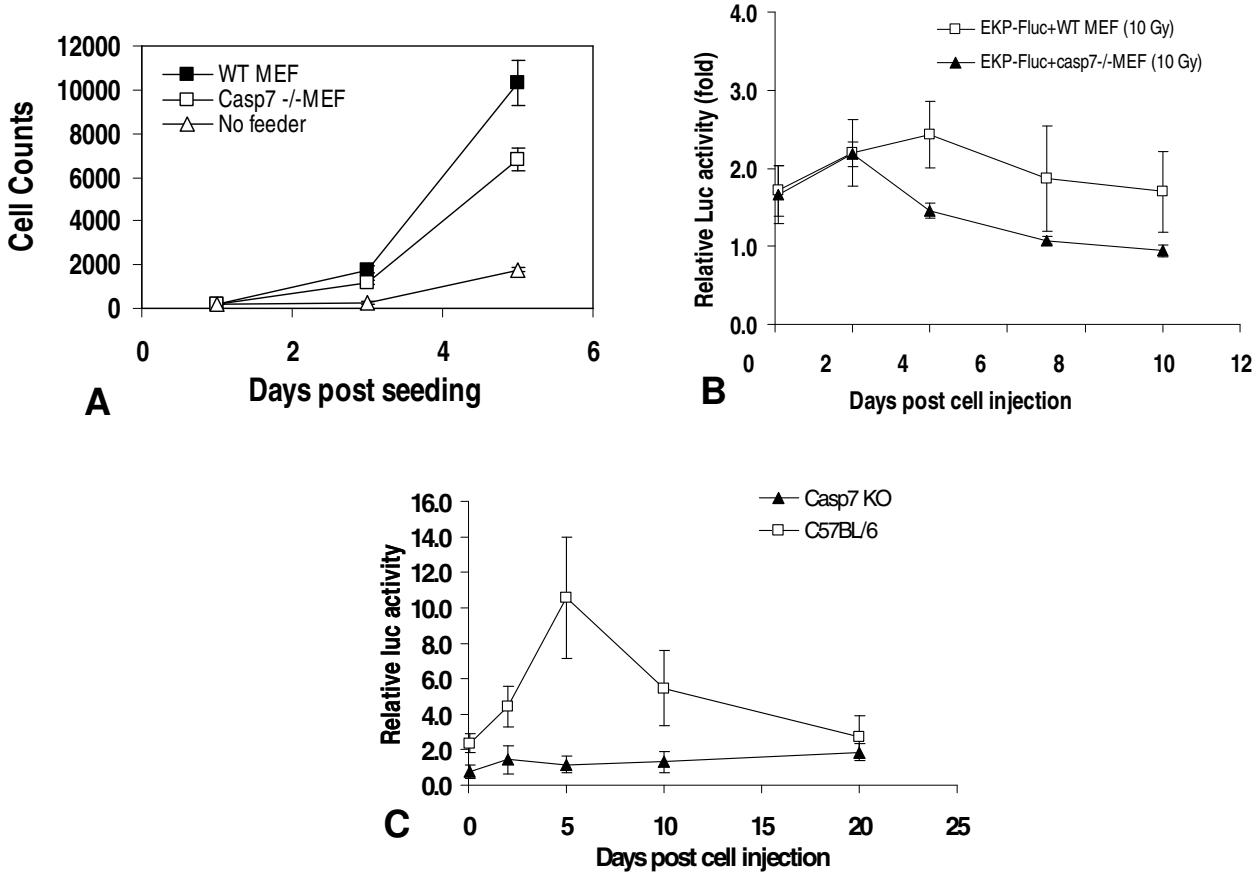

Figure S2. A) Effect of caspase 7 on cell death-stimulated growth of EKP-Fluc progenitor cells. Wild type and casp7-/- MEF cells were irradiated (10Gy) and plated into 24-well plates. Fluc labeled epidermal keratinocyte progenitor (EKP-Fluc) were then seeded into the wells at 200 cells/well. The growth of the cells was then monitored serially by use of the IVIS200 instrument. The difference between wild type and casp7-/- MEF groups is significant at day 5 ($P<0.02$, $n=4$). The error bars represent SEM. **B**) Effect of caspase 7 on cell death-stimulated growth of EKP-Fluc progenitor cells in vivo. About 1000 EKP-Fluc cells were mixed with irradiated (10 Gy) wild type or casp7(-/-) MEF cells ($2x10^5$). They were then injected into the right hind legs of nude mice. As a control, equal numbers of EKP-Fluc cells were injected into the left legs of mice alone. The growth of the cells was then monitored through bioluminescence imaging. Shown was relative growth of feeder supported growth (right leg) normalized against non-feeder supported growth (left leg). C) Effect of caspase 7 on EKP-Fluc cellular growth in irradiated mice. About 1000 EKP-Fluc cells were injected subcutaneously into right hind legs of wild type and casp7-/- C57BL/6 mice that were irradiated (18 Gy). As controls equal numbers of EKP-Fluc cells were also injected into non-irradiated left hind legs of mice. The growth of the cells were then followed through bioluminescence imaging serially. Shown were relative luc signals from irradiated right legs normalized against those from non-irradiated left legs.

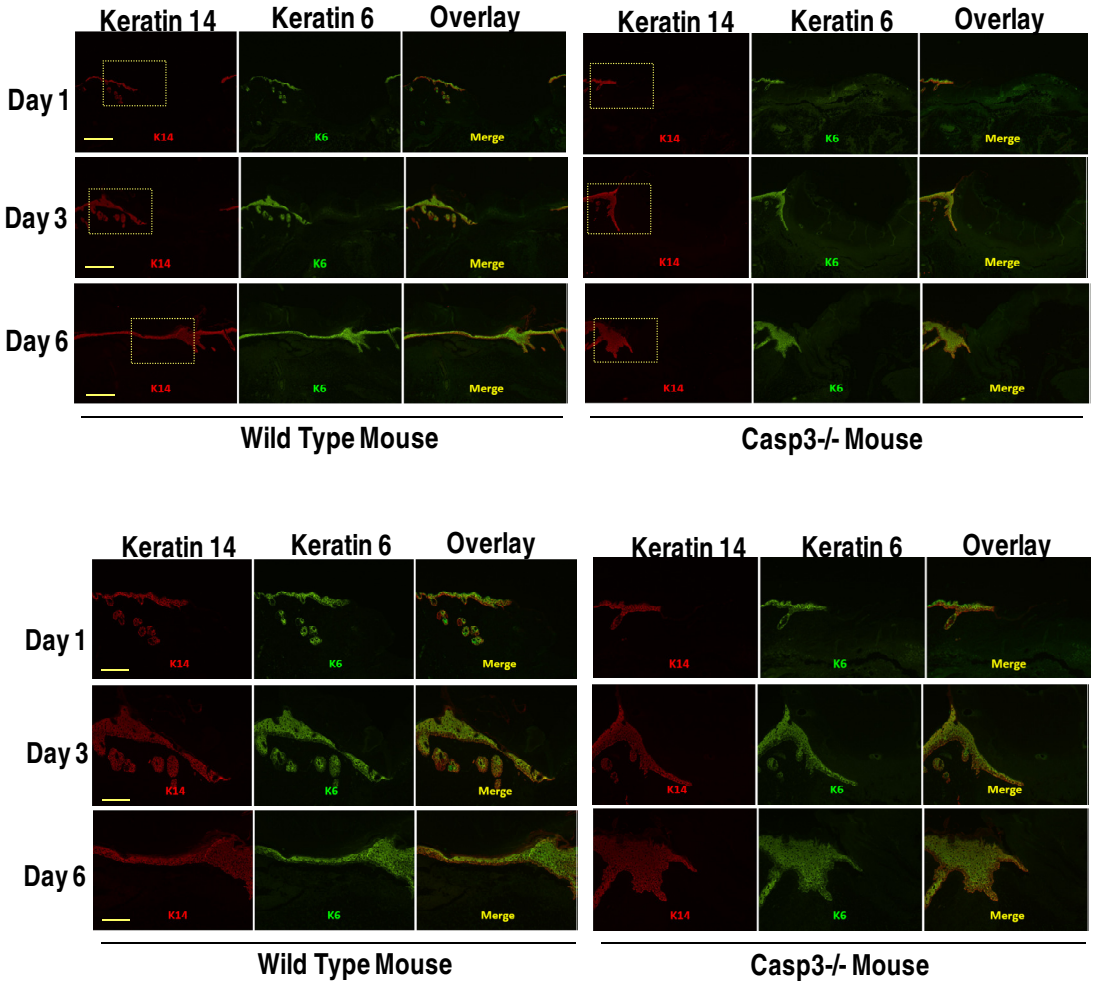

Figure S3. Immunofluorescence staining of cytokeratin 6 and cytokeratin 14 during wild type and casp3-/- skin wound healing. Skin excision wounds were generated through punch biopsy. At different times after skin biopsy, mice were sacrificed and tissues containing full thickness wounds were surgically removed for immunofluorescence analyses of cytokeratin K14, which stains for skin epithelial cells, and cytokeratin K6, which stains for skin keratinocytes. Top panel, images of 40x fields, which provide full views of wound healing process. Lower panel, images were taken with a 100x field, which provide more details for the staining. Yellow squares in the top panel indicate the approximate areas imaged in the lower panel. Please note the slight upwards shift in K6 staining when compared with K14, consistent with keratinocyte being the top most layer of skin epithelium. Scale bars in the left side images in the top panel represent 500μm. Scale bars in the left side images in the lower panel represent 200 μm.

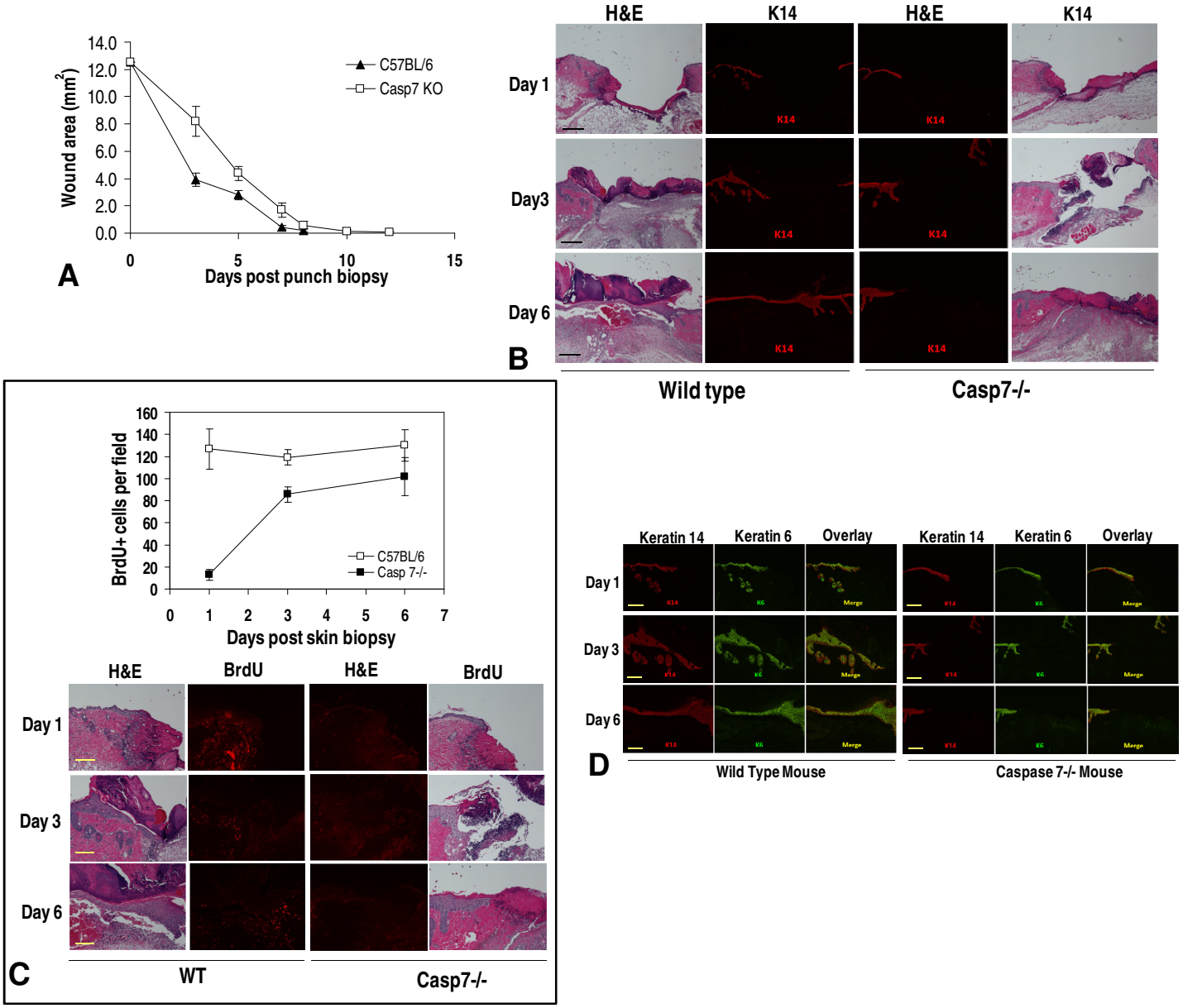

Figure S4. A). Effect of caspase 7 on excision wound healing in mice. Skin excision wounds at 4mm in diameter were generated in wild type and casp7-/- mice though punch biopsy. Wound healing in the mice were then monitored by measuring the size of the wounds using a caliper. Plotted in the graph are the sizes of the wounds in wild type as well as caspase 7 knockout mice. **B**) Cytokeratin 14 immunofluorescence staining during skin wound healing of wild type and casp7-/- mice. Skin excision wounds were generated in wild type and casp7-/- mice though punch biopsy. At different times after skin biopsy, mice were sacrificed and tissues containing full thickness wounds were surgically removed for immunofluorescence analyses of cytokeratin K14, which stains for skin epithelial cells, and cytokeratin K6, which stains for skin keratinocytes. The scale bars in the left side images represent 500 μm. **C**) **.** Immunofluorescence analysis of proliferating cells through BrdU staining. Paraffin-embedded tissue sections containing the full-thickness wounds were stained using an fluorescently-labeled antibody against BrdU. Quantification of BrdU positive cells were carried out by averaging the number of BrdU positive cells from 4 randomly chosen 100x fields. Top panel, quantitative data. The error bars represent SEM .The differences between to two groups are statistically significant ($P<0.01$, $n=6$) on days 1, 3, and 6. Lower panel, representative images of BrdU staining at different times after skin biopsy. The size bars represent 200 μm. **D**). Immunofluorescence staining of cytokeratin 6 and cytokeratin 14 during wild type and casp7-/- skin wound healing. Skin excision wounds were generated through punch biopsy. At different times after skin biopsy, mice were sacrificed and tissues containing full thickness wounds were surgically removed for immunofluorescence analyses of cytokeratin K14, which stains for skin epithelial cells, and cytokeratin K6, which stains for skin keratinocytes. Images shown were 40x fields. Size bars in the left panels represent 500 μm.

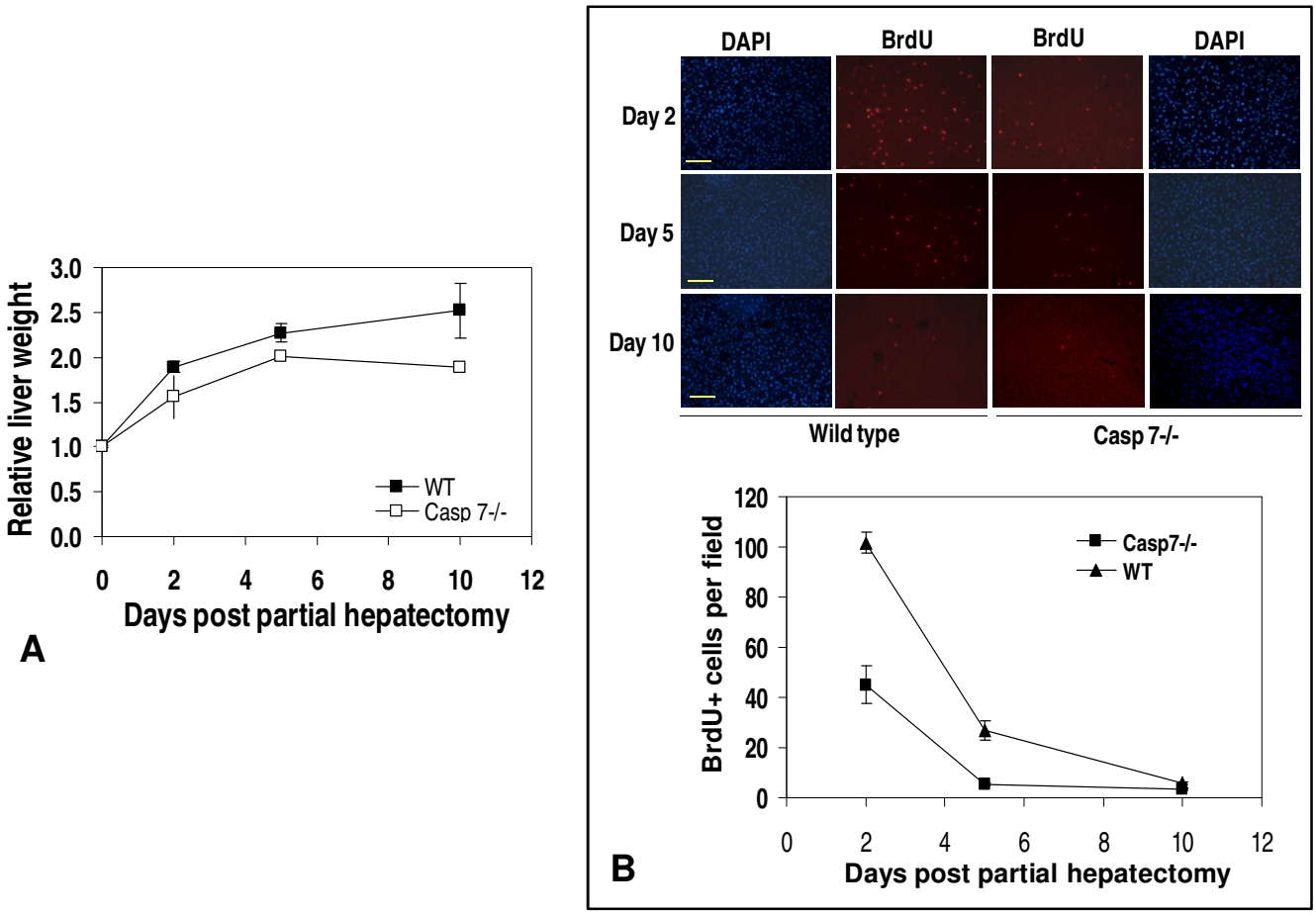

Figure S5. A). The effect of caspase 7 deficiency on liver regeneration. Partial hepatectomy was performed in wild type and caspase 7-/- mice. At different time points after hepatectomy, mice from each group were sacrificed and their liver weight measured. Plotted were measured liver weights normalized against those right after surgery. Error bars represent SEM (n=5 for each data point). The differences between the two groups are statistically significant on days 5 and 10 ($P<0.05$). **B**) Quantification of cellular proliferation after partial hepatectomy. Partial hepatectomy was performed in wild tyep as well as casp7-/- mice. At different times afterwards, mice were injected with BrdU (50mg/kg) and were left for 60 minutes before they were sacrificed. Paraffin liver tissue sections were prepared from the mice. The sections were then analyzed for cellular proliferation though immunofluorescence staining of BrdU. Top panel, representative images for BrdU staining. The scale bars represent 100 μm. Lower panel, quantitative data for BrdU staining in each 200x field under the microscope. The error bars represent SEM (n=4 for each data point). The different between the two groups are statistically significant on days 2 and 5 ($P<0.01$).

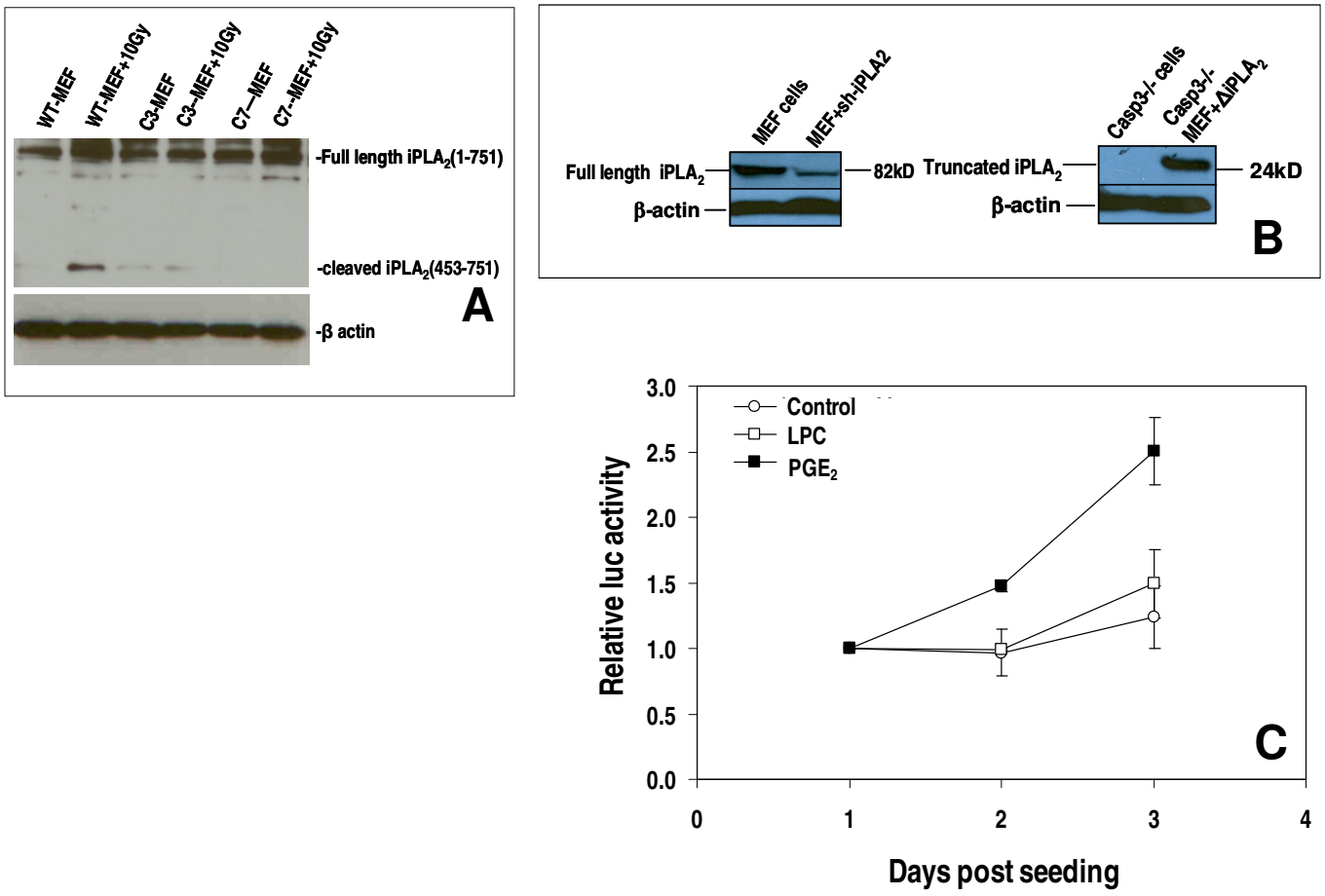

Figure S6. Western blot analysis. **A)** $iPLA_2$ analysis. wild type, casp3-/- and casp7-/- MEF cells were irradiated and cultured for 24 hrs. They were then lysed for western blot analysis for $iPLA_2$. An antibody obtained from Caymen Chemicals (Ann Arbor, MI) was used in the analysis. **B)** Left panel shows the effectiveness of a shRNA in knocking down the level of full length $iPLA_2$ in wild type MEF cells. The right panel shows the expression of a truncated $iPLA_2$ gene in casp3-/- MEF cells. **C**) Comparing the growth stimulating properties of PGE_2 and LPC. About 200 EKP-FLuc cells were plated in 24 well plates. Cells were treated with 0.5 μM of either PGE_2 or lysophophatidyl choline and their growth were measured though bioluminescence imaging. The error bars represent STD (n=4). The difference between the LPC group and PGE_2 group is significant ($P<0.01$). In addition, the difference between the LPC group and the control group is not significant ($P>0.05$).