SUPPLEMENTAL FIGURE LEGENDS:

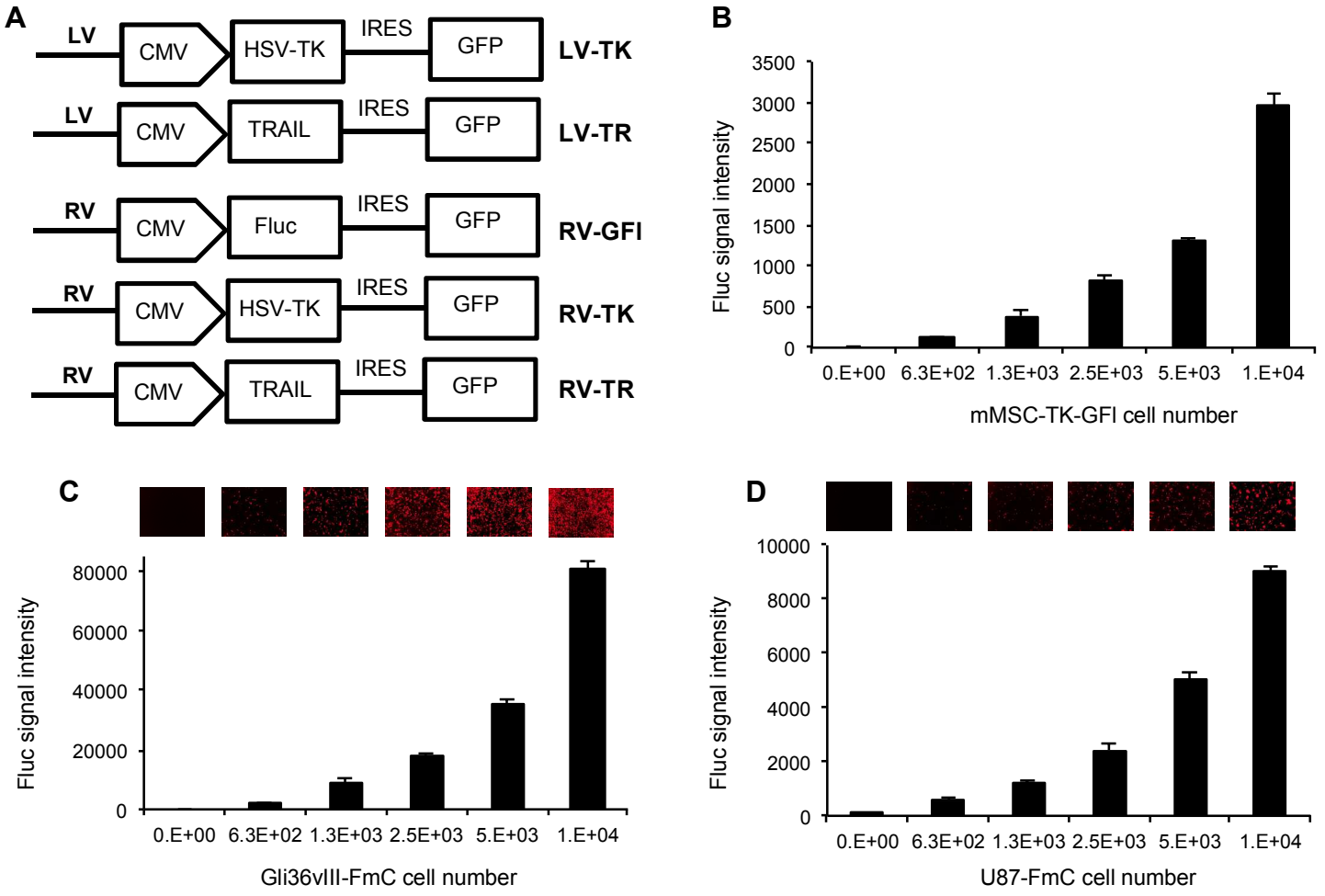
Supplemental Fig.1. Expression of bimodal imaging transgenes using engineered lentiviral and retroviral vectors. (A) A self-inactivating lentiviral and retroviral transfer vectors, both bearing an IRES-GFP element, were used to construct the following vectors: LV-TK, LV-TR [20], RV-GFI, RV-TK and RV-TR under the CMV promoter. (**B**) Serial dilutions of mMSC-TK cells expressing GFP-Fluc (mMSC-TK-GFI) were plated and 24hrs later Fluc signal intensity was determined. Plot shows direct correlation between mMSC-TK-GFI cell number and Fluc signal intensity. Abbreviations: CMV, cytomegalovirus promoter; Fluc, firefly luciferase; IRES, Internal ribosomal entry site; GFI, green fluorescent protein and firefly luciferase fusion; TK, Thymidine Kinase; TRAIL, tumor necrosis factor apoptosis-inducing ligand.

Supplemental Fig.2. hMSC-TR-TK have antitumor effect and can be eliminated post tumor treatment *in vitro*. U87-FmC cells were co-cultured with different proportions of hMSC-TR (grey columns) or hMSC-TR-TK (black columns) and two days later, GCV (10□μg/mL) was added to the cultures. (**A**) Plot shows the activation of Caspase-3/7 in the co-cultures with U87-FmC and engineered hMSC at day one. (**B**) Plot shows U87-FmC viability measured by Fluc signal in co-culture conditions at day three. (**C-G**) U87-FmC were co-cultured with engineered hMSC-TR-GFI or hMSC-TR-TK-GFI and two days later GCV (10□μg/mL) was added to the cultures. Photomicrographs (original magnification, x4) show hMSC GFP+ cells at day three post GCV treatment (**C-F**). **(G)** Plot shows % of viability of modified hMSC-Fluc cells measured by Fluc signal at day three. *Bars*, +SD. In all panels, *, $p < .05$ versus controls. Abbreviations: hMSC, human mesenchymal stem cells; GCV, ganciclovir; TK, Thymidine Kinase; TR, tumor necrosis factor apoptosis-inducing ligand; Fluc, firefly luciferase; GFI, green fluorescent protein and Fluc fusion.

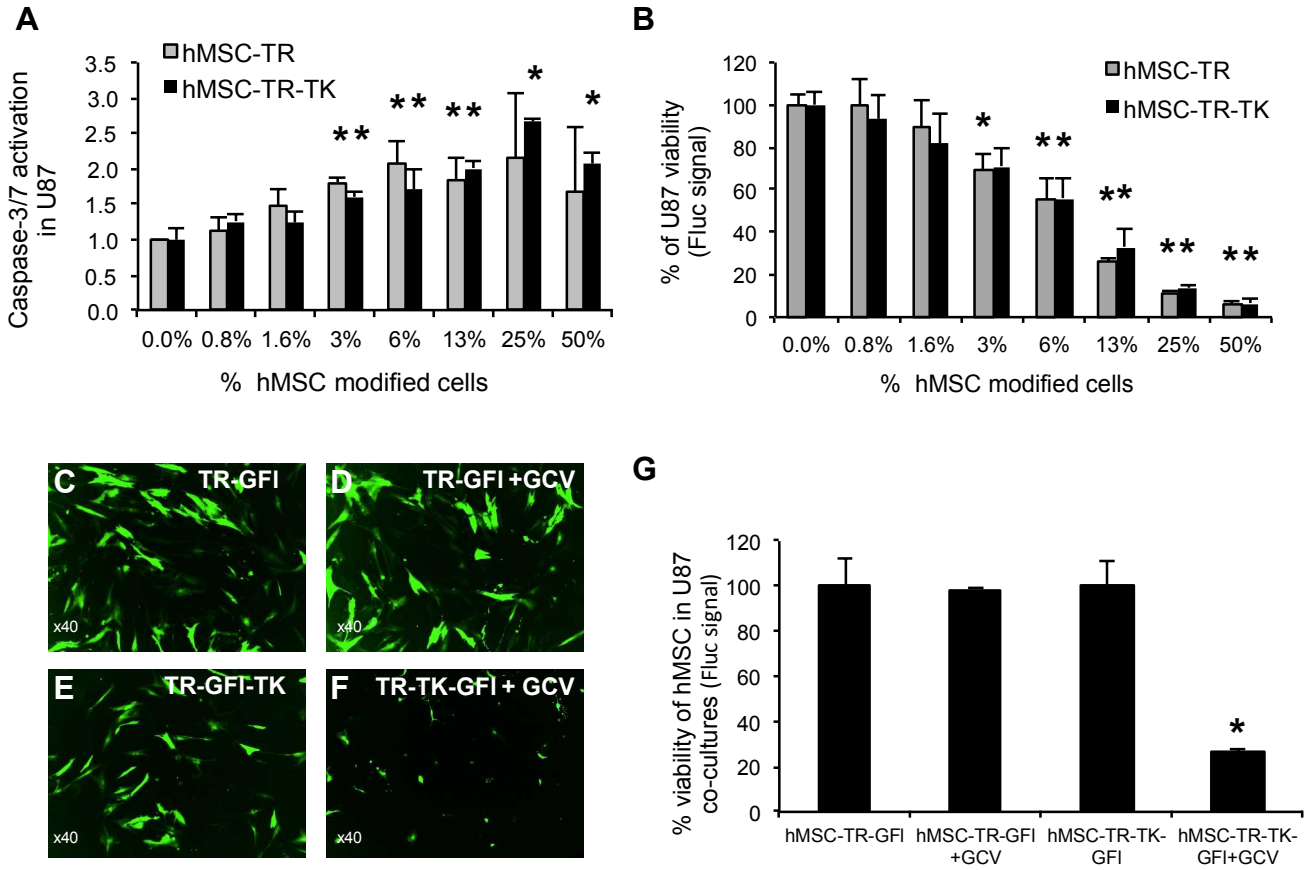
Supplemental Fig.3. Intratumorally implantation and fate of mMSC-TR-TK. Gli36vIII-FmC bearing mice were intratumorally implanted with mMSC-TR-TK. Photomicrographs of mice brain

sections showing presence of therapeutic mMSC-TR-TK (green) in GBM tumors (mcherry) after 4 days post mMSC implantation (**A**). Photomicrographs of mice brain sections showing CD31 staining (red) and mMSC-TR-TK (green) at day 32 post-implantation (**B**). (Original magnification, x10 left panel and x20 right panel).

Supplemental Figure 1



Supplemental Figure 2



Supplemental Figure 3