Supplementary information

Table S1. Physiochemical characterization of PBAE/pDNA NPs suspended in deionized water or full-component culture medium (n = 3).

Entry	Medium	Z-average(nm)	PDI	ζpotential(mV)
NPs/pCXCR4	DI H_2O	179.7±0.32	0.142±0.04	43.22±2.33
	ADSCs medium	207.7±0.75	0.149±0.01	-7.55±1.36
NPs/pEGFP	DI H_2O	183.5±0.34	0.136±0.03	42.84±1.24
	ADSCs medium	206.1±2.31	0.281±0.01	-8.77 ± 0.41

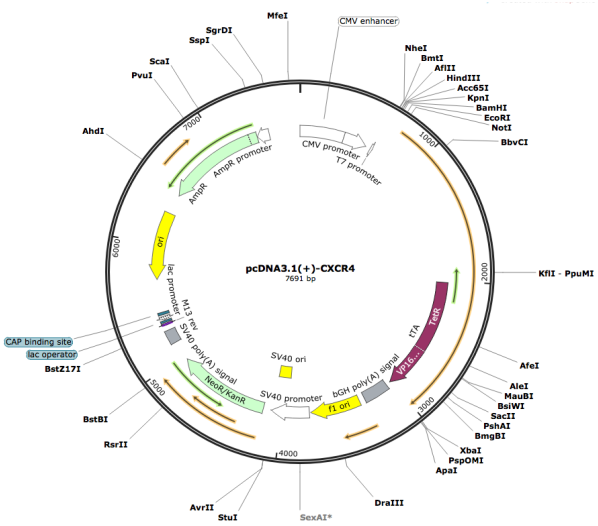

Figure S1. Map of pcDNA3.1(+)-CXCR4

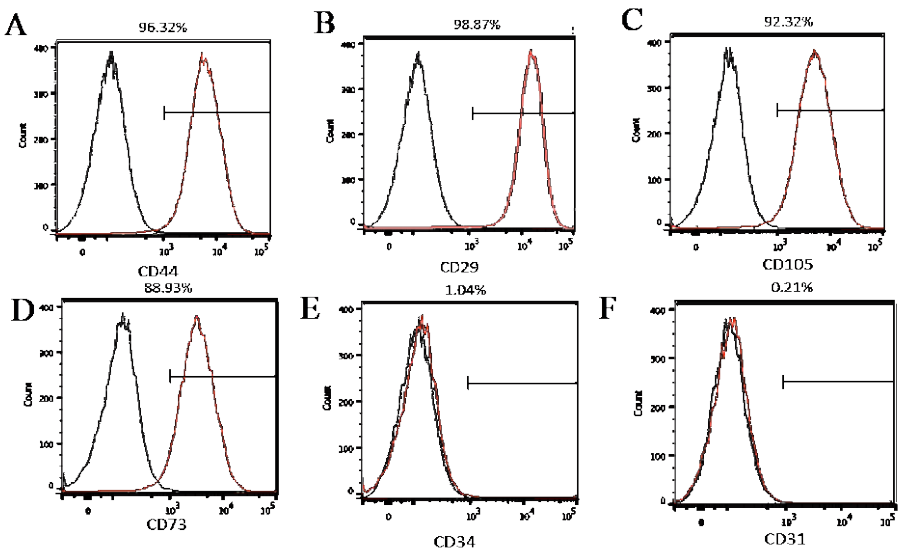

Figure.S2. Flow cytometry analyses indicates hADSCs at passage 3 were positive for CD44 (A), CD29 (B), CD105 (C), and CD73 (D), and negative for CD34 (E) and CD31 (F). 2×106 events were acquired and the frequency of positive cells was determined using FlowJo.

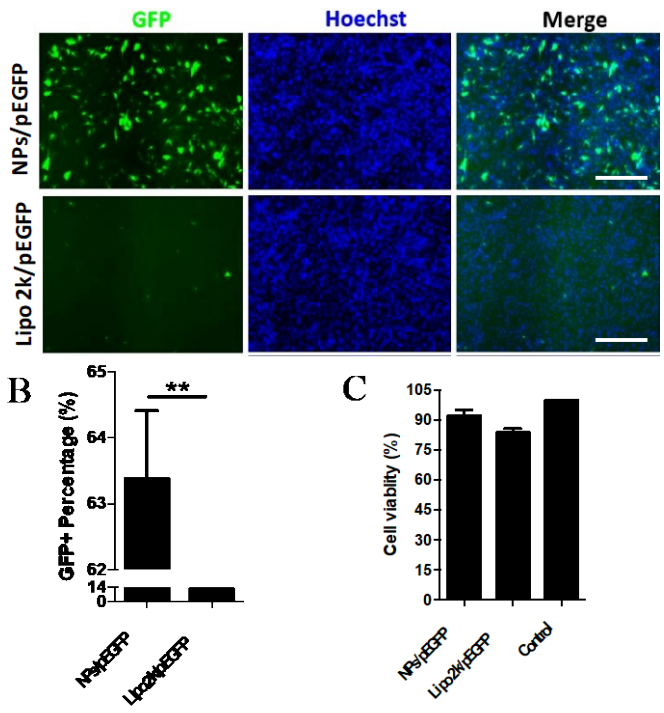

Figure S3. (A) Transfection efficiency visualized using fluorescence microscopy. In vitro transfection efficiency with PBAE NPs or a leading commercially available transfection agent (Lipofectamine 2000; Lipo 2k). EGFP was used as a reporter to optimize the transfection formulation, and pcDNA was used as a vector control. Optimal PBAE/pEGFP NPs led to higher transfection efficiency than achieved with Lipo 2k. No fluorescence was detected in pcDNA-treated hADSCs. Scale bars = 200 μm. (B) Flow cytometry of hADSCs 48 h after transfection with pEGFP mediated by PBAE NPs or Lipo 2k. hADSCs treated with 20:1 PBAE:pEGFP consistently demonstrated ~5.4-fold higher transfection efficiency than cells transfected with Lipo 2k. **$p<0.01$. (C) Cell viability was analyzed via the MTS assay 48 h after transfection with NPs/pEGFP or Lipo 2k/pEGFP. hADSCs transfected with NPs/pEGFP exhibited no significant change in viability compared with naïve controls. The viability of untransfected, unmanipulated parallel cultures of hADSCs was defined as100% viability.

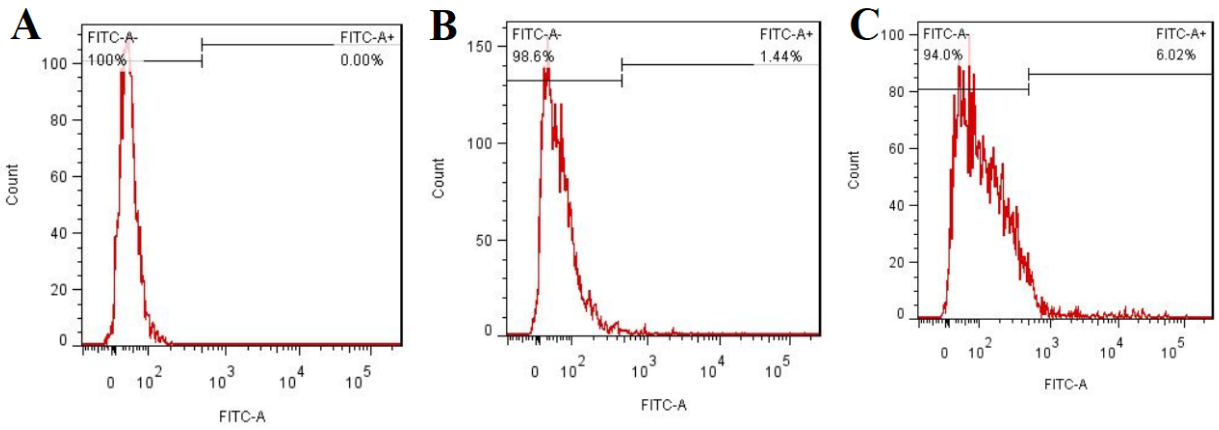

Figure S4. CXCR4^{+} hADSCs (passae 3) determined using Flow Cytometry (without permeabilization 48h after NPs-mediated transfection. (A) Non-treated hADSCs (no transfection and no immunostaining); (B) untransfected hADSCs without immunostaining; (C) Transfected hADSCs with immunostaining.

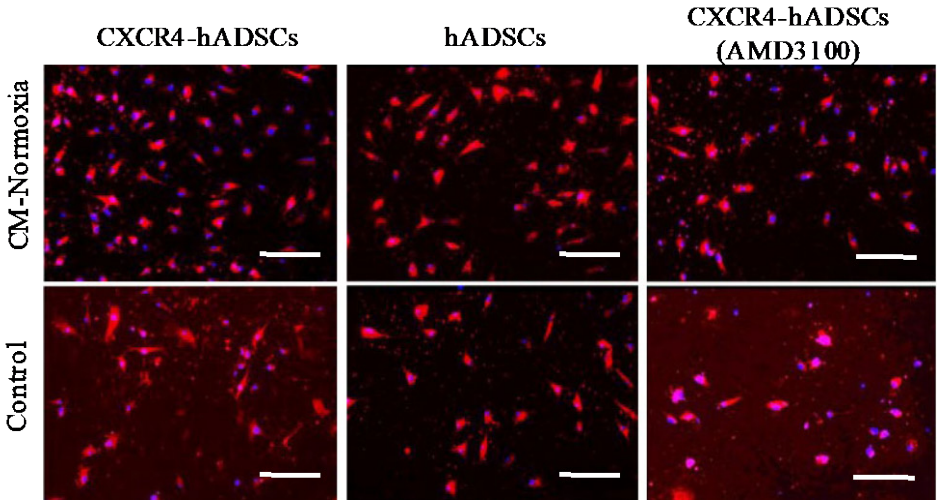

Figure S5. More hADSCs migrate toward conditioned medium in which the malignant GBM cell line U87MG was cultured under normoxic conditions (O2, 20%) than toward fresh Dulbecco's Modified Eagle Medium (control). CXCR4 overexpression further enhanced this migration. Pre-incubation with the CXCR4 antagonist AMD3100 did not affect the migration of naïve hADSCs toward conditioned medium. Cell membranes were stained red with the florescent dye PKH26; nuclei were labeled blue with Hoechst 33342. Scale bar = 200 μm.

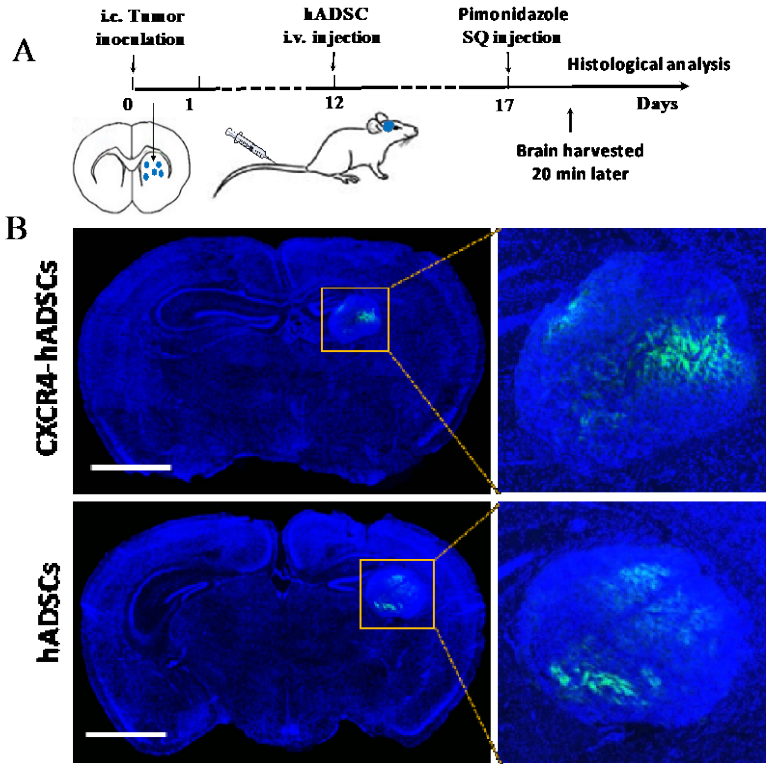

Figure S6. hADSCs did not migrate towards tumor tissues 5 days after injection into the tail veins of mice with brain glioma. (A) Schematic of experimental design. i.c., intracranial; i.v., intravenous; SQ, subcutaneous. (B) Representative sections of the tropism of CXCR4-overexpressing hADSCs and naïve hADSCs toward malignant cells in the brain tissue of a xenograft mouse model 5 days after intravenous injection.