

Supplemental Information

Albumin-Stabilized Manganese-Based Nanocomposites with Sensitive Tumor Microenvironment Responsivity and Their Application for Efficient SiRNA Delivery in Brain Tumor

Kai Xu,^{ab} Zhenghuan Zhao,^c Junfeng Zhang,^{ab} Wei Xue,^{ab} Haipeng Tong,^{ab}
Heng Liu,^{*d} and Weiguo Zhang^{*ab}

^aDepartment of Radiology, Daping Hospital, Army Medical University, Chongqing 400042, China.

^bChongqing Clinical Research Center for Imaging and Nuclear Medicine, Chongqing 400042, China.

^cCollege of Pharmaceutical Science, Southwest University, Chongqing 400716, China.

^dDepartment of Radiology, PLA Rocket Force Characteristic Medical Center, Beijing, 100088, China.

Corresponding to: Heng Liu (liuheng0918@163.com); Weiguo Zhang (E-mail: wgzhang01@163.com)

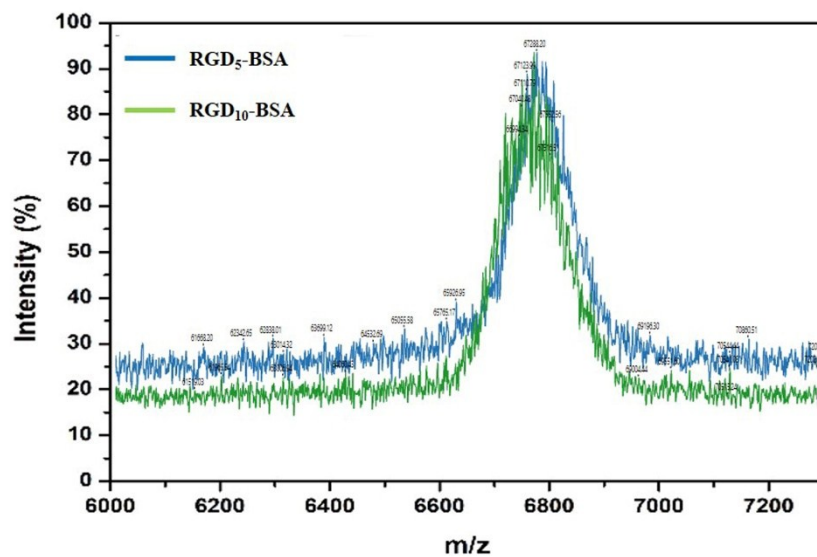


Figure S1. MALDI-TOF-MS analysis of RGD₅-BSA (molar ratio of RGD:BSA=5:1) and RGD₁₀-BSA (molar ratio of RGD:BSA=10:1).

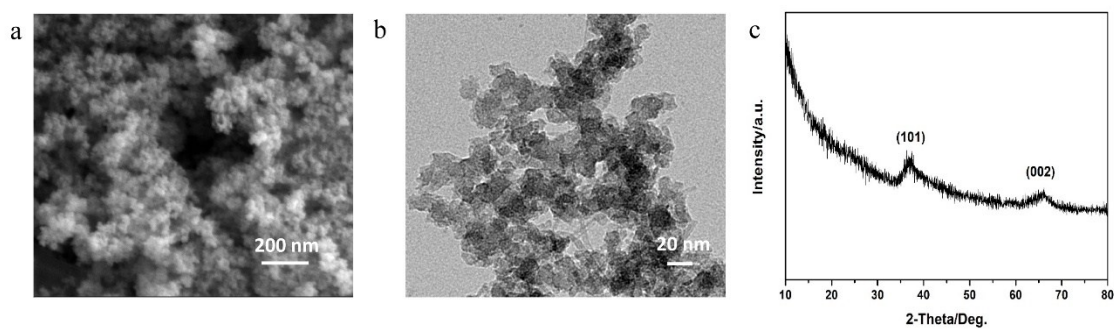


Figure S2. Characterization of MnO₂ NPs. (a) SEM image of MnO₂ NPs. (b) TEM image of MnO₂ NPs. (c) XRD pattern of MnO₂ NPs.

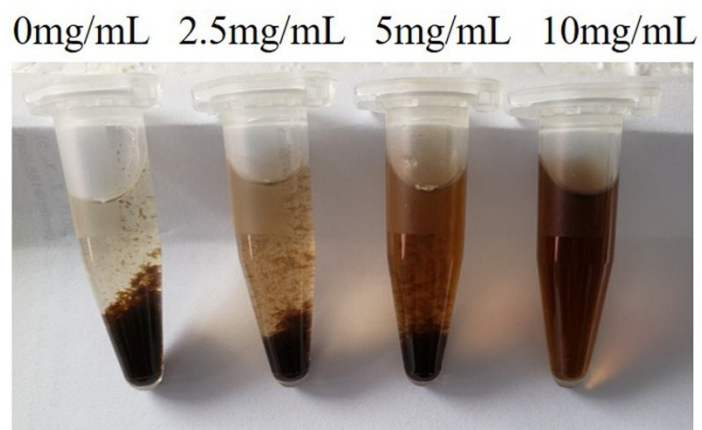


Figure S3. RGD-BMnNPs with different concentrations of BSA.

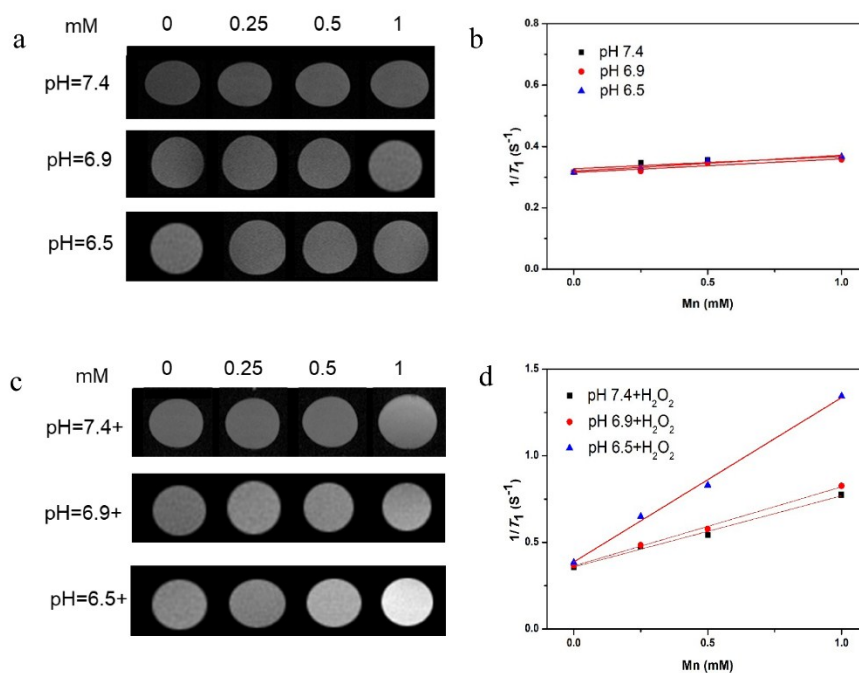


Figure S4. T_1 -weighted MR images and r_1 relaxivities of MnO_2 NPs in various solutions as a function of Mn concentrations. (a) T_1 -weighted MR images of MnO_2 NPs at pH=6.5-7.4 without H_2O_2 . (b) r_1 relaxivities of MnO_2 NPs at pH=6.5-7.4 without H_2O_2 . (c) T_1 -weighted MR images of MnO_2 NPs at pH=6.5-7.4 with H_2O_2 . (d) r_1 relaxivities of MnO_2 NPs at pH=6.5-7.4 with H_2O_2 .

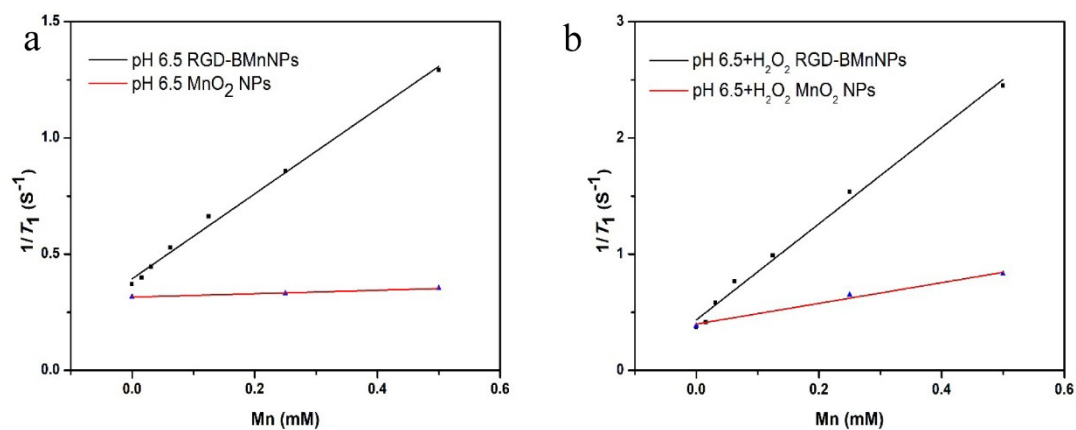


Figure S5. The comparison of MnO₂ NPs and RGD-BMnNPs. (a) r_1 relaxivities of MnO₂ NPs and RGD-BMnNPs at pH=6.5 without H₂O₂. (b) r_1 relaxivities of MnO₂ NPs and RGD-BMnNPs at pH=6.5 with H₂O₂.

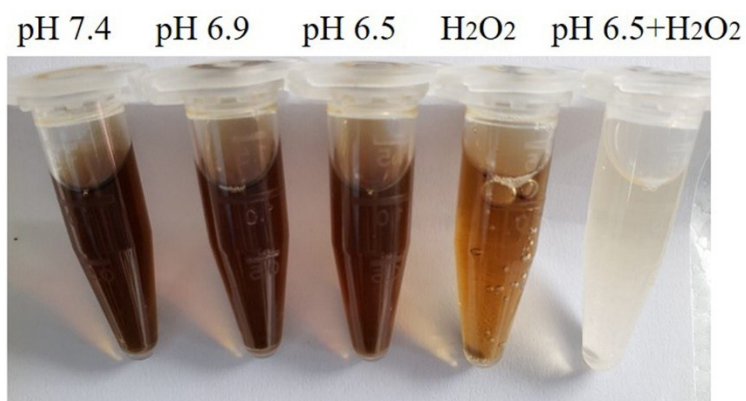


Figure S6. RGD-BMnNPs in different solutions.

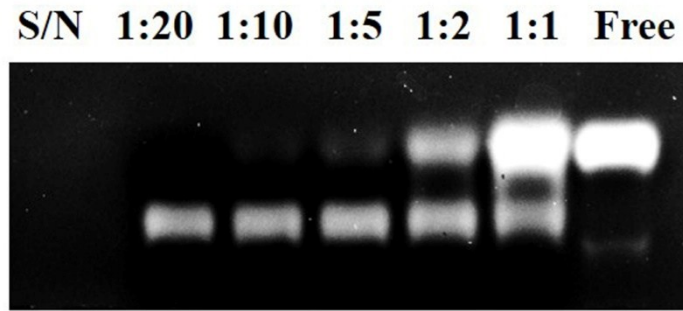


Fig S7. Agarose gel electrophoresis analysis of RGD-BMnNPs loading siRNA (siRNA:RGD-BMnNPs mass ratio).

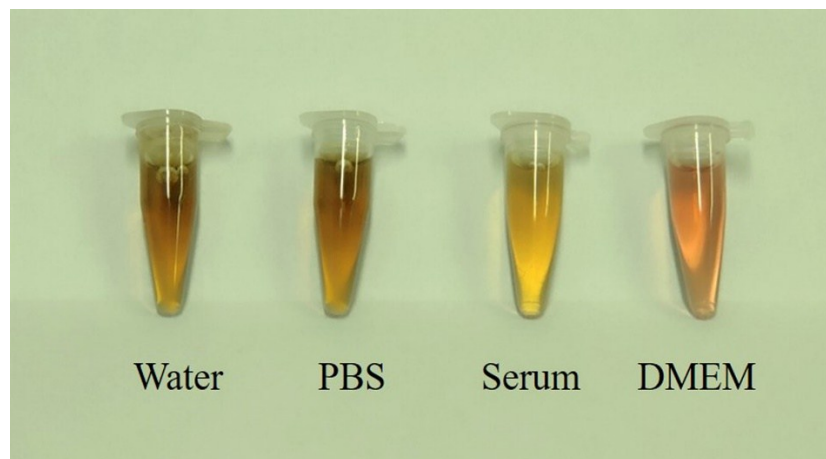


Figure S8. Stability of RGD-BMnNPs/VEGFA-siRNA-Cy5 in various solutions at 24 h after incubation.

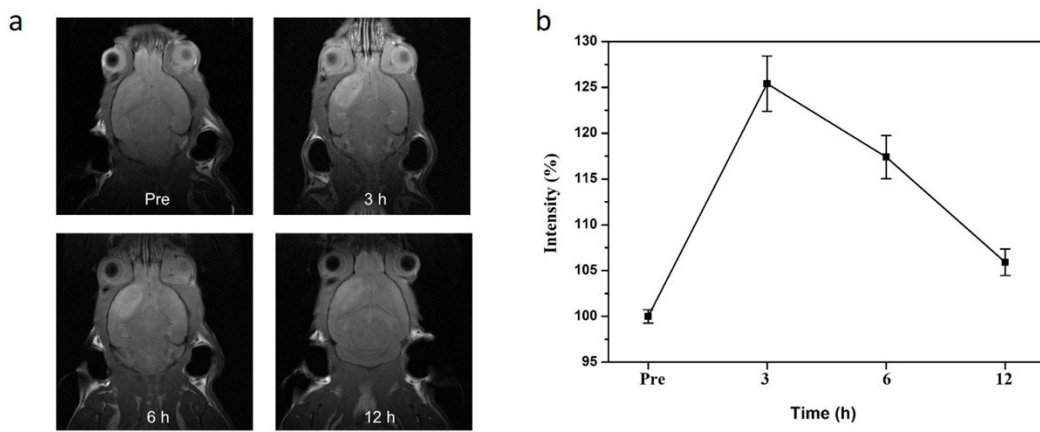


Figure S9. (a) T_1 -weighted MR images of U87MG tumor-bearing mouse prior to and at different time points post intravenous of RGD-BMnNPs. (b) Signal intensity of T_1 -weighted MR images from Figure a.

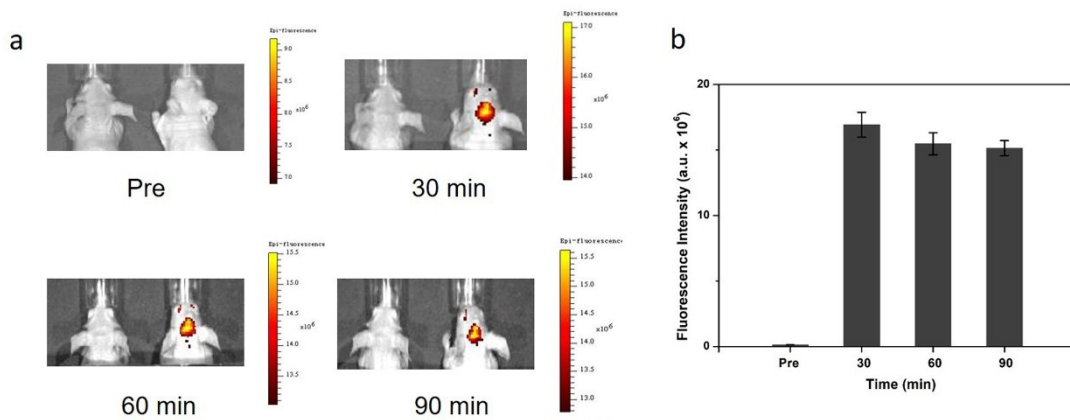


Figure S10. (a) Fluorescence images of U87MG tumor-bearing mouse prior to and at different time points post intravenous injection of RGD-BMnNPs. (b) Signal intensity of fluorescence images from Figure a.

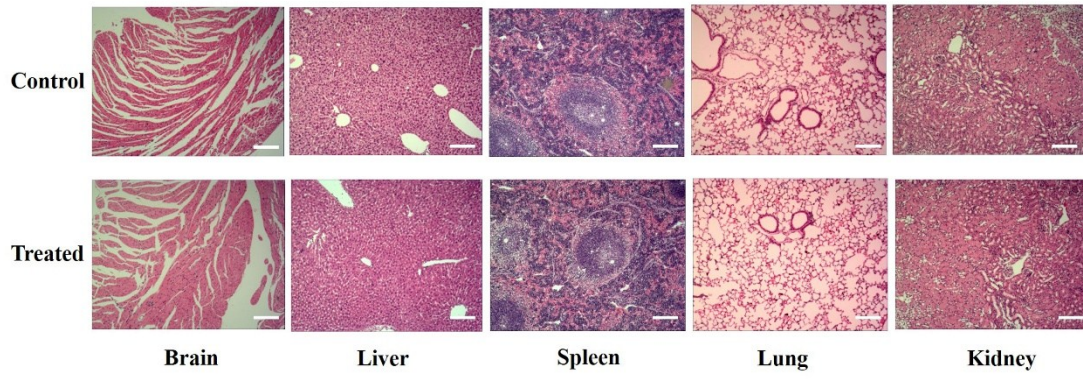


Figure S11. H&E stained histological sections of major organs including heart, liver, spleen, lung and kidneys obtained from mice at 28 days post-treatment. Scale bar, 100 μm .