Electronic Supplementary Material (ESI) for Biomaterials Science.

SUPPORTING INFORMATION

Delivery of siRNA based on engineered exosomes for glioblastoma therapy by targeting STAT3

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Supporting figures

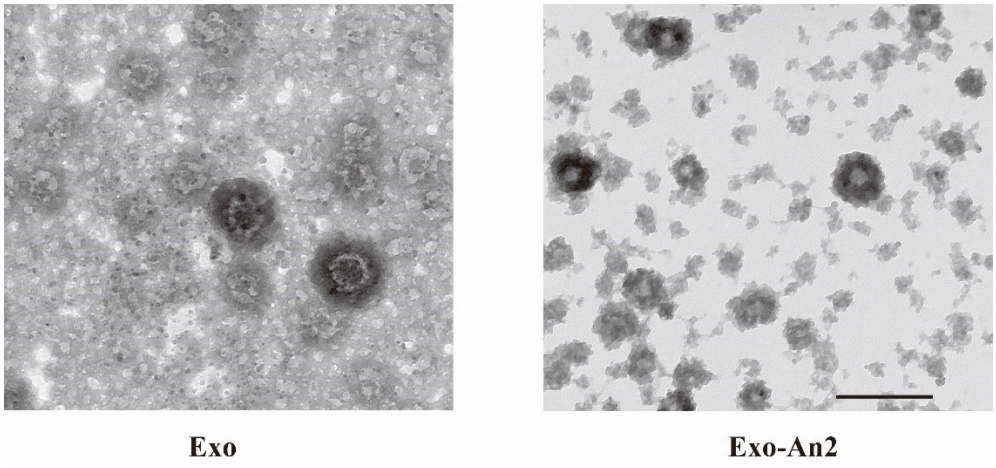

Figure S1. TEM images of Exo-An2 and Exo (scale bar is 200 nm). Exo-An2 and Exo showed saucer-cup morphology.

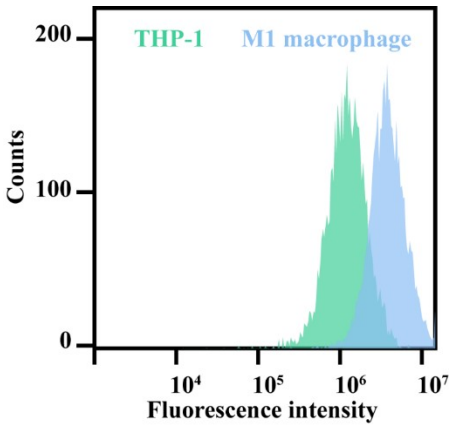

Figure S2. Flow cytometry analysis of internalization of Exo derived from THP-1 and M1 macrophages by U87MG. Exosomes derived from M1 macrophages exhibited the higher uptake efficiency than exosomes derived from THP-1.

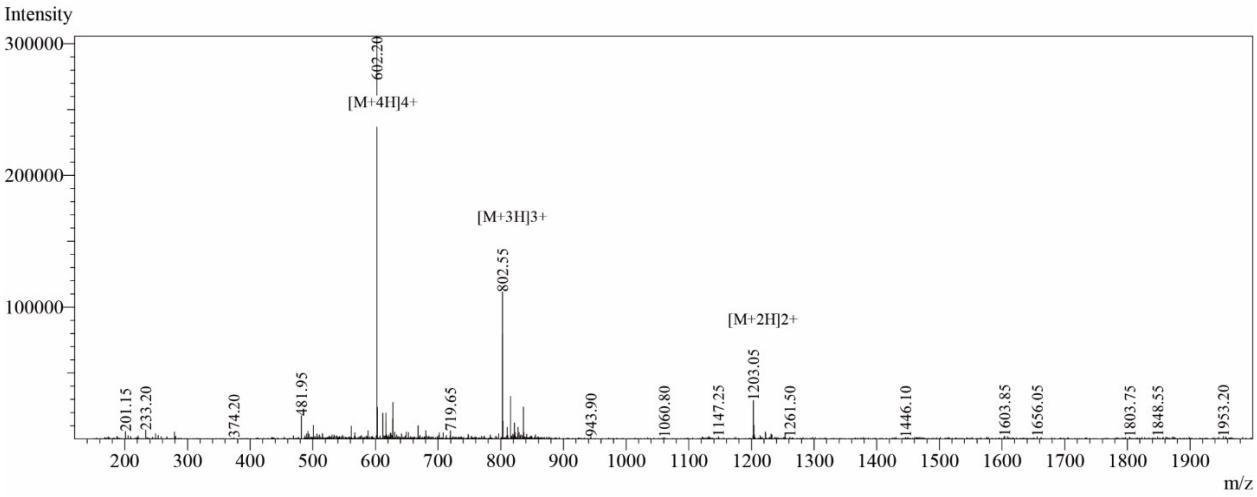

Figure S3. Mass spectrum of An2. The peak of An2 is clearly seen at *m/z* 1203.05.

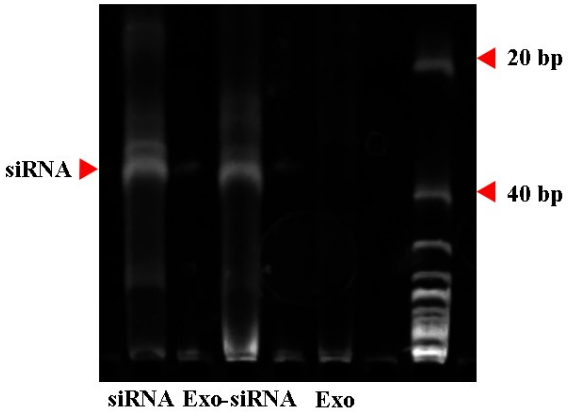

Figure S4. PAGE gel analysis for the detection of siRNA. siRNA was encapsulated to exosomes, and Exo-siRNA was sonicated for 30 min to release siRNA. Then Exo-siRNA (0.1 nmol siRNA) and 0.1 nmol siRNA and 10 μL exosomes were loaded on 20% TBE PAGE gel and electrophoresed (90 V, 180 min) in TBE running buffer. After electrophoresis, the gel was stained by 2.5 μL SYBR gold in 25 mL TBE buffer for 30 min, followed by detection using ChemiScope 6000. siRNA and Exo were used as control.

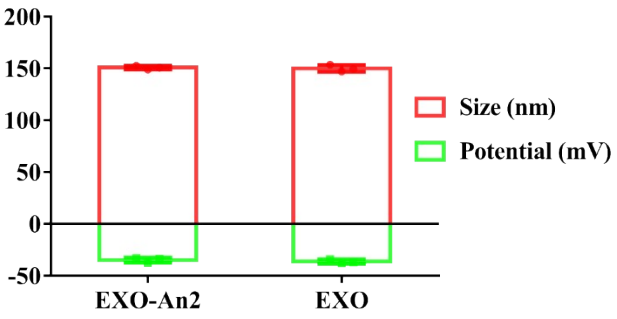

Figure S5. The average particle size and zeta-potential of Exo-An2 and Exo determined by nanoparticle tracking analysis. The average particle size and zeta-potential of Exo-An2 were similar to those of Exo. Values represent means ± SD (n = 3).

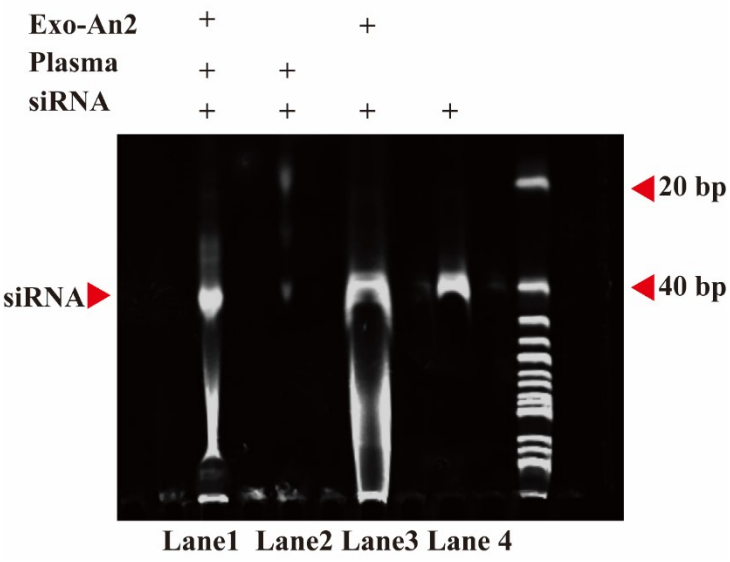

Figure S6. Stability of siRNA loaded with or without Exo in human plasma. Lane 1: Exo-An2-siRNA was incubated with plasma for 24 h; Lane 2: siRNA was incubated with plasma for 24 h; Lane 3: Exo-An2-siRNA; Lane 4: siRNA. The PAGE gel demonstrates that Exo-An2 effectively protects the siRNA from plasma RNase degradation.

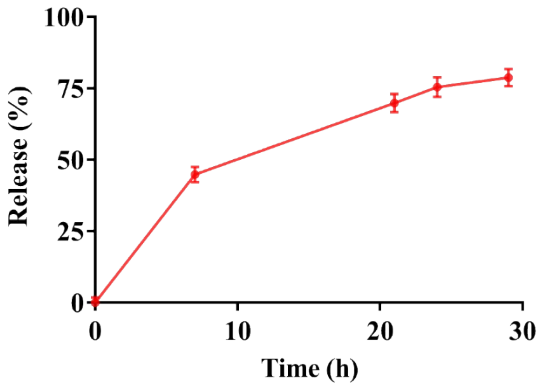

Figure S7. Release profiles of total FAM-tagged siRNA from Exo-An2 determined by incubation for up to 28 h in PBS (pH 7.4). Approximate 75% of the encapsulated siRNA was gradually released within 21 h. Values represent means ± SD (n = 3).

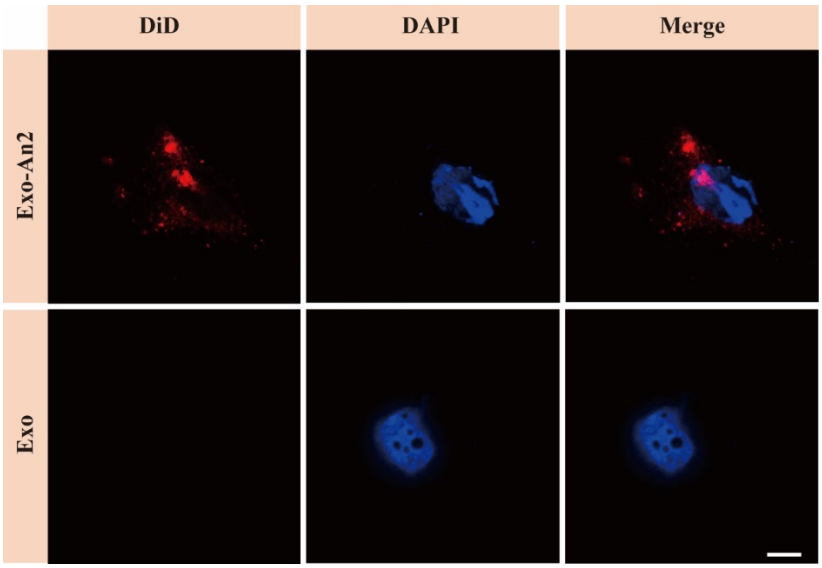

Figure S8. Confocal images of U87MG incubated with Exo and Exo-An2 for 4 h (scale bar is 10 μm). Exosomes and cell nucleus were labeled with a red fluorescent dye (DiD) and DAPI respectively (red: exosome, blue: cell nucleus). Confocal images reveal that conjugation of An2 on the surfaces of the exosomes could promote internalization of exosomes.

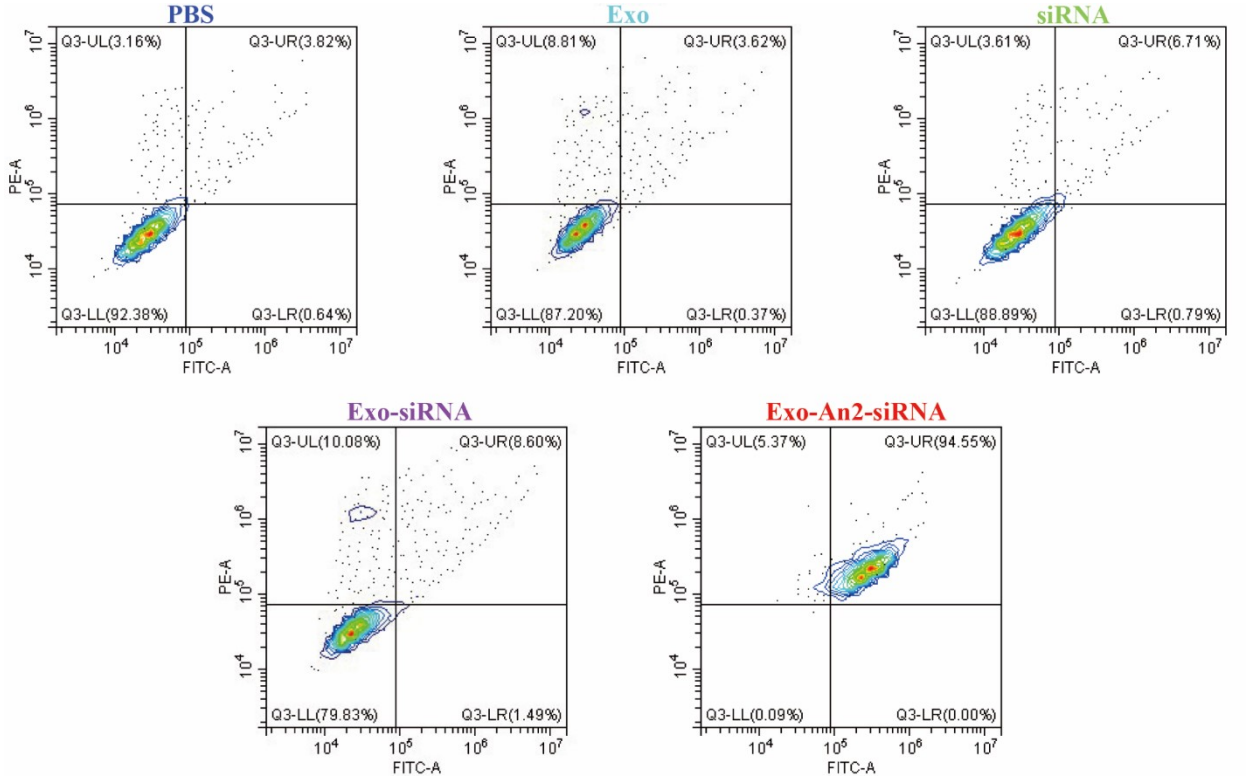

Figure S9. Flow cytometry analysis of apoptotic effect of PBS, Exo, siRNA, Exo-siRNA and Exo-An2-siRNA. U87MG were treated with PBS, Exo, siRNA, Exo-siRNA and Exo-An2-siRNA for 48 h. The apoptotic percentage of U87MG treated with Exo-An2-siRNA reached around 94.55%, which was much higher than that of U87MG treated with Exo-siRNA (10.09%), PBS (4.46%), Exo (3.99%), and siRNA (7.5%).

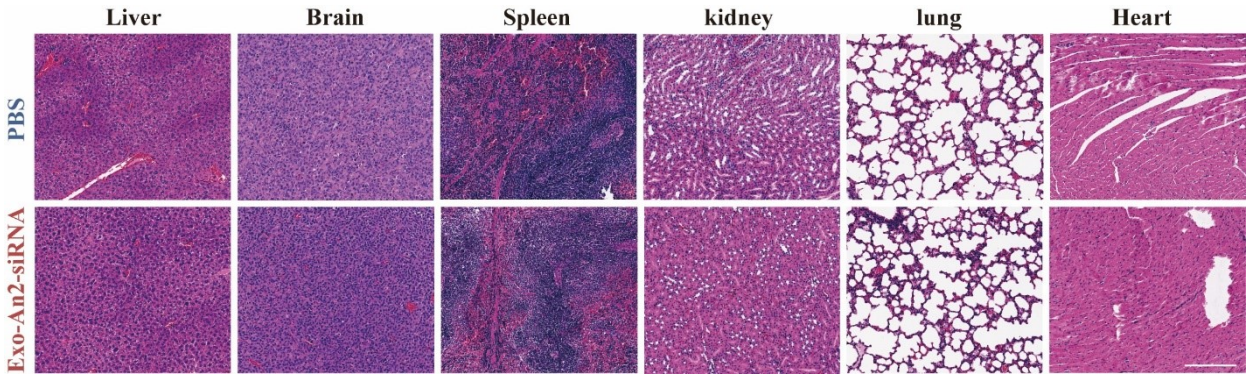

Figure S10. H&E in the major organs from mice receiving the PBS and Exo-An2-siRNA treatment. The mice injected with PBS were used as a control (scale bar is 200 μm). Compared to the PBS group, the major organs did not exhibit any damage in the Exo-An2-siRNA group.