Supporting information

Methods

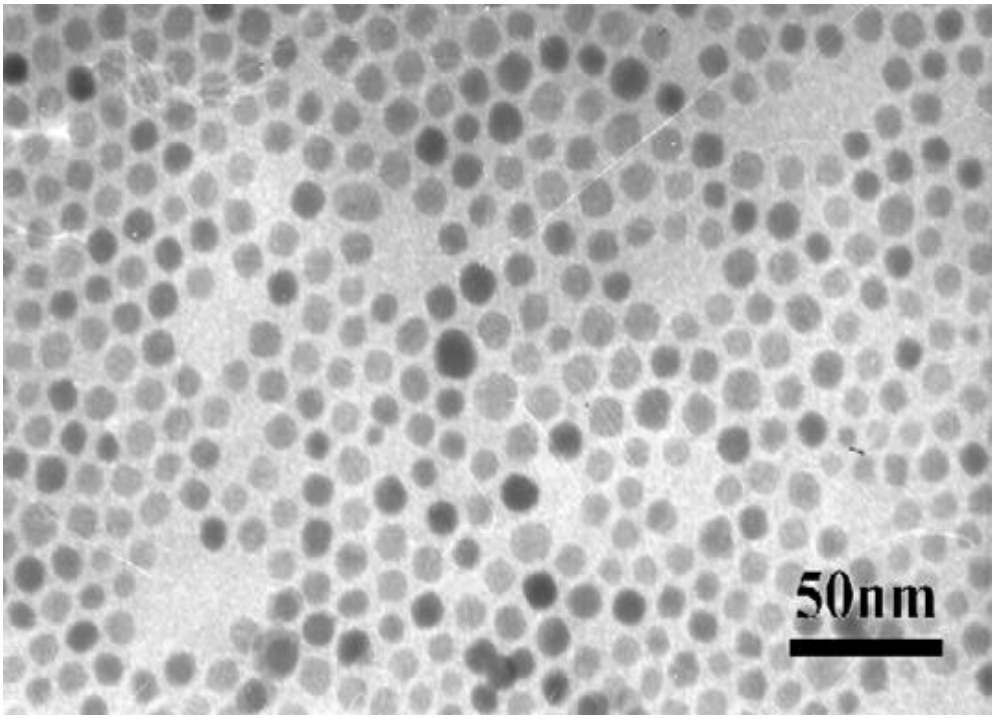
1.1. Synthesis and characterization of superparamagnetic Fe3O4 nanoparticles

Briefly, Fe(acac)3 (0.706g), 1,2-hexadecanediol (2.021g), oleic acid (1.71g), oleyl amine (1.61g), and benzyl ether (20ml) were mixed and magnetically stirred under argon gas. The reaction mixture was heated to 200°C for 2 h, and then heated to 290°C for 1h. After being cooled to room temperature, the products were purified with 50ml ethanol. The precipitates were separated by centrifugation at 6000 rpm for 15min. The morphologies of the Fe3O4 nanoparticles were observed via transmission electron microscope (TEM) at an operating voltage of 200 kV with a JEOL-100CXII (Japan) in bright-field mode. Dilute suspensions of Fe3O4 nanoparticles in chloroform were dropped onto a carbon-coated copper grid and then air dried.

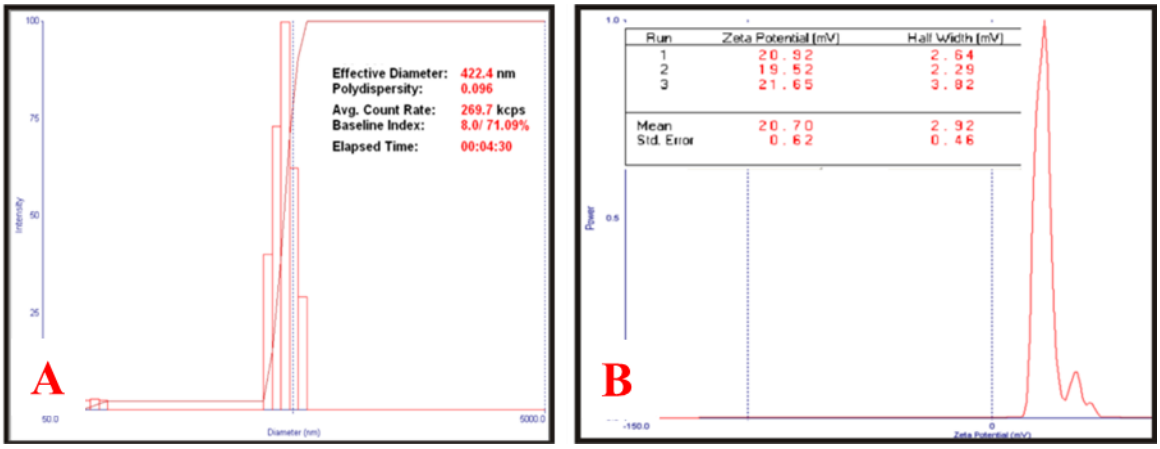
1.2. The measurement of particle size and surface charge

The particle size and size distribution were determined by quasielastic laser light scattering with a Brookhaven Zetasizer (Brookhaven Instruments Ltd., U.S.) at 25 °C. About 0.25 ml of each samples suspension was diluted with 2.5 ml of water immediately after preparation. Each experiment was repeated three times. The zeta

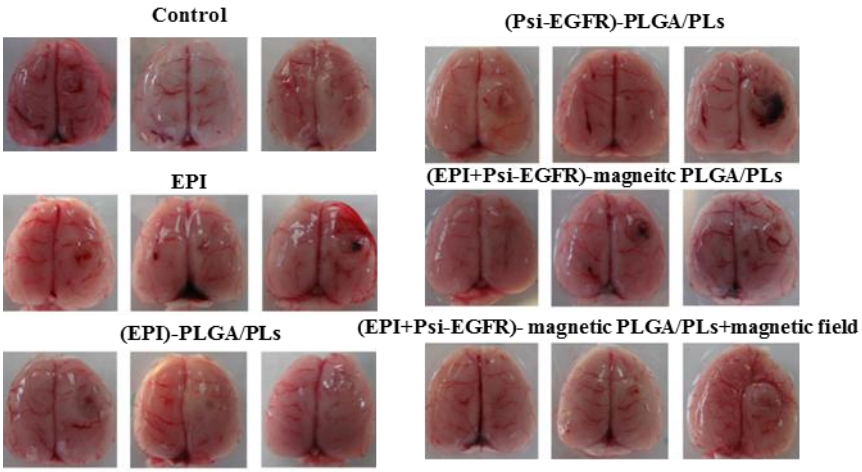
potential was measured by using a Zetasizer (Brookhaven, U.S.). Zeta limits ranged from -150 to 150 V. Strobing parameters were set as follows: strobe delay -1.00, on time 200.00 ms, and off time 1.00 ms



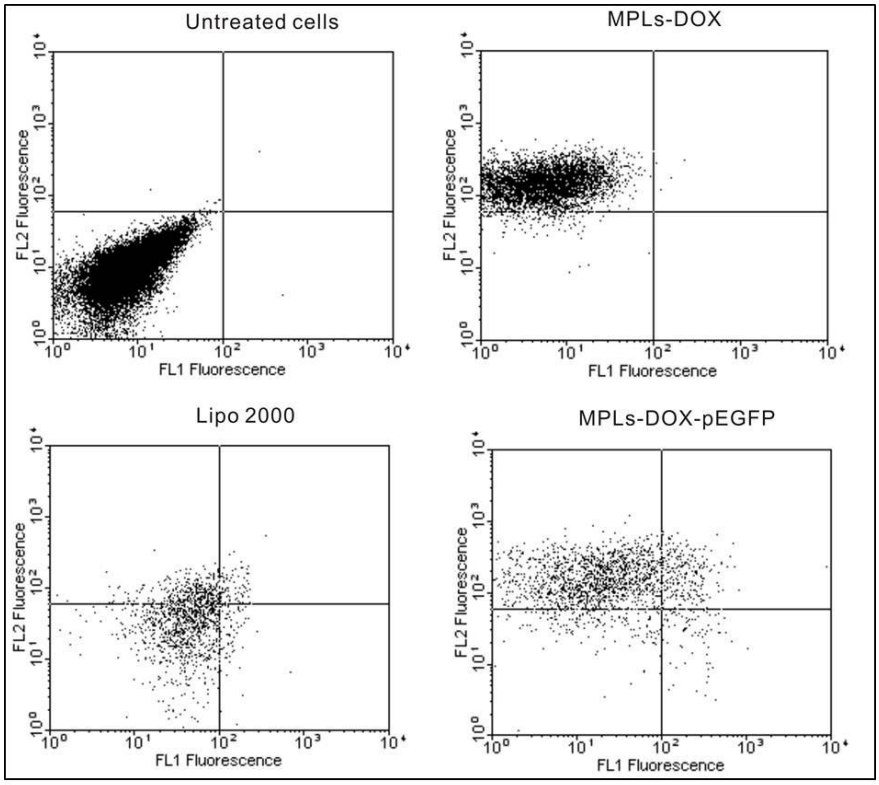
S-Figure 1 TEM of magnetic nanocrystals.



S-Figure 2 Size distribution and zeta potential of PLGA / MPLs.

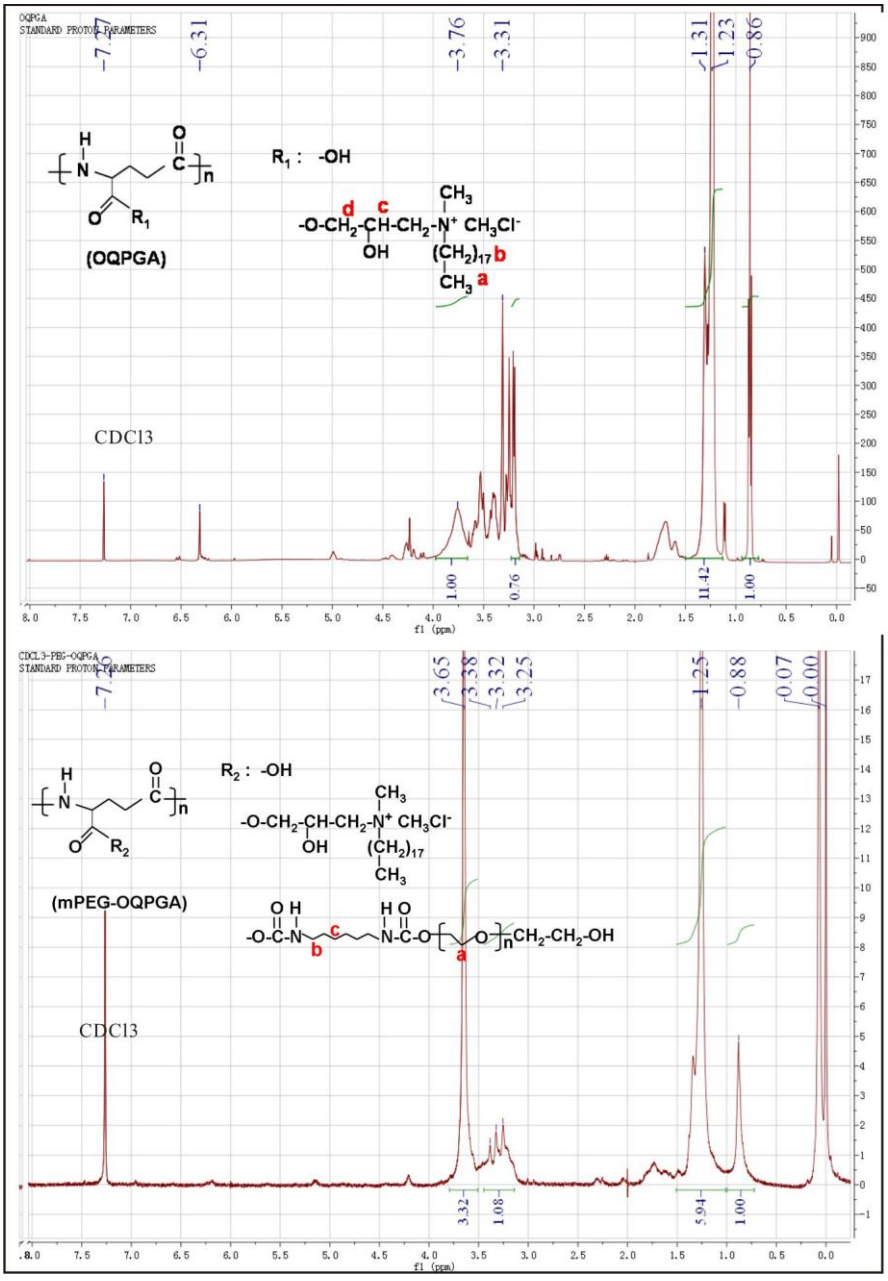


S-Figure 3 The brain samples of different groups



	Untreated cells	MPLs -DOX	Lipo 2000	MPLs -DOX-pEGFP
dox+	0.04%	97.76%	0.12%	92.44%
gfp+	0.01%	0.02%	21.75%	6.82%
gfp+ dox+	0.11%	0.14%	0.88%	2.19%

S-Figure 4 The flow cytometry results of control group and MPLS-DOX (doxorubicine loaded magnetic PLGA), Lipo-2000 (pEGFP loaded lipo2000), MPLs-DOX-pEGFP (doxorubicine and pEGFP coloaded PLGA/ polymeric liposome). FL1 channel represents the green fluorescence emitted from green fluorescent protein and FL2 channel represents the red fluorescence emitted from doxorubicine.



S-Figure 5 1H-NMR of OQPGA and mPEG-OQPGA