Supporting Information

Sustained Release of Immunosuppressant by Nanoparticle-anchoring Hydrogel Scaffold Improved the Survival of Transplanted Stem Cells and Tissue Regeneration

Ruixiang Li, Jianming Liang, Yuwei He, Jing Qin, Huining He, Seungjin Lee, Zhiqing Pang, and Jianxin Wang

Corresponding Author:

Dr. Zhiqing Pang

Tel: +86-21-51980069

E-mail: zqpang@fudan.edu.cn

Prof. Jianxin Wang

Tel: +86-21-5198-0088

E-mail: jxwang@fudan.edu.cn

In vitro leakage of NPs or RNPs from the hydrogel

To determine the leakage of nanoparticles from the hydrogel, a leakage test was established (schematic diagram shown in Fig. S2A). In brief, 2 mg of FPR648-labelled NPs or RNPs was suspended in 1 mL of PBS and mixed with 1 mL of 1% (w/v) RADA16 solution (in deionized water). Then, 300 μL of the mixture was quickly added to Millicell inserts (Millipore) followed by gelation for 30 min at 37°C. The Millicell inserts were hung in a 12-well plate containing 1 mL of PBS in each well as the reception chamber. To mimic the physiological environment, the plate was subjected to mild shaking (100 rpm, 37°C) during the experiment. The aqueous solution in the reception chamber was collected at 72 h, analyzed using a microplate reader (EX 642 nm/EM 663 nm, Cary Eclipse, Agilent, USA).

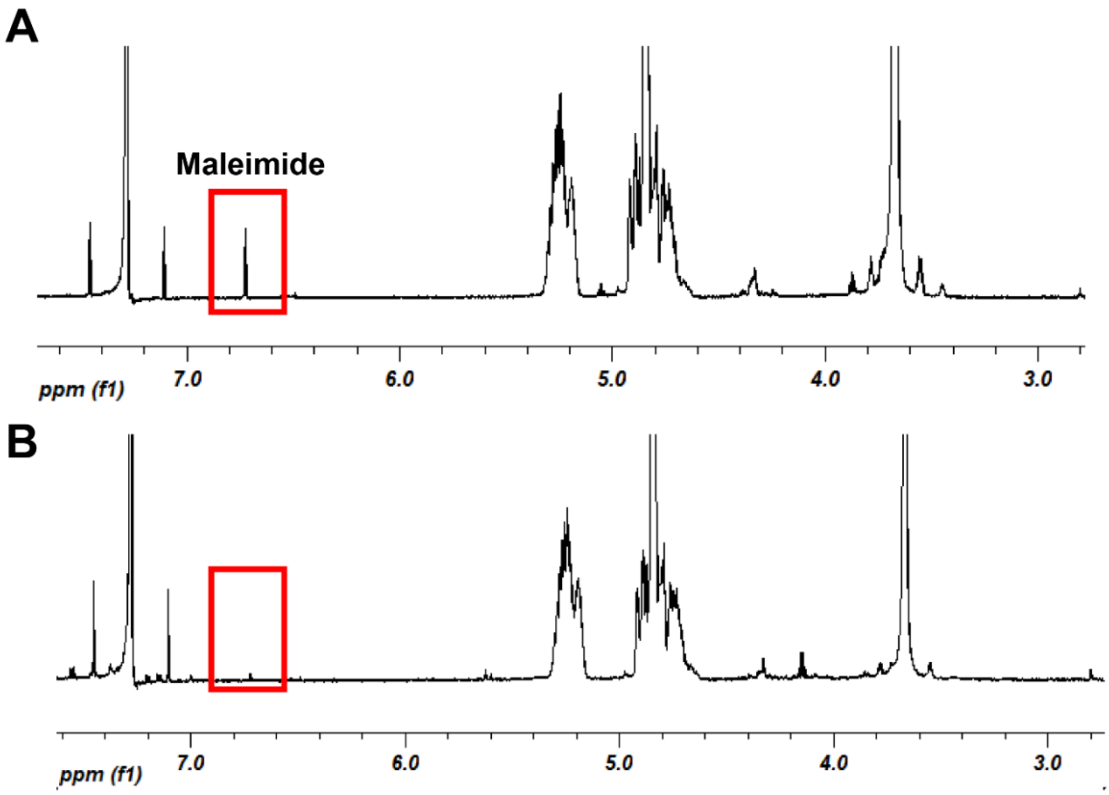


Figure S1. Characterization of synthesized materials. (A): ^{1}H-NMR spectra of maleimide-polyethylene glycol-poly (lactic-co-glycolic acid) (Mal-PEG-PLGA) and (B): RADA16 peptide modified- polyethylene glycol-poly (lactic-co-glycolic acid) (RADA16-PEG-PLGA) polymer materials. After the reaction, the maleimide proton peak disappeared, indicating the successful formation of RADA16-PEG-PLGA.

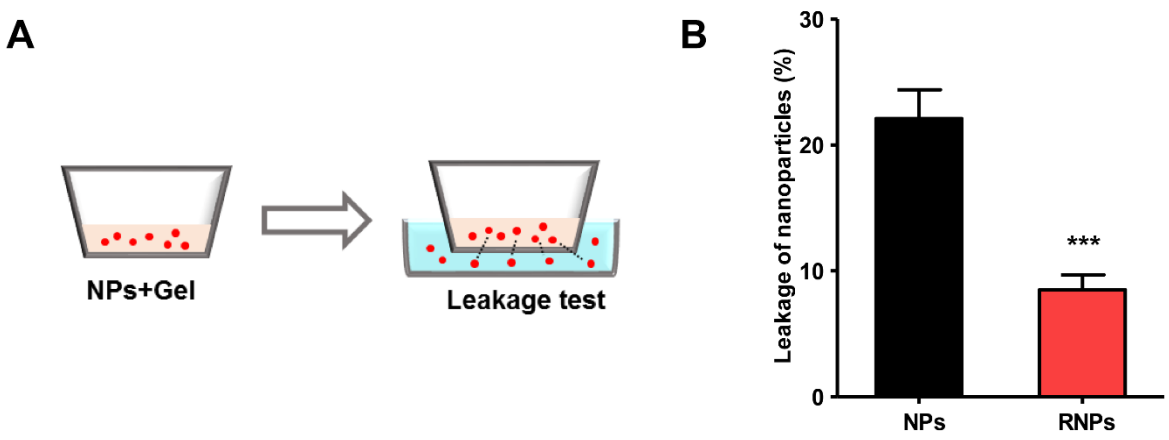


Figure S2. *In vitro* leakage of NPs or RNPs. (A): Schematic illustration of the leakage test (B): Percentage of leaked NPs or RNPs from hydrogel within 72 hours, n=3, ***p<0.001, compared with NPs.

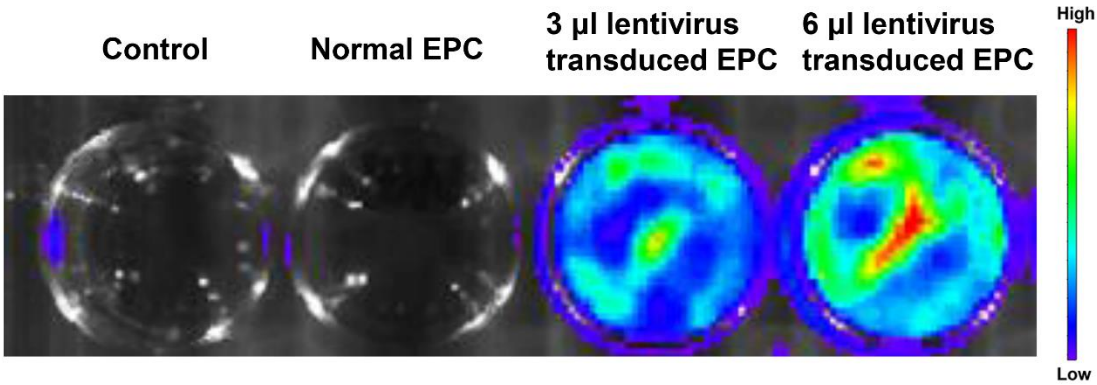
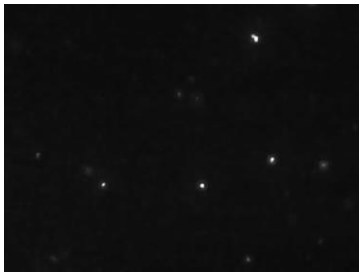
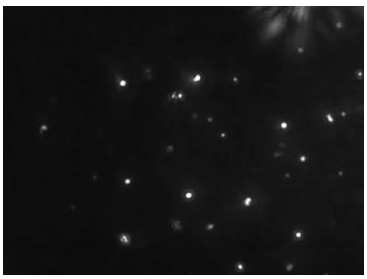


Figure S3. Transduction of luciferase into EPCs. EPCs were cultured in 24-well plate and transduced with 3 μl lentivirus or 6 μl lentivirus. The bioluminescence intensity of transduced EPCs was observed by adding 100 μg D-luciferin. Free D-luciferin was served as control. 6 μl of lentivirus presented the best transduction effect in EPCs.



Movie S1. Brownian motion of NPs in hydrogel analyzed by NTA.



Movie S2. Brownian motion of RNPs in hydrogel analyzed by NTA.