Electronic Supplementary Information

Enhanced and Long-Term CT Imaging Tracking of Transplanted Stem Cells Labeled with Temperature-Responsive Gold Nanoparticles

Chenggong Yu^{a,b}, Hongying Bao^{a,b}, Zhongjin Chen^b, Xiaodi Li^{a,b}, Xiaoyun Liu^{a,b}, Weizhi Wang^b, Jie Huang^{a,b,*}, Zhijun Zhang^{a,b,*}

^a School of Nano-Tech and Nano-Bionics, University of Science and Technology of China, Hefei 230026, China.

^b CAS Key Laboratory of Nano-Bio Interface, Division of Nanobiomedicine, Suzhou Institute of Nano-Tech and Nano-bionics, Chinese Academy of Sciences, Suzhou 215123, China.

*Corresponding authors:

Jie Huang, E-mail: jhuang2008@sinano.ac.cn, Tel: +86-0512-62872561;

Zhijun Zhang, E-mail: zjzhang2007@sinano.ac.cn, Tel: +86-0512-62872556



Supplementary Fig. 1. The synthetic route of TRP. Reaction conditions: (a) DCC, DMAP, and THF; (b) CuBr, PMDETA, MeOH, and H_2O .



Supplementary Fig. 2. The LCST measured spectrophotometrically with the solution being heated at a rate of 1 °C min⁻¹. The temperature at which the light transmittance (at 450 nm) of the polymer solution drops to 90% of the original value is defined as LCST.



Supplementary Fig. 3. Photograph of TRP (LCST at 37.47 °C) in water below and above LCST, respectively. The polymer is hydrophilic and soluble in water below LCST (35 °C), but insoluble above LCST (39 °C).



Supplementary Fig. 4. UV-Vis absorption spectra of TRP(37)@Au at 37 °C and 39 °C, respectively. The colloidal solution of TRP(37)@Au remains stable at 37 °C, but aggregates at 39 °C due to phase transition.



Supplementary Fig. 5. UV-Vis absorption spectra of TRP(41)@Au in aqueous solution at 37 °C, 39 °C, and 43 °C, respectively. TRP(41)@Au remains stable in the colloidal solution at 37 °C and 39 °C, but aggregates at 43 °C due to its phase transition.



Supplementary Fig. 6. Photograph of TRP(41)@Au and TRAuNPs in n-octanol and water at 37 °C and 39 °C, respectively, when reached thermodynamic equilibrium.



Supplementary Fig. 7. Hydrodynamic diameters of TRAuNPs and TRP(41)@Au at 37 °C and 39 °C, respectively, with three cycles of cooling/heating.



Supplementary Fig. 8. The concentration of Au in the hMSCs after incubation with (A) TRAuNPs at different concentrations for 24 h at 39 °C, and (B) TRAuNPs (0.2 mg mL⁻¹ of Au) at different time points at 39 °C, n = 3.



Supplementary Fig. 9. Laser confocal microscopy images of hMSCs labeled with TRP(41)@Au at 37 °C and 39 °C, respectively.



Supplementary Fig. 10. Relative fluorescence intensity of the hMSCs labeled with TRAuNPs and TRP(41)@Au at 37 °C and 39 °C, respectively. n = 3, **p<0.01



Supplementary Fig. 11. The intracellular TRP(41)@Au retention in hMSC at different time points at 37 °C and 39 °C, respectively.



Supplementary Fig. 12. The intracellular AuNPs after incubation at 37 °C and 39 °C for 24, 48, and 72 hours, respectively.



Supplementary Fig. 13. The plot of distribution volume of the hMSCs as a function of the tracking time.