Electronic Supplementary Information

Long-term *in vivo* CT tracking of mesenchymal stem cells labeled with Au@BSA@PLL nanotracers

Xinyu Ning,[a,b] Hongying Bao,[a] Xiaoyun Liu,[a] Han Fu,[a] Weizhi Wang,[a] Jie Huang,*[a] and Zhijun Zhang*[a]

[a] 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

[b] School of Life Sciences, Shanghai University, 99 Shangda Road, Shanghai, 200444, China

* Corresponding authors. E-mail: jhuang2008@sinano.ac.cn, Tel: 86-512-62872561, Fax: 86-512-62603079; E-mail: zjzhang2007@sinano.ac.cn, Tel: 86-512-62872556, Fax: 86-512-62603079.

Table S1 qRT-PCR primers.

	Gene	Forward (5'-3')	The full name of Gene
Adipogenic differentiation	human-FABP4-f1	AAACTGGTGGTGGAATGCGT	Fatty acid binding protein 4
	human-FABP4-r1	CAATATATCCCACAGAATGTTGTAGAG	
	human-PPARγ-f1	CTTGCAGTGGGGATGTCTCAT	Peroxisome proliferator activated receptor gamma
	human-PPARγ-r1	AGGTCAGCGGACTCTGGATT	
	human-β-Actin-f1	AGTCCTGTGGCATCCACGAAACTA	Beta-Actin
	human-β-Actin-r1	ACTCCTGCTTGCTGATCCACATCT	
Osteogenic differentiation	human-OCN-f1	AACCAGGCTCCCTTTCCTTT	Osteocalcin
	human-OCN-r1	CCCAGCTCTGCCTTTTCTCT	
	human-ALP-f1	ACCACTCCCACGTCTTCTCC	Alkaline phosphatase
	human-ALP-r1	ACATAGCCTGGACCGTTTCC	
	human-Col1-f1	ATGATTGTCTTTCCCCATTCATTT	Alpha-1 type I collagen
	human-Col1-r1	GGGCTCTAATGATGTTGAACTTGT	
	human-β-Actin-f1	AGTCCTGTGGCATCCACGAAACTA	Beta-Actin
	human-β-Actin-r1	ACTCCTGCTTGCTGATCCACATCT	

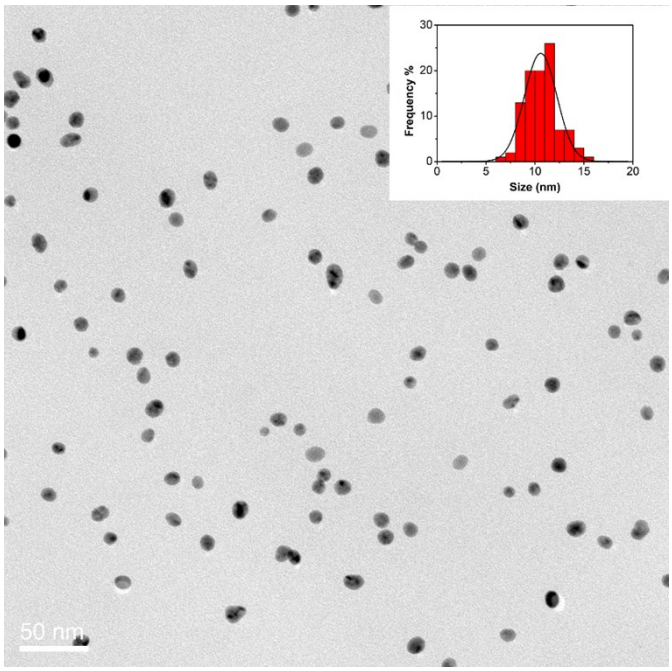

Fig. S1 TEM image of Au@BSA. Inset presents the size statistics of Au@BSA, 10.70 nm ± 1.70 nm.

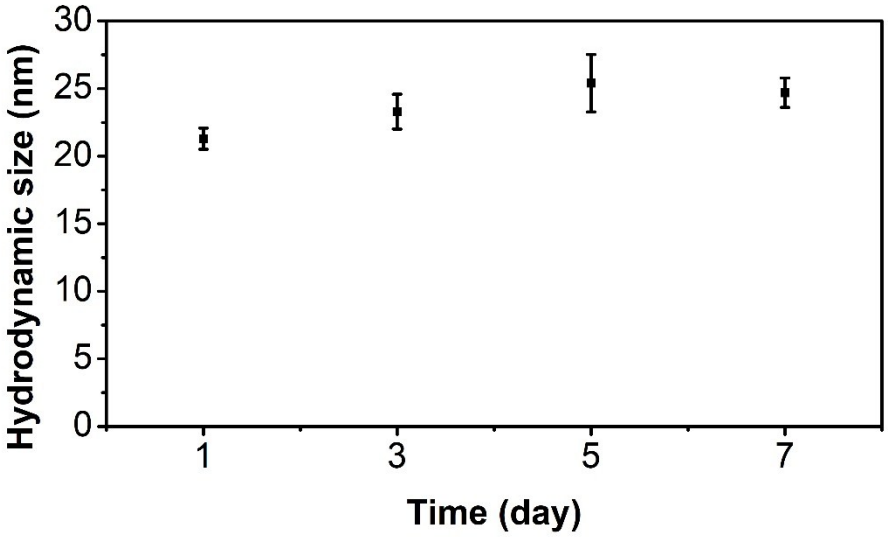

Fig. S2 Dynamic light scattering data of Au@BSA@PLL in aqueous solution at different time interval.

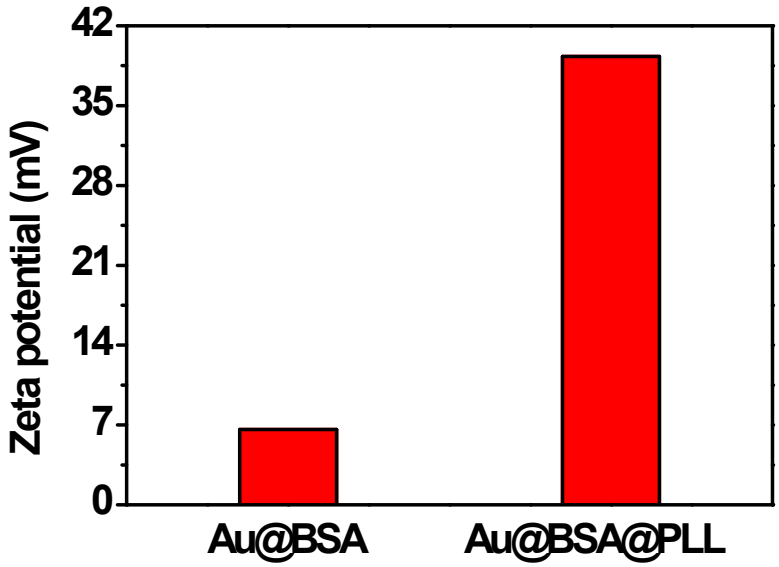

Fig. S3 Zeta potentials of Au@BSA and Au@BSA@PLL.

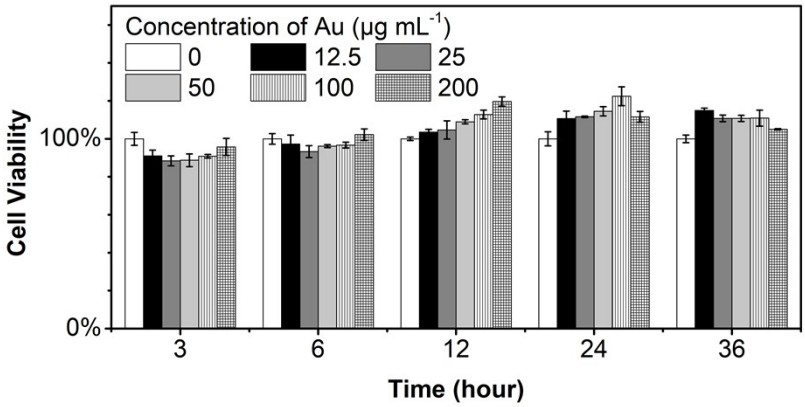

Fig. S4 Relative viability of the hMSCs labeled with Au@BSA at various Au concentrations for different periods of time.

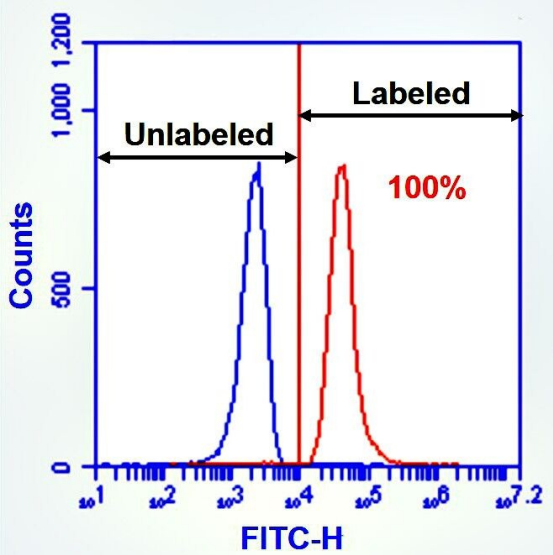

Fig. S5 Flow cytometry analysis of hMSCs incubated with Au@BSA (200 μg mL^{-1} Au) for 24 h. The cells without Au@BSA labeling were examined as a control.

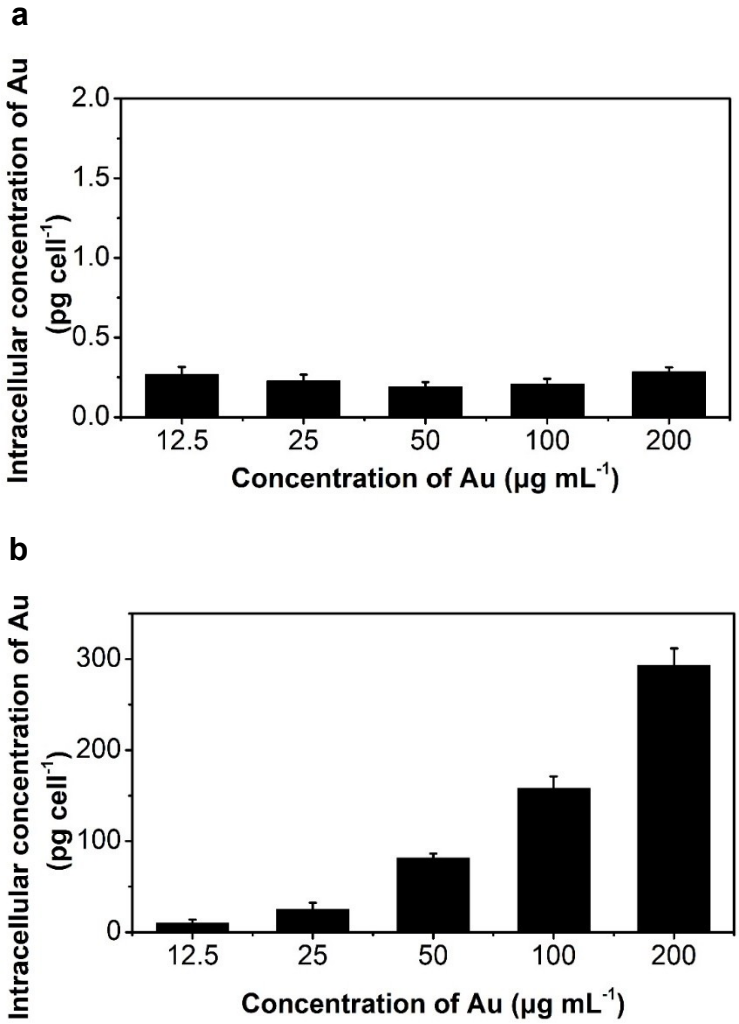

Fig. S6 (a) Intracellular Au content in the hMSCs labeled with Au@BSA at different Au concentrations for 24 h. (b) Intracellular Au content in the hMSCs labeled with Au@BSA@PLL at different Au concentrations for 24 h.

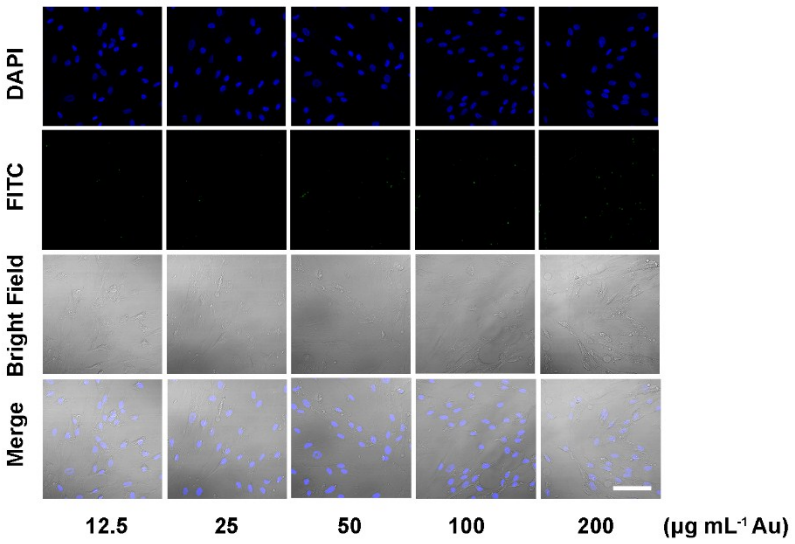

Fig. S7 Confocal microscopy images of the hMSCs labeled with Au@BSA-FITC. (Scale bar=100 μm)

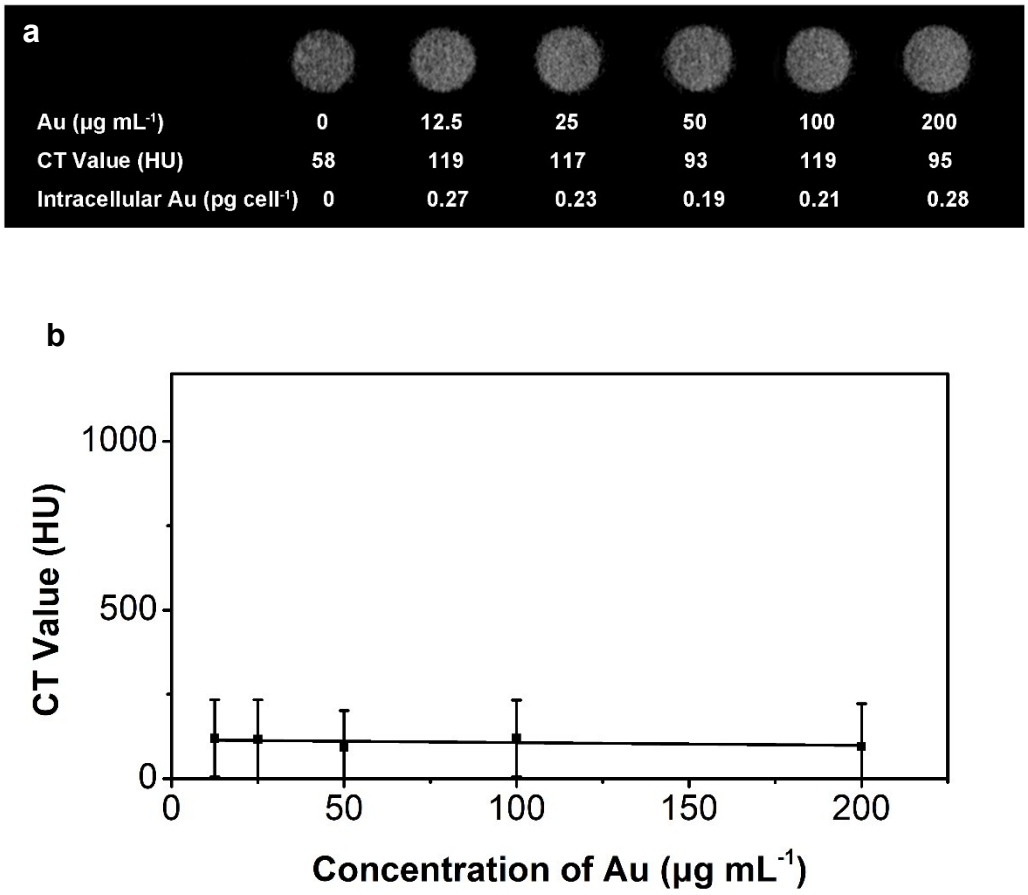

Fig. S8 (a) *In vitro* micro-CT imaging the hMSCs (1×10^6 cells) labeled with different concentrations of Au@BSA. (b) Calculated HU values as a function of the concentration of Au@BSA added for cell labeling.

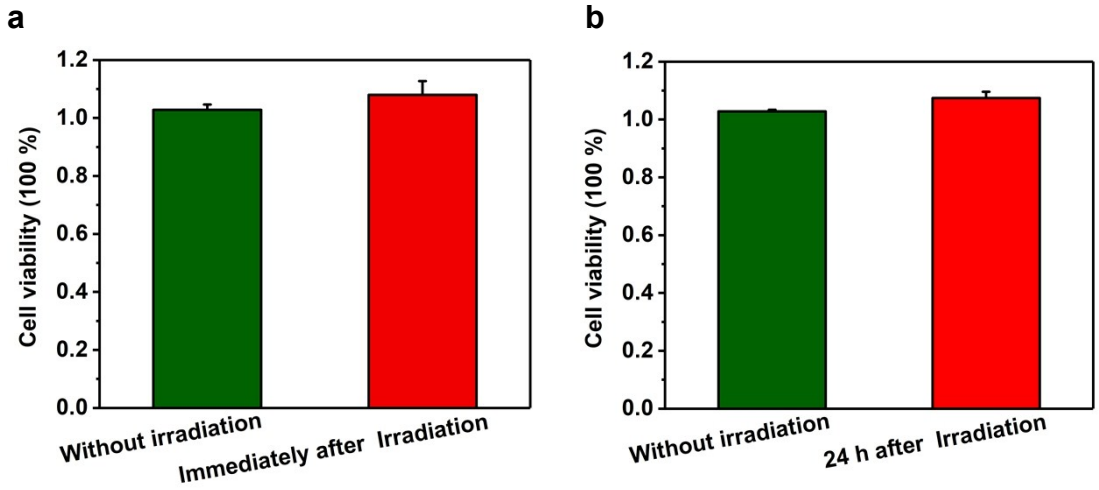

Fig. S9 Relative viability of the hMSCs incubated with Au@BSA@PLL at 200 μg mL^{-1} of Au (A) immediately and (B) at 24 h after X-ray irradiation.

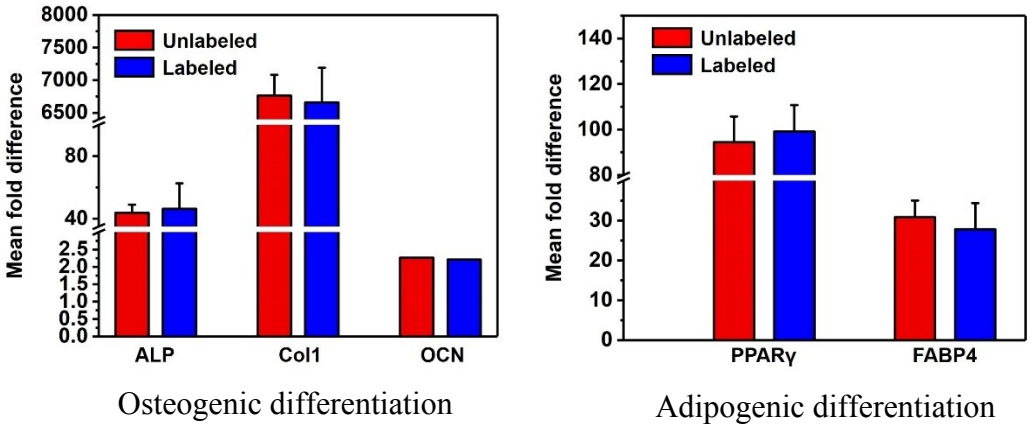

Fig. S10 Relative expression level of ALP, Col1, and OCN on days 21, and PPARγ and FABP4 on day 14 of the labeled hMSCs during osteogenic differentiation process and adipogenic differentiation process, respectively. The unlabeled hMSCs were set as controls.

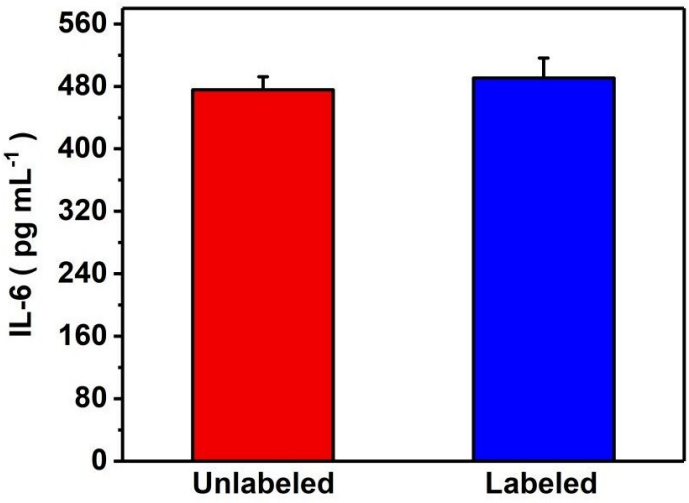

Fig. S11 The expression level of the inflammatory cytokines IL-6 in the unlabeled and the Au@BSA@PLL labeled hMSCs.

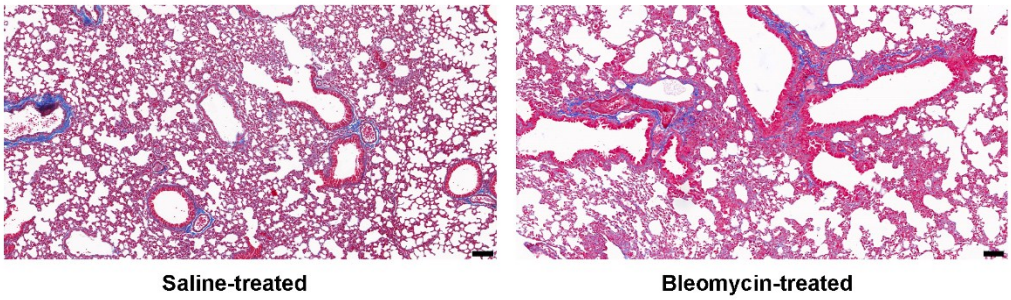

Fig. S12 Masson's trichrome staining of saline-treated or bleomycin-treated lung sections. (Scale bar=100 μm)

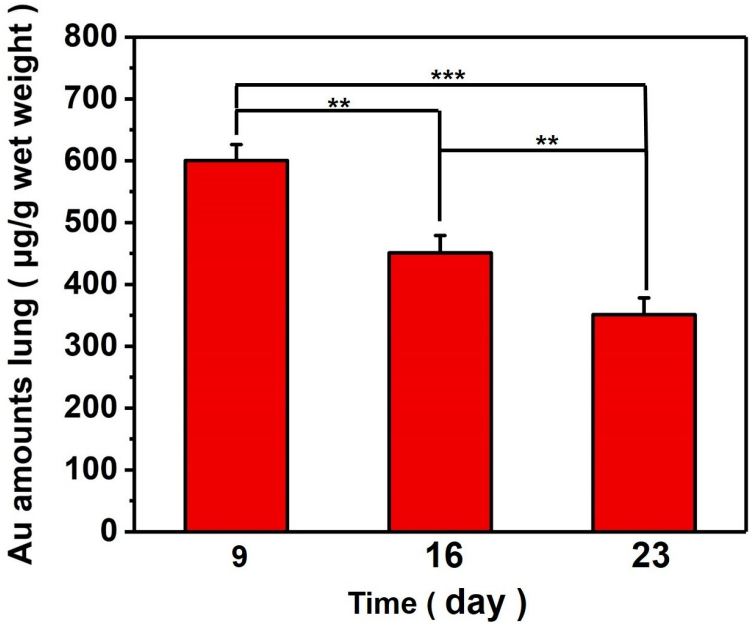

Fig. S13 Au content in lung tissue at the 9 d, 16 d and 23 d post-transplantation of the labeled hMSCs.