Supporting Information

Delivering siRNA to control osteogenic differentiation and real-time detecting cell differentiation in human mesenchymal stem cells by multifunctional gold nanoparticle

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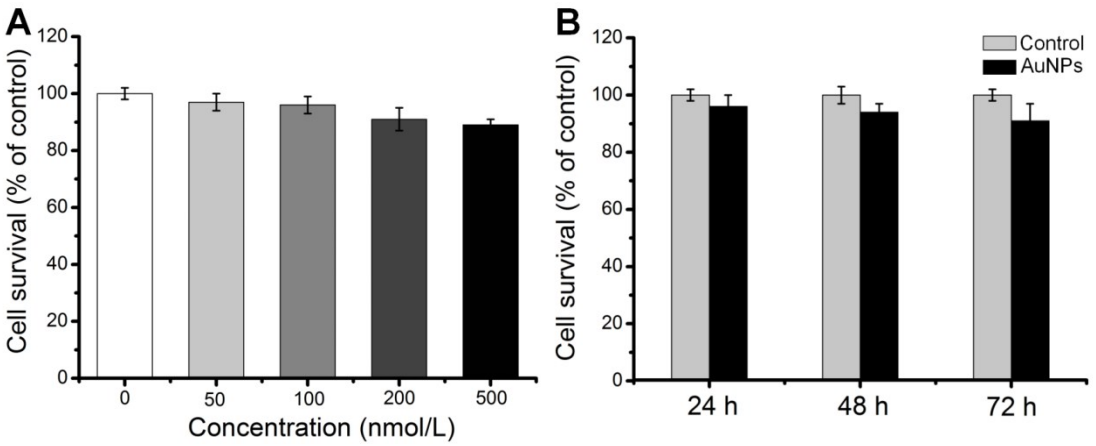

Fig. S1 Cell cytotoxicity of AuNP-PEI-peptide-FITC. A) Cells viability of hMSCs with different concentration of AuNP-PEI-peptide-FITC (0/50/100/200/500 nM) for 24 h incubation. The cells viability of hMSCs was maintained 90% when the concentration of AuNP-PEI-peptide-FITC was 500 nM after 24 h incubation (n=3). B) Cells viability of hMSCs with different incubation time of AuNP-PEI-peptide-FITC (24/48/72 h). Compared to control (hMSCs only, 100% cells viability), the cells viability of hMSCs was maintained 90% after 72 h incubation with AuNP-PEI-peptide-FITC at 200 nM (n=3).

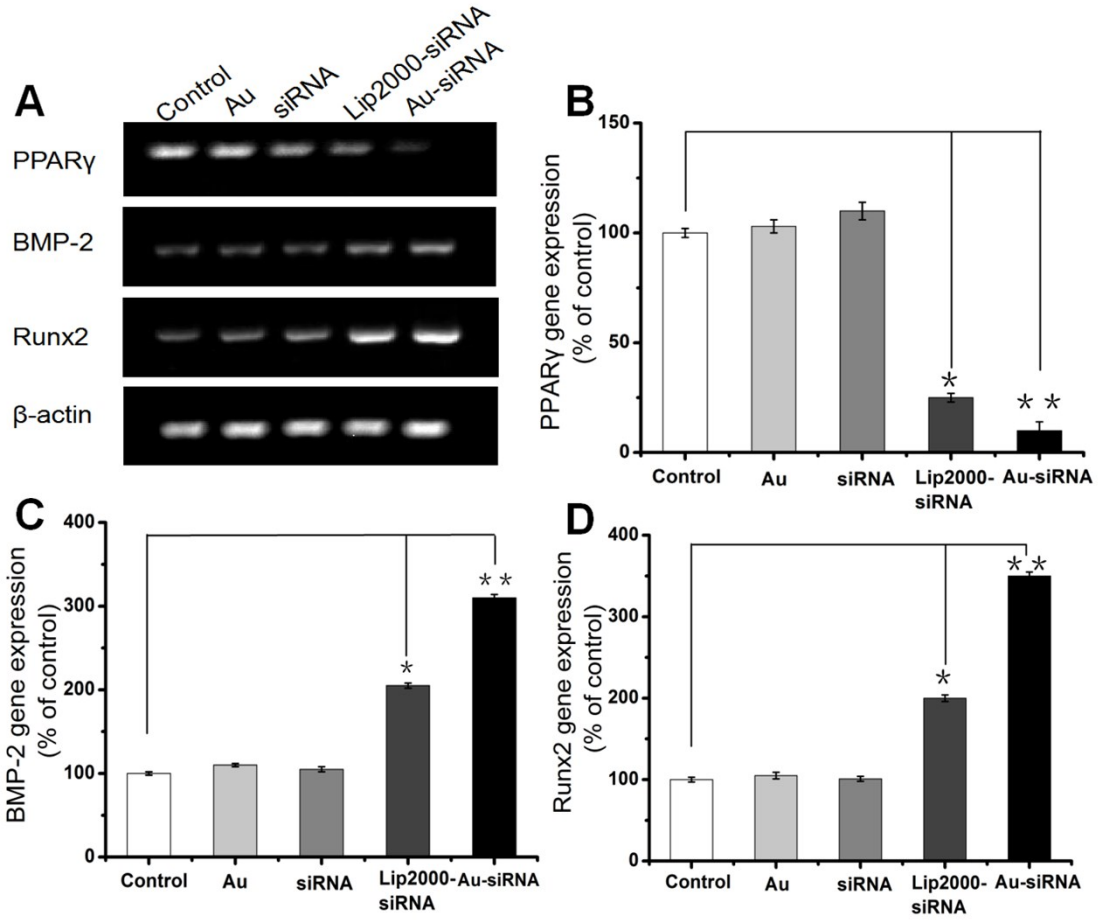

Fig. S2 Silencing PPARγ gene by AuNP-PEI-peptide-FITC/siRNA nanocomplexes and RT-PCR analysis of the PPARγ, BMP-2 and Runx2 gene expression in hMSCs after various treatments at 3 days osteogenic differentiation. Compared to control, the AuNP-PEI-peptide-FITC/siRNA nanocomplexes showed a high down-regulated expression of PPARγ gene and up-regulated expression of BMP-2 and Runx2 gene, indicating that the AuNP-PEI-peptide-FITC/siRNA nanocomplexes silenced PPARγ gene and controlled the osteogenic differentiation of hMSCs efficiently. AuNP-PEI-peptide-FITC/siRNA: 10:1, AuNP-PEI-peptide-FITC: 200 nM, siRNA: 20 nM. (n=3, $p^{*}<0.05$, $p^{**}<0.01$).

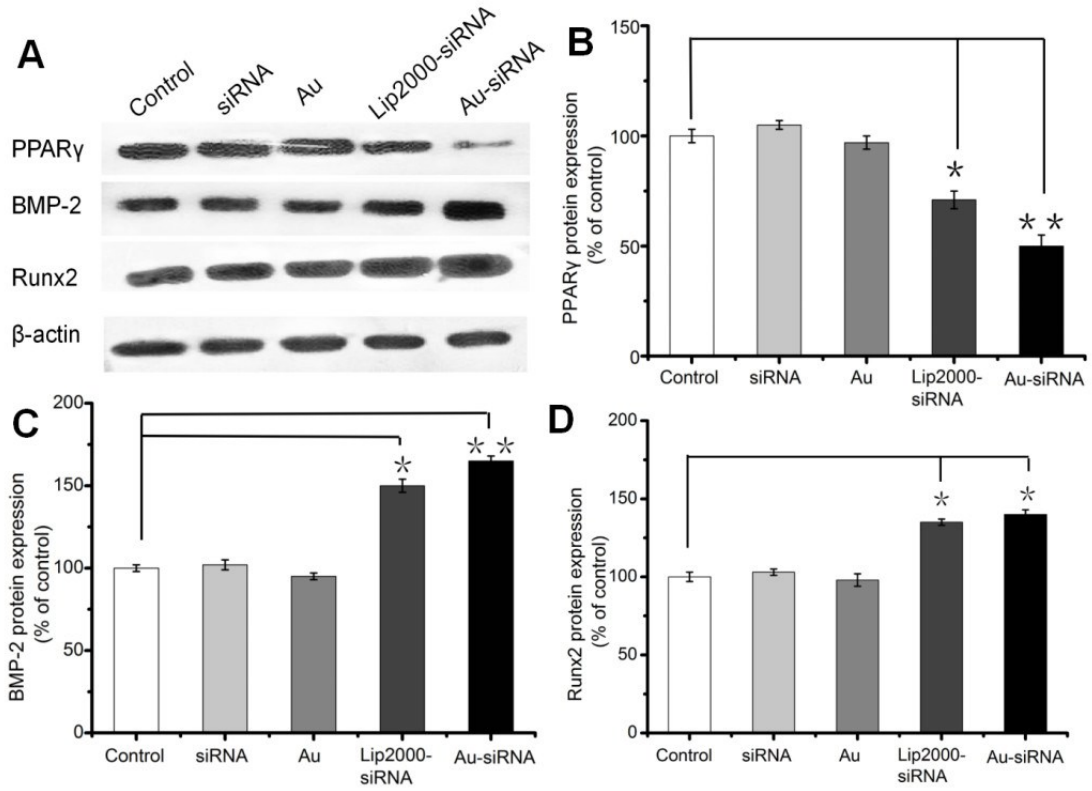

Fig. S3 Inhibiting PPARγ protein expression by AuNP-PEI-peptide-FITC/siRNA nanocomplex and Western blot analysis of the PPARγ, BMP-2 and Runx2 protein expression in hMSCs after various treatments at 3 days osteogenic differentiation. Compared to control, the AuNP-PEI-peptide-FITC/siRNA nanocomplex showed a significant down-regulated protein expression of PPARγ and up-regulated protein expression of BMP-2 and Runx2, indicating that the AuNP-PEI-peptide-FITC/siRNA nanocomplex inhibited PPARγ protein and controlled the osteogenic differentiation of hMSCs efficiently. AuNP-PEI-peptide-FITC/siRNA: 10:1, AuNP-PEI-peptide-FITC: 200 nM, siRNA: 20 nM. (n=3, p*<0.05, p**<0.01).

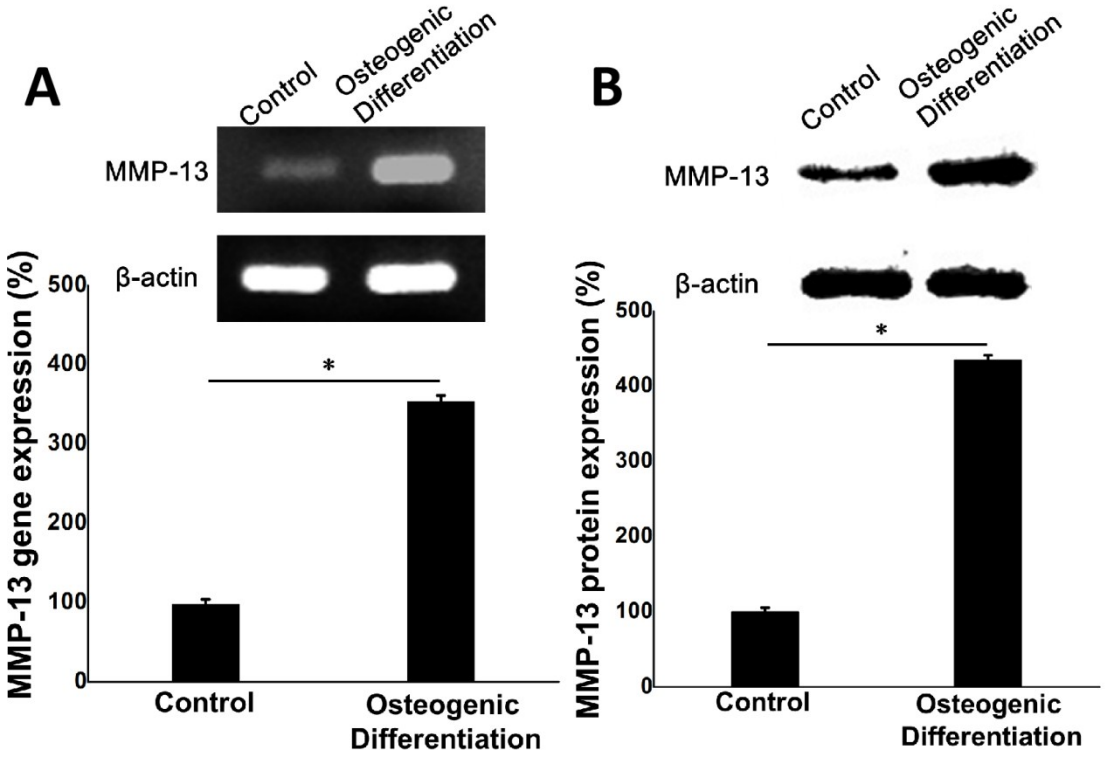

Fig. S4 A) RT-PCR analysis of the MMP13 gene expression in hMSCs after seven days osteogenic differentiation culture. Compared to control (culture medium), the osteogenic differentiation treatment group (osteogenic differentiation culture medium) showed a significant expression of MMP13 gene (n=3, $p^*<0.05$). B) Western blot analysis of the MMP13 protein expression in hMSCs after seven days osteogenic differentiation culture. Compared to control (culture medium), the osteogenic differentiation treatment group (osteogenic differentiation culture medium) showed a significant expression of MMP13 protein (n=3, $p^*<0.05$).