**Supplemental Figures – Jin and Zhao et al.**

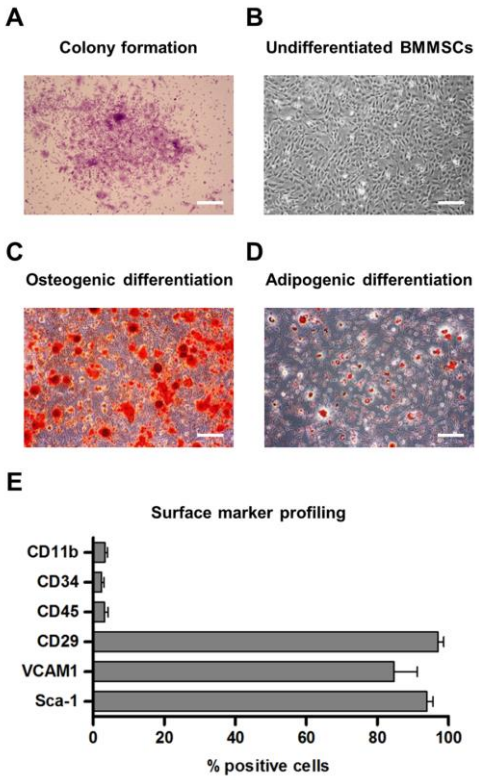


**Figure S1.** Identification of BMMSCs used in the present study was in accordance with currently accepted MSC definitions. **(A):** Colony formation of BMMSCs stained with crystal violet. BMMSCs expanded in a fashion that started from a single cell to a colony with over 50 cells. Bars: 500 µm. **(B):** Undifferentiated BMMSCs expanded readily in a spindle shape. Bars: 500 µm. **(C):** Osteogenic differentiation of BMMSCs stained with alizarin red after induction for 14 d. Bars: 200 µm. **(D):** Adipogenic differentiation of BMMSCs stained with oil red O after induction for 14 d. Bars: 200 µm. **(E):** Flow cytometry was performed to identify surface marker expression on BMMSCs. Data represents mean ± SEM. n=3 per marker. Abbreviations: BMMSC, bone marrow-derived mesenchymal stem cell; MSC, mesenchymal stem cell; Sca-1, stem cell antigen-1; SEM, standard error of the mean; VCAM1, vascular cell adhesion molecule 1.

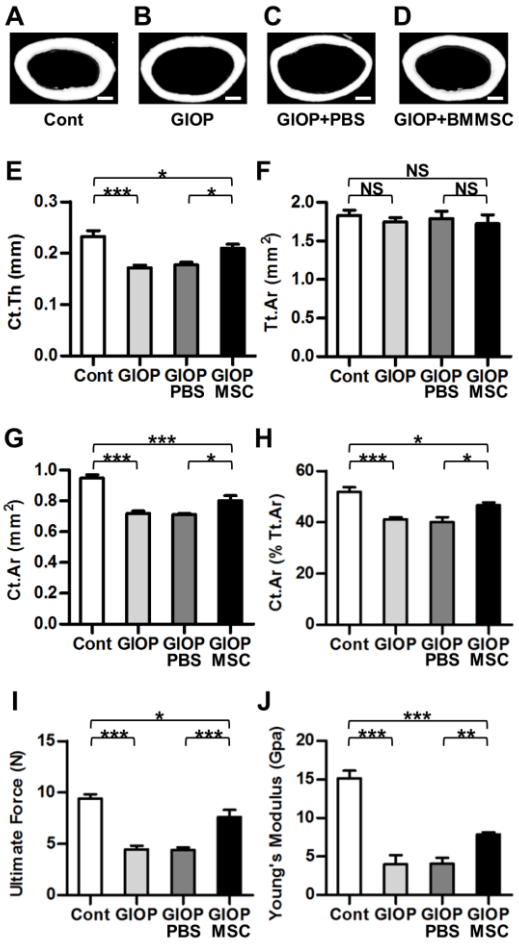


**Figure S2.** Cortical bone mass and mechanical tests for bone quality. **(A-D):** Representative micro-CT images illustrating the cortical bone mass in the midshaft of femora. Bars: 500 µm. **(E-H):** Corresponding parameters showing partial prevention of glucocorticoid-induced cortical bone loss by MSC therapy. **(I, J):** Mechanical parameters of tibiae analyzed by 3-point bending tests demonstrating maintenance of bone quality by MSC therapy in glucocorticoid-treated mice. Data represents mean ± SEM. n=4 per group. **P* < .05, ***P* < .01 and ****P* < .001. Abbreviations: BMMSC, bone marrow-derived mesenchymal stem cell; Cont, control; Ct.Ar, cortical bone area; Ct.Th, cortical bone thickness; GIOP, glucocorticoid-induced osteoporosis; MSC, mesenchymal stem cell; PBS, phosphate buffer saline; SEM, standard error of the mean; Tt.Ar, total area.

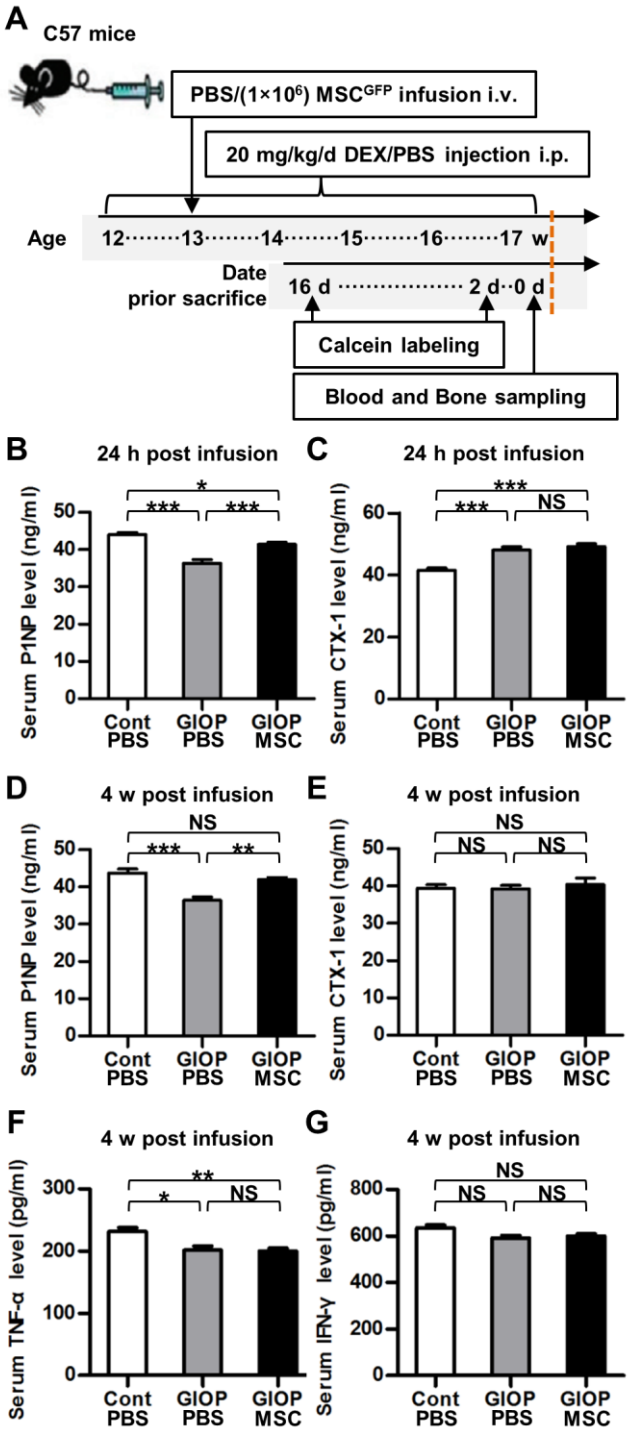
A
C57 mice
PBS/(1×10⁶) MSC^GFP infusion i.v.
20 mg/kg/d DEX/PBS injection i.p.
Age
12·····13·····14·····15·····16·····17 w
Date
prior sacrifice
16 d ····· 2 d··0 d
Calcein labeling
Blood and Bone sampling
B
24 h post infusion
Serum P1NP level (ng/ml)
C
24 h post infusion
Serum CTX-1 level (ng/ml)
D
4 w post infusion
Serum P1NP level (ng/ml)
E
4 w post infusion
Serum CTX-1 level (ng/ml)
F
4 w post infusion
Serum TNF-α level (pg/ml)
G
4 w post infusion
Serum IFN-γ level (pg/ml)
Cont PBS
GIOP PBS
GIOP MSC
NS

**Figure S3.** Study design of the Experiment 2 and levels of serological markers. **(A):** Schema indicating the study design of the Experiment 2 for bone modeling investigation. Calcein labeling and the blood and the bone sampling were performed at indicated time points. **(B, C):** ELISA analyses of bone formation **(B)** and bone resorption **(C)** markers in serum at 1 w post glucocorticoid treatment (24 h post infusion) showing inhibition of bone formation and elevation of bone resorption rates. BMMSC infusion partially rescued bone formation but did not prevent the stimulation of bone resorption. **(D, E):** ELISA analyses of bone formation **(D)** and bone resorption **(E)** markers in serum at 4 w post infusion showing maintenance of bone formation underlies therapeutic effects of infused BMMSCs in GIOP. **(F, G):** ELISA analyses of inflammatory markers in serum showing inhibited TNF-α level in GIOP with paralleled inflammation after BMMSC infusion. Data represents mean ± SEM. n=4 per group. **P* < .05, ***P* < .01 and ****P* < .001. Abbreviations: BMMSC, bone marrow-derived mesenchymal stem cell; Cont, control; CTX-1, cross linked C-telopeptide of type 1 collagen; DEX, dexamethasone; ELISA, enzyme-linked immunosorbent assay; GFP, green fluorescent protein; GIOP, glucocorticoid-induced osteoporosis; IFN-γ, inteferon-gamma; i.p., intraperitoneally; i.v., intravenously; MSC, mesenchymal stem cell; NS, not significant; P1NP, procollagen 1 N-terminal peptide; PBS, phosphate buffer saline; SEM, standard error of the mean; TNF-α, tumor necrosis factor-alpha.