# Supplementary Materials

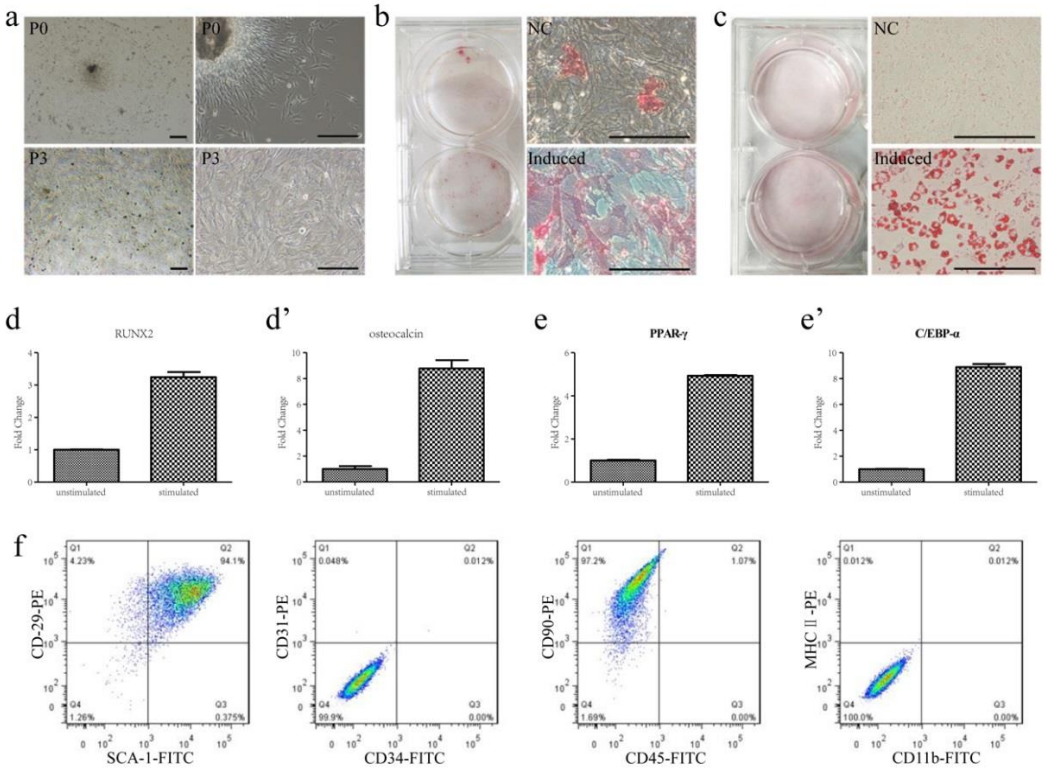
## Supplementary material 1

### Methods for Isolation and identification of MSCs from murine compact bones

Murine MSCs were isolated from 1-week-old C57BL/6 (H2b) compact bones following a previous protocol [22]. Long bones of 1-week-old C57BL/6 (H2b) mice were dissected and the bone marrow was flushed out. The compact bones were digested with 1% Type II collagenase (Sigma-Adrich) for 2 hrs, and the digested bone debris were cultured in alpha-minimal essential medium (α-MEM, Gibco) containing 10% fetal bovine serum (FBS, StemCell Technologies) supplemented with 1 U/ml penicillin (Sigma-Adrich) and 1 μg/ml streptomycin (Sigma-Adrich) in a humidified atmosphere of 37 ℃, 5% $CO_2$ incubator. The fresh medium was added to the tissue fragments till 72 hrs, and the adherent cells were detached using 0.25% trypsin-EDTA (Sigma-Adrich) digestion, and subcultured at ratio of 1:3 to passage every 2~3 days. The adherent cells isolated at passages 3~5 were used for in vivo experiment.

**Supplementary material 2**

**Isolation and identification of MSC from murine compact bones**




The adherent cells isolated from the bone compact at passages 0 (up) and passage 3 (down) were spindle shaped (a). The alkaline phosphatase staining to test the ALP activity (Sigma-Adrich) and the osteogenesis of MSCs (b), with the induced-differentiated (down) and the spontaneous-differentiated NC results (up). (c) shows the adipogenesis of MSC, with oil red O (Sigma-Adrich) staining for lipid droplets to test the induced-differentiation results (down) and the spontaneous-differentiation results (up). The real-time quantitative PCR detecting the expression of RUNX2 (d), osteocalcin (d'), PPAR-γ (e) and C/EBP-α (e'), exhibit the osteogenic differentiation capability and adipogenic differentiation capability of MSCs. The MSC cell surface markers were detected by flowcytometry analysis in (f). MSCs were positive for CD29, SCA-1 and CD90, but negative for CD31, CD34, CD45, MHC-class II and CD11b. Scale bars: a-c, 200 μm.

**Supplementary material 3**

**The qRT-PCR primers sequence**

| **Primer** | **Sequence** |
|---|---|
| Gapdh top | GGAGACAACCTGGTCCTCAG |
| Gapdh bottom | ACCCAGAAGACTGTGGATGG |
| TGF-β1 top | CGGTGCTCGCTTTGTA |
| TGF-β1 bottom | GCCACTCAGGCGTATC |
| Collagen I (Col1a2) top | CTTGTGGCTTCTGACTATCT |
| Collagen I (Col1a2) bottom | AGGAAAATGAGGCTGTTA |
| IFN-γ top | CTGGTGGACCACTCGGATGA |
| IFN-γ bottom | TTACTACCTTCTTCAGCAACAGCAA |
| TNF-α top | TTCTCATTCCTGCTTGTGG |
| TNF-α bottom | TTGGGAACTTCTCATCCCT |
| mmu-miR-148a-3p top | ACACTCCAGCTGGGTGTCAGTTTGTCAA |
| snoRNA202 top | ACACTCCAGCTGGGGCTGTACTGACTTGATG |
| URP | TGGTGTCGTGGAGTCG |

**Supplementary material 4**

**The stem-loop RT primer sequence**

| **stem-loop RT primer** | **Sequence** |
|---|---|
| mmu-miR-148a-3p RT | CTCAACTGGTGTCGTGGAGTCGGCAATTCAGTTGAGTGGGGTAT |
| snoRNA202 RT | CTCAACTGGTGTCGTGGAGTCGGCAATTCAGTTGAGCATCAGAT |

**Supplementary material 5**

**Statistics of *p* value between MP group and DM group, n=20**

| Day | $p_{\text{blood glucose}}$ | $p_{\text{body weight}}$ |
|---|---|---|
| $14^{th}$ | 0.014 | 0.621 |
| $21^{st}$ | <0.0001 | 0.031 |
| $28^{th}$ | 0.0096 | 0.02767 |
| $35^{th}$ | 0.010473 | 0.05385 |
| $42^{nd}$ | 0.003497 | 0.02893 |
| $49^{th}$ | 0.036424 | 0.007234 |
| $56^{th}$ | <0.0001 | 0.000648 |