**Table S1** primer sequence

| Gene name | Forward primer sequence (F) | Reverse primer sequence (R) |
|---|---|---|
| *Ucp-1* | AGGCTTCCAGTACCATTAGGT | CTGAGTGAGGCAAAGCTGATTT |
| *Pgc-1α* | GGAGCTGGATGGCTTGGGACAT | TTCGCAGGCTCATTGTTGTACTGGT |
| *Cox-7a1* | GCTCTGGTCCGGTCTTTTAGC | GTACTGGGAGGTCATTGTCGG |
| *Cidea* | TGACATTCATGGGATTGCAGAC | GGCCAGTTGTGATGACTAAGAC |
| *Cd137* | CGTGCAGAACTCCTGTGATAAC | GTCCACCTATGCTGGAGAAGG |
| *Tmem26* | ACCCTGTCATCCCACAGAG | TGTTTGGTGGAGTCCTAAGGTC |
| *Tbx-1* | GGCAGGCAGACGAATGTTC | TTGTCATCTACGGGCACAAAG |
| *Fndc5* | ATGAAGGAGATGGGGAGGAA | GCGGCAGAAGAGAGCTATAACA |
| *Gapdh* | GACAAAATGGTGAAGGTCGGTG | TGATGTTAGTGGGGTCTCGCTC |

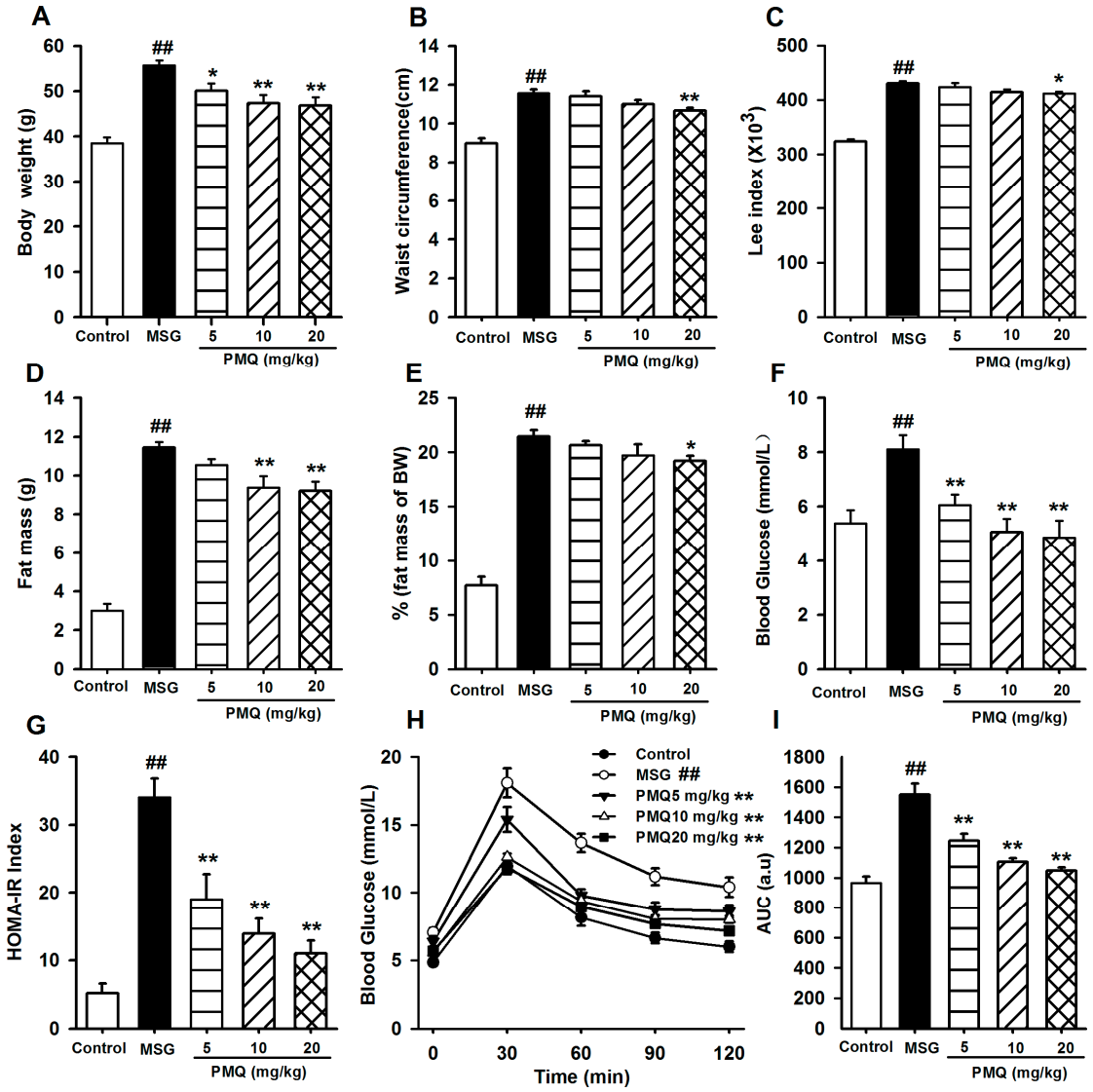


**Figure S1 PMQ reduces obesity and improves insulin sensitivity.** Vehicle or PMQ were administered orally to 5-week-old CD-1 or MSG-induced obese mice for 19 weeks, and body weight (A), waist circumference (B), Lee index (C), fat mass (D), fat mass percentage (E), blood glucose (F), HOMA-IR index (G), OGTT (H) and AUC (I) levels were determined. ##$P < 0.01$ vs control group; *$p < 0.05$, **$p < 0.01$ vs MSG group. Data are expressed as means ± SEM, $n$ = 8-10.

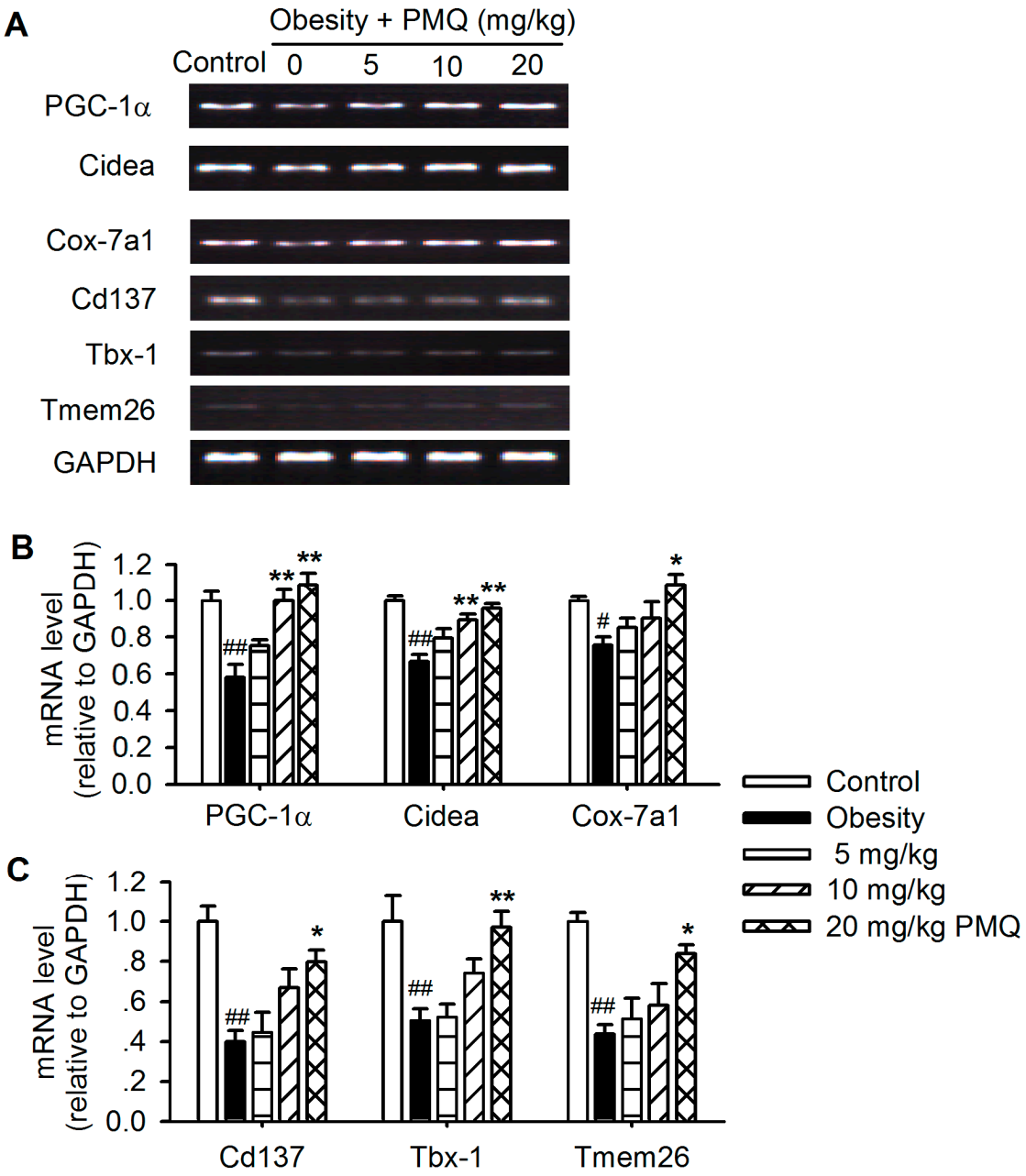


**Figure S2. PMQ promotes the browning of inguinal WAT in MSG mice.** (A) Representative PCR bands of brown-fat specific genes and beige cell markers in the inguinal depots. Each mRNA measurement was normalized to GAPDH (B, C). #$p$ < 0.05, ##$p$ < 0.01 vs control group; *$p$ < 0.05, **$p$ < 0.01 vs MSG group. Data are expressed as means ± SEM, $n$ = 4.

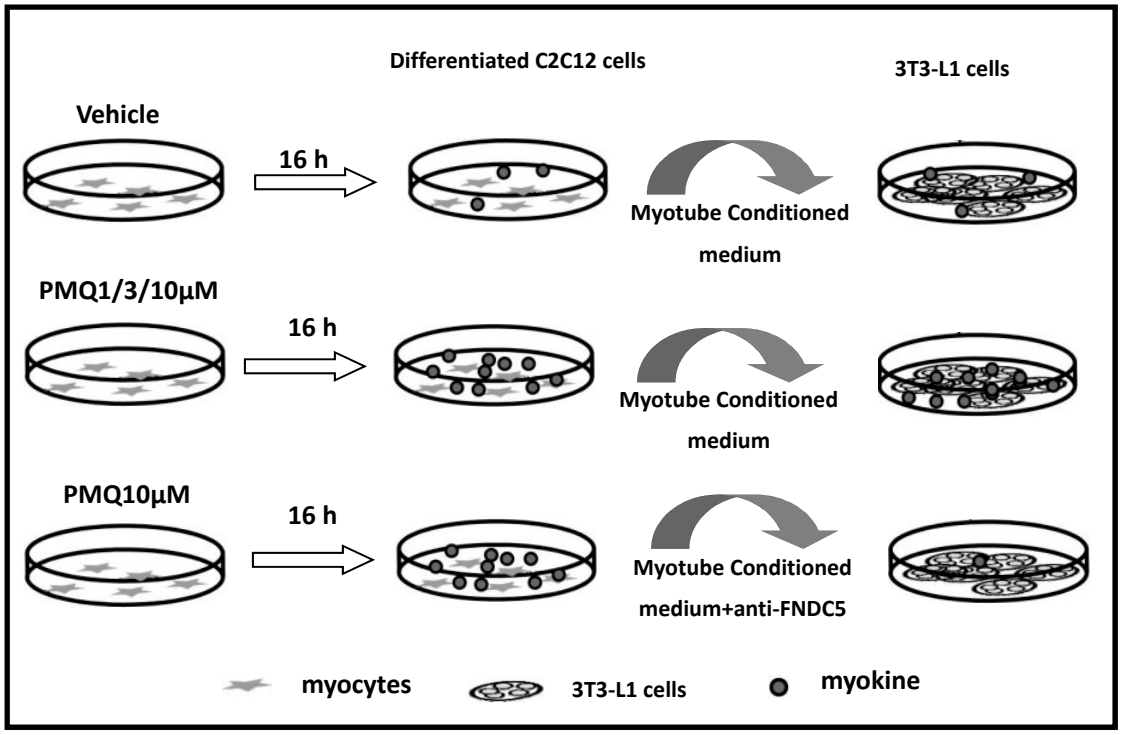


**Figure S3. Experimental scheme for myotube-conditioned media treatment on 3T3-L1 adipocytes.** Differentiated C2C12 cells were incubated with PMQ (1, 3, 10 μM) or vehicle for 16 h. Then the 24 h myotube-conditioned media were collected and filtered. Thereafter, the conditioned media were transferred to differentiation medium of 3T3-L1 adipocytes for 8 days until adipocytes matured.

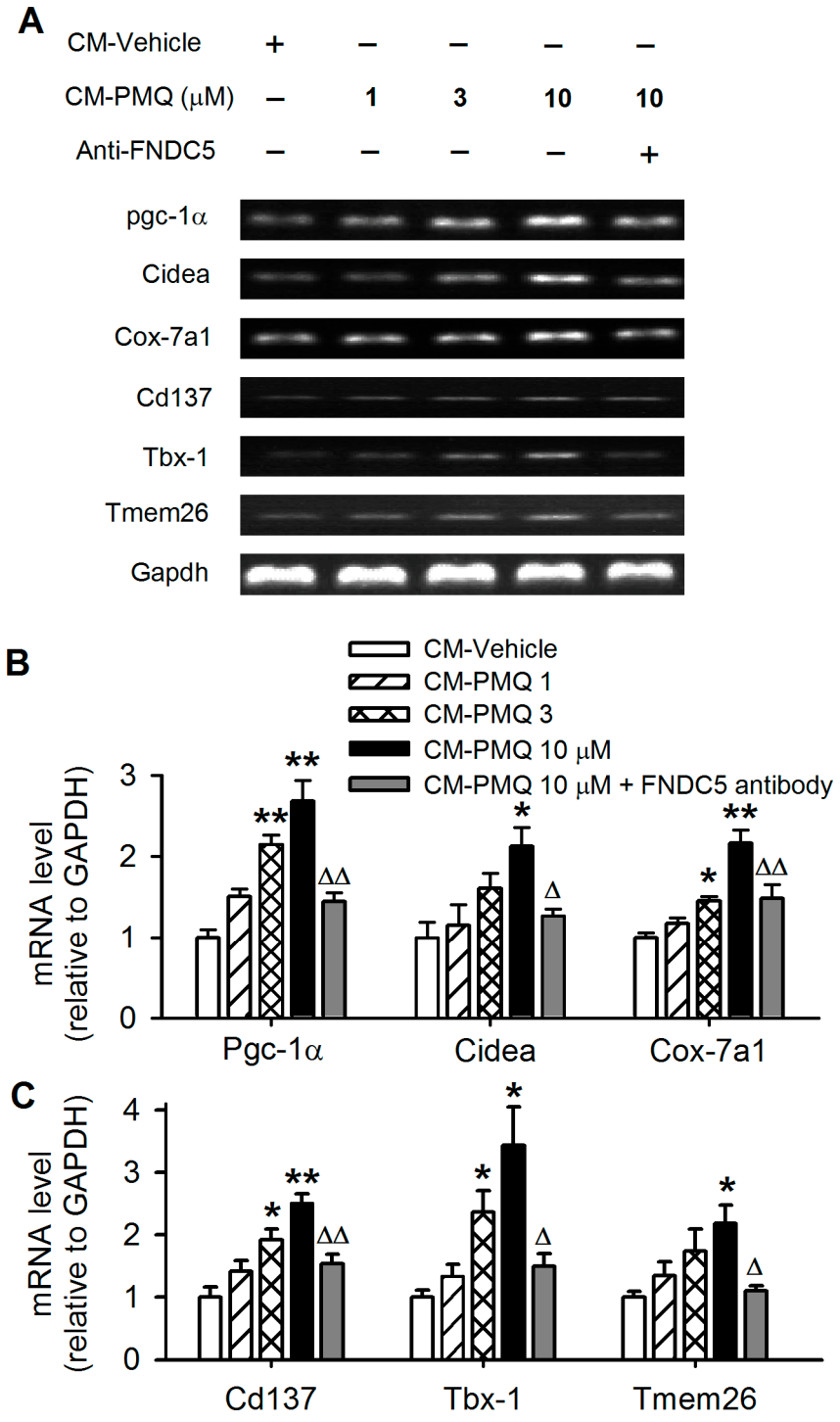


**Figure S4. Conditioned media from PMQ-treated myotubes induce brown-like transition in 3T3-L1 cells.** 3T3-L1 cells were treated with CM-vehicle, CM-PMQ (1, 3, 10) and CM-PMQ10 plus FNDC5 antibody (anti-FNDC5). (A) Representative PCR bands of brown-fat specific genes and beige cell markers in the inguinal depots. Each mRNA measurement was normalized to GAPDH (B, C). $n = 3$. *$p < 0.05$, **$p < 0.01$ vs MCM-vehicle; $\Delta P < 0.05$, $\Delta\Delta P < 0.01$ vs MCM-PMQ10. Data are expressed as means ± SEM.