**Additional file 1**

**Table S1. Sequences of siCD90 and shCD90**

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| --- | --- |
| *siCD90-1* | Sense: CGAAUCCCAUGAGCUCCAAdTdT |
|  | Anti-sense: UUGGAGCUCAUGGGAUUCGdTdT |
| *siCD90-2* | Sense: GCCAUGAGAAUAACACCAAdTdT |
|  | Anti-sense: UUGGUGUUAUUCUCAUGGCdTdT |
| *siControl* | Sense: UUCUCCGAACGUGUCACGUTT |
|  | Anti-sense: ACGUGACACGUUCGGAGAATT |
| *shCD90* (GenePharma) | CGAAUCCCAUGAGCUCCAA |
| *shControl* (GenePharma) | TTCTCCGAACGTGTCACGT |
| *shCD90* (Genechem) | CGAATCCCATGAGCTCCAA |
| *shControl* (Genechem) | TTCTCCGAACGTGTCACGT |

**Table S2. Primer pairs used in qPCR**

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| --- | --- |
| *Nanog* | Sense: CGGTGGCAGAAAAACCAGTG |
|  | Anti-sense: AAGGCTTCCAGATGCGTTCA |
| *Sox2* | Sense: GGCAAGGCAGAGAAGAGAGTG  |
|  | Anti-sense: TCTGGCGGAGAATAGTTGGG |
| *Oct4*  | Sense: TGATCCTCGAACCTGGCTA  |
|  | Anti-sense: CTCAGGCTGCAAAGTCTCC |
| *CD90*  | Sense: TGCTCTCAGTCTTGCAGGTG  |
|  | Anti-sense: TGGATGGAGTTATCCTTGGTGTT |
| *C/EBPα*  | Sense: TTGAAGCACAATCGATCCATCC  |
|  | Anti-sense: GCACACTGCCATTGCACAAG |
| *Adiponectin*  | Sense: CCTGTTCCTCTTAATCCTGCCCA |
|  | Anti-sense: ATCTCCTTTCTCTCCCTTCTCTCCA |
| *PPAR-γ*  | Sense: GGAGCCTAAGTTTGAGTTTGCTGTG |
|  | Anti-sense: TGCAGCAGGTTGTCTTGGATG |
| *αP2*  | Sense: GTGGGATGGAAAGTCGACCA |
|  | Anti-sense: ATCCAGGCCTCTTCCTTTGG |
| *Leptin*  | Sense:TCAAGCAGTGCCTATCCAGAAAGTC |
|  | Anti-sense:GGGTGAAGCCCAGGAATGAAGTC |
| *GAPDH* | Sense: GTGTTTCCTCGTCCCGTAGA  |
|  | Anti-sense: ATGAAGGGGTCGTTGATGGC |
| *18S rRNA* | Sense: GCCTGAGAAACGGCTACCACAT |
|  | Anti-sense: CCGCTCCCAAGATCCAACTACG |

**Figure S1.** **Inhibitory effect of *CD90* silencing on AKT activation.** S-ADSCs were transfected with siCD90 or siControl for 24 h, and stimulated with insulin (100nM) for different time periods. Protein levels of p-AKT, AKT were detected by western blot.



**Figure S2. Infection of S-ADSCs with GFP-tagged shControl or shCD90 lentivirus.** S-ADSCs were infected with GFP-tagged shControl or shCD90 lentivirus (GenePharma). The infection efficiency was determined by GFP signals under fluorescence microscope. BF, bright field. Scale bar = 100μm.



**Figure S3.** **Influence of shCD90 lentivirus on WAT weight.** GFP-tagged shControl or shCD90 lentivirus (Genechem) was injected into bilateral inguinal fat pads (7.0×106 TU per point, 3 points per fat pad) of male mice at the age of 8 weeks, respectively. WAT weight was measured after 4 weeks of treatment.

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**Figure S4. Expression of *CyclinD1* and *Leptin* in WAT. A-C** The expression of *CD90* (A), *CyclinD1* (B) and *Leptin* (C) in inguinal, axillary SAT and epididymal, mesenteric VATfrom mice fed on normal diet (GSE53307). **D,E** The expression of *CyclinD1* (D) and *Leptin* (E) in adipocytes and SVCs of epididymal VAT from mice fed on short-term of normal or high-fat diet (GSE65557). **F** The expression of *CyclinD1* in SAT and omental VAT from obese patients (GSE20950).

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**Figure S5.** **Contribution of CD90 overexpression to AKT activation in ADSCs. A** CD90-Flag (Genechem) were overexpressed on ADSCs from human omental adipose tissue by lentiviral infection, protein levels of CD90-Flag, p-AKT, AKT and CyclinD1 were detected by western blot.Anti-Flag Ab was used to detect the expression of CD90-Flag. **B** ADSCs overexpressing CD90-Flag were incubated with MK2206 (2μM) for 16 h, protein levels of CD90-Flag, p-AKT, AKT and CyclinD1 were detected by western blot.

