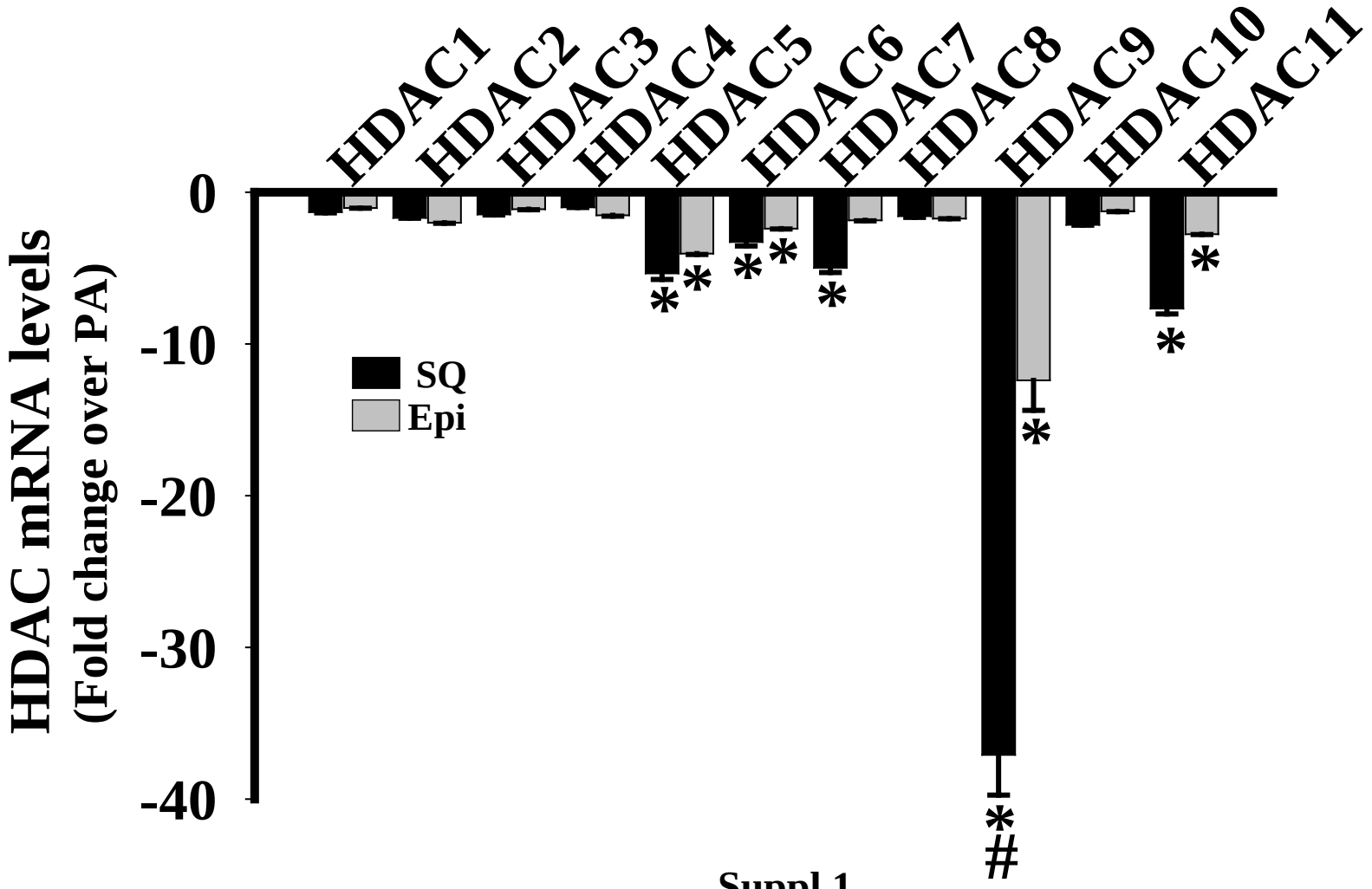
Suppl Fig.1: **Adipogenic differentiation of mouse subcutaneous (SQ), epididymal (Epi), and 3T3-L1 preadipocytes triggers HDAC9 down-regulation**. *A, In vitro* adipogenic differentiation of freshly isolated preadipocytes from mouse SQ and Epi adipose tissues for 7 days promotes marked down-regulation of HDAC9 mRNA, as determined by sybergreen qRT-PCR. Values are expressed as fold changes from HDAC mRNA levels in undifferentiated preadipocytes and normalized with mouse RPLP0. Data are mean ± SEM from three different groups of mice. Fold decrease in HDAC9 mRNA following adipogenic differentiation is higher in SQ compared to Epi. * $p< 0.001$ compared to values with preadipocytes. Also, fold decrease in HDAC9 mRNA levels following adipogenic differentiation is significantly higher (# $p< 0.001$) in SQ compare to Epi. *B*, HDAC9 down-regulation is also observed during adipogenic differentiation (7 days) of 3T3-L1 model adipogenic cell line. Data are mean ± SEM of three independent experiments.

Supple Fig.2: **Short chain fatty acid HDAC inhibitor butyrate and valproic acid differentially influence adipogenic differentiation**. Presence of butyrate (1 mM) during adipogenic differentiation (14 days) of human SQ preadipocytes does not influence while valproic acid (1 mM) markedly inhibits cytoplasmic lipid droplets accumulation, as determined by microscopic visualization of live cells. Control cells received vehicle only.

Supple Fig.3: **HDAC9:USF1 complex accumulates in the preadipocytes**. *A*, Co-immunoprecipitation of USF1 with HDAC9 from the lysates of undifferentiated (PA) and 3-day differentiated (AD) 3T3-L1 cells shows increased USF1 precipitation by HDAC9 from the lysates of undifferentiated 3T3-L1 cells. Adipogenic differentiation does not change the levels of USF1 (*B*) while the levels of HDAC9 shows marked down-regulation (*C*).

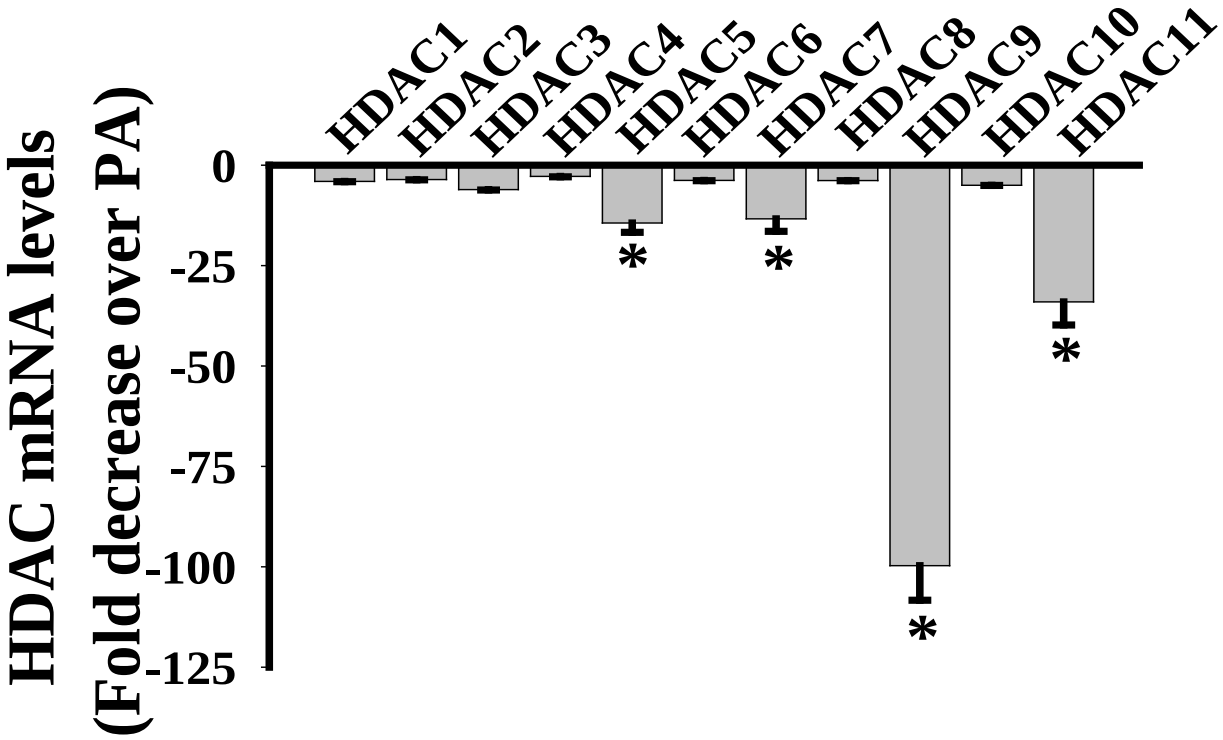
Supple Fig.4: **USF1 and USF2 levels and USF1 binding to E-box site of the C/EBPα gene promoter do not change during adipogenic differentiation of human SQ preadipocytes.** *A*, Levels of USF1 and USF2 mRNAs show no significant difference between preadipocytes and 7-day *in vitro* differentiated adipocytes from human SQ adipose tissue, as determined by sybergreen QPCR. Data are normalized with RPLPO and expressed as mean ± SEM from three separate donors setting preadipocytes values as 100. *B*, Western blot analysis show that USF1 and USF2 protein levels do not differ between preadipocytes and 7-day *in vitro* differentiated adipocytes from human SQ adipose tissue. Data are representative of three separate donors. *C*, ChIP analysis demonstrates no significant difference in USF1 binding to E-box site of C/EBPα gene promoter in preadipocytes vs. 7-day *in vitro* differentiated adipocytes from human SQ adipose tissue. Data are mean ± SEM from three separate donors done in duplicate.

Supplementary Fig. 1A



Suppl 1

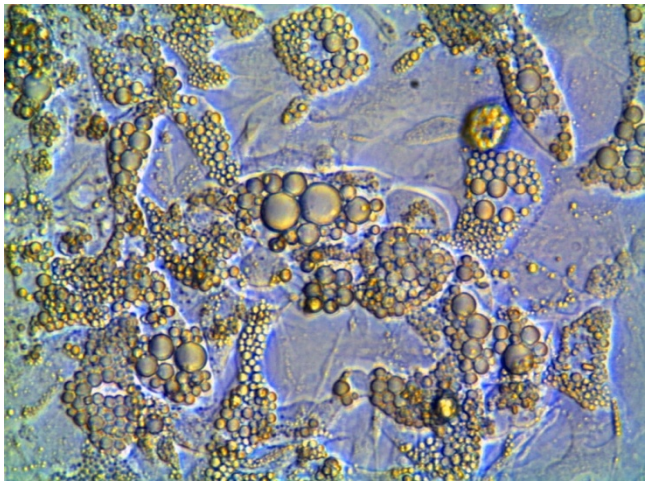
Supplementary Fig. 1B



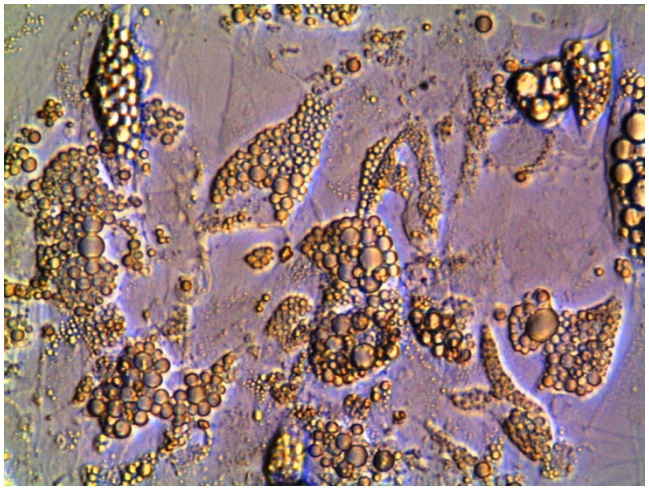
Suppl 2

Supplementary Fig. 2

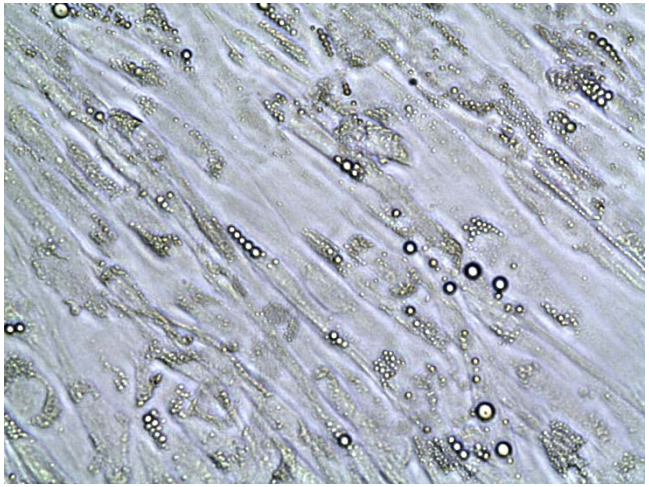
Control



Butyrate

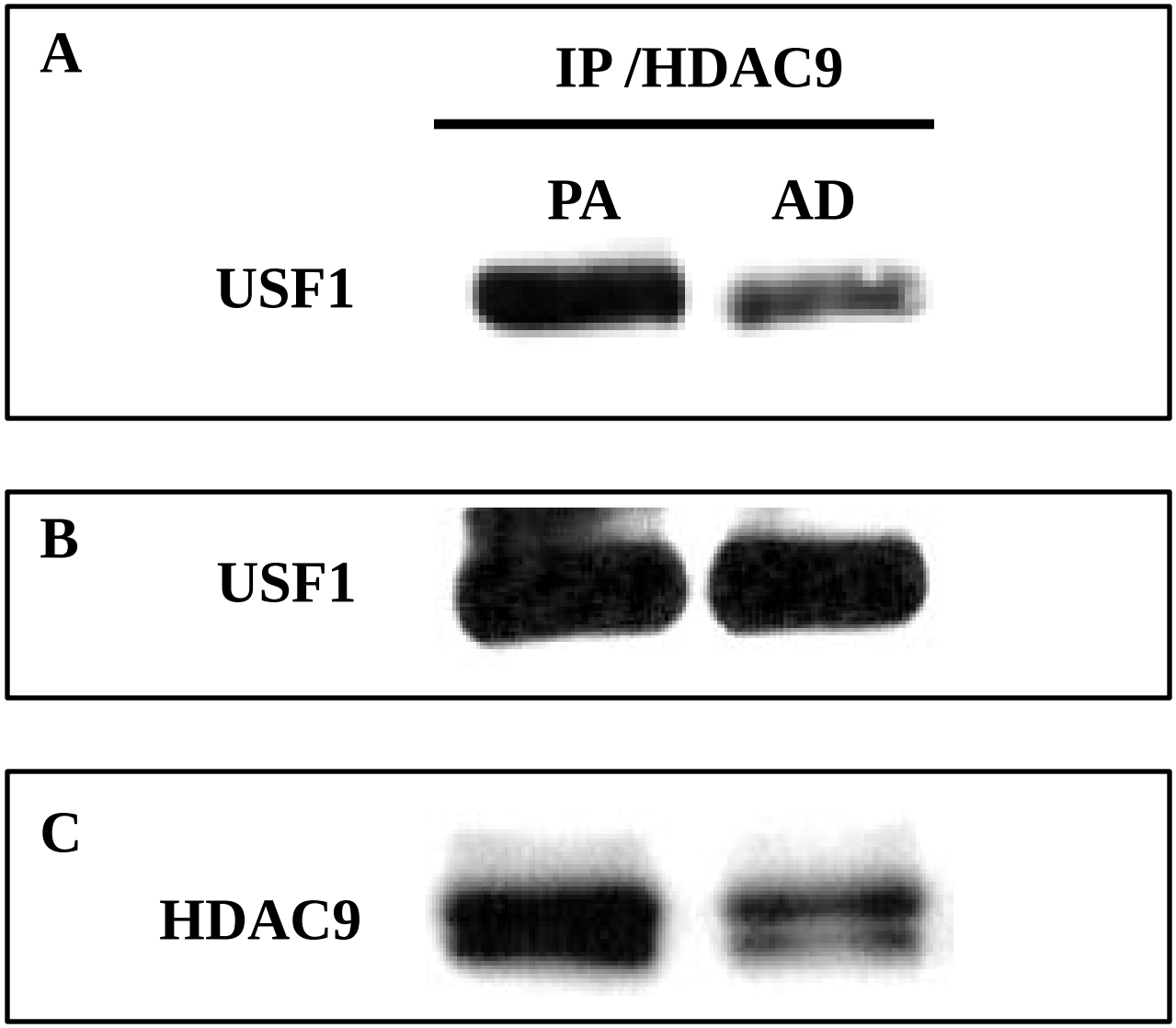


Valproic acid



Suppl 3

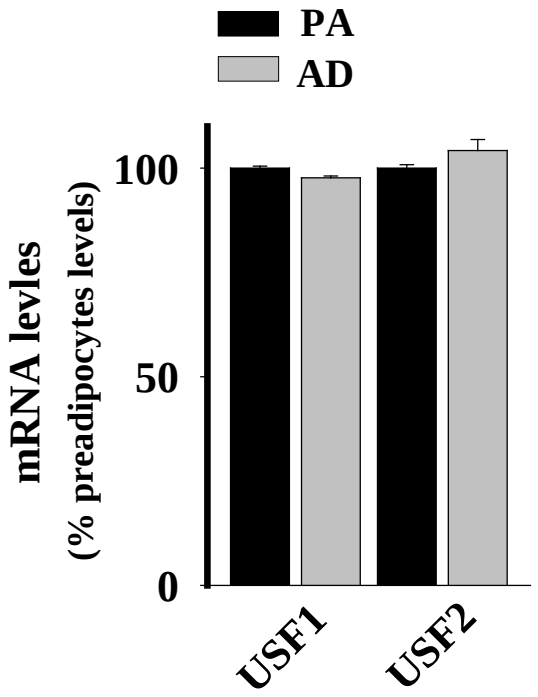
Supplementary Figure 3



Suppl 4

Supplementary Fig. 4

A



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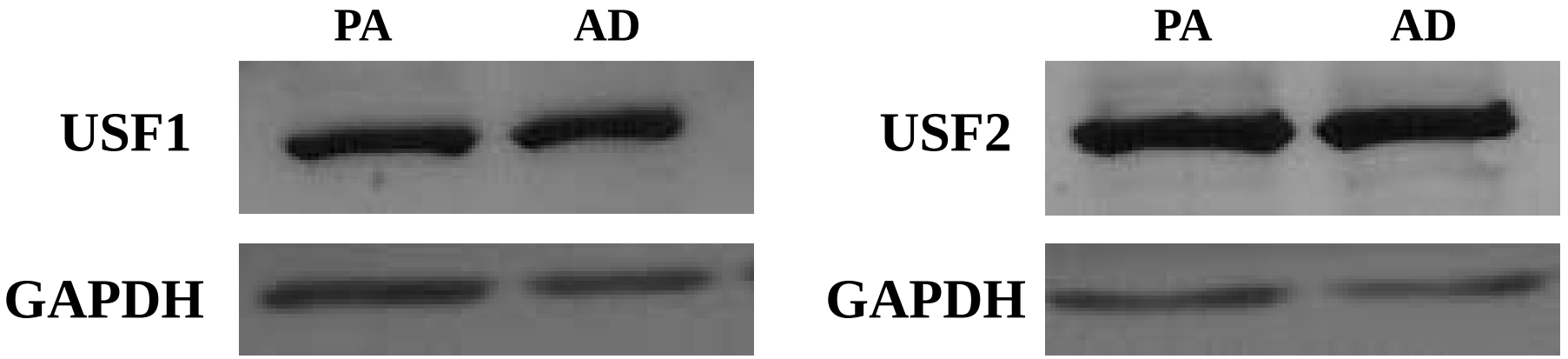
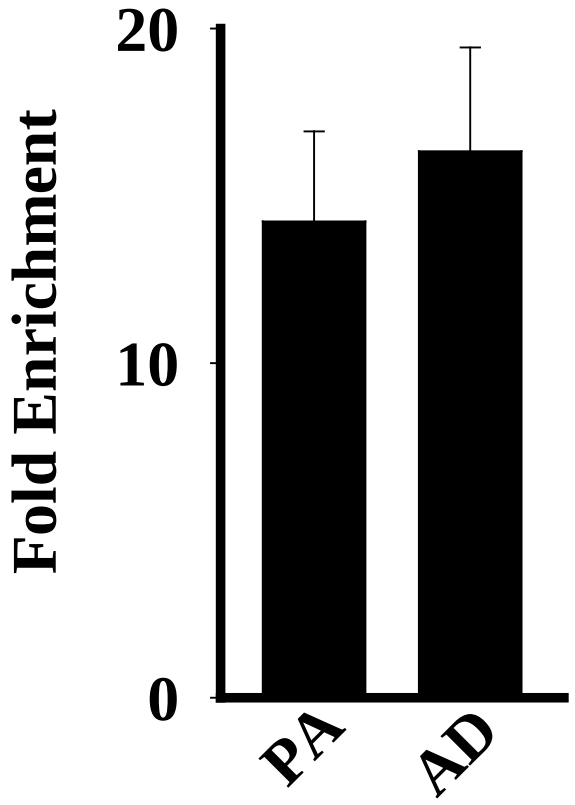


Suppl 5

C



Suppl 6