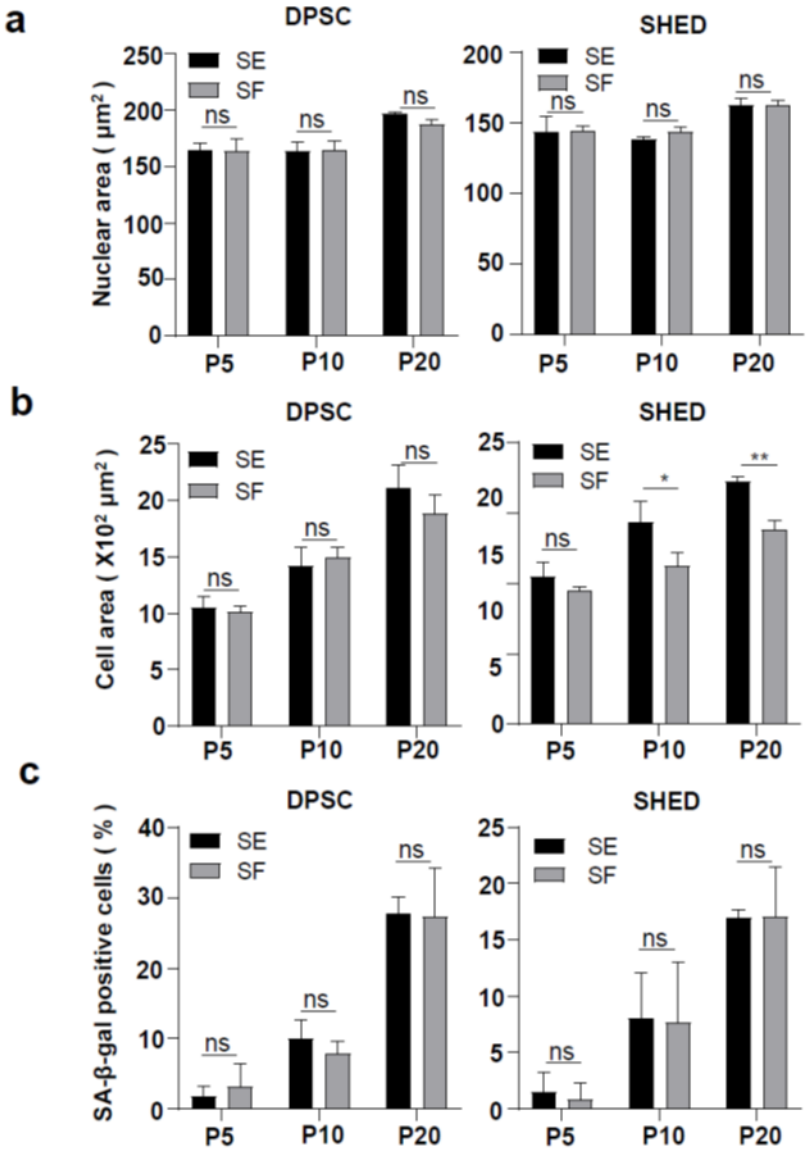


**Fig. S1** Characterization of the morphology of hMSC-DP under SF culture conditions. **a-b** Cell morphology analysis by high-content imaging. The nuclear area **(a)** and cell area **(b)** of DPSCs and SHED are shown in SE and SF culture conditions. n = 3 for each group. **c** Cellular senescence assay. The percentage of SA-β-gal positive cells was calculated and compared between SE and SF culture conditions. n = 3 ~ 5 for each group. SE, serum; SF, serum-free. Data shown as mean ± SEM. ns, not significant.

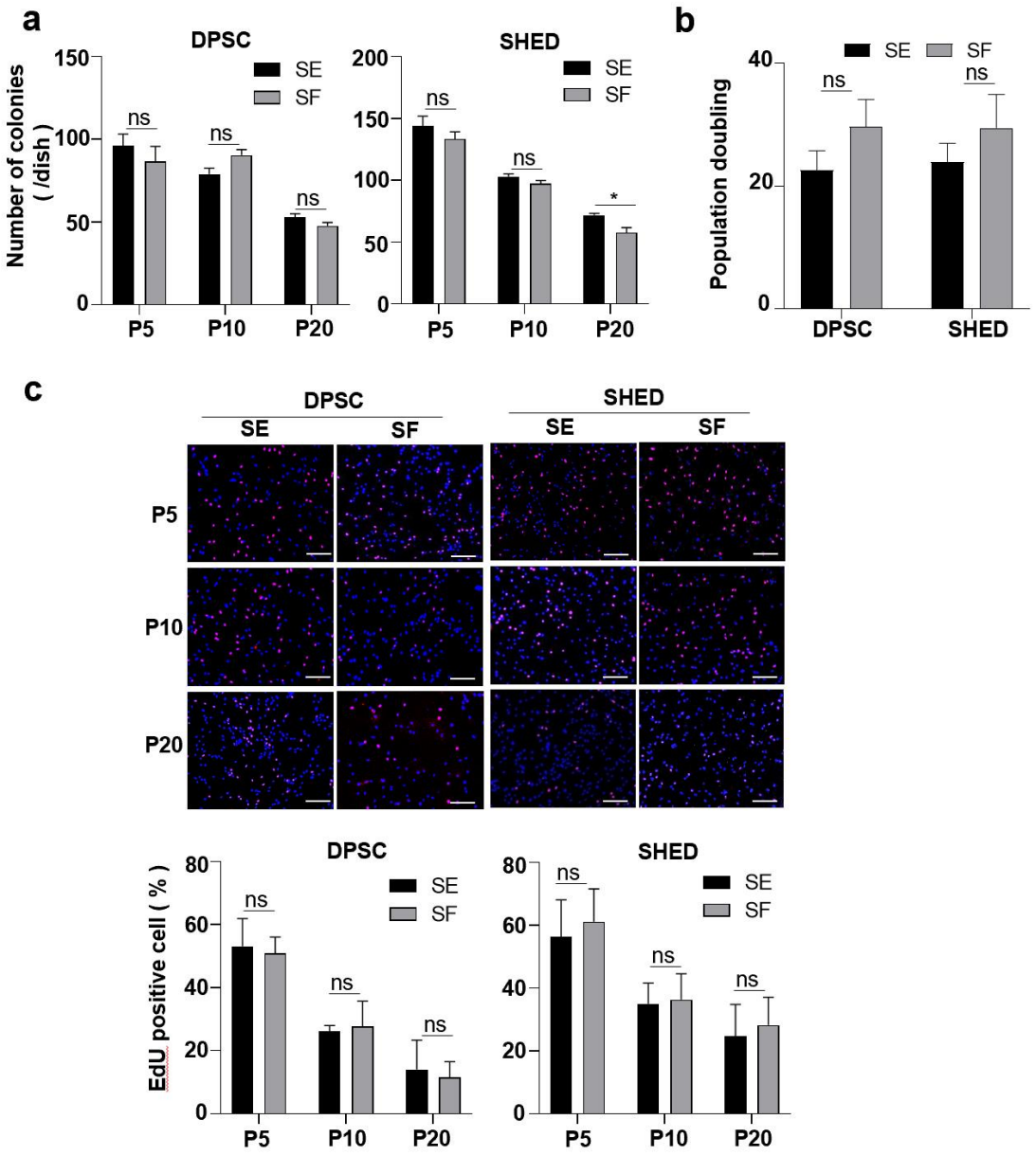


**Fig. S2** Proliferation capacity of hMSC-DP under SF culture conditions. **a** CFU-F assay. The numbers of colonies of hMSC-DP under SE or SF culture conditions were calculated and compared. n = 3 for each group. **b** Population doubling scores were calculated and compared between SE and SF culture conditions in DPSC and SHED groups, independently. n = 3 for each group. **c** EdU assay. The percentage of EdU-positive cells were calculated and compared between SE and SF culture conditions in DPSC and SHED groups,

independently. n = 3 for each group. Scale bar = 200 μm. SE, serum; SF, serum-free. Data shown as mean ± SEM. *$p < 0.05$. ns, not significant.

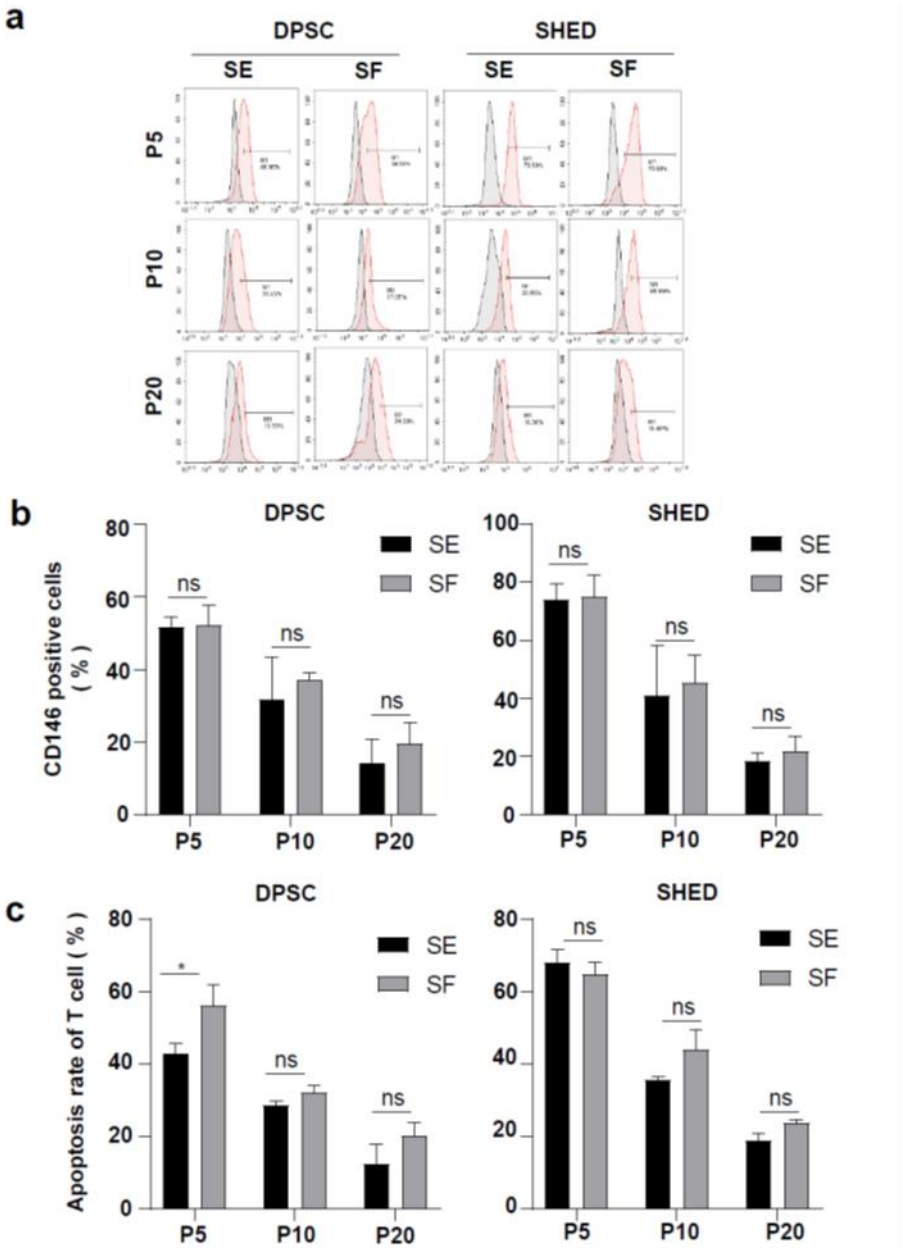


**Fig. S3** Surface phenotypic profiles and *in vitro* immunoregulation ability of hMSC-DP. **a-b** Flow cytometry showed the percentage of CD146-positive hMSC-DP under SE or SF culture conditions at P5, P10 and P20 **(a)**. The percentage of CD146-positive cells was compared between SE and SF culture conditions **(b)**. n = 3 for each group. **c** The percentage of apoptotic T cells was calculated in SE and SF culture conditions. n = 3 for each group. SE, serum; SF, serum-free. Data shown as mean ± SEM. *$p < 0.05$. ns, not significant.

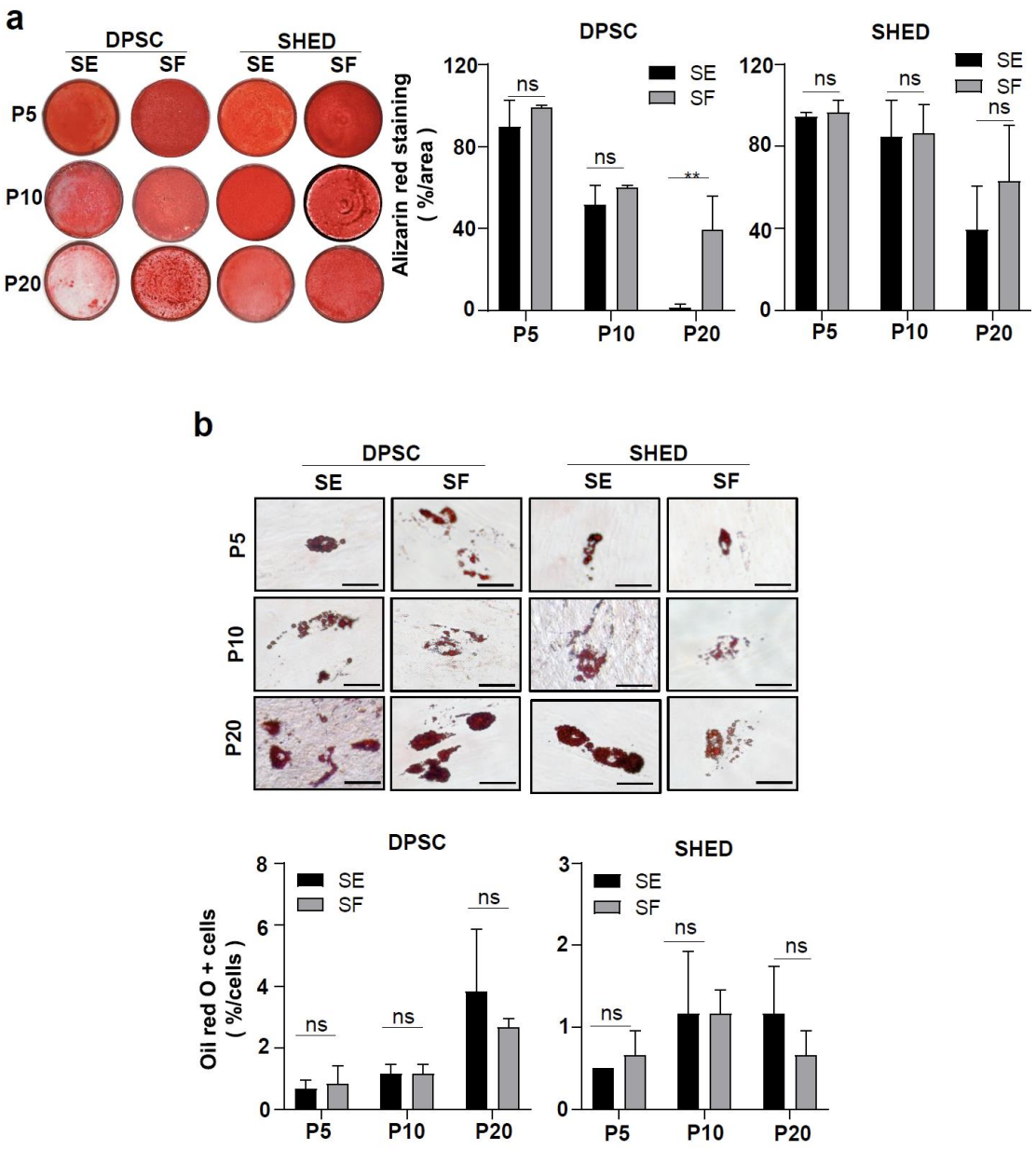


**Fig. S4** Multilineage differentiation of hMSC-DP. **a** Alizarin red staining assay. The osteogenic capacity was compared between SE and SF culture conditions at P5, P10 and P20. n = 3 for each group. **b** Oil red O staining assay. The adipogenic capacity of hMSC-DP was compared between SE and SF culture conditions at P5, P10 and P20. n = 3 for each group. Scale bar = 50 μm. SE, serum; SF, serum-free. Data shown as mean ± SEM. $^{**}p < 0.01$. ns, not significant.

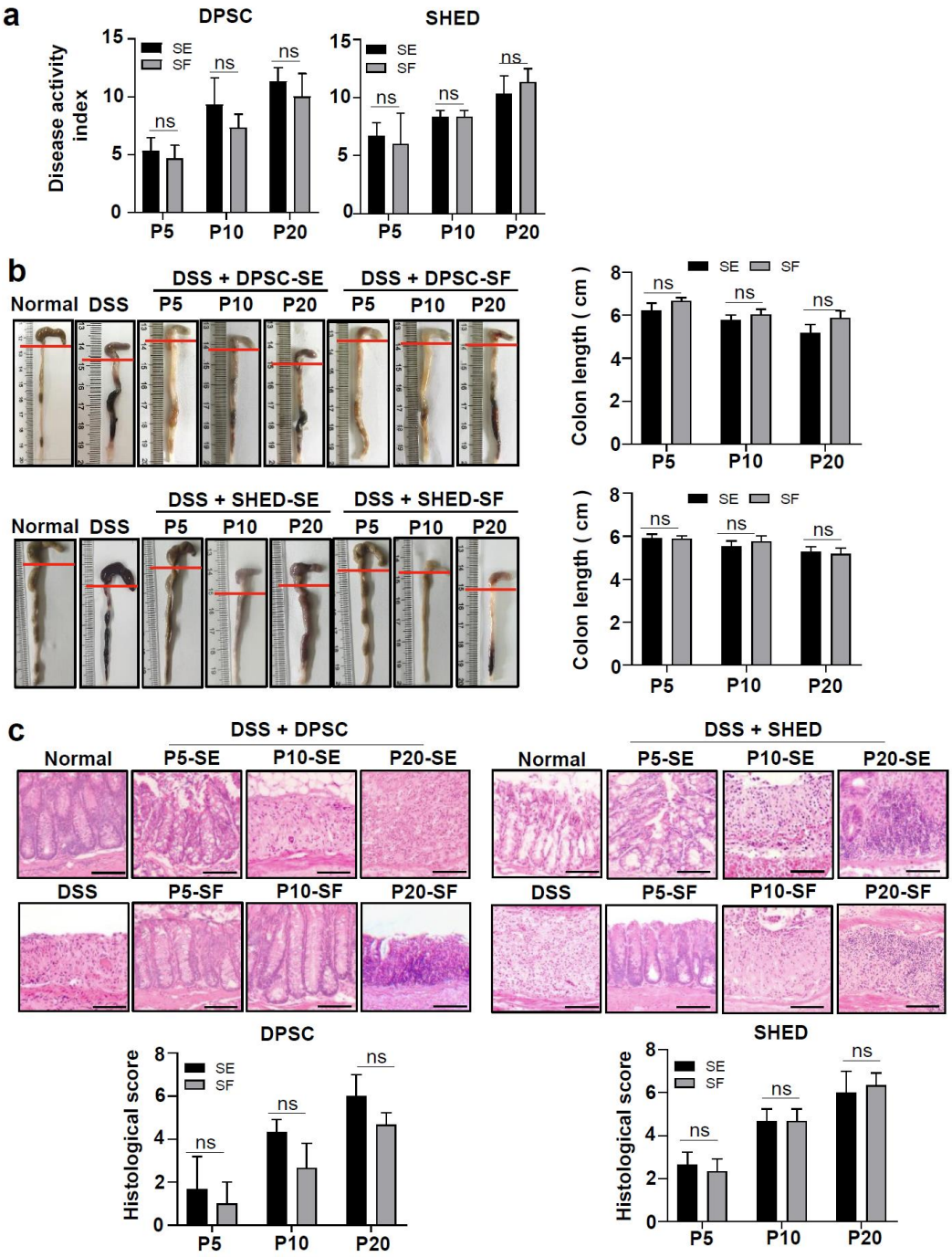


**Fig. S5** Therapeutic effects of hMSC-DP on experimental colitis. **a** Disease activity index (DAI) of DPSC- and SHED-treated groups was compared between SE and SF culture conditions at P5, P10 and P20. n = 3 for each group. **b** The colon length after DPSC and SHED treatment was compared between SE and SF culture conditions at P5, P10 and P20. n = 3 for each group. **c**

Histological structure was examined by H&E staining. The histological score of each group was compared between SE and SF culture conditions. n = 3 for each group. Scale bar = 100 μm. SE, serum; SF, serum-free. T Data shown as mean ± SEM. ns, not significant.

**a**

| R square / hMSC-DP / items | DPSC | SHED |
|---|---|---|
| CFU-F clones | 0.8162 | 0.9416 |
| EdU positive cells ( % ) | 0.9429 | 0.8791 |
| SA-β-gal positive cells ( % ) | 0.9338 | 0.9237 |
| Alizarin red staining ( %/area ) | 0.9365 | 0.7800 |
| Apoptosis rate of T cell ( % ) | 0.9231 | 0.9888 |
| DAI scores of DSS-induced colitis | 0.9645 | 0.7568 |
| HAI scores of DSS-induced colitis | 0.9447 | 0.9846 |
| Colon length ( cm ) | 0.7787 | 0.8851 |

**b**

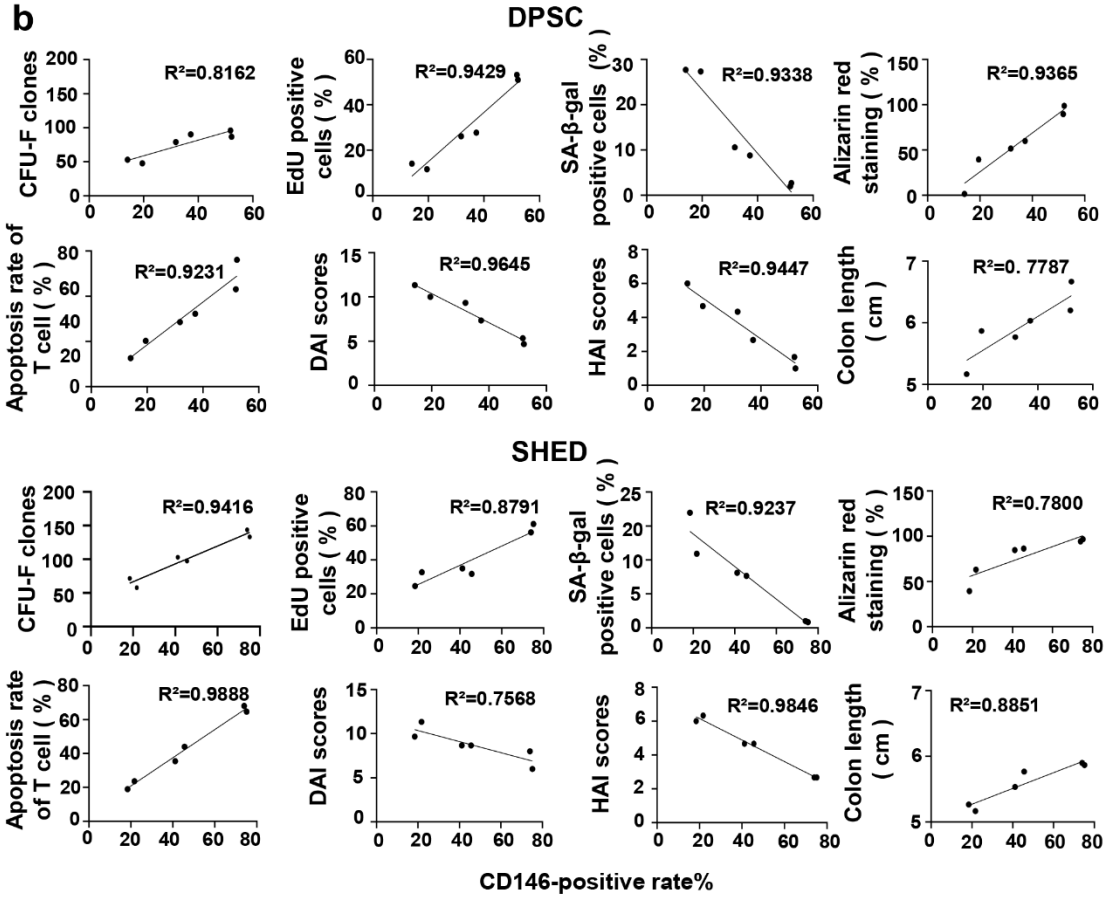


**Fig. S6** The expression level of CD146 is associated with hMSC-DP properties. **a** The correlation of CD146 with experimental parameters. **b** Linear regression plots showed the correlation between CD146 expression and experimental parameters including CFU-F clones, percentage of EdU positive cells, percentage of Alizarin red positive area, percentage of SA-β-gal positive cells, DAI scores, HAI scores and colon length.