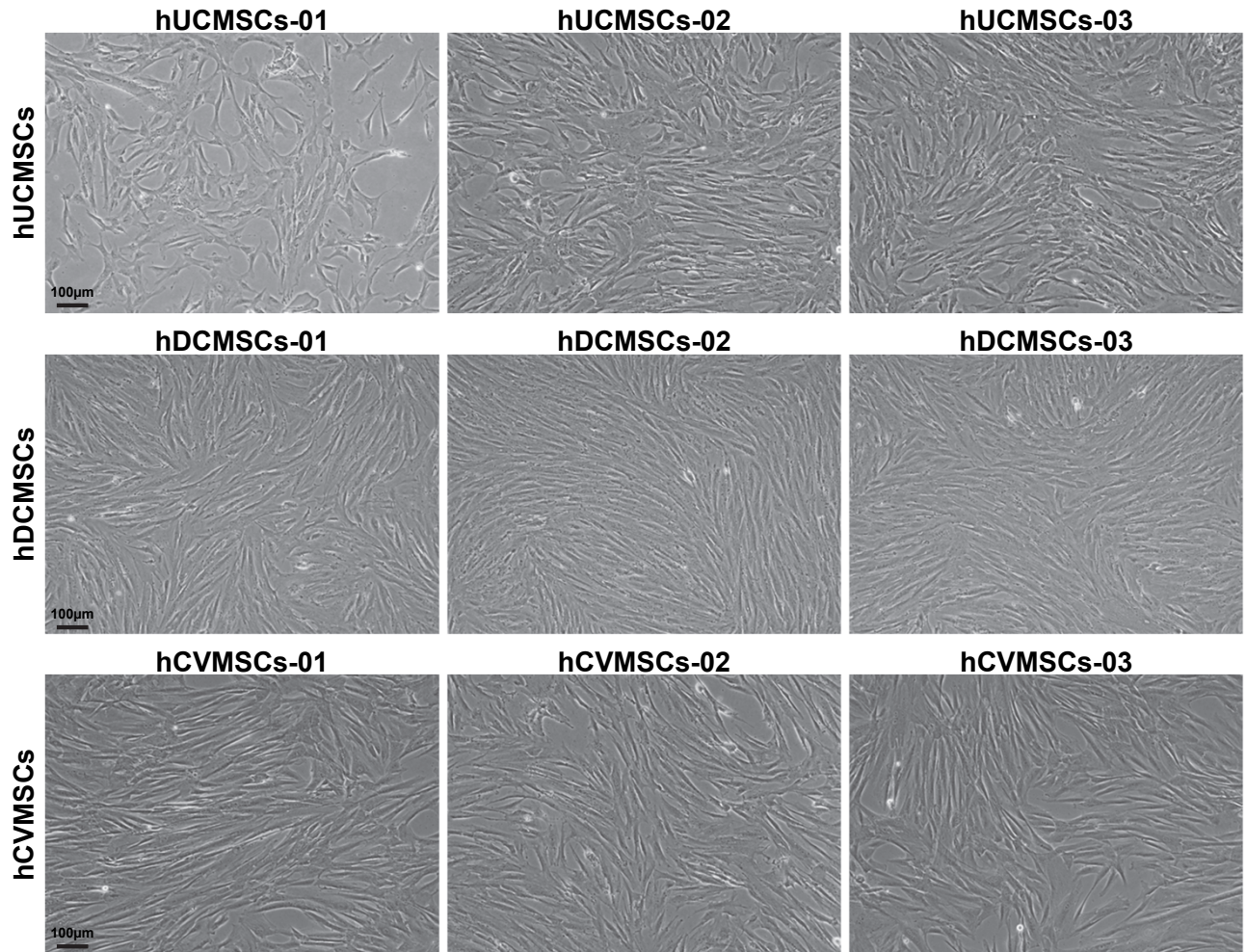
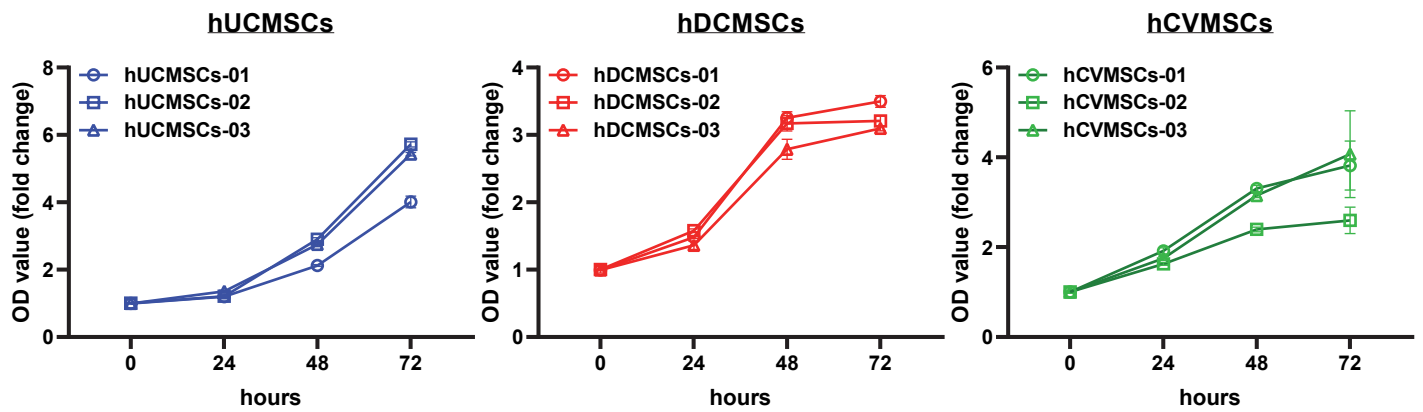
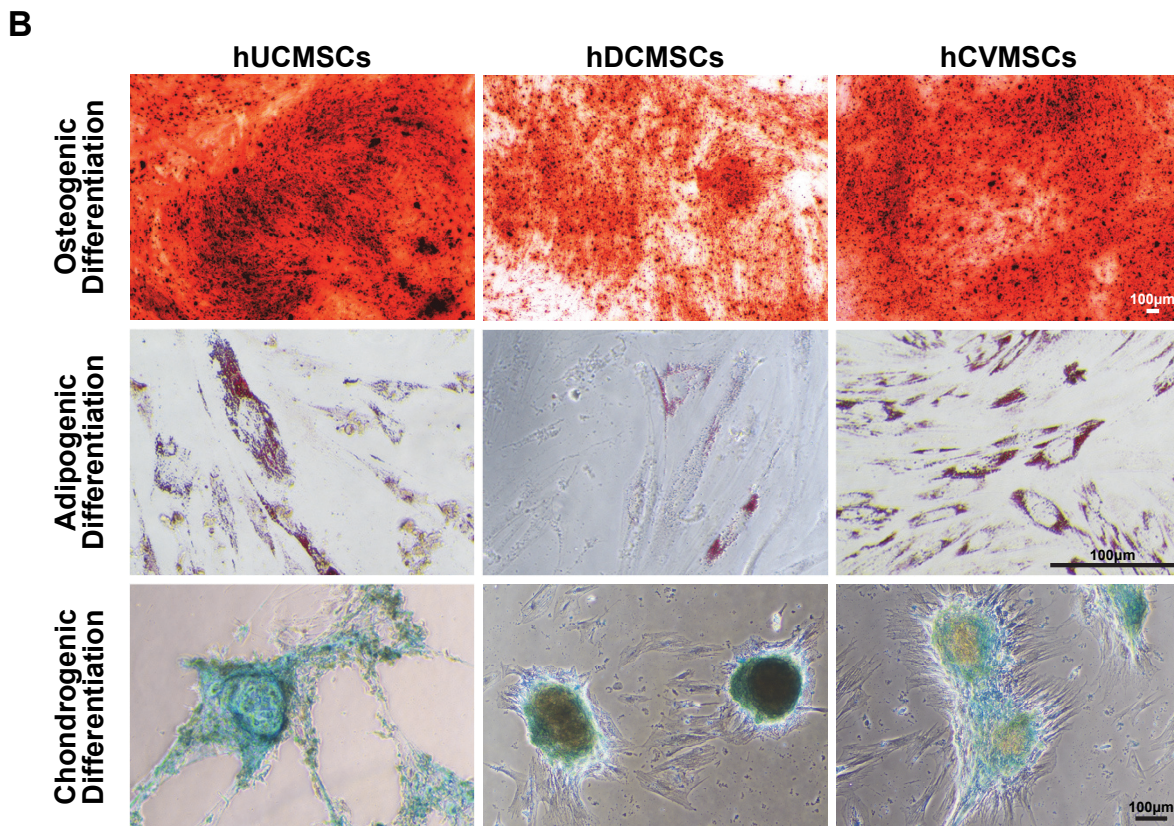
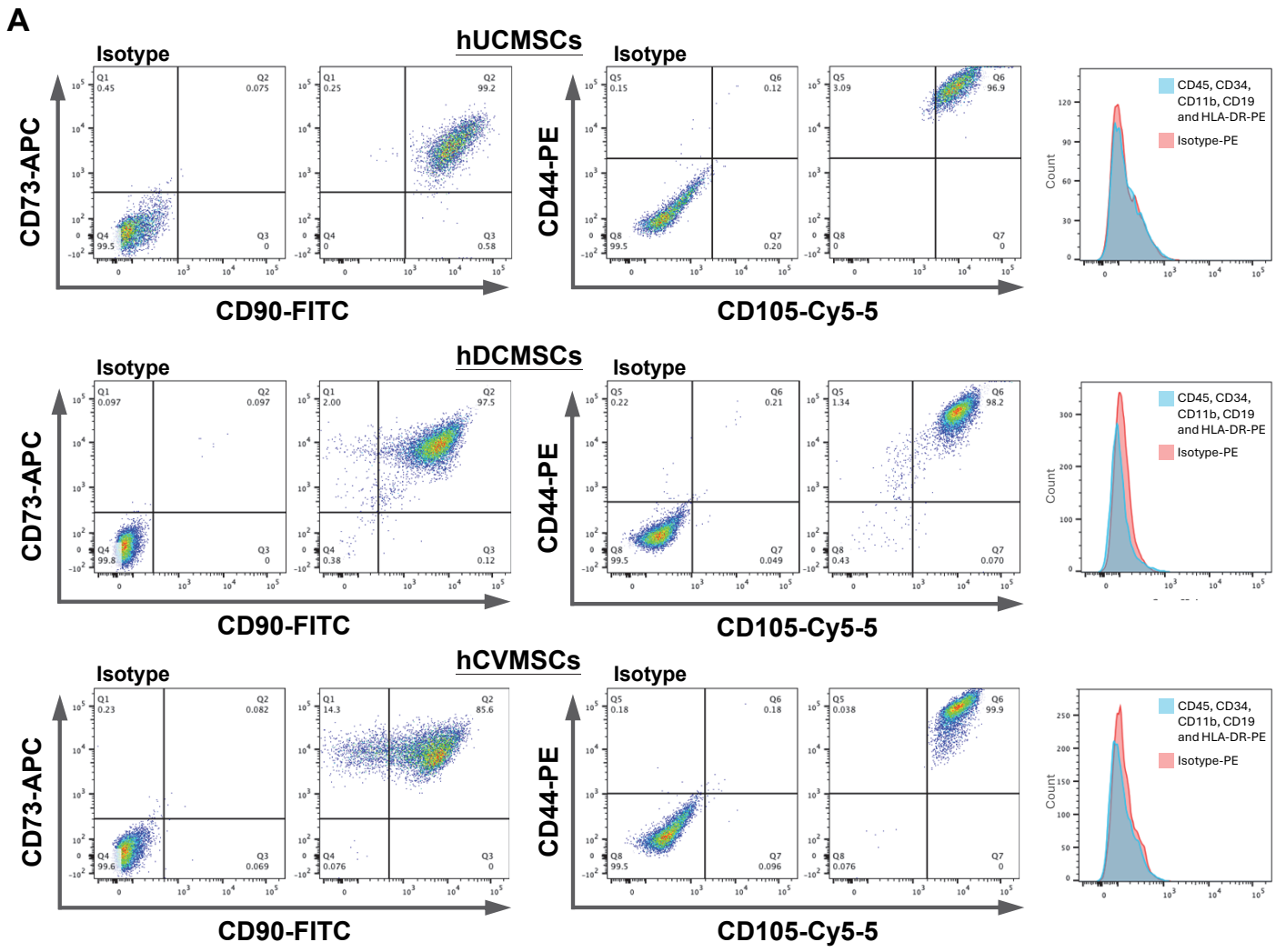
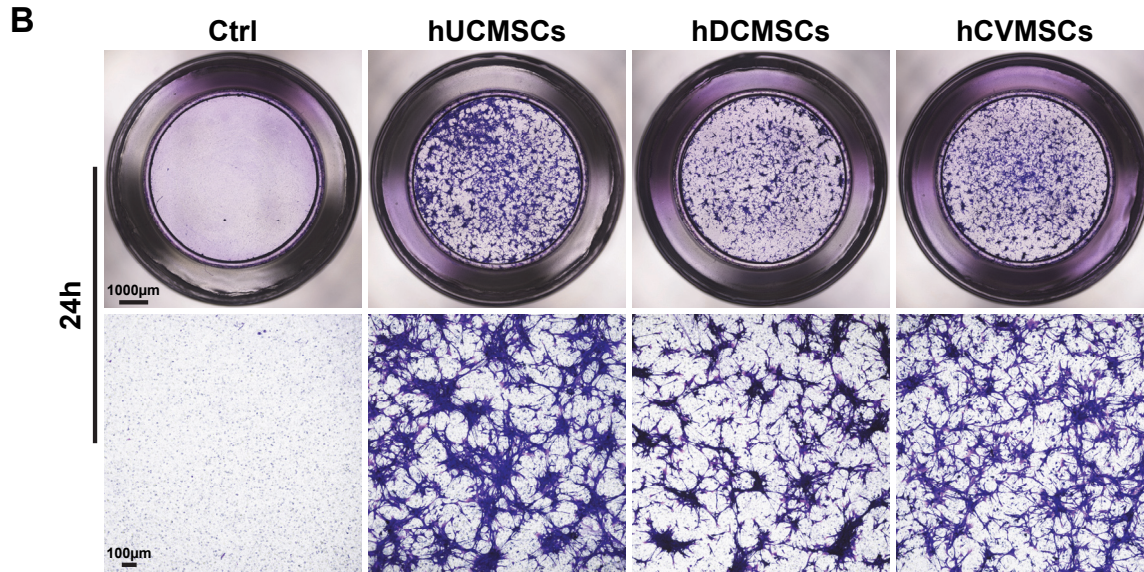
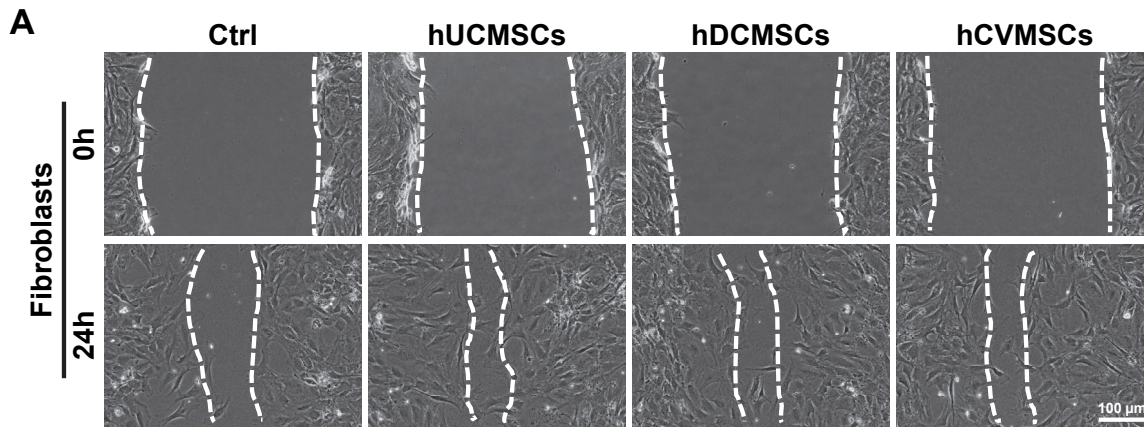


**A****B**

**Figure S1. Morphology of perinatal MSCs.** **A)** Phase-contrast images of hUCMSCs, hDCMSCs and hCVMSCs derived from 3 donors (scale bar: 100  $\mu\text{m}$ ); **B)** Cell proliferation of perinatal MSCs was assessed by MTT assay. Experiments were repeated at least three times.

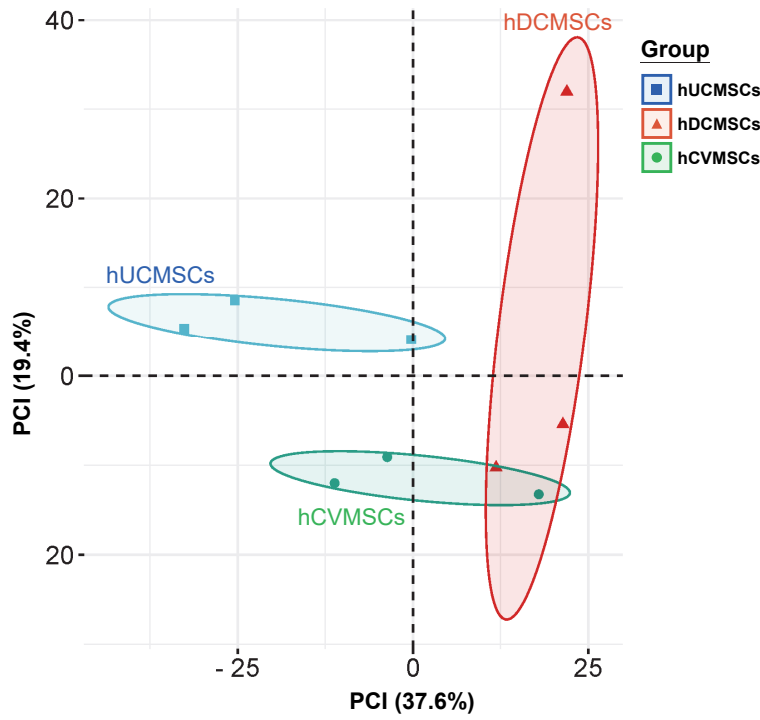


**Figure S2. Characterization of perinatal MSCs.** **A)** Flow cytometry analysis of perinatal MSCs using positive markers, CD90, CD105, CD44 and CD73 and negative markers, CD34, CD11, CD19, CD45 and HLA-DR; **B)** Perinatal MSCs could undergo osteogenic, adipogenic and chondrogenic differentiation (scale bar = 100  $\mu$ m) as demonstrated by Alizarin red, Oil red O, and Alcian blue staining. Experiments were repeated at least three times.



**Figure S3. The secretome derived from perinatal MSCs promotes MEF migration and hBMMSC recruitment *in vitro*.** **A)** Images from the wound scratch healing assay for mouse embryonic fibroblasts (MEF) treated with different secretome, scale bar = 100  $\mu\text{m}$ . Quantification of MEF migration is shown on the right. Experiments were repeated at least three times; **B)** Transwell migration assay was used to analyze the recruitment of hBMMSCs by the secretome derived from perinatal MSCs. Scale bar =1000  $\mu\text{m}$  and 100  $\mu\text{m}$ . Quantification of DMSO-dissolved crystal violet at OD (490 nm) is shown on the right. Experiments were repeated at least three times. All data are presented as mean  $\pm$  SD. \*, \*\*, \*\*\*, and \*\*\*\* represent  $p < 0.05$ , 0.01, 0.001 and 0.0001, respectively, by Tukey's *post-hoc* test when statistical significance by One-way ANOVA ( $p < 0.05$ ) is obtained.

A

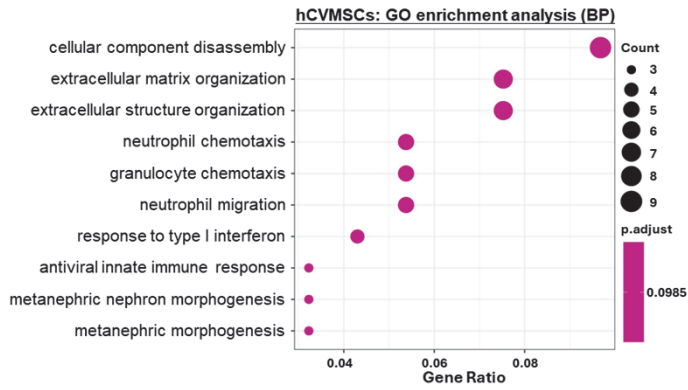
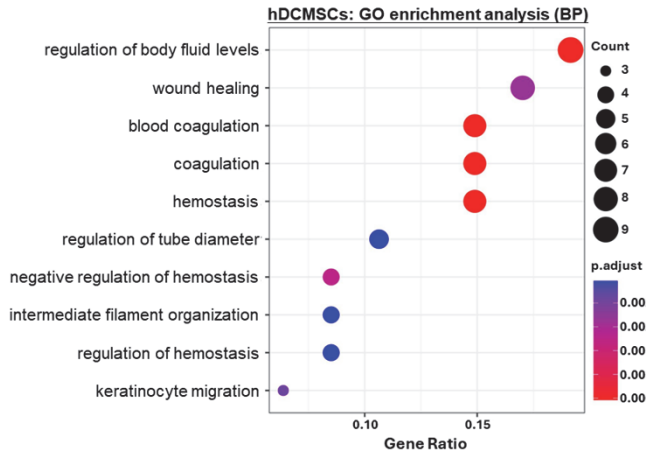
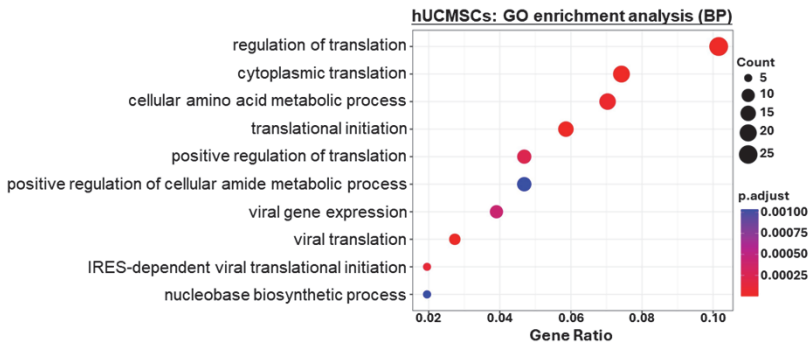


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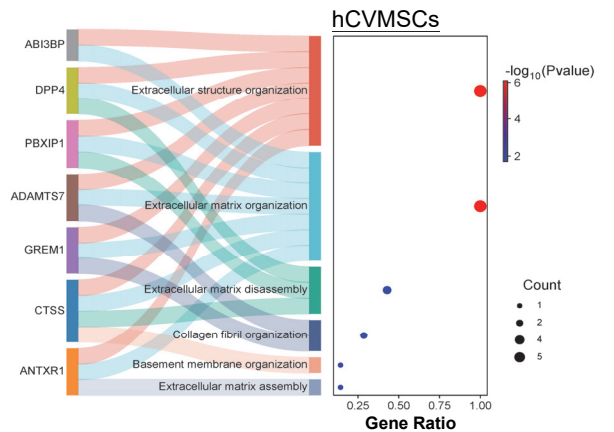
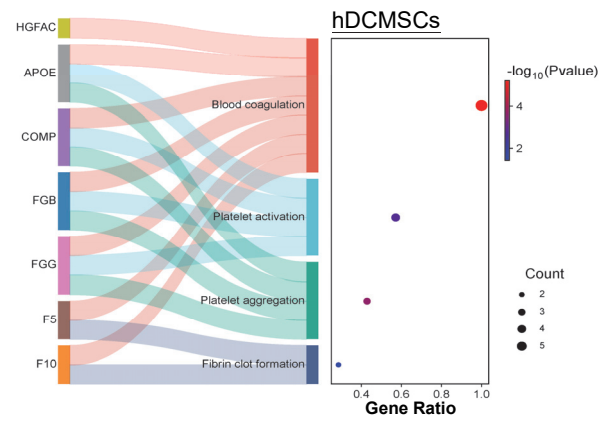
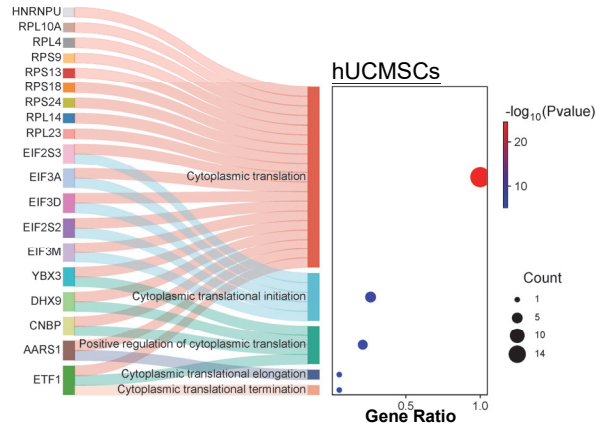
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MAP1B	DARS1	GET3	MATR3	ANP32E	DSC3	COMP	STAT1	RPL8	CDH6	SPTBN1	PGLS	CCT2	NUCKS1	HMG2	DYNC1I2	THBS3
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ELAVL1	C2CD2L	PPP2R1A	ENAH	PPP3CA	SRSF7	CD86			DSTN	GARS1	RPS4X	GLRX	SCMH1			

**Figure S4. Comparative analysis of secretome profiles of perinatal MSCs.** **A)** Principal component analysis (PCA) of the proteome profiles across all placental MSC samples. The PCA score plots showed the separation of the three MSC types (hUCMSCs, hDCMSCs, and hCVMSCs) based on the first two principal components; **B)** The list of uniquely expressed secretory proteins from each MSC group and common proteins shared by two types of MSCs.

**A**

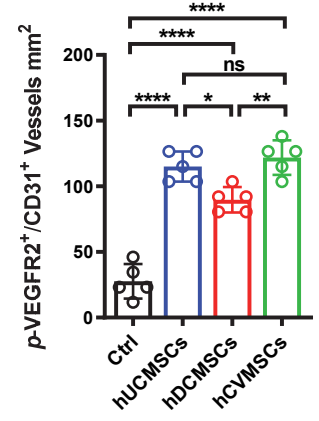
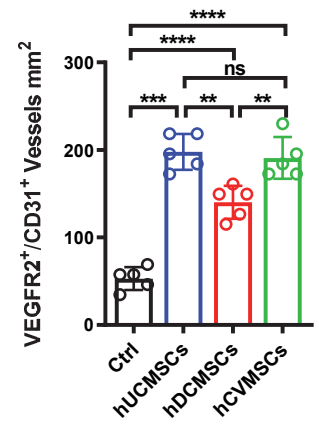
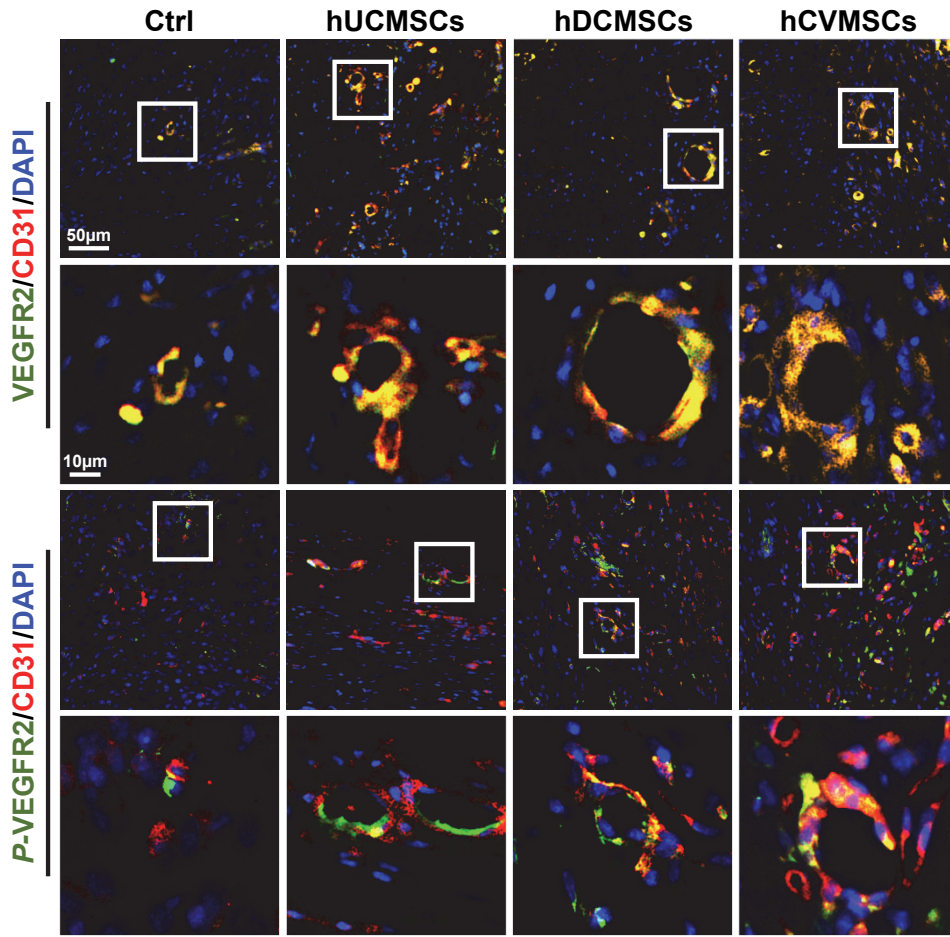


**B**

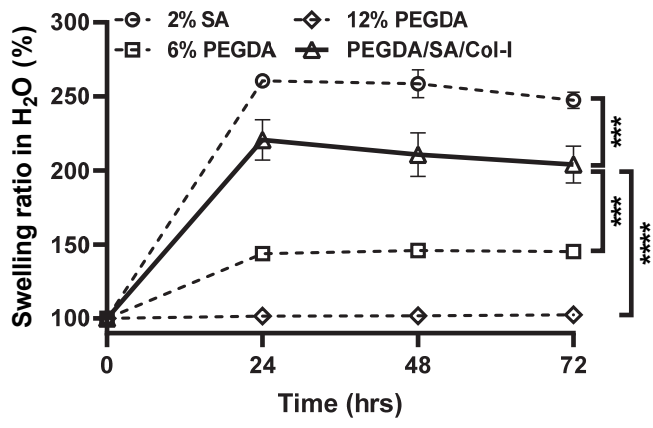
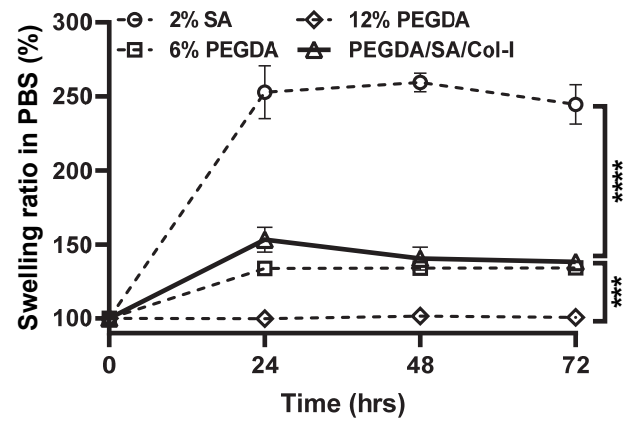


**Figure S5. Analysis of secretome profiles.** **A)** GO analysis of biological processes for the individually expressed proteins in hUCMSCs, hCVMSCs and hDCMSCs; **B)** Sankey dot plot of regulation of translation (hUCMSCs), blood coagulation (hDMSCs) and extracellular matrix organization (hCVMSCs).

A

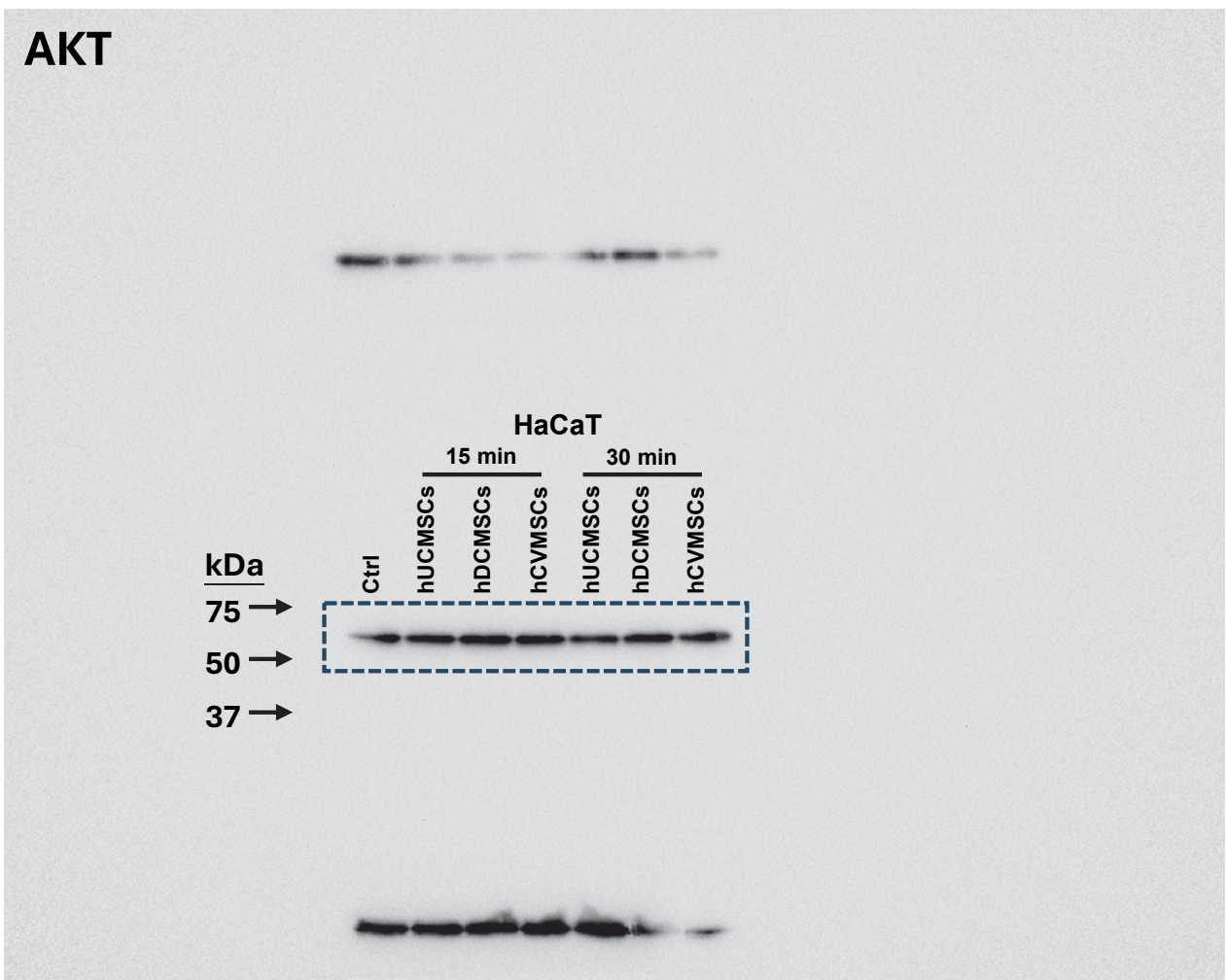
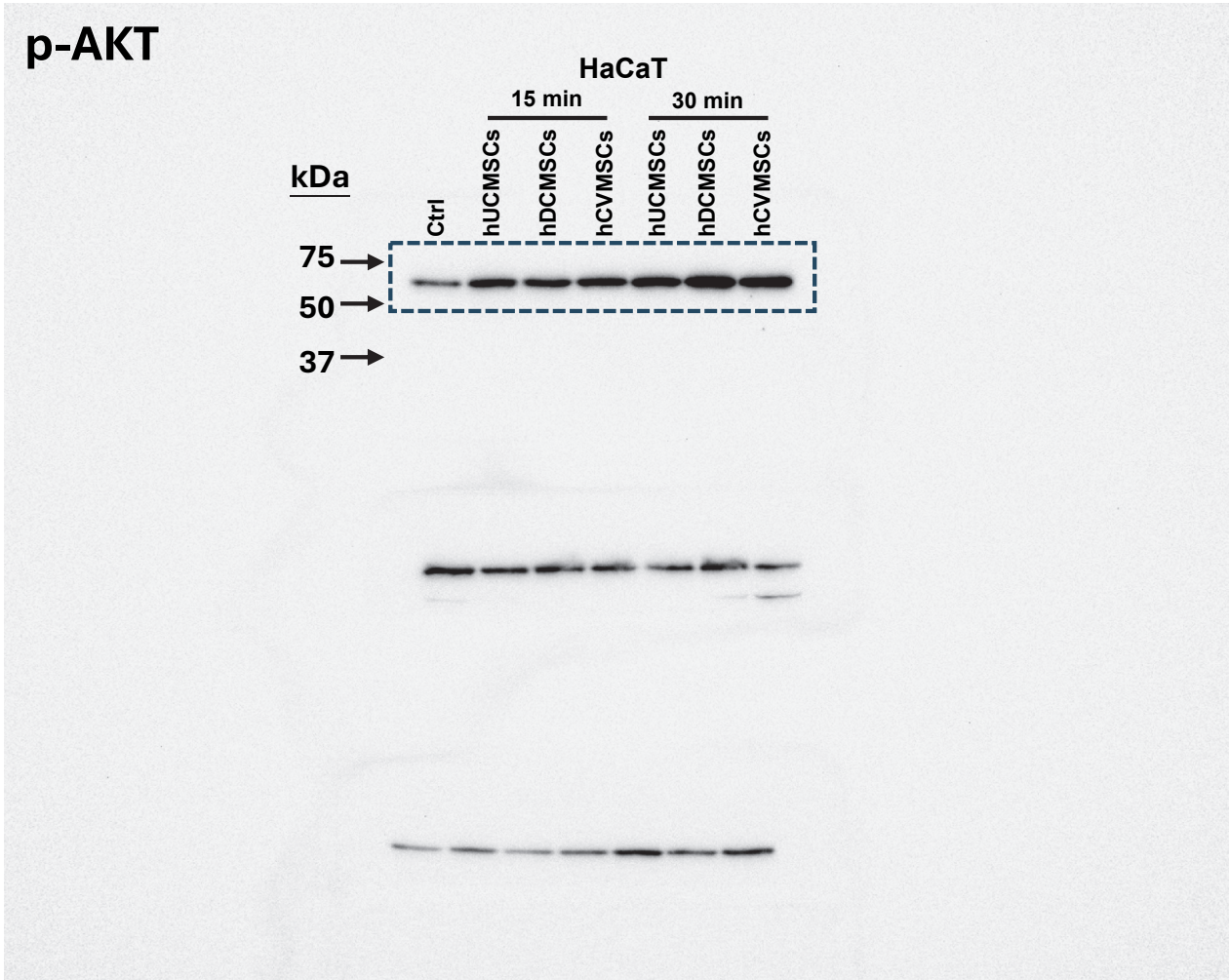


**Figure S6. Human perinatal MSCs promote VEGFR signaling in endothelial cells.** Representative immunofluorescence (IF) images of VEGFR2, p-VEGFR2 and CD31 staining in wounds on day 10 for each group. Quantification of double positive cells per unit area is shown on the right. All data are presented as mean  $\pm$  SD, n = 5 for all groups. Scale bar = 50  $\mu$ m and 10  $\mu$ m. \*, \*\*, \*\*\* and \*\*\*\* represent  $p < 0.05$ , 0.01, 0.001, and 0.0001, respectively, by Tukey's *post-hoc* test when statistical significance by One-way ANOVA ( $p < 0.05$ ) is obtained.

**A****B**

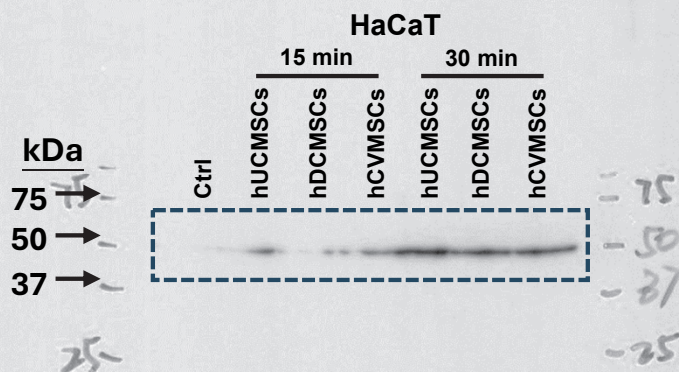
**Figure S7. Assessment of swelling properties of various hydrogels in H<sub>2</sub>O and PBS.** The swelling ratio of different hydrogels were determined for 72 hours in H<sub>2</sub>O and PBS. Experiments were repeated at least three times. All data are presented as mean  $\pm$  SD. \*\*\*, and \*\*\*\* represent  $p < 0.001$  and 0.0001, respectively, by Tukey's *post-hoc* test when statistical significance by One-way ANOVA ( $p < 0.05$ ) is obtained.

# HaCaT

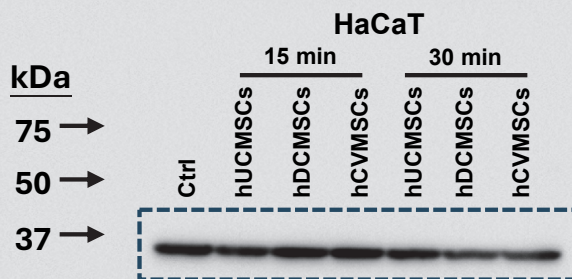


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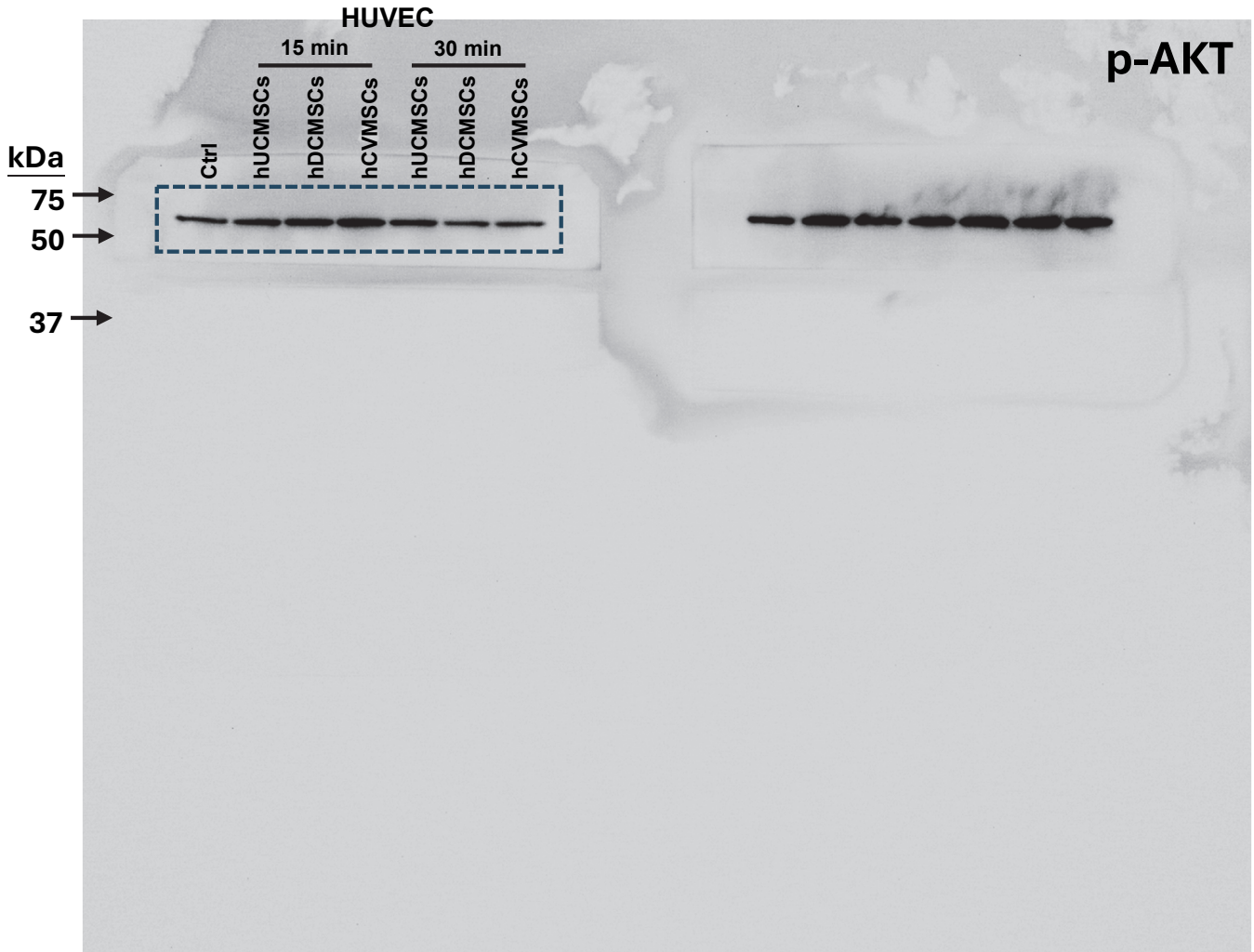
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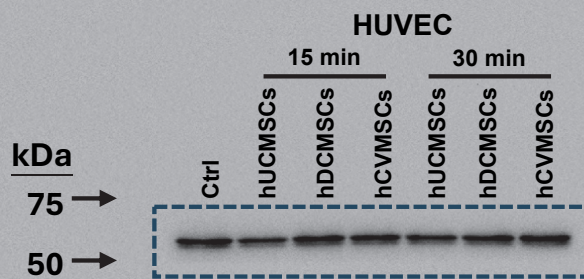
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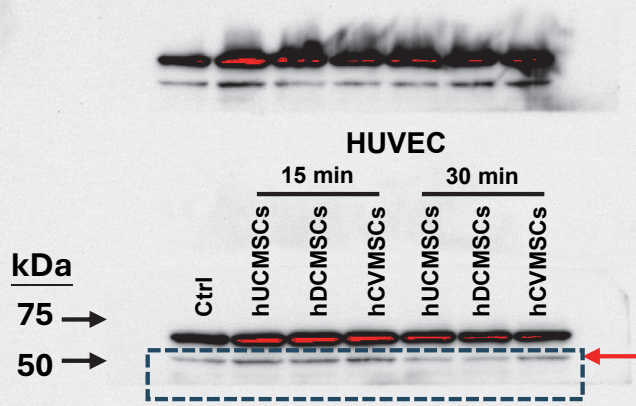


## AKT

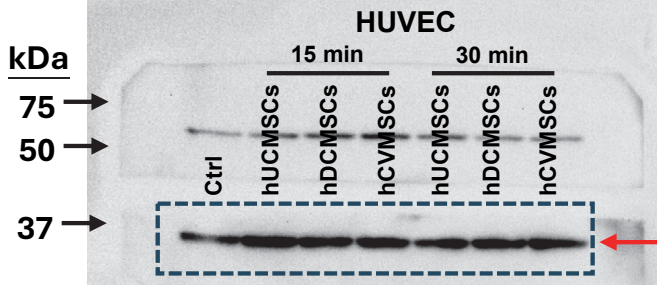


# HUVEC

## Cyclin D1



## GAPDH



**Figure S8. Full-length western blots for Figure 5.**