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High Glucose Reduces the Shear Stress-Induced CD59 Expression on EPCs through F-Actin Alteration

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Abstract: Objective: Endothelial progenitor cells (EPCs) play a vital role in postnatal vascular injury and repair, especially vasculogenesis and angiogenesis. The purpose of this study was to investigate the effect of laminar shear stress in attenuating the decreased-expression of complement regulatory protein CD59 and the mechanism of cytoskeleton F-actin. **Methods:** EPCs were isolated from human umbilical vein blood and planted on glass slides, which applied to the laminar shear stress force (12 dyne/cm^2) in a high glucose (20 mM) culture environment. The gene and protein expression of CD59 were detected by SYBGreen quantitative PCR and fluorescence activated cell sorter (FACS) respectively. The rearrangement of cytoskeleton F-actin was detected by FITC-phalloidin staining. **Results:** The elevated effect of shear stress on the expression of CD59 was significantly reduced in high glucose condition. Moreover, we found that F-actin was disorganized by high glucose, while rearrangement of cytoskeleton would be reversed by a moderate concentration of jasplakinolide (JAS) intervention. **Conclusion:** Our study indicated that high glucose inhibiting the rearrangement of EPCs cytoskeleton resulted the sensitivity of EPCs to laminar shear stress which should elevate the expression of complement regulatory protein CD59. As a result, EPCs was sensitive to membrane attack complex (MAC) -mediated cell autolysis.

Keywords: Endothelial progenitor cells, laminar shear stress, mechanosensors, complement regulatory protein.

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