Experimental review on the Substance P-enhanced endothelial permeability in human umbilical vein endothelial cells (HUVECS)

ABSTRACT

Inflammation is the immediate response to tissue damage or harmful stimuli. Though inconvenient, its role is significant and important as the protective and physiological response of our body. It directly sets the stage for tissue repair particularly increasing endothelial permeability which then contributes to the healing process. However, in some cases inflammation may progress out of control causing various inflammatory diseases. Neurogenic inflammation is a sub-set of inflammation and is characterized by an increase in neuronal chemical mediators such as Substance P (SP). In this study, we investigated the involvement of SP in enhancing endothelial permeability on HUVECs monolayer. Neurogenic inflammation was induced through the administration of SP (1 nM to 100 nM) on HUVECs monolayer inserts, and incubated with varying short (10, 20 and 30 minutes) and longer (6, 12 and 24 hours) time-points. FITC-Dextran were finally added to cell culture inserts for 5 minutes to let the fluorescence molecule pass through the gaps. Endothelial permeability is directly proportional with extravasation of FITC-Dextran, determined by fluorescence intensity reading. Based on our data, there were no significant differences between control group (non-treated cell) and the different concentrations of SP at different time-points. Our current findings suggest that SP was unable to increase the endothelial permeability on HUVECs monolayer inflammatory experimental model. Experiments that use this model to mimic vascular inflammation in laboratory settings may require further elucidation in the future.

Keyword: Substance P; Neuropeptide; Neurogenic inflammation; HUVECs; FITC-dextran; Endothelial permeability