

Comparison of 3-D caveolae structural change induced by VEGF or Angiopoietin: evaluation by HVEM

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Caveolae, which are 50- to 100-nm flask-shaped membrane invaginations, were first detected on the surface of endothelial and epithelial cells[1]. The functions of caveolae and caveolins in mammalian cells are beginning to be explored. There is growing evidence that caveolae may act as structurally and biochemically distinct plasma membrane compartments that localize and regulate transmembrane signaling events [2].

VEGF, which are well known as a potent vasculogenin and angiogenic growth factor[3], may induced increased permeability in venules or microvessels thus macromolecules are extravasated across these vessels. One of the receptor for the VEGF, VEGF receptor-2(VEGFR-2), is co-localized with caveolin-1 in the caveolae of endothelial cells [4, 5]. This finding suggests that the VEGFR-2 signaling machinery may be localized in the endothelial caveolae. VEGF may induced increased permeability in venules or microvessels thus macromolecules are extravasated across these vessels. These are mediated by three possible pathways : (1) cytoplasmic vesicles and vacuoles that span endothelial cytoplasm from the lumen to albumen, (2) trans-endothelial cell pores, and (3) fenestration [6, 7, 8].

Angiopoietin-1 (Ang1) and its receptor, Tie2, play critical roles in blood vessel formation. Ang1 triggers a variety of signaling events in endothelial cells leading to vasculogenic and angiogenic processes. Tie2 and phospholipase D (PLD) are also localized in the caveolae. Previously, we reported that caveolae may be the platform for Tie2/PLD association in endothelial cells and PLD is a new mediator of Ang1/Tie2-induced signaling pathway[9]. But little is known about the morphological changes of caveolae induced by the Ang1. We evaluated 3-dimensional morphologic characteristics of caveolae structure of human umbilical cord vein endothelial cell (HUVEC) and it's morphological

change induced by vasculogenic and angiogenic growth factor(VEGF, Ang 1).

Reference

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