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Carvacrol inhibits angiogenesis and endothelial dysfunction in human umbilical vein endothelial cells

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Objective: An adequate nutrient and substrate supply is essential for normal intrauterine development of the fetus. Disturbances in uterine blood supply are associated with higher perinatal morbidity and mortality caused by preterm delivery, pre-eclampsia or intrauterine growth restriction. Adaptation of the uterine vasculature to the rising needs of the fetus occurs through both vasodilation and development of new vessels. Angiogenesis is the process of neovascularization from pre-existing blood vessels in response to hypoxia or substrate demands of tissues. It is important to find natural drug against angiogenesis.
Materials and methods: In this study we have used HUVECs (Human Umbilical Vein Endothelial Cells) which shows the angiogenesis and carvacrol, a monoterpenoid, an anti-angiogenic agent. To detect the anti-angiogenic activity of carvacrol determined with the help of MTT and LDH assay. Further wound healing assay observed with the help of scratch assay. Molecular marker levels determined with the help of MAP kinase, NFκB, MMPs and VEGF.
Results: Carvacrol causes dose dependent (25, 50 and 80μ M) decrease in cell viability of HUVECs. Carvacrol found to be causing the anti-wound healing activity determined with the help of scratch assay. Moreover, we found the dose dependent inhibition of MAP kinase pathway evaluated with the help of western blotting. In addition we have found reduced levels of NFκB, MMPs and COX-2 protein expression in HUVECs.
Conclusion: Therefore our result suggests that carvacrol could be used as a potential treatment for the angiogenesis development during the pregnancy.