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## 정맥의 신생혈관내막증식과 평활근증식에 대한 내피세포미세입자의 역할

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### The Effects of Endothelial Microparticle on the Neointimal Hyperplasia Formation and Vascular SMC Proliferation

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**Background:** Vascular access stenosis occurs frequently and predominantly as a result of neointimal hyperplasia (NH) formation due to smooth muscle cell (SMC) proliferation at the venous anastomosis. Effective treatment for NH in this setting is lacking. Endothelial microparticles (EMP) are closely associated with vascular dysfunction and atherosclerosis. We are to investigate the effects of EMP on proliferation of SMCs and NH formation.

**Methods:** Human umbilical vein endothelial cells (HUVECs) were cultured and stimulated by indoxyl sulfate (IS). The culture media of HUVECs were collected and ultracentrifugated at 100,000×g. The pellet was resuspended, incubated with fluorescent endothelial antibodies and analyzed by flow cytometry with comparing calibration beads. Human aortic smooth muscle cells (SMCs) were treated by these collected EMPs. The proliferations of SMCs were measured by BrdU cell proliferation assay. Ex vivo culture experiments were also performed on porcine internal jugular veins with or without EMPs for 12 days, and compared with TGF-β treated venous tissues.

**Results:** The CD31+CD42- EMPs were well produced by IS, the quantity of them was similar to the amount generated by positive control, TNF-α (10 ng/mL). EMPs stimulated the proliferation of cultured SMCs in a dose-dependent manner. In ex vivo culture, NH was significantly developed in EMP treated veins compared to controls with similar patterns stimulated by TGF-β.

**Conclusion:** EMPs stimulate the proliferation of vascular SMCs and NH production in porcine vein. Further investigation is needed to demonstrate the role of EMPs on vascular access stenosis.

**Key Words:** 신생혈관내막증식, 내피세포미세입자  
Neointimal hyperplasia, Endothelial microparticle