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신장 간엽 줄기세포에서 유래된 미세입자가 전혈관신생 신호 전달과 혈관내피세포 관 형성에 미치는 영향

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Microparticles from Kidney Derived-mesenchymal Stem Cells Act as Carrier of Proangiogenic Signals and Contribute to Endothelial Tube Formation

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Infusion of in vitro expanded kidney derived-mesenchymal stem cell (MSC) improved renal function following acute ischemia-reperfusion injury. The kidney derived-MSC accelerated the recovery from acute kidney injury (AKI) in vivo and contributed to vasculogenesis and endothelial repair via paracrine mechanism. Cell-derived microparticles (MP) are a new mechanism of cell-to-cell communication. Recent studies have demonstrated MP derived from MSC confers protective effect against AKI.

In the current study, we isolated and characterized MP from kidney derived-MSC and investigated its in vitro biologic effects. MSC were cultured in hypoxic chamber in serum deprived MEM with hydrogen peroxide (200 uM) and MP were isolated from supernatants by differential ultrafiltration (2,000x g, 10 min, 100,000x g, 1hr). Presence of MP was confirmed by electron microscopy and flow cytometry. Flow cytometry of MP demonstrated the presence of several adhesion molecules shown to be expressed on MSC membrane such as CD29, CD44, CD73, and alpha4-, alpha5-, alpha 6 integrins. RT-PCR confirmed the presence of proangiogenic genes such as VEGF, IGF-1, and HGF in isolated MP. MP labeled with PKH26 red fluorescence dye were readily incorporated by cultured human umbilical vein endothelial cells (HUVEC) via mechanism and MP promoted tube formation of HUVEC on Matrigel.

Our results support the hypothesis that MSC-derived MP may act as a source of proangiogenic signals and addition of MSC-derived MP may confer promote tube formation for the endothelial cells.

Key Words: 미세입자, 신장 간엽 줄기세포, 전혈관신생
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