

복막중피세포에서의 인 유도성 세포자멸사

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Phosphate-induced Apoptosis in Human Peritoneal Mesothelial Cells in Vitro

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Hyperphosphatemia was known to have significant predictive value of cardiovascular mortality in patients with chronic kidney disease and with receiving hemodialysis and peritoneal dialysis (PD). Recently, it has been demonstrated that phosphate uptake through the type III sodium-dependent phosphate cotransporter, Pit-1, induced apoptosis of aortic vascular smooth muscle cells and endothelial cells in vitro. The apoptotic effects of hyperphosphatemia will be herein evaluated on human peritoneal mesothelial cells (HPMCs).

Methods: HPMC were isolated using the trypsin-EDTA method from omental tissue which was obtained from a patient undergoing abdominal surgery. We treated several different phosphate concentration, 1 to 5 mM and calcium concentration, 1.8 and 2.8 mM on HPMC to assess the effects of concentration. Twenty four later after treatment of each concentration of phosphate and calcium, MTT and TUNEL assays were performed to identify cell death and apoptosis. Bax and Bcl-2 were measured by western blot and caspase-3 activity by a colorimetric assay.

Results:

1. Pit-1 expression on HPMC was demonstrated by RT-PCR.
2. Apoptosis in HPMC significantly increased in high concentration of phosphate in a dose-dependent manner, and enhanced in the presence of 2.8 mM calcium instead of 1.8 mM according to TUNEL assay and MTT assay ($p < 0.001$).
3. High phosphate concentrations significantly decreased anti-apoptotic Bcl-2 expression ($p < 0.05$).
4. Caspase-3 activity increased in high concentrations of phosphate.

Conclusion: High concentration of phosphate induces apoptosis in HPMC by a caspase-related mechanism.

Key Words: 복막중피세포, 인, 세포자멸사

Peritoneal mesothelial cell, Phosphate, Apoptosis