The Research about Mesangial Cell Function Abnormality which may be involved in The Development of Hypertension through Decreased Salt Excretion

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Summary

Mesangial cells play an important part in physiological and pathophysiological regulation of glomerular filtration, a main determinant of salt excretion. To explore the involvement of deranged mesangial cell functions in the pathogenesis of hypertension, the growth activity of mesangial cells was compared in stroke-prone spontaneously hypertensive rats (SHRSP) and Wistar-Kyoto rats (WKY). Upon exposure to fetal calf serum, arginine vasopressin, or endothelin-1, the growth response was significantly higher in mesangial cells cultured from glomeruli of 4-week old SHRSP than in those of age-matched WKY. SHRSP mesangial cells showed higher growth in response to phorbol myristate acetate than WKY cells, which indicates the abnormality of protein kinase C (PKC) and/or post-PKC signal transduction mechanism in SHRSP mesangial cells. It is considered that this contributes at least in part to the enhanced response to above-mentioned vasoactive peptides in SHRSP mesangial cells. Abnormally high growth of SHRSP mesangial cells in the presence of fetal calf serum was significantly inhibited by dihydropyridine calcium antagonist, manidipine. Calcium antagonist may prevent or delay the development of hypertension not only through vasodilation but also through inhibition of mesangial cell growth. Furthermore, by slowing mesangial cell proliferation, calcium antagonist also may slow the progression of hypertension-induced glomerular sclerosis.