# Sodium Excretion and the Disorder of Mesangial Cell Function ---Mesangial expansion induced by in vivo gene transfection of renin and angiotensinogen

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## Summary

The handling of sodium is one of the most important functions of kidney. Renal sodium excretion is regulated by various biological active substances. Among them, angiotensin II (AII) is a potent peptide which promotes sodium retention. Furthermore, an increasing body of evidence suggests that AII contributes to the development of glomerulosclerosis resulting in the disorder of excretion of sodium from kidney. Nevertheless, it still remains to be elucidated whether AII directly induces sclerotic change in glomeruli. To explore this issue, we studied the induction of glomerular change by in vivo gene transfection of renin-angiotensin system. The expression vectors containing cDNA for human renin or angiotensinogen were constructed. These plasmids were introduced into rat kidney via renal artery by HVJ-liposome method. Blood pressure, blood- and urine-analyses and glomerular histology were examined on days 3, 5 and 7 after the introduction. Blood pressure did not change after gene transfer. There were no significant changes in plasma renin activity or renal function during 7-days experiment. The expansion of mesangial matrix was observed in the transfected kidneys on days 5 and 7 without associating hypercellularity. Qualitative analysis of accumulated matrix by immunohistochemistry using specific antibodies revealed the increase in type I and III collagens which did not exist in normal glomeruli. Furthermore, α-smooth muscle cell actin which is known to appear in various types of glomerulonephritis was seen in glomerular cells of transfected kidney. These results suggest that AII directly acts on the glomerular cells to lead phenotypic change and overproduction of mesangial matrix by these cells.