Intraglomerular Lipid Deposition in Experimental Focal Glomerular Sclerosis in the Rat

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Dear Sir,

It is well known that focal glomerular sclerosis is observed in rats by administration of puromycin amino-nucleoside (AN). Although the pathogenesis of glomerular sclerosis in this model is still unknown, some hypotheses have been reported, such as mesangial overloading [1]. A recent report [2] suggests that chronic renal disease may be mediated by abnormalities of lipid metabolism. We studied the intraglomerular lipid deposition in this model and analyzed the intraglomerular lipid.

AN (1.5 mg/100 g of body weight) was injected daily, first for a week, and then again 6 weeks later. AN-treated rats and control rats were sacrificed monthly from the 3rd to the 6th month. Kidney tissues were observed by light microscopy and electron microscopy. To examine the intraglomerular lipid deposition, sections stained with Sudan III were observed and lipid extracted from isolated glomeruli was analyzed by thin layer chromatography. Isolated glomeruli were obtained by the sieving method. At the sacrifice, blood was sampled to measure total protein, creatinine and lipid according to the standard method. Urinary protein was measured by sulfosalicylic acid method.

After 3 months, 87% of the glomeruli revealed glomerular sclerosis in AN-treated rats. Electron microscopy showed that the main pathologic change in sclerosis was an increasing of mesangial matrix. Lipid deposition was seen in 95% of the sclerotic glomeruli, especially in the sclerotic lesions. Morphological changes were not observed in control rats. Serum levels of total protein and creatinine were normal in each group. Significant proteinuria and hyperlipemia were observed in AN-treated rats, but not in control rats. Thin layer chromatography revealed that the intraglomerular lipid consisted of cholesterol ester and triglyceride (fig. 1).

Grond et al. [1,3] suggested that mesangial accumulation of macromolecular substance leads to glomerular sclerosis [1, 3]. The lipid deposition has some relation to the development of focal

glomerular sclerosis in AN-treated rats. Furthermore, to consider the similarity of mesangial cell and vascular smooth muscle cell [4], glomerular sclerosis and atherosclerosis may have common features in their pathogenesis.

References

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Fig. 1. Intraglomerular lipid analyzed by thin layer chromatography. A = Control rat; B = AN-treated rat; 1 = cholesterol ester; 2 = triglyceride; 3 = free fatty acid; 4 = free cholesterol.