

## Decrease of Ganglioside GM3 is Implicated in the Proliferation of Mesangial Cells Caused by High Ambient Glucose

Division of Nephrology, Department of Internal Medicine<sup>1</sup>,  
Department of Pharmacology<sup>2</sup>, Wonkwang University School of Medicine<sup>3</sup>

Seung Hoon Baek, Seon Ho Ahn, Ju Hung Song, Bong Kyu Choi<sup>2</sup>, Kyu Yong Jung<sup>2</sup>

Ganglioside is known to regulate the differentiation and proliferation of many cell types. Using cultured mesangial cells (MC) isolated from rat glomeruli, this study examined whether altered ganglioside expression is pathologically implicated in the proliferation of MC caused by high ambient glucose. High glucose (20mM) conspicuously stimulated the proliferation of MC, whereas it caused a significant reduction in mesangial sialic acid contents. Based upon mobility on high-performance thin-layer chromatography (HPTLC) and reactivity to anti-GM3 monoclonal antibody, MC showed a complex ganglioside pattern that consisted of three different components of gangliosides, mainly GM3, and high glucose caused a severe reduction of these gangliosides with apparent changes in the composition of major ganglioside GM3. Semi-quantitative analysis by HPTLC showed that GM3 was reduced to 59% of control in MC cultured high glucose. A prominent immunofluorescence microscopy showed a dramatic disappearance of GM3 expression in high glucose-treated MC. High glucose caused a significant reduction in GM3 synthase activity. Km value in high glucose-treated MC was significantly different from that in normal MC, but not in Vmax. These results suggest that altered ganglioside expression, mainly GM3, is implicated in the proliferation of MC caused by high ambient glucose, and these may play an important pathological role in development of diabetic glomerulopathy.