Effect of Beraprost Sodium, a PGI2 Analogue, on Proliferation of Cultured Rat Glomerular Mesangial Cells

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Dear Sir,

A study of the effect of beraprost sodium (BPS) on proliferation of cultured rat glomerular mesangial cells is described. Prosta-cyclin (PGI2) synthesized from arachidonic acid by cyclo-oxygenase is a potent relaxant of vascular smooth muscle and an anti-aggregatory agent [1]. BPS, a stable analogue of PGI2, has a long biological half-life and is orally effective in inhibiting the aggregation of platelets [2]. Recently, Wang et al. [3] reported that BPS might improve albumin-uria and glomerular filtration rate (GFR) due to its vasodilating effects in the early phase of streptozotocin (STZ)-induced diabetic rats. Sakai et al. [4] examined the cyto-protective effect of BPS in cultured human endothelial cells from the umbilical vein. They showed an effect of BPS on proliferation of endothelial cells and speculated contribution to an increase in cyclic AMP (cAMP) level in endothelial cells treated with BPS. Davison et al. [5] reported a pro-liferative effect of dibutyryl cAMP in human dermal microvesSEL endothelial cells, but not in human umbilical cord vein endothelial cells. This effect appeared at a concentration of $5 \times 10^{-4}$M, but at not more than $1 \times 10^{-3}$M or less than $1 \times 10^{-4}$M [5]. However, the effect of BPS on glomerular mesangial cells has remained unclear. In this study, rat glomerular mesangial cells were cultured with 0.5% fetal calf serum (FCS) in RPMI 1640 for 48 h. The cells were incubated with 200 mg/dl or 500 mg/dl of glucose and 0-30 µmol/l of BPS in RPMI 1640 containing 10% FCS for 18 h. Thereafter, proliferation of the glomerular mesangial cells was determined by the 5-bromo-2'-deoxy-uridine labelling and detection kit III. Proliferation of glomerular mesangial cells was suppressed after incubation with high-glucose medium without BPS treatment. In high-glucose medium, the proliferation of the mesangial cells under the incubation with low dose BPS (0.1-0.3 µg/l) was significantly greater than that without BPS (p < 0.05). On the other hand, the proliferation of the mesangial cells under incubation with high-dose BPS (10-30 µg/l) was significantly lower than that without BPS in the same medium (p < 0.05). These findings suggest that the low-dose BPS might improve the suppression of mesangial cell proliferation in the high-glucose medium. It
is postulated that BPS might influence the viability of the mesangial cells under the high-glucose conditions.

References