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General Summary

Major fields of research are nephrology, hypertension, and uric acid metabolism. Published achievements and recent reports are summarized here.

Research Activities

Nephrology

1. Glomerulonephritis

Nephron numbers have recently been reported to be involved in the development of hypertension and chronic kidney disease. Our study suggested that an imbalance in individual body mass index and glomerular number is an independent risk factor for the progression of chronic kidney disease.

In *Nephrin-Bmp4* transgenic mice, the development of glomerular capillary tuft was markedly impaired, due to the lack of endothelial and mesangial cells. In contrast, *Nephrin-Noggin* transgenic mice exhibited collapsed glomerular capillary tufts due to a lack of mesangial cells.

We have established the transgenic estrogen receptor (ER)-E2F1 suicide-inducible mouse, which expresses ER-E2F1 fusion protein. E2F1 is a transcription factor that regulates cell proliferation; its ectopic expression induces apoptosis in differentiated cells. Therefore, cells of the ER-E2F1 mouse can be eliminated on demand by adminstering tamoxifen.

2. Dialysis

We evaluated the clinical value of the combination of peritoneal dialysis and hemodialysis. We found that this combined therapy is a useful way to control body fluids and that peritoneal function may be maintained with long-term treatment.

We studied acute humoral rejection and attempted to perform ABO-incompatible renal transplantation and husband-to-wife renal transplantation. In transplant glomerulopathy, glomerular expression of plasmalemmal vesicle-associated protein 1 is positively correlated with the severity of transplant glomerulopathy and proteinuria.

In clinical studies, we evaluated the role of collagen enzymatic and glycation-induced cross-links as a determinant of bone quality in patients with secondary hyperparathyroidism.

Hypertension

A study of the awareness of home blood pressure measurement among physicians who deal with hypertension was a major research project in 2009. This study is unusual in that it focuses on home-based blood pressure measurement. Because the guidelines released by the Japanese Society Hypertension in 2008 are the only guidelines to consider home blood pressure measurement, highlighting the importance of such measurement is important.

Uric acid metabolism

Sevelamer decreased serum urate levels, possibly by adsorbing urate in gastrointestinal tract in patients undergoing maintenance hemodialysis.

Fenofibrate decreased serum uric acid levels by increasing its urinary excretion, most likely through the inhibition of urate transporter 1 (URAT1) by fenofibric acid, its major metabolite, in renal proximal tubules.

An investigation of uric acid dynamics and staining of URAT1 after renal transplantation showed that serum uric acid levels were related, in part, to the expression of URAT1 in the proximal renal tubule.

Publications

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