

Department of Internal Medicine

Division of Diabetes, Metabolism and Endocrinology

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General Summary

Physicians should practice patient-oriented medicine based on the concept of evidence-based medicine, which consists of research evidence, clinical expertise, and patients' preferences. To accomplish this goal, we encourage the members of our staff to do basic and clinical research. Areas of research include diabetes, metabolism, and endocrinology.

Research Activities

Epidemiology and evidence-based medicine

A nationwide epidemiologic study of mortality in approximately 3,500 patients with type 1 diabetes was started in 1986 and has continued to provide much information about the prognosis of Japanese children with type 1 diabetes. A population-based interventional study of childhood obesity and glucose intolerance has also continued. Several clinical trials of the treatment of type 2 diabetes are being performed.

Genetic epidemiology of diabetes mellitus

A loss or decrease in the function of glutathione peroxidase (GPX) 1, an antioxidant enzyme, is crucial for the development of coronary atherosclerosis. This year, we have found that the single nucleotide polymorphism in complementary DNA (Pro197Leu substitution) of GPX-1 is genetically associated with coronary artery calcification detected with multislice computed tomography and have published our findings in a leading journal. We are planning a prospective study that enables us to perform a new type of individualized medicine.

Gene and cell-based therapy for diabetes mellitus

To restore the pancreatic beta cell mass and restore glucose metabolism in diabetes mellitus, we have transferred the CDK4 gene, a gene for a regulatory factor of the cell cycle, to animals with diabetes. We found that the reduced beta cell mass was increased and that blood glucose levels were decreased. We are preparing our findings for publication in a leading journal.

Diabetic vascular complications

Research has focused on the pathogenesis and treatment of diabetic vascular complications. Clinical studies have examined dietary therapy for type 2 diabetes. Experimental studies using vascular smooth muscle cells, mesangial cells, and retinal pericytes have investigated the role of the Rho/Rho-kinase-mediated signaling pathway in the pathogenesis of diabetic vascular complications and have provided evidence that these molecules are potential pharmacological targets in the treatment of diabetic vascular injury.

Insulin resistance and obesity

A series of basic research studies of insulin resistance were performed in Otsuka Long-Evans Tokushima Fatty rats. The effects of new oral hypoglycemic agents on insulin resistance were investigated.

Endocrinology

The potential role of inflammatory cytokines on the dynamics of the urocortin-corticotropin-releasing hormone receptor system in HL-1 cardiomyocytes was evaluated. The involvement of corticotropin-releasing hormone receptor signaling against vascular inflammatory stress was studied in human aortic endothelial cells.

The molecular pathogenesis of impaired negative feedback mechanism by glucocorticoids in the growth and development of pituitary macroadenoma causing subclinical Cushing's disease was investigated.

Immunopathological analysis was performed of pituitary tissue obtained at autopsy in a case of acquired combined pituitary hormone deficiency.

Clinical features of 5 patients with subclinical Cushing's disease were characterized.

Dietary therapy

The effects of a high monounsaturated fatty acid enteral formula versus a high-carbohydrate enteral formula on postprandial plasma glucose concentrations and insulin response was examined in patients with type 2 diabetes mellitus and in healthy volunteers. A high-monounsaturated enteral formula suppressed postprandial hyperglycemia without exaggerated insulin secretion compared with a high-carbohydrate enteral formula in patients with type 2 diabetes mellitus and healthy subjects.

Publications

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