

Institute of Clinical Medicine and Research

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General Summary

Reorganization of the full-time faculty members (researchers) has been significantly performed. On the other hand, a total of 3 research technicians and office employees have been included in the same facility as they were last year. Along with the start of the institute, we have expanded research support of Kashiwa Hospital divisions, including gastroenterology and hepatology, neurosurgery, clinical laboratory medicine, diabetes, metabolism and endocrinology, general medicine, obstetrics and gynecology, and surgery, to help their progress in research themes.

Research Activities

Study of glucose and lipid metabolism abnormality through application with measurement of biological gas component

A specific composition of the biological gas component, such as breath, has been reported when observed in metabolic disorders. For example, breath analysis has been approved by the United States Food and Drug Administration as a noninvasive diagnostic method of a test for rejection occurring after heart transplantation. To apply the same technology for the early noninvasive diagnosis of glucose and lipid metabolism, we analyzed the volatile components of the very small amount of gas of biological origin, including skin gas. In the 2014 fiscal year, we performed basic and clinical studies for this reason. For the analysis, skin gas was collected in a dedicated bag, and the volatile components were adsorbed on a thermal removable collection tube. The volatile components were then quantitatively determined with gas chromatography. As a result, differences in the gas composition from patients with metabolic syndrome and type 2 diabetes mellitus have been observed when compared with healthy control subjects. Specifically, compositions of some substances, e.g., acetone, with strong signals by gas chromatography were changed in association with the disorder. We are planning to develop a new noninvasive method and devices for measuring biomarkers in the near future. This study was performed in collaboration with Division of Diabetes, Metabolism and Endocrinology, Associate Professor Takeo Iwamoto, and Canon Inc.

A study of the injury mechanism and regenerative medicine of pancreatic islets in diabetes

Injuries of cells in endocrine pancreatic islets play a critical role in the development and progression of diabetes. In the 2014 fiscal year, we studied “self-organization of the islets” with Schwann cells covering the entire periphery of the islet based on a completely new concept of “cell protection from metabolic stress.” In islet Schwann cells, the same cells as brain astrocytes, regulating the microcirculation of pancreatic islets through the

glutamate transporter should play an important role in protecting against the cell damage caused by oxidative stress through the nuclear factor (erythroid-derived 2)-like 2 pathway. We are planning to study further for the recovery of this metabolic pathway and finally prevention of β -cell dysfunction by using a high-efficiency gene transfer method that we developed in a recent study.

Research cooperation with the research institute of science and technology of the Tokyo University of Science

The Tokyo University of Science and The Jikei University have already conducted education and research cooperation. Because of a geologic advantage, some of research projects had been already performed jointly with the Tokyo University of Science. To promote this relationship, the first joint symposium was held in the 2014 fiscal year. At the symposium with the attendance of Professor Senya Matsufuji, president of The Jikei University, and Professor Yasutaka Moriguchi, vice president of the Tokyo University of Science, 7 original papers were presented and subjected to discussion.

Publications

Seino Y¹, Sasaki T, Fukatsu A², Ubukata M³, Sakai S³, Samukawa Y³ (Kansai Electric Power Hosp, ²Yachiyo Hosp, ³Taisho Pharm).

Efficacy and safety of luseogliflozin as monotherapy in Japanese patients with type 2 diabetes mellitus: a randomized, double-blind, placebo-controlled, phase 3 study. *Curr Med Res Opin.* 2014; **30**: 1245-55.

Seino Y¹, Sasaki T, Fukatsu A², Sakai S³, Samukawa Y³ (Kansai Electric Power Hosp, ²Yachiyo Hosp, ³Taisho Pharm). Efficacy and safety of luseogliflozin monotherapy in Japanese

patients with type 2 diabetes mellitus: a 12-week, randomized, placebo-controlled, phase II study. *Curr Med Res Opin.* 2014; **30**: 1219-30.

Seino Y¹, Sasaki T, Fukatsu A², Ubukata M³, Sakai S³, Samukawa Y³ (Kansai Electric Power Hosp, ²Yachiyo Hosp, ³Taisho Pharm).

Dose-finding study of luseogliflozin in Japanese patients with type 2 diabetes mellitus: a 12-week, randomized, double-blind, placebo-controlled, phase II study. *Curr Med Res Opin.* 2014; **30**: 1231-44.