Departmental History
The Second Department of Internal Medicine and its Celebrated Research Achievements

Our department was established in June 1916 as the Second Department of Internal Medicine, with the launch of the Tohoku Imperial University Medical College. Since Professor Toyojiro Kato presided as the Founding Chair, our department has been led in succession by Professors Fusakichi Nakazawa, Tatsuo Torikai, Kaoru Yoshinaga, Keishi Abe, and Sadayoshi Ito, until the new system for the advancement and diversification of graduate school education in 1999. The history of clinical research in our department is closely linked to Professor Kato’s research career.

Founding Chair: Toyojiro Kato (1916–1944)

Professor Kato was born in Mie Prefecture in 1882 and studied internal medicine, and particularly neurology, under Professor Kinnosuke Miura after graduating from Tokyo Imperial University in 1907. In 1910, at the tender age of 28, he was appointed to a professorship at Sendai College of Medicine and also to the Chair of the Department of Neurology at the affiliated Miyagi Hospital. For two and a half years from February 1913, he studied in Germany, Austria, England, and the United States, performing biochemical research on cardiac electrical conduction systems at the University of Freiburg, cerebral tumors at the University of Vienna, pathophysiology of the autonomic nervous system, and analysis of blood gases at the University of Cambridge. The work he accomplished during the period became the foundation of research carried out here at the Second Department of Internal Medicine and the Department of Neurology. In July 1915, while studying abroad, he became an appointed professor at the newly established Tohoku Imperial University School of Medicine, taking charge of the Second Department of Internal Medicine from July 1916. He served as the departmental Chair for 28 years before retiring in March 1944.

Since the first edition of the *Tohoku Journal* in April 1920, Professor Kato, together with Professors of physiology Fujita and Satake, served on the editorial board of the journal and became the major driving force to make the journal Japan’s leading English-language medical journal. Furthermore, recognizing the importance of aviation medicine from early on, he worked tirelessly to found the Aeromedical Research Center and was appointed Director upon its establishment in 1944. Although the center was closed soon after by the allied forces after the
Second World War, considering the highly recognized importance of aviation and space medicine today and its rapid development, we greatly admire Professor Kato’s foresight. The prototype hypertension and endocrinological research currently being conducted at the Second Department of Internal Medicine can be recognized, to a certain extent, to have its roots in the aviation medicine research performed at that time.

Professor Toyojiro Kato

Second Chair: Fusakichi Nakazawa (中澤房吉) (1944–1957)

Professor Fusakichi Nakazawa, the second departmental Chair, was born in Niigata Prefecture in 1893. After graduating as a member of the inaugural class of Tohoku Imperial University School of Medicine in July 1919, he joined the Second Department of Internal Medicine led by Professor Kato and became Assistant Professor in 1923. He studied in Germany, Denmark, Austria, and the United States from 1926 to 1928. In particular, under the supervision of Professor August Krogh in Copenhagen, he developed a device to measure colloid osmotic pressure of body fluid while also investigating glomerular filtration mechanisms. In addition, he observed clinical medicine under Professor Schlesinger in Vienna.

After being appointed as Professor following the retirement of Professor Kato in 1944, he made neurology, nephrology, and hypertension the main research topics in his classroom and trained a large number of students. The prominent examples of his scientific meeting activities are a report entitled “Proteins Found in Body Fluid and Associated Disease as Determined by Colloid Osmotic Pressure”, which was a summary of research performed immediately after returning from overseas and presented as an invited paper at the Meeting for the Japanese Society of Internal Medicine in 1943, and a report entitled “Hypertension (Clinical Aspects)”, which was also presented as an invited paper at the same meeting held in 1951. The latter was an epidemiological study on the prevalence of hypertension in the rural areas of Akita Prefecture, performed by all members of his classroom since he assumed his professorship. The work was regarded very highly worldwide and became the foundation for the subsequent hypertension research activities in the Department. He also served as Dean of the School of Medicine after 1953 and retired in 1957.

Professor Fusakichi Nakazawa
Third Chair: Tatsuo Torikai (1957–1973)

Professor Tatsuo Torikai, the third departmental Chair, was born in Kumamoto Prefecture in 1909 and joined Department of Internal Medicine under Professor Shimazono, Tokyo Imperial University, after graduating from Tokyo Imperial University School of Medicine in 1934. He became Professor in the First Department of Internal Medicine at Niigata College of Medicine in 1949 and was appointed to a professorship, as a successor of Professor Nakazawa, at the Second Department of Internal Medicine, Tohoku University School of Medicine, in September 1957.

Professor Torikai was already regarded as a leader in the field of Endocrinology when working at Niigata University. In particular, following the discovery of primary aldosteronism by Conn, he presented the first Japanese clinical cases of the disease in 1956, which attracted widespread attention from researchers and clinicians alike. After coming to Sendai, he presented a second series of clinical cases found among the inpatients of the Second Department of Internal Medicine. Professor Torikai promoted research and provided extensive research guidance on a wide range of endocrinology topics. As a result, his students became experts in various fields and later assumed leadership positions in universities. For example, his successors Kaoru Yoshinaga and Keishi Abe were experts on the renin-angiotensin system in endocrinology as well as hypertension; Tatsuo Sato (later Professor at the Department of Internal Medicine, Kumamoto University) and Yukio Miura (later Professor at the Tohoku University Health Administration Center) on catecholamine; Kiyoshi Miura (later Professor at the Department of Internal Medicine, Gifu University), Hiroshi Demura (later Professor at the Department of Internal Medicine, Tokyo Women’s Medical University) and Reiko Demura (later Professor at the Institute of Clinical Endocrinology, Tokyo Women’s Medical University Hospital) on pituitary and adrenal cortex glucocorticoid hormones; Soitsu Fukuchi (later Professor at the Department of Internal Medicine, Fukushima Medical School) on mineralocorticoid hormone; Akira Shibata (later President of Niigata University), Ryo Miura (later President of Akita University), and Chuichi Ito (later Dean of Iwate Medical University) on hematology; Hiroshi Saito (later Dean of Nagasaki University School of Medicine) on nephrology; and Tokutaro Sato (later Professor at the Department of Internal Medicine and Rehabilitation Science, Tohoku University Graduate School of Medicine) and Keigo Yasuda (later Professor at the Department of Internal Medicine, Gifu University) on diabetes. In addition, Katsuya Itahara, who was Assistant Professor at the Second Department of Internal Medicine, became the first Professor of the Neurology Department upon the establishment of
the Institute of Brain Disease, Tohoku University School of Medicine, in 1965.

In his training of students, Professor Torikai never forced them to work on particular research topics; he left them to their own initiatives. However, he held departmental research meetings and constantly asked for reports on research progress. Although this was a difficult practice to follow for those who were unable to find a research topic on their own, at the same time it led to the achievement of innovative and unique research. This educational approach was also reflected in his clinical training. He arrived at the hospital ward earlier than any other Departmental staff, monitored abnormalities presented by patients and incomplete medical records, and filled in the records in red ink. Furthermore, the competence of attending physicians was always strictly tested during clinical rounds. In 1969, he presented a report entitled “Hypertension and Endocrine Secretion” as an invited speaker at the meeting for the Japanese Society of Internal Medicine.

Professor Tatsuo Torikai

Forth Chair: Kaoru Yoshinaga (year 1973–1992)

Professor Kaoru Yoshinaga, who became the fourth departmental Chair, was born in Tochigi Prefecture in 1928. After graduating from Tohoku University School of Medicine in 1954 and completing an internship, he joined the Second Department of Internal Medicine under Professor Nakazawa in 1955. Under the supervision of Professor Torikai, he performed research on hypertension, particularly hypertensive substances, and his study on the development of a method to measure urinary catecholamine was highly regarded even overseas. He became Assistant Professor of the Second Department of Internal Medicine in January 1966 and later Professor in January 1973. The Second Department of Internal Medicine, at the time that it was led by Professor Torikai, was recognized for its outstanding achievement in many fields including endocrinology. However, due to ongoing university dispute at that time, various difficulties arose between educational, clinical, and research areas, and the Second Department of Internal Medicine itself was also facing many difficult challenges. In particular, the department was dealing with a medical litigation case in which a patient with hyperthyroidism died from complications of hypokalemia as well as the aftermath of fire which broke out in July 1975.

Despite all the difficulties, there considerable progress was made in terms of research.
Besides research in Professor Yoshinaga’s specialized field (i.e., hypertension), the progress made in other research fields were presented at international conferences and published in many English journals. This included endocrinological research on antidiuretic hormones and pituitary-adrenal, thyroid, and parathyroid systems, renal disease research developed through the use of kidney biopsy, blood disorder study to treat leukemia, and immunology research on connective tissue disorder. While Professor Yoshinaga was Chair of the Department, his own students and those of Professor Torikai were appointed Professors at other universities. Besides his successor Professor Sadayoshi Ito, those who were later appointed to professorships included Takeshi Sasaki (later Professor at the Department of Immunology and Hematology, Tohoku University School of Medicine), Minoru Yasujima (later Professor at the Department of Laboratory Medicine, Hirosaki University), Yutaka Imai (later Professor at Tohoku University Graduate School of Pharmaceutical Science and Medicine), Takao Saito (later Professor at the Division of Nephrology and Rheumatology, Department of Internal Medicine, Fukuoka University School of Medicine), Katsumi Yoshida (later Professor at the Department of Medical Technology, Tohoku University School of Health Sciences), Makito Sato (later Professor at the Department of Health Sciences, Tohoku Fukushi University), Ken Omata (later Professor at Miyagi University of Education), Masao Hiwatari (later Professor at International University of Health and Welfare), Masaru Shoji (later Professor at the Department of Pharmacodynamics, Meiji Pharmaceutical University), Keiichi Itoi (later Professor at the Laboratory of Information Biology, Graduate School of Information Sciences, Tohoku University), Masahiro Kohzuki (later Professor at the Department of Internal Medicine and Rehabilitation Science, Tohoku University Graduate School of Medicine), Tetsuya Ootaka (later Professor at the Department of Medical Technology, School of Health Sciences, Faculty of Medicine, Tohoku University), and Kazuhiro Takahashi (later Professor at the Department of Endocrinology and Applied Medical Science, Tohoku University Graduate School of Medicine Health Sciences).

Professor Yoshinaga trusted the competence of his students to prepare manuscripts written in Japanese and typically made few corrections. However, in the case of their manuscripts written in English, he thoroughly edited them until there was no space left for further correction. Because of such careful editing, many of their research reports stood up to the rigorous review process and were accepted for publication in leading scientific journals. In addition, he organized the meeting for the Japanese Society of Hypertension in April 1982 and presented an invited paper entitled “Modulator of Blood Pressure and Clinical Aspect of Hypertension” as an invited speaker.

He held many important positions during the latter half of his years in office. He served as the Director of the University Hospital from April 1985 and the Dean of the School of
Medicine from April 1988. He also took responsibility as Acting President following the resignation of President Ootani due to illness in October 1990. After calmly handling some difficult situations and successfully overcoming many challenges over a 10-month period from February 1991, he retired in March 1992.

Professor Kaoru Yoshinaga

Fifth Chair: Professor Keishi Abe (1992–1997)

The fifth Chair, Professor Keishi Abe, was born in Iwate Prefecture in 1933. He joined the Second Department of Internal Medicine under Professor Torikai in 1960 after graduating from Tohoku University School of Medicine in 1959 and completing his internship. Under the supervision of Professor Torikai, he advanced the research on hypertension, particularly on vasoactive substances such as angiotensin, bradykinin, serotonin, histamine, and prostaglandin, and his research was held in high regard both nationally and internationally. He laid the foundation for the globalization of the Second Department of Internal Medicine by promoting research meeting international standards. He was appointed to an assistant professorship in 1983 and took a professorship in 1987 for a newly organized graduate school division, the Department of Clinical Biology and Hormonal Regulation. As appropriate for a graduate course, his class promoted research using molecular biological techniques, in particular those determining the sequence of receptors and the structure of ion channels. Unlike Professor Yoshinaga, who served in various positions on the campus, Professor Abe was an actual driving force for the clinical research performed in the Department itself. For this reason, many of the above-mentioned professors who were former students of Professor Yoshinaga were also students of Professor Abe. Professor Abe assumed his professorship at the Second Department of Internal Medicine in August 1992, following the retirement of Professor Yoshinaga.

During the transformation of the Faculty of Education systems following discontinuation of the Liberal Arts Department, Professor Abe, as Co-Chair and Chair of the Medical Affairs Subcommittee, introduced an integrated 6-year education system to raise physicians capable of assuming clinical duties upon graduation. At the same time, he was a leader of the medical community, serving on the board of the Japanese Society of Internal Medicine, Japanese Society of Nephrology, and Japanese Society of Hypertension. He organized the Eastern Regional Meeting of the Japanese Society of Nephrology in May 1995, a meeting of the Japanese Society of Hypertension in October 1996, and was an invited speaker
on “Pathology and Treatment of Hypertension” at a meeting of the Japanese Society of Internal Medicine in April 1997. He retired in March 1997.

Professor Keishi Abe

Sixth Chair: Sadayoshi Ito (1997–present)

Professor Sadayoshi Ito, the sixth departmental Chair, succeeded Professor Abe in August 1997 and served as the last Professor of the so-called “numbered internal medicine departments” (i.e. the Second Department of Internal Medicine) and overcame many difficulties associated with the advancement of the graduate school educational system and new clinical system introduced in April 1999. He was appointed to a professorship in the Division of Nephrology, Endocrinology and Vascular Medicine at this time. The Department of Nephrology, Hypertension, and Endocrinology was established to conduct research on nephrology, hypertension, and endocrine secretion, and the class was opened by Professor Ito of the Second Department of Internal Medicine.

Professor Ito was born in Miyagi Prefecture in 1954, graduated from Tohoku University School of Medicine in 1979, completed his internship in the Department of Internal Medicine at Furukawa City Hospital, and in 1981 he joined our department which was led by Professor Kaoru Yoshinaga at the time. He conducted research on hypertension and renal circulation under Professor Keishi Abe and also studied under Dr. Oscar Carretero of the Hypertension and Vascular Research Division, Henry Ford Hospital, Detroit, USA, from 1982. He established a method to analyze renin secretion using isolated juxtaglomerular apparatus and revealed that the macula densa cells control renin secretion. Although he returned to the Department in 1985, he left for the US again in 1988 at the behest of Professor Carretero. He stayed in the US for a total of 10 years, returning to the Department in 1995. During his time in the US, he developed a method to directly study the tubuloglomerular feedback mechanism under a microscope after perfusing both glomerular afferent arterioles and the macula densa cells. His research was praised at conferences held in the US and other countries and he received a number of awards. He was the only Japanese among the 25 scientists invited to speak at the Renin and Angiotensin Centenary Symposium.

Our Department focuses on nephrology, hypertension, and endocrinology. In particular, under the direction of Professor Ito and through his extensive international research
experience and global insight, we conduct a variety of basic and clinical research on the pathogenesis, diagnosis, and treatment of hypertension, kidney diseases, and endocrine disorders. By fully understanding these diseases, a major goal of our department is to raise well-rounded, outstanding physicians.

Since taking office at the Second Department of Internal Medicine, Professor Ito has worked tirelessly—as a special Assistant Director of the Hospital on campus and as a member of the Review Board for the Ministry of Education and Ministry of Health—for the establishment of high-quality research, clinical, and educational systems that can hold their own in this era of intense global competition. At the same time, he is actively engaged in scholarly activities, including acting as Chief Editor for the international journal Nephron. In addition, in order to keep up with international standards, every year he invites around 10 internal medicine professors from overseas to present their research progress and asks them to join clinical rounds held in English. As a result, excellent young physicians are currently being raised in the Department.

Under Professor Ito, those who have been appointed to a professorship are Takaaki Abe (Division of Medical Science, Tohoku University Graduate School of Biomedical Engineering), Akira Sugawara (Department of Advanced Biological Sciences for Regeneration, Tohoku University Graduate School of Medicine), Juro Sakai (Division of Metabolic Medicine, Research Center for Advanced Science and Technology, University of Tokyo), Hiroshi Sato (Department of Clinical Pharmacology and Therapeutics Tohoku University Graduate School of Medicine), and Masaaki Nakayama (Fukushima Medical University School of Medicine Department of Nephrology, Hypertension, Diabetology, Endocrinology and Metabolism).

Professor Sadayoshi Ito