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PREFACE TO HETEROCYCLES ISSUE HONORING THE 70TH BIRTHDAY OF PROFESSOR DR. KIYOSHI TOMIOKA

January 14 of this year was the 70th birthday (*Koki* in Japanese) of Professor Kiyoshi Tomioka Emeritus Professor of Kyoto University and Professor of the Faculty of Pharmaceutical Sciences at the Doshisha Women's College of Liberal Arts. It is my great pleasure and honor to address my congratulations in this special issue, cerebrating his *Koki*.

Professor Tomioka has made tremendous contributions to the development of organic chemistry, especially the chemistry of organolithium. One of his greatest accomplishments was the development of an external chiral ligand, 1,2-dimethoxy-1,2-diphenylethane (MOP) for the lithium cation.[1] By utilizing this MOP, he has developed various asymmetric reactions of anionic species with lithium as a counter cation as well as catalytic asymmetric versions. The utility of MOP was clearly demonstrated by its application to the asymmetric total syntheses of biologically and medicinally important alkaloids, such as dihydrexidine, lycorine, and pancratistatin derivatives. In addition to lithium, he also developed chiral ligands for transition metals—a unique hemilabile chiral phosphine ligand and a chiral N-heterocyclic carbene ligand—which were successfully applied to copper(I)- and rhodium(I)-catalyzed asymmetric reactions. In addition, he also contributed to radical-based C–H activation and the design and development of novel organic gelators.

Professor Tomioka was born in Tokyo in 1948. In 1967, he began his studies at the University of Tokyo and received his PhD under the supervision of Professor Shun-ichi Yamada in 1976. He then worked as a postdoctoral fellow in the research group of Professor A. I. Meyers at Colorado State University, while he was entertaining ideas of his novel chemistries. In 1978, when the late Professor Koga was promoted to a full professor at the University of Tokyo, he recruited Professor Tomioka to work as a research associate in his new research group. This was where Professor Tomioka implemented his splendid ideas regarding new chiral ligands as well as natural product synthesis and developed his own chemistry. He was promoted to an associate professor in 1983 and the following year was awarded the Pharmaceutical Society of Japan Award for Young Scientists for his work on "Asymmetric Total Synthesis of Some Biologically Active Natural Products". In 1992, he obtained a position at the Institute of Scientific and Industrial Research, Osaka University as a full professor and began to establish his own research group. Soon after in 1996, he accepted an offer of a professorship from Kyoto University, where he further

[1] This ligand is referred to as MOP in Professor Tomioka's research group although MOP is more widely known as an abbreviation for Monodentate Optically Active Phosphine (2-diphenylphosphino-2'-methoxy-1,1'-binaphthyl) developed by Professor Tamio Hayashi.

developed his lithium chemistry and also explored new research fields, such as transition metal chemistry, radical chemistry, and molecular architecture. His achievements were widely recognized and in 2003 he was awarded the Pharmaceutical Society of Japan Award for his work on "Asymmetric Reaction Based on Molecular Structure Control and Activation".

I was lucky to join Professor Tomioka's research group at Kyoto University as an assistant professor in 2001. In his research group, there were many excellent students working on his research projects. Professor Tomioka is an enthusiastic scientist and also an excellent educator. His first piece of advice for me was to "Stick to your bench!" He often came up to the lab, had discussions with us, and sometimes even showed us his experimental techniques. Occasionally, he brought a student or myself to his office and presented a multi-hour personal lecture. The lectures were profound, occasionally literary and metaphorical, and full of suggestions. It was a tough time but, looking back, it was valuable and I learned many things from him. He has produced many excellent graduates, who are actively working in industry and academia. In 2010, he accepted a position at the Doshisha Women's College of Liberal Arts where he continues his research and education in the Faculty of Pharmaceutical Sciences.

Professor Tomioka has also made significant contributions to academic societies as the president of the Japanese Society for Process Chemistry (2010–2017) and as a regional editor of *Tetrahedron* (2007–presents). He also worked for the government as a member of advisory committees of the Japan Society for the Promotion of Science; the Ministry of Health, Labour and Welfare; and the Ministry of Education, Culture, Sports, Science and Technology.

Professor Tomioka has been an excellent and thoughtful mentor for both his coworkers and students. The students often only realize this after they graduate, and I believe that several of them miss his personal lectures. His former and present colleagues and students wish him good health and long life. On behalf of them, I would like to express my heartfelt congratulations and wishes for his happy *Koki*!

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Ken-ichi Yamada was born in 1973 in Tokyo and grew up in Chiba, Japan. He graduated from The University of Tokyo in 1996 and received his PhD. degree from the same university in 2001 under the direction of Professor Masakatsu Shibasaki. He joined Professor Kiyoshi Tomioka's research group at Kyoto University as an assistant professor in 2001 and was promoted to an associate professor in 2006. After Professor Tomioka retired from Kyoto University, he joined Professor Kiyosei Takasu's research group at the same university in 2011. Since 2016, he has been a full professor at Graduate School of Pharmaceutical Sciences, Tokushima University.