

The Roy L. Whistler International Award in Carbohydrate Chemistry 2020

The International Carbohydrate Organization is delighted to announce that the Roy L. Whistler International Award in Carbohydrate Chemistry for 2020 has been awarded to **Dr. Yasuhiro Kajihara**, Professor of Organic Biochemistry at Osaka University, Japan.

In 1984, the International Carbohydrate Organization established the Award in honour of Professor Roy L. Whistler, to recognize scientists ‘*who have made contributions of excellence in carbohydrate chemistry and biochemistry and with promise of continuing significant contributions*’. The Award is recognized with a plaque, a cheque for US \$20,000, and an invitation to present the opening lecture at the XXX International Carbohydrate Symposium (ICS), which will be held in Shanghai, China from July 12th to 17th, 2020.

Prof. Kajihara receives this award for his pioneering work on the chemical synthesis of glycoproteins bearing either homogeneous biantennary complex-type or high mannose-type oligosaccharides and their application to elucidate the role of glycosylation in glycoprotein biochemical function.

Dr. Kajihara’s research is devoted to the development of efficient semi-synthetic methodologies to access diverse libraries of complex N-glycans such as asparaginyl bi- and tri- antennary sialyloligosaccharides. This semi-synthetic idea is now applied by many chemists in both academia and the glycotech industry. Using these glycans, he has synthesized over 40 kinds of glycoproteins including their glycoforms and misfolded glycoproteins in order to elucidate oligosaccharide function.

A pivotal contribution from the Kajihara team has been the development of practical ways of using Boc-chemistry solid phase peptide synthesis (SPPS) for the preparation of complex sialylglycopeptide-thioesters, which has been a long-standing problem due to the acid lability of sialic acid-containing glycans.

Of note is the unprecedented semi-synthesis of two types of triantennary sialyloligosaccharides starting from Fmoc-Asn-(biantennary asialo-nonaoligosaccharide)-OH and employing ten chemical conversion steps. For this feat, the Kajihara team performed regiospecific protection of 24 hydroxy groups and regiospecific glycosylation with a Gal- β -1,4-GlcNAc donor to yield the native triantennary complex type sialyloligosaccharides. More recently, Dr. Kajihara chemically synthesized five homogeneous erythropoietin (EPO) glycoforms by varying the glycosylation number and glycosylation sites. These EPO probes clearly demonstrated that the bioactivity of EPOs was dependent on the number of oligosaccharides and glycosylation sites. Moreover, the team were able to synthesize a synthetic EPO having homogeneous biantennary sialyloligosaccharides that exhibited comparable bioactivity to the heterogeneous glycoprotein expressed in mammalian cell, which is a milestone in glycoprotein science.

The homogeneous glycoproteins prepared by Dr. Kajihara have been valuable tools to further our understanding of N-glycan function and have helped provide valuable insights into the role of oligosaccharides in protein re-folding processes in the ER and in the potent bioactivity of cytokines.

Prof Kajihara has published over 140 papers and reviews and he is a recipient of the 2014 Award of The Chemical Society of Japan for Creative work and the 2002 Encouragement Awards of Japan Society of Carbohydrate Research and the Encouragement Awards of Japan Society of Carbohydrate Research 2000 Encouragement Award of GlycoTokyo.

Prof. M. Carmen Galan

Secretary of the International Carbohydrate Organization (ICO)

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