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Carbohydrate Research

journal homepage: www.elsevier.com/locate/carres

Foreword

Glycoscience as a challenge: from synthesis to function

Dedicated to Johannis Paulus (Hans) Kamerling

Hans Kamerling was born on August 16, 1944 in Middelharnis, the Netherlands. This village is located in the province of Zeeland, in the southwestern part of the country, close to the North Sea. This area was struck on the night of 31 January–1 February 1953 by the Beatrix Flood, which caused a great disaster that affected a great part of the coastlines of the Netherlands, England, Belgium, Denmark, and France. Officially, 1836 people were killed in the Netherlands. Hans and his family had to leave their home and live for several months in a non-damaged part of the Netherlands. He received his secondary education at the Rijks H.B.S. in Middelharnis. His teacher in chemistry stimulated him to follow his interests in this discipline with studies at a university. Hans accepted this advice and studied chemistry at Utrecht University from 1962 to 1969. The master's degree study comprised a major in bio-organic chemistry with mass spectrometric sequence analysis of amino acids in small peptides as the main topic. His supervisors were Professor Joseph Arens and Dr. Hans Vliegthart. Peptides were at that time the main research interests of the laboratory, and new mass spectrometric facilities in the laboratory for analytical chemistry made it feasible to analyze peptide derivatives. He took a minor in microbiology and performed studies on mutants of *Streptococcus mutans* in relation to caries. His supervisors were Professor Peter de Haan and Dr. Jan van Houte. From these studies he kept a life-long interest in mass spectrometry and bacterial polysaccharides.

When I got the opportunity to start a new research group at Utrecht University in bio-organic chemistry in 1968, I decided to take glycoscience as the central theme. I invited Hans as the first PhD student to join the group in 1969, soon followed by Dick Streefkerk and Johan Haverkamp. The group successfully explored the power of advanced mass spectrometry and NMR spectroscopy for the characterization of glycostructures leading to Hans' PhD degree in 1972 as the first from the group. The 2nd International Symposium on Glycoconjugates organized by Professor Jean Montreuil in Lille, France in 1973 marked a milestone in this research area. We presented our results for this select group of scientists and made many new personal contacts, leading to several fruitful collaborations and friendships. Along this route, a joint project on the structure determination of sialic acids was started with Professor Roland Schauer, first in Bochum, then later in Kiel, Germany. Since that time numerous joint studies have given rise to many exciting results, and Hans still today continues these collaborations. Influential for his career were his fruitful postdoctoral periods, first with Professor Bengt Lindberg in Stockholm, Sweden in 1974, which proved crucial for his work on polysaccharides, and then with Professor Akira Kobata in Kobe, Japan, where he was able to familiarize himself with modern separation techniques for closely

related glycans. In the period 1976–1981, Hans broadened his scope of interest by an association with the division, Inborn Errors of Metabolism of the Academic Wilhelmina Children's Hospital in Utrecht. With Professor Syb Wadman and colleagues, he explored the analysis and synthesis of amino acids, peptides, and organic acids that accumulated in the physiologic fluids of patients. Further extensions of his research interests were the synthesis of oligosaccharide fragments of polysaccharides, mostly in relation to the development of a new generation of carbohydrate-based vaccines and glycoprotein–glycans. Later groundbreaking studies on carbohydrate-mediated interactions were performed. He has reported as a (co)author the exciting results in about 400 papers in journals and books and in more than 40 PhD theses with him as (co)supervisor (For details see: <http://www.bijvoet-center.nl/boc2/contact/kamerling>). He has presented close to 200 communications at scientific meetings and international symposia. His extensive research activities are based on a profound knowledge of the field and are characterized by an imaginative approach of the problem. Furthermore, his investigations are always performed and reported in an exceptionally accurate manner.

His splendid scientific work was recognized at Utrecht University by his appointment as Utrecht University Fund Professor of natural products in 1990, then subsequently as full Professor in bio-organic chemistry in 2000 and Chairman of the department of bio-organic chemistry in 2003. The carbohydrate community also owes him considerably for his contributions to the editorial boards of the *Glycoconjugate Journal*; *Archives of Biochemistry and Biophysics*; *Journal of Carbohydrate Chemistry*; *Recueil des Travaux Chimiques des Pays Bas*; *Biochemistry: an Indian Journal*; *Chemistry: an Indian Journal*. In particular, his work as a member of the Board and Editor of *Carbohydrate Research* should be mentioned. He has been (co)editor of several books, but the magnum opus is *Comprehensive Glycoscience*, which appeared in four volumes in 2007. Many scientific national and international organizations and bodies for science and/or education have benefited from his thoughtful contributions. Importantly, he acts as the Netherlands representative in the European and International Carbohydrate Organizations; of the latter he is also secretary. Outstanding and indispensable were his contributions as secretary of the organizing committees of three main conferences held in the Netherlands: 'The International Carbohydrate Symposium' in Utrecht in 1984, the 'European Carbohydrate Symposium' in Utrecht in 1997, and the 'International Symposium on Glycoconjugates' in The Hague in 2001. In recognition of his great contributions to glycoscience he has received the following awards: the Roy L. Whistler Award from the International Carbohydrate Organization in 1990, the doctorate honoris causa from the L. Kossuth University, Debrecen,

Hungary in 1999, and he was appointed Professor Invitato of Havana University, Havana, Cuba in 2002.

Now, at the age of 65, he will retire from Utrecht University. Fortunately, he will continue as extraordinary Professor at Groningen University, in the northern part of the Netherlands. Hopefully, the glycoscience community can profit from his rich knowledge and experience for many years to come.

Hans Vliegenthart
Bijvoet Center, Utrecht University,
Utrecht, The Netherlands
Tel.: +31 30 253 2184; fax: +31 30 254 0980.
E-mail address: j.f.g.vliegenthart@uu.nl