

## COINS Seminar #49

**[Date]** 24/October/2019 (Thu.) 16:00-17:15 (Registration Open at 15 : 30)

\* Research Mixer 17:15-18:15 \*JPY500

**[Venue]** Innovation Center of NanoMedicine (iCONM) 3F 3001 Meeting room

**[Registration]** URL: [https://www.cis-trans.jp/coins\\_seminar49/index.html](https://www.cis-trans.jp/coins_seminar49/index.html)

Title : Multivalent Nanosystems and Supramolecular Dendritic Architectures

Abstract : Multivalency is a ubiquitous phenomenon in nature involving complex binding mechanisms for achieving non-covalent strong yet reversible interactions. Interfacial multivalent interactions at pathogen-cell interfaces can be competitively inhibited by multivalent scaffolds that prevent pathogen adhesion to the cells during the initial stages of infection, while monovalent inhibition fails to inhibit the biological pathway. The lack in understanding of complex biological systems makes the design of an efficient multivalent inhibitor a toilsome task and is the reason why as of yet no multivalent anti-infective has emerged on the market until now. This talk will focus on the design and application of dynamic 2D and 3D multivalent nanosystems as potent inhibitors for pathogens.



Speaker : Prof. Dr. Rainer Haag

Affiliation : Freie Universität Berlin, Germany

Position : Chair Professor of Organic and Macromolecular Chemistry,

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<CV>

Rainer Haag, born 1968, is Full Professor in Organic and Macromolecular Chemistry at the Freie Universität Berlin. Since 2008 he is the head of a collaborative research center SFB 765 "Multivalency a chemical organization and action principle". His research interests are dendritic polymers as highly functional polymeric supports for catalysis, macromolecular nanotransporters for DNA- and drug-delivery and protein resistant material surfaces. In 2004 his group was awarded the young investigator NanoFutur award from the German Ministry of Science (BMBF) and in 2010 the Arthur K. Doolittle Award of the American Chemical Society (ACS) for their work on "multifunctional nanotransport systems". He is also advisor for two start-up companies (nanopartica and Dendropharm) that license the group's technology. With Dendropharm he received the Innovation award Berlin-Brandenburg 2016.

Rainer Haag completed his PhD thesis (1995) on Highly Strained Acepentalene Derivatives with Prof. A. de Meijere, University of Göttingen, Germany. In 1994 he joined the group of Prof. M. Rabinovitz, Hebrew University, Jerusalem (Israel) as a Research Fellow. In 1996-1997 he worked as a Postdoc with Prof. S. V. Ley, University of Cambridge (England) on the total synthesis of Spongistatine and soluble polymeric supports for combinatorial synthesis. As a research fellow (1997-1999) with Prof. G. M. Whitesides, Harvard University, Cambridge (USA) he worked on the electronic properties of self-assembled monolayers, nanostructuring of surfaces and multivalent drugs. From 1999 until 2002 he completed his habilitation on "Dendritic Polymers as High-loading Supports for Organic Synthesis and Drug-Delivery" and was research group leader at the Materials Research Center (FMF) of the University of Freiburg (Mentor: Prof. Rolf Mülhaupt). He is recipient of the ADUC-Habilitanden prize 2000, the Reimund-Stadler prize 2001 and the Heinz-Maier Leibnitz prize 2002 of the German Chemical Society. In 2003 he received the Dozenten Award of the German Chemical Industry. He was a co-founder of Hyperpolymers, a company specialized on dendritic polymers. In May 2003 he became Associate Professor in Organic Polymer Chemistry at the University of Dortmund. In 2004 Rainer Haag accepted a Chair position at the Freie Universität Berlin.

<Award>

- 2019 JSPS International Fellowship for Research in Japan
- 2016 Innovation Award Berlin-Brandenburg with the startup company DendroPharm
- 2015 Research Building "SupraFAB" (granted by the German Research Council)
- 2014 Teaching Award for the Concept "Translation of Project Ideas", Freie Universität Berlin
- 2014 Honorary Life-time Fellow of the Indian Society of Biology and Chemistry
- 2010 Arthur Doolittle Award of the American Chemical Society (ACS)
- 2004 Nanoscience Award for Young Scientists from the Ministry of Science (BMBF)
- 2003 Early Career Award of the German Chemical Industry (VCI)
- 2002 Heinz Maier-Leibnitz-Prize of the German Science Foundation (DFG)
- 2001 Reimund-Stadler-Prize of GdCh-Division Macromolecular Chemistry
- 2000 ADUC-Habilitation-Award of the German Chemical Society (GDCh)
- 1997 Selected Member of the Study Foundation of the German People

<Key words>

multivalency, nanosystems, monocytes/macrophages, inflammatory diseases