

Title A Bioorganometallic Journey from Peptide
Bioconjugates to Novel Metal-based Antibiotics

Speaker Prof. Dr. Nils Metzler-Nolte
Professor,
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Date & Time Friday, May 31, 2019 3:00 p.m.

Place I²CNER hall, I²CNER Bldg.1, Ito Campus, Kyushu University

Abstract

Our group uses the unique spectroscopic and chemical properties of organometallic complexes for research in biomedical applications. The experimental challenge is to identify air- and water stable organometallic compounds with the desired properties, and to devise methods for the mild, biocompatible synthesis of bioconjugates with these metal complexes.

This presentation will highlight various synthetic strategies to obtain bioactive metal-peptide bioconjugates that have been developed in our group, and will present some exemplary biomedical applications of such metal complexes and metal-peptide conjugates. I will show how the versatile reactivity of metal complexes can be matched with peptide chemistry and purification techniques. Potent novel anticancer agents based on a number of different metals such as Fe, Ru, Re, and Au were developed, characterized and tested for their antiproliferative activity against a range of different cancer cells. In-depth studies were carried out to study uptake and intra-cellular localization of the compounds, as well as their potential mode of action. Also, I will present novel organometallic-peptide conjugates with very potent antibacterial activities that even surpass that of a last-resort antibiotic, vancomycin. Importantly, these organometallic-peptide conjugates have a novel mode of action, allowing them to avoid the common mechanisms of bacterial resistance. As a promising outlook towards clinical applications, these conjugates can be optimized to have little toxicity against human cells and low hemolytic potential.

About the Speaker

SPhD (Dr. rer. nat.), University of Munich, Inorganic Chemistry, 1994
Postdoc (with M. L. H. Green), University of Oxford, UK, 1995 - 1996
Associate Professor, University of Heidelberg, 2000 - 2006
Full Professor (W3), Chair of Inorganic Chemistry I, Ruhr-University Bochum, 2006 –
Dean of the Ruhr-University Research School for Graduate Studies, 2009 - 2012
Vice-President for Early Career Researchers and International Affairs of Ruhr University
Bochum, 2010 - 2012

Host: Professor Seiji Ogo

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