Polymers under Multiple Constraints

Kolloquium

Thursday,

23rd October 2014

at: **5.15 pm**

Gustav-Mie-Hörsaal, Theodor-Lieser-Str. 9, 06120 Halle

Coffee will be served from 4.45 pm!

Prof. Dieter Willbold

Institut für Physikalische Biologie, Heinrich-Heine-Universität, Düsseldorf, Germany
and
Institute of Complex Systems, ICS-6: Structural Biochemistry, Research Centre Jülich, Jülich

Aβ oligomer directed therapy and diagnosis of Alzheimer's disease

Alzheimer's disease (AD) is a progressive neurodegenerative disorder. Several lines of evidence suggest a central role of amyloid-β-peptide (Aβ) in the pathogenesis of AD. More than Aβ fibrils, small soluble and prion-like Aβ oligomers are suspected to be the major toxic species responsible for disease development and progression. Therefore, these oligomers should be our major target for therapy and used as the most direct biomarker for diagnosis and therapy monitoring.

Diagnosis: The Aβ oligomer count in CSF of AD-affected and healthy persons as determined by our new ultrasensitive surface-based fluorescence intensity distribution analysis (sFIDA) assay revealed a surprisingly clear distinction between both groups. All samples of the control group showed homogenously low numbers of Aβ oligomers, while the samples of the AD group exhibited significantly higher levels of Aβ oligomers with high variability. The Aβ oligomer levels clearly correlated with the patients' mini-mental state examination (MMSE) scores.

Therapy: We present our newest in vitro and in vivo results on D-enantiomeric peptide derivatives that specifically eliminate to Abeta oligomers and convert them into non-amyloidogenic, non-fibrilar and non-toxic species without increasing the concentration of monomeric Aβ. We show that next to plaque load and inflammation reduction, oral application of the compounds slowed down neurodegeneration and improved cognitive performance in transgenic AD mouse models.