TECHNISCHE UNIVERSITÄT WIEN
Vienna University of Technology

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IAP-SEMINAR

EINLADUNG

Termin: **Dienstag, 26.11.2013 um 16:00 Uhr**

Ort: **Technische Universität Wien,**
Institut für Angewandte Physik,
Seminarraum 134A, Turm B (gelbe Leitfarbe), 5. OG
1040 Wien, Wiedner Hauptstraße 8-10

Vortragender: **Dr. Willem Vanderlinden**
KU Leuven, Molecular Imaging and Photonics, Leuven/Belgium

Thema: **Quantitative Scanning Force Microscopy of the Loops and Curls in DNA**

Kurzfassung

When Watson and Crick first proposed their double helix model for dsDNA, they mentioned: *"Since the two chains in our model are intertwined, it is essential for them to untwist if they are to separate. Although it is difficult at the moment to see how these processes occur without everything getting tangled, we do not feel that this objection would be insuperable"* The entanglement of DNA and Nature's way of coping with it is the subject of DNA topology.
In my talk, I will discuss how the geometry of topologically constrained DNA molecules changes on surface adsorption. This knowledge is crucial for the quantitative assessment of DNA-ligand interactions employing scanning force microscopy (SFM). Furthermore, I will elaborate on the in situ DNA surface dynamics at the solid-liquid interface. Next, results on the DNA structural impact of photo-oxidative Ru(II)-complexes are presented. Ru(II)-complexes comprising at least two TAP (TAP = 1,4,5,8-tetraazaphenanthrene) ligands can cleave the DNA backbone or form covalent adducts with guanine bases on blue light irradiation, and are as such of great interest in the framework of photodynamic therapy. It is shown how DNA binding in the ground state affects the outcome of the reaction in the excited state, and how mono- and bis-adducts alter the mechanical and topological properties of DNA.
The last part of the talk deals with the DNA binding properties of the human transcription factor LEDGF/p75, which acts as a molecular protein hub tethering various pathogenic protein complexes to transcriptionally active regions in the human genome. Among these cargo protein complexes are the HIV pre-integration complex and the MLL histone-methyltransferase, and LEDGF/p75 therefore acts as a critical cofactor in the development of HIV/AIDS and leukemia. Employing two novel SFM-based methodologies to reveal details about the DNA conformation inside nucleoprotein complexes, we have shown that (i) dimers of LEDGF/p75 can form synapses in DNA and (ii) LEDGF/p75 induces flexible bends in DNA in a torque-dependent manner. It will be discussed how these properties relate to the biological functions of LEDGF/p75 as a cofactor in the pathogenesis of AIDS and leukemia.

Alle interessierten Kolleginnen und Kollegen sind zu diesem Seminar
(45 min mit anschließender gemeinsamer Diskussion) herzlich eingeladen.

U. Diebold e.h.
(Seminar-Chairperson)

H. Störi e.h.
(LVA-Leiter)