Institut für Angewandte Biowissenschaften

Institutskolloquium

am 02.09.2015 um 16:00 Uhr
Haus 16, Raum 1095

Gastvortrag am Institut für Angewandte Biowissenschaften:

Dimitri E. Khoshtariya:,

Institute for Biophysics and Bionanosciences, Department of Physics, I. Javakhishvili Tbilisi State University, 0128, Tbilisi, Georgia,
*Department of Chemistry and Pharmacy***,** *Friedrich-Alexander University of Erlangen-Nürnberg, 91058 Erlangen, Germany*
Department of Chemistry, University of Pittsburgh, Pittsburgh, PA 15260, USA
Department of Biophysics, I. Beritashvili Center for Experimental Biomedicine, 0160 Tbilisi, Georgia

„Protein-film voltammetry as a powerful biophysical method for mimicking and mechanistic studies of biological electron transfer“

Redox-active proteins can be diversely functionalized at metal-deposited self-assembled monolayers (SAMs) of widely variable composition and thickness. The voltammetric methodology in combination with the advanced theory-based data processing procedures allow for comprehensive kinetic data analyses within the congruent series of nano-devices and the subsequent calculation of the key physical parameters, such as the rate constant, medium reorganization energy of ET, the donor-acceptor electronic coupling, effective relaxation time (related to fluctuational dynamics of the complex environment), etc. In this presentation, the unique results of in-depth mechanistic protein-film voltammetry studies of the last decade, for a number of representative prototype redox-active proteins, cytochrome *c*, azurin, myoglobin, glucose oxidase, as well as for a few of bio-mimicking assemblies, will be reviewed. The mechanistic aspects to be considered include the following: (a) long-range electron tunnelling, (b) dynamic (frictional) control by cooperative fluctuations, (c) ET coupling to ligands' inner-sphere reorganization, (d) proton-coupled two-electron transfer, (e) medium's nonlinear response to ET, (f) broken ergodicity for ET (dynamical arrest)