SEMINARIUM RENTGENOWSKIE

Dnia 4 września 2012r. o godz. 10.30 , w sali D Instytutu Fizyki PAN, odbędzie się seminarium, na którym dr Jarosław Majewski z Lujan Neutron Scattering Center, Los Alamos National Laboratory, Los Alamos, New Mexico, wygłosi referat p.t.:

"Interaction of Alzheimer's Disease Tau Protein and Amyloid-Beta with Model Lipid Membranes"

Abstract:

Amyloid plaques and tau neurofibrillary tangles comprise pathological hallmark of Alzheimer's disease (AD). The mechanism of tau's misfolding and aggregations as well as the amyloid-beta aggregation are unknown, but evidence suggests that they in AD brains may abnormally interact with the neuronal cell membrane. Using lipid monolayers at the air/water interface and supported lipid bilayersas model membrane systems, we characterized the interaction between tau and amyloid constructs and with membranes of different lipid compositions and elucidated the structure of the protein-membrane films using a combination of biophysical techniques, including pressure-area isotherms, fluorescence microscopy, and x-ray and neutron scattering. For example, our data show that the full length human tau (hTau40) and its constructs are highly surface active and exhibited strong association with negative DMPG lipids and induced morphological changes observed with fluorescence microscopy, while exhibiting weaker and no interactions with positive DMTAP and neutral DMPC lipids. To elucidate molecular-scale structural details, we used X-ray scattering techniques to study tau and lipid monolayer association. X-ray reflectivity modeling indicated hTau40's presence under a DMPG monolayer and partial insertion into the lipid headgroup region, while grazing incidence X-ray diffraction data showed hTau40 insertion disrupted lipid packing. We also used neutron reflectivity assays to investigate hTau40's ability to disrupt lipid bilayers. The protein completely disrupted a DMPG bilayer while not affecting a neutral DPPC bilayer. These results indicate hTau40 has a propensity to interact with a negatively charged membrane surface and disrupt lipid packing, suggesting a possible protein-aggregate induced mechanism for aggregation and toxicity.

Dr Iraida Demchenko