SFB 1078 Protonation Dynamics in Protein Function

Colloquium

Mon, **Nov. 11**,2024

15:15 – 17:30

Freie Universität Berlin

SupraFAB, Room 201

(Altensteinstr. 23a, 14195 Berlin)

Dr. Gustavo Fuertes Vives – Institute of Biotechnology of the Czech Academy of Sciences, Czech Republic

Triggering and monitoring biological responses in natural and engineered photoreceptors with genetically encoded non-canonical amino acids

Non-canonical amino acids (ncAA) introduced by genetic code expansion are useful tools to generate proteins with novel properties and functions. In the field of photosensory reception, ncAA can be leveraged in, at least, two different ways: as reporters to monitor light-induced structural rearrangements in photoactive proteins, and as phototriggers to initiate reactions upon irradiation of non-photoactive proteins. On the one hand, I will show the power of ncAA carrying vibrational tags (nitriles, alkynes) to detect the evolution of EL222 (a transcription factor regulated by blue light) microenvironments along the photocycle by infrared/Raman spectroscopies. On the other hand, I will present our efforts to photocontrol protein conformational changes (variants of photoactive yellow proteins devoid of its native chromophore) and protein-protein interactions (complex formation between interleukin-24 and is receptors) based on photocaged/photoswitchable ncAA. Overall, our integration of ncAA and vibrational spectroscopy sheds light on the structural dynamics of light-oxygen-voltage (LOV) sensors. Similarly, by merging ncAA and protein design, we can create new-to-nature photofunctional proteins.

Prof. Dr. Helge Ewers – Professor for Membrane Chemistry, Department of Biology, Chemistry, and Pharmacy, Freie Universität Berlin, Germany

Biophysics of viral internalization

Viruses need to enter cells for their reproduction. All the means they have to enter cells is encoding binding to receptors that allow for their entry into the structure of their surface proteins. In this way, they must exploit preexisting cellular mechanisms for their internalization and intracellular delivery. We found here a purely biophysical mechanism for viruses that enter cells via polyvalent binding to glycolipids. Our data show that multivalent, lipid binding globular particles such as viruses enter cells without the need of the clathrin endocytic machinery. Their internalization depends merely on reaching a threshold in adhesion energy that is required for membrane deformation, which leads to internalization.

C offee and tea will b e a vailable during the break at 16:15

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