



Guest Lecture

of the

RTG Molecular Basis of Sensory Biology

Thursday, 1st February 2018,
17.00 h s.t., room W3-1-152

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“Fluorescence microscopy and spectroscopy for dynamic structural biology: tools and applications”



Abstract

Membrane transporters are vital to any living system and involved in the translocation of a wide variety of substrates. Despite their importance, all proposed molecular models for transport are based on indirect evidence due to the inability of classical biophysical and biochemical techniques to visualize dynamic structural changes. My group has recently started to use single-molecule fluorescence microscopy to characterize conformational states and changes in active membrane transporters in vitro to directly observe how different steps in transport are coordinated.[1-3]

In the first part of my talk I provide an overview of our mechanistic contributions to the field of primary[1,2] and secondary active transporter[3] with a focus on conformational dynamics of the soluble periplasmic domains. In the second part of the talk, I describe our latest developments of "enabling technology" for mechanistic studies, i.e., advanced biophysical assays[4] and the development of "self-healing" organic fluorophores with their applications in single-molecule FRET or super-resolution microscopy.[2]

[1] G. Gouridis et al., *Nature Structural & Molecular Biology* 22 (2015) 57-64

[2] J.H.M. van der Velde et al., *Nature Communications* 7:10144 (2016)

[3] A. A. Jazi et al., *Biochemistry* 56 (2017) 2031-2041

[4] E. Ploetz and E. Lerner et al., *Scientific Reports* 6:33257 (2016)