EuroSciCon

10th Edition of International Conference on

Structural Biology

March 15-16 2018
Barcelona, Spain

Richard Neutze et al., Biochem Mol biol J, Volume 4
DOI: 10.21767/2471-8084-C1-008

TIME-RESOLVED DIFFRACTION EXPERIMENTS AT AN X-RAY FREE ELECTRON LASER REVEALS STRUCTURAL CHANGES IN BACTERIORHODOPSIN

Richard Neutze[1], Eriko Nango[2,3], Tomoyuki Tanaka[2,3], Takanori Nakane[2,3], So Iwata[2,3], Antoine Royant[4], Jörg Standfuss[5], Przemyslaw Nogly[5] and **Cecilia Wickstrand[1]**

[1]University of Gothenburg, Sweden
[2]Kyoto University, Japan
[3]Riken SPring-8 Center (SACLA), Japan
[4]ESRF, France
[5]Paul Scherer Institute, Switzerland

X-ray free electron lasers (XFEL) provide a billion-fold jump in the peak X-ray brilliance when compared with synchrotron radiation. One area where XFEL radiation has an impact is time-resolved structural studies of protein conformational changes. This presentation will describe how we used time resolved serial femtosecond crystallography at an XFEL to probe light-driven structural changes in bacteriorhodopsin. Bacteriorhodopsin is a light-driven proton pump which has long been used as a model system in biophysics. The mechanism by which light-driven isomerization of a retinal chromophore is coupled to the transport of protons "up-hill" against a transmembrane proton concentration gradient involves protein structural changes. Collaborative studies performed at SACLA (the Japanese XFEL) have probed structural changes in microcrystals on a time-scale from nanoseconds to milliseconds. Structural results from these studies enabled a complete picture of structural changes occurring during proton pumping by bacteriorhodopsin to be recovered.

Biography

Richard Neutze took his PhD in Physics in 1995 from the University of Canterbury (New Zealand). He was introduced to Molecular Biophysics at Oxford University (England); completed a Postdoc at Tübingen University (Germany); and then moved to Uppsala University (Sweden). In 1998, he became Assistant Professor at Uppsala University and he moved his group to Chalmers University of Technology in 2000. In 2006, he was appointed Professor of Biochemistry at the University of Gothenburg. He has worked on the structural biology of aquaporins; bacterial rhodopsins; photosynthetic reaction centres; and time-resolved diffraction and time-resolved wide angle X-ray scattering studies of membrane proteins, using both synchrotron radiation and X-ray free electron lasers.

richard.neutze@gu.se