

Mo 30. September 2019
Time: 16:30 h

Dept. of Chemistry and
Biochemistry (DCB)
Freiestrasse 3, 3012
Bern, Room S481

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This lecture is hosted by
Prof. Dimitrios Fotiadis
(IBMM) and is offered
within the framework of
the Seminars in
Biochemistry (DCB).

NCCR TransCure Lecture in Biology by Ramona Schlesinger

Proton translocations in Channelrhodopsin-1 from *Chlamydomonas augustae*

A new research field named optogenetics aims of triggering physiological light responses in individual cells or tissues. One interesting candidate for optogenetic applications is channelrhodopsin-1 from the eyespot of the alga *Chlamydomonas augustae* (CaChR1), which naturally translocates cations upon light excitation during the process of phototaxis. As in CaChR1 the absorption maximum is red shifted compared to other members of its class it can be better activated in deeper tissues as light of longer wavelength can penetrate easier. We are looking into the question how activity of light excitable proteins is connected to protonation dynamics. In our approach on the photocycle of CaChR1 we want to understand which amino acids are involved in protonation/deprotonation events taking place during activity. For this purpose different variants have been created and analyzed with time-resolved UV-Vis spectroscopy and FT-IR difference spectroscopy. We were able to assign several bands to individual amino acids in the carboxylic region as well as S-H region. A special attention has been drawn to the involvement of cysteines to the mechanism of the channel as seven out of fourteen cysteines in total are localized in a belt like formation in the core of the protein flanking the chromophore retinal. We could show that two cysteines influence assigned signals in the carboxylic region indicating a direct or indirect interaction with carboxylates hereby illustrating, at least in one case, a key role in a proton translocation process.