SFB 1078

Protonation Dynamics in Protein Function

▶ Colloquium

▶ **M. Agustina (Tina) Domínguez-Martín** – Department of Biochemistry and Molecular Biology University of Córdoba (Spain)

Exploring Cyanobacterial Photosynthetic Light Harvesting: Structural Insights, Diversity, and Regulatory Mechanisms

Phycobilisomes (PBS) are intricate light-harvesting antennas found in cyanobacteria. To balance light energy harvesting with the risk of photodamage, many cyanobacteria have evolved a photoprotective mechanism involving the interaction between the photoreceptor Orange Carotenoid Protein (OCP) and PBS. Recently, the structure of PBS and the OCP-PBS complex has been elucidated in the model organism *Synechocystis* PCC 6803, with resolutions ranging from 1.6 to 3.5 Å. These structures revealed three distinct conformational states of the antenna, including two previously unknown in the unquenched PBS. The PBS-OCP complex showed four OCP molecules arranged as two dimers, which act to quench the PBS. Structurally, it appears that different PBS architectures may influence OCP binding. Currently, we are biochemically and spectroscopically characterizing OCPs and PBS from various marine cyanobacteria species. New homologous families of the constituent domains of OCP have recently been identified (Melnicki et al., 2016). Nine distinct clades of N-terminal domain homologs, referred to as Helical Carotenoid Proteins (HCPs), have been described across diverse cyanobacteria. Homologs of the C-terminal domain (CCPs) have also been found in nearly every genome encoding an HCP. It is likely that OCP originated from the fusion of HCP and CCP into a single polypeptide. We are currently investigating a marine cyanobacterium that possesses a more complex OCP-related system. Our ongoing research aims to provide insights into the regulation of photosynthesis and photoprotection in these ecologically significant species.

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

Freie Universität Berlin · TU Berlin · Humboldt-Universität zu Berlin · CHARITÉ UNIVERSITÄTSMEDIZIN BERLIN · FMP Leibniz-Institut für Molekulare Pharmakologie · JUSTUS-LIEBIG-UNIVERSITÄT GIESSEN