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STUDY OF EXTRINSIC PSB PROTEINS OF PHOTOSYSTEM II BY SOLUTION NUCLEAR MAGNETIC RESONANCE

Adriana Rathner[1], Michal Kamenický[1], Michaela Horničáková[1], Kousik Chandra[1], Norbert Müller[1], Jaroslava Kohoutová[2], Rüdiger Ettrich[2], Linda Cerofolini[3] and **Claudio Luchinat[3]**

[1]Johannes Kepler Universität Linz, Austria
[2]Academy of Sciences of the Czech Republic, Czech Republic
[3]University of Florence, Italy

Nuclear magnetic resonance (NMR) is a powerful technique which enables characterization of various biomolecules in solution. This way one is able to track more accurately the dynamic properties and changes in the structure over time and varying conditions (temperature, salt concentration, ligand addition, and pH). Psb proteins of photosystem II are a class of extrinsic proteins located on the cytosolic part of the oxygen evolving center. They help to maintain proper conditions for the water splitting reaction ultimately leading to the release of molecular oxygen. We have studied so far three representatives: PsbP (23 kDa), PsbQ (16 kDa) and PsbO (33 kDa). Using NMR we have been able to determine 3D structures of PsbP and PsbQ in solution including their highly flexible regions whose characterization was hindered with the use of other techniques (X-ray and Cryo-electron microscopy). The most interesting information about detailed interplay of those proteins and its dependence on the presence of metal cations has been studied using combination of techniques, such as titration and chemical exchange NMR technique (CEST), isothermal titration calorimetry (ITC) and microscale thermophoresis (MST).

Biography

Adriana Rathner obtained her Double Bachelor's Degree in Biological Chemistry at Johannes Kepler University Linz (Austria) and the University of South Bohemia (Czech Republic) in 2010. Her Bachelor's thesis dealt with the optimization of synthesis of dipeptides for isotope labeling and pilot expression of outer surface protein from pathogenic Borrelia, respectively. She then continued in the Joint Master's Program of Biological Chemistry and within her thesis, worked with recombinant photosynthetic protein PsbP and its initial NMR characterization in the group of Professor Norbert Müller (JKU Linz). Since 2013, she is a PhD student in the same group with the main focus on large scale production of isotopically labeled proteins of photosystem II and their subsequent study by various solution nuclear magnetic resonance (NMR) techniques.

adriana.rathner@jku.at