

**COMPUTATIONAL STUDIES OF TWO CYTOCHROMES  $c_6$  FROM  
CYANOBACTERIA *Synechococcus* sp. PCC 7002****KAMIL TAMIOLA and ANDRZEJ SZCZEPANIAK**Institute of Biochemistry and Molecular Biology, University of Wrocław,  
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The electron transfer between two membrane-bound complexes: cytochrome *b<sub>6</sub>f* and photosystem I (PSI) can be accomplished by the copper-containing protein – plastocyanin (PC). Higher plants use PC as the only electron donor whereas most of green algae and cyanobacteria can use either PC or cytochromes, depending on the copper concentration. There is a great amount of data containing information about sequences and the structures of cytochromes  $c_6$ . However the cyt  $c_6$  from *Synechococcus* sp. PCC 7002 seem to be exceptional proteins. An extensive research aimed to characterize proteins involved in photosynthetic pathways in discussed cyanobacteria showed the presence of two genes (*petJ1*, *petJ2*) encoding slightly different cytochromes  $c_6$  [1]. It is the first known example of presence of two cytochrome  $c_6$  genes in a single cyanobacterium cell. Moreover, a precise sequence analysis of these two proteins has given us remarkable information about the unique phosphorylation site in PetJ1 isoform not found in PetJ2 and other representatives of  $c_6$  family. Due to this, theoretical models has been built (PDB ID: 1T58 and 1T59, PetJ1 and PetJ2, respectively) and extensive research has been performed to give strong basis for empirical investigation of PetJ1 and PetJ2 futures. The molecular docking with casein kinase II catalytic subunit, isoelectric point (structure dependent solution of Poisson-Boltzman equation) and redox potential calculation have been done, giving satisfying 95% accuracy. The acquired data will be used to prepare initial conditions for *in vitro* and *in vivo* phosphorylation of PetJ1 and explanation of this phenomenon in the context of photosynthetic pathways.

**REFERENCE**

1. Nomura, Ch.T. Electron transport proteins of *Synechococcus* sp. PCC 7002. PhD thesis. The Pennsylvania State University, 2001.