

Cyanophycinase: A dispensable enzyme of key importance

Éva Kiss, Laboratory of Photosynthesis

Cyanophycin is a nitrogen (N)-rich biopolymer synthesized by many cyanobacteria. It is built from the amino acids arginine (Arg) and aspartate (Asp), and its accumulation is determined by the amount of Arg in the cell. Cyanophycin-, and particularly Arg metabolisms comprise the most complex and poorly understood metabolic pathways in living organisms. To contribute to this widely unexplored field, we studied the cyanophycinase enzyme (CphB) that catalyses the first step of cyanophycin degradation (mobilization of N stockpile). CphB of *Synechocystis* sp. PCC 6803 interacts with Gun4 and ArgD that are essential proteins involved in the biosynthesis of photosynthetic pigments and Arg, respectively. Despite of its complex formation with Gun4, the deletion of CphB (Δ cphB) had only marginal effects on the accumulation of chlorophyll and bilins, and did not seem to affect photoautotrophy. However, Δ cphB was depleted of Arg that was detrimental specifically during heterotrophic growth. Our data reveals the role of CphB in the regulation of Arg biosynthesis, which has key importance under none-photosynthetic conditions.