Connections between nitrogen and photosynthesis regulatory networks: Role of PII from *Synechococcus* sp. PCC 7942 in acclimation to changes in nitrogen availability.

Asunción Contreras, Javier Espinosa, Sergio Burillo, and Inmaculada Fuentes.

*Universidad de Alicante. Apartado 99. E-03080, Alicante. Spain*

Cyanobacteria respond to nutrient stress conditions by degrading their phycobilisomes, the light harvesting complexes for photosynthesis. We have investigated the involvement of the nitrogen signal transduction protein PII in the level of photosynthetic pigments in *Synechococcus* sp. PCC 7942. Under non starvation conditions, *Synechococcus* cells lacking PII show reduced levels of pigments [1] and, in addition, they require a longer period of time to recover after they are transferred to ammonium containing medium. In contrast, cells carrying PIIS49A, a PII protein that cannot be phosphorylated, require a longer period of time to enter chlorosis, thus suggesting that non-phosphorylated PII has a role in preventing bleaching of cultures. Yeast two-hybrid analysis indicate specific protein-protein interactions between the histidine kinase NblS and both PII and PIIS49A. The NblS mutant protein produced by the *nblS-1* strain, defective in signal transduction in vivo [2], was also defective for yeast two-hybrid interactions with PII and PIIS49A proteins. In the light of these data and of structural similarities found between the ATP binding domains of NblS and that of NtrB, whose structure has recently been determined [3], we propose that PII communicates signals of nitrogen sufficiency to NblS by a mechanism similar to the one used to regulate the NtrB/NtrC system in proteobacteria.