CONCERTED RESPONSES TO IRON AVAILABILITY IN CYANOBACTERIA

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Cyanobacteria are believed to be the first organisms to perform oxygenic photosynthesis. They have successfully conquered most of the environmental conditions on Earth. Their living habitats range from soil and freshwater to the open sea; and they contribute to a significant proportion of the CO_2 fixation, thus to the global biomass production. Beside their ecological importance, their capacity for adaptation has made the discovery of the underlying molecular networks a fascinating field of research.

An intriguing example for this adaptive capacity is given by iron homeostasis. Iron is an essential cofactor in many metabolic reactions, being a limiting factor for aquatic organisms due to its insolubility in the presence of oxygen. At the same time, due to its toxicity the concentration of intracellular iron must be under strict control. Therefore, the mechanisms controlling its homeostasis have to be coordinated with not only the extracellular conditions but also the general cellular state. Such coordination requires mechanisms on different time scales. Small RNAs, e.g. ryhB, have been shown to be crucial for fast responses while slower responses depend on modulation of transcription factors such as Fur. This complex behaviour needs to be approached by methods of *in vivo*, *in vitro* and *in silico* biology. Such an approach is presented here.