PERCEPTION OF LIGHT BY CYANOBACTERIA DURING CHROMATIC ADAPTATION

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In different light qualities certain cyanobacteria (we use one called *Fremyella diplosiphon*) adjust the composition of their light-harvesting complex to better absorb the prevalent wavelengths of light in the environment; this process is called complementary chromatic adaptation. The ability to perceive and adapt to changing light conditions is critical to the growth and development of photosynthetic organisms. Light quality and quantity vary on any given day because of changes in the cloud cover and pollution. Competition for light in aquatic environments may be particularly fierce because of shading among the different organisms and the disproportional absorption of light in the water column. To overcome this problem, certain cyanobacteria have developed the ability to harness as much as possible of the available light by altering the pigment-protein composition of their light-harvesting structures. A change in the light-harvesting composition, and generally, the physiology of the cell, is triggered by photoreceptors. Recently, we have identified a putative photoreceptor that controls complementary chromatic adaptation in cyanobacteria (Kehoe and Grossman, 1996). This photoreceptor has similarity to phytochrome, which regulates many developmental and physiological processes in plants. We have also identified other components of the signal transduction chain involved in complementary chromatic adaptation. Understanding the cyanobacterial photoreceptor and how it controls the physiology of the cell will help us understand how both physiological and developmental processes are controlled in plants.

1. Kehoe, D and A. R. Grossman (1996) Sensor of chromatic adaptation is similar to phytochrome and ethylene receptor. Science, **273:**1409-1412.