# How does the regulation of energy flow change acclimation to the environment?

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By turning light into chemical energy, photosynthesis allows photosynthetic cells to power their metabolism, maintain cellular integrity, replicate their organelles and genomes, and divide. The functioning of a phototrophic organism requires a tight coordination between the amount of light energy converted into photosynthetic electrons and the energy used by metabolic reactions. Such a function is particularly important as environmental variability can quickly put pressure on (i) metabolic energy demand, for example, through changes in nutrients like carbon or nitrogen availability, or on (ii) photosynthetic electron flow, through changes in light intensity or quality. The photosynthetic electron transport system is a key hub that regulates the cell's tight bioenergetic balance. In this talk, using examples from the green microalga *Chlamydomonas reinhardtii*, the cyanobacterium *Synechococcus*, and the diatom *Phaeodactylum tricornutum*, we will discuss how photosynthetic energy is coordinated to meet cellular energy demands in changing environments and how tuning the bioenergetic balance affects, positively or negatively, the ability of organisms to face dynamic environments. We will further explore how future technological and computational developments open a new era to understand how photosynthetic cells maintain their bioenergetic homeostasis in complex environments.

**References:**

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