Cyanobacterial pilins are essential for metal homeostasis.

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In *Synechocystis* cultures, a switch from the exponential growth phase to the linear naturally occurs with increasing OD. The growth rate is slowed down due to limiting conditions and the storage of photosynthetic assimilates leads to a step-wise downregulation of photosynthetic genes. The switch does not function in pili mutants resulting in a total blockage of their growth at surprisingly low OD (7 μg of chlorophyll ml^{-1}). Pilins are connected with cell motility and serve a broad spectrum of functions including secretion, cell aggregation, and extracellular DNA uptake. When pili mutants get to the blocked phase, they keep a high rate of chlorophyll-protein biosynthesis and degradation which exhausts cells and increases oxidative stress. The aging culture of the cells lose phycobiliproteins similar to manganese depletion and accumulate carotenoids. The same effect is present under low light conditions. The phenotype of the misregulation is more pronounced under manganese and iron deprivation. It is worth mentioning that pili are suspected to help with the mineral uptake but a theory of conductive pili that would mediate electron transport to reduce extracellular sources of minerals has been experimentally disproved. The role of pili subunits in mineral transport across the plasma membrane in *Synechocystis* will be discussed with attention to iron, manganese, and phosphate ions.