

Who gets the iron? Unique and universal features of siderophore transporters in cyanobacteria

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Abstract

Siderophore production is an energetically costly process that can confer a competitive advantage to the producer in iron-limited environments. However, many microorganisms act as "cheaters" — expressing siderophore transport genes to scavenge iron-loaded siderophores they do not themselves synthesise. The transport system thus becomes the next battleground in the evolutionary struggle for this essential resource.

Here, we characterise the import system of cyanochelin B, a photolytic lipopeptide siderophore produced by *Leptolyngbya* sp. NIES-3755. Putative import genes from the cyanochelin B transport cluster were cloned and heterologously expressed in *Synechocystis* sp. PCC 6803. Transporter specificity was assessed by cultivating the engineered strain in the presence of several xenosiderophores. Bioinformatic analysis revealed a correlation between transporter cross-specificity and phylogenetic relatedness, and uncovered a domain architecture unique to cyanobacterial TonB-dependent transporters.