Goldschmidt 2026 Abstract
https://doi.org/10.46427/gold2026.38095

Targeting possible metal oxidation genes in Leptothrix cholodnii SP-6

SERGIO PALACIOS JR.[1], OLUSHOLA AWOYEMI[2], LEVI MEDINA[1], JESSICA L KEFFER[2], CLARA S CHAN[2], KATI GESZVAIN[1] AND EMILY J FLEMING-NUESTER[1]

[1]California State University, Chico
[2]University of Delaware

Iron is an essential metal for all biological systems and can be oxidized biotically by organisms throughout the tree of life. Iron oxidation in neutrophilic freshwater iron-oxidizing bacteria has been inferred through a combination of comparative genomics, transcriptomics, proteomics, and other techniques. These previous studies have yielded many metal-oxidizing proteins, but metal oxidation and the specific proteins have not been directly linked through experimental strategies that cause a loss of function (i.e., deletions, disruption, and other direct genetic approaches). Leptothrix cholodnii SP-6 oxidizes iron, has multi-copper oxidases (MCOs), cytochromes, and porin cytochrome complexes (PCC) that are homologous to those present in other metal-cycling bacteria. L. cholodnii SP-6 is relatively easy to grow in the lab as a heterotroph, forms individual colonies, and has a promising genetic system, making it a model to identify genes associated with metal oxidation. To link gene products to metal oxidation, we deleted genes predicted to encode metal oxidation and measured growth and metal oxidation over time. Metal oxidation was altered in mutants compared to that of the L. cholodnii SP-6 wild type. Future work will focus on teasing apart the role each of the different proteins plays in metal oxidation.