Mechanisms of Trace Metal Assimilation in Marine *Roseobacters*

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The *Roseobacter* clade has been shown to be influential in the marine carbon, nitrogen, and sulfur cycles, but little is known as to how they influence the cyling of trace metals. Here we present case studies from bioinformatic genome mining and genetic analyses that point to molecular mechanisms of how the Roseobacter clade might influence the cycling of metals in their environments. We surveyed 42 marine Roseobacter genomes for the presence of uptake systems for oxidized, reduced, and chelated metal species. Systems for the acquisition of inorganic Mn, Fe, Co, Ni, Cu, and Zn were identified using sequence homology searches. Specific metal-chelates were assigned to predicted transporters and related components using sequence homology searches, genome neighborhood analysis, and Markov sequence clustering. We also report an unexpected putative role for tripartite ATP-independent periplasmic transporters in assimilation of metal chelates, particularly siderophores. Further, we describe the functional characterization of an outer membrane receptor required for heme uptake in a particular *Roseobacter*_strain, *Ruegeria* sp. TM1040, by insertional inactivation of a predicted TonB dependent transporter. Collectively, these findings refine the our knowledge of the specific metal compounds encountered and potentially utilized by microbes in marine environments.