

Microbial sulfur cycle in aquatic ecosystems

FUKUI, Manabu^{1*}, Hisaya Kojima¹

¹Institute of Low Temperature Science, Hokkaido University

Sulfur is essential for all organisms as major components of cell materials. There are also a variety of abundant inorganic sulfur compounds in the biosphere, and prokaryotic respiratory processes depending on these chemical species are major driving force of sulfur cycle in ecosystems. In the sulfur cycle, reductive processes are mainly mediated by sulfate-reducing prokaryotes (SRP). SRP are capable of dissimilatory sulfate reduction coupled with oxidation of organic matter, and this reaction is thought to contribute largely to anaerobic mineralization in aquatic ecosystems. Shen et al. (2001) demonstrated that microbial sulfate reduction had evolved by 3.47 Gyr ago, and suggested the earlier emergence of biological sulfur oxidation. Activity of SRP results in generation of sulfide, which supports growth of sulfur-oxidizing prokaryotes (SOP). Both SRP and SOP are polyphyletic, and their diversities in natural environments are drastically affected by temperature. We will discuss the relationship between microbial sulfur cycle and temperature.

Keywords: sulfate reduction, sulfur oxidation, microorganism, genome, aquatic environment, functional gene