

Sulfate-reducing bacteria

Source: Wikipedia.org

Sulfate-reducing bacteria comprise several groups of bacteria that use sulfate as an oxidizing agent, reducing it to sulfide. Most sulfate-reducing bacteria can also use other oxidized sulfur compounds such as sulfite and thiosulfate, or elemental sulfur. This type of metabolism is called dissimilatory, since sulfur is not incorporated - assimilated - into any organic compounds. Sulfate-reducing bacteria have been considered as a possible way to deal with acid mine waters that are produced by other bacteria.

Phylogeny

The sulfate-reducing bacteria have been treated as phenotypic group, together with the other sulfur-reducing bacteria, for identification purposes. They are found in several different phylogenetic lines. Three lines are included among the Proteobacteria, all in the delta subgroup:

- Desulfobacterales
- Desulfovibrionales
- Syntrophobacterales

A fourth group including thermophiles is given its own phylum, the Thermodesulfobacteria. The remaining sulfate-reducers are included with other bacteria among the Nitrospirae and the gram-positive Peptococcaceae - for instance *Thermodesulfovibrio* and *Desulfotomaculum*, respectively. There is also a genus of Archaea known to be capable of sulfate reduction, *Archaeoglobus*.

Environmental markers

The rotten egg odor of hydrogen sulfide is often a marker for the presence of sulfate-reducing bacteria in nature. Sulfate-reducing bacteria are responsible for the sulfurous odors of salt marshes and mud flats, as well as intestinal gas. Sulfate-reducing bacteria slowly degrade tough-to-digest materials that are rich in cellulose in anaerobic environments. Rather than breathing oxygen, they "breathe" sulfate. Sulfate occurs widely in seawater, sediment, or water rich in decaying organic material. Ecologically these bacteria are common in anaerobic environments. However during the Permian–Triassic extinction event a severe anoxic event seems to have occurred where these forms of bacteria became the dominant force in oceanic ecosystems.