

**P022** *Ferroplasma acidiphilum* and *Acidithiobacillus ferrooxidans*, two iron-oxidizing acidophiles living in extreme environment

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*Acidithiobacillus ferrooxidans* is an acidophilic chemolithoautotrophic bacterium that derives energy from the oxidation of  $\text{Fe}^{2+}$  at pH 2 using oxygen as electron acceptor. *Acidithiobacillus* contains various electron carriers suspected to be involved in electron transfer from  $\text{Fe}^{2+}$  to oxygen, all being encoded by genes from the *rus* operon : the outer membrane-bound cytochrome *c* *Cyc2*, the periplasmic soluble cytochrome *Cyc1* and rusticyanin and the inner membrane-bound  $\text{aa}_3$ -type cytochrome *c* oxidase. We have shown that all these proteins are associated in a macromolecular complex including a hypothetical membrane-bound protein ORF1, proteins from the *bc* complex and an outer membrane protein OMP40. The supercomplex is functionally active as measured by kinetics experiments using  $\text{Fe}^{2+}$  as substrate and allows a direct electron transfer from  $\text{Fe}^{2+}$  to oxygen. This is the first characterization of a complex containing soluble and membranous proteins from outer and inner membranes from an acidophile.

Oxidation of  $\text{Fe}^{2+}$  by acidophiles is an important component of the iron geochemical cycle. So we started to investigate the energetic metabolism of *Ferroplasma acidiphilum*, acidophilic archae using also  $\text{Fe}^{2+}$  as energy source. Preliminary experiments suggest that the organization of the respiratory chain is SoxM-like found in *Sulfolobus acidocaldarius*.