



## **Meteorite-associated growth physiology of the iron oxidising extremophile *Metallosphaera sedula***

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Extremophiles cherry pick the habitats at the edge of living limits, shaping the life under inhospitable conditions. Such microbes are characterised by functional capabilities required for survival in harsh and extreme environments. These living entities serve as models for a life on early Earth with its severe and ancient habitats, providing an understanding of the extent of biology on Earth, and enabling a discovery of its wider presence in the universe. The Fe-oxidising archaeon *Metallosphaera sedula* inhabits extreme environments, flourishing in hot acid and exhibiting unusual heavy-metal resistance. This chemolithotrophic archaea thrives at 73°C and pH 2, utilizing energy derived from metal oxidation. Iron and sulphur compounds are preferentially required for its growth. Owing its physiological versatility, *M. sedula* is able to grow efficiently chemoauto- and chemomixotrophically using pyrite, chalcopyrite or sulfur compounds as an energy source and can also grow heterotrophically using yeast extract representing an excellent model organism for basic research into bioleaching processes. Stimulated by its exceptional physiological properties, we have set out to assess the survival potential of *M. sedula* by investigating the viability of this archaeon living on and interacting with minerals of non-terrestrial origin. Initial results demonstrate that the iron oxidising thermoacidophile *M. sedula* utilizes metals trapped within stony meteorites as the most preferential energy source, resulting in i) one order of magnitude higher growth rate comparatively to the other energy substrates of terrestrial origin (sulfide ores, hydrogen, iron sulfate) ii) a drastic shift in a lower temperature limit for this microbe. A comprehensive complex of genetic, biochemical and geochemical techniques will be applied to analyze microbial-meteorite liaison.