Methanosuratincola verstraetei LCB70

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Abstract

Methane is the second most abundant climate-active gas, and understanding its sources and sinks is an important endeavour in microbiology, biogeochemistry, and climate sciences. For decades, it was thought that methanogenesis, the ability to conserve energy coupled to methane production, was taxonomically restricted to a metabolically specialized group of archaea, the Euryarchaeota. The discovery of marker genes for anaerobic alkane cycling in metagenome-assembled genomes obtained from diverse habitats has led to the hypothesis that archaeal lineages outside the Euryarchaeota are also involved in methanogenesis. Here we cultured *Methanosuratincola verstraetei* strain LCB70, a member of the archaeal class Methanomethylicia (formerly Verstraetearchaeota) within the phylum Thermoproteota, from a terrestrial hot spring. Growth experiments combined with activity assays, stable isotope tracing, and genomic and transcriptomic analyses demonstrated that this thermophilic archaeon grows by means of methyl-reducing hydrogenotrophic methanogenesis. Cryo-electron tomography revealed that *M. verstraetei* are coccoid cells with archaella and chemoreceptor arrays, and that they can form intercellular bridges connecting two to three cells with continuous cytoplasm and S-layer. The wide environmental distribution of *M. verstraetei* suggests that they might play important and hitherto overlooked roles in carbon cycling within diverse anoxic habitats.

Species *Methanosuratincola verstraetei*

Etymology

[ver.strae.te'i] **N.L. gen. n.** *verstraetei*, In honor of the contributions of Professor Willy Verstraete (Ghent University, Belgium) to anaerobic microbiology and biotechnology.

Nomenclatural type

NCBI Assembly: GCA_049570475.1 [Ts]

Description

Strain LCB70 is a methanogen affiliated with the candidate genus *Methanosuratincola*, class Methanomethylicia, phylum Thermoproteota, for which we propose the name *Methanosuratincola verstraetei* sp. nov. *Methanosuratincola verstraetei* LCB70 is thermophilic methyl-reducing methanogen of the phylum Thermoproteota that grows as coccoid cells with a diameter of 845 ± 163 nm. Its genome has a length of 1.52 Mb and a GC content of 54.6%.

Classification

Archaea » *Thermoproteota* » *Methanosuratincolia* » *Methanosuratincolales* » *Methanosuratincolaceae* » *Methanosuratincola* » *Methanosuratincola verstraetei*

References

Effective publication: Kohtz et al., 2024 [1]

Registry URL

https://seqco.de/i:55771

References

1. Kohtz et al. (2024). Cultivation and visualization of a methanogen of the phylum Thermoproteota. *Nature*. DOI:10.1038/s41586-024-07631-6

Register List Certificate of Validation

On behalf of the *Committee on the Systematics of Prokaryotes Described from Sequence Data* (SeqCode Committee), we hereby certify that the Register List **seqco.de/r:fmoqupgc** submitted by **Hatzenpichler, Roland** and including 1 new name has been successfully validated.

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