



Aalborg Universitet

AALBORG UNIVERSITY
DENMARK

Development of bipolar prosthecae by candidate phylum Acetothermia bacteria

Hao, Liping; Mcllroy, Simon Jon; Kirkegaard, Rasmus Hansen; Karst, Søren Michael; Fernando, Eustace; Aslan, Hüsnü; Meyer, Rikke; Albertsen, Mads; Nielsen, Per Halkjær; Dueholm, Morten Simonsen

Creative Commons License
CC BY 4.0

Publication date:
2018

Document Version
Accepted author manuscript, peer reviewed version

[Link to publication from Aalborg University](#)

Citation for published version (APA):

Hao, L., Mcllroy, S. J., Kirkegaard, R. H., Karst, S. M., Fernando, E., Aslan, H., Meyer, R., Albertsen, M., Nielsen, P. H., & Dueholm, M. S. (2018). *Development of bipolar prosthecae by candidate phylum Acetothermia bacteria*. Poster presented at 17th International Symposium on Microbial Ecology, Leipzig, Germany.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- ? Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- ? You may not further distribute the material or use it for any profit-making activity or commercial gain
- ? You may freely distribute the URL identifying the publication in the public portal ?

Take down policy

If you believe that this document breaches copyright please contact us at vbn@aub.aau.dk providing details, and we will remove access to the work immediately and investigate your claim.

Development of bipolar prosthecae by candidate phylum Acetothermia bacteria

Liping Hao¹, Simon J. Mcllroy¹, Rasmus H. Kirkegaard¹, Søren M. Karst¹, Warnakulasuriya E.Y. Fernando¹, Hüsnü Aslan², Rikke L. Meyer², Mads Albertsen¹, Per H. Nielsen¹, Morten S. Dueholm¹

¹Center for Microbial Communities, Department of Chemistry and Bioscience, Aalborg University, Denmark
²Interdisciplinary Nanoscience Center, Aarhus University, Aarhus, Denmark



Background

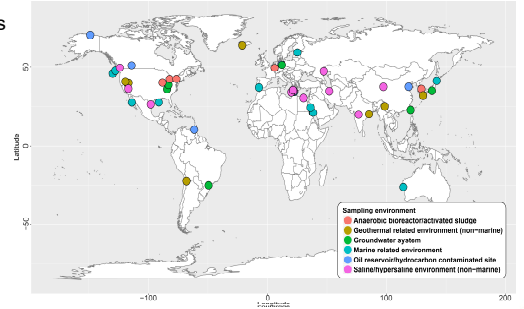
Bacteria from the candidate phylum Acetothermia (OP1) are globally dispersed and occupy many diverse habitats (see figure to the right). However, little is known about their physiology and ecology. We previously observed that Acetothermia bacteria were the most abundant bacteria in the metagenome from an anaerobic digester.

Aim

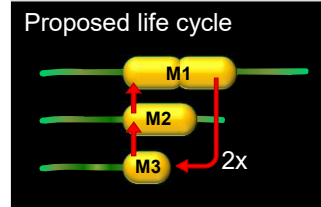
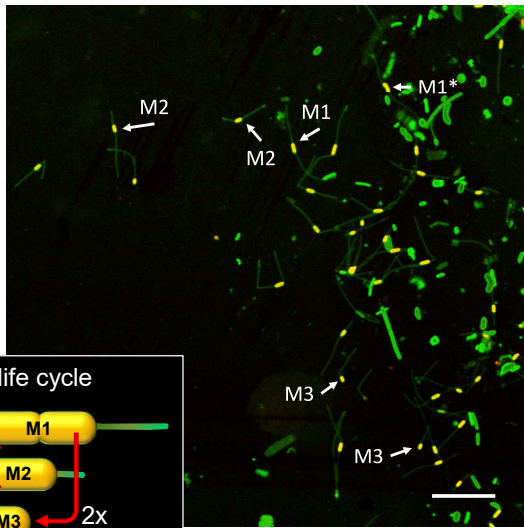
To learn more about their abundance, morphology, and physiological and ecological function.

Conclusions

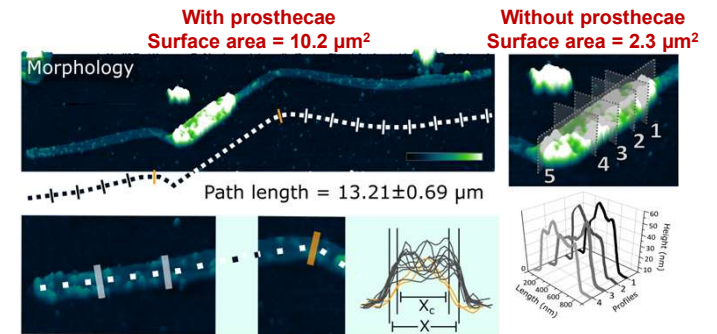
- Specific FISH probes were designed and used to study the Acetothermia bacterium *in situ*.
- The morphology was unusual and composed of a central rod-shaped cell with bipolar prosthecae.
- This may allow for increased nutrient uptake at low concentrations by greatly expanding the cell surface area.
- We obtained the first closed genome from the candidate phylum Acetothermia.
- Genome annotation suggests an anaerobic chemoheterotrophic lifestyle.



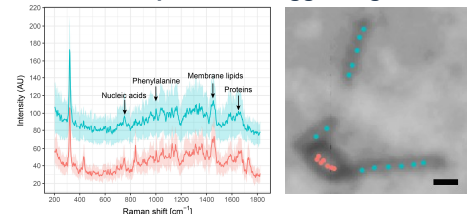
FISH combined with Syto9 staining reveal an unusual morphology composed of a central rod-shaped cell with bipolar prosthecae



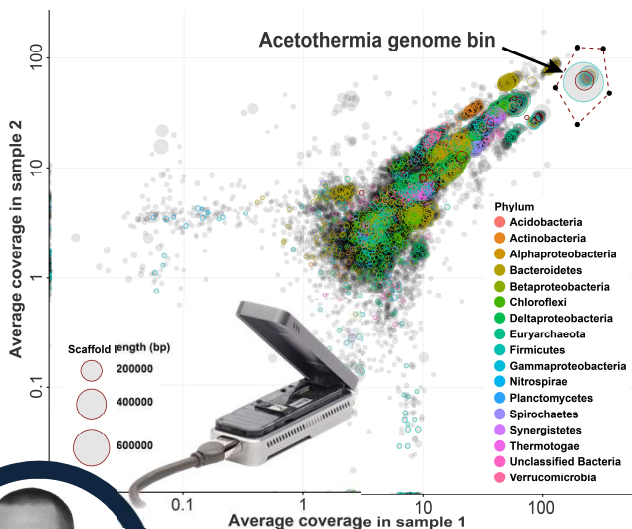
AFM shows that prosthecae greatly expand the cell surface area



Raman spectra of the prosthecae and central rod cell showed similar chemical compositions suggesting shared cytoplasm



The first closed genome from the candidate phylum Acetothermia was made by genome binning and scaffolding with Nanopore data



Genome annotation and metabolic reconstruction suggested an anaerobic chemoheterotrophic lifestyle

