A Bacterium Not Like The Others:

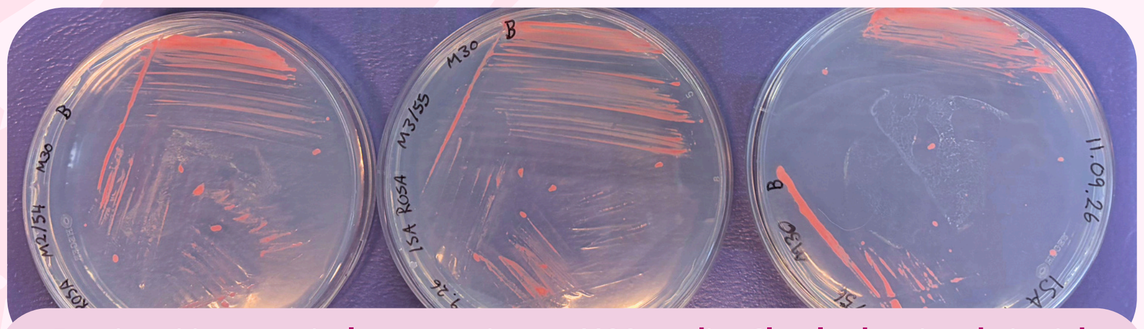
Studying Novel Planctomycetes Using Different Scientific Methods, Why They Are So Different, And Why They Are Important To Study

Elinor Røise

Department of biological sciences, University of Bergen, Norway

What are planctomycetes?

Planctomycetota is a phylum of understudied bacteria that challenge our understanding of prokaryotes. These bacteria have characteristics that previously only have been recognised in eukaryotes, such as budding, inner membranes, and pseudo organelles.



Roseimaritima spp. isolates growing on M30 media. Clearly showing their pink pigmentation. Left to right isolates M2, M3, and M11x.

Roseimaritima

The three isolates that have been used in this study (respectively named M2, M3 and M11x) are of the genus *Roseimaritima*, which are pink, rosette forming, marine planctomycetes. These isolates were obtained from water samples taken from 75m deep in Adventfjorden, Svalbard.

How do you study them?

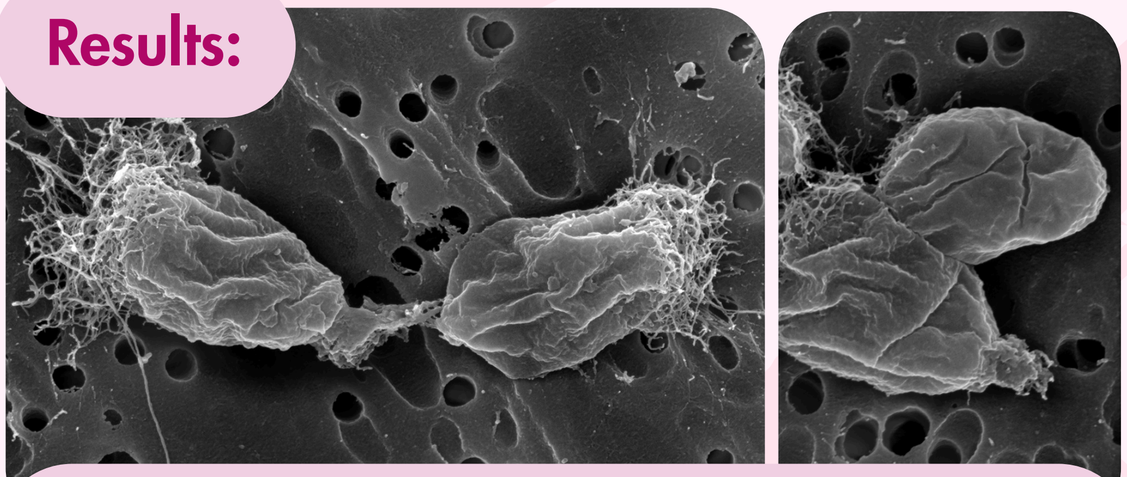
In this study, these bacteria have been studied using different microbiological techniques. Basic cultivation methods, light microscopy, flow cytometry, transmission electron microscopy and scanning electron microscopy (respectively referred to as TEM and SEM).

Budding

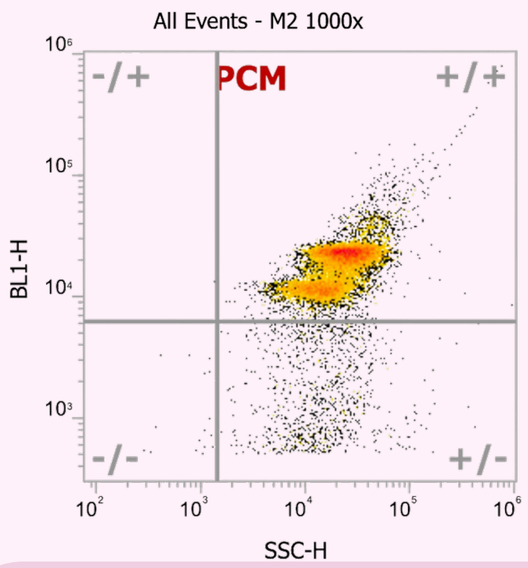


Simplified cross section illustration of planctomycetes budding. Illustrated is the mother cell, with pili, containing DNA, riboplasm and paryphoplasm, budding a daughter cell developing the same structures.

Results:



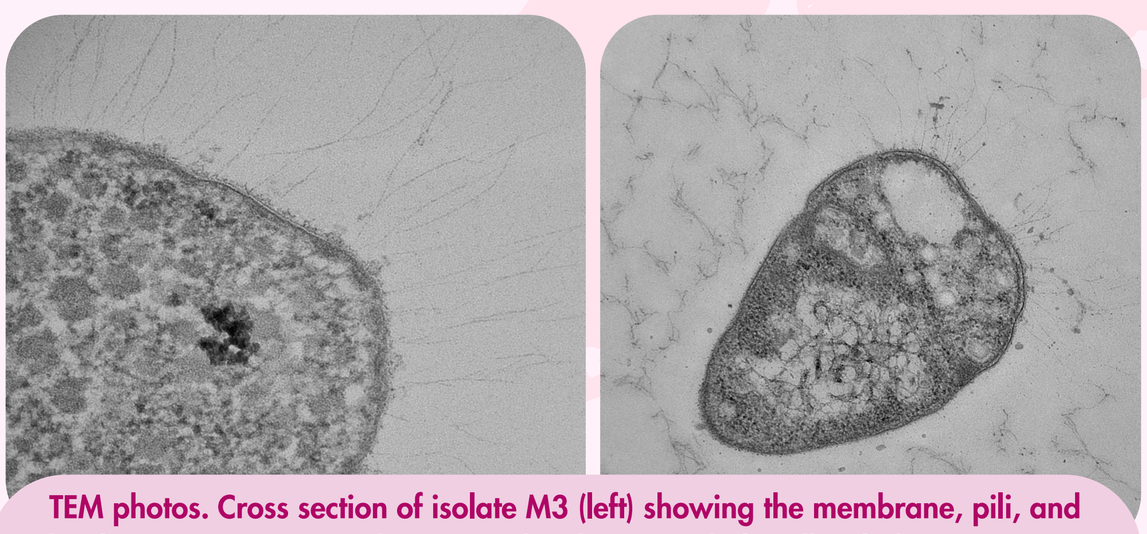
SEM photos. Isolate M11x (left), two cells in a small rosette formation connected at one pole with a holdfast structure, opposite pole full of pili. Isolate M3 (right), two cells next to each other, bottom cell showing early stages of budding at the pole.



Experiment: **Planctomycetes som BV**
Group: **PM 20261026**
Sample: **M2 1000x**
Time Recorded: **13:47:45**

Gate	Count	Concentration
All Events	12,978	129.780
-/+	1	0.010
+/+	11,918	119.180
-/-	18	0.180
+/-	1,041	10.410

Flow cytrometry of isolate M2, 1000x dilution. The data points represent the size of the cells counted. Two distinct concentrations of data can be seen in this plot, which indicate either cells in different stages of life (budding - fully grown cell) or cells in rosette formations.



TEM photos. Cross section of isolate M3 (left) showing the membrane, pili, and riboplasm. Cross section of M11x (right) showing whole cell including DNA, inner membrane systems, riboplasm, paryphoplasm and pili.

Why is it important to study them?

Planctomycetes have been discovered to be beneficial both environmentally and medically. Further understanding of this phylum can potentially uncover even more applications, and we can learn more about the bridge between prokaryotes and eukaryotes.

Acknowlagements:

Huge thanks to supervisor Lise Øvreås, lab technicians Elzbieta Anna Petelenz and Birte Töpper, TEM photos from MIC LAB, SEM photos from EMILAB, and planctomycetes budding illusration from Stine Øren.

299.9