

The background of the slide is a microscopic image of numerous rod-shaped bacteria. The bacteria are stained red, and several of them have bright green fluorescent spots in their centers, likely representing a specific protein or genetic marker used in the research.

Bacterial Communication

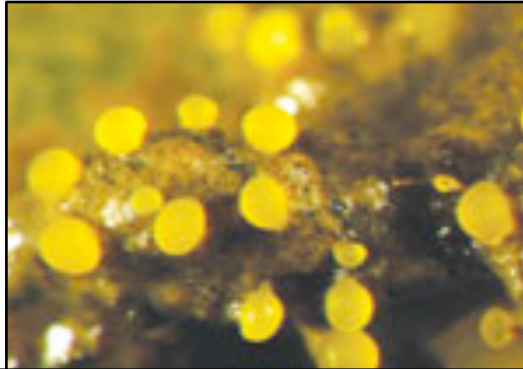
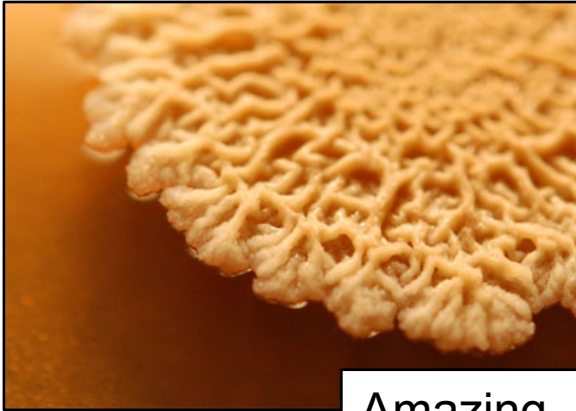
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For many many years, bacteria (and other microbes) were assumed to lead solitary lives, unable to communicate with one another.

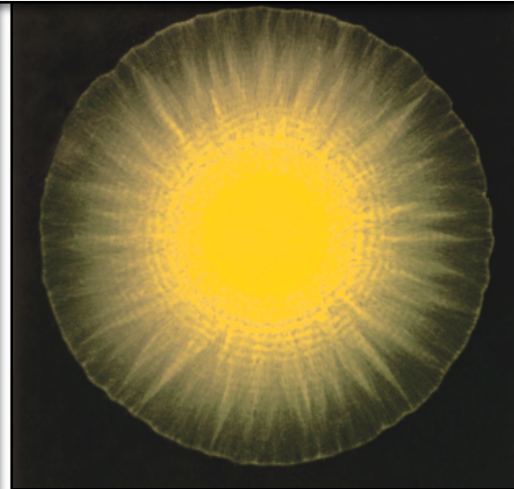
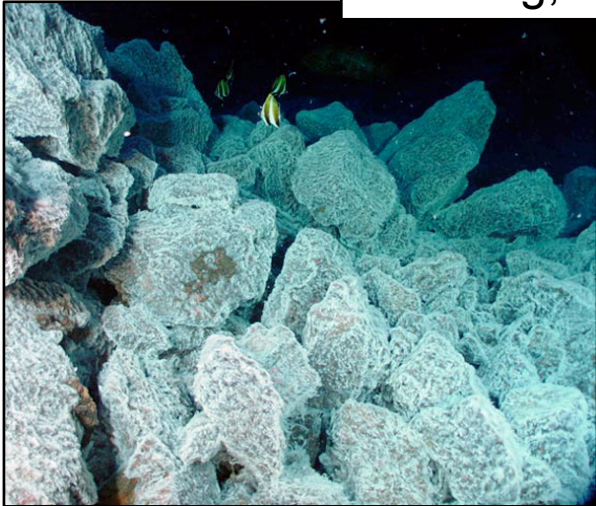
NOT TRUE!

Long- and close-range signaling abounds in the microscopic world.

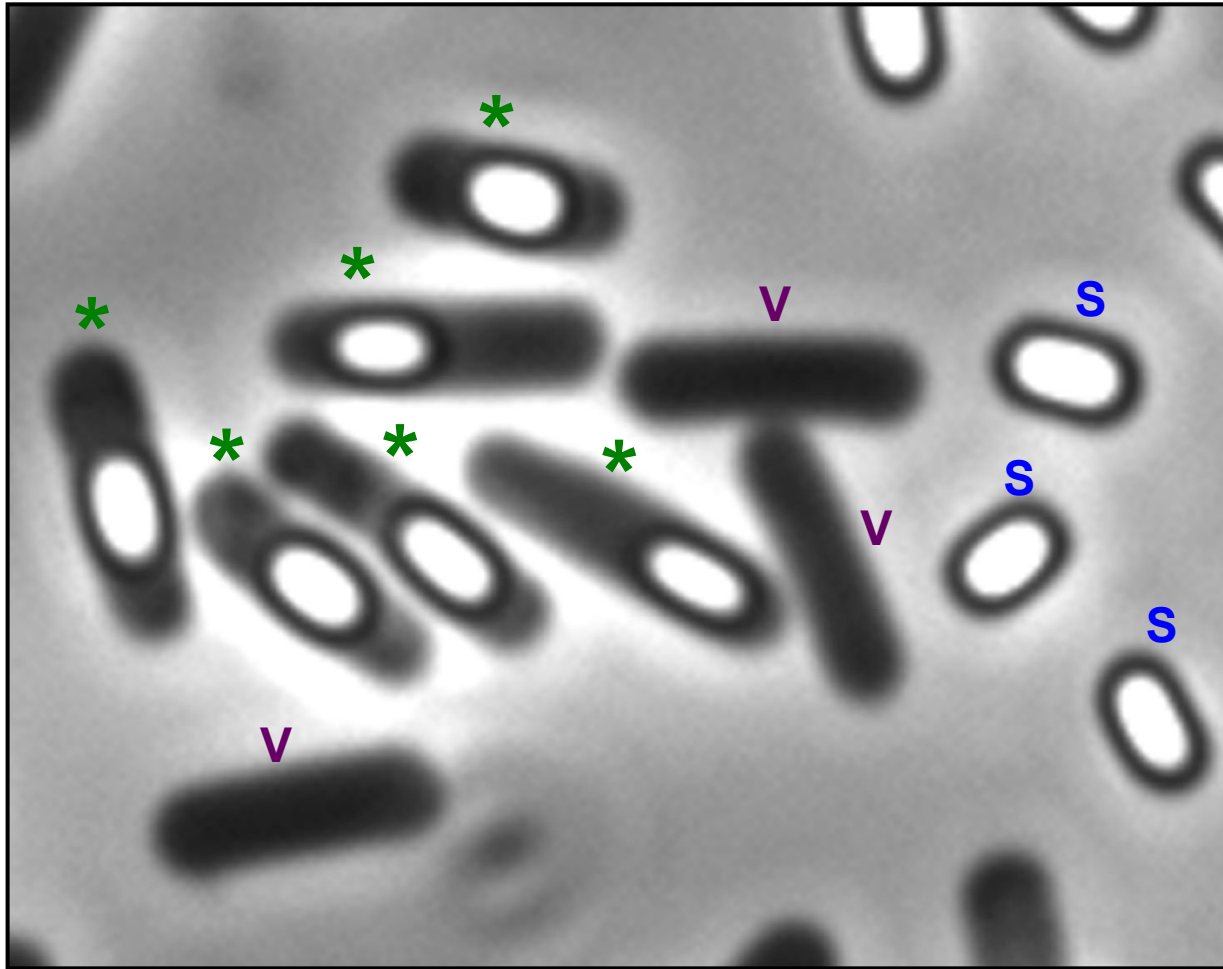
Intimate bacterial communication?



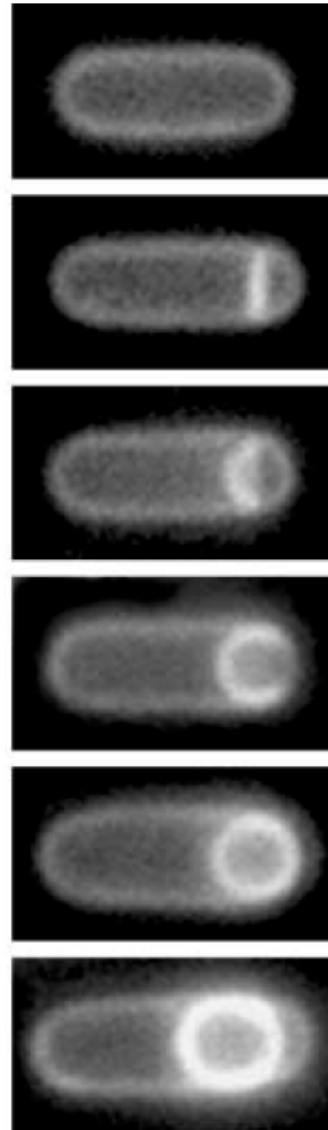
Amazing, intricate, elaborate bacterial communities!



Bacillus subtilis sporulation: a primitive developmental pathway



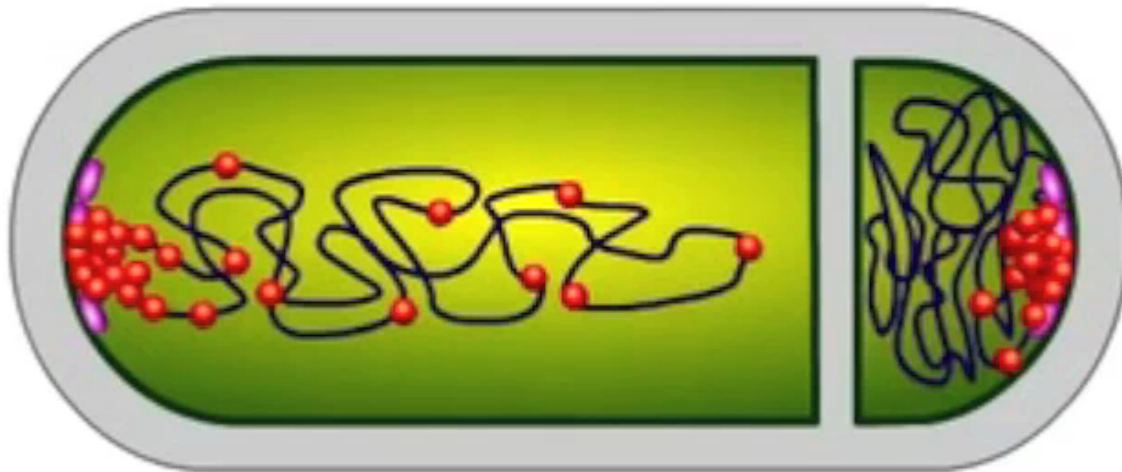
Bacillus subtilis spore formation



← Asymmetric division

Engulfment

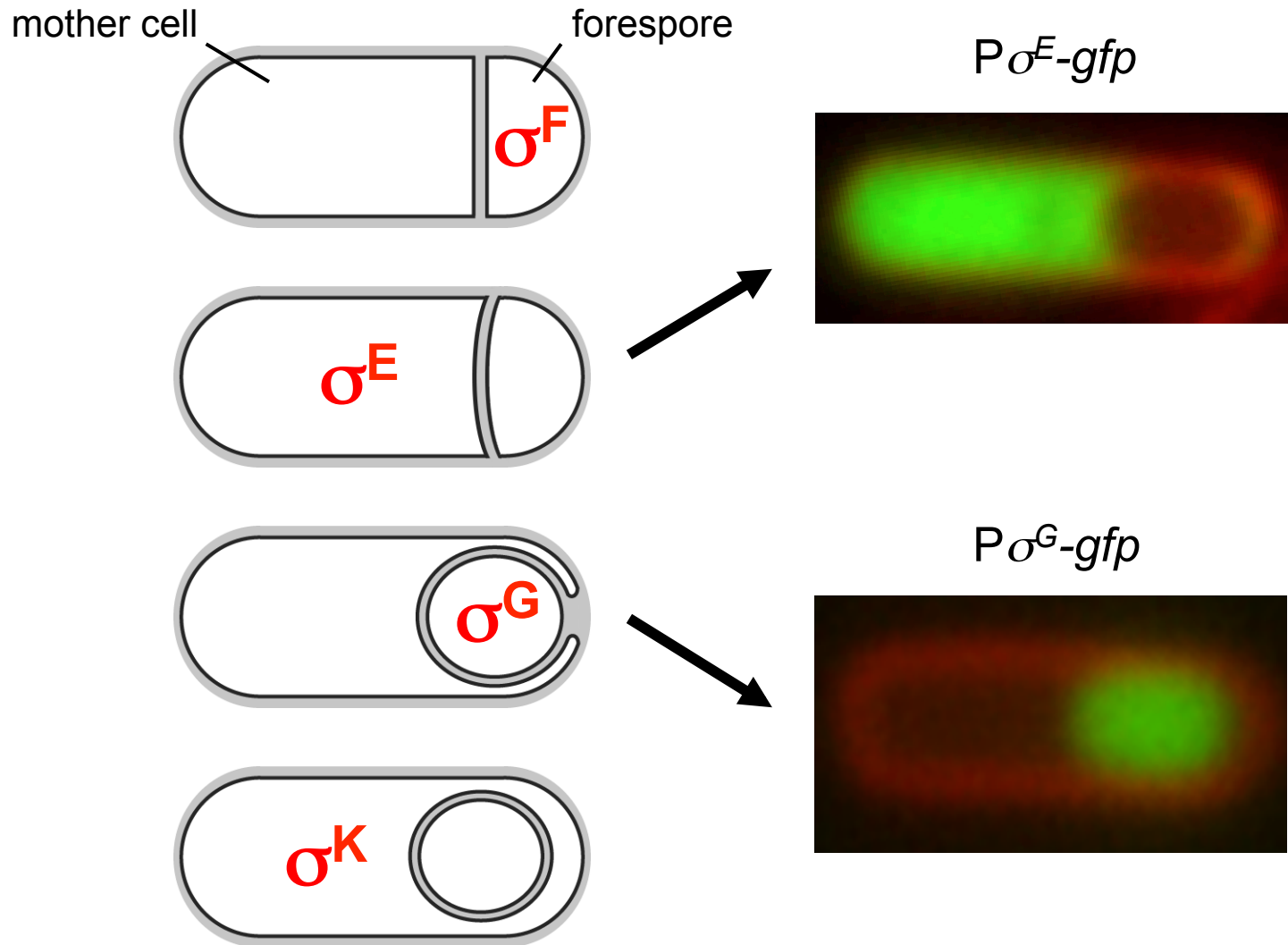
Forespore engulfment animation (2D)



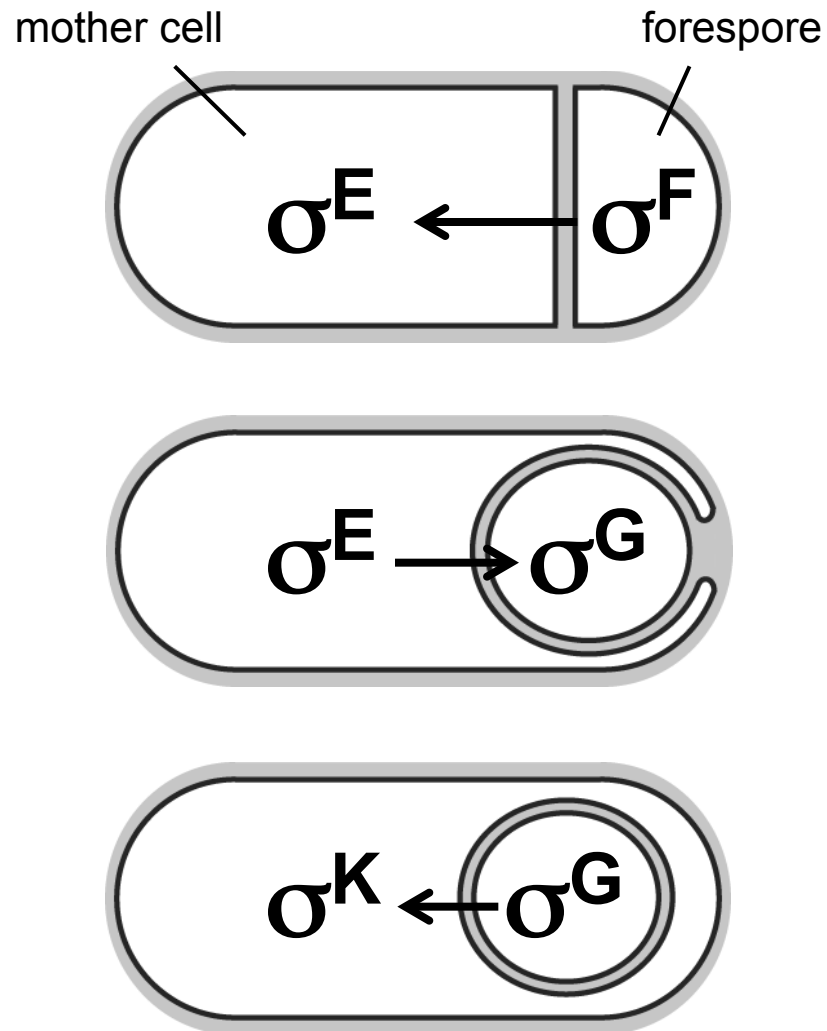
Forespore engulfment animation (3D)



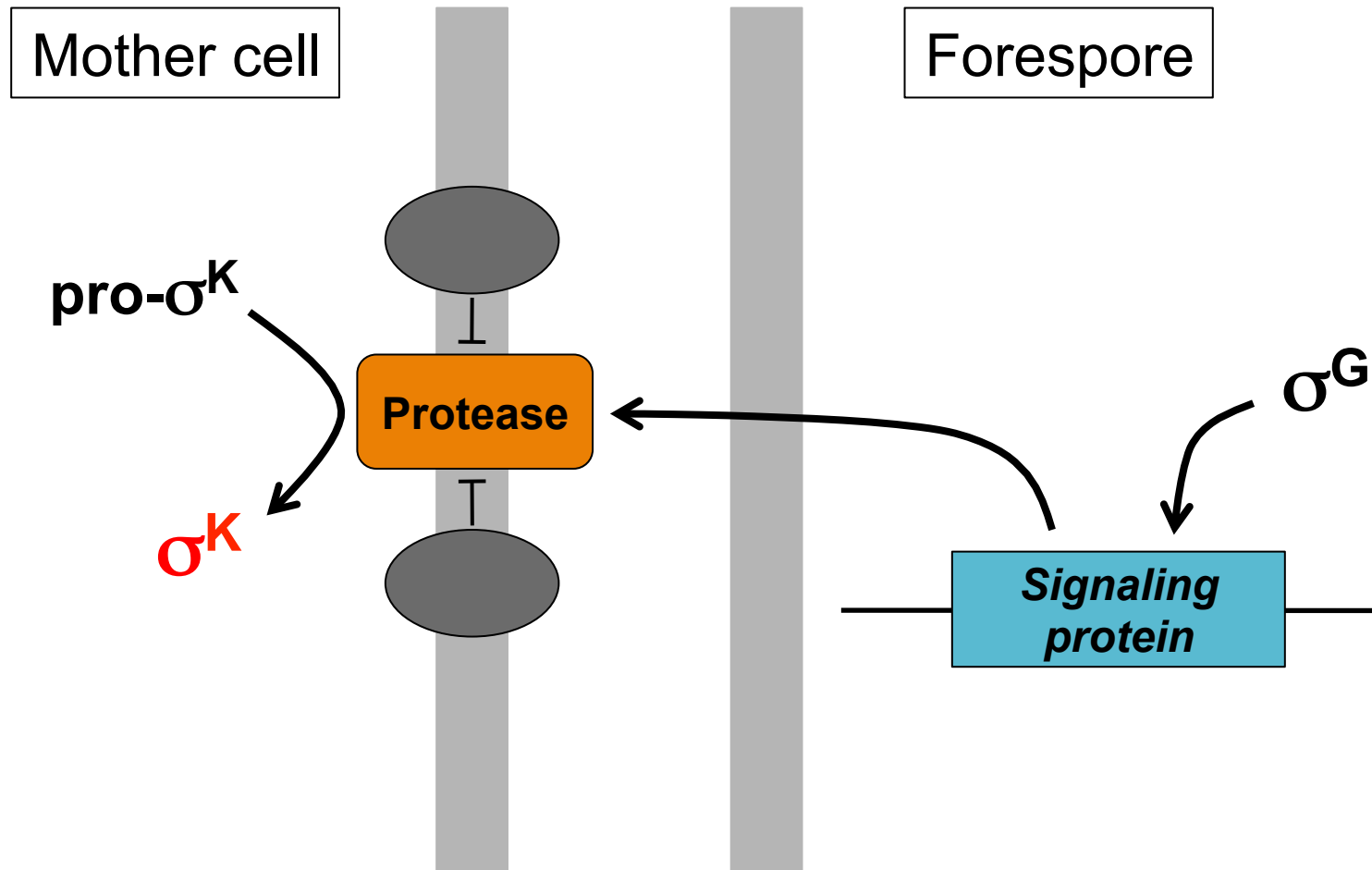
Sporulation transcription factors are cell specific



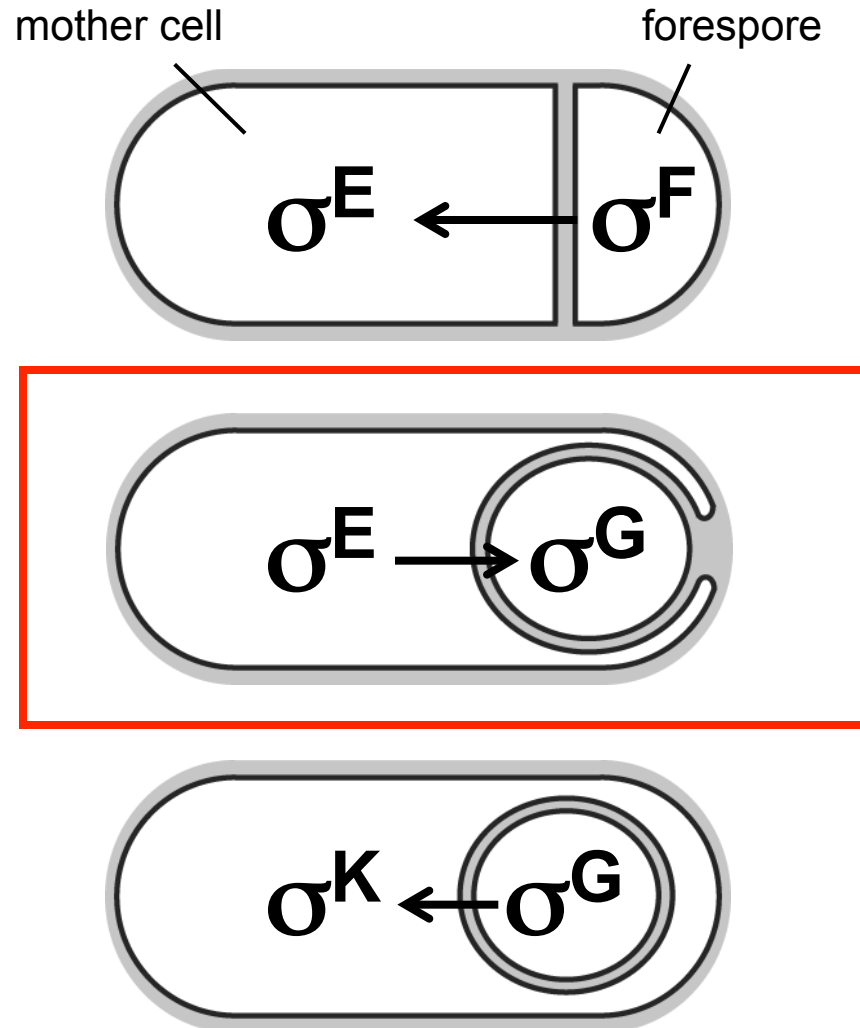
The mother cell and forespore communicate



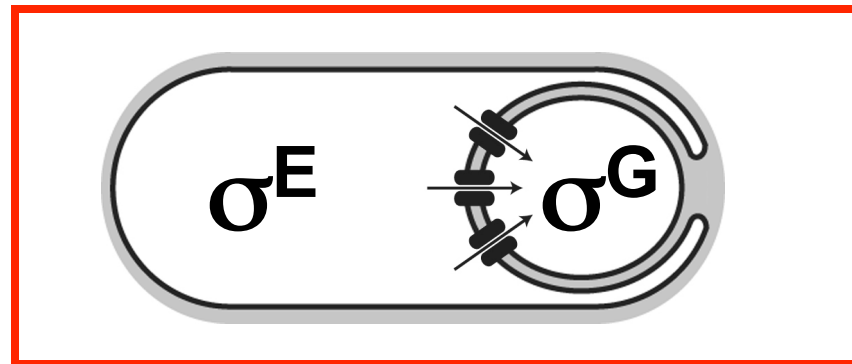
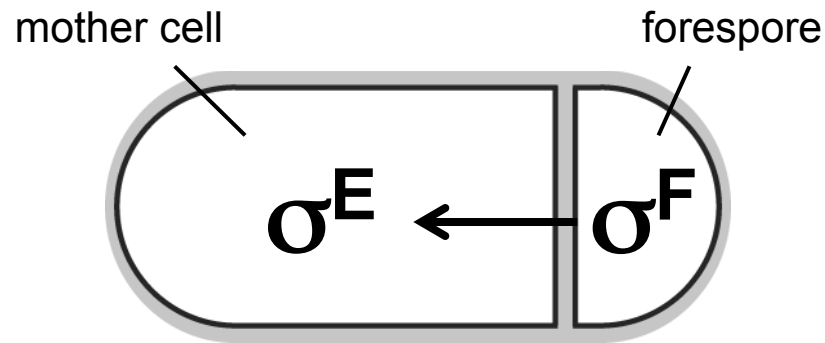
Cell-cell communication leading to σ^K activation



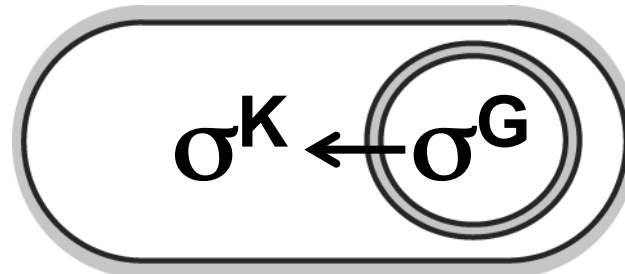
The events leading to σ^G activation have remained mysterious



An unexpected form of cell-cell “communication”!

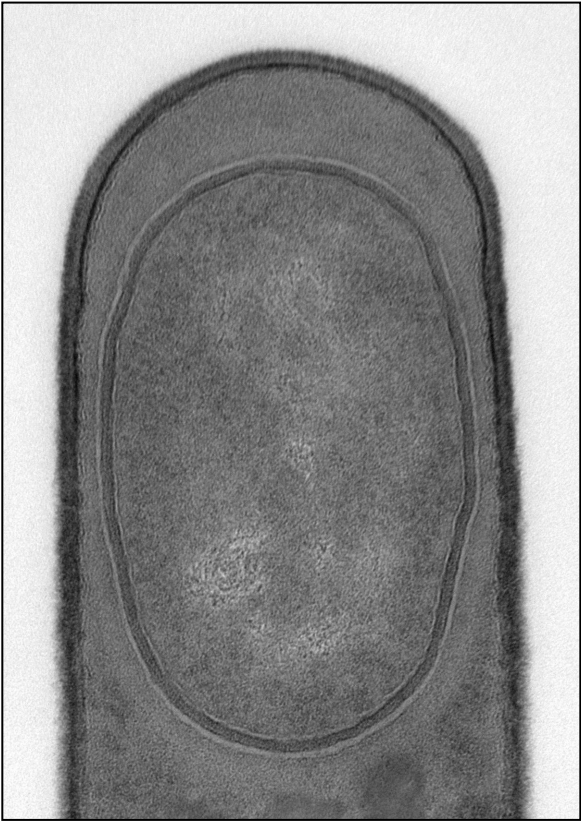


We think the mother cell is “feeding” the forespore!!!



Shriveled forespores in the absence of the channel

Wild Type

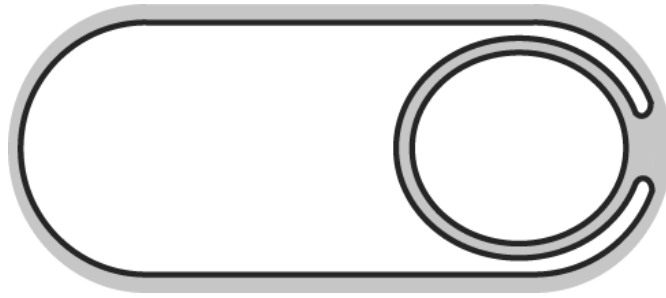


Channel mutants



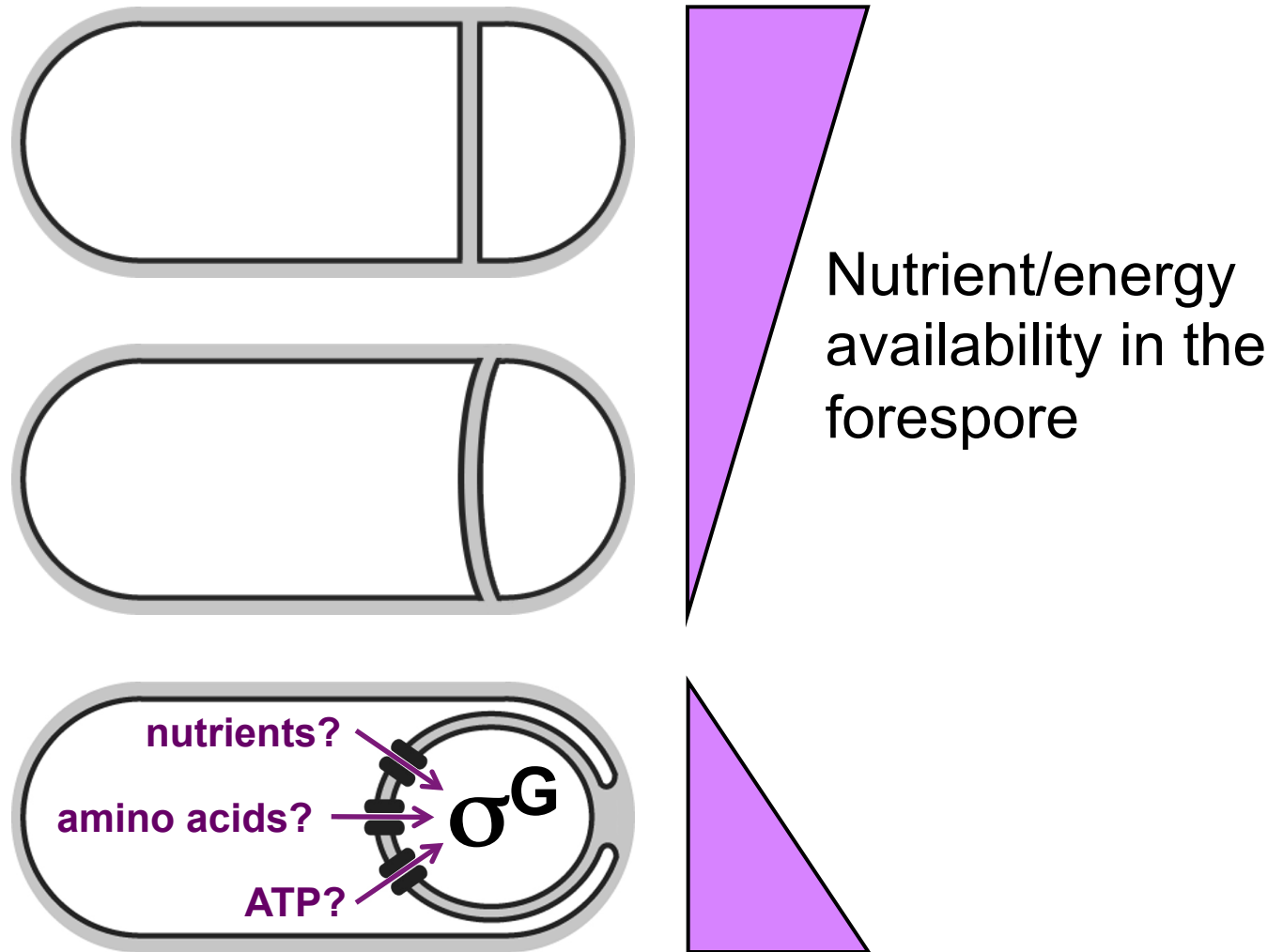
(from Doan *et al* (2009) *PLOS Genetics* 5: e1000566)

Feeding Tube Model

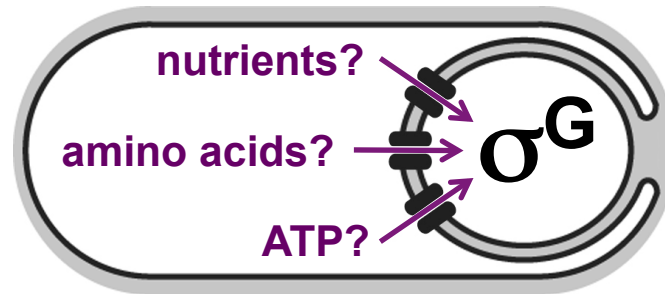


Nutrient/energy
availability in the
forespore

Feeding Tube Model



Current Research



What is the metabolic status of the forespore?

What does the feeding tube look like?

How is the feeding tube regulated?

What is the substrate for transport?

Thank you!