

Microm 410: Diversity II

The Myxobacteria

1. Gram negative rod shaped cells without a flagellum
2. Lives in soil- exists as a predator and saprophyte
3. Engages in many social behaviors- swarming motility, intercellular communication, and the formation of fruiting bodies
4. Some of the largest prokaryotic chromosomes
5. Fruiting bodies are filled with myxospores

Table 15.20 Classification of the fruiting myxobacteria^a

Characteristics	Genus/DNA (mol% GC)
Vegetative cells tapered: Spherical or oval myxospores, fruiting bodies usually soft and slimy without well-defined sporangia or stalks	<i>Myxococcus</i> (68–71)
Rod-shaped myxospores: Myxospores not contained in sporangia, fruiting bodies without stalks	<i>Archangium</i> (67–68)
Myxospores embedded in slime envelope: Fruiting bodies without stalks	<i>Cystobacter</i> (68)
Stalked fruiting bodies, single sporangia	<i>Melittangium</i> (—)
Stalked fruiting bodies, multiple sporangia	<i>Stigmatella</i> (68–69)
Fruiting bodies are dark-brown clusters consisting of tiny spherical or disclike sporangia with an outer wall	<i>Angiococcus</i> (—)

^a Phylogenetically, those species examined fall into the delta subdivision of the Proteobacteria (see Table 12.1).

Table 12-20 part 1 Brock Biology of Microorganisms 11/e
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Table 15.20

Classification of the fruiting myxobacteria^a

Characteristics	Genus/DNA (mol% GC)
Vegetative cells not tapered (blunt, rounded ends); myxospores resemble vegetative cells; sporangia always produced: Fruiting bodies without stalks; myxospores rod-shaped	<i>Polyangium</i> (69)
Fruiting bodies without stalks; myxospores oval; highly cellulolytic	<i>Sorangium</i> (—)
Fruiting bodies without stalks; myxospores coccoid	<i>Nannocystis</i> (70–72)
Stalked fruiting bodies	<i>Chondromyces</i> (69–70)

^a Phylogenetically, those species examined fall into the delta subdivision of the Proteobacteria (see Table 12.1).

Table 12-20 part 2 Brock Biology of Microorganisms 11/e
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Figure 12-45a Brock Biology of Microorganisms 11/e
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Figure 12-45b Brock Biology of Microorganisms 11/e
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Hans Reichenbach

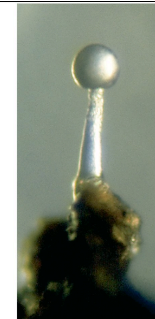


Figure 12-45c Brock Biology of Microorganisms 11/e
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Fruiting body development is a complex process that involves:

1) Intercellular communication

“A Signaling”

“C Signaling”

2) Two forms of motility

“Social Motility”

“Adventerous Motility”

A cartoon of *Myxococcus xanthus* fruiting body development:

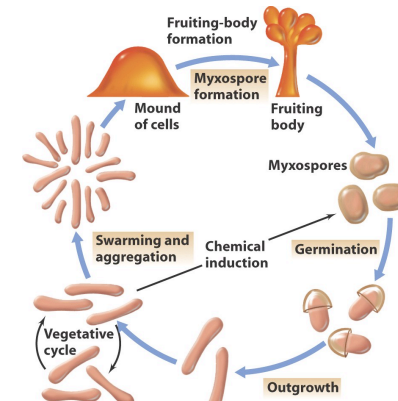
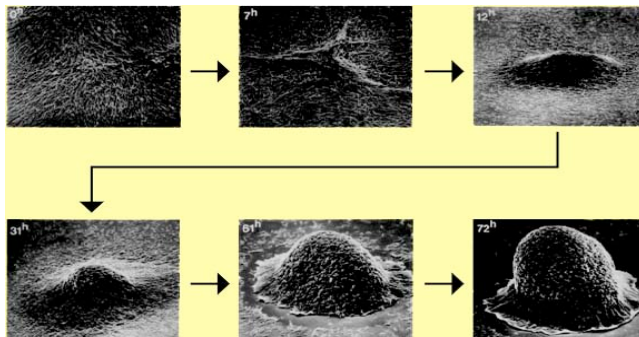


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Fruiting body formation under starvation conditions (~100,000 cells).
Cells on the inside of the structure develop into spores.

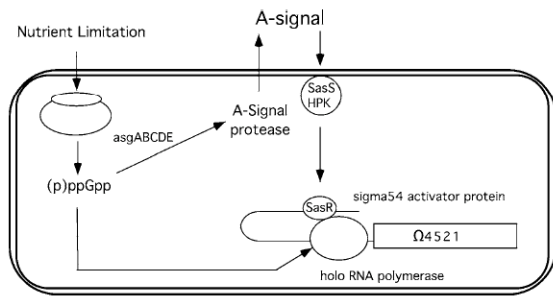
Factors important for initiation of fruiting body development:

1. Solid surface
2. Appropriate cell density
3. Must perceive nutrient down shift

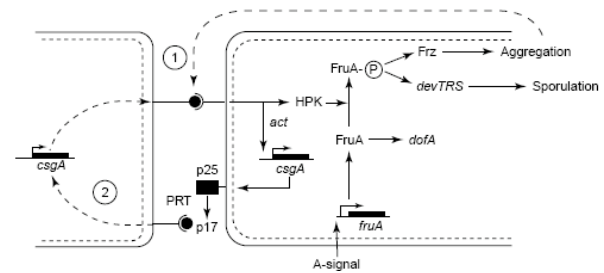
The cell uses A signaling and the stringent response

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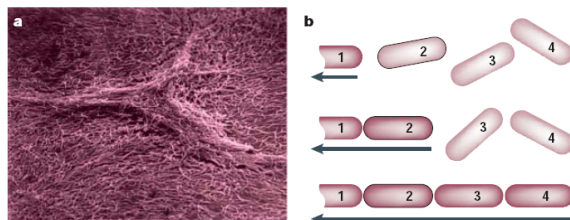
The Basic Model for A-signaling



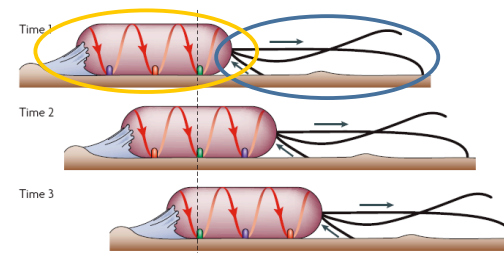
The Basic Model for C-signaling and developmental gene regulation at the aggregation stage



Streaming motility and aggregate formation



Two types of motility are required for fruiting body development



Social Motility
Adventerous Motility

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