

MicroPredator: Myxo (*Myxococcus xanthus*)

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Myxo showing off how organized it is even when growing on a Petri plate in the lab.

Claim to fame: a team player and the ultimate bacterial predator!

Myxococcus xanthus, Myxo, is one of the most important bacteria living in the soil. It has a unique way of living compared to many other bacteria, and even other single-celled organisms. Instead of just floating around or living on its own, Myxo forms big groups or "colonies" where all the bacteria work together like a team. By doing so, they can achieve a lot of tasks that they would not be able to do individually. Here are some examples!

Shake it, move it!

Myxo doesn't like to stay still. If conditions are favorable, Myxo is an explorer! And it can move in two different ways. The first kind is called "social swarming" or twitching motility. Bacteria move together in a group across surfaces. This is a very efficient way of moving on wet, damp surfaces. The bacteria produce hooks, or pili, which extend through the surface, and then bacteria retract them to move forward, as if they were pulling on a rope.

The second type is called "adventurous swarming". This movement is best adapted to harder, drier environmental conditions. In this case, individual Myxos, not groups, search for food. To do so, they produce a slime through their rear end which propels them forward. But, just like ants would do, they all come back to the larger colony. And they come back following their own scent, the slime, the same way they took to wander off.

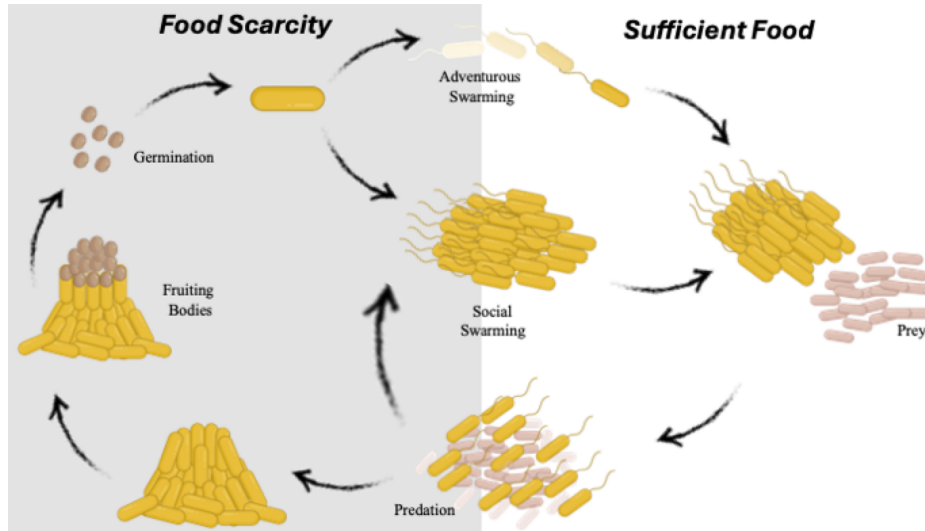
Hunting like a wolf pack!

Imagine a group of hunters working together, using teamwork to catch their prey. Myxo does something similar when it "hunts" for food, except instead of chasing animals, it hunts other bacteria. It is known as a "predatory bacterium" because it can attack and feed on other bacteria. And the Myxo team will eat and attack all bacteria!

To succeed, Myxo bacteria move in groups, forming large, coordinated colonies: the more, the merrier! The Myxos work together to trap other smaller, weaker bacteria that they can eat. Once they find their prey, they surround it and release special chemicals that break down the cell walls of the other bacteria, making it easier for them to eat. In fact, they are also known to be like a 'factory' of these chemicals, very much like antibiotics that can efficiently kill other bacteria.

After the killing, time for the digesting! After breaking down their prey, Myxos absorb all the nutrients from the other bacteria and use them to grow and multiply.

This behavior is pretty amazing because most bacteria just live on their own, eating whatever they can find in the environment. But Myxo hunts in a group, like wolves hunting in a pack!



The Myxo life cycle. When there is enough food, Myxo uses two distinct motility systems; adventurous motility and social motility, to chase and hunt other bacteria present in the soil. When there is not enough food around, Myxo cells form mounds and some cells develop into resistant spores which will resist to adverse environmental conditions. When there is enough food or conditions are better, the spores germinate and resume active growth.

When times get tough: survival mode!

But what happens, if there are no bacteria around to eat? Or if the weather is too dry? Or if there are too many predators around? Or the soil is polluted? These conditions may be hard for Myxo to survive. Myxo has a cool trick up its sleeve to deal with these tough situations: it can create something called "spores."

A spore is like a super-resistant survival package. When conditions are harsh, some bacteria can change into spores that are much tougher than regular bacteria. These spores can survive extreme heat, dryness, or even chemicals that would usually kill normal bacteria. But Myxo is no ordinary bacteria. They not only form spores, they also form fruiting bodies! Much more complex! It is like a small package where thousands of spores can rest, protected from the unfavorable conditions.

When the environment becomes better, the spores "wake up" and turn back into regular bacteria. This ability to make spores helps Myxo live through hard times, just like how some seeds can wait for the right time to grow into new plants.

Myxo is an amazing pack-hunting predator of other bacteria

Myxo is not only interesting because it hunts and makes spores, but it also plays a key role in the environment. By eating other bacteria, it helps control the population of different types of bacteria, making sure that no single type takes over. It could be also used to kill harmful bacteria that attack plants!

Myxo is also of great help to scientists that are studying how single-celled organisms can work together, coordinate their movements, cooperate together and work as one large organism.