



THE ADVENTURES OF...

SHEWY

THE ELECTRIC MICROBE



DISCOVER THE MAGIC OF MICROBES AS SHEWY EXPLORES THIS COMPLEX, MUDDY WORLD!

This comic follows the story of Shewy, an electric bacteria, as it lives inside a MudWatt science kit.

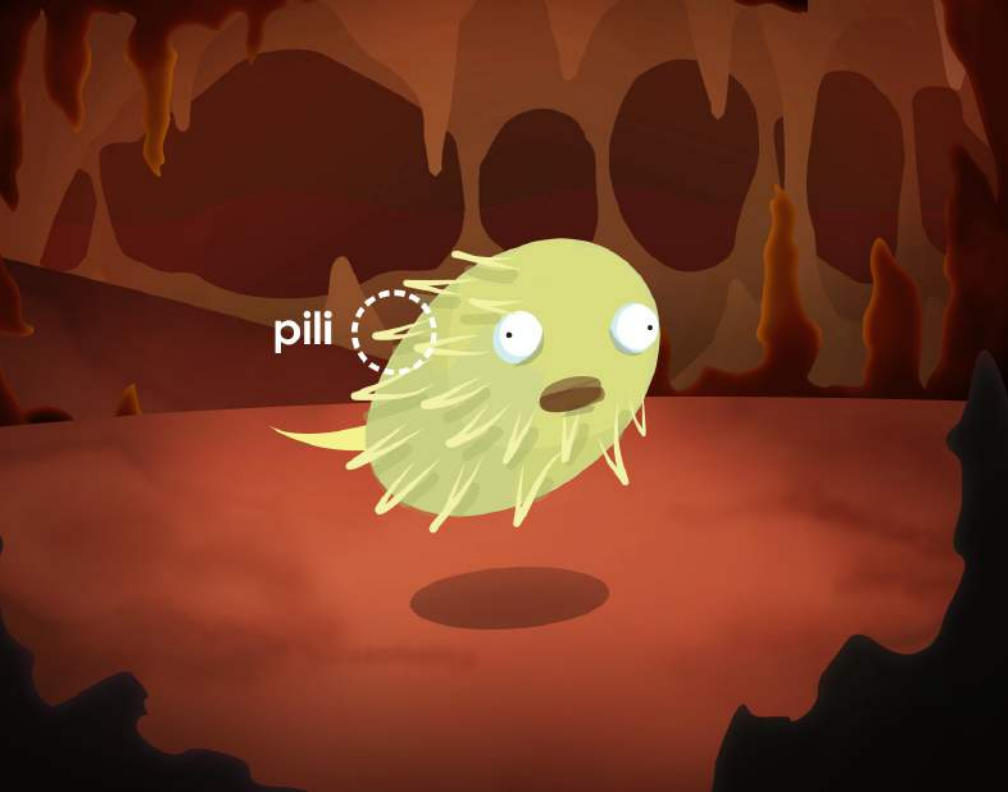
Follow Shewy's adventures and learn along the way!



If you'd like to grow some Shewies of your own and experience the magic of dirt-power for yourself, then get a MudWatt science kit at www.mudwatt.com!

1

Shewy wanders a muddy world in search of food.



Shewy (short for “**Shewanella**”) is a type of bacteria that lives in soils all around the world, including right beneath your feet! Like most bacteria, Shewy has tails or “**pili**” that help it interact with its environment.

A mysterious forest in the distance...



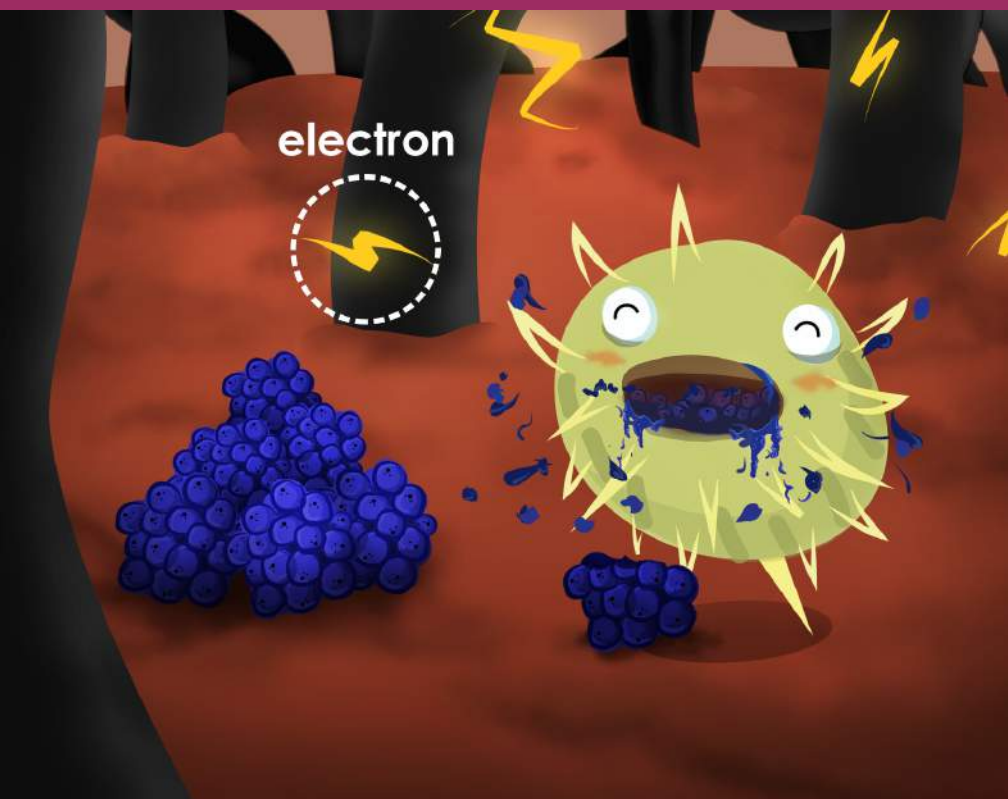
The **fiber forest** that Shewy is swimming through is the **anode** that you use to make your MudWatt, made of tiny conductive graphite fibers. Although these fibers seem tiny to us, they are huge for Shewy!

A fiber forest full of nutrients!



Luckily, there are **nutrients** in this forest, which are sources of energy for Shewy. They are the leftover remains of decaying plant life that have decomposed in the soil.

A glorious feast to power up!



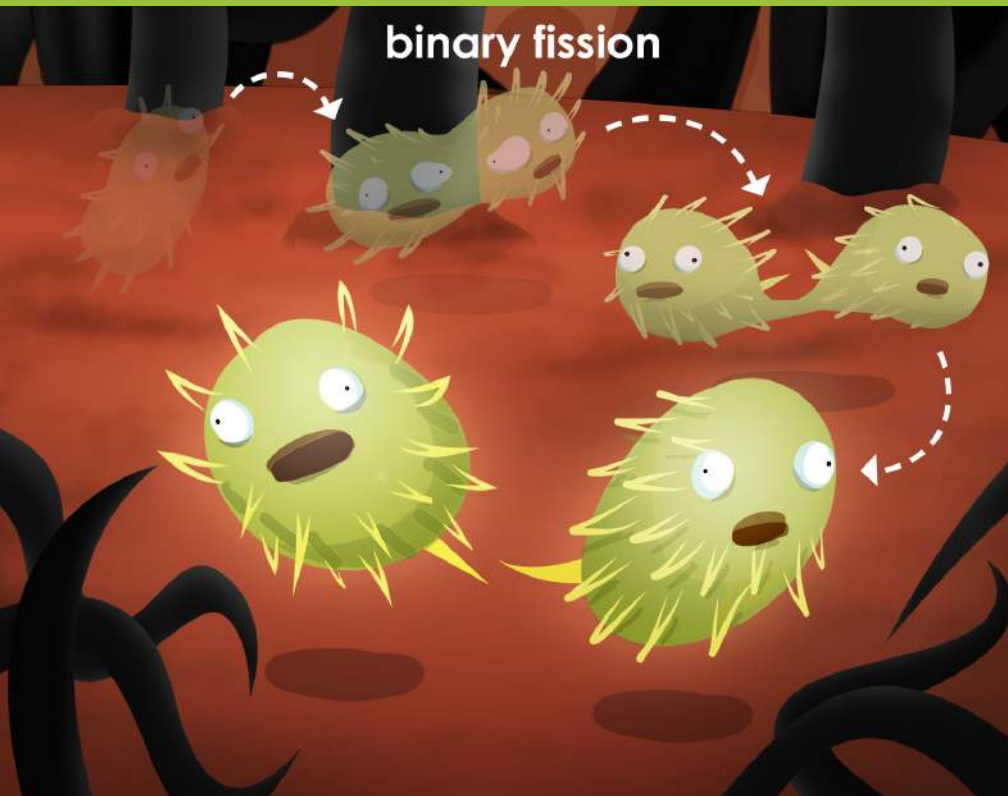
As Shewy eats, it creates molecules with extra **electrons** on them. Eventually, Shewy needs to get rid of these extra electrons to keep eating.

Zap! An electrical charge bursts to a nearby fiber!



The **fibers** of the **anode** are conductive, so they allow **electrons** to flow freely through them. Shewy's extra electrons are transferred to the fiber and move through the wires of the MudWatt. Shewy like this because it means Shewy can keep eating!

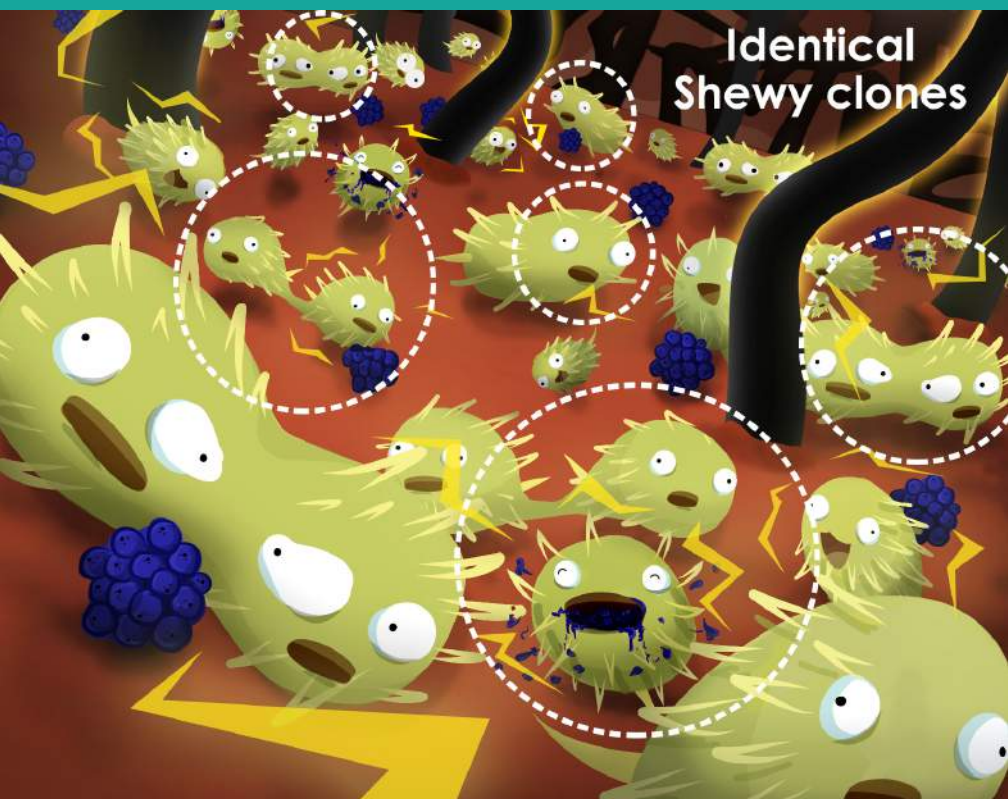
With Shewy's ability to replicate, one becomes two.



As Shewy eats and grows, eventually Shewy **replicates**, making an exact copy of itself. This process is called **binary fission**.

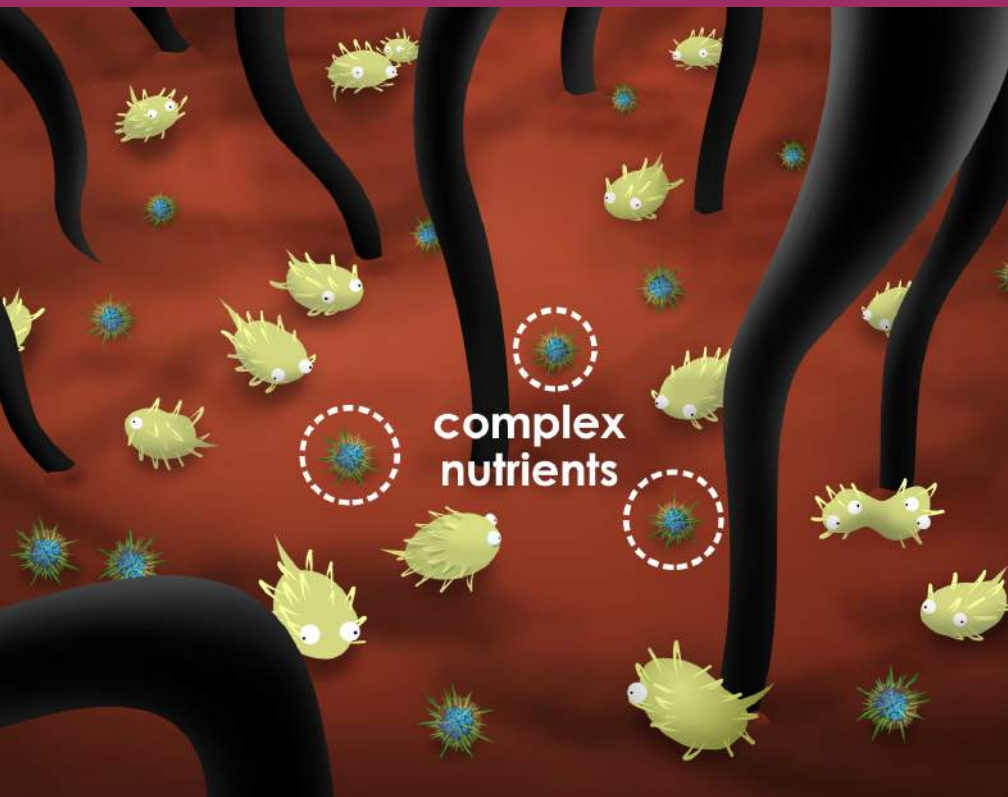
7

Two becomes four.
Four becomes eight.
Soon there are millions!



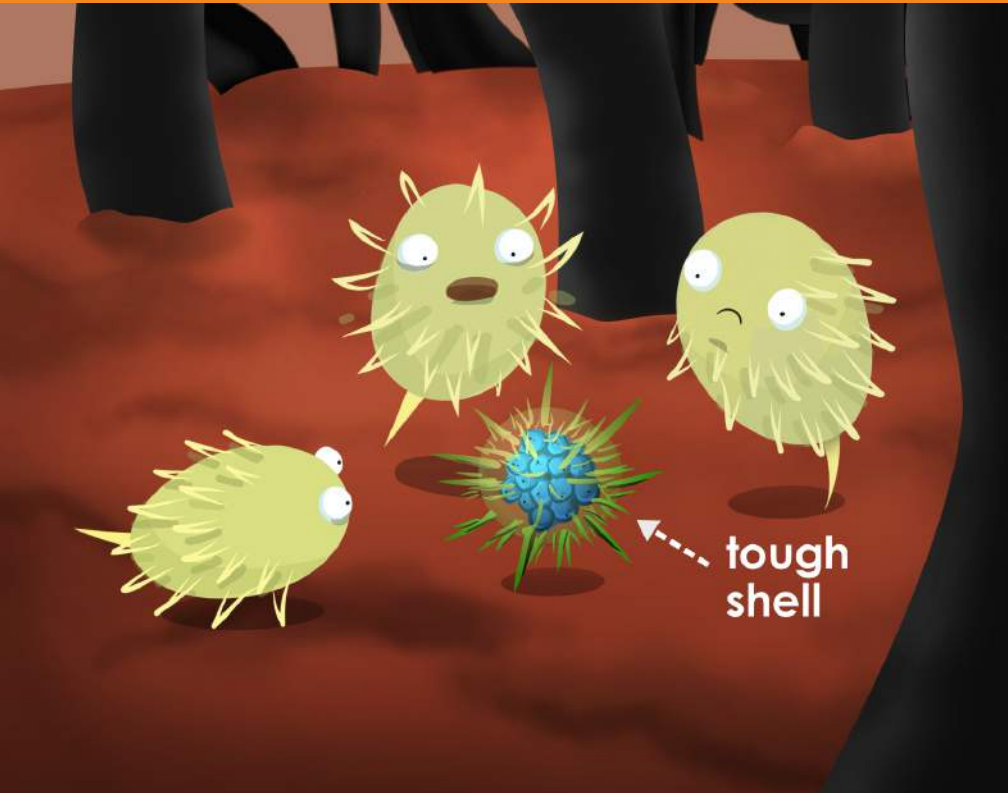
When put in ideal conditions, bacteria populations can **double** every 20 minutes! With **millions** of electric bacteria like Shewy, enough electrons are collected by the fibers to start blinking the LED.

Simple foods are eaten first.
Now only complex,
inedible nutrients remain...



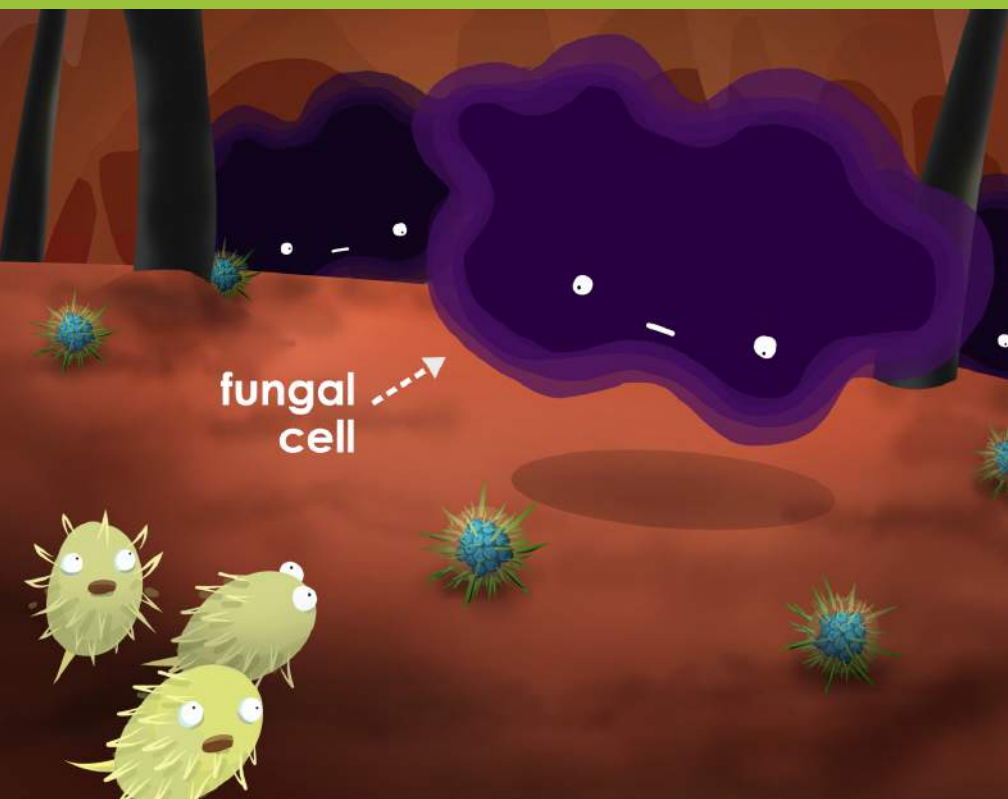
Complex nutrients are tougher to eat and digest. For example, a piece of a decaying plant may have a tough cellulose shell that bacteria like Shewy can't break down.

The Shewies can't digest these complex foods. What will they do?



For making the complex nutrients ready to eat, or “**bioavailable**”, bacteria like Shewy often need help from other organisms in their environment to break them down.

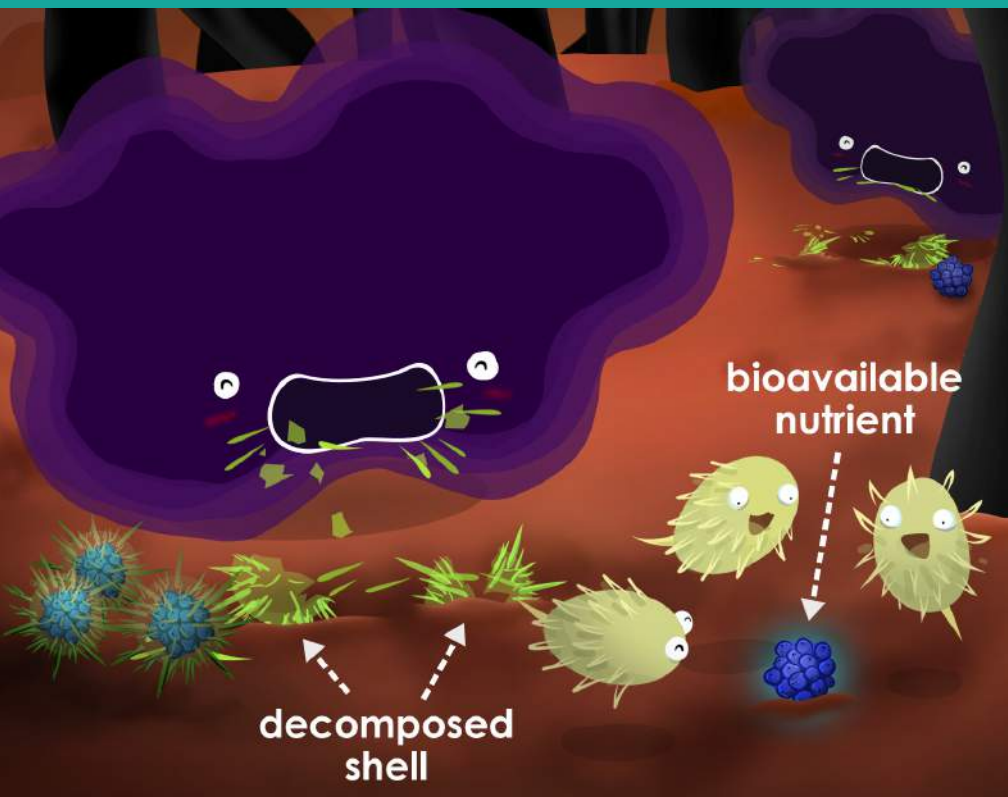
A fungi clan arrives. Are they friends or foes?



It is a microbe-eat-microbe world out there. Often, larger microbes called **predators** rely on a diet of whole bacteria like Shewy. Let's hope these fungi are friendly...

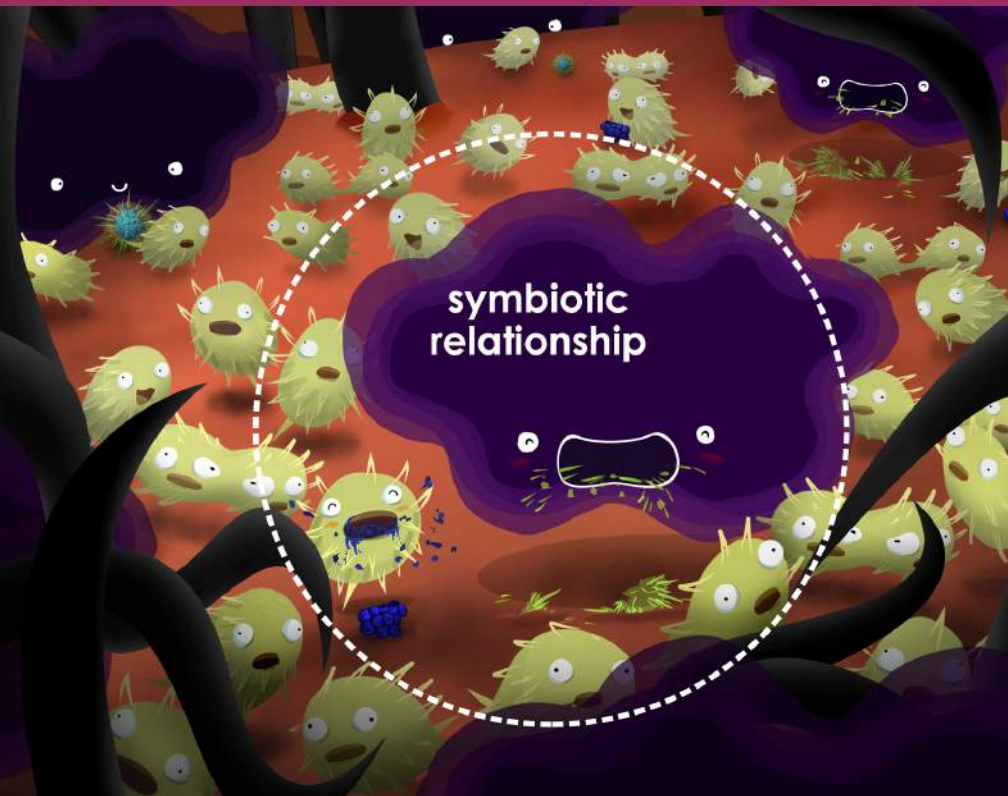
11

The fungi munch up the complex foods, freeing the simple nutrients inside.



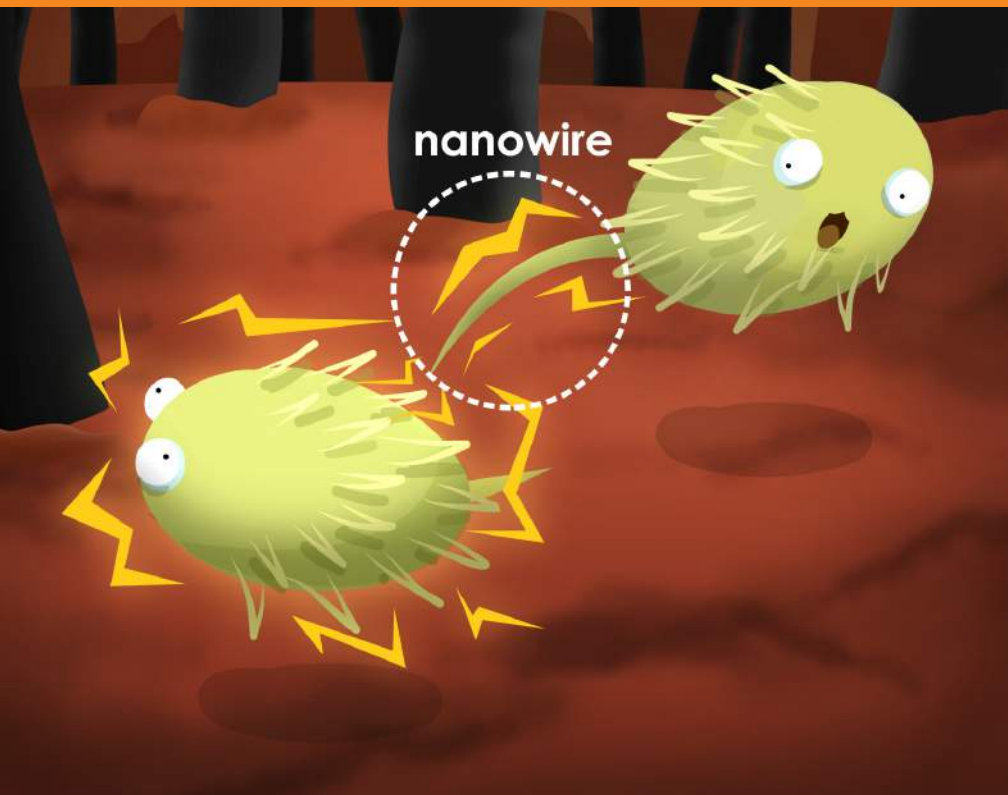
It turns out these **fungi** love to munch up the tough shell of the complex nutrients, but don't like the leftovers, which is food for the Shewies!

Symbiosis saves the day!



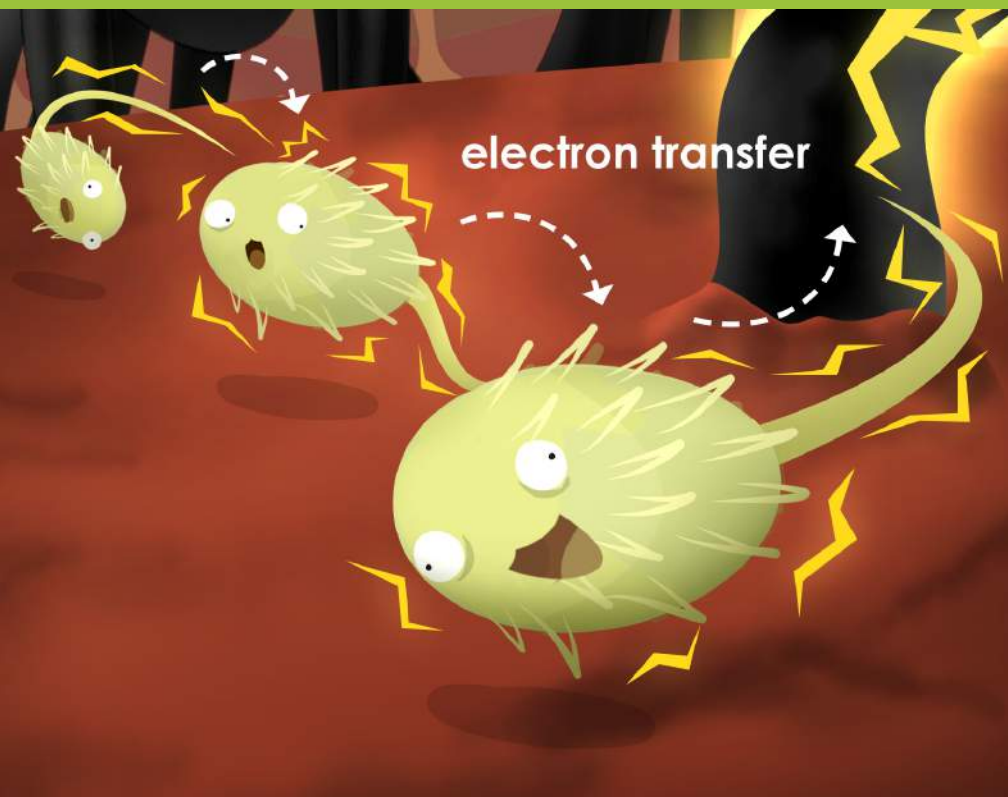
Both the Shewy clan and the Fungi clan benefit from their relationship! This is an example of **symbiosis**.

A shocking development!
Shewies grow
electron-shuttling nanowires!



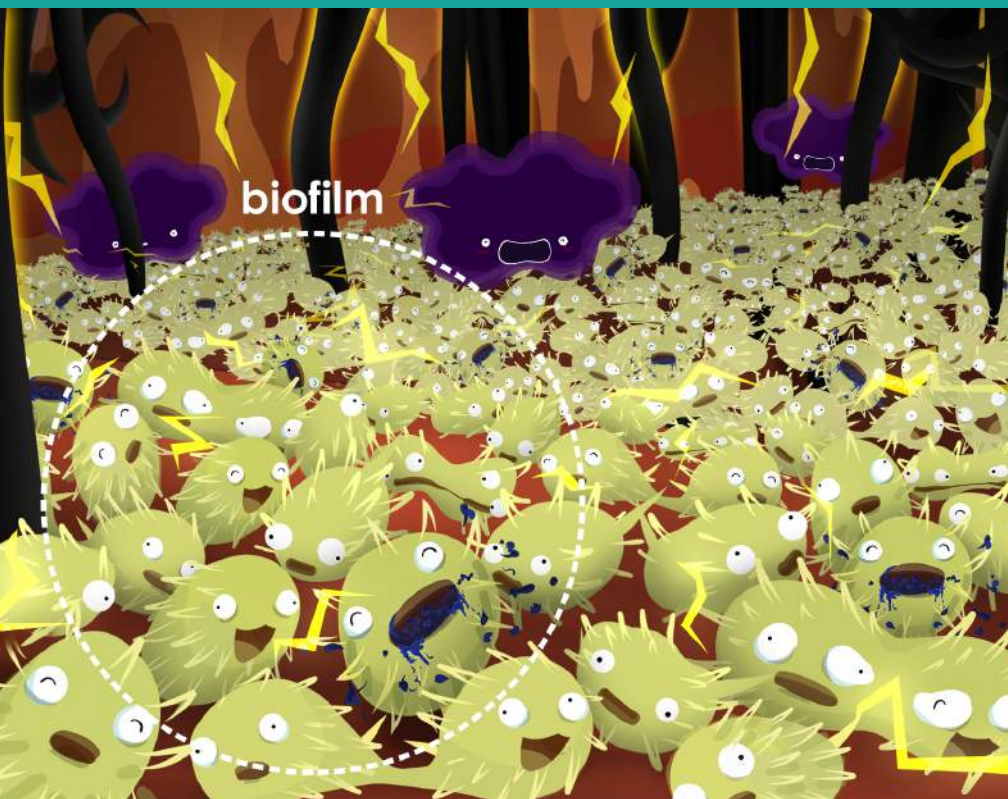
Electric bacteria like Shewy create conductive pili called “**nanowires**”. These pili enable Shewies to transfer electrons to each other.

Even distant microbes can discharge to a fiber by linking nanowires!



In nature, electric bacteria like Shewy can connect themselves together with their nanowires. This enables Shewies that are **far away** from the conductive fibers of the anode to still get rid of their **electrons**.

A connected community flourishes – the power of working together!



In nature, Shewies create vast, electrically connected networks! When bacteria create dense communities, this is called a **biofilm**.

Like Shewy?

Explore the world of Shewy and Shewy's friend Geo with some awesome MudWatt kits!



Available at: www.mudwatt.com

Enter in promocode

"SHEWY"

and get **10% off!**



This comic follows the story of Shewy, an electric bacteria, as it lives inside a MudWatt science kit. Follow Shewy's adventures and learn along the way!