

Supporting Minds Factsheet

Slime Mould

You may not be aware of it, but you are never far from a slime mould in the woods. You have probably seen one and either not paid attention or thought it was some kind of disgusting discolouration on rotting bark. For a long time, scientists thought that slime moulds were a kind of fungus, since they had similar life cycles and were present in the dark, damp environments favoured by fungi.



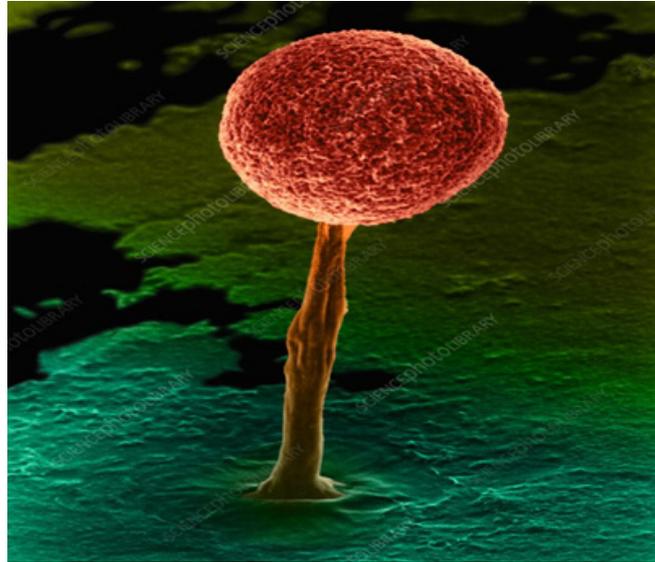
Slime mould called 'Dog's Vomit'!



Slime mould engulfing and absorbing the yeast present in beer

Researchers now think that slime moulds are closer to amoeba – in other words, single cell structures that can move by reaching out little creeping limbs called pseudopods. Unlike fungi, slime moulds move in search of food, engulfing yeast, bacteria and other by-products of decay. As such, they are an important component of the endless clean-up programme that exists in forests.

In the first stage of development, slime moulds exist as groups of individual cells that swarm around in the soil, invisible without a microscope.



An individual slime mould cell, greatly magnified

The individual cells mass gather and fuse to form what is called plasmodium that is highly visible, appearing in different forms and colours. At this stage of development, slime moulds can look like slimy blobs surrounded by oozy networks of cobweb-like patterns that are often strikingly beautiful in their intricacy. Some are like a huge bag of jelly. These masses can become very big.



Badhamia Utricularis



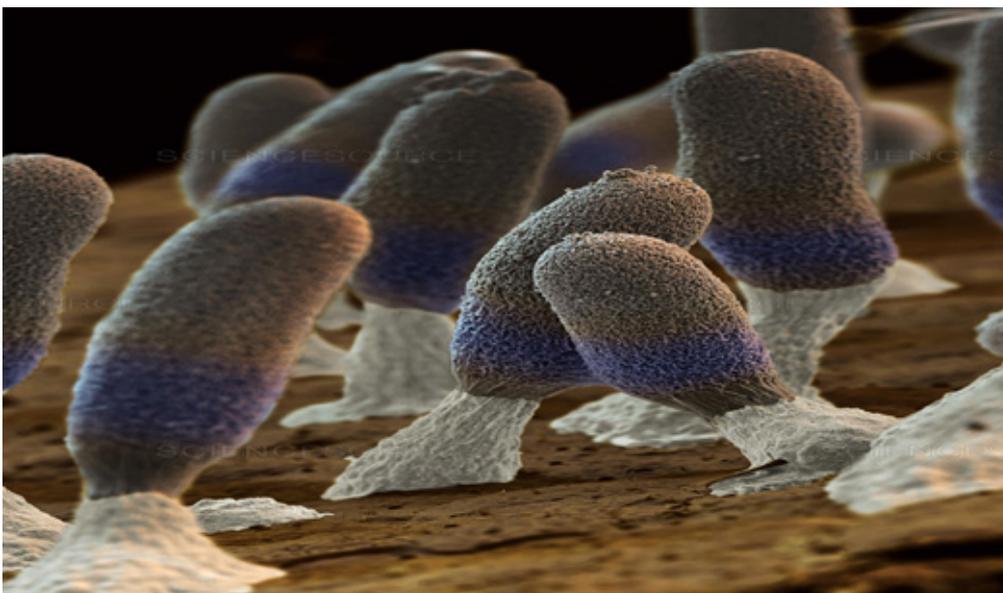
Hemetrichia Serpula – hairy slime mould

In 1973, residents in Dallas, Texas noted a strange, slimy, moving phenomenon that was referred to as 'The Blob' - inspired by a 1950s horror movie of the same name.



An excitable reporter suggested that this was a mutant bacterium capable of overtaking the world, until a local mycologist identified the would-be conqueror as a simple slime mould.

When the time is right, the oozy plasmodium coalesces to form the fruiting bodies that release spores the atmosphere, giving rise to the next generation of slimes.



A hugely magnified image of individual fruiting bodies ready to send spores into the air

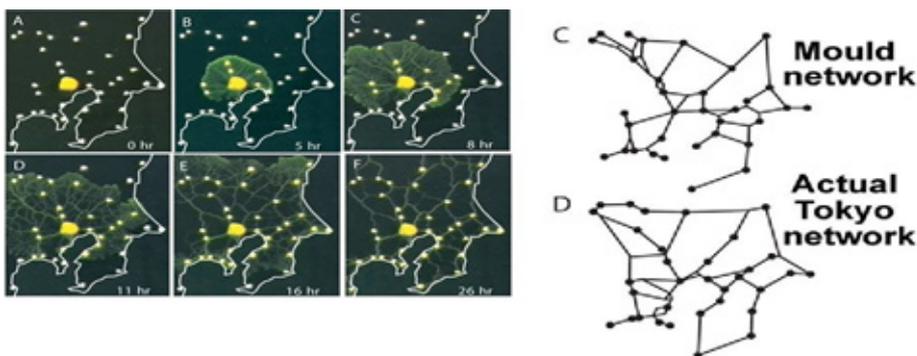
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In its plasmodial stage, slime mould seems to move with a purpose. Despite having neither central nervous system nor brains, slime moulds appear to have memories and are able to learn new things. They seem to be able to make decisions based on comparing courses of action. Slime moulds can find the shortest distance between two points.



Slime mould finding its way through a maze

Japanese researchers created a model of the Greater Tokyo area in a petri dish and, into it, released a type of slime mould called a 'many headed slime'. The researchers placed single oat flakes (the slime moulds' favourite food) at major urban hubs. After just a single day, the slime mould developed into a network that was almost identical to the Tokyo subway by finding the shortest distance between the points where oats were placed.



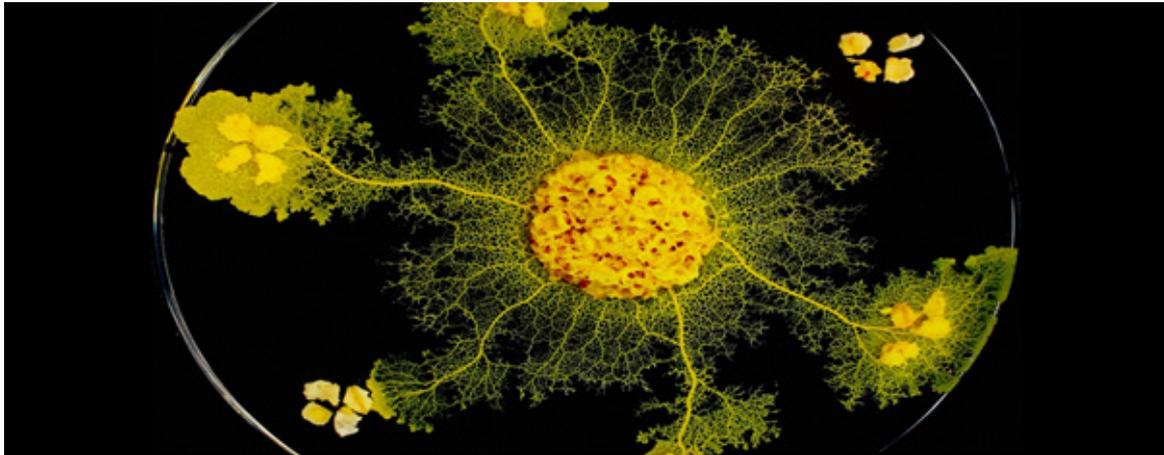
<http://scienceblogs.com/notrocketscience/2010/01/21/slime-mould-attacks-simulates-tokyo-rail-network/>

British researchers are using slime moulds to figure out the best escape routes from buildings in the event of fire.

Researchers at France's National Centre for Scientific Research taught slime moulds to enter areas that they normally would avoid because they contain toxic substances such as salt. Once slime moulds became accustomed to substances that they usually avoided, they passed on this knowledge to their evolving cells.

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This particular slime mould was put into a dormant state for a year and then brought back to activity. Not only did it retain the knowledge it had learned the previous year, the behaviour was passed to new and different cells.



Re-animated slime mould remembers directions after a year of dormancy

What is completely extraordinary is that slime moulds seem to have acquired memory without having any of the normal biological components normally required for memories to form. It has no central nervous system and no brain cells.

This raises the question of how learning developed through the process of evolution, and whether we need to widen our definition of cognition to include non-humans!



A human brain



A slime mould "brain"!!

The link below will take you to a wonderful, time-lapse video clip of a slime mould in action.

<https://www.newforestnpa.gov.uk/discover/plants-fungi/slime-moulds/>

If you have thought about keeping a pet, but have neither the space nor the time for the usual cat, dog, fish or hamster, the link below will demonstrate how to keep a tame slime mould at home

<https://warwick.ac.uk/fac/sci/lifesci/outreach/slimemold/care>