



Dissecting an Article: Snotty Hagfish



When you threaten a hagfish, it squirts a huge amount of snotty goo from hundreds of glands that run along its sides. The goo is in such large quantities it could gag a large predator like a shark. The goo that they secrete can expand to 20 litres when it is combined with water; it is like mixing powdered glue paste up for papier-mâché. This goo is produced as a defence mechanism where they become so slippery that the predator can't hold on to them. They can also tie themselves into a knot spreading the goo all over the predator, this twisting pretzel movement also removes the goo that is sticking them to themselves so that they can escape. The hagfish is mainly prey for birds and mammals, with very few sea creatures daring to eat the slimy snot ball. Scientists think that this could be because the goo is able to block fish's gills which would suffocate them so instead they stay away.

Hagfish are an eel-like marine fish that are found in deep areas of the ocean. Hagfish occur in a range of colours including pink, brown, blue, grey and even black or white spotted. They are very simple fish and lack a true eye. They have a series of eye spots instead that detect light rather than actually see objects. Hagfish use long whiskers around their mouths called barbels to help them sense the things in their environment. They feed in a very peculiar way. They enter the bodies of dead or dying animals and eat them using sets of jaws that move horizontally instead of vertically like ours that are covered in sharp spines that pull flesh from their prey. They also have four spiny rake shaped teeth that sit back in their mouths on a hard tongue that pull bits of food in and down their throats. They average 50 cm in length and are covered in a sagging, loose skin. Hagfish skin has been used to make many fashion accessories including wallets, handbags and belts because it makes very robust leather that is easily manipulated. They have also been used as a food source in some Asian countries, where the slime is collected and used to thicken foods and is also whipped up to give airiness to foods similar to how egg white is used. Because they look quite repulsive and are so greasy and gross, people have done very little research into hagfish and have been inclined to leave them alone.



Recently, Materials Scientists from a laboratory at the University of Guelph in Canada have been studying hagfish slime and have been able to create strong, stretchy fibres from it. They state that the fibres could be used for things like parachutes, packaging or even material for clothes in the future. It isn't known how successful these products would be given the bad reputation of the disgusting hagfish – would you be brave enough to wear clothes made of mucus?

When scientists and cooks want to extract the slime for use, they don't kill the hagfish, rather they have to irritate them or make them scared enough to slime. Sometimes this is done by holding the hagfish by the tail and giving it electric shocks or by hitting its tank with a stick. Once it slimes, buckets and buckets of goo can be collected from just one fish.

The slime itself isn't a simple gel like you would eat in jelly. It contains millions of tiny microscopic fibres called microfilaments that can trap water and stop the goo from being torn apart. This makes it quite strong for slime. The filaments that are in the slime are made of proteins (proteins are often referred to as the building blocks of life) similar to those that make up your hair or fingernails. Scientists have been able to extract these tiny filaments and use them to create threads similar to nylon about 20 cm in length. They have amazing ductile strength and can be stretched a long way before they break. In fact, they are almost as strong as spider web silk (which is thought to be five times as strong as steel if you could get enough of it). The fibres made from hagfish are also a lot kinder on the environment because they come from a living thing which doesn't need to be killed in order to extract the slime and each individual hagfish produces huge quantities. The main material used in producing things like parachutes which are light but strong is nylon but this has a negative impact on the environment because it is produced from petroleum.