

Hagfish found to eat through its skin

3 March 2011, by Lin Edwards



(PhysOrg.com) -- A new study in Canada has shown that the primitive fish called the Hagfish, which has the habit of burrowing into dead or dying creatures on the sea bed, eats by absorption through its skin and gills as well as via its mouth.

The Pacific hagfish (*Eptatretus stoutii*), also known as the slime eel, is an [ancient species](#) of fish shaped like a simple tube and living at the bottom of the sea. It is almost blind and uses feelers around its mouth to seek out food. Hagfish also have a tendency to exude copious quantities of a thick gel-like slime when disturbed, but despite this habit, they are eaten in a number of countries, such as Korea, along with their eggs and even their slime.

The research team was led by Dr Chris Glover of the University of Canterbury in Christchurch, New Zealand and the Bamfield Marine Sciences Center in Canada. It was already known that the hagfish has an internal salinity similar to its environment, which led the researchers to suspect the skin might be permeable. To test this hypothesis they caught a number of hagfish near Vancouver Island and tested their skin and gill tissue for absorption of two

[amino acids](#).

The results showed that amino acids were absorbed by both skin and gill tissue, and the amount of absorption increased as the concentration of amino acids increased, but only up to a certain point. Glover said this indicates there is a specific transport mechanism for transporting the amino acids, and the rate of absorption does not continue to increase after all absorption sites are occupied.

Hagfish are traditionally grouped with vertebrates, having a bony skull, but they are jawless and have a flexible notochord instead of a bony spine. Invertebrates such as worms and mollusks also absorb nutrients through their skin or gills, but this is the first time anything as close to a true vertebrate has been shown to feed in the same way. In vertebrates the skin is impermeable to reduce chemical exchanges between the body and its environment, and this allows them to live in salt or fresh water and to minimize loss of fluids on land.

The study, published in the journal *Proceedings of the Royal Society B: Biological Sciences*, shows the feeding methods of hagfish may be transitional between those used by aquatic invertebrates and vertebrates such as modern fish.

Dr Glover said the ability to absorb nutrients through the skin and gills may also be an adaptation to an environment in which meals are infrequent and there is fierce competition for the carcasses. He said their calculations suggest the relatively large area of the skin could absorb nutrients at around the same levels as the digestive tract. The skin also absorbs the nutrients faster than the gut.

More information: Adaptations to in situ feeding: novel nutrient acquisition pathways in an ancient vertebrate, by Chris N. Glover et al. *Proceedings of the Royal Society B: Biological Sciences*, Published online before print March 2, 2011, [doi](#):

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