

The Guardian



Scientists reveal secrets of dragonfish's 'invisible' fangs

Deep-sea creature's teeth are made of similar material to ours, but heavily adapted for stealth

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The dragonfish, a dweller of the dark ocean depths, would slot nicely into any horror movie, with virtually transparent fangs and bioluminescent barbel that help it thrive in its extreme environment.

The nature of its teeth had been a mystery until Wednesday, when scientists revealed they are made of the same basic material as human teeth but with a different microscopic structure.

The researchers studied the dragonfish species called *Aristostomias scintillans*, which is caught at depths of up to 1,000 metres (3,000 ft) off the Californian coast and can grow to 25 cm (10 in) in length.



The teeth of a dragonfish. Photograph: Audrey Velasco-Hogan/AP

It has a black, elongated body, with a long, fleshy filament called a barbel hanging from its lower jaw with a bioluminescent organ called a photophore on the end to lure prey. It also has two rows of photophores along the length of its body. Its long, sharp teeth are big relative to its body size.

Its teeth, like ours, are made up of an outer layer of enamel and an inner layer of dense bony tissue called dentine, but there are nanoscale crystals in the enamel that prevent any light that exists in the near blackness from reflecting off the tooth surface.



A dragonfish specimen collected off the coast of San Diego, California. Photograph: Audrey Velasco-Hogan/AP

“Thus, the mouth is invisible and the prey is caught more easily,” said materials scientist Marc André Meyers of the University of California, San Diego, who led the research published in the journal *Matter*.

“Initially, we thought the teeth were made of another, unknown material,. However, we discovered that they are made of the same materials as our human teeth: hydroxyapatite and collagen,” he said.

“However, their organisation is significantly different from that of other fish and mammals. This was a surprise for us: same building blocks, different scales and hierarchies. Nature is amazing in its ingenuity.”

A small number of other fish such as the anglerfish and hatchetfish have transparent teeth. “These have not been investigated yet, but I suspect they have a similar structure,” Meyers said.

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