Glowing bacteria in anglerfish 'lamp' come from the water

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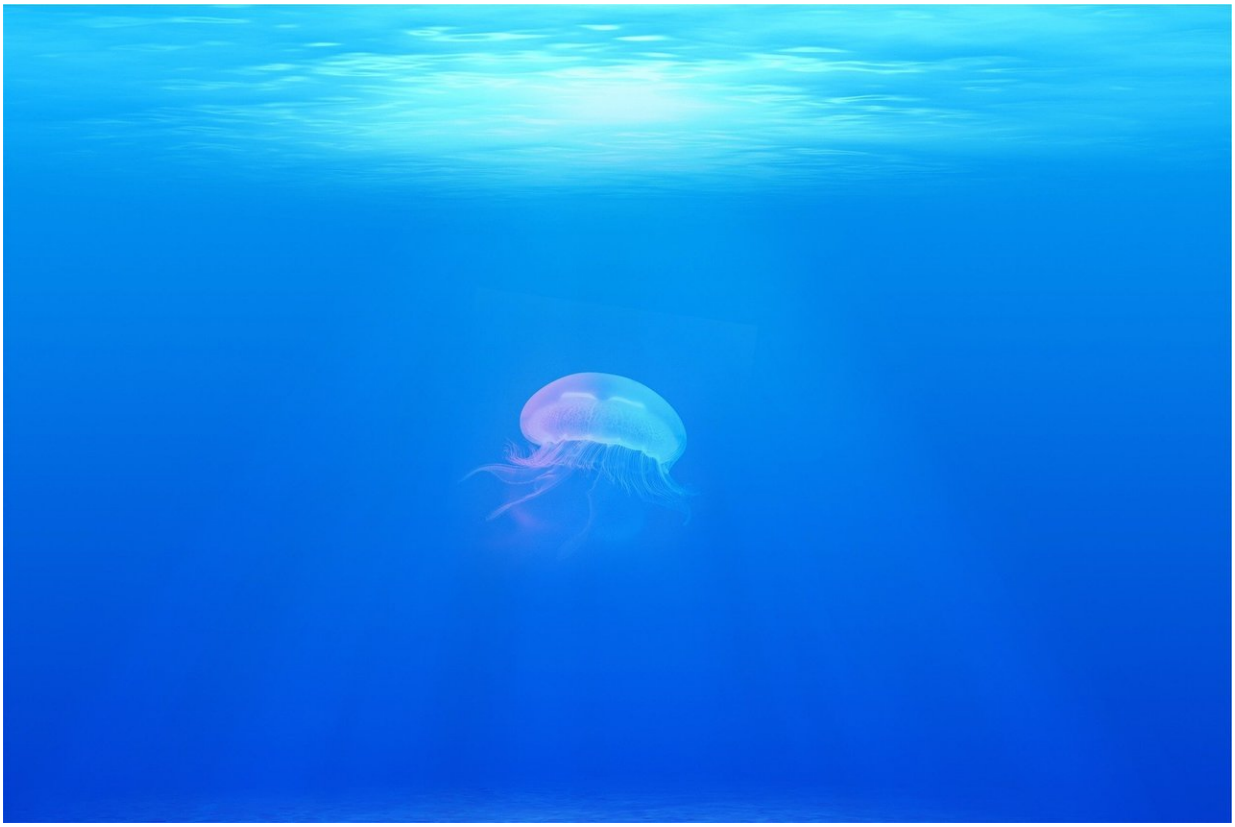

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New research shows that female deep-sea anglerfish's bioluminescent bacteria—which illuminate their "headlamp"—most likely come from the water.

Scientists who study these fish are still mostly in the dark about the bacteria, which share a symbiotic relationship with the fish. Researchers knew from an earlier study that, based on their genomes, these bacteria did not appear to be fully equipped to live on their own outside of a host.

"In previous work that I had done, we found for the symbionts of deep-sea anglerfish that the bacteria have undergone genomic reductions; they've lost a lot of genes, suggesting that they are probably obligately dependent on their host," said Tory Hendry, assistant professor of microbiology at Cornell University and the paper's senior author.

A reduced genome is a hallmark of bacteria that live their whole lives inside a host and receive services and nutrients that they no longer need instructions to acquire. Such species then lack the genetic "software" to survive on their own.

In the study, the researchers obtained previously collected specimens of seven species of anglerfish across six families. They also studied the only two species of bioluminescent bacteria known to live within the bulbs of anglerfish. While one species of bacteria was specifically only found in one species of fish, the other bacteria species was found in all six of the remaining species studied.

The fish were each caught in different locations, from the Gulf of Mexico to the Cape Verde islands. While some were caught almost 20 years apart, the bacteria in the bulbs were 99% identical.

Another study by collaborators in the DEEPEND Consortium revealed that anglerfish only acquire bacteria later in life once their light organ has developed. The bulb has a little pore in it, and the researchers wonder if the fish may spew bacteria into the environment once microbe populations grow, possibly to ensure that future generations of young fish have access to the luminous microbes in the water.

The paper, "Diverse Deep-Sea Anglerfishes Share a Genetically Reduced Luminous Symbiont That Is Acquired from the Environment," was published Oct. 1 in the journal *eLife*.

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