

First sign of animal life on Earth may be a sponge fossil

July 28 2021, by Christina Larson



This undated photo provided by Elizabeth Turner, Laurentian University, shows a field location in Northwest Territories, Canada. Canadian geologist Elizabeth Turner may have found the earliest fossil record of animal life on Earth in the area shown, according to a report published Wednesday, July 28, 2021, in the journal *Nature*. Credit: Elizabeth Turner/Laurentian University via AP

A Canadian geologist may have found the earliest fossil record of animal life on Earth, according to a report [published](#) Wednesday in the journal *Nature*.

Around a billion years ago, a region of northwest Canada now defined by steep [mountains](#) was a prehistoric marine environment where the remains of ancient sponges may be preserved in mineral sediment, the paper says.

Geologist Elizabeth Turner discovered the rocks in a remote region of the Northwest Territories accessible only by helicopter, where she has been excavating since the 1980s. Thin sections of rock contain three-dimensional structures that resemble modern sponge skeletons.

"I believe these are ancient sponges—only this type of organism has this type of network of organic filaments," said Joachim Reitner, a geobiologist and expert in sponges at Germany's University of Gottingen, who was not involved in the research.

The dating of adjacent rock layers indicates the samples are about 890 million years old, which would make them about 350 million years older than the oldest undisputed sponge fossils previously found.

"What's most stunning is the timing," said Paco Cardenas, an expert on sponges at Sweden's Uppsala University, who was not involved in the research. "To have discovered sponge fossils from close to 900 million years ago will greatly improve our understanding of early animal evolution."



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Many scientists believe the [first animal groups](#) included soft [sponges](#) or [sponge-like](#) creatures that lack muscles and nerves but have other features of simple animals, including cells with differentiated functions and sperm.

To be sure, there's very little scientific consensus or certainty about

anything dating back a billion years ago, so other researchers will likely continue to vet and debate Turner's findings.

"I think she's got a pretty strong case. I think this is very worthy of publishing—it puts the evidence out there for other people to consider," said David Bottjer, a paleobiologist at University of Southern California, who was not involved in the research.

Scientists believe life on Earth emerged around [3.7 billion](#) years ago. The earliest animals appeared much later, but exactly when is still debated.

Until now, the oldest undisputed fossil sponges date to around 540 million years ago, an era called the Cambrian period.

But scientists using a line of reasoning called the [molecular clock](#)—where they analyze the rate of genetic mutations to backdate when two species likely diverged—say that available evidence points to sponges emerging much earlier, around a billion years ago.



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Yet no supporting physical evidence has yet been found until now.

"This would be the first time that a sponge fossil has been found from before the Cambrian, and not only before, but way before—that's what's most exciting," said Uppsala University's Cardenas, adding that the research seems to confirm the molecular clock estimates.

Fossil evidence is scant before the [Cambrian period](#) when animals first developed hard skeletons, exoskeletons and shells, which are more likely to be preserved.

"Those kinds of fossils belong to more complicated animals—obviously there has to be a back history" of simpler animals like sponges emerging first, said the paper's author Turner, who is based at Laurentian University in Ontario.

The dating of 890 million years ago is significant because, if the sponge's identification is confirmed, it shows that the first animals evolved before a time when oxygen in the atmosphere and ocean reached a level scientists once thought was necessary for animal life. Yet recent research shows that some sponges can survive with very little [oxygen](#).

"Everything on Earth has an ancestor. It's always been predicted that the first evidence of animal life would be small and cryptic, a very subtle clue," said Roger Summons, an MIT geobiologist who was not involved in the research.

More information: Possible poriferan body fossils in early Neoproterozoic microbial reefs, *Nature* (2021). [DOI: 10.1038/s41586-021-03773-z](#) , www.nature.com/articles/s41586-021-03773-z

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Citation: First sign of animal life on Earth may be a sponge fossil (2021, July 28) retrieved 16 July 2024 from <https://phys.org/news/2021-07-oldest-fossils-animals-canada.html>

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