MEDIA RELEASE

AUSTRALIAN MUSEUM

Sea monsters evolve surprisingly similar teeth.

Dr Matthew McCurry, Australian Museum Research Institute and lead author of the study holding an assortment of fossilised marine predator teeth. © James DiLoreto, Smithsonian Institution

Monday April 15th 2019. Sydney, Australia: A team of Australian and American palaeontologists have found that a diverse range of ancient aquatic species, including pliosaurs, fossil whales and aquatic dinosaurs all evolved similar features on their teeth. The research findings were published in the scientific journal *Biological Journal of the Linnean Society*.

Lead author of the paper, Australian Museum Research Institute (AMRI) and University of New South Wales (UNSW) palaeontologist, Dr. Matthew McCurry, along with scientists from UNSW and the Smithsonian, USA, examined the teeth of living and extinct species to make this discovery.

McCurry said animals that have evolved to live underwater develop similar features like paddle-like limbs and streamlined bodies to deal with the environment – all examples of convergent evolution.

“Here we showed that animals which feed underwater including full aquatic species like early whales or ichthyosaurs as well as semiaquatic species like spinosaurid dinosaurs evolve similar ridges on their teeth. Sometimes the process of evolution generates similar solutions in unrelated species. What we found was that species, both living and extinct, that feed in water often evolve similar ridges on their teeth.”

“There are a few different possibilities about why the ridges evolved. They could help these species grip onto slippery prey like fish, or to stop the prey becoming stuck on the teeth, or to help the teeth puncture scaly prey,” Dr McCurry said.

McCurry explained that feeding in water is challenging for a number of reasons:

“Some of the most common types of prey in water, fish, squid etc., are slippery and hard to catch. Buoyancy also prevents animals from breaking apart the prey into smaller pieces in that same way that terrestrial animals do, so they often shake large prey at the surface of the water. Also, as most aquatic animals have adapted their arms for swimming they can no longer use them to manipulate prey once it is caught.” he said.

This collaborative project allowed scientists from Australia and the US to use their extensive natural history collections to examine the teeth of living and fossilized species to make this discovery.

MEDIA CONTACT
Claire Vince, Media Advisor
Claire.vince@austmus.gov.au
02 9320 6181 /. 0468 726 910

Curator of fossil marine mammals, National Museum of Natural History, USA, Dr. Nick Pyenson, who supervised McCurry while he conducted a pre-doctoral fellowship at the Smithsonian, said the ridges have evolved many times. They are common in aquatic feeding species and rare in terrestrial species.

“The fossil record of marine predators over the past 250 million years shows many recurring solutions to the problems of how to feed underwater. When we see repeated evolutionary structures -- such as specific tooth types -- that's telling us a bit about how evolution works,” Pyenson said.

Director of AMRI, Dr. Rebecca Johnson commented that this study is a terrific example of the value of collaboration and the utility of 3D scanning technologies, which allow for novel information to be extracted from the fossils in the museum collections.

“Museum collections continue to give crucial insights into evolution of life, both past and present. How these animals lived, and they adapted to survive in their environment,” she said.

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ABOUT AUSTRALIAN MUSEUM (AM):
The AM, founded in 1827 is the nation’s first museum, and is an internationally recognised natural science and culture institution focused on Australia and the Pacific. As custodian of more than 18 million objects, the AM is uniquely positioned to provide a greater understanding of the region through its scientific research, exhibitions and public and education programs. Through the Australian Museum Research Institute (AMRI), the AM also has a leading role in conserving Australia’s biodiversity through understanding the environmental impacts of climate change, potential biosecurity threats and invasive species.

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