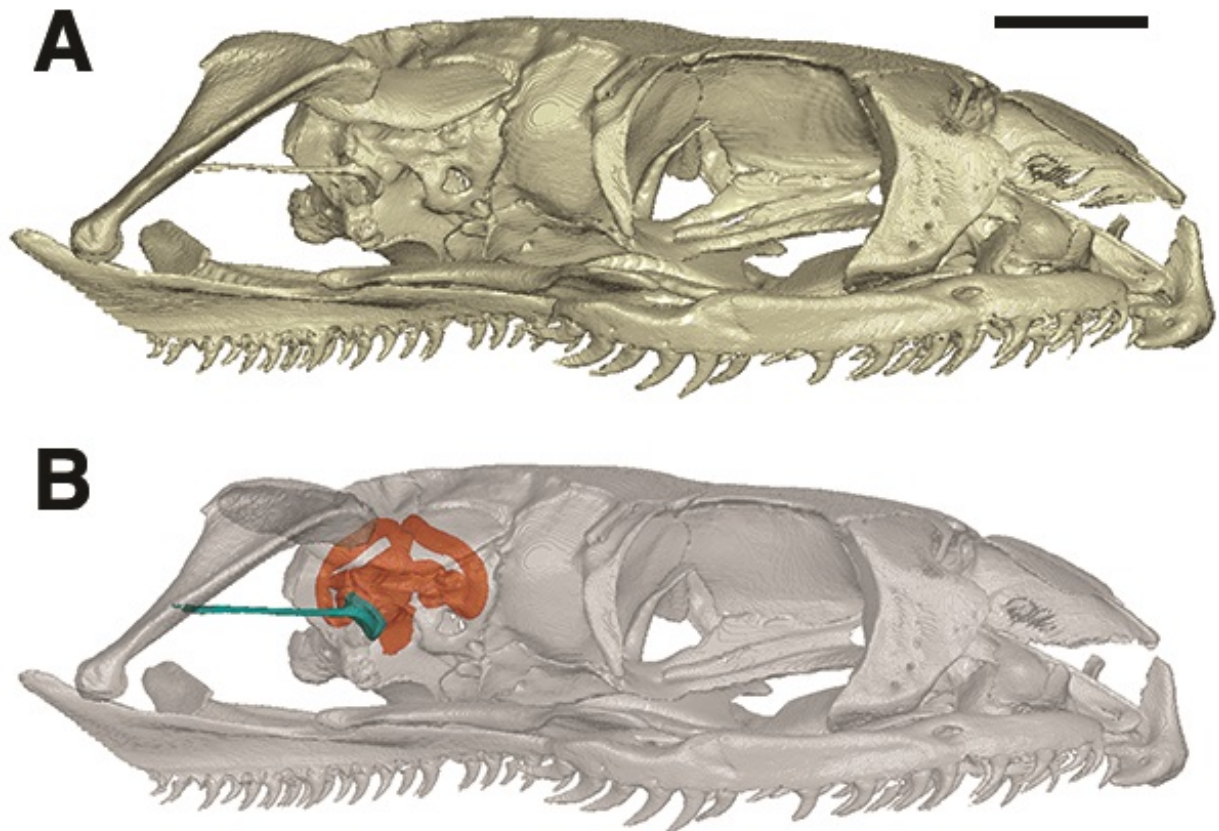


Mystery of how snakes lost their legs solved by reptile fossil

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Modern snake skull, with inner ear shown in orange. Credit: Hongyu Yi

Fresh analysis of a reptile fossil is helping scientists solve an evolutionary puzzle - how snakes lost their limbs.

The 90 million-year-old skull is giving researchers vital clues about how snakes evolved.

Comparisons between CT scans of the fossil and modern reptiles indicate that snakes lost their legs when their ancestors evolved to live and hunt in burrows, which many snakes still do today.

The findings show snakes did not lose their limbs in order to live in the sea, as was previously suggested.

Scientists used CT scans to examine the bony inner ear of *Dinilysia patagonica*, a 2-meter long reptile closely linked to modern snakes. These bony canals and cavities, like those in the ears of modern burrowing snakes, controlled its hearing and balance.

They built 3D virtual models to compare the inner ears of the fossils with those of modern lizards and snakes. Researchers found a distinctive structure within the [inner ear](#) of animals that actively burrow, which may help them detect prey and predators. This shape was not present in modern snakes that live in water or above ground.

The findings help scientists fill gaps in the story of snake evolution, and confirm *Dinilysia patagonica* as the largest burrowing snake ever known. They also offer clues about a hypothetical ancestral species from which all modern snakes descended, which was likely a burrower.

The study, published in *Science Advances*, was supported by the Royal Society.

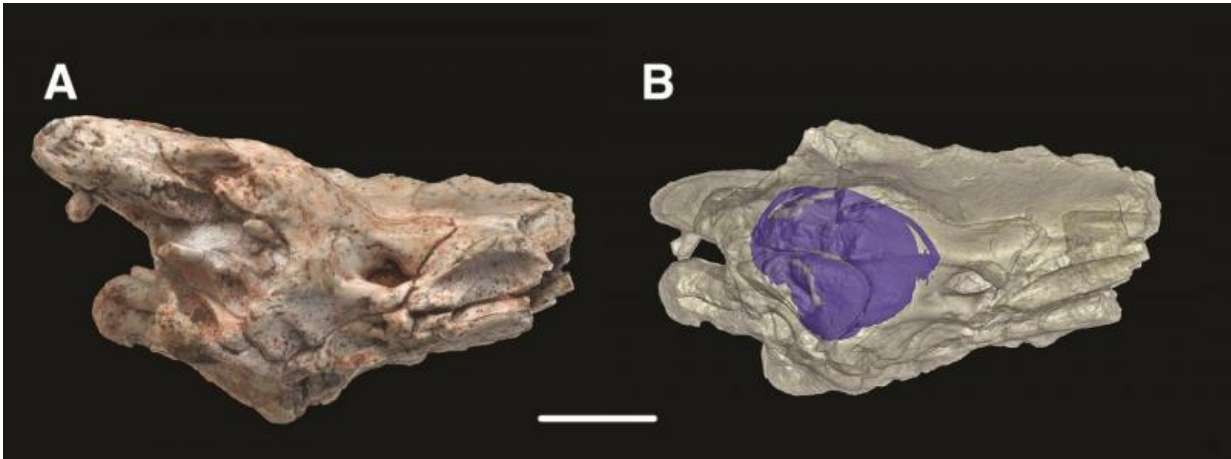


Image and representation of brain case and inner ear of *Dinilysia patagonica* fossil, which scientists at the University of Edinburgh and American Museum of Natural History have used to show that modern snakes lost their legs when their ancestors became expert burrowers. Credit: Hongyu Yi

Dr Hongyu Yi, of the University of Edinburgh's School of GeoSciences, who led the research, said: "How [snakes](#) lost their legs has long been a mystery to scientists, but it seems that this happened when their ancestors became adept at burrowing. The inner ears of fossils can reveal a remarkable amount of information, and are very useful when the exterior of fossils are too damaged or fragile to examine."

Mark Norell, of the American Museum of Natural History, who took part in the study, said: "This discovery would not have been possible a decade ago - CT scanning has revolutionised how we can study ancient animals. We hope similar studies can shed light on the evolution of more species, including lizards, crocodiles and turtles."

More information: The burrowing origin of modern snakes, *Science Advances*, [DOI: 10.1126/sciadv.1500743](https://doi.org/10.1126/sciadv.1500743)

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