

## Ancient Queensland fish 'close living relative' to humans, scientists believe

ABC Wide Bay / By Brad Marsellos

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Professor Meyer says the Australian lungfish has a bone structure similar to human's upper arms or legs. *(Pixabay: Patty Jansen)*

Scientists have cracked the world's largest animal genome to better understand the evolution of life on land.

Researchers say the Australian lungfish, native to the Burnett and Mary Rivers, is the closest living fish relative to humans and other land dwellers.

A group of European scientists, led by evolutionary biologist professor Axel Meyer from the University of Konstanz in Germany, sequenced 43 billion DNA building blocks, 14 times larger than the human genome.

The sequencing was only made possible through recent technological advancements.

Through analysis of the genetic mapping, the scientists linked the emergence of fish onto land 400 million years ago by observing the lungfish's physical characteristics, including its ability to breathe air and use its fins like limbs.

### Key points:

- Australian lungfish have the ability to breathe air using a single lung
- They have the largest genome of any animal sequenced so far
- The lungfish have existed for nearly 400 million years and fossils show they have remained unchanged for more than 100 million years



Evolutionary biologist Professor Axel Meyer is part of a team that fully sequenced the 43 billion DNA building blocks of the Australian lungfish. *(Supplied: Axel Meyer)*

"Among the fishes, they are our closest living relatives, we are sure about this now,"  
Professor Meyer said.

"We can see a lot in the genome and in the biology of the lungfish that helps us understand what the features must have been important for the conquest of land."

## **Cracking the code**

Finding the link between fish and life on land has been a lifetime passion and journey for Professor Meyer.

As a child, he read *Old Fourlegs*, a book about a prehistoric fish known as a coelacanth being caught in a South African fishing net.

Professor Meyer has spent the last three decades studying evolutionary biology and genetics, but the lungfish's DNA sequence was too complicated to code until now.

Assembling a team from laboratories in Konstanz, Wurzburg and Hamburg in Germany and Vienna in Austria, Professor Meyer was finally able to crack the animal world's longest DNA code.

"If you want to leave water, you have to be able to breathe air and not continue to rely on breathing through your gills, so you have to have lungs," Professor Meyer said.

"Then you have to be able to walk on land, and that's a different thing to accomplish for a fish that is used to being neutrally buoyant and paddling with their fins.

"Lungfish, if they moved on land, would have to crawl like a salamander and they already do that underwater."



Scientists say the Australian lungfish is the link between fish making the conquest of land 400 million years ago. (Facebook: Chicago Shedd Aquarium)

## Fins with fingers

The Australian lungfish is a protected species that was first described in 1870 by zoologist Gerard Krefft.

It is a common sight in the Burnett and Mary River with people fishing or canoeing often receiving a fright after mistaking the nearly 2-metre fish for a crocodile.

The fish rises to the surface and makes a large gasping noise as it breathes air.

There is still much to learn from the fish that hasn't changed in 100 million years and has been popularly described as a "living fossil".

Scientists still don't know how long the species live for, with the oldest [lungfish dying](#) in captivity in 2017 after being taken from the wild in 1933.

And while the ability to use its single lung to stay alive out of water makes it quite unique in the fish world, Professor Meyer understands it's the bone structures of its fins, including finger bones, that sets it apart from the other species of lungfish.

It can also help explain the evolution of animal life on land.



The Australian lungfish is a living link to evolution.

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"The Australian lungfish has a bone structure that is similar in the basic arrangements of the bones to our upper arms or to our legs," he said.

"There is one strong humerus, the upper arm bone, and then two bones that branch off like our lower arm, then come the digits.

"That makes the Australian lungfish much more interesting than the South American or African lungfish."

Professor Meyer and the European science laboratories involved in the sequencing will continue their research and focus on the other species of lungfish DNA.

### **'Only lineages still alive'**



The Australian lungfish use their fins like arms. (Supplied: Chicago Shedd Aquarium)

Professor Meyer hopes to visit the Wide Bay region in Queensland to study the Australian lungfish in its natural environment. He feels they are an important living link to the past we can continue to learn from.

"Both the coelacanths and lungfish are really, really important," he said.

"They are the only lineages still alive that tell us something that might have happened 400 million years ago.

"Of course, paleontologists have found fossils that are even closer to us, that show features of limbs and other aspects of their body. But these creatures are no longer alive. You are only dealing with rocks."