Four-legged fish an evolutionary mistake

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The "four-legged fish" Ichthyostega is not the "missing link" between marine and land animals, but rather one of several short-lived "experiments". This is what scientists from Uppsala and Cambridge universities maintain in an article in the latest issue of the scientific journal *Nature*.

The "four-legged fish" Ichthyostega lived in Greenland during the Devon Period, some 355 million years ago, and is one of the very oldest land vertebrates. Since it was discovered back in the 1930s, and nearly the entire skeleton has been preserved, it quickly acquired iconic status as the "missing link" between fish and land animals. Now a Swedish-British research team is presenting a new reconstruction of this classic animal that paints a radically different picture of its body shape and life style.

It isn´t easy to interpret the fossil of Ichthyostega. Even though almost the whole skeleton is represented, there is no single fossil that shows the whole animal. Instead it is necessary to assemble a puzzle from information found in several different fossils. This was first done in the 1950s by Professor Erik Jarvik at the Museum of Natural History in Stockholm, who reconstructed the animal with a crocodile-like body standing on four sturdy legs, with a large torso and a simple backbone made up of identical vertebrae. However, for the last five years a research team from Uppsala and Cambridge has been piecing together another interpretation.

"We discovered that the vertebrae are not at all identical, but differ depending on where in the body they were located. Moreover, the torso

is differently shaped than Jarvik thought, and the hind legs look more like the flippers of a seal," says Professor Per Ahlberg of Uppsala University.

The new reconstruction assigns Ichthyostega a backbone that resembles that of a mammal-surprising for such an early land animal. This means that Ichthyostega had an unusual pattern of locomotion. Both fish and primitive now-living land animals, such as salamanders and lizards, move by slithering their bodies sideways. This also seems to be the case for Acanthostega, the other (and more primitive) four-legged fish from Greenland in the Devon Period. But Ichthyostega,s large torso, with ribs that overlap like roofing tiles, made its upper body completely stiff, and the hind quarters seem rather to be adapted to flexing vertically, as in mammals.

"Ichthyostega probably moved rather clumsily on land by lifting its upper body and ”walking” on its front legs while simultaneously floundering along on its hind flippers. Its also possible that it combined with this a vertical bending of the spine to slide forward something like a giant inchworm," says Per Ahlberg, who maintains that Ichthyostega is not the ”missing link” but rather one of several short-lived evolutionary experiments with various bodily shapes and patterns of locomotion during the transitional period from marine to land life.

Source: Uppsala Universitet

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