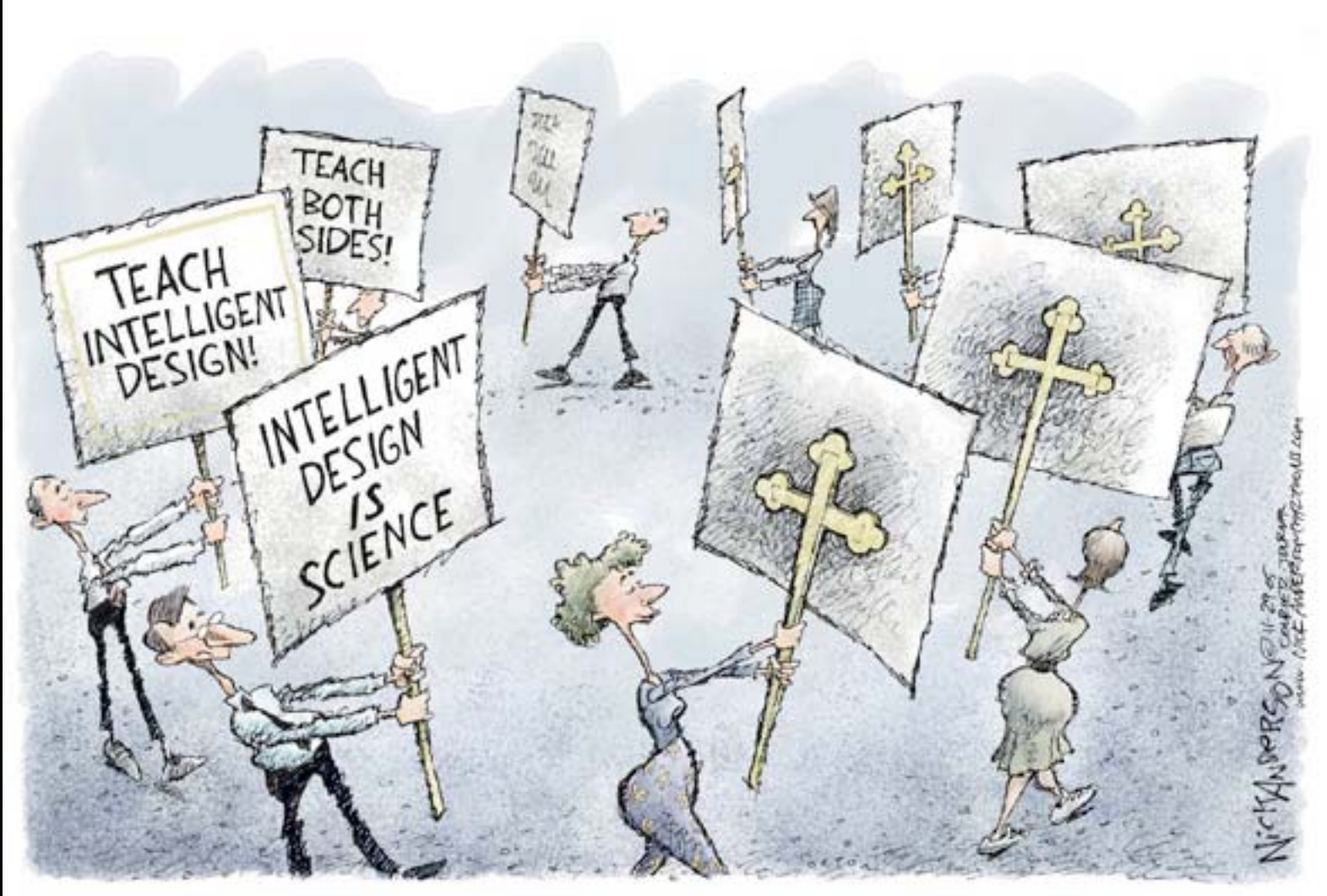


Science and Secularism in a Demon-Haunted World

PZ Myers

University of Minnesota, Morris

<http://scienceblogs.com/pharyngula>



The first week of April, 2006

Two discoveries—one in paleontology, the other in molecular biology—in one week. How do scientists and creationists respond?

The players

- **Scientific institutions**—universities, museums, research foundations, libraries, journals
- **Answers in Genesis**—Young Earth creationists
- **Reasons to Believe**—Old Earth creationists
- **The Discovery Institute**—Intelligent Design creationists

The journals

Read!

- Science
- Nature
- Scientific American
- Natural History
- Seed

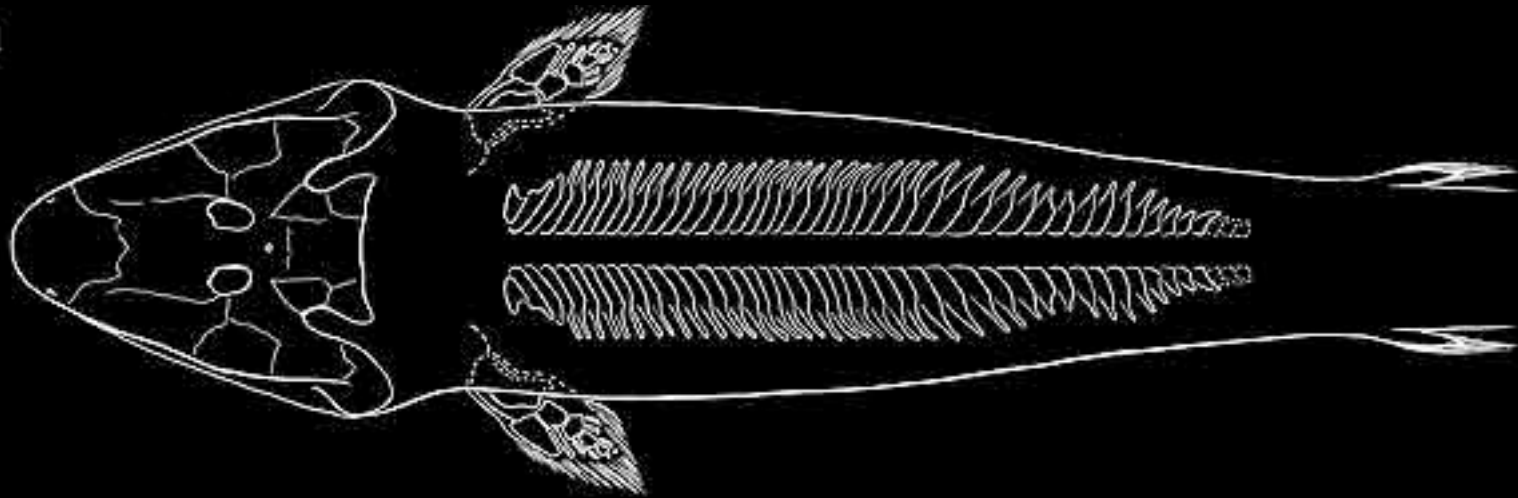
A productive prediction

First, it demonstrates the predictive capacity of palaeontology. The Nunavut field project had the express aim of finding an intermediate between *Panderichthys* and tetrapods, by searching in sediments from the most probable environment (rivers) and time (early Late Devonian). Second, *Tiktaalik* adds enormously to our understanding of the fish-tetrapod transition because of its position on the tree and the combination of characters it displays.

- Ahlberg and Clack

Tiktaalik roseae

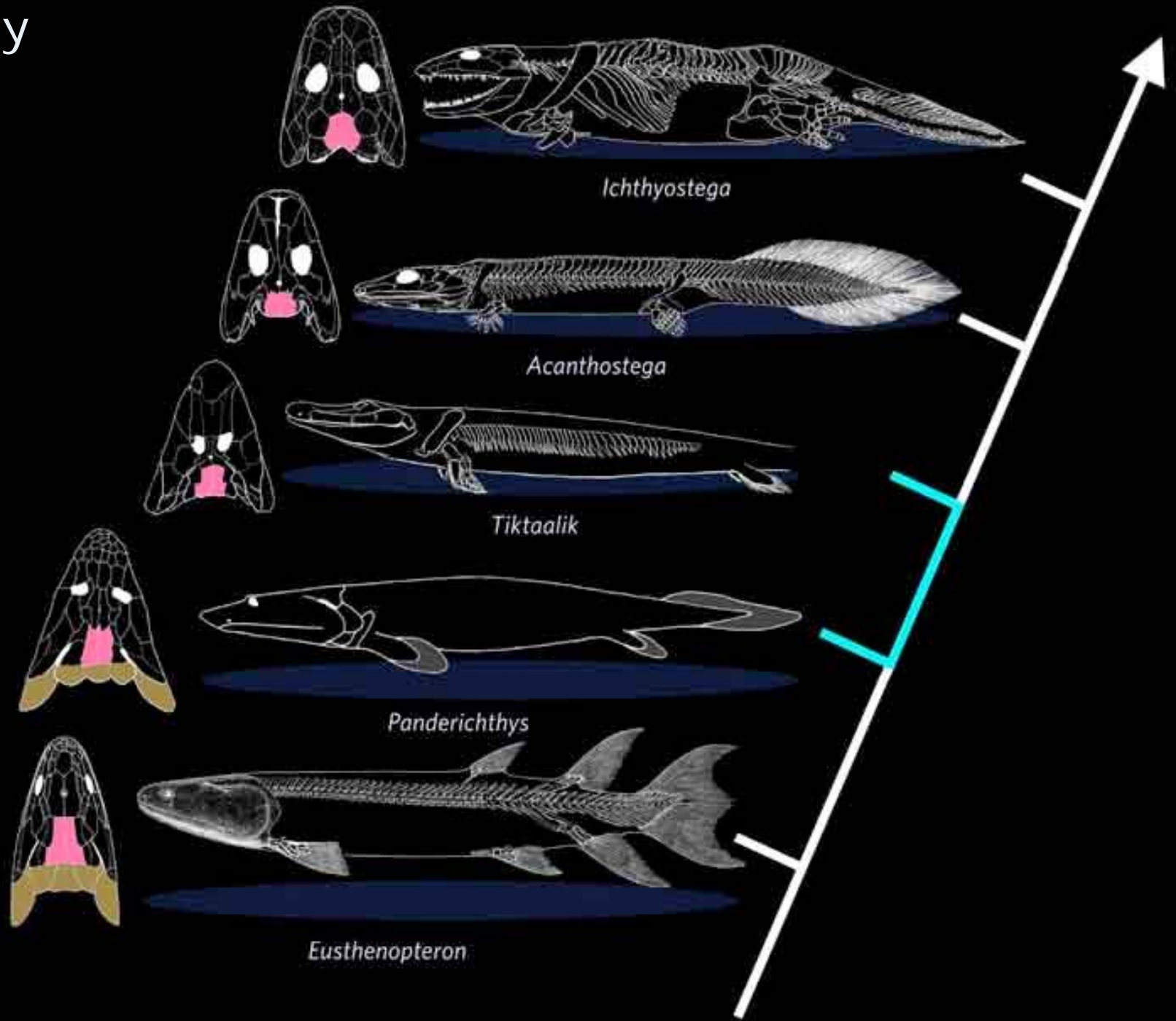
a



b



Phylogeny



Fin evolution



Glyptolepis



Sauropterus



Eusthenopteron



Panderichthys



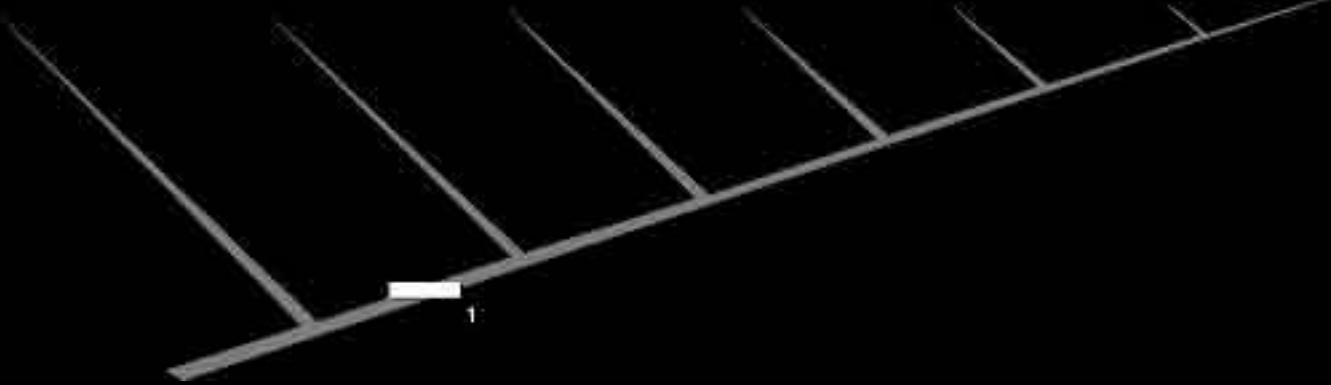
Tiktaalik



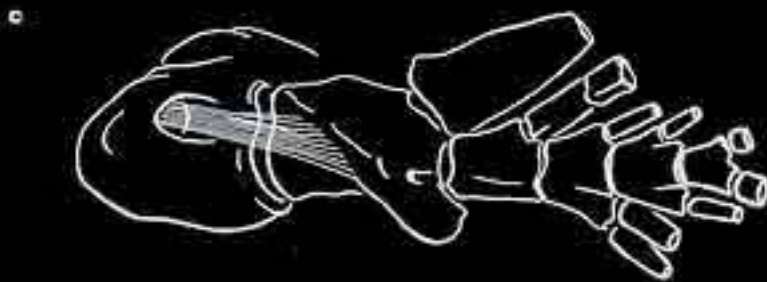
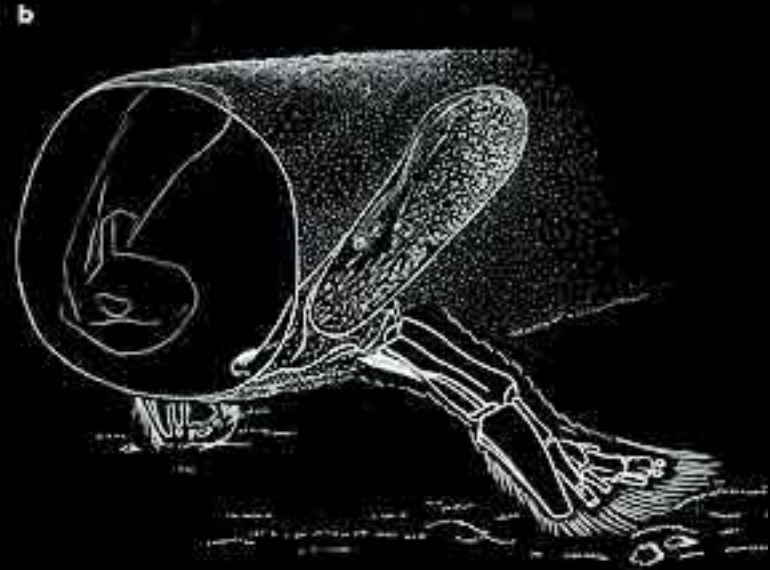
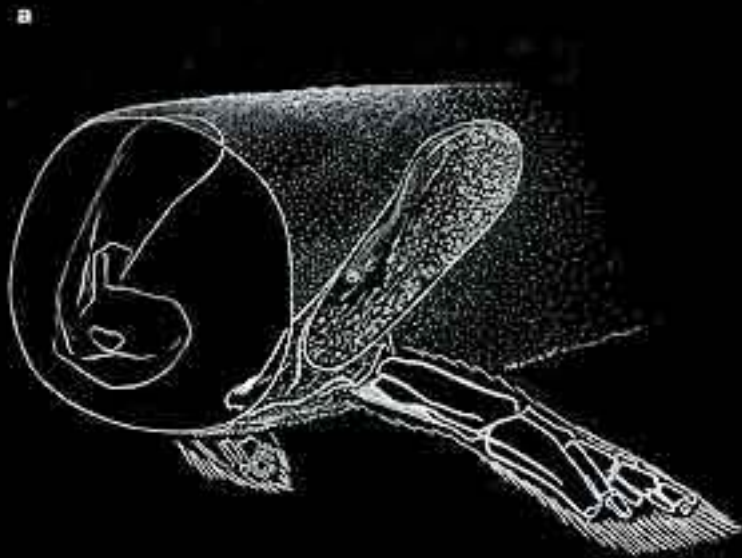
Acanthostega



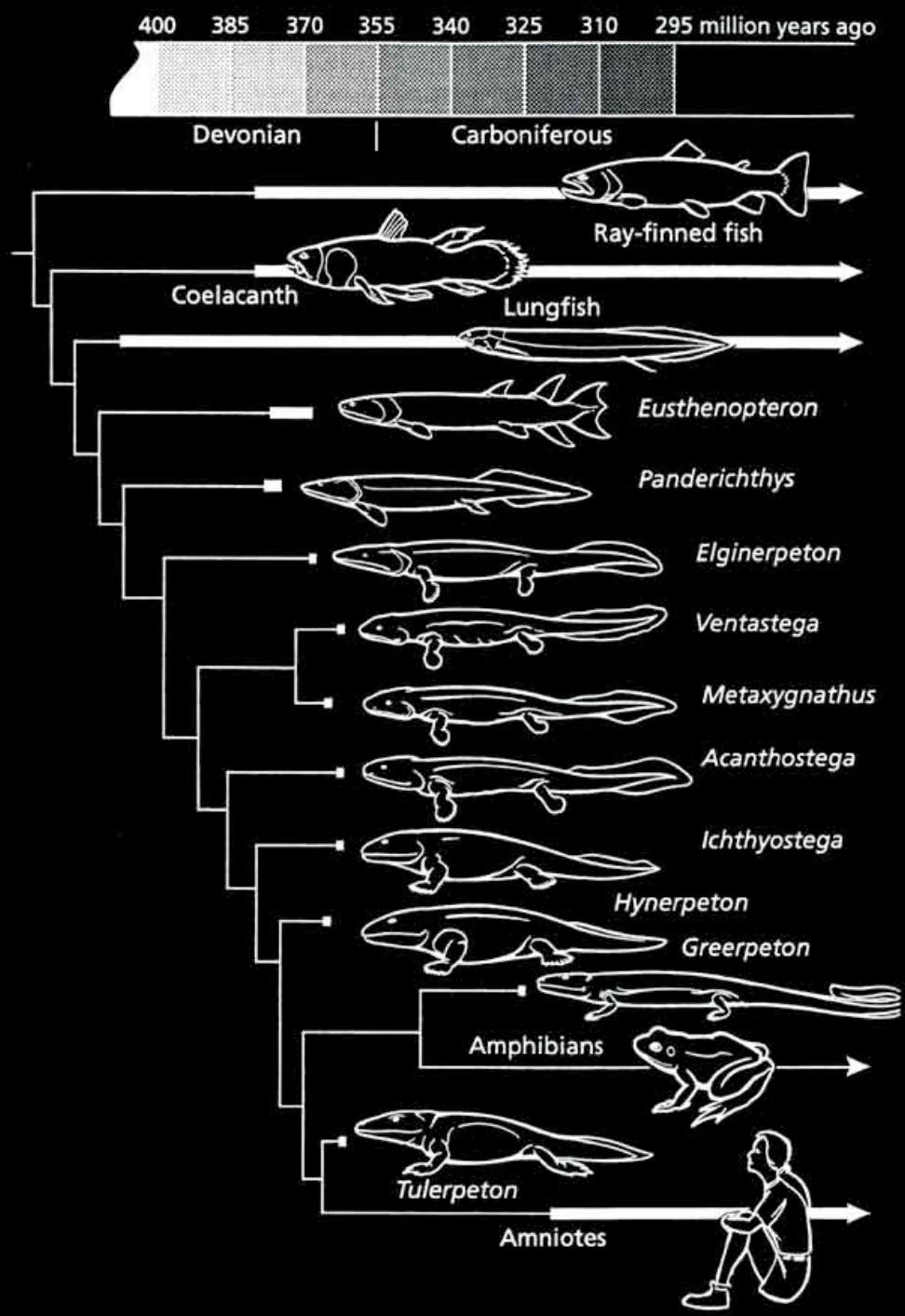
Tulerpeton



Fin function



Our place



Embrace your inner fish!



(trollart.com)

How is it that hardly any major religion has looked at science and concluded, "This is better than we thought! The Universe is much bigger than our prophets said, grander, more subtle, more elegant"? Instead they say, "No, no, no! My god is a little god, and I want him to stay that way." A religion, old or new, that stressed the magnificence of the Universe as revealed by modern science might be able to draw forth reserves of reverence and awe hardly tapped by the conventional faiths.

Carl Sagan

Answers in Genesis says:

All they have actually found is a fish that is another example of a lobe-finned fish (one of which still lives today—the coelacanth) that has bones similar in position to those seen in the arm and wrist of land-walking creatures—except these structures support fins with rays in them, not digits like fingers and toes (and as has been stated, they are NOT connected to the axial skeleton).

<http://www.answersingenesis.org/docs2006/0406fishin.asp>

Answers in Genesis concludes

This website has consistently demonstrated that fossil creatures are essentially the same (stasis), or have degenerated (lost information, the opposite of what evolution requires). This is predicted in the creation model (animals reproducing "after their kind"; Genesis 1:24–25). Also, creationists have shown that the evidence found in the fossil record is highly consistent with catastrophism (i.e., a worldwide flood such as the Flood of Noah in the book of Genesis).

Reasons to Believe says:

"Evolution couldn't have happened that rapidly given the extensive biological changes needed for a creature to move from the water to land. Evolutionary biologists have made up their minds before they even examine the data," Rana continues. "They are so convinced that evolution is a fact they are unwilling to carefully weigh the evidence."

http://www.reasons.org/press_releases/20060409.shtml

Reasons to Believe concludes:

"It's apparent that *Tiktaalik* was well-suited to live in a shallow-water environment near the land's edge. The biological characteristics that this creature needed to thrive in that environment are similar to those required to live on the land," maintains Rana. "These shared features could just as easily reflect the work of a Creator who reused a mosaic of designs."

The Discovery Institute says:

These fish are not intermediates, explain Discovery Institute scientists I queried about the find. *Tiktaalik roseae* is one of a set of lobe-finned fishes that include very curious mosaics—these fishes have advanced characteristics of several different groups. They are not intermediates in the sense that they are half-fish/half-tetrapod. **Rather, they have some tetrapod-like features.**

http://www.evolutionnews.org/2006/04/latest_fossil_find_no_threat_t.html
(this page has been modified several times now)

The Discovery Institute says what?

What remains unexplained
is the dearth of so-called
"missing" links.

The Discovery Institute compounds the error:

According to DI Fellows a number of these fishes—*Ichthyostega*, *Elpistostege*, *Panderichthys*—have been hailed in the past as the “missing link.” Maybe one is a missing link; maybe none are. What remains unexplained is how natural selection and random mutation could produce the many novel physiological characteristics that arise in true tetrapods.

The Discovery Institute concludes:

“This latest fossil find poses no threat to intelligent design.” So says Discovery Institute senior fellow and leading intelligent design theorist Dr. William Dembski, adding:

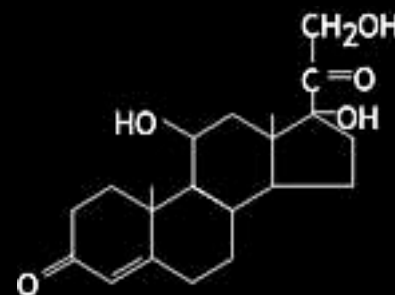
“Intelligent design does not so much challenge whether evolution occurred but how it occurred. In particular, it questions whether purposeless material processes—as opposed to intelligence—can create biological complexity and diversity.

Creationists (including Intelligent Designers!):

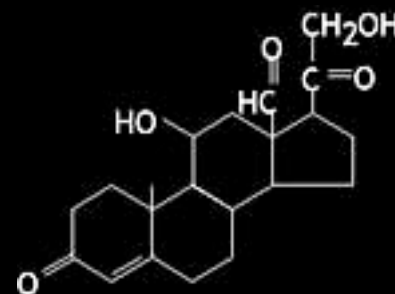
- Do not understand evolutionary theory
- Belittle genuine scientific discoveries
- Offer no testable alternative explanations
- Demand details from evolution that they do not provide in their own hypotheses

A tale of two hormones

Glucocorticoids, such as **cortisol**, are steroid hormones that regulate metabolism and response to stress. They bind to glucocorticoid receptors (**GRs**).



Mineralocorticoids, such as **aldosterone**, are steroid hormones that control homeostasis of water and salts. They bind to mineralocorticoid receptors (**MRs**).



The aldosterone receptor

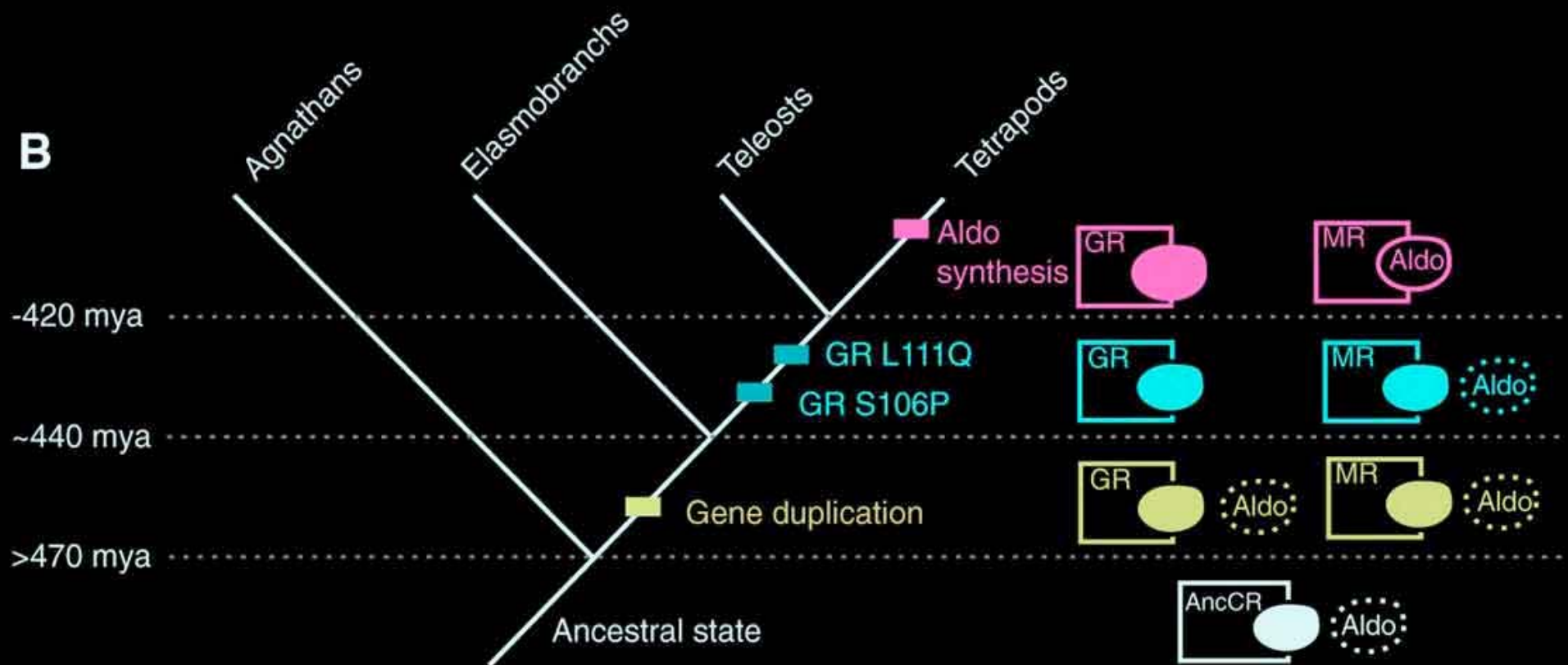


Which came first?

- Aldosterone binds to a specific mineralocorticoid receptor (MR).
- Cortisol binds to a specific glucocorticoid receptor (GR).
- MR and GR are homologous to one another.

Which evolved first, the hormone or its receptor?

Evolution of a receptor



The Discovery Institute's response:

"Piddling."

—Michael Behe

(NY Times, 7 April)

**"The Bridgham *et. al.*
study published in *Science*
is trivial."**

—Stephen Meyer

The creationist litany

- Find evidence of macroevolutionary changes: it's still just a fish.
- Work out the details of an evolutionary innovation down to the nucleotide level: it's piddling.

Creationists are science-deniers.

What can we do?

- Read and educate ourselves.
- Evangelize science.
 - Communicate
 - Teach
 - Write
 - Vote
- *Do* science.

Freethinkers: *Represent* an exemplary life of reason.

My practise as a scientist is atheistic. That is to say, when I set up an experiment I assume that no god, angel, or devil is going to interfere with its course; and this assumption has been justified by such success as I have achieved in my professional career. I should therefore be intellectually dishonest if I were not also atheistic in the affairs of the world. And I should be a coward if I did not state my theoretical views in public.

J.B.S Haldane

References

Ahlberg PE, Clack JA (2006) A firm step from water to land. *Nature* 440:747-749.

Bridgham JT, Carroll SM, Thornton JW (2006) Evolution of hormone-receptor complexity by molecular exploitation. *Science* 312(5770):97-101.

Daeschler EB, Shubin NH, Jenkins FA (2006) A Devonian tetrapod-like fish and the evolution of the tetrapod body plan. *Nature* 440:757-763.

Shubin NH, Daeschler EB, Jenkins FA (2006) The pectoral fin of *Tiktaalik roseae* and the origin of the tetrapod limb. *Nature* 440:764-771.

Zimmer, Carl (1999) *At the Water's Edge : Fish with Fingers, Whales with Legs, and How Life Came Ashore but Then Went Back to Sea*. Free Press.

