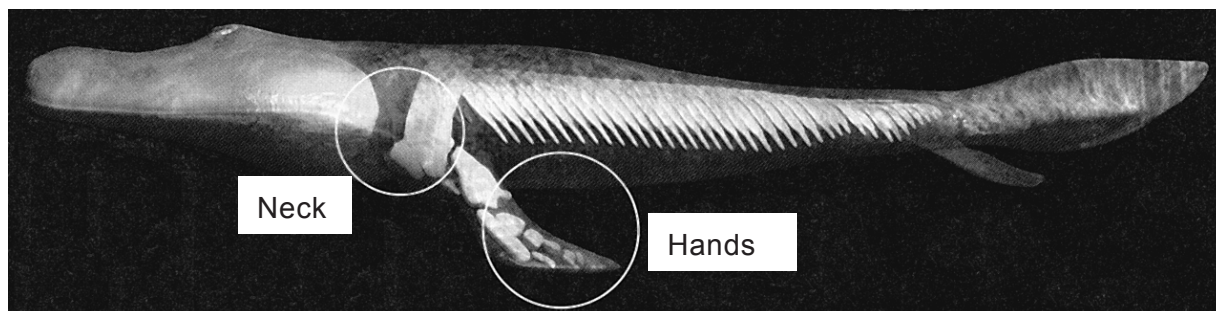


The Fish Within Us



By Jeneen Interlandi

1 **F**our years ago, while digging in the Canadian Arctic, paleontologist Neil Shubin discovered the 375 million-year-old fossil of a fish that appeared to have both neck and hands. It was seemingly clear evidence of the transition from life in water to life on land. Scientists heralded the find as their best answer yet to the belief that an absence of such “missing links” is evolutionary theory’s most obvious flaw.

2 But while world headlines marveled at the idea that our own hands were somehow descended from these fish fingers, Shubin began exploring the anatomical vestiges of our previous lives. If we evolved from fish, he reasoned, our body design should look more convoluted than rational. Over the next few years, he found ample evidence to support his claim: our veins meander inefficiently, our knees give out easily under the weight of bodies they were not designed to support and our brains are clumsy upgrades from earlier models. “Turning a fish into a human is like turning a Volkswagen Beetle into a hot

rod¹⁾,” Shubin says. In his new book, *Your Inner Fish*, Shubin explains how a range of medical conditions, from hiccups to heart disease, are the byproducts of our clunky evolution. “The extraordinary disconnect between our past and our 22 present means that our bodies fall apart in certain predictable ways,” he says. “Our circulatory systems are a good example. They were designed for activity, but we now have the lifestyles of spuds.”

3 The good news is that natural selection may yet correct some of those inefficiencies. A study published in the December Proceedings of the National Academies of Sciences found that not only are humans still evolving, but we are doing so at a faster rate than ever before, with genes that affect our diets and brains leading the race. “If humans had always evolved this rapidly, the difference between us and chimps would be 160 times greater than it actually is,” says the study’s lead author, University of Utah anthropologist Henry Harpending.

4 The findings have turned some traditional assumptions on their heads. For decades, biologists believed that human evolution had ground to a halt about 10,000 years ago, when the

dawn of agriculture and technology gave us unprecedented control over our environments and made us masters of our own destiny. But rather than slow evolution down, those advances, Harpending says, enabled humanity to hit the accelerator. With better technology, our ranks have swelled from millions to billions. This has driven us to colonize more and different regions of the globe. More people mean more mutations, and more environments mean more things to adapt to. Migration into the Northern Hemisphere, for example, has favored adaptation to cold weather and less skin pigmentation for better sunlight absorption.

5 “History looks more and more like a science-fiction novel in which mutants repeatedly arose and displaced normal humans – sometimes quietly, by surviving starvation and disease better, other times as a conquering horde,” says study co-author Gregory Cochran. But what the next generation of mutants will look like is 25. While Harpending and Cochran estimate that 7 percent of all human genes are undergoing rapid evolution, they concede that scientists haven’t a clue what most of those genes do – or what direction they’re moving in. One safe bet, they say, is that people from different regions of the world will be less alike than they are today. While malaria-resistant genes are evolving in

Africa, genes that suppress body odor and make for coarser hair have emerged in Asia. Meanwhile, the ability to digest milk into adulthood has evolved in Europe, where dairy farming is common, but has yet to appear throughout China and Africa. “We are evolving away from one another,” says Harpending.

6 That’s not something everyone likes to talk about. “As soon as you say, ‘This group of people is genetically different from that group of people,’ some constituency will manipulate that to say, ‘This group is genetically superior to that group,’” says University of Chicago neuroscientist Bruce Lahn. “If we are evolving away from one another, it’s because each population is adapting to a different environment, so you can’t compare them to one another like that.”

7 Keen to avoid this controversy, Lahn says many of his colleagues have chosen to focus on our overwhelming genetic similarities instead of exploring the biology of our differences. But even our fear of diversity may be something we can evolve past. “Eventually, our reasoning centers will develop more control over our emotional ones,” says Lahn. “That would make for more rational, tolerant beings.” It appears we have quite a few more scales to shed. ■

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noot 1 Een “hot rod” is een oude auto die is aangepast om vanuit stilstand snel te kunnen accelereren. De term “hot rod” dateert uit de jaren dertig.

Tekst 6 The fish within us

- 1p **20** What point is made in paragraph 1 regarding the “375 million-year-old fossil”?
- A** It accounts for the fish-like features that the human body still contains.
 - B** It explains why some fish seem to have necks and hands.
 - C** It indicates that man’s evolution has taken longer than generally thought.
 - D** It is considered to lend support to the evolutionist theory on the origin of human life.

“... is like turning a Volkswagen Beetle into a hot rod,” Shubin says’
(paragraph 2)

- 1p **21** What does Shubin mean?
- A** A complete metamorphosis requires a long period of development.
 - B** Adaptation for a new purpose entails compromise and loss of function.
 - C** Demanding too high a performance from a machine or organism results in environmental harm.
 - D** The design of the original should not be ignored in the process of modification.
- 1p **22** Which of the following fits the gap in paragraph 2?
- A** complex
 - B** fast-moving
 - C** human
 - D** medicalised

- 1p **23** “natural selection may yet correct some of those inefficiencies” (begin alinea 3)
Welke zin uit alinea 4 geeft een voorbeeld van een dergelijke correctie?
Noteer de eerste twee woorden van deze zin.
- 1p **24** “The findings ... on their heads.” (eerste zin alinea 4)
Welk nieuw inzicht wordt in alinea 4 beschreven?
- 1p **25** Which of the following fits the gap in paragraph 5?
A anybody’s guess
B cause for concern
C dependent on scientific progress
D easy to predict
- 1p **26** ““We are evolving away from one another,” says Harpending.’ (einde alinea 5)
In welk opzicht?
- 1p **27** What issue is discussed in paragraph 6?
A The disbelief of the general public regarding genetic differences among humans.
B The inevitability of genetic research revealing differences among populations.
C The possible exploitation of genetic research results by people with a political agenda.
- 1p **28** “It appears we have quite a few more scales to shed.” (laatste zin)
In relatie tot welk verschijnsel moet deze zin worden gelezen?
Benoem dit verschijnsel door middel van een citaat uit alinea 7.

Bronvermelding

Een opsomming van de in dit examen gebruikte bronnen, zoals teksten en afbeeldingen, is te vinden in het bij dit examen behorende correctievoorschrift, dat na afloop van het examen wordt gepubliceerd.