

# Scientists: New phylum sheds light on ancestor of animals, humans

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Genetic analysis of an obscure, worm-like creature retrieved from the depths of the North Atlantic has led to the discovery of a new phylum, a rare event in an era when most organisms have already been grouped into major evolutionary categories.

The analysis also appears to shed light on the ancestor of chordates, the backboned animals that include human beings and two small invertebrate groups closely related to one another: lancelets and tunicates.

“It’s a tremendous surprise that this mysterious creature from the ocean will help us understand our distant past,” said Leonid Moroz, a professor of neuroscience and zoology at UF’s Whitney Laboratory for Marine Bioscience near St. Augustine and one of the researchers who participated in the discovery.

Moroz and 13 other scientists report their findings today in the journal *Nature*.

Scientists have long been puzzled by the half-inch-long creature known by its scientific name of *Xenoturbella* and first retrieved from the Baltic Sea more than 50 years ago. Early genetic research identified it as a type of mollusk. But then scientists discovered the mollusk-like DNA actually resulted not from the creature itself, but from its close association to clams and likely habit of eating mollusk eggs, Moroz said. The *Xenoturbella* does not seem to have a brain, gut or gonads, making it unique among living animals.

More precise genomic sequencing at the Whitney Lab – where Moroz and his collaborators identified about 1,300 genes including mitochondrial genes – helped to reveal a surprise: *Xenoturbella* belongs to its own phylum, a broad class of organisms lying just below kingdom in taxonomic classification. It is one of only about 32 such phyla in the animal kingdom. “During the last 50 to 60 years, only a few new phyla have been established,” Moroz said.

Perhaps more significant, the analysis of *Xenoturbella* seems to confirm that human beings and other chordates share a common ancestor, a first in science. Its extreme characteristics suggest that this common ancestor – one the creature shares with its sister phyla, echinoderms and hemichordates, as well as chordates — did not have a brain or central nervous system.

“It is a basal organism, which by chance preserved the basal characteristics present in our common ancestor,” Moroz said. “This shows that our common ancestor doesn’t have a brain but rather a diffuse neural system in the animal’s surface.”

A reconstructed genetic record reported in the Nature article also implies that the brain might have been independently evolved more than twice in different animal lineages, Moroz said. This conclusion sharply contrasts the widely accepted view that the centralized brain has a single origin, Moroz noted.

Moroz added that the project is an example of interdisciplinary research involving scientists from three different countries, one that also integrates classical marine biology with modern genomic techniques. Scientists who participated in the research hailed from the University College of London, the Wellcome Trust Center for Human Genetics, the University of Chicago, Harvard Medical School, the University of California-Berkeley, the Broad Institute of MIT and Harvard, the Royal

Swedish Academy of Sciences and the Whitney Lab.

Source: University of Florida

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