

Study Casts Doubt on Accepted Heredity of Whales

By NATALIE ANGIER

Sperm whales, those mountainous squared-skulled beings that inspired the story of Moby Dick, and the great toothless whales like humpbacks and blue whales, long thought to be distant marine cousins, are far more closely related than anyone had suspected, a new study suggests.

The findings capsize some cherished assumptions about whale evolution and indicate that major changes in whale shape, behavior and feeding habits occurred in what amounts to an eyeblink, in evolutionary terms.

The new work, based on a comparison of whale genes, also offers firm support for the theory that all whales descended from the group of hooved, plant-eating land animals called ungulates. The study presents the cow as possibly the closest terrestrial relative of the whale.

Scientists have long believed that sperm whales, which have a row of formidable teeth along their bottom jaw and use the echoing of sound waves to find the squid they feast upon, were close kin of dolphins and porpoises. These mammals also have teeth and hunt their prey by echolocation.

Two Types, One Family

The toothless whales, which have very different bodies than the toothed ones and do not use echolocation for hunting, were thought to be on a distinct evolutionary branch. The toothless whales are called baleens for the feeding apparatus in their jaw, a huge sieve of whalebone through which they filter shrimplike krill and tiny fish from the huge amounts of sea water they gulp.

The new analysis of whale genes places sperm and baleen whales together in one tight-knit family, apart from dolphins. It indicates that the split between the baleen and sperm groups could have occurred as recently as 13 million years ago, compared with the 45 million years commonly thought to separate the two varieties of great whales.

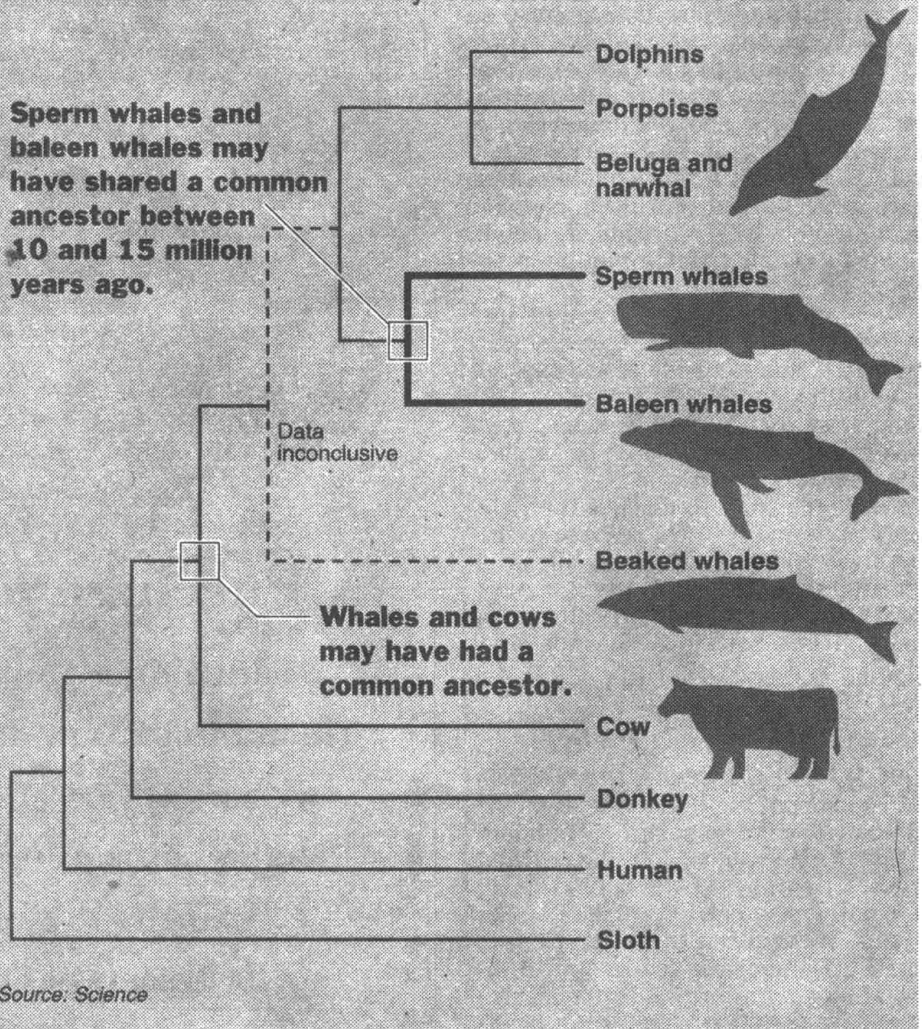
"If our hypothesis is correct, then one thing I find interesting is the idea that evolution of whale traits occurred much faster than we would have thought," Dr. Axel Meyer, a co-author of the study, said in a recent telephone interview.

"Baleen and sperm whales are very very different," said Dr. Meyer, an assistant professor of ecology and evolution at the State University of New York at Stony Brook. "Their bones are different, their feeding habits are different, their social structure is completely different. But those differences may have arisen in a very short amount of time."

The new findings appear today in the

Whales' Family Tree?

A new theory, based on genetic analysis, holds that sperm whales and baleen whales are closely related and branched off comparatively recently from an unknown common ancestor. This schematic family tree, based on the new analysis, also suggests that the land animal most closely related to whales is the cow.



The New York Times

journal Nature. The other co-author is Dr. Michel C. Milinkovich, a zoologist and research affiliate at Yale University. A student of Dr. Meyer, Guillermo Orti, also took part in the study.

High Tech vs. Tradition

The conclusions are preliminary and remain to be confirmed by others before they are widely accepted. The latest experiments also pit the might of molecular genetics against such traditional means of studying relationships among species as an examination of fossils and a comparison of important physical, or morphological, features. Similar clashes between high-tech research and the low-tech style have occurred in the study of human origins, with vitriolic and seemingly irreconcilable results.

"We know that a lot of scientists, a lot of morphologists, will be against us," Dr. Milinkovitch said. "But our data base is very good, and we would

be extremely surprised if we turned out to be wrong."

Dr. Meyer said he was initially suspicious of his team's data. "I told Michel, 'We'd better do this over three times because the results are so unusual,'" he said.

Doubts About a Late Split

Dr. Michael J. Novacek of the American Museum of Natural History in Manhattan, who wrote an analysis accompanying the report, said he was intrigued but skeptical about some elements of the work. "I think the paper is a very good one, with some very interesting results, but I'm not totally convinced," he said.

While Dr. Novacek says he may be willing to accept the kinship between baleen and sperm whales, he insists that the fossil record negates the possibility that the two whale types split as recently as the report proposes.