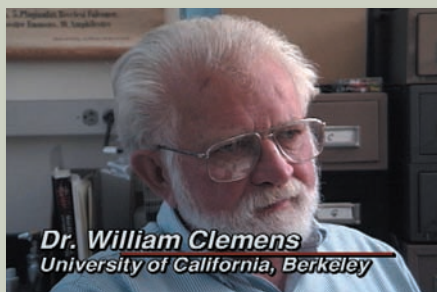


Modern evolution scientists do not believe that whales evolved from a black bear as Charles Darwin once speculated. They now theorize that whales evolved from an animal similar to a hyena¹⁹ or a cat²⁰ or a hippopotamus²¹ through a complicated sequence of chance mutations in a series of animals over 10 million years.

Scientists who oppose evolution think the idea of a cat or a hippopotamus or a hyena becoming a whale by a series of chance mutations is even more preposterous than Darwin's idea that a bear could become a whale through natural selection and acquired characteristics. They argue that the odds of a land animal changing into a whale, by a series of mistakes in the genes, is statistically impossible.

From *Evolution: The Grand Experiment* video series



*“In trying to understand the evolution of whales and dolphins from four-legged terrestrial carnivores, the first thing you have to keep in mind is that **chance** plays a tremendous role in this.”²²*

— Dr. Clemens

Dr. William Clemens, Professor of Integrated Biology, University of California, Berkeley

Whale Progenitors?

*Scientists who support evolution suggest whale evolution is one of the best examples to demonstrate evolution from the fossil record, yet they are still not sure what land animal evolved into a whale. Some believe it was the cat-like animal called *Sinonyx* (left). Others believe it was the hyena-like animal called *Pachyaena* (bottom). Still others believe it was a hippo-like animal (right), although hippos have not been found to be living before whales.*



Sinonyx photo Exhibit Museum of Natural History, U. of Mich., Ann Arbor
© 2007 AVC Inc., Photo by Debbie Werner

Pachyaena photo California Academy of Sciences, San Francisco
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From Land Animal to Whale?

What are the differences in the DNA of a whale and the DNA of the land animal from which it may have evolved?²³ First, it should be noted that scientists have not yet determined the entire DNA sequence of a whale. And, they will probably never be able to decode the DNA sequence of the proposed land animal which, theoretically, eventually evolved into the whale. (This is because the DNA is usually degraded or destroyed in the fossilization process.) Nonetheless, by listing the anatomical differences between a land animal and a whale, and estimating the number of new proteins

that would be required to bring about these changes, scientists are able to estimate the number of chance mutations in the DNA that would have had to occur for whales to evolve.

As mentioned, modern scientists are not sure if the first land animal that evolved into the whale was a hyena-like, cat-like, or a hippopotamus-like animal. For the sake of the following discussion, we will use the example of an extinct hyena-like animal, called *Pachyaena*, as the land animal that evolved into the whale.

How many parts of a hyena would have to change by chance mutations to become a whale?

1. The hyena would have to develop a dorsal fin.



Above: Whales have dorsal fins which provide rotational stability in the water. Many mutations in the DNA letters would be necessary for a hyena-like animal (**above, right**) to form a dorsal fin by chance.



2. The bony tail of the hyena would have to change into a cartilaginous fluke.



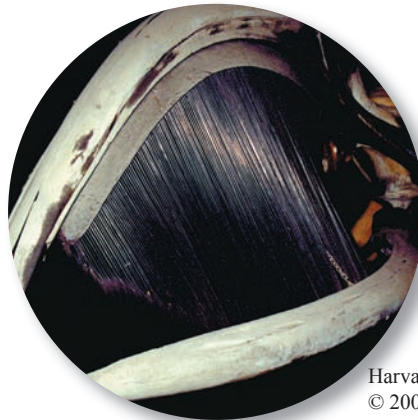
There are many differences between a hyena's tail and a whale's tail. A hyena's tail is made of mostly bones and fur and is not involved in locomotion. A whale's tail is wide, made of mostly cartilage and large muscles, and is the primary body part used for propulsion through water.



California Academy of Sciences, San Francisco
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3. The hyena's teeth would have to develop into a huge baleen filter.

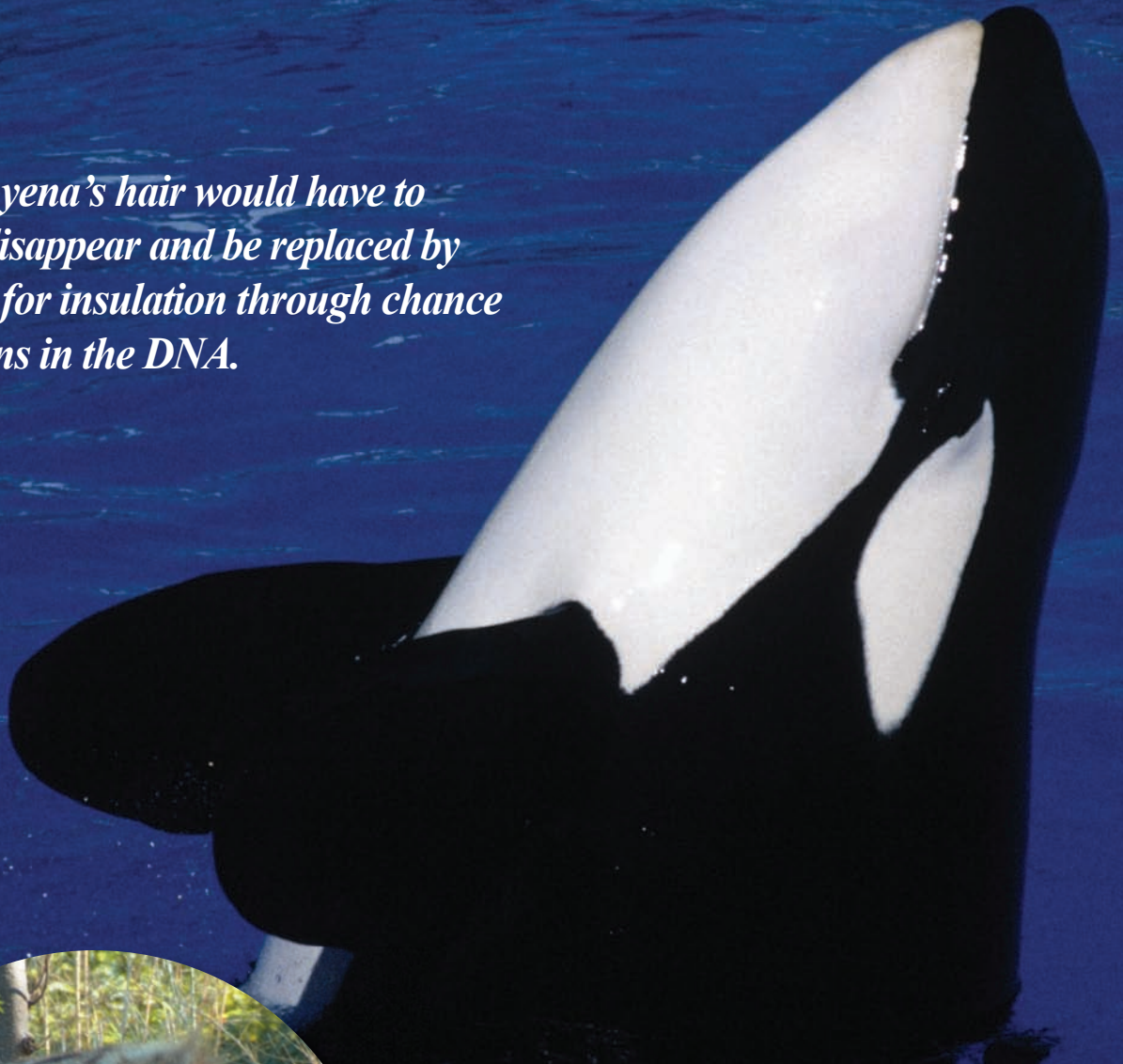
Above: *A hyena has teeth for chewing meat. Toothless whales (right) have no teeth, only a fine filter called a baleen for filtering plankton. How many chance mutations would it take to lose all the teeth and then form this huge filter? What are the odds of this happening?*



Harvard Museum of Paleontology
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4. The hyena's hair would have to nearly disappear and be replaced by blubber for insulation through chance mutations in the DNA.



The hyena (left) is covered by hair for warmth. Hair does not function to warm the body in water. Whales and dolphins instead have a thick layer of blubber.

5. *The nostrils would have to move from the tip of the hyena's nose to the top of the whale's head, disconnect from the mouth passage, and form a strong muscular flap to close the blowhole.*



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Right: *Hyenas and other land mammals breathe through their nose and mouth.*

Below: *Whales have a blowhole on the top of their head through which they breathe. The blowhole connects their lungs directly to the outside without air going through the mouth.*

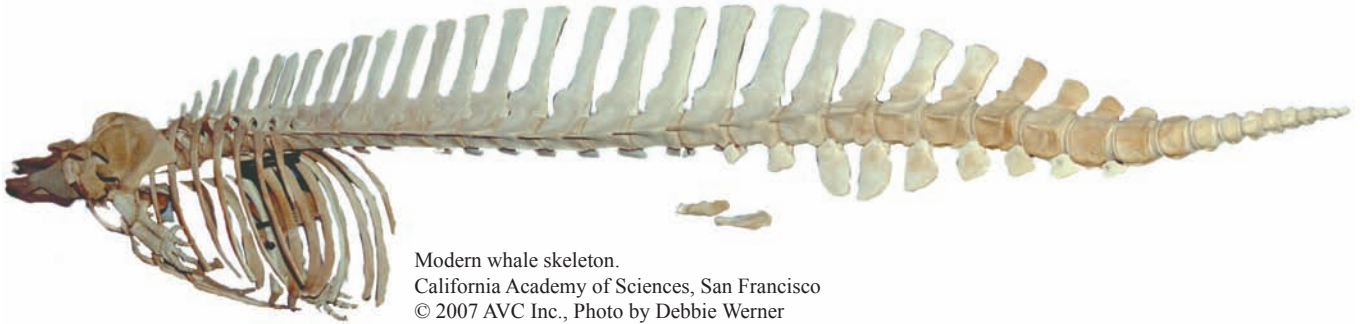
Whales also have a strong muscular flap, which covers the blowhole, and prevents saltwater from rushing into their lungs as they descend into deep, high-pressure water. What are the odds of these features occurring by mutations?



6. *The hyena's front legs would have to change into pectoral fins.*

Humpback whales do not have front legs but have pectoral fins.





Modern whale skeleton.
California Academy of Sciences, San Francisco
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College of the Atlantic, Maine © 2007 AVC Inc., Photo by Debbie Werner

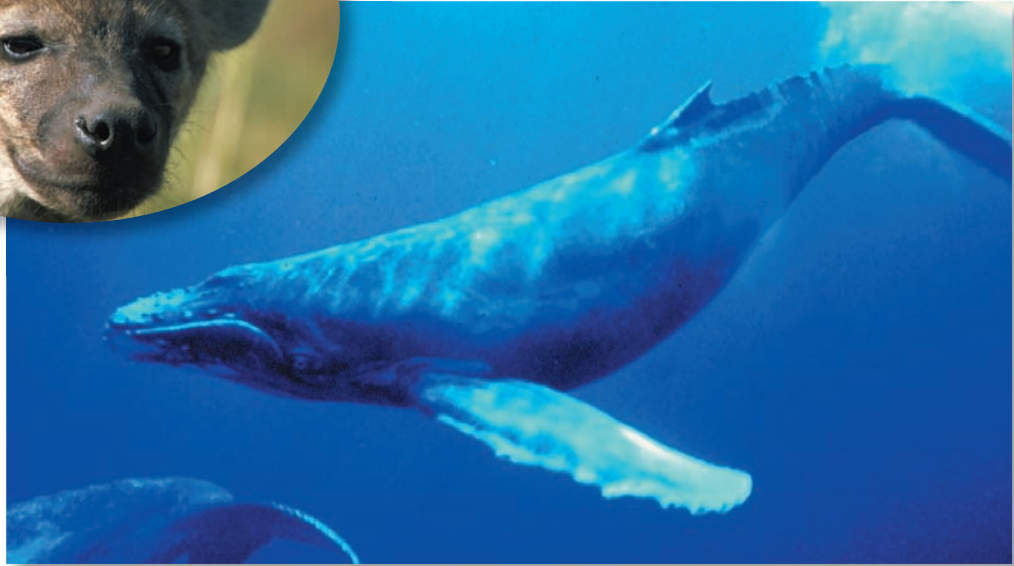
7. The hyena's body would have to increase in size from 150 pounds to 360,000 pounds.

The skull would have to change from less than a foot long to 14-feet long. The eyes and brain would have to enlarge. The thickness of the eyes would have to increase to withstand pressure and the eye lenses would need to become enormous. The hyena's heart would have to change from the size of a human fist to the size of a Volkswagon Beetle.¹⁴ The heart valves would have to change from the size of a dime to the size of a hubcap.²⁴



Visitor standing next to a 14-foot long whale skull at the College of the Atlantic Museum in Maine.





8. The hyena's external ears would have to disappear and then develop to compensate for high-pressure diving to 1,640-feet deep.



9. The hyena's back legs would have to disappear.



What Are the Differences?

	<i>Pachyaena</i>	Blue Whale
Length:	<i>6 feet</i>	<i>100 feet</i> ¹³
Weight:	<i>150 pounds</i>	<i>360,000 pounds</i> ¹³
Diving capability:	<i>8 feet?</i>	<i>1,640 feet</i> ²⁵
Teeth:	<i>Teeth for eating meat</i>	<i>Filter for eating plankton</i>
Tail:	<i>Tubular, used to show emotion</i>	<i>Wide fluke, used for propulsion</i>
Front legs:	<i>Legs for running</i>	<i>Flipper for steering</i>
Back legs:	<i>Legs for running</i>	<i>Absent</i>
Air passage:	<i>Tip of nose</i>	<i>Top of head</i>
Dorsal fin:	<i>None</i>	<i>Present for rotational stability</i>
Water intake:	<i>Freshwater only</i>	<i>Salt water only</i>
Heat regulation:	<i>Fur</i>	<i>Blubber</i>
Ears:	<i>External</i>	<i>Internal and can withstand high-pressure diving</i>
Propulsion:	<i>Legs</i>	<i>Tail</i>

**Could a hyena evolve into a whale by chance mutations?
What are the odds of this happening?**

