

Humpback whales share brain cells with humans

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Humpback whales have joined an exclusive evolutionary club alongside humans, gorillas and dolphins, thanks to the discovery of a particular type of brain cell in the large aquatic mammals.



A humpback whale jumps out of the waters off Hawaii in this undated photo. A new study showed the large aquatic mammals have a brain cell found in humans.

(Associated Press/NOAA Fisheries)

The brains of humpback whales contain spindle neurons, a kind of brain cell found in the cerebral cortex in large primates like humans and gorillas, according to a study published online on Monday.

Patrick R. Hof and Estel Van der Gucht of the Department of Neuroscience at Mount Sinai School of Medicine in New York published their findings in *The Anatomical Record*, the official journal of the American Association of Anatomists.

The authors found humpback whales not only had spindle neurons in the same area of the cortex where they are found in hominids, but also in other parts of their brain.

Named for their long, spindle-shaped bodies, spindle neurons are a complex and not completely understood cellular structure found in the brains of larger primates and cetaceans, the group of marine mammals that includes whales and dolphins.

They are thought to be involved in cognitive processes such as learning, remembering and recognizing, and are affected by conditions like Alzheimer's disease, autism and schizophrenia. In humans, they occur in the part of the brain thought to control speech, social organization and empathy.

"In spite of the relative scarcity of information on many cetacean species, it is important to note in this context that sperm whales, killer whales, and certainly humpback whales, exhibit complex social patterns that included intricate communication skills, coalition-formation, co-operation, cultural transmission and tool usage," the authors state.

"It is thus likely that some of these abilities are related to comparable histologic complexity in brain organization in cetaceans and in hominids."

May go back 30 million years

Similar cells have also been found in toothed whales such as killer whales, which were generally considered more intelligent than baleen whales such as the humpback, which filter water for their food.

The presence of spindle cells in both suggests brain size may play a role in brain complexity, the authors said.

The development of spindle cells may have occurred in cetaceans as early as 30 million years ago, the authors speculate, or 15 million years before they turned up in early hominids.

The complex brains may have been present in earlier cetacean ancestors and simply disappeared in smaller species, or in a rare case of parallel evolution, whales and dolphins might have developed the spindle neurons independently.

The authors suggested further study to determine how differences in brain organization between cetaceans and primates lead to divergent behaviour.