Evolution of whale size linked to diet

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(PhysOrg.com) -- The wide range of body sizes among whales arose early in their evolution and was associated with changes in diet, according to a new study by researchers at UC Davis and UCLA. The study appears in today's (May 20) issue of the journal Proceedings of the Royal Society B.

"There's a huge size variation in cetaceans," said Samantha Price, a postdoctoral researcher at the UC Davis Department of Evolution and Ecology and co-first author on the paper. They range from dolphins and porpoises to the largest animal that has ever lived, the blue whale.

Modern whales appeared in the oceans about 30 million years ago, after a more ancient group of whale species became extinct. But scientists do not know whether modern whales evolved fairly rapidly, becoming diverse in size as they adapted to new ecological niches, or if the differences between groups appeared more gradually over time.

Price, then a researcher at the National Evolutionary Synthesis Center at Duke University, and co-authors Graham Slater, Francesco Santini and Michael Alfaro at UCLA constructed a "family tree" for whales based on genetic data, and used it to understand how the traits of diet and size evolved.

Fish-eaters, mainly dolphins and porpoises, tend to be small. Whales that feed on squid are larger, probably because they need to make long, deep dives to catch their prey, Price said. Plankton-feeding whales, such as the blue whale, are the largest of all. These differences hold up within

groups -- dolphin species that eat squid are bigger than those that eat fish. Orcas are something of an outlier, as they eat a lot of fish but are large; but they also eat mammals such as seals and sea lions, Price noted.

A model of whale evolution that makes size dependent on diet gave the best fit to the data, Price said.

Provided by UC Davis