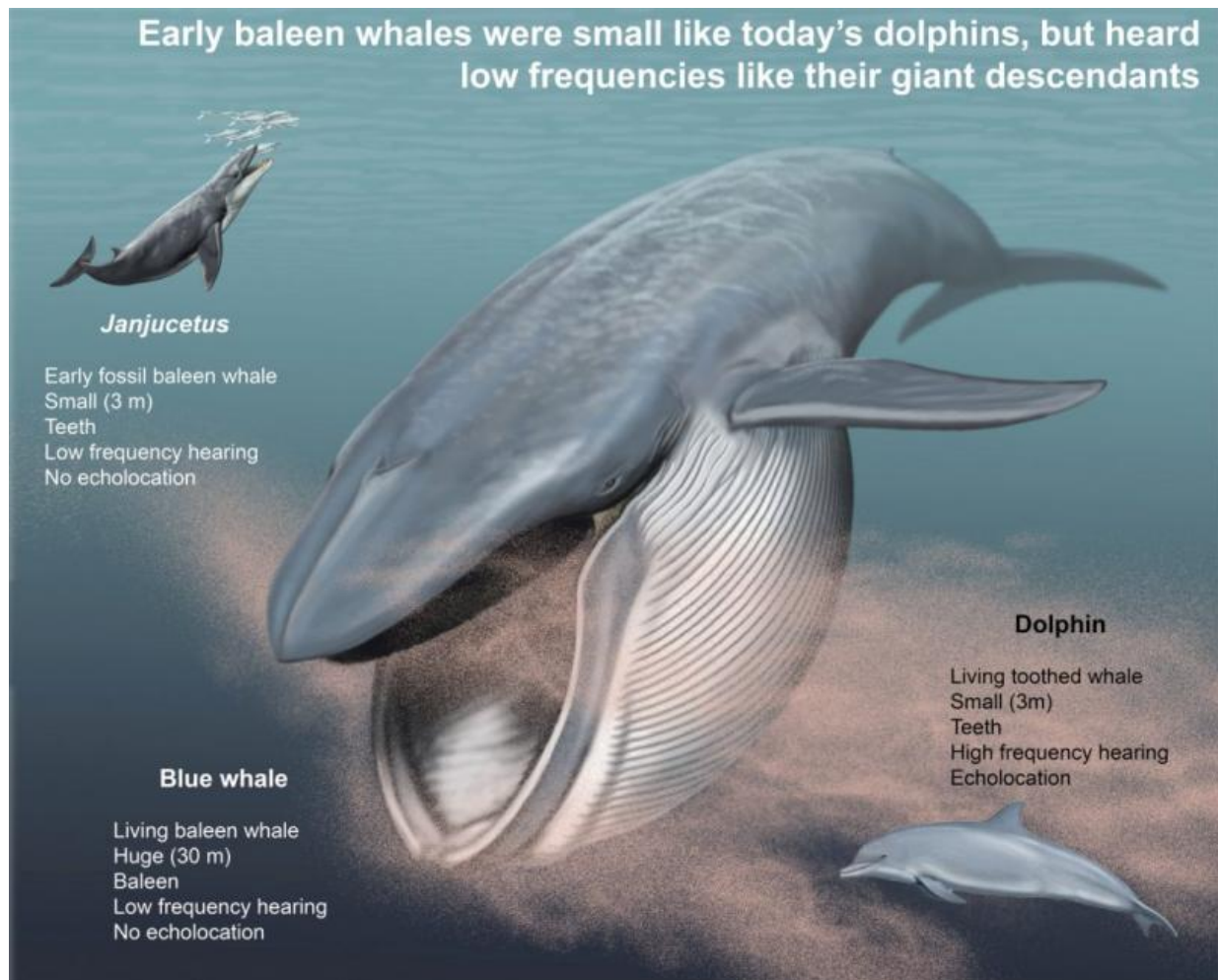


Early baleen whales contended for title of ocean's Barry White

February 24 2017, by Jon Tennant



Credit: Carl Buell

Until now, it has been a bit of a mystery about the evolution of hearing capabilities in those graceful ocean behemoths, the baleen whales.

We know that modern baleen whales can hear the lowest frequency sounds, known as infrasonics, of any living mammal. At times, the sounds get so low (less than 20 hertz, Barry White eat your heart out) that even humans cannot hear them.

The modern blue whale is an example of a baleen whale, and comes in at a whopping 30 metres in length. They have [low frequency](#) hearing still, but unlike their modern dolphin cousins they cannot echolocate. Echolocation is a sensory system that requires an ability to hear high frequencies to hear, often achieving ultrasonic levels of more than 20,000 hertz.

Early baleen whales were a bit weird, being a lot smaller than their living cousins, and still having teeth, looking more akin overall to modern whales and other toothed whales.

We can determine the frequency that whales, both fossils and living ones, can hear by analysing the shape and structure of the inner ear, or cochlea. In animals that are millions of years old, like the earliest baleen whales, this can be quite complicated due to the fragility of preserved specimens.

By using methods adopted from medical research, like CT scanning, scientists can digitally reconstruct and examine the anatomy of fossils in astonishing detail, and safely.

When looking at the cochlea of early baleen whales that still possessed this primitive toothed condition, [researchers have now found](#) that they were remarkably similar to those of modern baleen whales, such as the blue whale. This was despite being a whole order of magnitude smaller,

more around the size of a modern dolphin.

What this means for ancient baleen whales possessed low frequency hearing like modern baleen whales, but still couldn't echolocate. So they had the primitive conditions of both main groups of modern whales and dolphins, and almost certainly communicated much in the same fashion as modern baleen whales (see Finding Nemo for reference).

Now, we know that the songs of modern whales are both beautiful and complex. But were these same songs being heard in oceans 30 million years ago too?

Travis Park, recent PhD thesis-submitter and lead author of the study, said "This at last reveals that the earliest baleen whales heard low frequency sound. The similarities of baleen whale cochleae to older whales shows us that this ability evolved well before other extreme adaptations such as baleen, filter feeding and gigantic body size. Although there's no way of testing the idea, it's tempting to think that mysticetes [baleen whales] have been singing their complex, beautiful whale songs for millions of years."

This discovery also means that the echolocation and high frequency hearing of dolphins and toothed whales evolved after the initial evolution of low frequency hearing, contrary to a whole host of studies on this that lacked the detailed information on the inner ear that Park and colleagues obtained.

Furthermore, it demonstrates that low-frequency hearing evolved prior to the evolution of low body size in [baleen whales](#). Why it evolved then, is still a mystery waiting to be solved.

More information: Travis Park et al. Low-frequency hearing preceded the evolution of giant body size and filter feeding in baleen

whales, *Proceedings of the Royal Society B: Biological Sciences* (2017).
[DOI: 10.1098/rspb.2016.2528](https://doi.org/10.1098/rspb.2016.2528)

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