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Unicorn of the Sea

Narwhals breaching. Some scientists believe narwhals raise their tusks to sense their environment.

Credit: NOAA/Climate.gov

Like the legendary unicorn it resembles, the narwhal is an enigma.

It lives only in Arctic waters, in a frozen seascape far from civilization, making it hard to study and therefore not well known to science.

For instance, we don't know what it does with its most distinctive feature.

We do know that its 6- to 10-foot tusk is actually a single tooth, which grows through its lip and continues growing throughout the narwhal's life.

And that narwhals living farther north have thicker tusks than their southerly cousins.

Some scientists have thought the tusk is used by males to show dominance, or to joust with other males. But some females have tusks too.

Some theorize it's a sensory organ allowing the whale to test temperature or salt levels in water. But if so, *all* narwhals should have one.

Narwhals don't use their tusk for spearing or scaring prey, though their prey species are now changing. We're not sure why.

Narwhals are known to be some of the deepest-diving cetaceans, going down more than a mile. But we don't know what they do down there.

Scientists saw a group of narwhals swimming erratically off the coast of Greenland, so they put a tracker on one male and followed it for three months. But its path was so seemingly random they had to use chaos theory to try to make sense of it.

Perhaps the narwhal is just unknowable today, making the unicorn of the sea all the more intriguing.

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Background: Unicorn of the Sea

Synopsis: The narwhal is largely a mystery to modern science. From their tusks to their behavioral patterns, scientists are forced to theorize about the majestic whales with the assistance of the insight of Inuit people, as well as a little help from chaos theory. The enigma of the only member of the Monodon genus has captivated many around the world.

- The narwhal's name is derived from its pale, grayish color. The old Norse "*Nar*" means corpse, while "*hval*" means whale. The scientific name, *Monodon monoceros*, literally means one tooth one horn. All males and some females sport this unusual spiral tusk that grows through the upper lip.
  - Narwhals are usually 11.5 to 16.5 ft (3.5–5 m) in length, with their tusks adding an additional 6 to 10 ft (2–3 m). The tusks of female narwhals are thinner and more tightly wound than males.
  - Groups of narwhals are called a "blessing," which normally ranges from 15 to 20 individuals but can be in the hundreds, like their relatives the dolphins.
  - When trapped by shifting ice, narwhals become the prey of orca, walruses, polar bears and Inuit hunters.
  - They live only in Arctic waters, and are one of the deepest-diving marine mammals, going as deep as 5,900 ft (1,800 m), making them exceptionally difficult to study.
- The indigenous people of the Arctic often hunt and eat narwhals and they are the only people legally allowed to do so.
  - Traditionally, they ate narwhal to supply vitamin C to their diet as there aren't many other sources in their environment. They no longer hunt narwhals for survival, but rather to keep ancient practices alive.
  - These Inuit people have shared previously untapped knowledge with scientists like Dr. Martin Nweeia, an expert on narwhals, who studied for two years with different Inuit communities to learn more about the mysterious creature.
  - He obtained many samples from Inuit people, and learned to tell where a narwhal came from based on its tusk. Shorter and thicker tusks come from farther north, and longer and thinner ones come from farther south.
  - Inuit hunters also observed a dive time of around 45 minutes, longer than previously understood.
- The purpose of the narwhal tusk is a mystery, with different scientists suggesting different uses for the giant tooth.
  - One theory regards social hierarchy, with males using the tusk to establish dominance.
  - Some suspect they are used for mating rituals, to impress females and potentially even to battle rival suitors.
  - Dr. Nweeia believes they may be a sensory organ, pointing to dentinal tubules found in the tusk, microscopic tubes connecting the tooth's nerve to the outside ocean.
  - To test this theory, Nweeia attached brain and heart monitors to a live narwhal. He placed its tusk in saltwater, and observed a heart rate increase, and in freshwater, observing a heart rate decrease.
- While the tusk is the defining trait of the "unicorn of the sea," another strange aspect of the narwhal is its seemingly erratic daily behavior.
  - Scientists observed irregular behavior in a blessing of narwhals off the coast of East Greenland and decided to track one of the males. After 83 days, they were able to use chaos theory to assist in figuring out a pattern in his movements.

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References: Unicorn of the Sea

What is a Narwhal? I NOAA Ocean Explorer
Narwhal I National Geographic
A Lifetime of Love for the Charismatic Narwhal I Knowable
The Tales Layered inside Narwhal Tusks I Atlas Obscura
Narwhals Are So Weird That Chaos Theory Explains Their Behavior I ScienceAlert

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- During the day, the narwhal stayed closer to the surface but when diving, went quite deep. At twilight, the dives were shallower but longer. These patterns adjusted based on the amount of sea ice in the area, with less surface activity and more diving when there was an increased amount of ice.

- Tusks grow continually throughout a narwhal's life and can be read like the rings of a tree, allowing us to study their lives. The narwhal's Arctic habitat is impacted by warming trends, and their tusks are showing us how they are coping with changing conditions.
  - Scientists have found that mercury concentrations in some tusks have increased dramatically from 2000 to 2010. This is likely caused by atmospheric transport, dominantly from Asia, drifting into the Arctic regions, a changing diet, or some combination of these. Higher amounts of this neurotoxin could lead to reproductive and cognitive difficulties.
  - Their diet has been slowly changing from Arctic species to more open ocean ones, which is an issue since fish like Arctic cod and halibut help the narwhal pack on fat to protect against frigid temperatures. This change could be due to Arctic fish populations declining or moving further north for colder temperatures.

Blessing of narwhals, northern Canada, August 2005.

Credit: Courtesy of Kristin Laidre, via NOAA Ocean Exploration

  - The combined effects of heightened mercury concentrations and a changing diet could be problematic for the species, with possible issues affecting narwhal reproductive and immune health.

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