

Greenland shark

The **Greenland shark** (*Somniosus microcephalus*), also known as the **gurry shark**, or **grey shark**, or by the Inuit name *eqalussuaq*, is a large shark of the family Somniosidae (“sleeper sharks”), closely related to the Pacific and southern sleeper sharks.^[2] The distribution of this species is mostly restricted to the waters of the North Atlantic Ocean and Arctic Ocean.

It is the vertebrate species with the longest known lifespan (392 ± 120 years), and is among the largest extant species of shark. As an adaptation to living at depth,^[3] it has a high concentration of **trimethylamine N-oxide** in its flesh, the presence of which causes the meat to be toxic.^[4] However, Greenland shark flesh treated to reduce toxin levels is eaten in Iceland as a delicacy.^[5]

1 Description

This is one of the largest living species of shark, of dimensions comparable to those of the great white shark. Greenland sharks grow to 6.4 m (21 ft) and 1,000 kg (2,200 lb),^[6] and possibly up to 7.3 m (24 ft) and more than 1,400 kg (3,100 lb).^{[7][8]} Most Greenland sharks observed have been around 2.44–4.8 m (8.0–15.7 ft) long and weigh up to 400 kg (880 lb).^{[7][8]} Males are typically smaller than females. It rivals the Pacific sleeper shark (possibly up to 7 m or 23 ft long) as the largest species in the family Somniosidae. The Greenland shark is a thick-set species with a short, rounded snout, small eyes, and very small dorsal and pectoral fins. The gill openings are very small for the species’ great size. Coloration can range from pale creamy-gray to blackish-brown and the body is typically uniform in color, though whitish spots or faint dark streaks are occasionally seen on the back.^[7] A 4.79 m (15.7 ft) long Greenland shark weighing in at 1,099 kg (2,423 lb) was taken by a Norwegian fisherman in Western Norway in 2013, making it one of the biggest catches ever taken in the history of fishing. This is not the first large Greenland shark taken in Norway, with several catches over 3.5 m (11 ft) and 500 kg (1,100 lb) recorded.^[9]

1.1 Dentition

When feeding on large carcasses, the shark employs a rolling motion of its jaw. The teeth of the upper jaw are very thin and pointed, lacking serrations. These upper jaw teeth, numbering from 48 to 52 teeth, act as an-



The dentition of a Greenland shark.

chor while the lower jaw does the cutting. The lower teeth are interlocking and are broad and square, 50 to 52 in count, containing short, smooth cusps that point outward.^[7] Teeth in the two halves of the lower jaw are strongly pitched in opposite directions.^[10]

2 Life history

The Greenland shark is an apex predator mostly eating fish. Recorded fish prey have included smaller sharks, skates, eels, herring, capelin, Arctic char, cod, redfish, sculpins, lumpfish, wolffish and flounder.^[7] It also preys on seals.^[11] As an ectotherm, the Greenland shark is slow, cruising at 0.76 mph (1.22 km/h) with a top speed of 1.6 mph (2.6 km/h).^[12] It is among the slowest-swimming sharks, with a maximum swimming speed about half that of a typical seal. Therefore, biologists have wondered how the sharks are able to prey on the seals. It is thought that they may ambush them while they sleep.^[13] Greenland sharks have also been found with remains of polar bear, horses, moose,^[14] and reindeer (in one case an entire reindeer body) in their stomachs.^{[7][15]} The Greenland shark is known to be a scavenger, and is attracted by the smell of rotting meat in the water. The sharks have frequently been observed gathering around fishing boats.^[7]

The shark is often colonized by the parasitic copepod *Ommatokoita elongata*, which attaches itself to the shark’s eyes.^{[16][17]} The shark occupies what tends to be a very

deep environment seeking its preferable cold water (−0.6 to 10 °C or 30.9 to 50.0 °F) habitat. It has been observed at a depth of 2,200 m (7,200 ft) by a submersible investigating the wreck of the *SS Central America*. A specimen videotaped at 2,773 m (9,098 ft) off the coast of Brazil on 11 February 2012 may have been a Greenland shark, but cannot be distinguished in the video from a southern sleeper shark or Pacific sleeper shark.^[18] In August 2013, researchers from Florida State University caught the first documented Greenland shark in the Gulf of Mexico. The specimen was caught at a depth of 1,749 m (5,738 ft), where the water temperature was 4.1 °C (39.4 °F).^[19] A more typical depth for the species is above 1,200 m (3,900 ft). During the winter, when the sharks look for warmer waters to inhabit, they are often found at or near the surface of the water.^[7]

2.1 Longevity

The Greenland shark is currently the vertebrate species with the longest known lifespan.^[20] An examination of 28 specimens in one study published in 2016 determined by radiocarbon dating that the oldest of the animals that they sampled had lived for about 392 ± 120 years (a minimum of 272 years and a maximum of 512 years). The authors further concluded that the species reaches sexual maturity at about 150 years of age.^[20]

2.2 Reproduction

As recently as 1957, females were found not to deposit eggs in the bottom mud, but retain the developing embryos within their bodies so they are born alive after an undetermined gestation period. About 10 pups per litter are normal, each initially measuring some 90 cm (35 in) in length.^[21]

3 Physiological adaptations

Like other elasmobranchs, Greenland sharks have high concentrations of the nitrogenous waste products urea and trimethylamine N-oxide (TMAO) in their tissues as osmoprotectants and to increase their buoyancy.^[22] TMAO also serves to counteract the protein-destabilizing tendencies of urea^{[23][24]} and pressure.^{[24][3]} Its presence in the tissues of both elasmobranch and teleost fish has been found to increase with depth.^{[3][25]}

4 As food

The flesh of the Greenland shark is toxic because of the presence of high concentrations of TMAO (trimethylamine oxide). If the meat is eaten raw or even if

cooked without pretreatment, the ingested TMAO is metabolized into trimethylamine, which can produce effects similar to extreme drunkenness. Occasionally, sled dogs that end up eating the flesh are unable to stand up because of this effect. Similar toxic effects occur with the related Pacific sleeper shark, but not in most other shark species, whose meat is often consumed fresh.^{[26][27]}

The meat can be eaten if it is boiled in several changes of water or dried or fermented for several months to produce *kæstur hákarl*. Traditionally, this is done by burying the meat in boreal ground for 6–8 weeks, which presses the TMAO out of the meat and also results in partial fermentation. The meat is then dug up and hung up in strips to dry for several more months.^[28] It is considered a delicacy in Iceland.^{[29][30]} Chef Anthony Bourdain described *kæstur hákarl* as “the single worst, most disgusting and terrible tasting thing” he has ever eaten.^[31]

5 Inuit legends

The shark is not considered dangerous to humans, though Inuit legends of this species mention them attacking kayaks. Although such a large shark could easily consume a human swimmer, the extremely cold waters it typically inhabits makes the likelihood of attacks on humans very low, and no cases of predation on people have been verified.^[7]

The Greenland shark’s poisonous flesh has a high urea content, which gave rise to the Inuit legend of skalugsuak, the first Greenland shark.^[32] The legend says that an old woman washed her hair in urine and dried it with a cloth. The cloth blew into the ocean to become Ekalugsuak.^[33]

The Greenland shark plays a role in cosmologies of the Inuit from the Canadian Eastern Arctic and Greenland. Igloodik Inuit believe that the shark lives within Sedna’s urine pot, and consequently its flesh has a urine-like smell, and acts as a helping spirit to shamans.^[34]

6 Research

The Greenland Shark and Elasmobranch Education and Research Group (GEERG) has been studying the Greenland shark in the Saguenay Fjord and St. Lawrence Estuary since 2001. The Greenland shark has repeatedly been documented (captured or washed ashore) in the Saguenay since at least 1888.^[33]

7 See also

- List of sharks

8 References

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9 Further reading

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10 External links

- Greenland Shark and Elasmobranch Education and Research Group
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