

Snout Goo May Help Sharks Sense Prey

This 'jelly' relays the electric currents that are created as prey move

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Tests of jelly extracted from a bonnethead shark (such as this one) and two rays show that it may help these fish sense their prey—even in murky conditions.

Sharks appear to have a sixth sense that helps them locate prey in murky ocean waters. These fish rely on special electricity-sensing pores on their heads and snouts. The pores were first described in 1678. Even now, however, scientists aren't quite sure how they work. But new data have just brought them a step closer.

These pores are known as ampullae (AM-puh-lay) of Lorenzini. They connect to cells that sense electric fields. And that can be useful as the movement of nearby prey emit such fields.

Those pores are filled with what might best be thought of as shark jelly. It's a mysterious goo that is thick but clear. Scientists had suspected the jelly might play some role in detecting prey, but they weren't sure just how.

So Marco Rolandi of the University of California, Santa Cruz and his engineering colleagues have just analyzed this goo. They squeezed some of it from the pores of a bonnethead shark and two skates (the "big" and longnose species).

Protons are a type of positively charged subatomic particle. Their movement can create an electric current. Many good proton conductors occur in nature. (One, for instance, exists in squid skin.) Rolandi's team investigated whether the shark jelly, too, could transmit protons.

Snout Goo May Help Sharks Sense Prey (continued)

And indeed it can, the scientists now report. Protons move well through the jelly and transmit an electric current. They shared their findings May 13 in *Science Advances*.

Shark jelly is, in fact, the living world's best proton conductor. Engineers have come up with a synthetic compound that is 40-times better. But other than that material, known as Nafion, nothing comes close to the stuff sharks make. So it appears that shark jelly may allow these fish to sense very weak electric fields—picking up on teensy hints that lunch may be swimming nearby.

Power Words

electric current	A flow of charge, called electricity, usually from the movement of negatively charged particles, called electrons.
electric field	A region around a charged particle or object within which a force would be exerted on other charged particles or objects.
engineer	A person who uses science to solve problems. As a verb, to engineer means to design a device, material or process that will solve some problem or unmet need.
gel	A goeey or viscous material that can flow like a thick liquid.
prey	(n.) Animal species eaten by others. (v.) To attack and eat another species.
proton	A subatomic particle that is one of the basic building blocks of the atoms that make up matter. Protons belong to the family of particles known as hadrons.
rays	(in biology) Members of the shark family, these kite-shaped fish species resemble a flattened shark with wide fins that resemble wings.
shark	A type of predatory fish that has survived in one form or another for hundreds of millions of years. Cartilage, not bone, gives its body structure.
subatomic	Anything smaller than an atom, which is the smallest bit of matter that has all the properties of whatever chemical element it is (like hydrogen, iron or calcium).
synthetic	An adjective that describes something that did not arise naturally, but was instead created by people. Many have been developed to stand in for natural materials, such as synthetic rubber, synthetic diamond or a synthetic hormone. Some may even have a chemical makeup and structure identical to the original.

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