



A smooth dogfish swims in a testing tank in the WHOI Environmental Systems Lab, where researchers are working to learn how sharks use their senses to locate food.

For Sharks, the Nose Knows

Sharks do follow their noses to zero in on prey—but only one nostril at a time. When sharks catch a whiff of a potential meal, timing is everything: They will head in the direction of the nostril that caught the scent first—even when the other nostril detects higher concentrations of the odor.

A new study by Jayne Gardiner of the University of South Florida and Jelle Atema of Boston University and the Woods Hole Oceanographic Institution refutes the prevailing theory that sharks follow the strongest scent when hunting prey.

Timing can be a much more reliable tool than odor strength, Atema explained, because odors do not travel in coherent plumes in the ocean. “The plume breaks up into pieces, floats to different levels and gets transported in a current,” he said.

Most often, sharks will hit an odor patch at an angle rather than straight on. By veering in the direction of the nostril that first encounters the odor, the shark will automatically steer into the odor patch. The difference in timing between when each nostril catches a scent can be as small as a tenth of a second.

The research team performed the sensory experiments on smooth dogfish sharks (*Mustelus canis*), a small species fairly common in waters off New England. Researchers used specialized headgear with tubes that fed small puffs of squid odor into the sharks’ left and right nostrils.

Their study was published in the June 10, 2010, issue of the journal *Current Biology*.

Smell is only one of several keenly attuned senses that make sharks efficient predators. In an earlier study, Gardiner and Atema found that sharks use what Atema described as a “fantastically sensitive organ” called a lateral line, which runs the length of their bodies and picks up vibrations in the water.

“It functions similar to the hairs on our skin, except that it’s much more sensitive,” Atema explained. “They measure minuscule water flow differences in the environment.”

Sharks use their sense of smell to steer toward a patch of odor. Then they use information from their lateral lines about water flow to track odor patches expediently to their source.

“Inspired by odor, sharks also look for current,” Atema said. “The two together is what makes them so efficient.”

—Erin Koenig

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