



Bats are, of course, the only mammals that can fly. Achieving that unique skill required some remarkable adaptations, such as converting their forearms and hands into wings and evolving a sonar system (echolocation) to avoid obstacles and capture prey while flying in the dark. Now researchers say these aerial acrobats also seem to use tiny hairs on their wings as sophisticated flight-data sensors, *Popular Mechanics* reports.

Distributed sparsely but evenly over the bats' wing membranes, these microscopic hairs apparently act as airflow sensors, scientists reported in the *Proceeding of the National Academy of Sciences*. And, reporter Mary Beth Griggs wrote, "those sensors are wired right into the brain to allow intuitive flight response."

Scientists have known about these microscopic hairs for years but were unable to determine their purpose. Griggs says interest in the hairs increased in 2005, when a study by John Zook of Ohio University biologist suggested they might act as touch receptors.

Susanne Sterbing-D'Angelo of the University of Maryland, co-author of the latest study, and her colleagues set out to expand on Zook's original idea. They built an enclosed obstacle course with cylindrical nets designed to resemble trees and, using rewards, trained bats to fly through the course, *Popular Mechanics* said.

They trained all the bats in the study to fly through this obstacle course, rewarding them with food at the end, the magazine said. They studied insect-eating big brown bats and short-tailed fruit bats.

After completing the first set of flights, the researchers used diluted hair-removal cream to remove the tiny hairs, then sent the bats back through the obstacle course, Griggs reports. Before and after flights were recorded with infrared video cameras and flight patterns were mapped and analyzed.

Without the hairs, Griggs writes, the bats were still able to make it through the obstacle course, but lacked the precision and agility they had before hair removal. They flew faster but made wider turns. Agility is critical for bats, and not just for hunting on the wing. "The more sharp turns you can make, the easier you can avoid predators," Sterbing-D'Angelo told *Popular Mechanics*.

To explore how the microscopic hairs work, the magazine said, the scientists blew tiny puffs of air on individual hairs (and on bats with the hairs removed) while monitoring the bats' brain activity. Bats without the hairs showed different patterns of brain activity in response to air moving over the wings.

Sterbing-D'Angelo told *Popular Mechanics* that this suggests that the bat's brain is using the hairs to interpret flight conditions, such as airspeed. The hairs may also reveal the direction from which a breeze or gust is coming from. She said bats without the hairs might fly faster because they can't get an accurate feeling for their speed. "Those hairs, particularly at the edge of the wing ... let the bat know when the flight is getting iffy."

The research is one part of a five-year study of bat flight funded by the U.S. Air Force to study bat flight. "It's no surprise that the Air Force would be interested ... in incorporating into its own aircraft designs the flight techniques nature has had millions of years to perfect," *Popular Mechanics* notes.

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