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## Whiskers on the Brain

Creatures of the night, rats rely on their supersensitive whiskers to grope through a dim and dangerous world. Researchers have long known that bending a rat's whisker tells it where it will encounter an object. Now a new study demonstrates that sweeping a whisker across a surface allow rats to distinguish between textures that confound even human fingertips.

Rats devote a huge portion of their brains solely to processing whisker sensations. This somatosensory "map" is so extensive that scientists can pick out the area of the brain responsible for handling individual whisker signals. Last year, neuroscientist Christopher Moore of the Massachusetts Institute of Technology in Cambridge and colleagues demonstrated that rat whiskers resonate like plucked harp strings--each wiggles most strongly at one specific frequency. A sweep across a surface such as sandpaper is enough to make a whisker vibrate. The longer, thicker whiskers at the back of a rat's face, they found, resonate at lower frequencies than the shorter, finer feelers near its mouth.

The group then set out to determine whether vibrations that occur at a whisker's resonance frequency were more likely to be detected by the rat's brain than others were. While wiggling individual whiskers at ever increasing speeds, they recorded the neural impulses received by the brain. They report in the 13 May issue of *Neuron* that the neurons fired with particular gusto at each whisker's resonance frequency. The results suggest that rats know where their whiskers are and how fast they're wiggling. "It's space and time overlaid on the same somatosensory map," Moore says.

The mechanism is likely similar to the way the hair cells of the inner ear detect sound, says neuroscientist Thomas Woolsey of Washington University in St. Louis, Missouri. Just as the brain integrates combinations of individual frequencies into a perceived sound, he says, the frequency information could help the rodent brain grasp an object's texture. The discovery suggests that more body systems may make use of resonance, says neuroscientist Asaf Keller of the University of Maryland, Baltimore. "I think it has corollaries to any sensory apparatus that resonates," perhaps even the hairs on our own skin.

--KATHLEEN WONG

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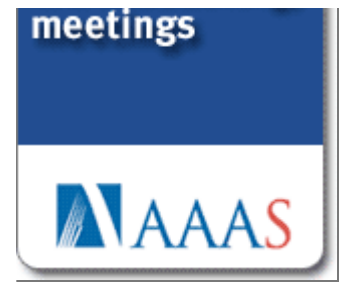
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