Medical Xpress

A good ear: Rats identify specific sounds in noisy environments

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A study conducted on hundreds of rats could help us understand how the brain identifies specific sounds in a noisy environment. The investigation, soon to be published in the journal Brain, was conducted by Alex Martin of the Université de Montréal Department of Psychology.

"Our ears have thousands of ciliated cells with different sensitivities," says Martin. "These cells identify the frequencies that make up a particular sound, but also the spectrum of different frequencies that blend together. That is why we can identify different instruments playing the same note."

For instance, during a concert, when the sound of the crowd mixes with several instruments, our brain can still identify the specific notes played by the trumpet, the violin or any other instrument in the orchestra. Still, Martin was curious to know the impact of background noise on the spatial sensitivity of auditory neurons.

Martin placed rats in a partially echo-free, sound-proof chamber and simultaneously played two types of sounds: Gaussian sound (containing all frequencies) of 25 decibels and a pure sound (made up of one frequency). He found that auditory neurons respond to a pure sound even if there is background noise.

Indeed, 71 percent of neurons don't change their response rate while 16 percent are excited by the sound and demonstrate increased sensitivity.

Only 13 percent of neurons decreased their sensitivity in presence of background noise.

Source: University of Montreal