

When it comes to hearing, the left and right sides of the brain work together, mouse research shows

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Johns Hopkins-led research has revealed an extensive network of connections between the right and left sides of the brain when mice are

exposed to different sounds. The researchers also found that some areas of the brain are specialized to recognize certain sounds, such as "calls" from the animals. Further, the researchers also found that deaf mice had far fewer right and left brain connections, suggesting that the brain needs to "hear" and process sound during early ages to spur development of left-right brain connections.

The [findings](#), say the researchers, may eventually help scientists pinpoint the time period when such [brain connections](#) and specialization form, and offer potential insights into how to restore [hearing loss](#). The findings have been published in *Proceedings of the National Academy of Sciences*.

"The [auditory system](#) is a collection of parts, which need to be connected properly," says Johns Hopkins neuroengineer Patrick Kanold, Ph.D., a professor of biomedical engineering.

"Using a novel microscope that enabled us to see both [brain](#) hemispheres at the same time, we found that some of those connections are between the right and left brain hemispheres, allowing functional specialization. When the brain does not get the right inputs, for example in hearing loss, these brain connections are missing. This obviously is an issue if we hope to restore hearing at a later age."

In efforts to find new ways to restore hearing, Kanold's team will continue its work to identify the specific time period when brain connections form in response to sound and how to restore abnormal connections.

The team is also continuing research to understand how the brain adapts to and modulates sound processing to filter out distracting signals, such as its [recent work](#) indicating that the brain's frontal cortex provides specific signals to the auditory system during behaviors that might help in this filtering process.

More information: Georgia Calhoun et al, Bilateral widefield calcium imaging reveals circuit asymmetries and lateralized functional activation of the mouse auditory cortex, *Proceedings of the National Academy of Sciences* (2023). [DOI: 10.1073/pnas.2219340120](https://doi.org/10.1073/pnas.2219340120)

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