

Now hear this: Scientists discover compound to prevent noise-related hearing loss

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Your mother was right when she warned you that loud music could damage your hearing, but now scientists have discovered exactly what gets damaged and how. In a research report published in the September 2013 issue of *The FASEB Journal*, scientists describe exactly what type of damage noise does to the inner ear, and provide insights into a compound that may prevent noise-related damage.

"Noise-induced hearing loss, with accompanying tinnitus and sound hypersensitivity is a common condition which leads to communication problems and [social isolation](#)," said Xiaorui Shi, M.D., Ph.D., study author from the Department of Otolaryngology/Head and Neck Surgery at the Oregon Hearing Research Center at Oregon Health and Science University in Portland, Oregon. "The goal of our study is to understand the [molecular mechanisms](#) well enough to mitigate damage from exposure to loud sound."

To make this discovery, Shi and colleagues used three groups of 6 - 8 week old mice, which consisted of a control group, a group exposed to broadband noise at 120 decibels for three hours a day for two days, and a third group given single-dose injections of [pigment epithelium](#)-derived factor (PEDF) prior to noise exposure. PEDF is a protein found in vertebrates that is currently being researched for the treatment of diseases like heart disease and cancer. The cells that secrete PEDF in control animals showed a characteristic branched morphology, with the cells arranging in a self-avoidance pattern which provided good coverage of the capillary wall. The morphology of the same cells in the animals

exposed to wide-band noise, however, showed clear differences—[noise exposure](#) caused changes in melanocytes located in the inner ear.

"Hearing loss over time robs people of their quality of life," said Gerald Weissmann, M.D., Editor-in-Chief of *The FASEB Journal*. "It's easy to say that we should avoid loud noises, but in reality, this is not always possible. Front-line soldiers or first responders do not have time to worry about the long-term effects of loud noise when they are giving their all. If, however, a drug could be developed to minimize the negative effects of loud noises, it would benefit one and all."

More information: Fei Zhang, Min Dai, Lingling Neng, Jin Hui Zhang, Zhongwei Zhi, Anders Fridberger, and Xiaorui Shi. Perivascular macrophage-like melanocyte responsiveness to acoustic trauma—a salient feature of strial barrier associated hearing loss. *FASEB J* September 2013 27:3730-3740, [DOI: 10.1096/fj.13-232892](https://doi.org/10.1096/fj.13-232892)

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