

Hearing loss announced by protein boom in blood

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Blood levels of a special protein found only in the inner ear spike after exposure to loud noise, UConn Health researchers report. The findings point the way to blood tests that could warn people at risk of hearing loss before they suffer serious damage.

Hearing loss can sneak up on people, slowly muffling the world, but only noticeable once the damage is done. Chronic exposure to loud noises can cause it, as can certain medications. Cisplatin, a cancer drug used to treat [solid tumors](#), and gentamicin, an antibiotic effective against a wide range of bacterial infections, are both known to damage [hearing](#) as a side effect. But not all patients treated with them will develop hearing loss, and both of these drugs and others known to damage hearing are still prescribed when their potential benefits outweigh the risk. They are discontinued if hearing loss occurs.

UConn otolaryngologist Kourosh Parham wants to

do better than that.

"Currently you can only identify hearing loss after it has occurred. Since there's no treatment for it, that's a devastating limitation," Parham says. He and colleagues at UConn Health are collaborating with French pharmaceutical company Sensorion to develop a [blood test](#) that can warn patients and their doctors of early damage to the inner ear, before hearing loss is noticeable.

Parham and his colleagues report in *Hearing Research* that levels of prestin, a protein found only in cells in the inner ear, rise sharply when those cells are damaged and start to die. Prestin is found specifically in outer hair cells. Outer hair cells serve as amplifiers. The prestin is a special protein that responds to sound waves, by expanding and contracting. It acts like a little muscle, and makes the cells appear to 'dance.' The dancing of the outer hair [cells](#) changes the shape of the membrane in the inner ear, amplifying the sound.

Because prestin is not found in any other part of the body, increased levels of prestin in the blood could indicate damage to the [outer hair cells](#) in the ear. And that is exactly what Parham and colleagues found, when they exposed rodents to very loud noises and then measured their blood levels of prestin. A similar finding was reported last year after mice were exposed to cisplatin.

The next step in the research is to test whether this happens to humans, too. But instead of exposing humans to loud noises, Parham's team wants to collaborate with cancer doctors who treat many patients with cisplatin. The patients can have their hearing and prestin levels tested before going on the drug, and then periodically during their treatment. Anyone whose [blood](#) levels of prestin spiked could be tested for early signs of hearing loss and switched to another anticancer drug. Partnering with the military, which often requires members to be regularly exposed to [loud noises](#), is

another potential path to putting the prestin test to use.

More information: Kourosch Parham et al. Noise-induced trauma produces a temporal pattern of change in blood levels of the outer hair cell biomarker prestin, *Hearing Research* (2018). DOI: [10.1016/j.heares.2018.11.013](https://doi.org/10.1016/j.heares.2018.11.013)

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