

# Why Do So Many Preemies Have Hearing Loss?

Source: <https://www.audiology.org/news/why-do-so-many-preemies-have-hearing-loss>

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It is so very interesting how one can know two different facts very well but not connect them. For example, I have known from the very first days of studying audiology that the peripheral auditory structure is mature in the human by the third trimester of prenatal life. I have also known for a while that the incidence of hearing loss is higher in babies born prematurely, compared to those delivered after a full-term pregnancy. And when I say higher, I mean alarmingly higher. While between 1 to 3 out of every 1,000 newborns are expected to have hearing loss at birth, as many as 15 out of every 100 (not 1,000) preemies may end up with significant hearing loss. If babies are rarely born before the end of the third trimester, then can the higher incidence of hearing loss in preemies really be blamed on the prematurity of birth?

A little digging around made clear that others were far ahead of my disconnected thinking. Turns out that preemies are often on broad spectrum antibiotics to prevent the dire consequences of life-threatening conditions. These antibiotics may have to be administered without actual knowledge of existing disease conditions as there is not the time to wait for detailed diagnostics to determine targeted antibiotics to use. It turns out that a good portion of the hearing loss observed in preemies may be secondary to the ototoxic effects of antibiotic treatment and not a consequence of prematurity itself.

Can we have the best of both worlds? Can we have the bug-fighting characteristics of the antibiotics without the potential ototoxicity? The answer to these questions may soon be in the affirmative. A number of groups are working on various strategies to prevent the ototoxic effects of antibiotics.

One of the promising methods uses the strategy of enlarging the size of the antibiotic molecule so it cannot enter the outer hair cell through the stereociliary transduction channels of outer hair cells. Certainly, easier said than done because while the "designer" antibiotic should not be able to enter the cochlear hair cells, its action on the pathogens it is trying to combat should not be compromised. The difficulty of this task notwithstanding, there appears to be some progress and it may well be possible that we will soon have effective antibiotics that do not cause hearing loss.

## Reference

Huth ME, Han K, Sotoudeh K, Hsieh Y, Effertz T, Vu AA, Verhoeven S, Hsieh MH, Greenhouse R, Cheng AG, Ricci A J. (2015) Designer aminoglycosides prevent cochlear hair cell loss and hearing loss. *J Clin Invest* 125(2):583–592.