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# Cochlear hair cell regeneration: an emerging opportunity to cure noise-induced sensorineural hearing loss

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*Teaser*: Mammals have lost their ability to regenerate dead cochlear hair cells; however, gene therapy, such as *Hes1* knockdown, is a potential tool to reactivate this capacity.

## Highlights

- Auditory hair cells play a pivotal role in transducing mechanical energy into electrical signal.
- Mammals have lost their capacity to self-repair damaged cochlear hair cells or regenerate dead cells.
- There are no known medical or surgical treatments for sensory neural hearing loss.
- Hes1 knockdown was found to be a potential tool to activate the supporting cell conversion into cochlear hair cells.

**In mammals, cochlear hair cells have a pivotal role in transducing mechanical energy into electrical signals. Cochlear hair cells are sensitive to acoustic trauma, drug insults, aging, and environmental or genetic influences that can cause permanent hearing loss. Currently, much research is focusing on noise-induced sensorineural hearing loss (SNHL). Noise-induced SNHL is primarily caused by damage to hair cells of the cochlear sensory epithelium. Here, we summarize progress in restoring the sensory epithelium after SNHL resulting from noise exposure. The prevalent strategy to regenerate cochlear hair cells is through transdifferentiation of the supporting cells through the activation of the NOTCH 1 pathway.**

*Keywords:* cochlear hair cells; noise; hearing loss; transdifferentiation; regeneration.