Cells of adult brain germinal zone have properties akin to hair cells and can be used to replace inner ear sensory cells after damage.

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Public Summary:

Scientific Abstract:
Auditory hair cell defect is a major cause of hearing impairment, often leading to spiral ganglia neuron (SGN) degeneration. The cell loss that follows is irreversible in mammals, because inner ear hair cells (HCs) have a limited capacity to regenerate. Here, we report that in the adult brain of both rodents and humans, the ependymal layer of the lateral ventricle contains cells with proliferative potential, which share morphological and functional characteristics with HCs. In addition, putative neural stem cells (NSCs) from the subventricular zone of the lateral ventricle can differentiate into functional SGNs. Also important, the NSCs can incorporate into the sensory epithelia, demonstrating their therapeutic potential. We assert that NSCs and edendymal cells can undergo an epigenetic functional switch to assume functional characteristics of HCs and SGNs. This study suggests that the functional plasticity of renewable cells and conditions that promote functional reprogramming can be used for cell therapy in the auditory setting.

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