

Growth hormone helps repair the zebrafish ear

2 September 2011

Loud noise, especially repeated loud noise, is known to cause irreversible damage to the hair cells inside the cochlea and eventually lead to deafness. In mammals this is irreversible, however both birds and fish are able to re-grow the damaged hair cells and restore hearing. New research published in BioMed Central's open access journal *BMC Neuroscience* shows that growth hormone is involved in this regeneration in zebrafish.

Provided by BioMed Central

Researchers from Western Kentucky University and the University of Louisville worked together to see which genes were switched on or off after [acoustic trauma](#) and found distinct patterns of gene expression. Two days after noise injury, [inner ear](#) cells were busy dividing to repair and replace the damaged hair cells. This repair was associated with an alteration in the regulation of 839 genes and many of the [cellular pathways](#) involved were the same as those involved in cancer. This included a massive 64 fold increase in the transcription of growth hormone.

MHC I ZE (a gene involved in regulating immune responses) is down-regulated. But, since a strong inflammatory response to tissue damage can interfere with wound healing, it is probably a good idea to locally inhibit the immune response while repairing injury. Four days after trauma, these levels had begun to return to normal.

Dr. Michael Smith commented, "Injecting growth hormone into zebrafish stimulated cell proliferation in their inner ears, especially cells of the utricle, a vestibular organ involved in balance. There are many homologs between zebrafish and [human genes](#) and we are beginning to work on the function of these genes within the ear. Understanding how fish are able to repair their [hair cells](#) may eventually help us to understand ear injury in people and provide treatments for hair cell loss."

APA citation: Growth hormone helps repair the zebrafish ear (2011, September 2) retrieved 2 May 2021 from <https://medicalxpress.com/news/2011-09-growth-hormone-zebrafish-ear.html>

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