

**UNIVERSITY OF OTAGO MEDICAL SCHOOL**  
**VESTIBULAR AND AUDITORY RESEARCH GROUP**  
**HOW TINNITUS DEVELOPS**

Chronic tinnitus is experienced by about 10– 5% of adults and produces many detrimental effects on the quality of daily life. However, the neurological basis of tinnitus is not clear. Therefore, there is no effective drug treatment for it at the moment.

The Vestibular and Auditory Research Group at University of Otago Medical School, led by Professor Paul Smith, Associate Professor Cynthia Darlington and Dr. Yiwen Zheng, has been conducting research into how tinnitus develops and testing drugs that might be effective in treating the condition.

Using ototoxic chemicals or noise exposure in combination with a behavioural paradigm, the group is able to induce and detect tinnitus in laboratory animals. Various drugs, including some anti-epileptic drugs (e.g. carbamazepine) and some experimental cannabinoids, have been tested.

Neurochemical changes in the cochlear nucleus, the first auditory relay station in the brain, have also been investigated. Most recently, they have found that new cells are generated in the adult cochlear nucleus following cochlear damage. At least some of these cells survive for at least a month after the cochlear injury and some of them appear to differentiate into neurons that release the neurotransmitter, GABA.

A new series of investigations has been stimulated by this exciting new finding, to determine where these newborn cells come from, how they interact with existing cells and what the implications are for the development of tinnitus. The research has been funded by the Jean Cathie Estate Bequest Fund, the Neurological Foundation of New Zealand and the National Foundation for the Deaf.

**National Foundation for the Deaf**  
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