

# Antibiotic can be used to treat rare inner-ear condition, treat vertigo

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The antibiotic gentamicin has been used to successfully treat a rare illness that affects the inner ear. This was confirmed by Karl Landsteiner University of Health Sciences' retrospective evaluation of the results of treatment administered to 32 patients. However, the analysis found that initial measurements do not provide a basis for predicting the method's long-term effectiveness. The antibiotic's effect on the vestibular system was also investigated, revealing strong correlations between the impacts on the individual semicircular canals.

Nausea, rotational vertigo, tinnitus and hearing loss – the effects of Meniere's disease come as a real shock to the system. It is caused by a sudden change in hydrostatic pressure in the inner ear. The condition is extremely debilitating and as a result, [treatment](#) is difficult. Previously, in extreme cases, the vestibular nerve was severed or the entire labyrinth surgically removed. Using a form of an antibiotic called gentamicin is a far more straightforward option. By instilling the antibiotic into the inner ear, doctors can take advantage of a side effect of the drug: gentamicin enables a targeted reduction in the irritability of the vestibular hair cells using a far less intrusive technique. Scientists from Karl Landsteiner University of Health Sciences in Krems (KL Krems) recently reviewed data on 32 Austrian patients treated between 2012 and 2015 and analysed the findings.

"Our evaluation confirmed the effectiveness of this simple treatment method," explained Dr. Béla Büki, from the Department of Otorhinolaryngology, University Hospital Krems, Karl Landsteiner

University of Health Sciences. "In over a third of cases, just a single injection was required to produce noticeable, long-lasting relief from the symptoms."

This corresponded with the results of other Austrian studies that used this technique. However, in some cases, the initial efficacy of the treatment gradually wore off over the following months, and further injections were needed to ensure effective, long-term treatment. Dr. Büki and his colleague, Dr. Heinz Jünger, head of the Department of Otorhinolaryngology are now focusing on whether they can use details of the initial success of the treatment to predict its effectiveness in the long run.

The team of researchers also assessed data collected using a specially designed measurement tool, which focuses on the vestibulo-ocular reflex (VOR). This reflex compensates for the effect of rapid head movements by causing the eyes to move in the opposite direction, which allows people to focus clearly on objects even when their head is in motion. In the case of vestibular system disorders, this reflex is reduced to varying degrees, which can be seen as an indicator of the seriousness of the condition, but also of the effectiveness of treatment. The researchers' evaluation of these data showed that the initial success of the treatment did not enable them to predict whether another antibiotic injection would be required a few months later. A wait-and-see approach is needed to monitor the effectiveness of the treatment.

Dr. Büki and his colleague also analysed the impact of the treatment on the various parts of the vestibular system. The central part, the labyrinth, consists of three semicircular canals made of bony material, positioned relative to one another in a complex structure. Dr. Büki and Dr. Jünger succeeded in measuring the effect of the antibiotic treatment on each of the canals, and not simply the overall impact. This distinction was vital to understanding the treatment method. "Our evaluation showed that the

effect of the antibiotic in a particular canal in the labyrinth is closely linked to that in the other two," said Dr. Büki of the key finding of the analysis, which will pave the way for hypotheses on the nerve connections in the labyrinth's complex structure.

This detailed assessment of a simple form of treatment for a rare and complex condition is an internationally acclaimed example of KL Krems' research activities, which focus on niche subjects related to health policy.

**More information:** Béla Büki et al. Intratympanal gentamicin in Meniere's disease: Effects on individual semicircular canals, *Auris Nasus Larynx* (2017). [DOI: 10.1016/j.anl.2017.02.008](https://doi.org/10.1016/j.anl.2017.02.008)

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