



Eardrum Nanomembrane Offers Tinnitus Care

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WARF: P120327US01

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a method to stimulate or detect audio signals at the eardrum using a piezoelectric membrane acting as a transducer.

Overview

Tinnitus is the perception of a sound with no external source. The sounds could be produced within a patient's own body, like crackling caused by muscle spasms, or wholly imagined. Either way, diagnosing hearing issues like tinnitus is complicated because doctors are unable to perceive the sound.

One in five people between the ages of 55 and 65 report symptoms of tinnitus. The proper course of treatment often is unclear given such discrepancies between patient and caregiver.

A sensor that could objectively detect audio vibrations could aid diagnosis and treatment of ear related conditions.

The Invention

UW-Madison researchers have developed a flexible membrane that attaches to the eardrum and detects vibrations. Alternatively, it can be signaled to excite the eardrum.

The nano-thin membrane is made of piezoelectric material. This type of material generates electricity in response to motion, or the reverse, generating motion in response to electricity.

Given this phenomenon, the membrane can be coupled to an antenna and electrodes to act as a transducer, transforming one form of energy into another. Thus, when sound waves strike the eardrum, the shaken membrane produces electrical energy that may be sent out and detected by a transceiver. Conversely, an ingoing radio frequency signal can be received by the electrodes and passed on as audio stimulation to the membrane, causing it to vibrate.

Applications

- Monitoring auditory and vestibular function
- Diagnosing hearing issues
- Treatment and implants for ear disorders
- Pain relief
- Improved hearing aids

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Key Benefits

- Objective sensor of sound

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- Membrane is thin, flexible and unobtrusive
- Design can be wireless

Additional Information

Related Technologies

- [WARF reference number P120073US01 describes an improved cochlear implant and method for improving the quality of life for those living with hearing impairment.](#)

Tech Fields

- [Medical Devices : Accessibility](#)

For current licensing status, please contact Jeanine Burmania at jeanine@warf.org or 608-960-9846

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