



Improved recording of auditory brainstem responses from apical portions of the cochlea by a basilar membrane resonance induced by fast stimulus rates

THE EXISTING PROBLEM OR ISSUE

Objective measures of hearing sensitivity are necessary to test subjects who cannot provide a reliable behavioural response, such as newborns, or adults with dementia. However, assessment of sensitivity to low-frequency sounds is a challenge with current clinical protocols.

The objective of this innovation is to improve the recording of Auditory Brainstem Responses (ABRs) evoked by neurons located at apical portions of the cochlea (sensitive to low-frequency sounds) by inducing a resonance in the Basilar Membrane (BM) displacement with short-duration stimuli presented at fast rates.

OUR SOLUTION

The basis of this innovation relies on taking advantage of the mechanical properties of the auditory filters of the basilar membrane to generate a resonance that increases the synchronicity of firing of auditory nerve fibers from a selected portion of the apical cochlea. This increased synchrony magnifies the amplitude of the response, with potential clinical benefit in detecting apical-cochlear generated neural signals.

A BM resonance can be generated at a specific characteristic frequency (c_f) by presenting auditory stimuli at a mean rate equal to the c_f . The auditory stimulus consists of a one period of a sinusoidal signal of frequency equal to the c_f , windowed with a Blackman window of the same duration.



ADVANTAGES	BENEFITS
ABR signals obtained with this method are greater in magnitude	Improved detection of neural responses to low-frequency sounds
The main components of ABRs to low-frequency sounds are easily identified	Potential sites of lesion can be determined by analysing the resulting ABRs
The induced resonance is localized to a specific apical portion of the BM	The frequency specificity of the ABRs improves, leading to a more accurate hearing assessment
Frequency-specific ABR responses can be obtained for low-frequency sounds	ABR responses to low-frequency interaural timing cues can be assessed

APPLICATIONS

- ✓ Hearing clinics and hospitals
- ✓ Research Centres
- ✓ Electrophysiology recording systems
- ✓ Diagnostics

INVENTORS

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INTELLECTUAL PROPERTY POSITION

Provisional Patent Application: 2018902272
Systems and methods for obtaining auditory evoked potentials

PARTNERING OPPORTUNITY

We are seeking an industry partner for further development and commercialisation of this technology through a research collaboration or technology licence.

WOULD YOU LIKE TO KNOW MORE?

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