MedicalXpress

Cochlea model reveals inner workings of the ear

May 13 2015

PhD student Mohammad Ayat's research involved developing a model of the cochlea, a snail-shaped chamber in the human ear, focused on the cochlear microphonic (CM)—an electrical signal generated inside the cochlea in response to sound.

The model—which includes electrical coupling of the cochlea—is the most detailed one-dimensional model developed to date, and allowed Mohammad to predict some characteristics of the cochlear microphonic.

"Some of these characteristics are different from what many researchers thought in the past, and may have clinical significance once further research is done," says Mohammad.

Mohammad says the cochlear microphonic signal is a potential tool for diagnosing hearing impairments and investigating cochlear function.

"The CM can provide information about the health of particular sections of the cochlea, which may lead to faster and more accurate methods of adjusting the many settings of modern hearing aids to compensate for areas of weakness.

"The cochlea is hard to study because of where it is in the body and the complex processes at work. Modelling allowed us to bridge these gaps and gain useful information."

Mohammad, who had no previous experience researching the cochlea,

says it took him around eight months to learn its functionality.

"It's a fascinatingly complex organ and there's still mystery around how it works. Further modelling and signal processing experiments will lead to better methods of diagnosis, and improved methods of treatment for hearing impairments. It may also lead to the development of bionics-inspired speech recognition systems similar to the human cochlea."

Provided by Victoria University