

## Scientists find new pieces of hearing puzzle

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Researchers funded by the Biotechnology and Biological Sciences Research Council (BBSRC) have gained important new insights into how our sense of hearing works. Their findings promise new avenues for scientists to understand what goes wrong when people experience deafness. Their findings are published in *Royal Society Open Biology*, a new open access journal.

The team was led by Prof John Wood of UCL (University College London). Professor Wood explains: "As many people will already know, our ears are filled with tiny hair cells that move in response to the pressure of a <u>sound wave</u>. But exactly what happens within cells to turn that movement into an <u>electrical signal</u> that our brains' can interpret as sound has been puzzling scientists for decades. Our findings have given us some new insights into the puzzle."

The UCL team found that when mice lack two proteins, called TRPC3 and TRPC6, they experience about an 80% drop in their ability to detect high frequency sounds. Intriguingly, the loss of these two proteins also makes the mice slightly less sensitive to light touch sensations. When the mice that lack these proteins are brushed lightly, a third of the <u>nerve</u> <u>cells</u> which would normally fire remain inactive. This finding suggests an important link between how our bodies sense touch and sound.

Only when both TRPC3 and TRPC6 were absent was the mice's hearing and <u>sense of touch</u> impaired; the loss of each <u>protein</u> on its own had no behavioural effect on the mice. This suggests that the proteins are only parts of a more complex mechanism used in detecting sound and touch.



Professor Wood continues: "We are still a long way from a complete understanding of touch and hearing but this is a really exciting lead. Our next step is to find out what other proteins are involved in this mechanism and how they all interact. Hopefully then, once we know how the mechanism works in people who can hear, we can understand what goes wrong in people who can't."

The two proteins, TRPC3 and TRPC6, seem to be able to make a pressure-sensitive ion channel in some cells but not others. In response to tiny pressures, this channel would allow the flow of electrical signals but seems to require some, as yet uncharacterised, additional factor. This research adds to our knowledge of the potential components required for sound transduction in hair cells and provides us with molecular tools to find other interacting proteins that may play a crucial role in hearing.

Professor Wood received the funding to do this work as part of a Longer and Larger award (LoLa) from BBSRC. These provide leading research teams with the time and resources to tackle major scientific questions.

Professor Douglas Kell, BBSRC Chief Executive, said, "Human biology still holds many secrets and there are big gaps in our understanding of even fundamental processes like touch, pain and hearing. As scientists invent new techniques and technologies we are able to investigate the fundamentals of human biology in exciting new ways. This is crucial because only by deepening our understanding of how our bodies work can we find new ways of helping people when things go wrong."

More information: <a href="mailto:rsob.royalsocietypublishing.org/content/current">rsob.royalsocietypublishing.org/content/current</a>

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