Jockey Club College of Veterinary Medicine and Life Sciences
香港城市大學
City University of Hong Kong
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JCC RESEARCH SEMINAR

TOPIC

Towards better hearing restoration strategies for the deaf through cochlear implants

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ABSTRACT

Cochlear Implants (CIs) have become a standard treatment for patients with severe hearing sensorineural loss. The most common cause of such hearing loss is loss of the inner ears' sensitive "hair cell" receptors which convert sound wave vibrations into neural activity. CIs use sound processor devices to convert incoming sounds into patterns of electrical pulses that are delivered directly to the auditory nerve, bypassing the damaged or missing hair cells. In doing so they often restore enough of a sense of hearing to allow people to understand speech in quiet, but the sense of hearing afforded by these devices is nevertheless very poor compared to healthy, natural hearing. One particular weakness is the poor ability of CI users to localize sounds in space, and researchers had previously speculated that this may be due to abnormal development of the auditory pathway during the period of deafness that precedes cochlear implantation, which may damage the normal auditory system's remarkable ability to detect minuscule differences in the arrival time of sounds between the two ears. But researching binaural cue development in deaf patients faces many limitations, which is why our team has turned to animal experiments using deafened rats. Over the past 6 years we have made a string of discoveries, which I will review in this talk. We were able to show that deafness per se does not damage the potential for exquisit interaural time difference sensitivity, that paying attention to precise electric pulse timing in the CIs is key to good binaural hearing, but also that certain echo suppression mechanisms in the brain do seem to be shaped by experience. Our experiments are generating a wealth of data which can guide the development of better prosthetic auditory devices for deaf patients in the future.

SPEAKER'S BIOGRAPHY

Jan Schnupp graduated from University College London with a Bachelor in Genetics in 1990 and obtained a doctorate in Neurophysiology from the University of Oxford in 1996 and a bachelor in mathematical sciences from the Open University in 2006. He was a junior research fellow at Christ Church, Oxford and a visiting research fellow at the University of Wisconsin at Madison before joining the faculty of the University of Oxford in 2002, where he was promoted to Professor in 2010. In 2016, Jan joined the faculty of City University of Hong Kong.

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