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Editorial:

Frontiers in auditory bioscience and technology: a special feature on recent advances in hearing research

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I was greatly honored to be asked by Helen ZHANG, Former Managing Editor, to serve as a guest editor of this special feature of *Journal of Zhejiang University-SCIENCE B (Biomedicine & Biotechnology)* on "Frontiers in Auditory Bioscience and Technology (FABT)".

Hearing impairment has become one of the most common sensory disabilities. The World Health Organization (WHO) estimates that 466 million people were living with disabling hearing loss in 2018, and that number could rise to 900 million by 2050. Conductive hearing loss, which predominantly involves the sound-transmitting route of the outer and middle ear, has been well handled by antibiotics and surgery. However, sensorineural hearing loss, which involves the inner ear and structures further within the auditory pathway, has very limited biological treatment options (current treatment options include only hearing amplification and cochlear implants). Part of the reason for the paucity of therapeutics is due to the complexity of the auditory system and the limited regenerative ability of the hearing sensory cells, hair cells, and connected nerve.

With recent progress in molecular biology and genetic medicine, researchers have started to dig deeper into the mechanisms underlying hearing loss. Based on these studies, more potential treatment options are under investigation.

In this special feature, we were lucky to recruit scientists who are active in the hearing field to share their perspectives and research. The first article by Mizutari (2019) reviews recent studies of blast-induced hearing dysfunction. He outlines the current understanding of conductive and sensorineural pathologies underlying blast-induced hearing loss, as well as some recent progress in the research. He also stresses the further need for studies of the detailed mechanisms and new treatment options.

In the next article, Peter and Kleinjung (2019) review the current neuromodulation techniques for the treatment of tinnitus. The authors provide extended perspective and discussion on the use and limitations of current non-invasive and invasive neuromodulation methods for the emerging field of hearing medicine.

The next two articles examine the molecular signals that regulate inner ear development and regeneration. Ma et al. (2019) review the role of bone morphogenetic proteins (BMPs) and the crosstalk between BMP signaling and other signaling pathways in the development of the inner ear. Next, Cheng (2019) discusses the role of the basic helix-loop-helix (bHLH) transcription factor Atoh1 and its transcriptional and posttranslational regulation during inner ear development. Both articles hope to provide a better understanding of cochlear development and,

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thus, offer more insight into therapeutic strategies for hair cell regeneration in the future.

Finally, Wang et al. (2019) present a clinical study of otogenic cerebrospinal fluid leakage secondary to congenital inner ear dysplasia. They also discuss the diagnosis and treatment of this rare and challenging issue. Zheng et al. (2019) then report new single nucleotide polymorphism (SNP) variants of a gene associated with nonsyndromic hearing loss (*DFNB49*) in the Chinese population.

These inspiring examples are a sampling of the recent work addressing significant progress in both clinical and basic hearing research. We are excited that the understanding and treatment of hearing disorders is heading into a new era. We are delighted to present this special feature of recent progress toward these goals.

Compliance with ethics guidelines

Yen-Fu CHENG declares that he has no conflict of interest.

This article does not contain any studies with human or animal subjects performed by the author.

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