REPORT ON THE 40TH ANNUAL MIDWINTER MEETING OF THE ASSOCIATION FOR RESEARCH IN OTOLARYNGOLOGY

Monika Oldak[1,2], W. Wiktor Jedrzejczak[1,2]

[1] Institute of Physiology and Pathology of Hearing, Warsaw, Poland
[2] World Hearing Center, Kajetany, Poland

The 40th annual midwinter international conference of the Association for Research in Otolaryngology was held 11–15 February 2017 at the Marriott Waterfront hotel, Baltimore, MD, USA. There were 23 podium sessions, 4 poster sessions (with over 900 poster presentations), 13 symposia, 5 workshops, and 8 mentoring sessions.

During the presidential symposium on "Big data from tiny samples; using comprehensive molecular profiling to understand development", new technologies were presented that increase our ability to characterize individual cells. The first involves RNA sequencing from a single cell or population of cells, and generates comprehensive mRNA profiles from different developmental processes. It reveals how a single genome becomes interpreted into a single cell. Secondly, the technique of Assay for Transposase Accessible Chromatin with high-throughput sequencing (ATAC-seq) is a method for mapping chromatin accessibility genome-wide, and allows the researcher to identify active promoters, enhancers, and other cis-regulatory elements and thus characterize the epigenetic landscape. Finally, using mass spectrometry profiles, gene expression at the protein level may be established. All these techniques serve to build a comprehensive understanding of a cell, tissue, or organ.

Dr Joseph Corbo from Washington University School of Medicine described the development of CRE-seq (CRE standing for cis-regulatory element), a novel technique for the massive parallel analysis of non-coding variants *in vivo*. It enables the researcher to narrow down the non-coding DNA variants to those of functional significance, and thus sets the stage for comprehensive "cis-regulome" analysis, which is defined as all CREs active in a tissue sample or a disease process.

Dr Ronna Herzano (Department of Otorhinolaryngology, Department of Anatomy and Neurobiology, and Institute for Genome Sciences, University of Maryland School of Medicine) talked about a cell type-specific approach to understanding hair cell development and survival. It allows ZEB1 and RFX transcription factors to be identified, in the first case for the development of the sensory epithelium and secondly for hair cell terminal differentiation. She explained how inner ear cell-type-specific analysis is not restricted to approaches based on flow cytometry, but such translatome analysis can also be performed using Ribotag mice. The approach holds great promise in understanding the mechanisms of hearing loss.

The topics of this year's symposia included:

- Multisensory interplay and plasticity, from cells to circuits and from mice to humans
- Patterns in sound sequences: how listeners discover/learn and use regularities in the acoustic environment
- Relating animal models to human cochlear implant use
- Advances in genome editing and its clinical application
- Neuronal and non-neuronal regulation of cochlear wiring and refinement
- Bridging the gap between hearing sciences and audio technologies
- *In vitro* model technologies for hearing regeneration and ototoxicity protection
- Vestibular influence on cognitive function
- Limiting factors in cochlear implants
- Auditory implants: improving auditory function from pre-processing to peripheral and central mechanisms.

In the field of otoacoustic emissions (OAEs) the topics of interest included inhibition of OAEs by contralateral acoustic stimulation, further research on swept-tone stimulus frequency OAEs, and effects of calibration methods and ear-tip construction on OAEs. There was also a study on the relationship between OAEs and one of new recently emerging methods – wideband acoustic absorbance.

A new topic, hidden hearing loss, was the focus of several works. There were studies on humans as well as animals, and they all aimed to detect hidden hearing loss and better understand the functional consequences.

This year's Award of Merit recipient was Alan R. Palmer (MRC Institute of Hearing Research, Nottingham University, UK) for his work on developing a variety of anatomical and physiological methods to elucidate auditory function. In his lecture on "Exploring auditory processing", he talked about examining structure/function relationships in the cochlear nucleus, using midbrain recordings to reassess how interaural time differences are extracted, and identifying selective processing of vocalization in the ventral processing stream in cortex.

At the awards ceremony there was also a special recognition of Arthur Popper and Richard Fay for their enormous contributions to the field of hearing science as editors of the Handbook of Auditory Research series. The series started at 1992 with "The Mammalian Auditory

Pathway: Neuroanatomy" and each year new volumes have been added. As of now there are more than 60, with recent volumes devoted to evolution of the vertebrate ear and frequency-following responses.

There were two participants from Poland, Monika Ołdak and W. Wiktor Jędrzejczak, both from the World Hearing Center, Institute of Physiology and Pathology of Hearing, Kajetany/Warsaw. They presented work on genetics and electrophysiology.