Editorial

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The 34th International Congress of the International Union of Physiological Sciences (IUPS) was held in Christchurch, New Zealand, in August 2001. The theme for this event was 'From Molecule to Malady'. This meeting provided the opportunity to consider the staggering degree to which molecular genetics, associated with the genome era, is supporting cutting edge physiological research into body function in health and disease. The inner ear provides a unique model application of this concept. Few fields have benefited as much from the revolution in molecular and integrative physiology as hearing. A satellite meeting of the IUPS congress entitled 'Auditory Function and Dysfunction: Molecular and Physiological Mechanisms' was convened to provide a forum for discussion and exchange of information across hearing science subdisciplines. The meeting was held in Auckland, New Zealand and in the week preceding the main IUPS congress. Invited speakers were given a brief of providing a synopsis of their specialty research area, with key background, current research, and future application. The target audience was ambitious: colleagues from within the same or related fields, ORL specialists, audiologists, and graduate students, representing the cross section of attendees at the satellite symposium, but also reflecting the target readership of *Audiology and Neuro-Otology*, which publishes the proceedings of the meeting. The meeting provided a tremendous opportunity for transfer of cutting edge 'basic and applied audiology and neuro-otology' research across subdisciplines in the field of hearing research.

The meeting was organised thematically into themes embracing the breadth of the fields of central auditory, and peripheral (cochlear) function. The theme of 'Central

Auditory Processing' produced a collection of reports describing current concepts in neural organisation of auditory centres in the brain, from cochlear nucleus to auditory cortex; including exciting developments in central auditory spatiotemporal plasticity, and plasticity associated with cochlear implant technology. This was complemented by papers on clinical studies of auditory learning strategy responses of the hearing-impaired. This juxtaposition of the research areas of 'basic' central auditory physiology, and that of 'applied' research into the hearing-impaired, provided a unique opportunity for integrating the 'basic' and 'clinical' areas of central auditory physiology.

The 'Cochlear Transduction and Transmission' section of the meeting spanned three areas. The first was contained in presentations by leaders in the study of the 'cochlear amplifier'. With the identification of 'prestin' as the molecular substrate of outer hair cell electromotility only last year, presentation of data on the properties of prestin and the contribution of outer hair cells to hearing sensitivity and frequency are at the cutting edge of cochlear transduction molecular physiology. The second area was of cochlear micromechanics. These papers highlighted current research on the mechanical, structural and functional features of the hearing organ, and considered the various signalling factors regulating cochlear homeostasis and hair cell physiology, including mechano-electrical, voltage- and ligand-gated ion channels. In this section, synaptic transmission was also considered from the level of molecular control of synaptic vesicle fusion and transmitter release, to experimental evidence on multimodal transmission involving glutamate and other trans-

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mitter molecules including ATP, and their associated receptors at afferent and efferent synapses. The application of this advancing knowledge of molecular signalling processes associated with development and maintenance of hearing was then delineated in the third theme, 'Gene Therapy and Therapeutic Interventions'. Here a group of papers provided insight into the application of gene therapy and genetic screening as strategies for detecting and treating hearing disorders. The latter spot-light the multi-disciplinary strategies which provide great potential for clinical intervention in genetic and environmentally related hearing loss.

The synopses of the IUPS satellite 'Auditory Function and Dysfunction: Molecular and Physiological Mechanisms' are published as three special issues of *Audiology and Neuro-Otology*. Issue No. 4 of volume 6, 2001, contains the synopses on 'Central Auditory Processing', and

the first issues of volume 7, 2002, provide the 'Cochlear Transduction and Transmission' material, and the 'Gene Therapy and Therapeutic Interventions' theme. The papers provided within these issues fully met the brief given to the contributors, all from leading laboratories and clinics, to inform and direct a broad readership to the background and advances in their respective areas of basic and applied hearing science. The editors take this opportunity to thank all the contributors to the symposium and to these editions of *Audiology and Neuro-Otology*, for so readily agreeing to the directive given to them. We believe that they have managed admirably, and have produced excellent reviews. These synopses will be of great value to current and future hearing researchers, providing focus and cross-fertilisation across a broad range of the subdisciplines.