



Rome 2015
IEB
inner ear
biology

Gemelli 
Fondazione Policlinico Universitario A. Gemelli
Università Cattolica del Sacro Cuore



Symposium & Workshop
52nd Inner Ear Biology
12-15 September 2015 - Rome, Italy

Chairs: Gaetano Paludetti and Diana Troiani

Program and Abstract book

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Publisher

Pacini Editore SpA

Via Gherardesca, 1 • 56121 Pisa, Italy

Tel. +39 050 313011 • Fax +39 050 3130300

info@pacinieditore.it • www.pacinimedica.it

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September 2015

Printed by Industrie Grafiche Pacini Editore S.p.A.

Via A. Gherardesca • 56121 Ospedaletto • Pisa • Italy

Telefono 050 313011 • Telefax 050 3130300

www.pacinimedica.it

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Lazzati Room

16.00 - 16.45	POSTER SESSION VII
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P89**CLASSIFICATION, PATHOPHYSIOLOGY AND AUDIOLOGICAL PATTERNS OF AGE-RELATED HEARING LOSS**

R. Santos¹, A.R. Lameiras¹, A. O'Neill^{1,2,3}, P. Escada^{1,2,3}, J. O'Neill^{2,3}, G. Fialho⁴, H. Caria^{4,5}

¹ENT-CHLO, HEM, ENT Service, Centro Hospitalar de Lisboa Ocidental EPE, Hospital Egas Moniz, Portugal; ²FCM/UNL, Department of Anatomy, Faculty of Medical Sciences, New University of Lisbon, Portugal; ³CEFITEC, Faculty of Sciences and Technology, New University of Lisbon, Portugal; ⁴BioISI, Biosystems & Integrative Sciences Institute Faculty of Science of the University of Lisbon, Portugal; ⁵ESS/IPS, School of Health, Polytechnic Institute of Setúbal, Portugal

Presbycusis (age-related hearing loss-ARHL) is a major health problem affecting nearly 70% of people aged ≥ 65 years old. It is responsible for communication disabilities (social deafness), isolation and reduced cognitive auditory input.

Due to its physiology complexity, the mechanisms of ARHL are not fully understood. They involve circulatory disturbances, apoptosis, genetic susceptibility and environmental causes.

Schuknecht (1969) developed a classification for ARHL which establishes an association between pathophysiological mechanisms and alterations of cochlear morphology underlying ARHL and a specific pattern of audiometric evaluation with clinical relevance. Sensorial ARHL is associated with degenerative changes in the organ of Corti and outer hair cells at the basal turn of the cochlea and is characterized by an audiometric pattern with loss in the high frequencies. Neural ARHL is characterized by neuronal loss, in particular of the neuronal afferents, with audiometric representation by a gradually downward curve and important negative impact in auditory discrimination. Metabolic ARHL results from atrophy of the stria vascularis with consequent alterations in the endolymph potential and changes in spiral ligament morphology, which is represented by a flattened curve with loss in all frequencies in the audiometric evaluation. Cochlear conductive ARHL is associated with alterations in cochlear conduction as result of stiffness of the basilar membrane at the basal turn of the cochlea and it is characterized by loss in the low frequencies. Mixed ARHL is characterized by loss in high frequencies as result of degenerative changes in the outer hair cells mainly in the basal turn of the cochlea; impaired discrimination due to severe loss of cochlear neuronal population; loss in all frequencies as effect of decreased stria vascularis cells and alterations in spiral ligament; loss in low frequencies due to injury in the apical turns of the cochlea. Considerations on these clinical data integrating the patient evaluation are crucial for genetic susceptibility evaluation. Some examples are presented.

P90**AGE-RELATED HEARING LOSS: IS THIS A PREVENTABLE CONDITION?**

M. Aparício¹, T.M. Matos², P. Arguello³, M. Antunes⁴, A. O'Neill^{5,6,7}, P. Escada^{5,6,7}, J. O'Neill^{6,7}, F. Fialho², H. Caria^{2,3}

¹Faculty of Sciences, University of Lisbon, Portugal; ²BioISI, Faculty of Sciences, University of Lisbon, Lisbon, Portugal; ³School of Health, Polytechnic Institute of Setúbal, Setúbal, Portugal; ⁴CEAUL, Faculty of Sciences, University of Lisbon, Portugal; ⁵ENT-CHLO, HEM, ENT Service, Centro Hospitalar de Lisboa Ocidental EPE, Hospital Egas Moniz, Portugal; ⁶FCM/UNL, Department of Anatomy, Faculty of Medical Sciences, New University of Lisbon, Portugal; ⁷CEFITEC, Faculty of Sciences and Technology, New University of Lisbon, Portugal

The better articulation between social sciences and biomedical sciences, due to the increased knowledge on the pathophysiological mechanisms of cellular aging and the genetic susceptibility factors underlying some age-related disorders, is particularly relevant to the field of active aging. We have been studying age-related hearing loss (ARHL), by attempting to identify predisposing genetic factors and by assessing the impact of ARHL in the quality of life of the elderly citizens. The study here presented focuses on ≈ 450 individuals from the Portuguese population, aged >65 , and includes audiological evaluation, assessment of sociological parameters, and genetic analysis involving genotyping of variants in genes previously associated with ARHL in other populations.

Socio-demographic parameters of the elderly individuals of the sample are also considered. The statistical analysis is towards the identification of natural patterns of hearing decrease considering both the shape and the magnitude of the audiological curve and the characterization of such patterns through statistical models. In conclusion, we discuss biological and clinical aspects, taking into consideration both the genetic results from the ARHL Portuguese population and the social dimensions of ageing. Thus, this study expects to contribute to the prognosis of ARHL in the future.

POSTER SESSION VII STEM CELLS AND GENE THERAPY

P91**HYALURONIC ACID PRETREATMENT FOR SENDAI VIRUS-MEDIATED COCHLEAR GENE TRANSFER**

Takaomi Kurioka¹, Kunio Mizutani¹, Katsuki Niwa¹, Makoto Inoue², Yasuji Ueda², Akihiro Shiotani¹

¹Department of Otolaryngology, Head and Neck Surgery, National Defense Medical College, Saitama, Japan; ²DNAVEC Corporation, Ibaraki, Japan

Gene therapy with viral vectors is one of the most promising strategies for sensorineural hearing loss. However, safe and effective administration of the viral vector into cochlear tissue is difficult because of the anatomical isolation of the cochlea. We investigated the efficiency and safety of round window membrane application of Sendai virus, one of the most promising non-genotoxic vectors, after pretreatment with hyaluronic acid (HA) to promote efficient viral translocation into the cochlea. Sendai virus expressing the green fluorescent protein reporter gene was detected throughout cochlear