Genetic variants of CDH23 associated with noise-induced hearing loss

Tomasz J. Kowalski[1], Malgorzata Pawelczyk[2], Elzbieta Rajkowska[3], Mariola Sliwinska-Kowalska[3*]

1 UCLA, Department of Orthopedics, Los Angeles, USA

2 Medical University of Lodz, Poland

3 Nofer Institute of Occupational Medicine, Lodz, Poland, *marsliw@imp.lodz.pl

ABSTRACT

Individual susceptibility to noise-induced hearing loss (NIHL) differs remarkably among individuals and depends on genetic and environmental factors. Over the last years we have gathered many information concerning the genetic factors of NIHL, but this quest is definitely far from finished. One of the most interesting genes to be further investigated is CDH23 encoding Cadherin 23, a component of the stereocilia tip links, which are thought to gate mechanotransduction channel in hair cells. The aim of this study was to analyze selected CDH23 polymorphisms and to evaluate their interaction with other environmental and individual factors known to determine NIHL development. The most prominent results (i.e. significant within the main effect of genotype) were obtained for 2 SNPs localized in exon 21 - rs3752751 and rs3752752. The effect of the latter one was observed in the medium noise exposure level and in the subgroup of young subjects exposed to impulse noise - CC genotype was more frequent among susceptible subjects while genotype CT appeared more often among resistant to noise subjects. Moreover, the effect of rs3752752 polymorphism was not modified by none of environmental/medical factors except for blood pressure, this however should be further investigated. The results of this study are of great value as identification of genetic variants displaying protective effects on the auditory organ is particularly important in young individuals shortly exposed to noise since they are mostly vulnerable to the development of noise-induced hearing loss.