

Abstract EFAS/DGA 2007

Stem cells in the auditory and vestibular organs of the inner ear

Senn, P. (1), Oshima, K. (2), Teo, D. (2), Grimm, C. (2), Heller, S. (2)

(1) Department of Otolaryngology, Head & Neck Surgery, University of Berne, Inselspital, Freiburgstrasse, 3010 Bern, Switzerland

(2) Departments of Otolaryngology, Head & Neck Surgery and Molecular & Cellular Physiology, Stanford University School of Medicine, 801 Welch Road, Stanford, CA, USA

Adult stem cells within many mature organs, such as blood, gut or skin are responsible for the replenishment of lost cells and therefore guaranteeing long-term morphology and functionality of an organ. But, adult stem cells have also been found in tissues with a minimal turnover such as brain, heart and of particular interest to us, the inner ear. Recent studies have shown that adult stem cells of the inner ear are pluripotent and capable to generate inner ear cell types. Unfortunately, adult inner ear stem cells do not naturally have the potential to sufficiently replenish lost hair cells in mammals. Especially in the adult mammalian cochlea, no regenerative capacity has been found, which is the main reason for the permanence of hearing loss. Adult mammalian vestibular organs, in contrast, replace a minimal number of lost hair cells throughout life. New findings indicate that the lack of regenerative capacity in the adult mammalian cochlea is either a result of an early postnatal loss of stem cells or diminishment of stem cell features of maturing cochlear cells. In comparison to the cochlea, vestibular organs have been found to retain a population of stem cells into adulthood. Such adult inner ear stem cells might be useful for future therapies of inner ear disorders including hearing loss. Additionally, adult stem cells from non-inner ear organs and embryonic stem cells could play a role in future inner ear therapies, because these cells have been found to be capable to generate inner ear cell types as well.

