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## **The Role of Programmed Cell Death 'Apoptosis' in the Development of Inner Sulcus in the Cochlea**

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**Accepted 2018-06-19, Published 2018-08-15**

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### **Abstract:**

Hearing loss is one of the most common chronic diseases that affect both young and old, but it is most prevalent in old people. This condition is generally irreversible in humans and can be due to the loss of hair cells, which are unable to regenerate. However, recent evidence of some regenerative ability reported in a number of non-mammal vertebrates have given us hope that, in the future a solution may be discovered. Although several advances have been recorded in this field in recent times and there are still challenges ahead. This study tried to investigate the formation of the inner sulcus located in the cochlea, as it is thought that, the processes involved during the development of this important region are most likely due to apoptosis or another type of programmed cell death, although this has not yet been confirmed. Mouse expressing an EGFP (green fluorescent protein) reporter at the Tecta locus was used. Specimens were stained with phalloidin as a general cell stain of f-actin and this was combined with (Terminal deoxynucleotidyl transferase dUTP Nick End) TUNEL staining in order to observe whether dying cells are the result of programmed cell death. Very little TUNEL staining was observed in the developing sulcal region, although some were seen in the associated mesenchymal cells in the cochlea. In some of the sections, Blebbing as well as extrusion of some cells that are thought to be undergoing programmed cell death were evident during the formation of the sulcus. The formation of the sulcus occurs earlier in the basal region of the cochlea than in the apical part following the regression of the greater epithelial ridge (GER) cells. Counting of nuclei in the sulcal region during the formation suggest that cells are being lost. It is not easy to establish whether these cells that are being removed could be due to apoptosis or another type of programmed cell death.

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