**17/MHS01/204**

*With the aid of a diagram, write an essay on the histology of an organ of Corti*



The organ of Corti is an organ of the inner ear located within the cochlea which contributes to audition. It is a specialized sensory epithelium that allows for the transduction of sound vibrations into neural signals. The organ of Corti itself is located on the basilar membrane. The organ of Corti includes: three rows of outer hair cells and one row of inner hair cells. Vibrations caused by sound waves bend the sterocilia on those hair cells via an electromechanical force.

**Histology of the organ of Corti**

Organ of Corti consists of different types of cells:
\*Inner [hair cells](http://en.wikipedia.org/wiki/Hair_cells)
\*Outer hair cells
\*Supporting cells

**Inner Hair Cell**

These cells are specialized in the mechanoelectrical transduction. There are almost 3500 cells disposed in one line along all the basilar membrane. They are connected to type I neuron peripheral fibers of spiral ganglion, these connection are very divergent (10/1). The luminal part of the cell is immerged in endolymph; the basal one is immerged in normal extracellular fluid. The luminal portion is formed by bundles of stereo cilia (inner ear), whose tips are connected by filamentous structures called tip-links.

**Outer Hair Cell**

These cells are acoustical pre-amplifiers. They are almost 12000, disposed in three parallel lines. These cells are connected to type II amyelinic neurons, the connections are very convergent. They have also afference from superior olivary nucleus. They have contractile activity.

**Supporting Cells**

These cells are of four different types:

Corti pillars

Hensen cells

Deiters cells

Claudius cells.

**Structure and function**

The primary function of the organ of Corti is the transduction of auditory signals. Sound waves enter the ear via the auditory canal and cause vibration of the tympanic membrane. The organ of Corti is composed of both supporting cells and mechanosensory hair cells. The three rows of outer hair and the one row of inner hair cells are separated by the supporting cells (Dieters of phalangeal cells). The hair cells within the organ of Corti have sterocilia that attach to the tectorial membrane. Inner and outer hair cells are distinctly different in structure. Both types of hair cells have sterocilia on the apical surface; however, the arrangement of sterocilia and their connection to the tectorial membrane are distinctly different.

 **Embryology of the organ of Corti**

The inner ear originates from the optic placode, a flat portion of the ectoderm that invaginates to create a vesicle. The vesicle undergoes a series of transformations eventually leading to the development of a multiple ducts including the cochlear duct.

 **Blood supply and lymphatics**

The labyrinthine artery is the man supplier of oxygenated blood to the cochlea and therefore the organ of Corti. The artery is also known as the auditory artery or internal auditory artery. The labyrinthine artery originates from the anterior inferior cerebellar artery (AICA). Occasionally, about 15%
 of the time, the auditory artery, can branch off directly from the basilar artery. Less commonly, this artery may originate from the superior cerebellar or vertebral artery.

The auditory follows the vestibulocochlear nerve from its point of origin into the internal acoustic meatus where it further divides into 2 branches; the anterior vestibular artery and the common cochlear artery.

 Physiological variants

Common variants include:

* The length of the outer cochlear wall.
* The diameter of the cochlear tube
* Length of the pars ascendens
* The width of the scala tympani

Individuals with narrow scala tympani are at a potential risk of experiencing trauma during electrode array placement.

