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COURSE: HISTOLOGY OF SPECIAL SENSES AND NEUROHISTOLOGY

ASSIGNMENT TITLE: HISTOLOGY OF THE EAR

1) With the aid of a diagram write an essay on the histology of an organ of corti

The organ of corti is also known as the spiral organ. It is located on the cochlear duct and is the place where sound vibrations of different frequencies are detected and responded to. The organ of corti is made up of hair cells and other epithelial structures all supported by the basilar membrane. The sensory hair cells have arranged V-shaped bundles of stereocilium and lose its single larger kinocilium during development.

- **Outer hair cells:** these are about 12,000 in number. They are in three rows near the saccule and it increases to five rows near the apex of the cochlea. Each columnar outer hair cell has a v-shaped bundle of stereocilia. The outer hair cells are in contact with a gelatinous mass called **tectorial membrane** which contains **tectorin**. The membrane is made up of collagen type II, V, IX, XI.
- **Inner hair cell:** these are about 3,500 cells. They are shorter and form a single row, they have a linear array of shorter stereocilia.

Both outer and inner hair cells have afferent and efferent nerve fibers from the spinal ganglion located in the bony core of the modiolus.

Supporting cells of the organ of corti

- Pillar cells
- Phalangeal cells
- Border cells
- Cells of hensen

There are two major types of columnar supporting cells of the organ of corti attached to the basilar membrane:

- Inner and outer phalangeal cells: they extend apical processes that intimately surround and support the basolateral parts of both inner and outer hair cells and the synaptic nerve endings. The apical portions of the outer phalangeal cells are cup-shaped to support the basilar portions of the outer hair cells and afferent and efferent nerve fibers. While the inner phalangeal cells are located deep to the inner hair cells and completely surround the inner hair cells. The apical ends of the phalangeal cells are joined to those of the hair cells by zonulae occludens.
- Pillar cells: these contain the inner and outer pillar cells. They are stiffened by heavy bundles of keratin and outline a triangular space, the inner tunnel between the outer and inner complexes of hair cells and phalangeal cells. The stiff inner tunnel plays a role in sound transmission.

The others are:

- Border cells: they delineate the inner border of the organ of corti. And are slender cells that support the inner aspects of the organ of corti.
- Cells of hensen: they define the outer border. They are located between the outer phalangeal cells and the cells of Claudius.



