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MATRIC NO: 17/MHS01/236

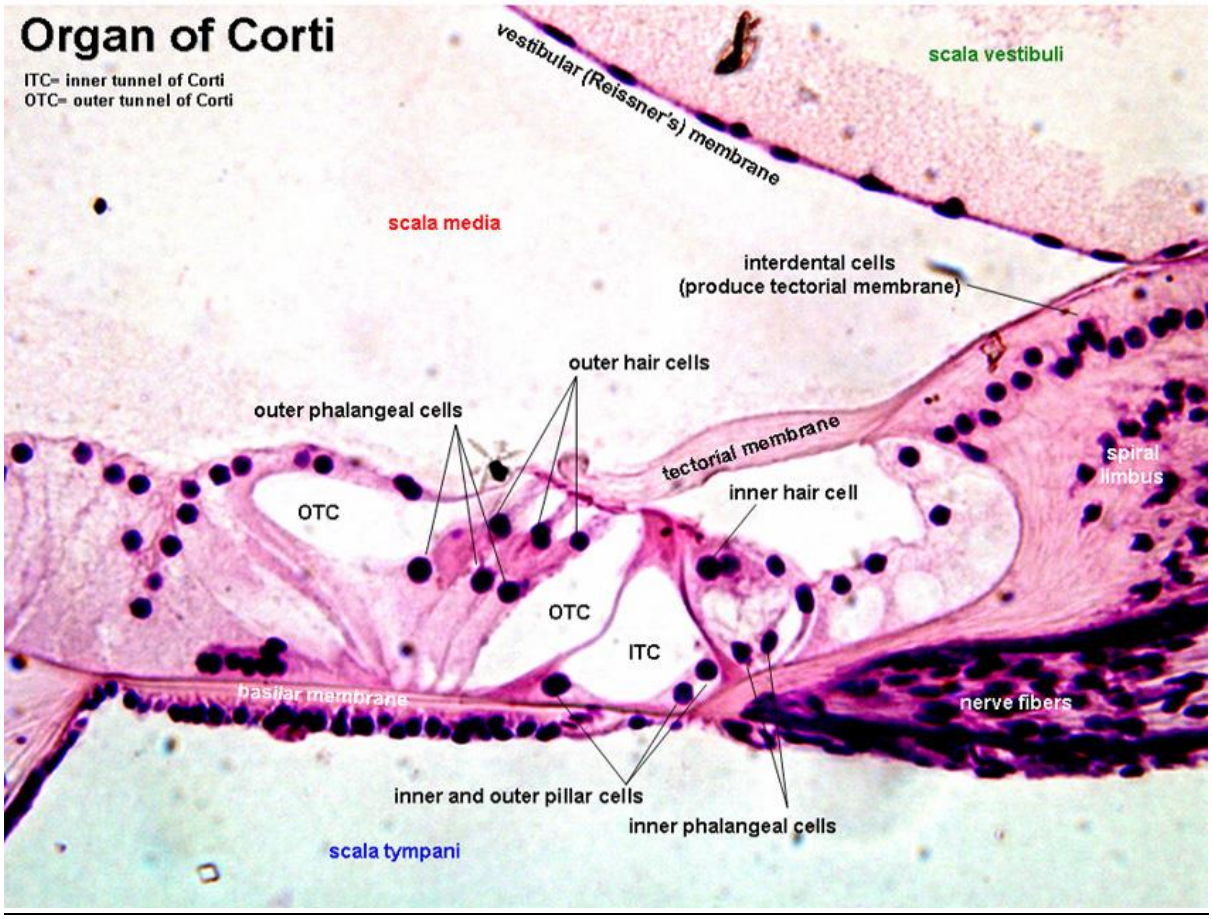
DERPARTMENT: MEDICINE AND SURGERY

COURSE: HISTOLOGY OF SPECIAL SENSES

ASSIGNMENT

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

HISTOLOGY OF THE ORGAN OF CORTI



The organ of corti is also called the spiral organ. It is a specialized sensory epithelium that allows for the transduction of sound vibrations into neural signals. The organ of Corti is located in the scala media of the cochlea of the inner ear. The scala media, or cochlear duct, is located between scala tympani and scala vestibuli and it is filled with endolymph. This structure is delimited by the basilar membrane and Reisner's membrane. The Organ of Corti covers the basilar membrane and it is under the tectorial membrane, an acellular gel into which hair cell stereocilia are immersed.

HISTOLOGY

Organ of Corti consists of different types of cells:

a) Inner hair cells
b) Outer hair cells
c) Supporting cells

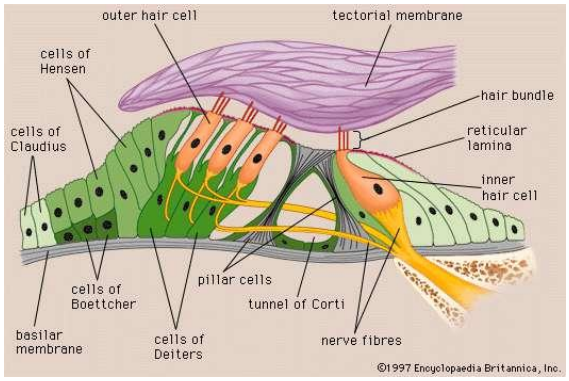
Inner Hair Cells

There are almost 3500 inner hair cells arranged in a single row. The inner hair cells are the actual sensory receptors, and 95% of the fibers of the auditory nerve that project to the brain arise from this subpopulation. The inner hair cells are shorter, each with a single array of shorter stereocilia. These cells are specialized in the mechanoelectrical transduction. They are connected to type I neuron peripheral fibers of spiral ganglion, these connections are very divergent. 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 stereocilia(inner_ear), whose tips are connected by filamentous structures called tip-links.

Outer Hair Cells

They are almost 12000. Outer hair cells Outer hair cells (OHC) occur in three rows near the oval window, increasing to five rows near the apex of the cochlea. OHC each have a curved row of longer stereocilia. The tips of the tallest stereocilia of the OHC are embedded in the tectorial membrane, an acellular layer extending over the spiral organ from the modiolus. The tectorial membrane consists of fine bundles of collagen (types II, V, IX, and XI),associated proteoglycans and other proteins and is formed during the embryonic period from secretions of cells that come to line the adjacent region called the spiral limbus.

Supporting cells



Two major types of columnar supporting cells are associated with the hair cells of the spiral organ

- Phalangeal/deiters Cells- Phalangeal cells intimately surround and directly support both inner and outer hair cells, almost completely enclosing each Inner Hair Cells but only the basal ends of the Outer Hair Cells.
- Pillar cells- Pillar cells are stiffened by bundles of keratin and outline a triangular, tunnel-like space between the outer and inner hair cells another structure important

in sound transduction. Outer and inner pillar cells outline a triangular shaped tunnel, called the inner tunnel, which is filled with perilymph-like fluid called endolymph

Other supporting cells are the cells of Hensen, Claudius, and Boettcher, after the 19th-century anatomists who first described them. Their function has not been established, but they are assumed to help in maintaining the composition of the endolymph by ion transport and absorptive activity.