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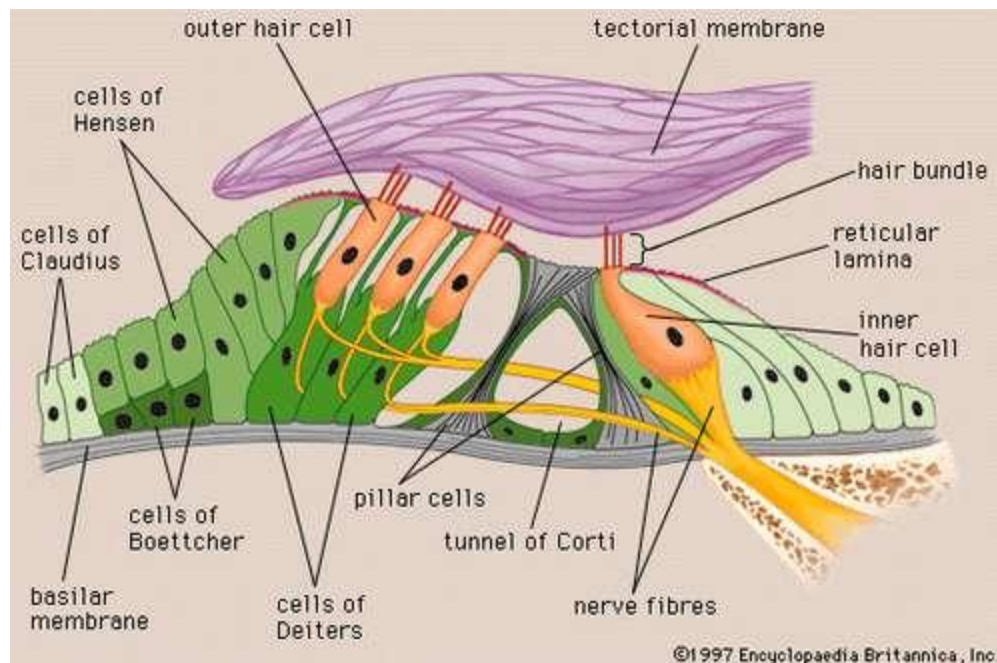
MATRIC NO: 17/MHS01/066

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Question

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

THE ORGAN OF CORTI



The internal ear has 3 major components;

1. The cochlear component which is involved in hearing
2. The vestibular component consisting of the utricle and saccule, it deals with balancing when stationary
3. The semi-circular component which deals with balancing when in motion

The cochlear has an endosteum covered canal “the cochlear canal”. Within this canal is a thin spiral endolymph filled tube called **the cochlear duct (scala media)**. The cochlear duct is separated from the **scala vestibule** by the reissner’s membrane and the **scala tympani** by the basilar membrane. The cochlear duct houses **the organ of corti**, the tectorial membrane, and structures from the basilar membrane.

The organ of corti is a sensory epithelium which is responsible for transducing sound vibrations into neural signals. It lies on the basilar membrane and contains 2 types of hair cells;

- The outer hair cells
- The inner hair cells

There are 3 rows of outer hair cells and a single row of inner hair cell. These cells are supported by **dieter cells/phalangeal cells**. At the top of the hair cells are projections called stereocilia which are arranged in a pattern in order to tune sound. The adjacent stereocilia are connected by tiplinks.

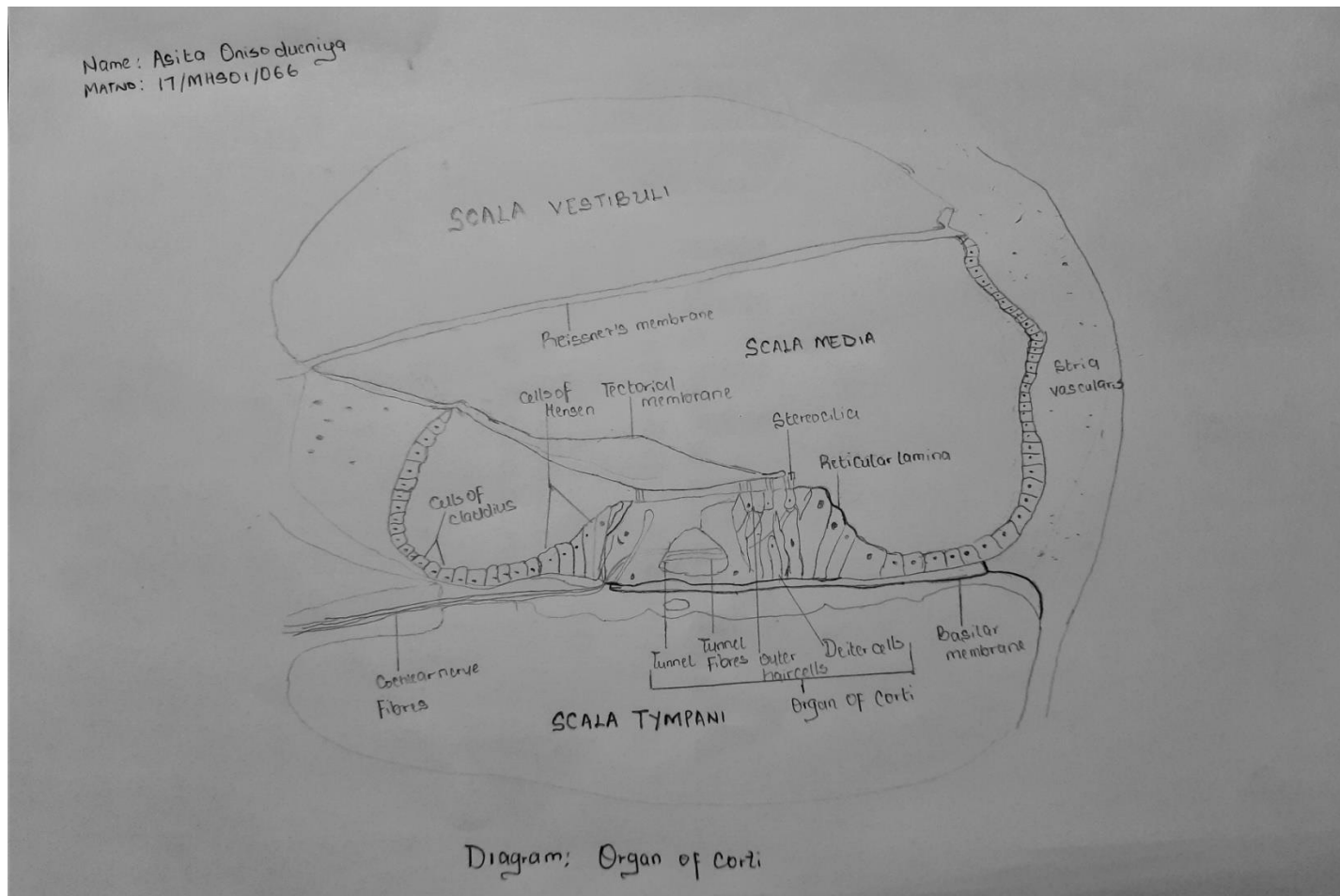
The organ of corti at the different regions of the cochlear is sensitive to different frequency of sound waves. The base of the cochlear transduces high frequency sounds, while the apex carries out transduction of low frequency sound. This property is what causes the tonotropic map along the basilar membrane.

FUNCTION

The function of the organ of corti is to transduce sound waves into neural signals.

The hair cells located in the organ of Corti transduce mechanical sound vibrations into nerve impulses. They are stimulated when the basilar membrane, on which the organ of Corti rests, vibrates. The hair cells are held in place by the reticular lamina, a rigid structure supported by the pillar cells, or rods of Corti, which are attached to the basilar fibres. At the base of the hair cells is a network of cochlear nerve endings, which lead to the spiral ganglion of Corti in the modiolus of the cochlea. The spiral ganglion sends axons into the cochlear nerve. At the top of the hair cell is a hair bundle containing stereocilia, or sensory hairs, that project upward into the tectorial membrane, which lies above the stereocilia in the cochlear duct. When the basilar membrane moves upward, the reticular lamina moves upward and inward; when the membrane moves downward, the reticular

lamina moves downward and outward. The resultant shearing forces between the reticular lamina and the tectorial membrane displace or bend the longest of the stereocilia, exciting the nerve fibres at the base of the hair cells. The nerve impulses are transmitted to the brain.



1 SKETCHED DIAGRAM OF ORGAN OF CORTI