

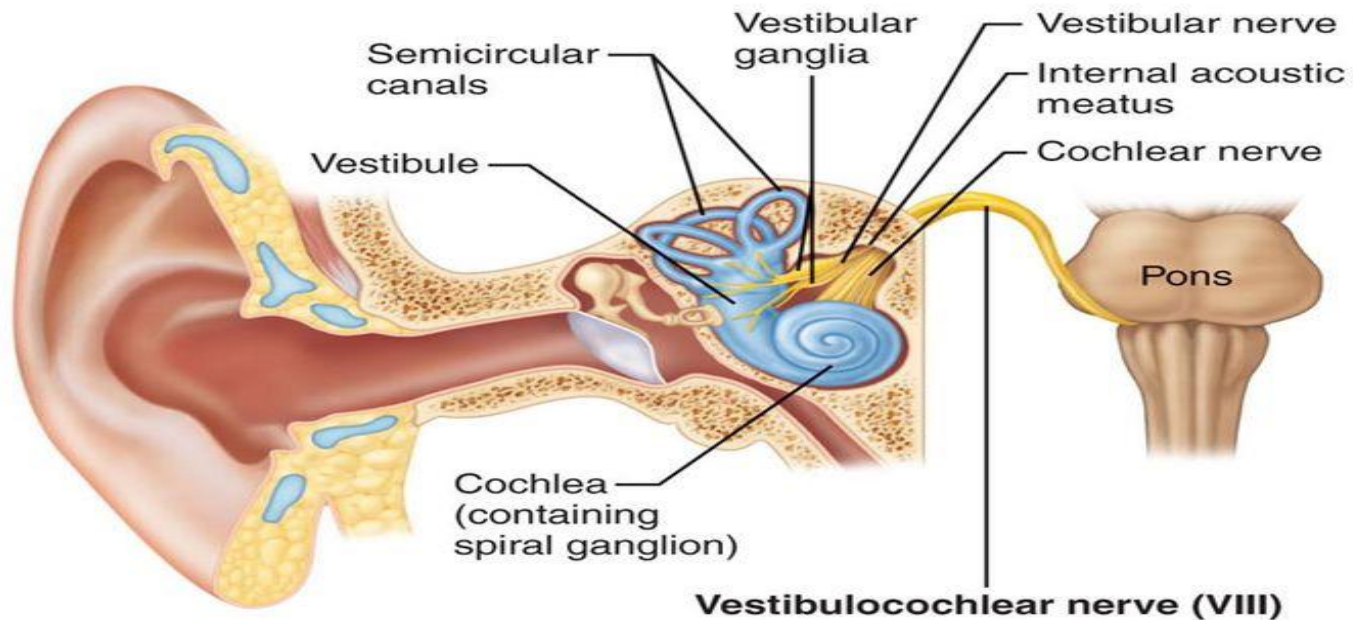


Vestibulo-Cochlear cranial nerve, 8th

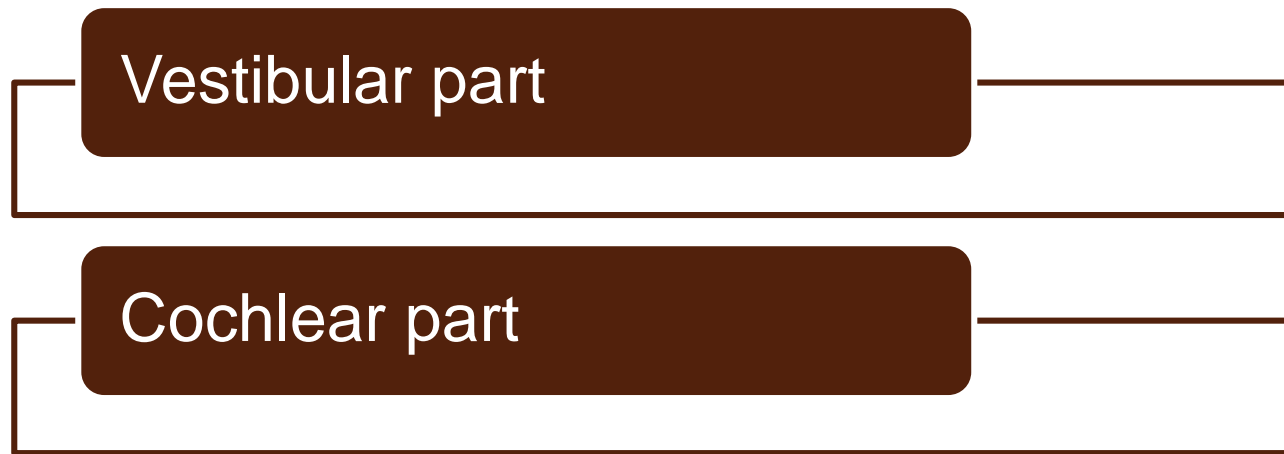


Done by:
نوف الحربي

The Vestibulocochlear Nerves - VIII



It is Special Sensory Afferent (SSA).



Vestibular & cochlear parts leave the ventral surface of brain stem at crebellopontine angle and enter the internal acoustic meatus with Facial nerve.

Vestibular nerve:

Peripheral processes :

- make dendritic contact with hair cells of the membranous labyrinth (inner ear).
- Their **cell bodies** (**1st order neuron**) are located in the vestibular ganglion → in internal acoustic "auditory" meatus .
- **central processes:**
 1. Mostly end up in the lateral, medial, inferior and superior vestibular nuclei (**2nd order neuron**)
 2. Some fibers go to the cerebellum through the inferior cerebellar peduncle

Vestibulospinal tract:

- influence the activity of spinal motor neurons
- control of body posture and balance
- Lateral tract arises from lateral vestibular (Deiter's) nucleus, descends ipsilaterally
- Medial tract is the descending part of the medial longitudinal fasciculus, projects bilaterally

EFFERENTS FROM VESTIBULAR NUCLEI :

To ipsilateral
flocculonodular lobe of
cerebellum
through

inferior
cerebellar
peduncle

Bilaterally to
ventral posterior nucleus of
thalamus

Which project
to the cerebral
cortex.

Bilaterally to
motor nuclei of cranial nerves
through

medial
longitudinal
fasciculus

To **Motor neurons of the spinal cord** as

lateral
(ipsilateral) &
medial
vestibulospinal
(bilateral) tracts.

Medial longitudinal fasciculus :

Ascending component :make connections with the nuclei of the **Oculomotor, Trochlear & Abducent** nerves (motor nuclei for extraocular muscles) for coordination of head & eye movements.

Descending component: extends into the spinal cord as the medial vestibulospinal tract.

Vestibular cortex located in lower postcentral gyrus

Auditory pathway :

It is a **multisynaptic** pathway

Representation of cochlea is bilateral at all levels above cochlear nuclei. “
hearing is bilaterally represented “

Cochlear(Auditory) nerve: it's also Special Somatic Afferent

cochlear nerve fibers make dendritic contact with hair cells of the organ of Corti within the cochlear duct of the inner ear.

cell bodies (**1st order neurons**) are located within the cochlea in the spiral ganglion.

central processes terminate in the dorsal and ventral cochlear nuclei (**2nd order neurons**) close to ICP.

PATHWAY OF COCHLEAR FIBERS

From the cochlear nuclei fibres ascend into the pons

Some fibers terminate in the nucleus of trapezoid body or in the superior olivary nucleus

Some fibers run ipsilaterally and terminate in the superior olivary nucleus



From the superior olivary nuclei

Fibers ascend to lateral lemniscus & some of them will terminate on the nucleus

and terminate in the inferior colliculus



The inferior colliculi project to medial geniculate nuclei of thalamus

auditory radiation pass through **sublenticular part of the internal capsule** primary auditory cortex(**Brodmann's areas 41, 42**) in **Heschl's gyrus**

surrounding the primary auditory cortex is known as the **auditory association cortex** or **Wernick's area**

- **Superior olivary nucleus:** send olivocochlear fibers -> organ of Corti (they are inhibitory in function and modulate transmission to cochlear nerve)
- **Superior olivary nucleus & the nucleus of the lateral lemniscus:** reflex connections with trigeminal and facial motor nuclei contraction of tensor tympani and stapedius reponse to loud noise
- **Inferior colliculi :**reflex connections with motor neurons in the cervical spinal segments (tectospinal tract the movement of head and neck in response to auditory stimulation

- **Lesion of vestibulocochlear nerve:** produces deafness tinnitus, vertigo, dizziness, nausea, nystagmus, loss of balance and ataxia
- **Acoustic neuroma:** benign tumour of 8th nerve attacks of dizziness, and profound deafness and ataxia
- **Lesions** anywhere along the pathway usually have no obvious effect on hearing.
- **Deafness is** essentially only **caused by** damage to the middle ear, cochlea, or auditory nerve.