

## Cranial Nerves

<i>CN</i>	<i>Mnemonics</i>	<i>Cranial Nerve</i>
I		
II		
III		
IV		
V		
VI		
VII		
VIII		
IX		
X		
XI		
XII		

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## Cranial Nerves

I.	On	Olfactory
II.	Old	Optic
III.	Olympus'	Oculomotor
IV.	Towering	Trochlear
V.	Top	Trigeminal
VI.	A	Abducense
VII.	Finn	Facial
VIII.	And	Aucustic (Vestibulocochlear)
IX.	German	Glossphyrengal
X.	Viewed	Vagus
XI.	A	Accessory
XII.	Hop	Hypglossal

## **By Location**

CN I –

CN II –

CN's III and IV –

CN's V, VI, and VII –

CN's VIII thru XII –

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## **By Location**

CN I – comes off the telencephalon (doesn't make a side trip through the thalamus)

CN II – comes off the diencephalon

CN's III and IV – come off of the midbrain

CN's V, VI, and VII – come off of the pons

CN's VIII thru XII – come off of the medulla

## Sensory and Motor Only

### Sensory Only:

- CN I –
- CN II –
- CN VII –

### Motor Only:

- CN IV –
- CN VI –
- CN XI –
- CN XII –

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## Sensory and Motor Only

### Sensory Only:

- CN I – (olfactory) Special sense for smell.
- CN II – (optic) Special sense for vision (can they see)
- CN VII – (facial) Special sense for equilibrium and hearing (can they hear and not fall over)

### Motor Only:

- CN IV – (trochlear) enervates the superior oblique muscle of the eye. (cardinal movements of the eye)
- CN VI – (abducence) enervates the lateral rectus muscle of the eye. (cardinal movements of the eye)
- CN XI – (accessory) enervates the SCM and upper trapezius. (turn the head and shrug their shoulders with resistance)
- CN XII – (hypoglossal) enervates muscles of the tongue. (move the tongue)

## Mixed Nerves

CN III – Oculomotor

- 1.
- 2.

CN V - Trigeminal

- 1.
- 2.

CN VII - Facial

- 1.
- 2.
- 3.
- 4.

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## Mixed Nerves

CN III – Oculomotor

1. Extrinsic muscles of the eye. (4 out of 6) (eight cardinal directions of the eye)
2. Parasympathetic to/from the eye. (dilation of pupil, accommodation) (reactive pupils and accommodation)

CN V - Trigeminal

1. General sense of the skin of the face (trigeminal neuropathology. Tic Do Lar Rue (sp?))
2. Motor to muscles of mastication

CN VII - Facial

1. General sense from the external ear.
2. Special sense of taste for anterior 2/3rds of the tongue and soft palate
3. Motor to the muscles of facial expression
4. Parasympathetic to the submandibular gland, sublingual gland, and the lacrimal gland.

## More Mixed Nerves

CN IX – Glossopharyngeal (CN IX & X share a nucleus – nucleus ambiguus – tough to test separately)

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

CN X – Vagus

- 1.
- 2.
- 3.
- 4.

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## More Mixed Nerves

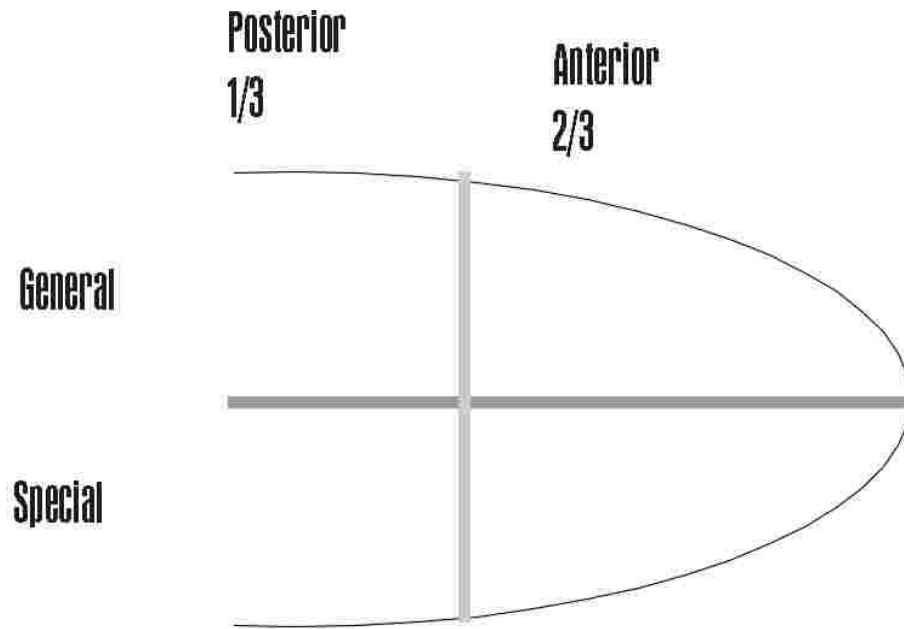
CN IX – Glossopharyngeal (CN IX & X share a nucleus – nucleus ambiguus – tough to test separately)

1. General sense of skin of external ear and the meatus.
2. Special sense for taste for posterior 1/3<sup>rd</sup> of the tongue.
3. General sense for the posterior 1/3<sup>rd</sup> of the tongue.
4. General sense for the major portion of the pharynx and related structures.
5. Parasympathetic to the parotid gland
6. Motor to the stylopharyngeal muscle

CN X – Vagus

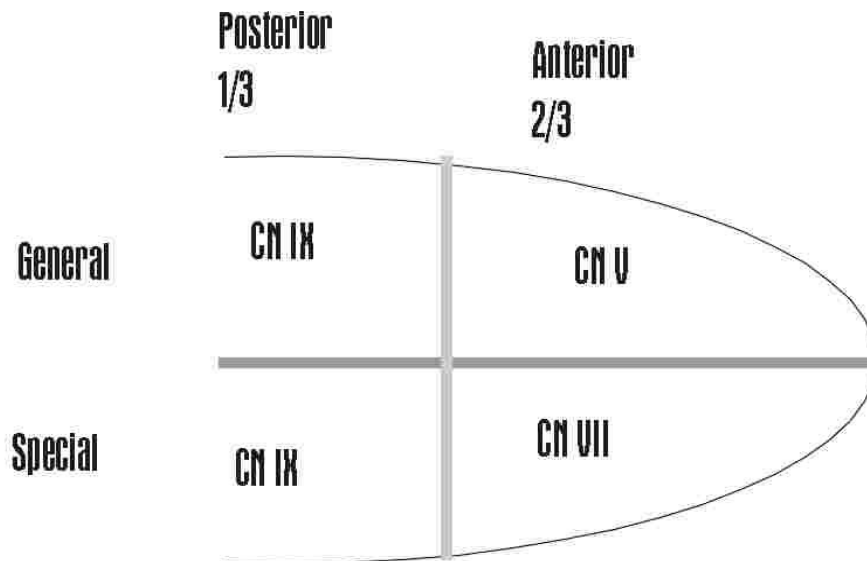
1. General sense from the external auditory meatus
2. General sense from the lower portion of the pharynx and associated areas
3. Motor to much of the muscles of the pharynx and larynx.
4. Parasympathetic supply to chest and much of the abdomen.

# Tongue Innervations



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# Tongue Innervations



## Auditory Pathway Terminology

**CN VIII** –

**Vestibular system** –

**Aucustic System** –

**Sound** –

**Outer Ear** –

**Middle ear** –

**Inner Ear** –

**Tympanic membrane** –

**Malleus** –

**Incas** -

**Stapes** –

**Oval Window** –

**Round Window** –

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## Auditory Pathway Terminology

**CN VIII** – Used to be called Auditory, is now called Vestibulocochlear. It is purely sensory, special sensory.

**Vestibular system** – equilibrium and balance – CN VIII

**Aucustic System** – Hearing – CN VIII

**Sound** – organ of hearing is the cochlea, specifically the organ of corti. Hair cells receptors embedded within endolymph. Volume and Tone trigger different movements of the hairs.

**Outer Ear** – the pina

**Middle ear** – between the eardrum and the inner ear

**Inner Ear** – The cavernous system within the mastoid bone.

**Tympanic membrane** – (ear drum) takes vibrations from the air and turns it into mechanical energy. (it's large compared to the oval window)

**Malleus** – connected to tympanic membrane

**Incas** - between the malleus and the stapes

**Stapes** – moves the oval window.

**Oval Window** – (smaller than the tympanic membrane ( $1/20^{\text{th}}$ ) the size of the tympanic membrane) The lateral border of the inner ear

**Round Window** – a membrane that's needed to let the system work.

## Auditory Pathway

CN VIII

1° neurons –

Dorsal and Ventral Cochlear Nucleus –

The pathway is –

There are commissural fibers –

You end up in the temporal lobe called the

How many neuron pathway?

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## Auditory Pathway

CN VIII

1° neurons – travel to the pons and synapses in the nuclei called the dorsal and ventral cochlear nucleus with the second order neurons.

Dorsal and Ventral Cochlear Nucleus – act like the dorsal root ganglion in the spine. They are in the pons and where the 1° and 2° neurons synapse.

The pathway is – both contralateral and ipsilateral. Meaning that if there is damage to one side of the brain, you still have bilateral hearing.

There are commissural fibers – that probably mean the two sides of the brain are “talking” with each other interpreting the messages.

The final pathway is the auditory radiation. (pathway of the 3<sup>rd</sup> order neuron)

You end up in the temporal lobe called the “tranverse gyrus of heschel” - primary hearing center. (there's also a secondary hearing center as well.)

How many neuron pathway? 3

# Visual Pathway

**CN II** – optic nerve

**Pupil** – the opening in the iris.

**Visual Field** – The world out there that is reflecting/generating light back to the subject. We always describe things in terms of the patient's visual field.

**Retinal Field** – The area that the light is hitting on the back of the eyeball. The imprint of the visual field on the back of the eye. The visual field is turned upside down with the lens system in the eye which means that the light hits the retina has been upside down.

**Nasal Field** – Light that is entering from the nasal side. The nasal visual field is the temporal retinal field.

**Temporal Field** – Light that is entering from the temporal side. The temporal visual field is the nasal retinal field.

**Receptors for color** – cones

**Receptors for light and dark** – rods

**Optic Chiasm** - All the axons from the nerve cells of each eye join together to form the left and right optic nerve. They exit the back of the eyeball and merge together to form the optic chiasm.

**Optic Tract** - The new mix of fibers continues as the optic tract.

**All cranial nerves except optic nerve** synapse somewhere in the thalamus

**Visual Cortex** – located in the occipital lobe of the brain

**Visual radiations** – the nerve fibers that travel from the thalamus to the visual cortex.

**Occipital pole** – where we see with the most acute vision.

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