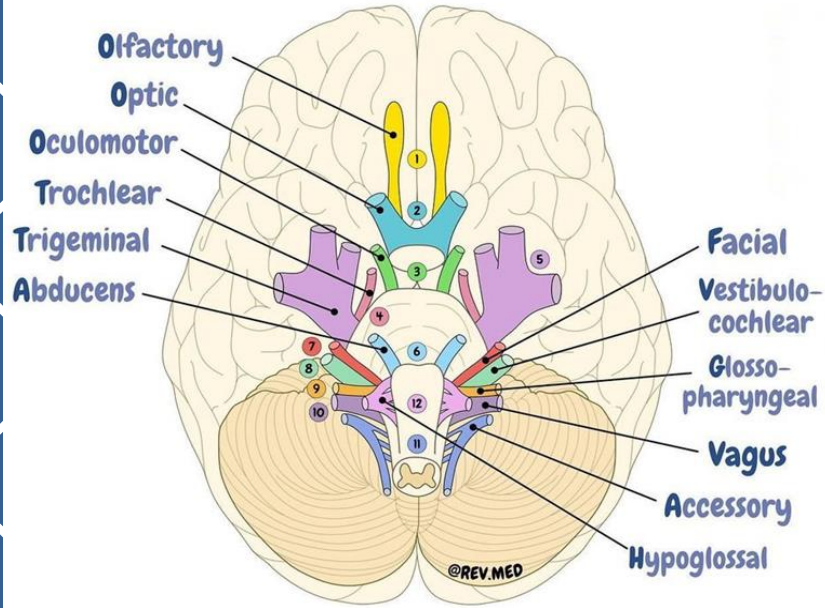


The Cranial Nerves

VENTRAL VIEW OF BRAIN



Mnemonic

Oh Once One Takes The Anatomy Final
Very Good Vacations Start Happening

The Cranial Nerves

MNEMONIC FOR NAMES

Oh Once One Takes The Anatomy Final
Very Good Vacations Start Happening

OLFACTORY	1	Oh	FACIAL	7	Final
OPTIC	2	Once	VESTIBULO-COCHLEAR	8	Very
OCULOMOTOR	3	One	GLOSSO-PHARYNGEAL	9	Good
TROCHLEAR	4	Takes	VAGUS	10	Vacations
TRIGEMINAL	5	The	SPINAL ACCESSORY	11	Start
ABDUCENS	6	Anatomy	HYPO-GLOSSAL	12	Happening

CRANIAL NERVES

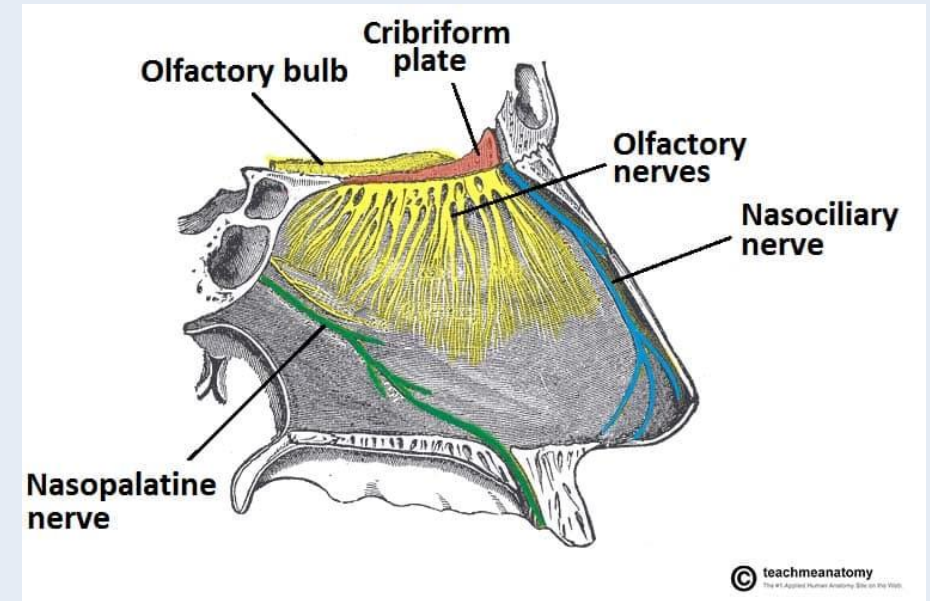
Presented By
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Assistant Professor

- ❖ There are 12 pairs of cranial nerves originating from nuclei in the inferior surface of the brain, some sensory, some motor and some mixed.
- ❖ Their names suggest their distribution or function, which, in the main, is generally related to the head and neck.
- ❖ They are numbered using Roman numerals according to the order they connect to the brain, starting anteriorly.
- ❖ They are:

Cranial Nerve Number	Name	Type
I	Olfactory	Sensory
II	Optic	Sensory
III	Oculomotor	Motor
IV	Trochlear	Motor
V	Trigeminal	Mixed
VI	Abducens	Motor
VII	Facial	Mixed
VIII	Vestibulocochlear (Auditory)	Sensory
IX	Glossopharyngeal	Mixed
X	Vagus	Mixed
XI	Accessory	Motor
XII	Hypoglossal	Motor

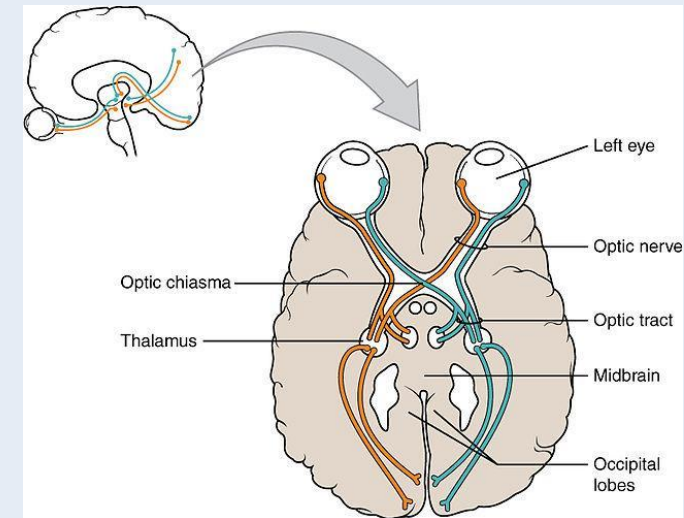
I. Olfactory nerves (sensory)

- These are the nerves of the *sense of smell*.
- Their sensory receptors and nerve fibres originate in the upper part of the mucous membrane of the nasal cavity, pass upwards through the cribriform plate of the ethmoid bone and then pass to the *olfactory bulb*.
- The nerves then proceed backwards as the olfactory tract, to the area for the perception of smell in the temporal lobe of the cerebrum.



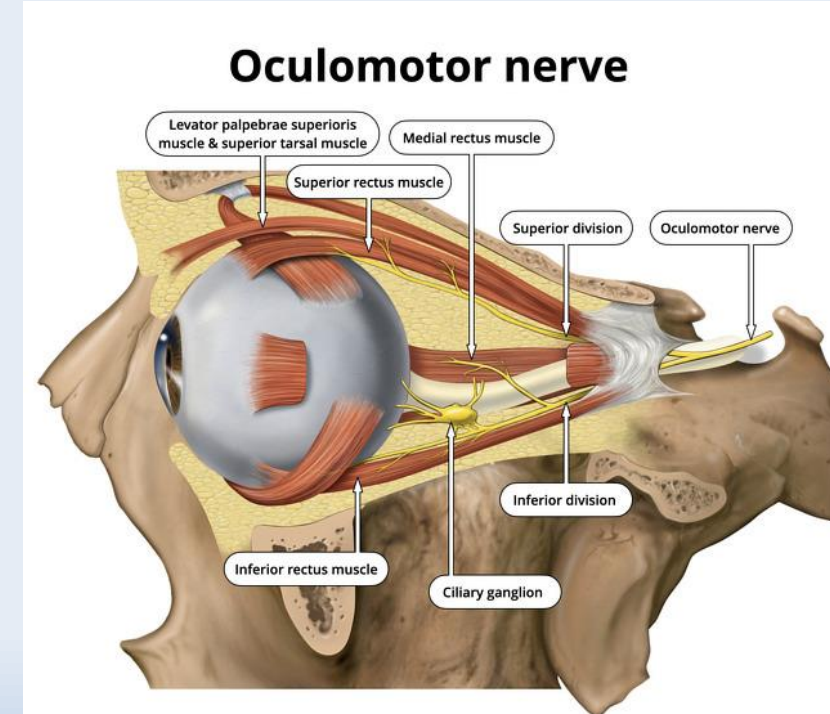
II. Optic nerves (sensory)

- These are the nerves of the *sense of sight*.
- Their fibres originate in the retinae of the eyes and they combine to form the optic nerves.
- They are directed backwards and medially through the posterior part of the orbital cavity.
- They then pass through the *optic foramina* of the sphenoid bone into the cranial cavity and join at the *optic chiasma*.
- The nerves proceed backwards as the *optic tracts* to the *lateral geniculate bodies* of the thalamus.
- Impulses pass from there to the visual areas in the occipital lobes of the cerebrum and to the cerebellum.
- In the occipital lobe sight is perceived, and in the cerebellum the impulses from the eyes contribute to the maintenance of balance, posture and orientation of the head in space.



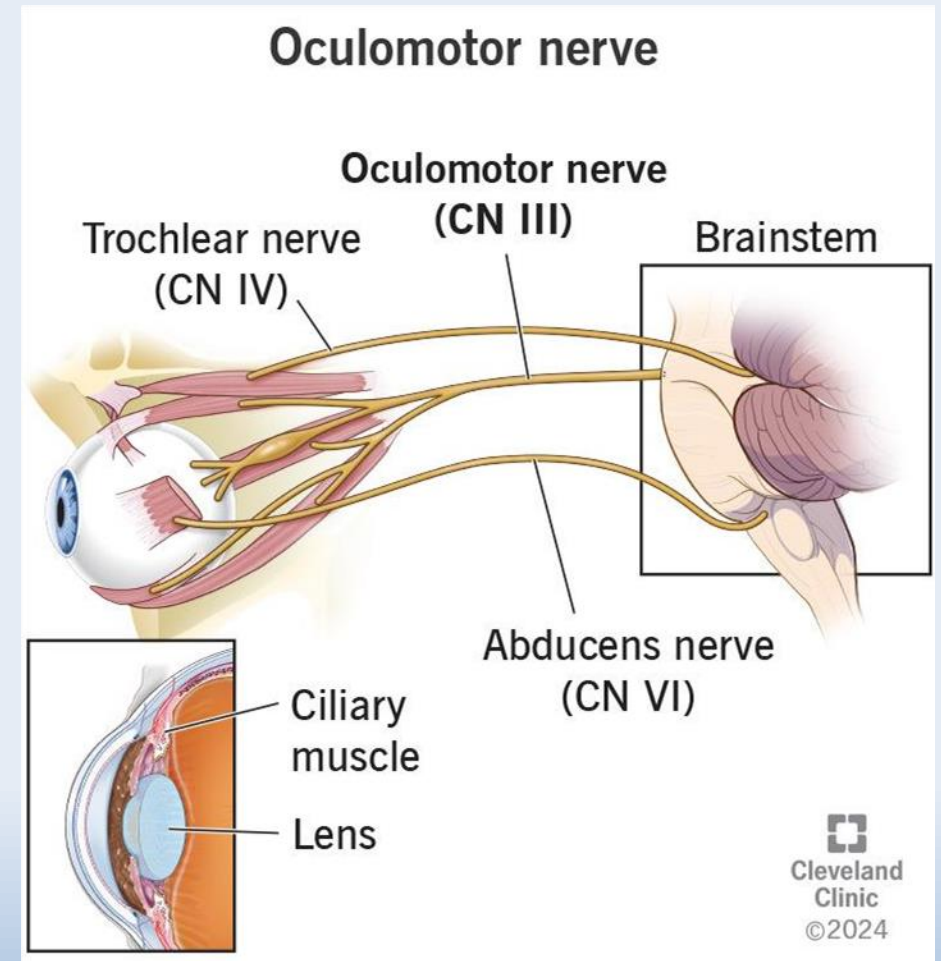
III. Oculomotor nerves (motor)

- ? These nerves arise from nuclei near the cerebral aqueduct.
- ? They supply:
 - ? Four of the six extrinsic muscles, which move the eyeball, i.e. The *superior*, *medial* and *inferior recti* and the *inferior oblique muscle*
 - ? The intrinsic (intraocular) muscles:
 - ? *Ciliary muscles*, which alter the shape of the lens, changing its refractive power.
 - ? *Circular muscles* of the iris, which constrict the pupil
 - ? The *levator palpebrae muscles*, which raise the upper eyelids.



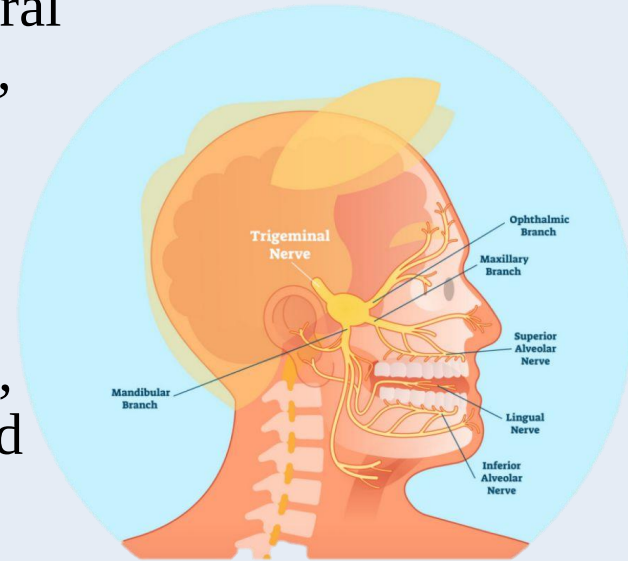
IV. Trochlear nerves (motor)

- These nerves arise from nuclei near the cerebral aqueduct.
- They supply the *superior oblique muscles* of the eyes.



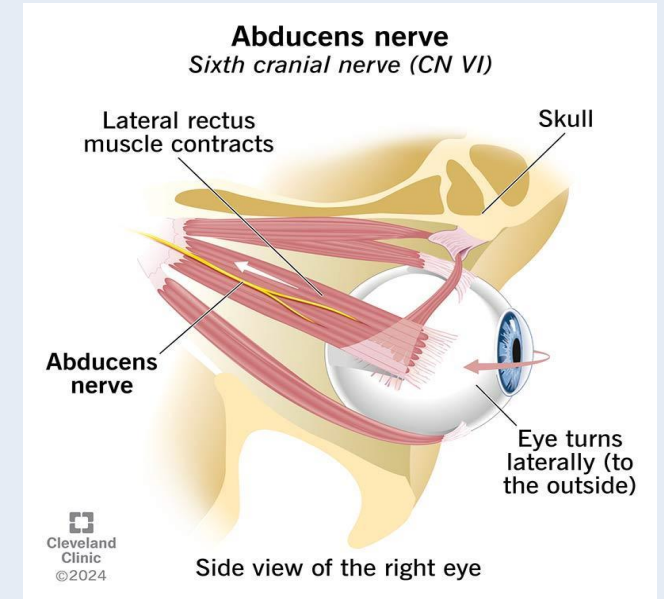
V. Trigeminal nerves (mixed)

- ? These nerves contain motor and sensory fibres and are among the largest of the cranial nerves.
- ? They are the chief sensory nerves for the face and head (including the oral and nasal cavities and teeth), transmitting sensory impulses, e.g. for pain, temperature and touch.
- ? The motor fibres stimulate the muscles for chewing (mastication).
- ? there are three main branches of the trigeminal nerves.
- ? *The **ophthalmic nerves*** are sensory only and supply the lacrimal glands, conjunctiva of the eyes, forehead, eyelids, anterior aspect of the scalp and mucous membrane of the nose.
- ? *The **maxillary nerves*** are sensory only and supply the cheeks, upper gums, upper teeth and lower eyelids.
- ? *The **mandibular nerves*** contain both sensory and motor fibres. These are the largest of the three divisions and they supply the teeth and gums of the lower jaw, pinnae of the ears, lower lip and tongue.
- ? The motor fibres supply the muscles for chewing.



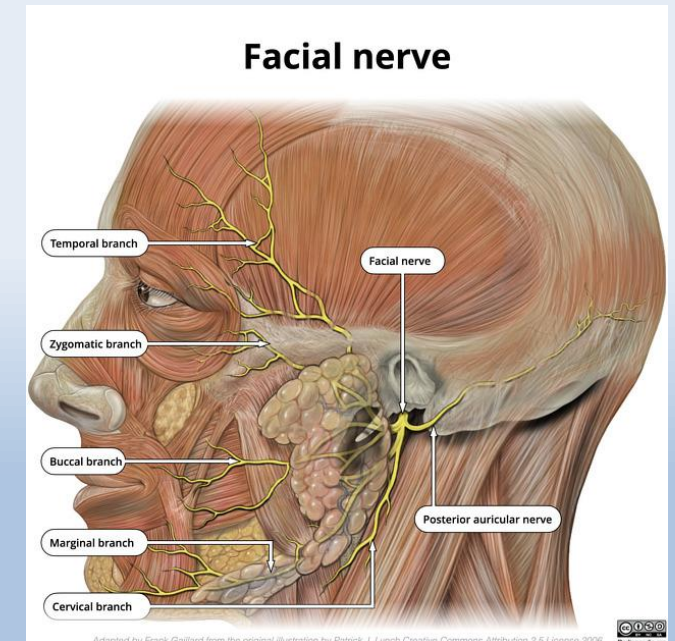
VI. Abducens nerves (motor)

- ? These nerves arise from nuclei lying under the floor of the fourth ventricle.
- ? They supply the *lateral rectus muscles* of the eyeballs causing abduction.



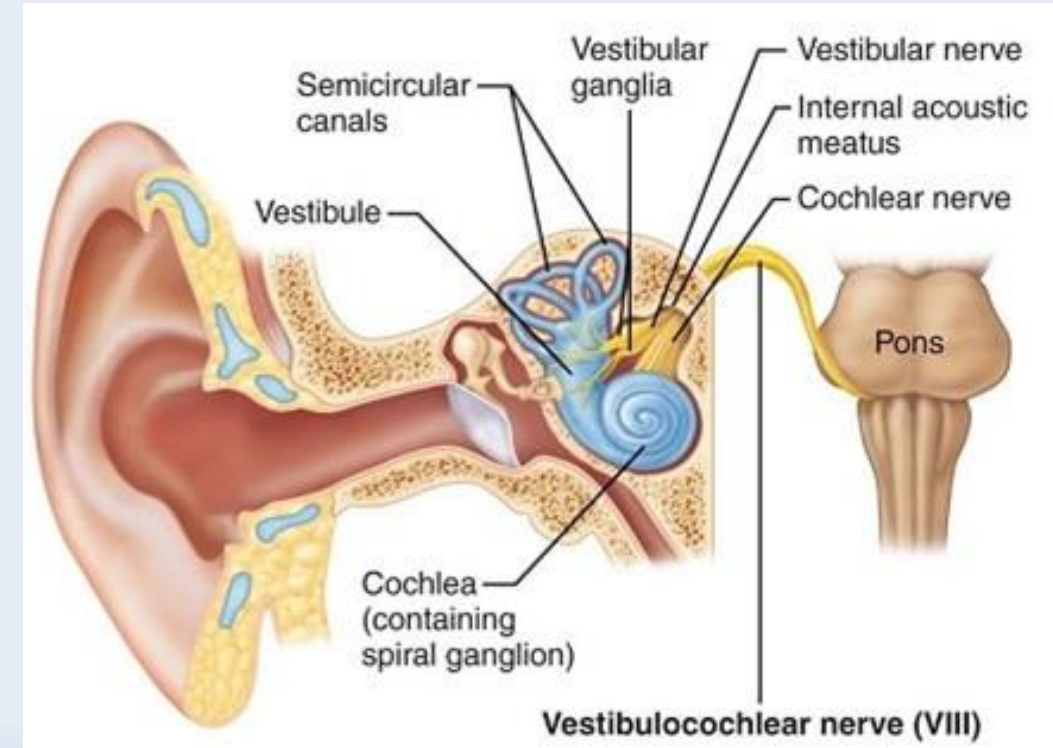
VII. Facial nerves (mixed)

- ? These nerves are composed of both motor and sensory nerve fibres, arising from nuclei in the lower part of the pons.
- ? The motor fibres supply the muscles of facial expression.
- ? The sensory fibres convey impulses from the taste buds in the anterior two-thirds of the tongue to the taste perception area in the cerebral cortex.



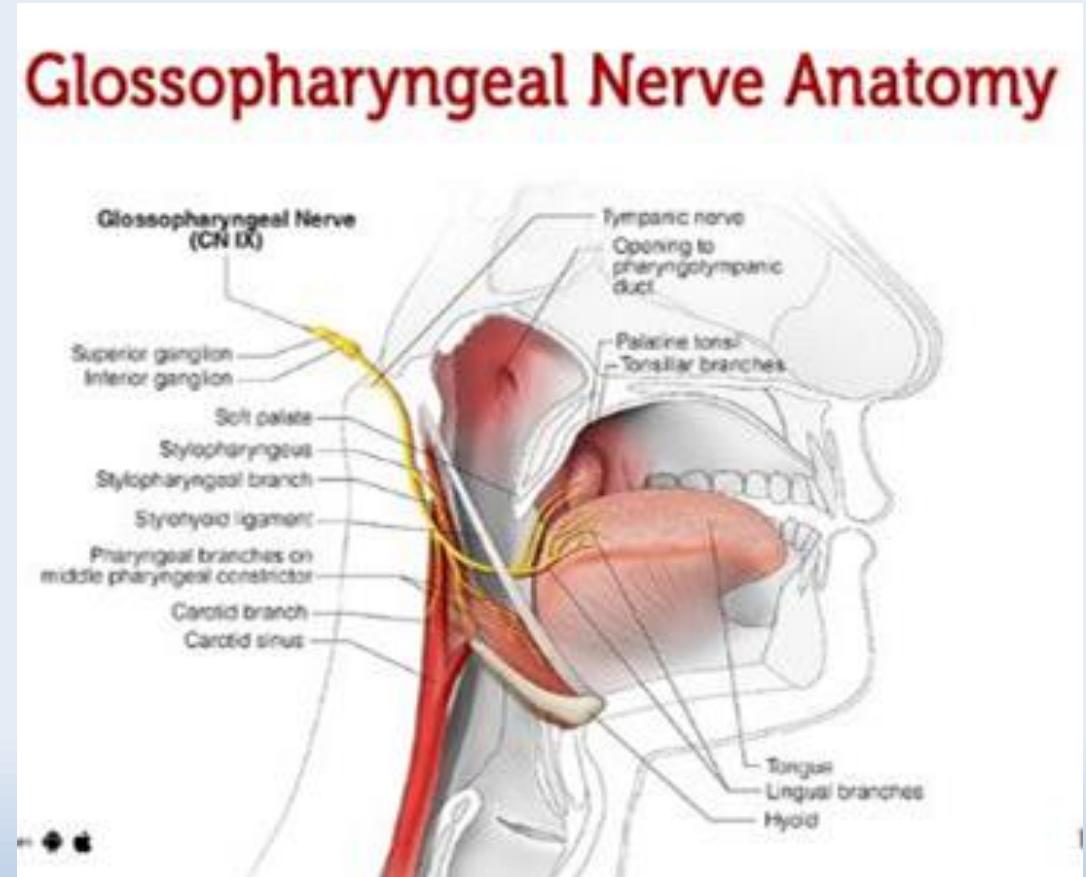
VIII. Vestibulocochlear (auditory) nerves (sensory)

- ? These nerves are composed of two divisions, the vestibular nerves and cochlear nerves.
- ? *The vestibular nerves* arise from the semicircular canals of the inner ear and convey impulses to the cerebellum.
- ? They are associated with the maintenance of posture and balance.
- ? *The cochlear nerves* originate in the spiral organ (of Corti) in the inner ear and convey impulses to the hearing areas in the cerebral cortex where sound is perceived.



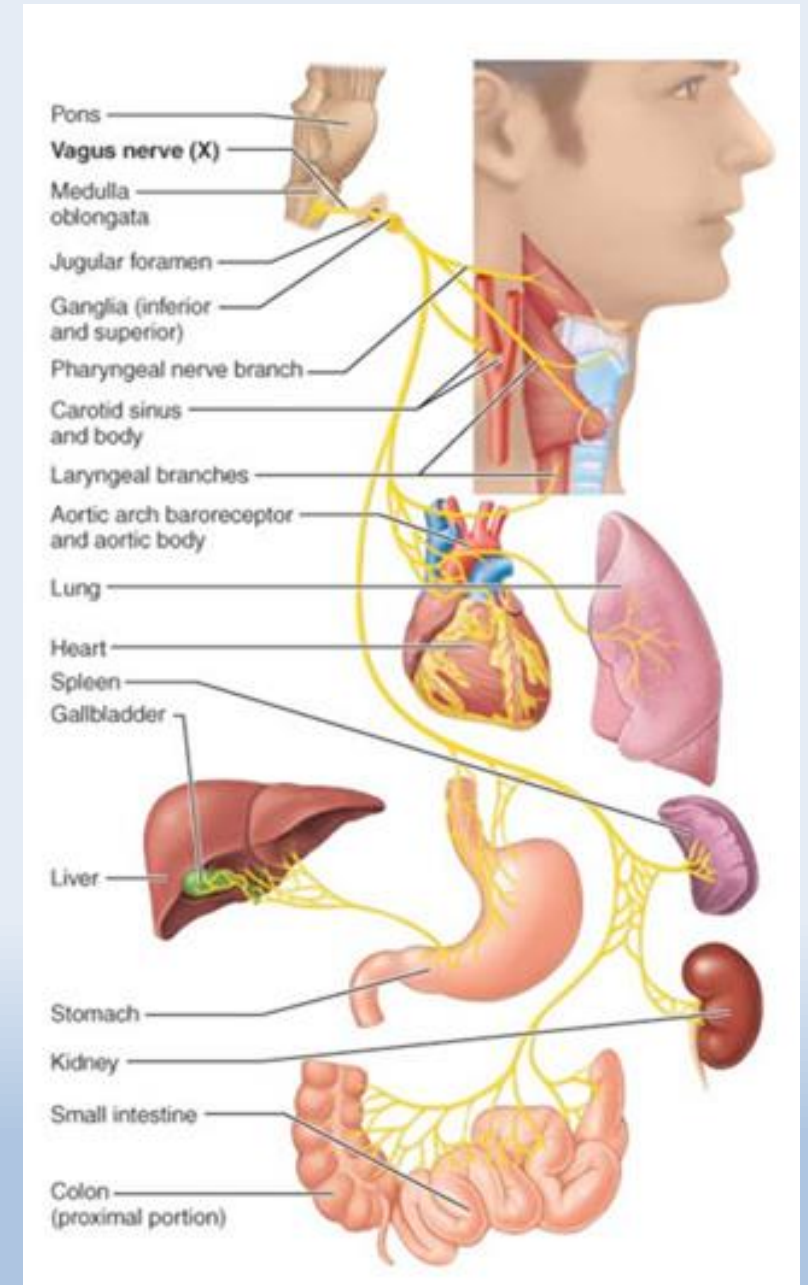
IX. Glossopharyngeal nerves (mixed)

- ? The motor fibres arise from nuclei in the medulla oblongata and stimulate the muscles of the tongue and pharynx and the secretory cells of the parotid (salivary) glands.
- ? The sensory fibres convey impulses to the cerebral cortex from the posterior third of the tongue, the tonsils and pharynx and from taste buds in the tongue and pharynx.
- ? These nerves are essential for the swallowing and gag reflexes.
- ? Some fibres conduct impulses from the carotid sinus, which plays an important role in the control of blood pressure



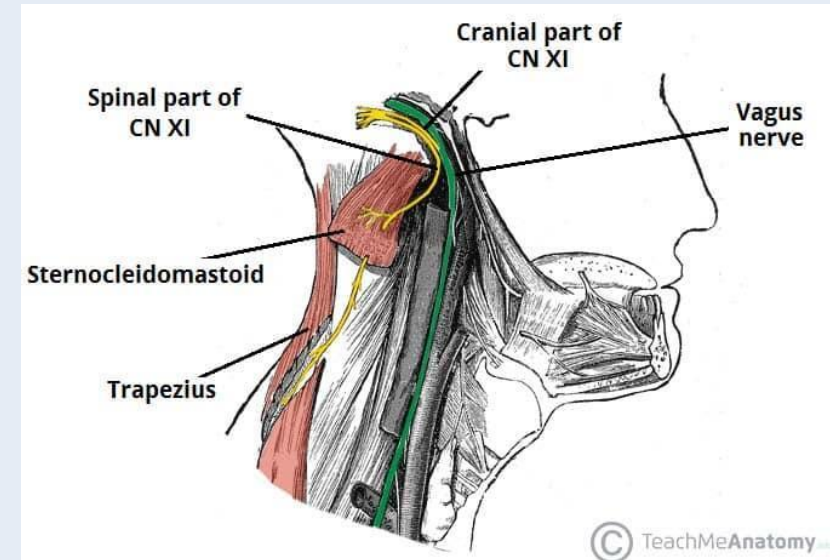
X. Vagus nerves (mixed)

- ? These nerves have the most extensive distribution of the cranial nerves; their name aptly means ‘wanderer’.
- ? They pass downwards through the neck into the thorax and the abdomen.
- ? These nerves form an important part of the parasympathetic nervous system.
- ? The motor fibres arise from nuclei in the medulla and supply the smooth muscle and secretory glands of the pharynx, larynx, trachea, bronchi, heart, carotid body, oesophagus, stomach, intestines, exocrine pancreas, gall bladder, bile ducts, spleen, kidneys, ureter and blood vessels in the thoracic and abdominal cavities.
- ? The sensory fibres convey impulses from the membranes lining the same structures to the brain.



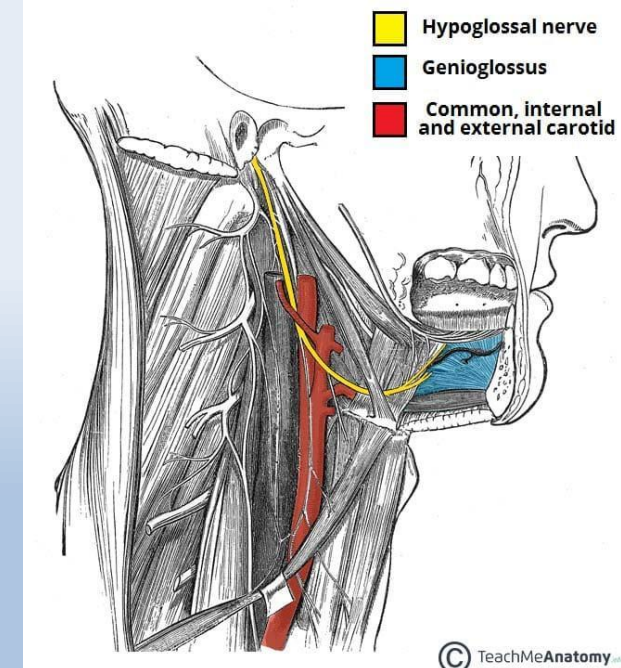
XI. Accessory nerves (motor)

- ? These nerves arise from nuclei in the medulla oblongata and in the spinal cord.
- ? The fibres supply the *sternocleidomastoid* and *trapezius muscles*.
- ? Branches join the vagus nerves and supply the *pharyngeal* and *laryngeal muscles* in the neck.



XII. Hypoglossal nerves (motor)

- ? These nerves arise from nuclei in the medulla oblongata.
- ? They supply the muscles of the tongue and muscles surrounding the hyoid bone and contribute to swallowing and speech.



CRANIAL NERVE	COMPONENTS	PRINCIPAL FUNCTIONS
Olfactory (I)	<i>Special sensory</i>	Olfaction (smell).
Optic (II)	<i>Special sensory</i>	Vision (sight).
Oculomotor (III)	<i>Motor</i> Somatic Motor (autonomic)	Movement of eyeballs and upper eyelid. Adjusts lens for near vision (accommodation). Constriction of pupil.
Trochlear (IV)	<i>Motor</i> Somatic	Movement of eyeballs.
Trigeminal (V)	<i>Mixed</i> Sensory Motor (branchial)	Touch, pain, and thermal sensations from scalp, face, and oral cavity (including teeth and anterior two-thirds of tongue). Chewing and controls middle ear muscle.
Abducens (VI)	<i>Motor</i> Somatic	Movement of eyeballs.
Facial (VII)	<i>Mixed</i> Sensory Motor (branchial) Motor (autonomic)	Taste from anterior two-thirds of tongue. Touch, pain, and thermal sensations from skin in external ear canal. Control of muscles of facial expression and middle ear muscle. Secretion of tears and saliva.

Vestibulocochlear (VIII)	<i>Special sensory</i>	Hearing and equilibrium.
Glossopharyngeal (IX)	<i>Mixed</i> Sensory Motor (branchial) Motor (autonomic)	Taste from posterior one-third of tongue. Proprioception in some swallowing muscles. Monitors blood pressure and oxygen and carbon dioxide levels in blood. Touch, pain, and thermal sensations from skin of external ear and upper pharynx. Assists in swallowing. Secretion of saliva.
Vagus (X)	<i>Mixed</i> Sensory Motor (branchial) Motor (autonomic)	Taste from epiglottis. Proprioception from throat and voice box muscles. Monitors blood pressure and oxygen and carbon dioxide levels in blood. Touch, pain, and thermal sensations from skin of external ear. Sensations from thoracic and abdominal organs. Swallowing, vocalization, and coughing. Motility and secretion of gastrointestinal organs. Constriction of respiratory passageways. Decreases heart rate.
Accessory (XI)	<i>Motor</i> Branchial	Movement of head and pectoral girdle.
Hypoglossal (XII)	<i>Motor</i> Somatic	Speech, manipulation of food, and swallowing.

Table 8–4 **CRANIAL NERVES**

Number and Name	Function(s)
I Olfactory	• Sense of smell
II Optic	• Sense of sight
III Oculomotor	• Movement of the eyeball; constriction of pupil in bright light or for near vision
IV Trochlear	• Movement of eyeball
V Trigeminal	• Sensation in face, scalp, and teeth; contraction of chewing muscles
VI Abducens	• Movement of the eyeball
VII Facial	• Sense of taste; contraction of facial muscles; secretion of saliva
VIII Acoustic (vestibulocochlear)	• Sense of hearing; sense of equilibrium
IX Glossopharyngeal	• Sense of taste; sensory for cardiac, respiratory, and blood pressure reflexes; contraction of pharynx; secretion of saliva
X Vagus	• Sensory in cardiac, respiratory, and blood pressure reflexes; sensory and motor to larynx (speaking); decreases heart rate; contraction of alimentary tube (peristalsis); increases digestive secretions
XI Accessory	• Contraction of neck and shoulder muscles; motor to larynx (speaking)
XII Hypoglossal	• Movement of the tongue