

Oculomotor nerve (CN3):

- **Origin of nucleus:** Midbrain/at the level of superior colliculus.
Note: The oculomotor nerve has a parasympathetic component which is located posterolateral to the main motor nucleus.
- **NS:** The oculomotor nerve supplies extrinsic muscles such as the levator palpebrae superioris, superior rectus, medial rectus, inferior rectus, and inferior oblique (all eyeball muscles except the lateral rectus and superior oblique). It also supplies intrinsic muscles such as the constrictor pupillae of the iris and ciliary muscles

Trochlear Nerve (CN4):

- **Origin of nucleus:** it is found anterior to the cerebral aqueduct, at the level of the inferior colliculi in the midbrain.
- **NS:** superior oblique muscle

Trigeminal Nerve (CN5):

- Mixed cranial nerve + the biggest cranial nerve + It has 4 nuclei: 3 sensory and 1 motor.
- **Origin of nucleus:**
Motor nucleus: Posterior part of the pons (Medial).
Main sensory nucleus: Posterior part of the pons (lateral).
Spinal nucleus:
 - Superiorly: main sensory nucleus. (ends @ midpontine area)
 - Inferiorly: C2 segment.
- **Mesencephalic nucleus:**
 - Lateral part of the gray matter around the cerebral aqueduct.
 - Inferiorly main sensory nucleus.
- **The modality of each nucleus:**
Main sensory nucleus: Discriminative and light touch of the face as well as conscious proprioception. (similar to PCML)
Spinal nucleus: Crude touch, pain, and temperature (similar to ALS)
Mesencephalic nucleus: Reflex proprioception of the periodontal ligament and of the muscles of mastication in the jaw.
- **NS:**
Sensory: Receives sensations from all the face except the angle of the mandible, which is supplied by great auricular nerve, + receives sensations from the oral cavity, nasal cavity, paranasal sinuses.
Motor: For the mandibular division ONLY. It supplies:
 - 1- Muscles of mastication (masseter, temporalis, medial pterygoid, and lateral pterygoid)
 - 2- Tensor tympani
 - 3- Tensor veli palatini
 - 4- Mylohyoid
 - 5- Anterior belly of the digastric muscle.

Abducent nerve (CN6):

- **Origin of nucleus:** underneath the floor of fourth ventricle, at the level of the facial colliculus (caudal part) of the pons.
- **NS:** lateral rectus muscle
- **Notes:** Has one motor nucleus.

(remember cranial nerves 6,7,8 emerge from the pontomedullary junction)

Facial nerve (cranial nerve VII):

- facial nerve is a mixed nerve (motor, sensory, and parasympathetic).
- **Origin of nucleus:**
Main motor nucleus: found in the deep reticular formation of the lower part of the pons.
The Parasympathetic Nuclei (superior salivatory lacrimatory nucleus): lie posterolateral to the motor nucleus.
Sensory Nucleus (part of nucleus of tractus solitarius): lie posterolateral to The Parasympathetic Nuclei.
- **NS:**
Motor: It gives motor innervation to the muscle of the face, The upper part of the face receives upper motor neurons from both hemispheres. The lower part only receives upper motor neurons from the contralateral hemisphere.
Sensory: Taste sensation from anterior 2 thirds of the tongue, General sensation from the skin of the external acoustic meatus.
Parasympathetic: for sublingual and submandibular glands.

Glossopharyngeal nerve (cranial nerve IX):

- Glossopharyngeal nerve is a mixed nerve (motor, sensory, and parasympathetic).
- **Origin of nucleus:**
Motor nucleus: deep in the reticular formation of the medulla, arises from the superior end of nucleus ambiguus.
Parasympathetic Nucleus (inferior salivatory nucleus): posterior to nucleus ambiguus.
Sensory: for taste and visceral sensation, it is found in nucleus tractus solitarius. For general sensation, it's found in the spinal nucleus of the trigeminal.
- **Extra:** nucleus tractus solitarius & spinal nucleus of trigeminal are found in medulla oblongata.
- **NS:**
Motor: the stylopharyngeus muscle
Parasympathetic: parotid gland
Sensory: Taste from posterior third of the tongue, Visceral sensation comes from the carotid sinus (baroreceptor), General sensation from the skin of auditory meatus, middle ear, auditory tube, pharynx except the nasopharynx (maxillary), and posterior 1/3 of the tongue.

Vagus nerve (cranial nerve X):

- Vagus nerve is a mixed nerve (motor, sensory, and parasympathetic).
- **Origin of nucleus:**
 - Motor Nucleus:** lower part of nucleus ambiguus.
 - Dorsal nucleus of Vagus (parasympathetic):** anterior to the floor of the lower part of the fourth ventricle.
 - Sensory:** for taste sensation(from epiglottis), it is found in nucleus tractus solitarius. For general sensation,it's found in the spinal nucleus of the trigeminal.
- **NS:**
 - Motor:** Supplies the constrictor muscles of the pharynx and the muscles of the larynx.
 - Parasympathetic:** involuntary muscles of the bronchi, heart, esophagus, stomach, small intestines, and large intestines as far as the distal one-third of the transverse colon.
 - Sensory:** Taste from the epiglottis, General sensation from the outer ear, mucosa of the larynx, and the dura of posterior cranial fossa.

Accessory nerve (cranial nerve XI):

- Motor and has two roots: cranial and spinal.
- **Origin of nucleus:**
 1. **Cranial Root** From nucleus ambiguus.
 2. **Spinal Root** Originates from the spinal cord (lamina IX from the upper 5 cervical segments).
- **NS:** supplies the trapezius and sternocleidomastoid, The soft palate is thought to be supplied by the cranial root.

Hypoglossal nerve (cranial nerve XII):

- Has one motor nucleus
- **Origin of nucleus:** Beneath the floor of the lower part of the fourth ventricle.
- **NS:** Supplies all the muscles of the tongue except palatoglossus (from the vagus).

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