

"Facial Nerve (Cranial Nerve VII)"

» Overview

- The facial nerve is both a motor and a sensory nerve.

"Facial Nerve Nuclei"

» Nuclei Types

- Three nuclei associated with the facial nerve:

- 1) Main motor nucleus
- 2) Parasympathetic nuclei
- 3) Sensory nucleus

"Main Motor Nucleus"

- Location: Lies deep in the reticular formation of the lower part of the pons.
- Supplies upper and lower part of the face
- The part which supplies upper face: Receives corticonuclear fibers from both cerebral hemispheres.

- The part which supplies lower face: Receives corticonuclear fibers only from the opposite cerebral hemisphere.

» Control:

- Voluntary control of facial muscles.
- Involuntary pathway exists for emotional facial expressions, part of the reticular formation.

"Parasympathetic Nuclei"

- Location: Posterolateral to the main motor nucleus
 - 2 in total

» Nuclei:

i) Superior Salivatory Nucleus:

- Receives afferent fibers from the hypothalamus via descending autonomic pathways.
- Receives taste information from the nucleus of the solitary tract from the mouth cavity.

ii) Lacrimal Nucleus:

- Receives afferent fibers from the hypothalamus for emotional responses.
- Receives fibers from sensory nuclei of the trigeminal nerve for reflex lacrimation due to corneal or conjunctival irritation.

"Sensory Nucleus"

» Location:

- Upper part of the nucleus of the tractus solitarius, close to the motor nucleus.

» Taste Sensation:

- Travels through peripheral axons of nerve cells in the geniculate ganglion of the seventh cranial nerve.
- Central processes synapse on nerve cells in the sensory nucleus.

» Efferent Fibers:

- Cross the median plane and ascend to the ventral posteromedial nucleus of the opposite thalamus and to several hypothalamic nuclei.
- From the thalamus, axons pass through the internal capsule and corona radiata to the taste area of the cortex in the lower part of the postcentral gyrus.

"Facial Nerve Course"

» Structure

- Consists of a motor root and a sensory root.

> Motor Root

- Fibers travel posteriorly around the medial side of the abducens nucleus.
- Pass beneath the colliculus facialis in the floor of the fourth ventricle.

- Finally, pass anteriorly to emerge from the brainstem.

- > Sensory Root (Nervus Intermedius)

- Formed by the central processes of unipolar cells in the geniculate ganglion.

- Also: Contains efferent preganglionic parasympathetic fibers from the parasympathetic nuclei.

- » Emergence and Pathway

- Both roots emerge from the anterior surface of the brain between the pons and medulla oblongata.

- Pass laterally in the posterior cranial fossa with the vestibulocochlear nerve.

- Enter the internal acoustic meatus in the petrous part of the temporal bone.

- At the bottom of the meatus, enters the facial canal and runs laterally through the inner ear.

- Expands at the medial wall of the tympanic cavity to form the sensory geniculate ganglion.
- Turns sharply backward above the promontory.
- Turns downward at the posterior wall of the tympanic cavity, on the medial side of the aditus to the mastoid antrum.
- Descends behind the pyramid and emerges from the stylomastoid foramen.

"Facial Nerve Distribution"

» Motor Supply

> Supplies:

- Muscles of facial expression
 - Auricular muscles
 - Stapedius
- Posterior belly of the digastric
 - Stylohyoid muscles

» Parasympathetic Supply

> Superior Salivatory Nucleus:

- Supplies submandibular and sublingual salivary glands.
- Supplies nasal and palatine glands.

> Lacrimal Nucleus:

- Supplies the lacrimal gland.

» Sensory Supply (via Sensory Nucleus)

- Receives taste fibers from:
 - Anterior two-thirds of the tongue
 - Floor of the mouth
 - Palate