

FACIAL NERVE

Functional components

- Motor (SVE) - muscles of facial expression ,
stapedius , stylohyoid
posterior belly of digastric
- Secretomotor (GVE) - lacrimal gland , glands in m.m. of nose, PNS , palate & nasopharynx
submandibular , sublingual and other minor salivary glands ,
mucosal glands in oral cavity
- Sensory (SVA) - taste from anterior 2/3 of tongue
from floor of oral cavity & palate
- Sensory (GSA) - from EAC (ext. auditory canal)

Facial nerve nuclei

- Main motor nucleus (SVE)
- Parasympathetic nuclei (Superior salivatory nucleus & lacrimal nucleus - GVE)
- Sensory nuclei (Nucleus of Tractus Solitarius - SVA,
Spinal part of Sensory nucleus of CN V - GSA)

- **Main motor nucleus**

- > lies deep in the reticular formation of **lower part of pons**

- > supplies muscles derived from 2nd branchial arch

- > **supranuclear connections - IMPORTANT**

- Upper part of nucleus receives corticonuclear fibres from both cerebral hemispheres

- Lower part of nucleus receives only contralateral corticonuclear fibres

- These connections have important bearing on clinical presentation of lesions affecting facial nerve .

These connections explain **voluntary control** of facial muscles .

Another INVOLUNTARY pathway exists –

It is separate & controls mimetic / emotional changes in facial expression .

It forms part of reticular formation .

- **Parasympathetic nuclei**

- > lie posterolateral to main motor nucleus

- > they are superior salivatory nucleus
& lacrimal nucleus

Neurons of the 2 nuclei seem to be intermingled with each other and exact location of these nuclei in humans are uncertain

- > receives afferent fibers from -

1. hypothalamus through autonomic descending pathways
2. taste fibers ascending from NTS

- > **lacrimal nucleus** receives afferent fibers from

1. hypothalamus for emotional responses
2. sensory nuclei of CN V for reflex lacrimation .

- Sensory nuclei - NTS (SVA) , Spinal nucleus of CN V (GSA)
 - > **upper part of NTS** (nucleus of tractus solitarius) lies close to motor nucleus
 - > **taste pathway** -

Receptors (taste buds)

1st order neuron (**geniculate ganglia**)

NTS

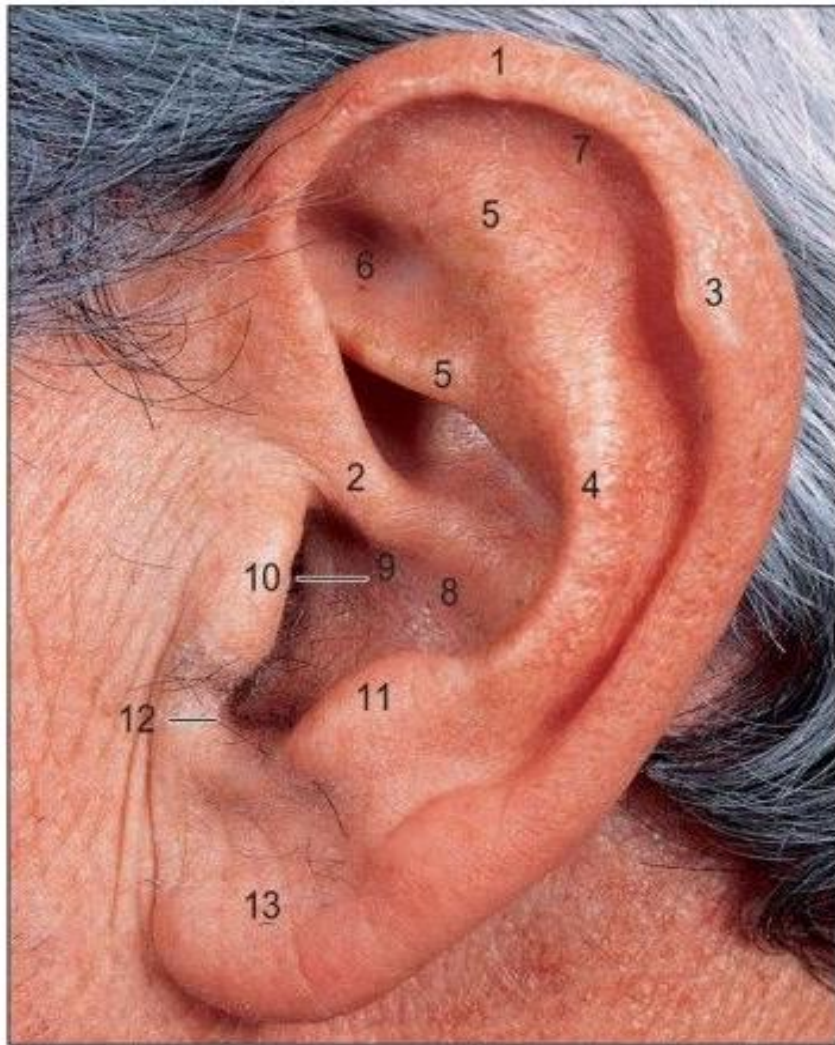
2nd order neuron

cross the median plane and ascend to

VPMN (ventral posteromedial nucleus)of opposite thalamus
& to a number of hypothalamic nuclei -

3rd order neuron

from thalamus pass through internal capsule & corona-radiata to end in **taste area of the cortex** in
lower part of post central gyrus (insular cortex) .



- Sensory nuclei cont'd
- > GSA fibers from
concha of EAC &
retroauricular groove region

will reach the

sensory nucleus of CN V
(after entering brainstem) &

then run with the CN V

1. Helix. 2. Crus of helix 3. Auricular tubercle. 4. Antihelix.
5. Crura of antihelix. 6. Triangular fossa. 7. Scaphoid fossa.
8. Concha of auricle. 9. External acoustic meatus. 10. Tragus.
11. Antitragus. 12. Intertragic notch. 13. Lobule of auricle.

Branches of facial nerve

- Greater superficial petrosal nerve
- Nerve to stapedius
- Chorda tympani
- Communicating branch
- Posterior auricular nerve
- Muscular branches

- Peripheral branches -
 - > 2 divisions entering the parotid are temporofacial / temporozygomatic & cervicofacial
 - they form a network of nerves within parotid (**pes anserinus /goose foot**)
 - the plexus gives of five / five group of branches
 - these branches leave the parotid and diverge into there area of distribution

branches are –

1. temporal
2. zygomatic
3. buccal
4. mandibular
5. cervical

- > they supply all muscles of facial expression

Course of facial nerve

- **Motor root**

Starting from motor nucleus first travels posteriorly around the medial side of abducent nucleus & then loops around the nucleus of CNVI coming lateral to it . This loop of facial nerve lies in the floor of IV th ventricle & produces an elevation in the ventricle called **facial colliculus** .

After looping around nucleus of CN VI it passes anteriorly to emerge from brainstem .

- **Sensory root** (nervus intermedius / nerve of Wrisberg) made of

1. central processes of unipolar cells of geniculate ganglion
2. parasympathetic fibers –
efferent preganglionic parasympathetic fibers from superior salivatory and lacrimal nuclei .

- The course of the facial nerve can be divided into
 - > intracranial - 24mm (5-12mm in IAC)
 - > intratemporal - 28 – 30 mm , facial (fallopian) canal ;
 - labyrinthine segment - 3-5mm
 - first genu (geniculate ganglion) -
 - tympanic segment 8-11mm
 - second genu
 - mastoid segment 12 – 20mm
 - stylomastoid foramen
 - > extratemporal portions

