Ganglia

- Ciliary ganglion
- Submandibular ganglion
- Otic ganglion
- Pterygopalatine ganglion
Ganglia

3 TYPES OF GANGLIA

SENSORY GANGLION has cell bodies only and NO synapses. Examples:
- Posterior (dorsal) root
- Trigeminal
- Glosso-pharyngeal
- Geniculate
- Vagal

SYMPATHETIC GANGLION has either a synapse or a fibre passing through it to synapse later. Examples:
- Sympathetic chain
- Sympathetic peripheral ganglia (coeliac, renal, superior mesenteric)

PARASYMPATHETIC GANGLION has parasympathetic nerves synapsing and both a somatic sensory and a sympathetic nerve passing through it. Examples:
- Ciliary
- Ptergopalatine
- Submandibular
- Otic
Ciliary Ganglion

- Sensory root
- Nasociliary nerve
- Sympathetic root
- Parasympathetic (motor) root
- Oculomotor nerve [III]
- Ciliary ganglion
- Sensory fibers
- Sympathetic fibers
- Parasympathetic preganglionic fibers
- Parasympathetic postganglionic fibers

Inset:
- Parasympathetic root
- Sensory root
- Sympathetic root
Nerve Pathway & Muscles

Constriction (Parasympathetic)

Dilation (Sympathetic)

A. Miosis (constriction)  B. Mydriasis (dilatation)

- radial muscle
- circular muscle
- Constricts
- Constricts

Iris
Dilated pupil
Constricted pupil

Midbrain
Medulla
I. C.
I. Th.
II. Th.

Sympathetic efferent (preganglionic) fibers

Parasympathetic efferent fibers
Ciliary ganglion
Long ciliary nerve to dilator pupillae
Short ciliary nerve to ciliary muscle
Short ciliary nerve to sphincter pupillae

Cardot plexus
Superior cervical ganglion
Edinger-Westphal Nucleus of Third Nerve
Spinal Cord
Pterygopalatine Ganglion

Diagram showing the Pterygopalatine Ganglion and its connections with other nerves and arteries, including:
- Lacrimal gland
- Pterygopalatine ganglion
- Maxillary nerve
- CN V (Trigeminal nerve)
- CN VII (Facial nerve)
- Palatine nerves
- Nasal nerves
- Nerve of the pterygoid canal
- Greater petrosal nerve
- Deep petrosal nerve
- Superior cervical ganglion
- Internal carotid artery
- Parasympathetic preganglionic
- Sympathetic preganglionic
- Sympathetic postganglionic
- Parasympathetic preganglionic
- Parasympathetic postganglionic
Submandibular Ganglion

- Parasympathetic root
- Sensory root
- Sympathetic root

- Greater petrosal nerve
- Chorda tympani nerve
- Trigeminal nerve (V)
- Facial nerve (VII)
- Superior salivatory nucleus

- Sympathetic preganglionics
- Sympathetic postganglionics
- Parasympathetic preganglionics
- Parasympathetic postganglionics

Submandibular ganglion

Sublingual gland

Facial artery

Lingual artery
Otic Ganglion

- Parasympathetic root
- Sensory root
- Sympathetic root

Internal Salivatory nucleus

Lesser petrosal n.
- Otic ganglion
- Parotid gland
- Auriculotemporal n.

Tympanic n.

Nerve to tensor tympani

Lesser petrosal nerve (secretomotor root)

Mandibular nerve

Motor root

Glossopharyngeal nerve

Nerve to tensor veli palatini

Postganglionic fibres

Sensory root

Nerve to medial pterygoid

Otic ganglion

Sympathetic root

Auriculotemporal nerve

Sympathetic plexus along middle meningeal a.

Maxillary artery

Medial pterygoid

Base of mandible

External carotid artery
Vagus n. (X)

- Glossopharyngeal nerve (CN IX)
- Vagus nerve (CN X)
- Spinal accessory nerve (CN XI)

- Internal jugular vein
- Superior ganglion of vagus nerve
- Inferior ganglion of vagus nerve

- Dorsal vagal nucleus
- Nucleus ambiguus
  - Superior part
  - Inferior part

- Nucleus of the solitary tract
  - Superior gastroepiploic branch
  - Inferior ganglion
  - Pharyngeal branch
  - Superior laryngeal n.
  - Jugular foramen
  - Spinal nucleus of trigeminal n.
Vagus n. (X)
Vagus n. (X)
Vagus n. (X)

Nausea & Vomiting
Oculomotor n. (III)
Trochlear n. (IV)
Abducens n. (VI)
Oculomotor n. (III), Trochlear n. (IV), Abducens n. (VI) Palsy
Trigeminal n. (V)

- Trigeminal nerve
- Ophthalmic branch (V₁)
- Maxillary branch (V₂)
- Superior alveolar nerve
- Lingual nerve
- Mandibular branch (V₃)
- Inferior alveolar nerve
- Motor root
- Sensory root
- Facial nerve
- Chorda tympani
Trigeminal n. (V) Pressure Points

Trigeminal n. (V) Compression
Facial n. (VII)
Facial n. (VII) Nuclei

CELL BODIES

BRAINSTEM

SVE
Motor Nucleus

GVE
Superior Salivatory Nucleus

GSA
SVA
Solitary Nucleus

POSTERIOR

SAGITTAL

GENICULATE GANGLION

TEMPORAL BONE
"Facial Canal"
Facial n. (VII) Distribution

General Visceral Efferent (GVE)

Submandibular Ganglion

Pterygopalatine Ganglion

Vidian Canal

Vidian Nerve

Foramen Lacerum

Carotid Artery

Deep Petrosal Nerve

Pterygopalatine Ganglion

Pterygopalatine Fossa
Facial n. (VII) Palsy

Peripheral lesion
(Bell’s palsy (CN VII))

Central lesion
(Stroke)

Nucleus of CN VII
(Facial nerve)

Bilateral innervation

Lesion

Empty bladder

Empty rectum

Upward traction

After chin appears

Brow droop

Upper lid retraction

Ptotic palpebral
malar sulcus
and nasojugal sulcus

Loss of nasolabial fold

Droopy eyelid, dry eye, or excessive tears
Twitching, or weakness
Drooping corner of mouth, dry mouth, impaired taste

Intercanthal line
Lower limbus line

Inter-
Glossopharyngeal n. (IX) & Palsy
Hypoglossal n. (XII)
& Palsy
Cranial root of accessory nerve (joins vagus nerve to supply muscles of larynx — except cricothyroid — via recurrent laryngeal nerve)

Jugular foramen
Superior ganglion of vagus nerve
Accessory (XI) nerve
Internal branch of accessory nerve
Inferior ganglion of vagus nerve
1st spinal nerve (C1)
2nd spinal nerve (C2)
External branch of accessory nerve (to sternocleidomastoid and trapezius muscles)
Sternocleidomastoid muscle
3rd spinal nerve (C3)
4th spinal nerve (C4)
Trapezius muscle

Motor fibers
Proprioceptive fibers
Accessory n. (XI) & Palsy
Figure X–12 Tumor of the glomus cells of the jugular bulb compressing cranial nerves IX, X, and XI (lateral view showing cut jugular foramen).
Ask before being Asked!