NERVE	ATTACHMENT	FORAMEN	COMPONENTS	NUCLEUS OF ORIGIN (EFFERENT) OR TERMINATION (AFFERENT)	MAIN STRUCTURES INNERVATED
I. OLFACTORY	olfactory bulb	cribriform plate	SVA	olfactory mucosa	1) olfactory nasal mucosa (smell)
II. OPTIC	optic chiasma	optic foramen (canal)	SSA	lateral geniculate body (dienceph.) (relayed to calcarine fissure)	1) rods and cones of retina (vision)
III. OCULO-MOTOR	sulcus on walls of interpeduncular fossa	sup. orbital fissur	GVE (parasymp) GSE	1) Edinger-Westphal (mid-brain) 2) Oculomotor nucleus (mid-brain)	1) (via ciliary ganglion) to sphincter pupillae & ciliary muscles 2) sup., med., & inf. recti and inf. obl. eyeball muscles and levator palpebrae superioris
IV. TROCHLEAR	superior medullary velum	sup. orbital fissure	GSE	1) trochlear nucleus (midbrain)	1) superior oblique eyeball muscle
V. TRIGEMINAL 1) Ophthal. 2) Maxil. 3) Mandib.	lat. part of pons	sup. orb. fis. foramen rotundum foramen ovale	1) GSA 2) SVE	1) sensory nuc. of Nerve V " " (pons) 2) motor nucleus of Nerve 5 (pons)	VI) skin of upper part of face- (upper orbit and above) V2) skin of mid face, upper teeth, nasal and palatal mucosa V3) skin of lower face and jaw, floor of mouth, mucosa of ant. 2/3 of tongue, lower teeth and gums ear pinna and canal 2) motor to muscles of mastication, ant. belly of digast., tensor tympani, mylohyoid, tensor palatini (first arch muscles)

NERVE	ATTACHMENT	FORAMEN	COMPONENTS	NUCLEUS AND ITS LOCATION ( )	MAIN STRUCTURES INNERVATED
VI. ABDUCENS	Sulcus between pons & medulla on anterior surface	sup. orbital fissure	1) GSE	1) abducens nucleus (pons)	1) motor to lateral rectus muscle (LR6)
VII. FACIAL	Cerebello-medullary pontine angle	internal auditory meatus	1) GVA	1) nuc. solitarius (pons)	1) deep sens. from soft palate
			2) SVA	2) nuc. solitarius (pons)	2) taste buds from the anterior 2/3 of the tongue
			3) GSA	3) sens. nuc. of N5 (pons)	3) sens. from small part of ear pinna
			4) GVE	4) sup. salivatory nuc. (pons)	4) motor to submand. & subling. gls. lacrimal gls., glands in nasal mucosa
			5) SVE	5) motor nuc. of 7 (pons)	5) motor to musc. facial express., post. belly digast., stylohyoid, and stapedius
VIII. AUDITORY	Cerebello-medullary pontine angle	internal auditory meatus	1) SSA		
			a. cochlear	a. cochlear nuclei (medulla)	a. organ of Corti in cochlear duct
			b. vestibular	b. vestibular nuclei (medulla)	b. semicircular canals, utricle & saccule
IX. GLOSSO-PHARYNGEAL	post. lateral (olivary) sulcus	jugular foramen	1) GVA.	1) nuc. solitarius (medulla)	1) deep sens. from post. tongue, soft palate, pharynx, mucosa of tymp. cavity, post. auditory tube, carotid body & sinus
			2) SVA	2) nuc. solitarius (medulla)	2) taste buds post. 1/3 tongue & adjacent pharynx
			3) GSA	3) sens. nuc. of N5 (medulla)	3) gen. sens. from small part of ear pinna and canal
			4) GVE	4) inf. salivatory nuc. (medulla)	4) parotid salivary gland (secretomotor)
			5) SVE	5) nuc. ambiguus (med)	5) stylopharyngeaus muscle

NERVE	ATTACHMENT	FORAMEN	COMPONENTS	NUCLEUS AND ITS LOCATION	MAIN STRUCTURES INNERVATED
X. VAGUS	post. lat (olivary) sulcus	jugular foramen	1) GVA 2) SVA 3) GSA 4) GVE 5) SVE	1) nuc. solitarius (medulla) 2) nuc. solitarius (medulla) 3) sens. nuc. of N5 (medulla) 4) dors. motor nuc. of 10 (medulla) 5) nuc. ambiguus	1) visc. sens. from pharynx, esoph., trachea, larynx and abdom. visc. 2) taste buds in epiglottis and glottis 3) sens. from small part of ear pinna, canal, and tymp. membr. 4) thoracic and abdominal viscera 5) muscles of pharynx and larynx, lev. palatini & cricothyroid
XI. SPINAL ACCESSORY (spinal roots)	Upper cervical spinal between post and ant roots	foramen mag and jugular foramen	1) GSE SVE	1) accessory nucleus (spinal cord) (C1-C5)	1) motor to sternocleidomastoid and trapezius
XII. HYPOGLOSSAL	ant. lat. (olivary) sulcus	hypoglossal canal	1)GSE	1) hypoglossal nuc. (medulla)	1) intrinsic and extrinsic muscles of the tongue (palatoglossus excepted)

NERVES LISTED ACCORDING TO FUNCTIONAL COMPONENTS

SPECIAL SOMATIC AFFERENT (SSA)

II. Optic:
Optic stimuli are received by the rods and cones, relayed to second and third order neurons which comprise the optic nerve. (About half the fibers decussate in the optic chiasma). Impulses are along the optic nerve and optic tract to the lateral geniculate bodies of the diecephalon. Relay is then from the lateral geniculate bodies to the calcarine fissure area of the occipital lobes.

VIII. Auditory (Acoustic) (Vestibulocochlear)

A. Sound stimulates hair cells (receptors) of the Organ of Corti in the cochlea and impulses are carried along bipolar neurons with their cell bodies in the spiral ganglion to the dorsal and ventral cochlear nuclei of the medulla (hearing).

B. Motion of the endolymph stimulates receptors in the sacculus and utriculus and the ampullae of the three semicircular canals. These impulses are carried along bipolar neurons whose cell bodies are in the vestibular ganglion and terminate in the medial, lateral, superior and spinal vestibular nuclei of the medulla (equilibrium).

GENERAL SOMATIC AFFERENT (GSA)

V. Trigeminal

Ophthalmic branch: from cornea, conjunctiva, eyelid, forehead and nose.

Maxillary branch: from skin of cheek, lower lid, side of nose and upper jaw, upper teeth, mucosa of mouth and maxillary sinuses.

Mandibular branch: from skin of ear pinna, ear canal, temporal area, lower jaw and teeth, mucosa of mouth, gums, and general sensation from anterior two-thirds of the tongue. All of the above neurons have their cell bodies in the trigeminal ganglion and terminate in the sensory nuclei of the 5th nerve.

VII. Facial, IX-Glossopharyngeal and X-Vagus: Sensory from a small portion of the ear pinna.

Nerve	Cell bodies in	Central termination
VII.	geniculate ganglion	sensory nucleus of N.5
IX.	superior ganglion	" " " N.5
X.	superior ganglion	" " "N.5

SPECIAL VISCERAL AFFERENT (SVA)

I. Olfactory: Sensations of smell are relayed by bipolar cells from the nasal mucosa to the glomeruli of the olfactory bulb.

VII. Facial: Sensations from taste buds in the anterior two-thirds of the tongue are carried along the chorda tympani to cell bodies in the geniculate ganglion. Central termination is in the nucleus solitarius.

IX. Glossopharyngeal: Sensations from taste buds in the posterior one-third of the tongue and adjacent pharyngeal wall are carried to cell bodies in the inferior ganglion of IX. Central termination is in the nucleus solitarius.

X. Vagus: Sensations from taste buds in the epiglottis and glottis are carried to cell bodies in the inferior vagal ganglion; from here central termination is in the nucleus solitarius.

GENERAL VISCERAL AFFERENT (GVA)

VII. Facial: Deep sensibility from the soft palate. Cell bodies are in the geniculate ganglion and the central termination is in the nucleus solitarius.

IX. Glossopharyngeal: Deep sensibility from the posterior one-third of the tongue, fauces, soft palate, mucous membrane of tympanic cavity, posterior part of auditory tube, carotid body and sinus and pharynx. Cell bodies are in the inferior ganglion (of IX) and the central termination is in the nucleus solitarius.

X. Vagus: Visceral sensibility from the pharynx, larynx, and the thoracic and abdominal viscera down to and including the ascending colon. Cell bodies are in the inferior vagal ganglion and the central termination is in the nucleus solitarius.

GENERAL VISCERAL EFFERENT (GVE) (Parasympathetic)

III. Oculomotor: Preganglionic neurons from the Edinger-Westphal nucleus of the midbrain terminate in the ciliary ganglion from which postganglionic neurons go to the sphincter pupillae and ciliary muscles.

VII. Facial: Preganglionic neurons from the superior salivatory nucleus project via the chorda tympani to the submandibular ganglion from which postganglionic neurons pass to the submandibular and sublingual salivary glands. Preganglionics ending in the sphenopalatine ganglion are relayed by postganglionics to the lacrimal glands.

GENERAL VISCERAL EFFERENT (GVE) (Parasympathetic), Continued.

IX. Glossopharyngeal: Preganglionics from the inferior salivatory nucleus pass to the otic ganglion from which posganglionics go to the parotid salivary gland.

X. Vagus: Preganglionics go from the dorsal motor nucleus of X to ganglia of thoracic and abdominal visceral muscles.

SPECIAL VISCERAL EFFERENT (SVE)

V. Trigeminal: From the motor nucleus of N.5, fibers go via the mandibular branch to the muscles of mastication, anterior belly of digastricus, tensor tympani, mylohyoid and tensor palatini. These are all branchiomeric muscles derived from the first pharyngeal arch.

VII. Facial: From the motor nucleus of N.7, fibers go to the muscles of facial expression (mimetic), the posterior belly of the digastricus, stylohyoid and stapedius muscles. These are all brachiomeric muscles derived from the second pharyngeal arch (second pharyngeal arch).

IX. Glossopharyngeal: From the nucleus ambiguus to the stylopharyngeus muscle. This is the single branchiomeric muscle derived from the third pharyngeal arch.

X. Vagus: From the nucleus ambiguus to the levator palatini, cricothyroid, constrictors of the pharynx, and intrinsic muscles of the larynx (4th-6th pharyngeal arches).

GENERAL SOMATIC EFFERENT (GSE)

Note: General somatic motor neurons innervate muscles derived from mesodermal somites. It is believed that the extrinsic muscles of the eye (recti, obliques) arise from three pairs of pre-otic head somites, and that tongue muscles arise from four or more pairs of post-otic head somites (occipital somites).

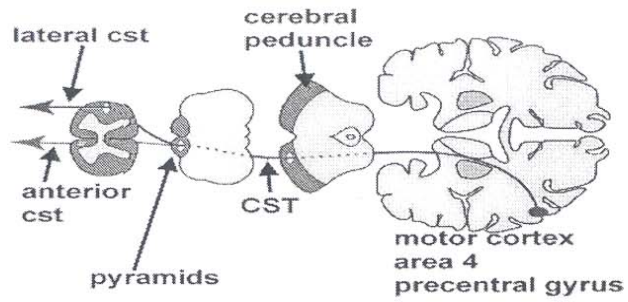
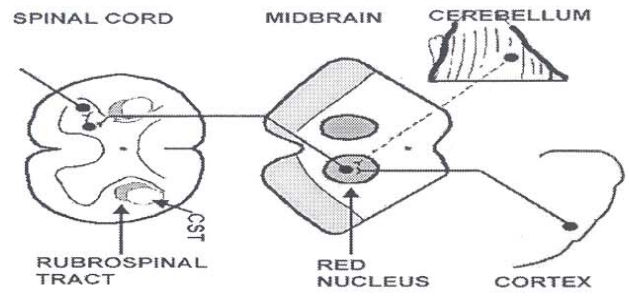
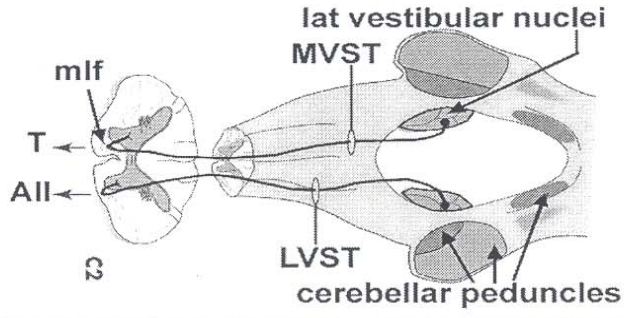
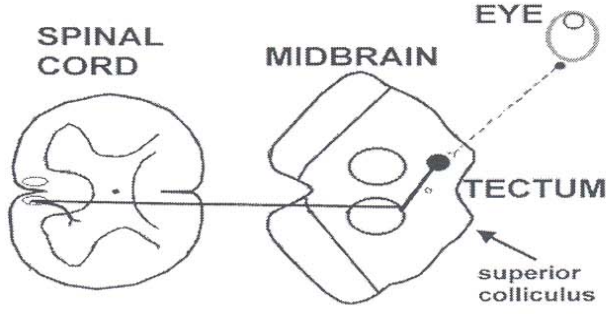
III. Oculomotor: Motor neurons pass from the oculomotor nucleus in the midbrain to the superior, medial and inferior recti, and inferior oblique muscles.

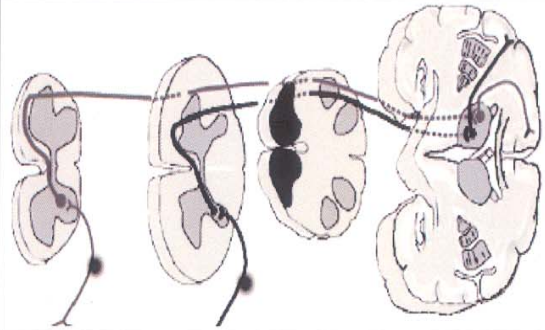
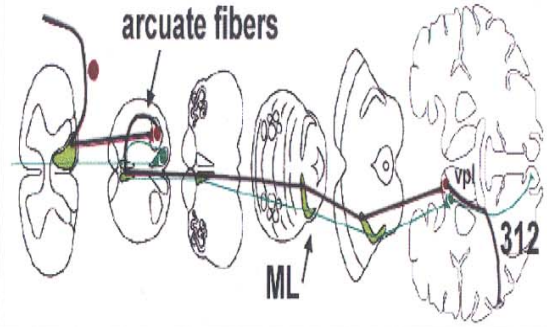
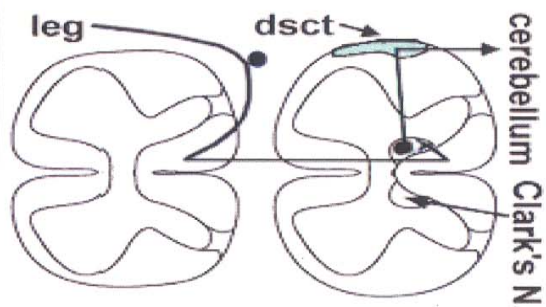
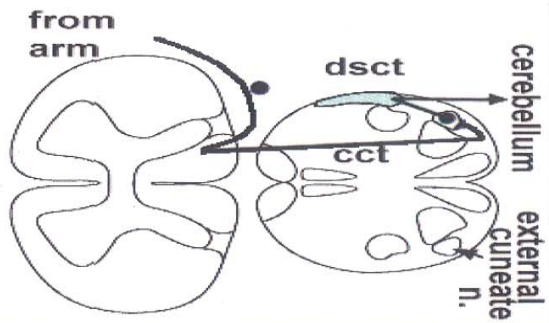
IV. Trochlear: Motor neurons extend from the trochlear nucleus in the midbrain to the superior oblique muscle.

VI. Abducens: Motor neurons from the abducens nucleus in the medulla to the lateral rectus muscle.

XI. Spinal Accessory (spinal roots only): From the spinal accessory nucleus (spinal) to the sternocleidomastoid and trapezius mm.

XII. Hypoglossal: Motor neurons extend from the hypoglossal nucleus in the medulla to intrinsic and certain extrinsic muscles of the tongue.

name	modality	synapse 1	synapse 2	synapse 3	course	Lat
corticospinal tract						
rubrospinal tract						
vestibulospinal tract						
tectospinal tract						

name	modality	synapse 1	synapse 2	synapse 3	course	Lat	clinical comments
spinothalamic tract							
dorsal column tracts							
dorsal spinocerebellar t							
cuneocerebellar tract							

name	modality	synapse 1	synapse 2	synapse 3	course	Lat	clinical comments
ventral spinocerebellar t.