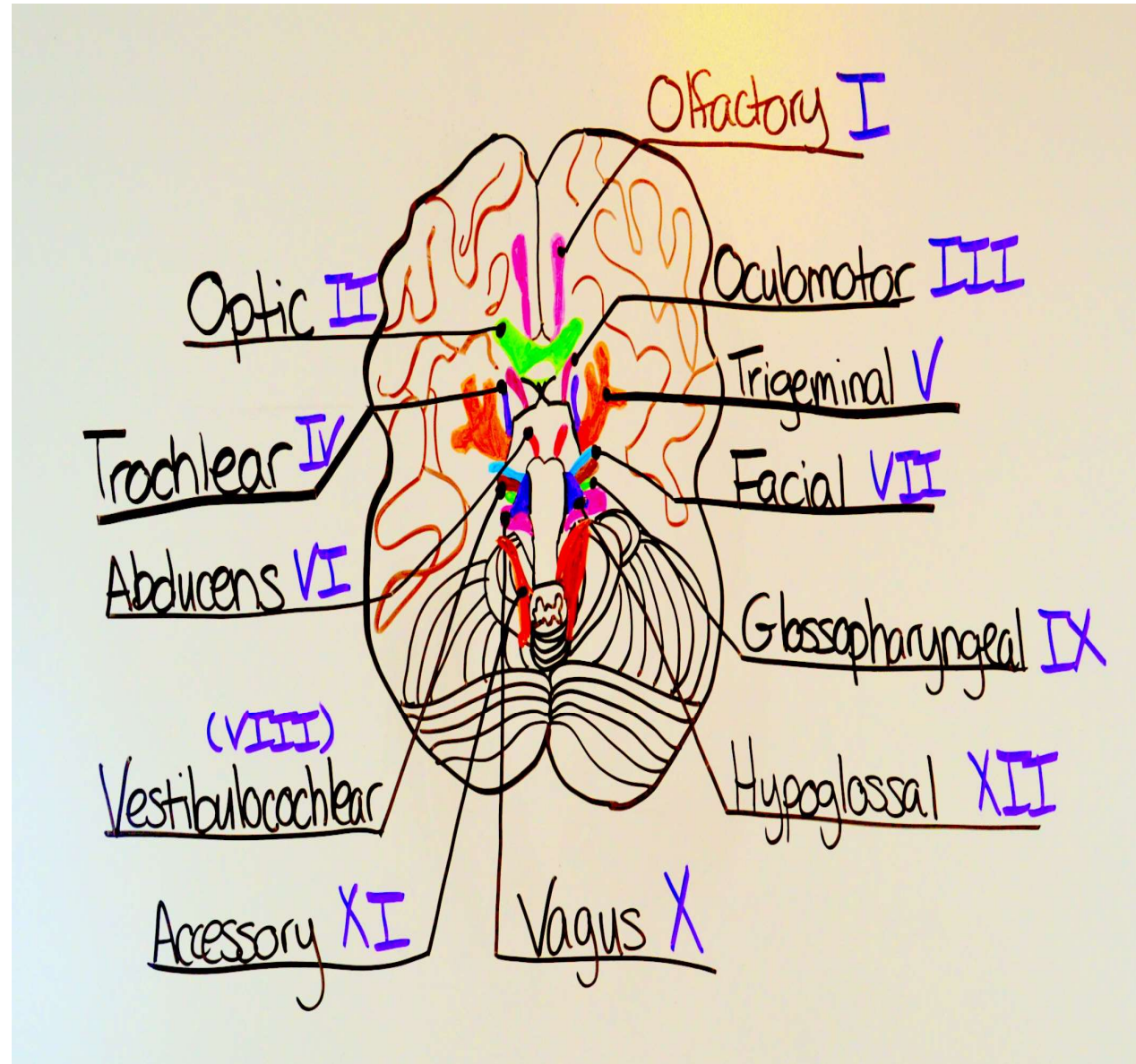
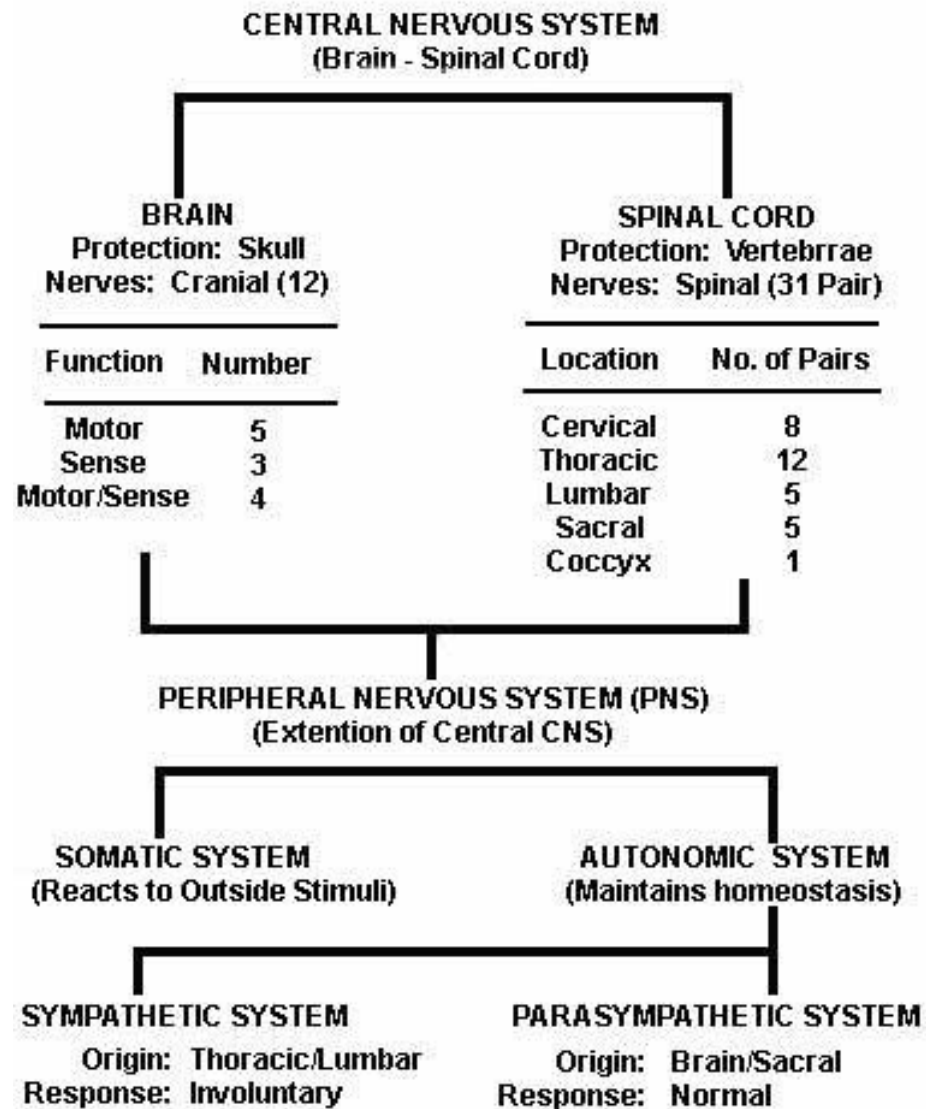
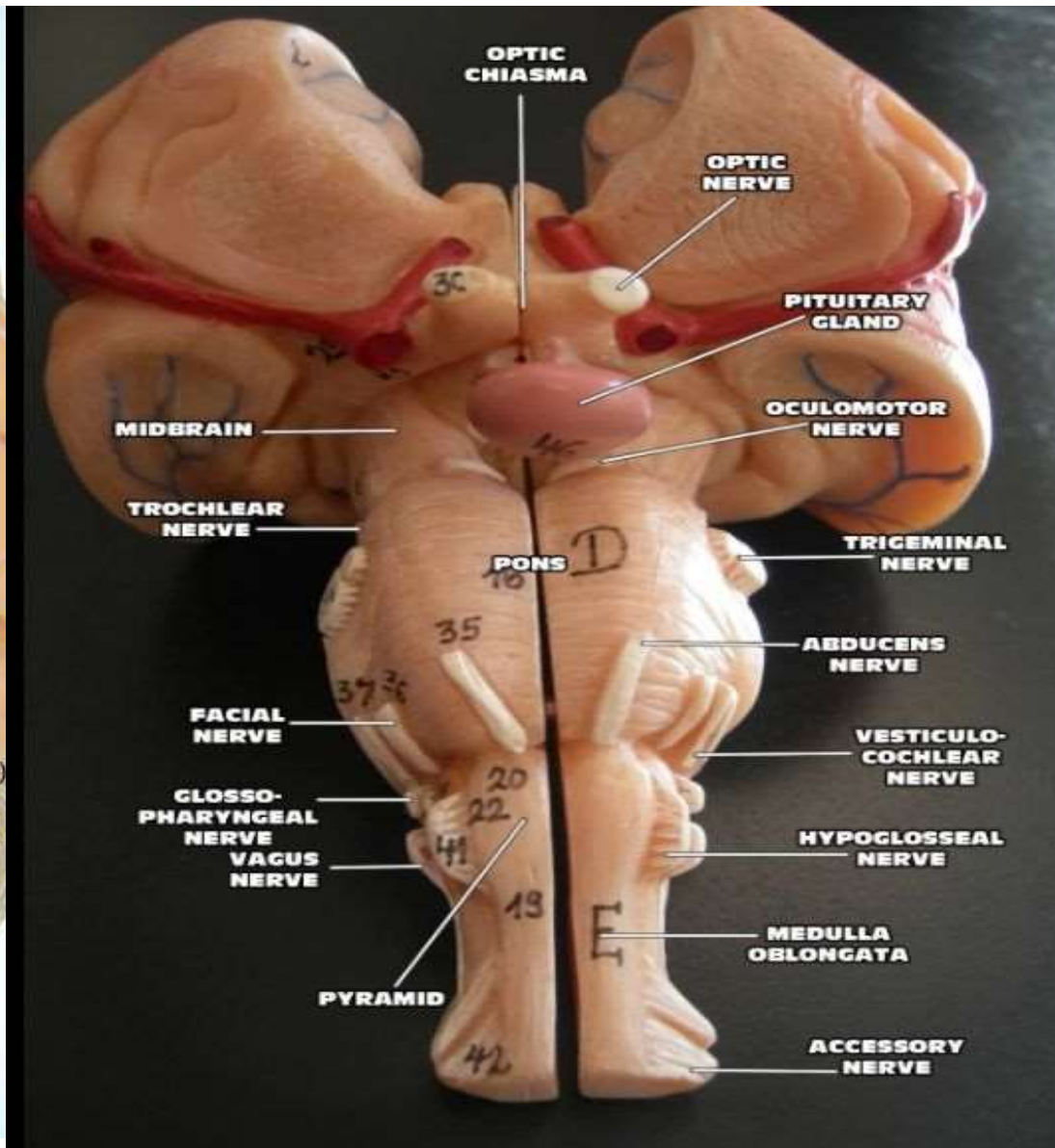
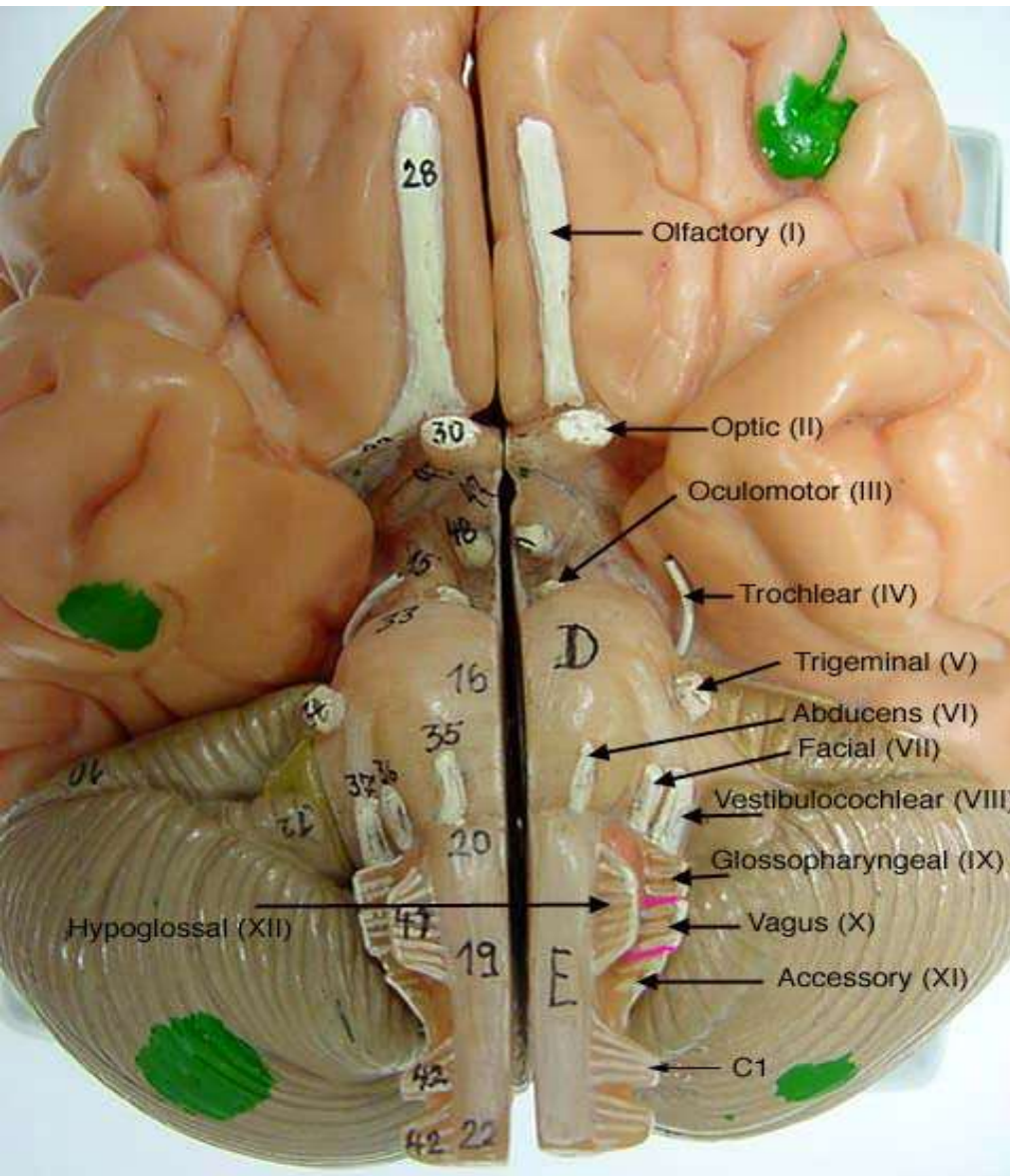


# Cranial nerve

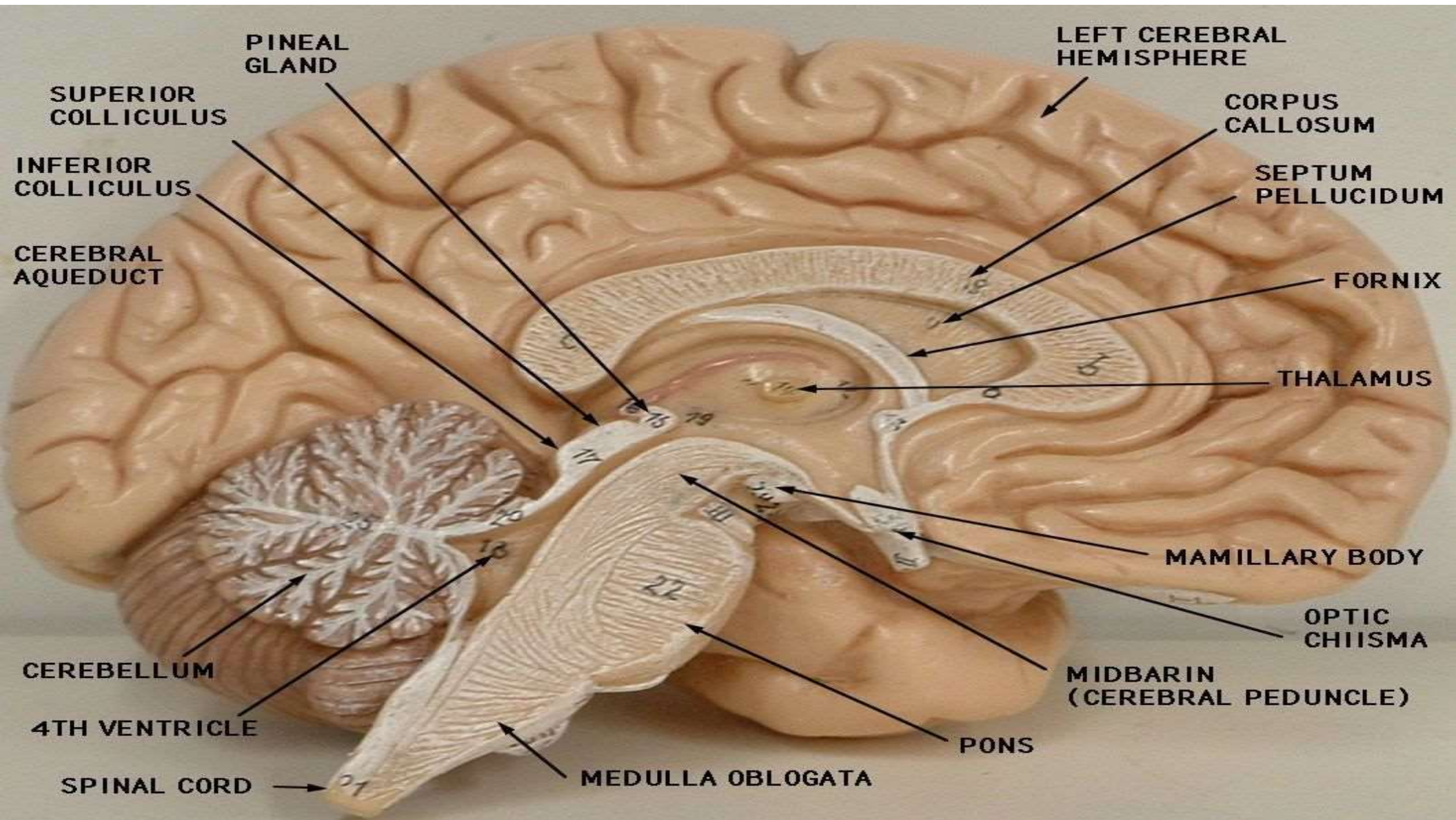
D.Hammoudi.MD



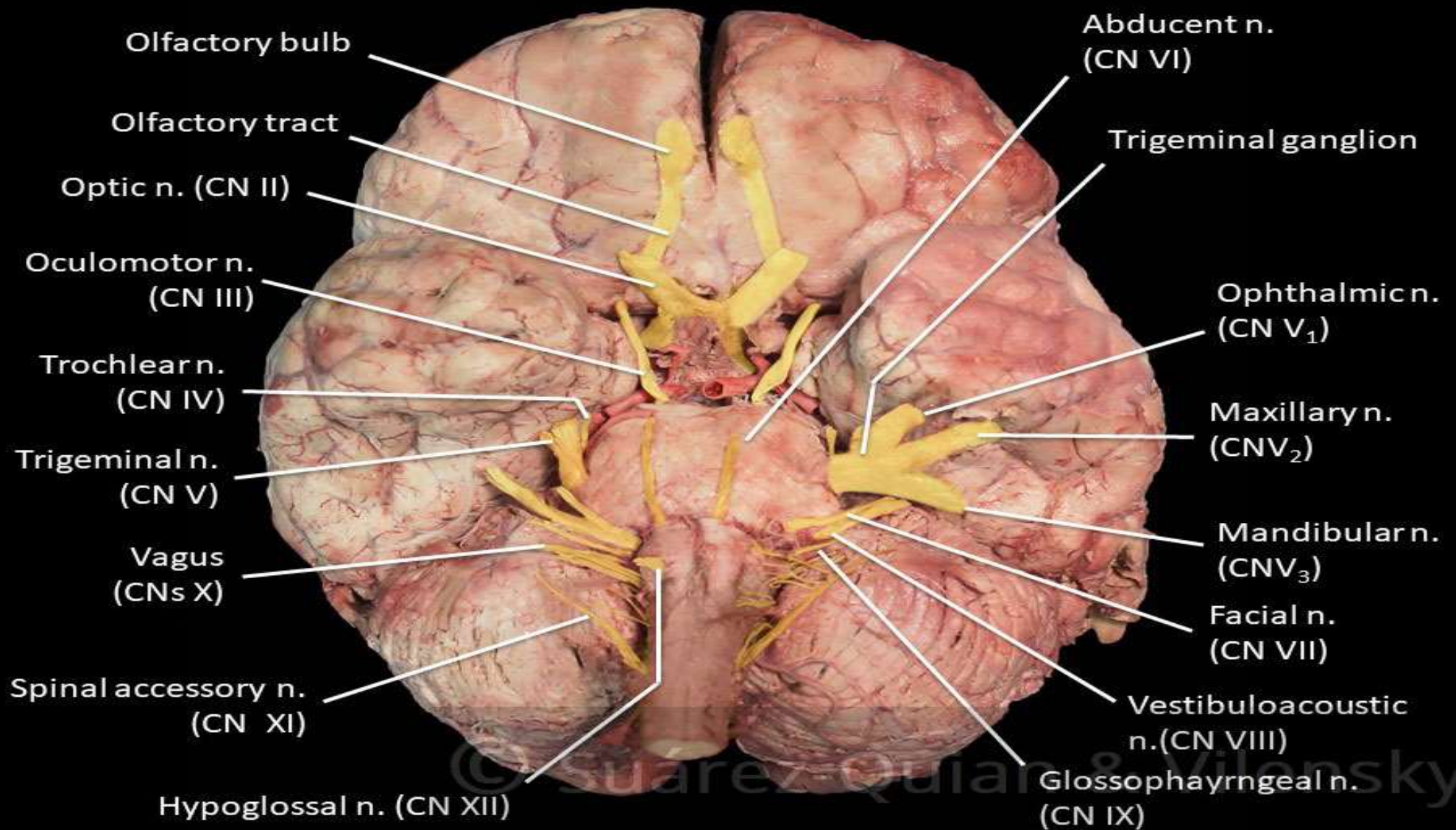












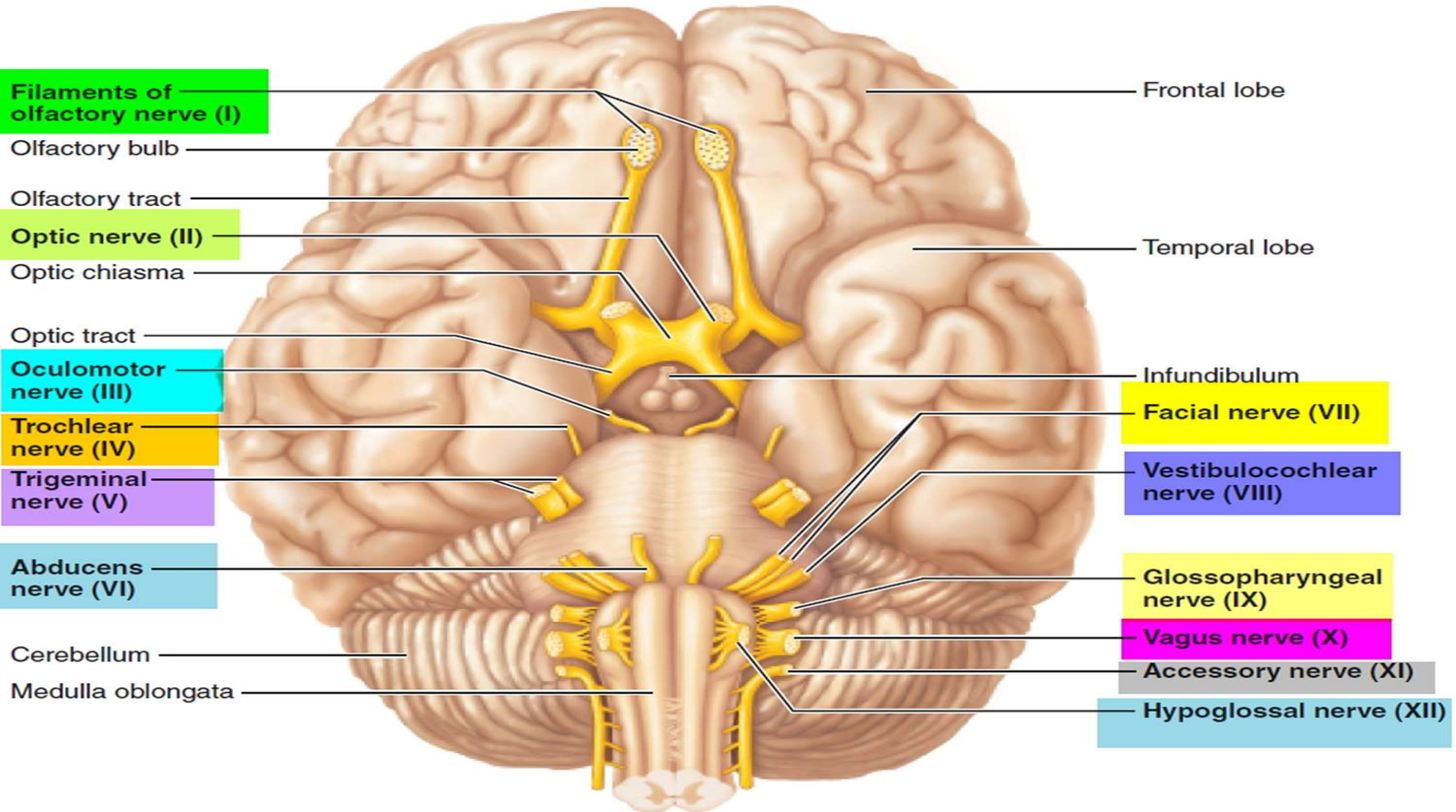
#	Cranial Nerve	Popular Mnemonic	One of my Mnemonics
---	---------------	------------------	---------------------

I	Olfactory	Oh	Only
II	Optic	Oh	Overgrown
III	Oculomotor	Oh	Orangutans
IV	Trochlear	To	Try
V	Trigeminal	Touch	To
VI	Abducens	And	Aggravate
VII	Facial	Feel	Fat
VIII	Vestibulocochlear	A	Vagrants
IX	Glossopharynx	Girls	Getting
X	Vagus	Vagina,	Vodka
XI	Accessory	Ah	And
XII	Hypoglossal	Heaven	Hamburgers



Cranial Nerve	Fibres	Structures Innervated	Functions	Brainstem Nucleus
<b>I Olfactory</b>	<b>Sensory</b>	Olfactory epithelium (via olfactory bulb)	Olfaction	-----
<b>II Optic</b>	<b>Sensory</b>	Retina	Vision	-----
<b>III Oculomotor</b>	<b>Motor</b>	<b>Superior/middle/inferior rectus, inferior oblique, levator palpebrae.</b>	Movement of eye ball	Oculomotor nucleus
	<b>Parasympathetic</b>	Pupillary constrictor, ciliary muscle of eyeball. Both via the <b>ciliary ganglion</b>	Pupillary constriction and accommodation	Oculomotor nucleus
<b>IV Trochlear</b>	<b>Motor</b>	<b>Superior oblique</b>	Movement of eyeball	Trochlear nucleus
<b>V Trigeminal</b>	<b>Sensory</b>	Face, scalp, cornea, nasal and oral cavities, cranial dura mater.	General sensation	Trigeminal sensory nucleus
	<b>Motor</b>	<b>Muscles of mastication</b> <b>Tensor Tympani muscle</b>	Opening/closing mouth Tension of tympanic membrane	Trigeminal Motor nucleus Trigeminal Motor nucleus
<b>VI Abducens</b>	<b>Motor</b>	<b>Lateral rectus</b>	Movement of eyeball	Abducens nucleus
<b>VII Facial</b>	<b>Sensory</b>	Anterior 2/3 of tongue	Taste	Nucleus Solitarius
	<b>Motor</b>	<b>Muscles of facial expression</b> <b>Stapedius Muscle</b>	Facial Movement Tension of ossicles	Facial Motor nucleus Facial Motor Nucleus
	<b>Parasympathetic</b>	Salivary and lacrimal glands via <b>submandibular and pterygopalatine ganglia</b>	Salivation and Lacrimation	Superior Salivatory Nucleus
<b>VIII Vestibulocochlear</b>	<b>Sensory</b>	Cochlea	Hearing	Cochlear Nucleus
		Vestibular apparatus	Proprioception of head, balance.	Vestibular nucleus
<b>IX Glossopharyngeal</b>	<b>Sensory</b>	Eustachian tube, middle ear	General Sensation,	Trigeminal Sensory nucleus
		Carotid Body, and sinus	Chemo/baroreception	
		Pharynx, posterior 1/3 of tongue	Taste	Nucleus Solitarius
	<b>Motor</b>	<b>Stylopharyngeous</b>	Swallowing	
	<b>Parasympathetic</b>	Salivary glands via the <b>otic ganglion</b>	Salivation	Inferior Salivatory nucleus
<b>X Vagus</b>	<b>Sensory</b>	Pharynx, larynx, oesophagus, external ear	General Sensation	Trigeminal Sensory nucleus
		Aortic bodies and arch	Chemo/baroreception	
		Thoracic and abdominal viscera	Visceral Sensation	Nucleus Solitarius
	<b>Motor</b>	Soft Palate, larynx, pharynx, upper oesophagus	Speech, swallowing	Nucleus Ambiguus
	<b>Parasympathetic</b>	Cardiovascular, respiratory and gastrointestinal systems.	Control of these systems	Dorsal Motor nucleus of Vagus
<b>XI Accessory</b>	<b>Motor</b>	<b>Sternomastoid, trapezius</b>	Movement of head and shoulders	Nucleus Ambiguus, cranial nerves
<b>XII Hypoglossal</b>	<b>Motor</b>	<b>Intrinsic and extrinsic muscles of tongue</b>	Movement of tongue	Hypoglossal nucleus







# CRANIAL



# NERVES

On  
Occasion  
Our  
Trusty  
Truck  
Acts  
Funny  
Very  
Good  
Vehicle  
Any  
How

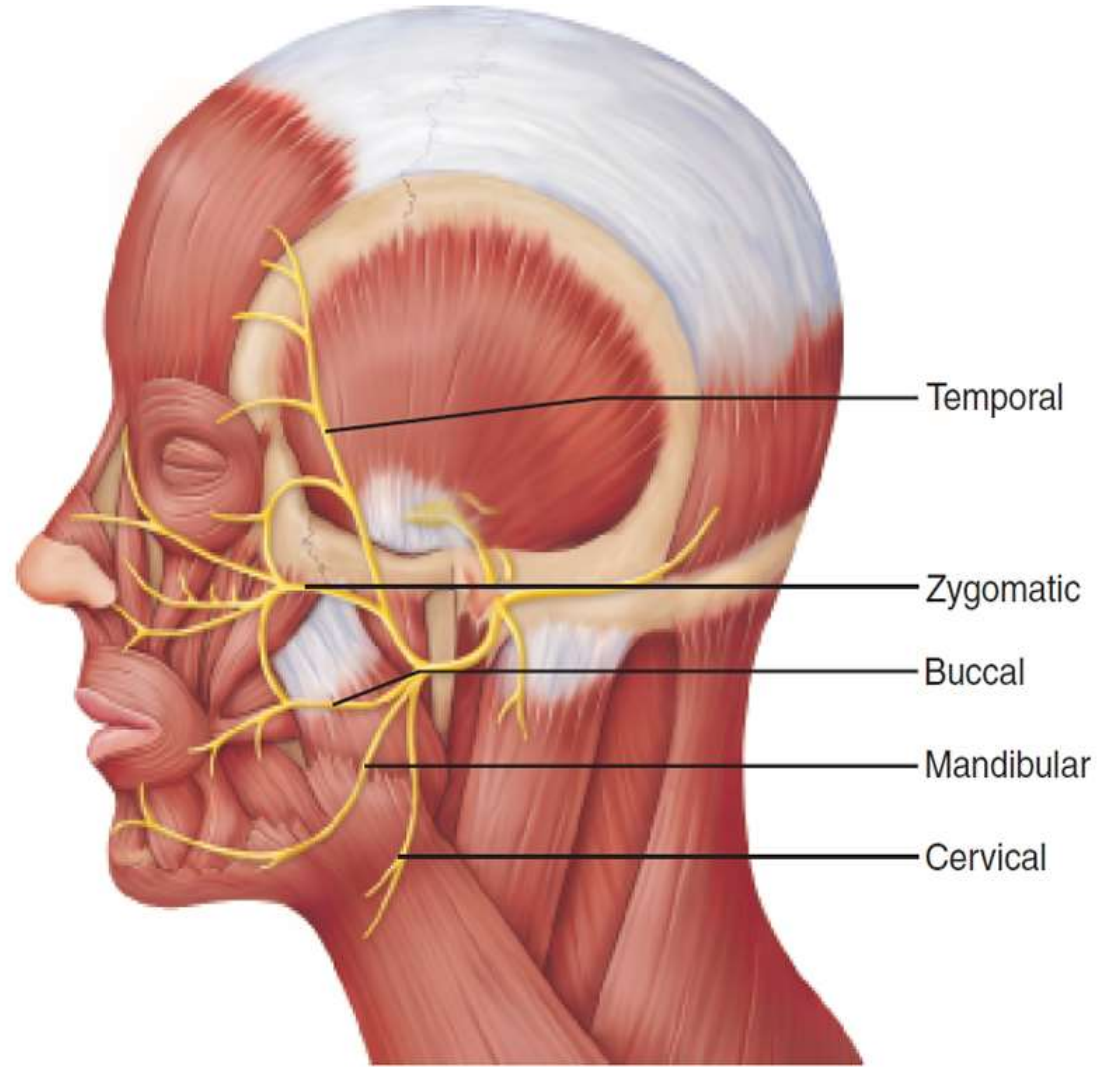
**O**lfactory (CN\*I)  
**O**ptic (CN II)  
**O**culomotor (CN III)  
**T**rochlear (CN IV)  
**T**rigeminal (CN V)  
**A**bducens (CN VI)  
**F**acial (CN VII)  
**V**estibulocochlear (CN VIII)  
**G**lossopharyngeal (CN IX)  
**V**agus (CN X)  
**A**ccessory (CN XI)  
**H**ypoglossal (CN XII)

Sensory  
Sensory  
Motor  
Motor  
Both\*\*  
Motor  
Both  
Sensory  
Both  
Both  
Motor  
Motor

Some  
Say  
Marry  
Money  
Bt  
My  
Brother  
Says  
Big  
Brain  
Matter  
More



**A simple method of remembering the courses of the five major motor branches of the facial nerve**



**Motor branches to muscles of facial expression and scalp muscles**



# Summary of Function of Cranial

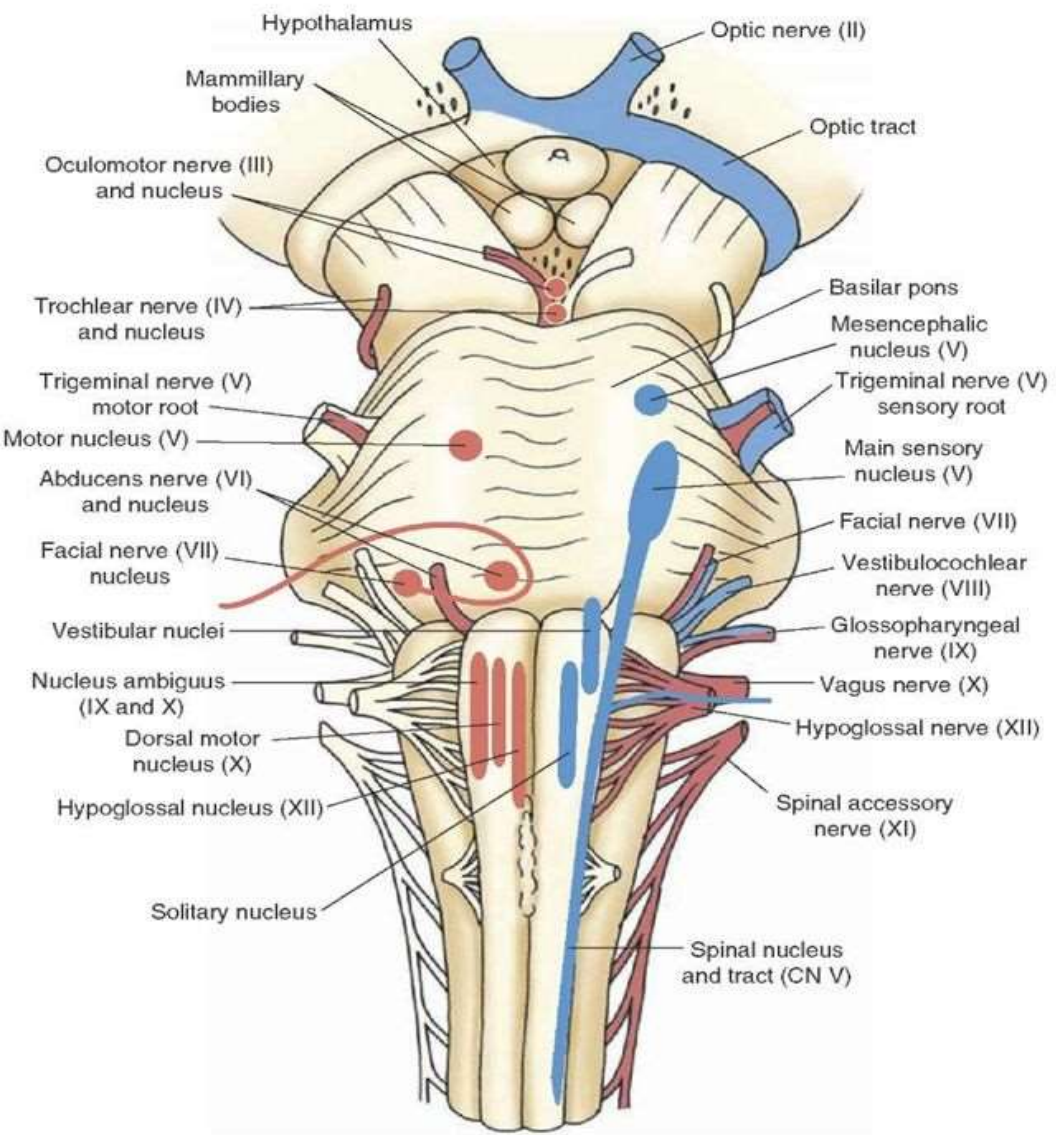
<b>Cranial nerves I – VI</b>	<b>Sensory function</b>	<b>Motor function</b>	<b>PS* fibers</b>
I Olfactory	Yes (smell)	No	No
II Optic	Yes (vision)	No	No
III Oculomotor	No	Yes	Yes
IV Trochlear	No	Yes	No
V Trigeminal	Yes (general sensation)	Yes	No
VI Abducens	No	Yes	No

<b>Cranial nerves VII – XII</b>	<b>Sensory function</b>	<b>Motor function</b>	<b>PS* fibers</b>
VII Facial	Yes (taste)	Yes	Yes
VIII Vestibulocochlear	Yes (hearing and balance)	Some	No
IX Glossopharyngeal	Yes (taste)	Yes	Yes
X Vagus	Yes (taste)	Yes	Yes
XI Accessory	No	Yes	No
XII Hypoglossal	No	Yes	No

**(b)** \*PS = parasympathetic

Figure 13.5b





— sensory fibres  
— motor fibres

**Optic (II)**  
**sensory:** eye



**Trochlear (IV)**  
**motor:** superior oblique muscle

**Abducent (VI)**  
**motor:** external rectus muscle



**Oculomotor (III)**  
**motor:** all eye muscles except those supplied by IV and VI



**Trigeminal (V)**  
**sensory:** face, sinuses, teeth, etc.  
**motor:** muscles of mastication



**Olfactory (I)**  
**sensory:** nose



**Intermediate motor:** submaxillary and sublingual gland  
**sensory:** anterior part of tongue and soft palate

**Vestibulocochlear (VIII)**  
**sensory:** inner ear



**Glossopharyngeal (IX)**  
**motor:** pharyngeal musculature  
**sensory:** posterior part of tongue, tonsil, pharynx



**Vagus (X)**  
**motor:** heart, lungs, bronchi, gastrointestinal tract  
**sensory:** heart, lungs, bronchi, trachea, larynx, pharynx, gastrointestinal tract, external ear



**Facial (VII)**  
**motor:** muscles of the face



**Hypoglossal (XII)**  
**motor:** muscles of the tongue



**Accessory (XI)**  
**motor:** sternocleidomastoid and trapezius muscles





Cribriform plate  
Olfactory n (CNI)

Optic canal  
Optic n (CNII)

Superior orbital fissure  
Oculomotor n (CNIII)  
Trochlear n (CNIV)  
Ophthalmic n (CNV<sub>1</sub>)  
Abducens n (CNVI)

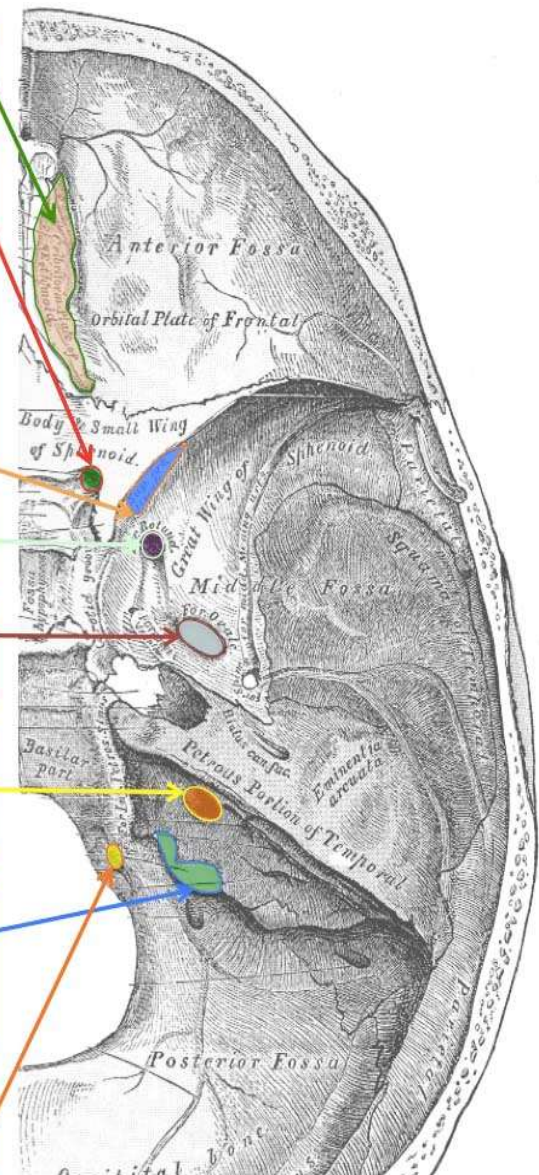
Foramen rotundum  
Maxillary n (CNV<sub>2</sub>)

Foramen Ovale  
Mandibular n (CNV<sub>3</sub>)

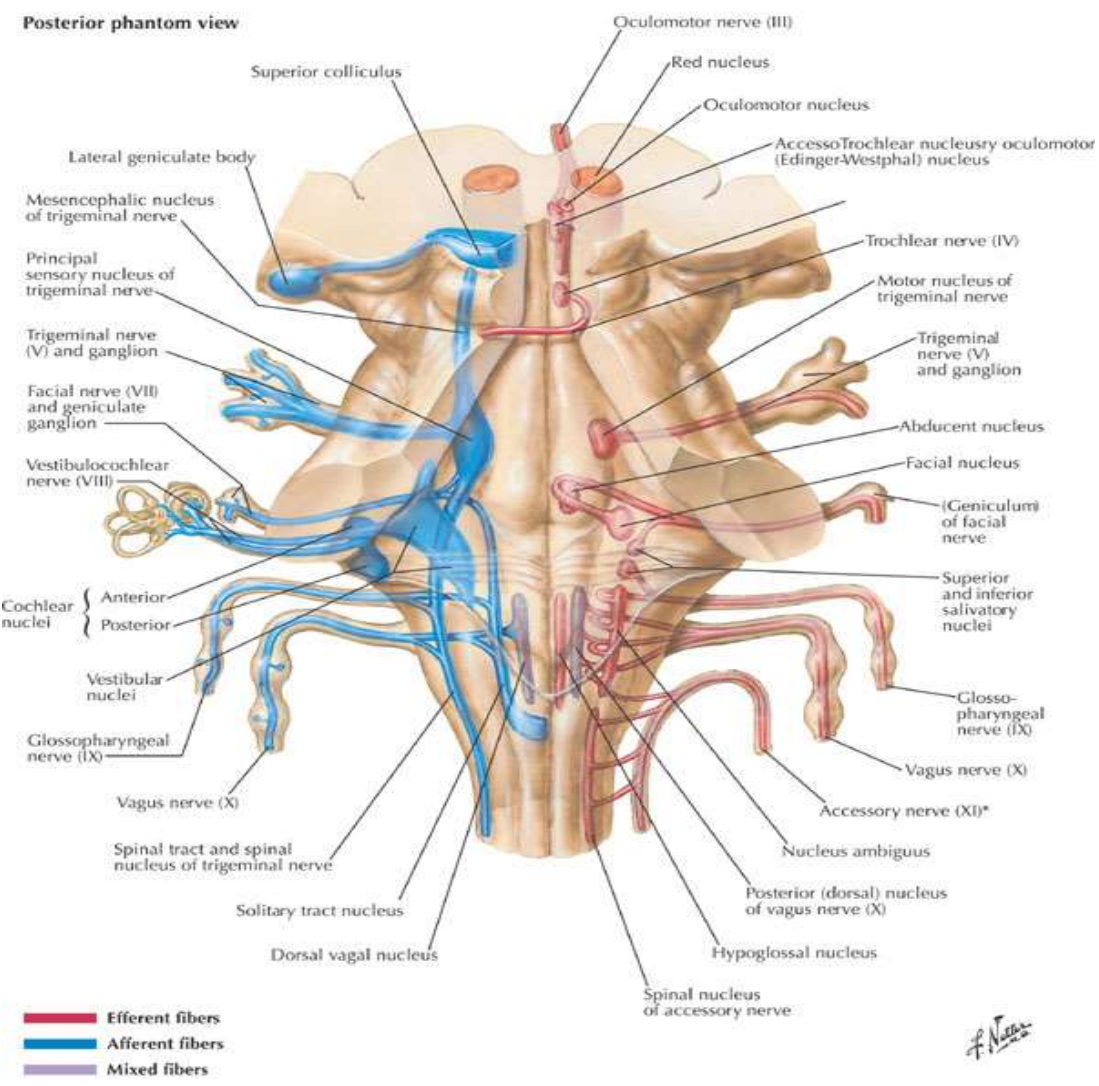
Internal acoustic meatus  
Facial n (CNVII)  
Vestibulocochlear n (CNVIII)

Jugular foramen  
Glossopharyngeal n (CNIX)  
Vagus n (CNX)  
Accessory n (CNXI)

Hypoglossal canal  
Hypoglossal n (CNXII)



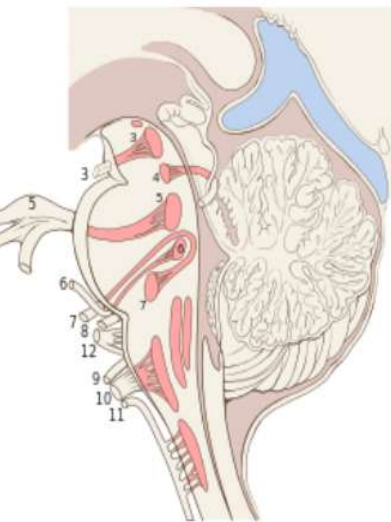
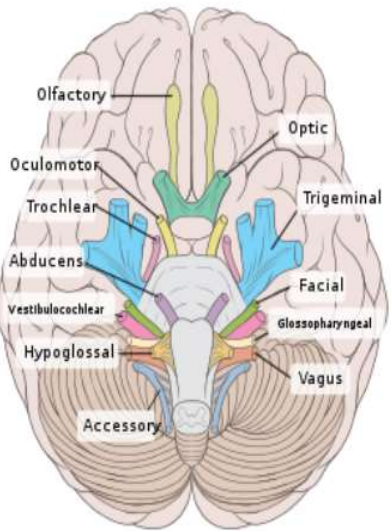
**Cranial Nerve Nuclei in Brainstem: Schema**



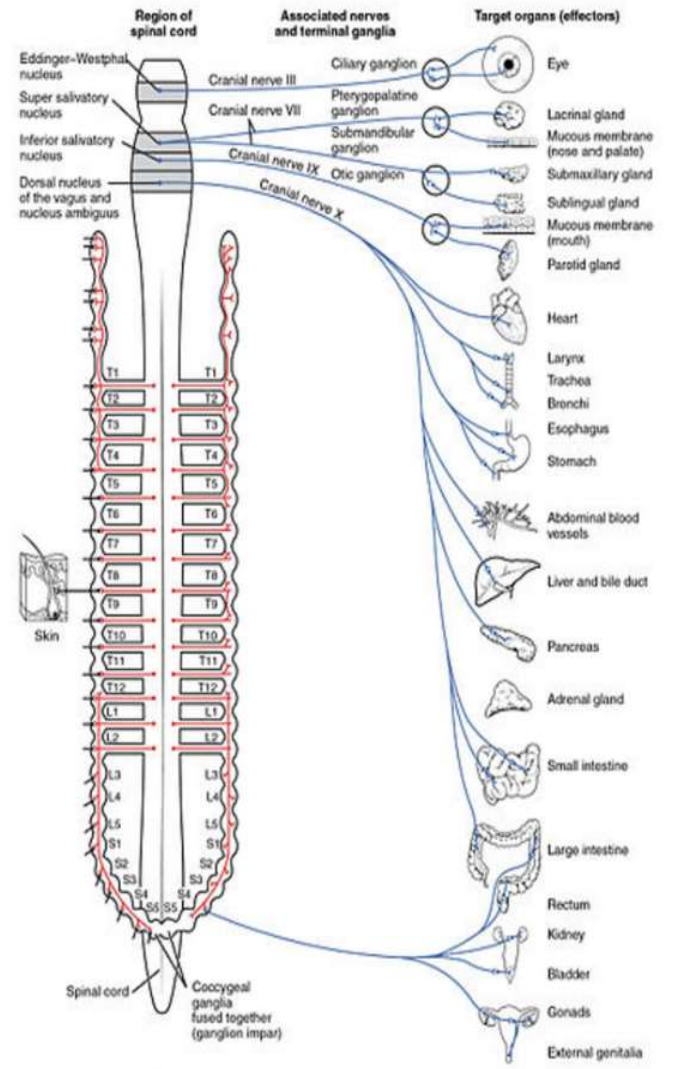
\*Recent evidence suggest that the accessory nerve lacks a cranial root and has no connection to the vagus nerve. Verification of this finding awaits further investigation

*f. Netter*



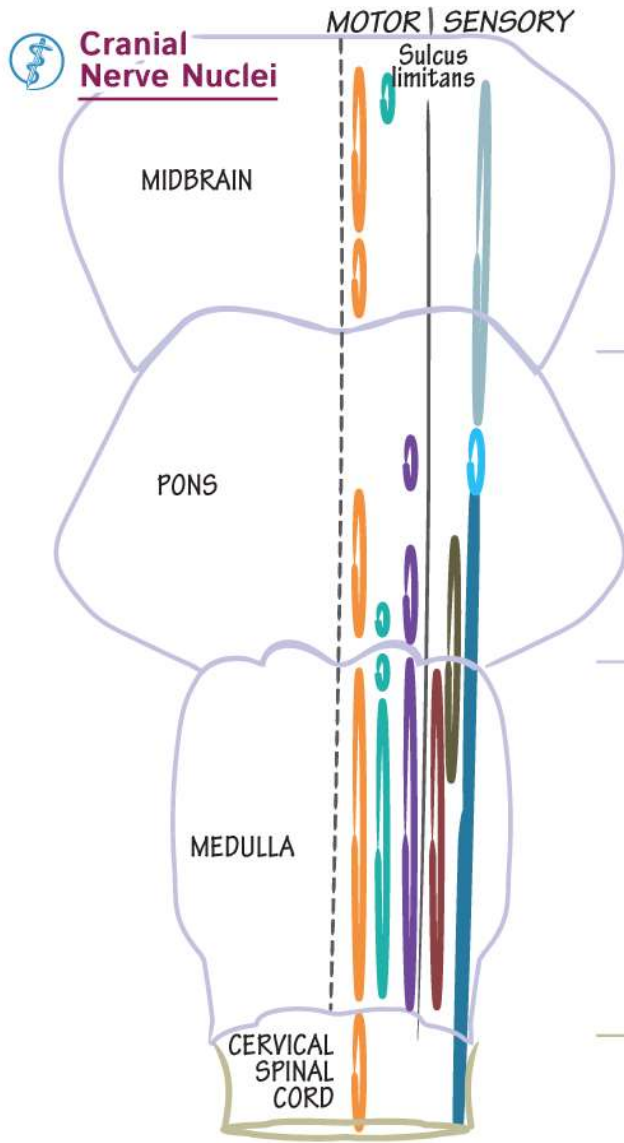



Cranial Nerve	Function	System	Function
CN 0 - Terminal	Pheromone	CNS	Sensory
CN 1 - Olfactory	Smell	CNS	Sensory
CN 2 - Optic	Vision	CNS	Sensory
CN 3 - Oculomotor	Eye Movement (A)	PNS	Sensorimotor + PSNS
CN 4 - Trochlear	Eye Movement (B)	PNS	Motor
CN 5 - Trigeminal	Chewing & Facial Sensation	PNS	Sensorimotor
CN 6 - Abducens	Eye Movement (C)	PNS	Motor
CN 7 - Facial	Facial Expression	PNS	Sensorimotor + PSNS
CN 8 - Vestibulocochlear	Hearing & Balance	PNS	Sensory
CN 9 - Glossopharyngeal	Taste	PNS	Sensorimotor + PSNS
CN 10 - Vagus	Internal Organs	PNS	Sensorimotor + PSNS
CN 11 - Accessory	Shoulder & Neck	PNS	Motor
CN 12 - Hypoglossal	Tongue	PNS	Motor



Nerve	Attachment to brain	Exit Foramen	Fibre Type	Location of cell bodies	Distribution
I - Olfactory	Olfactory bulb	Cribriform plate	SVA	Olfactory epithelium	Olfactory epithelium
II - Optic	Optic chiasma	Optic canal	SSA	Retina	Retina
III - Oculomotor	Midbrain	Orbital fissure and Round Foramen	GSE + GVE	Nuculi III parasympathetic nuculi III	Extraocular mm. Constrictor pupulli
IV - Trochlear	Midbrain (dorsal)	Round Foramen	GSE	Nuc IV	Dorsal oblique mm.
V - Trigeminal	Pons	V1 - Orbital fissure V2 - Round Foramen and Orbital Fissure V3 - Oval Foramen	V1 - GSA V2 - GSA V3 - GSA & GSE	V1 - Trigeminal ganglion V2 - Trigeminal ganglion V3 - Nuculi V	V1 - Eye region V2 - Upper jaw inc. teeth V3 - mm. of arch 1
VI - Abducens	Medulla oblongata	Orbital fissure	GSE	Nuc IV	Lateral rectus and retractor bulbi mm.
VII - Facial	Medulla oblongata	Stylomastoid foramen	SVA + GVE + GSE	Nuc III (Taste - geniculate ganglion)	mm. of arch 2 Submaxillary and sublingual glands Rostral 2/3 taste
VIII - Vestibulocochlear	Medulla oblongata	Inner acoustic meatus	SSA	Vestibular ganglion	Maculae and cristae
IX - Glossopharyngeal	Medulla oblongata	Jugular foramen	GSE GVA GVE GSA SVA	Ganglia IX - SVM Nuculi ambiguous - mm. arch 3	Carotid gland Caudal 1/3 taste mm. of arch 3 Carotid body
X - Vagus	Medulla oblongata	Jugular foramen	GSE GVA GVE SVA GSA	Ganglion X - (amongst others)	Thoracic and abdominal organs mm. of arches 4-6 Pharynx and larynx External ear
XI - Accessory	Medulla oblongata	Jugular foramen	GSE	Cervical spinal cord	Trapezius m. etc
XII - Hypoglossal	Medulla oblongata	Hypoglossal canal	GSE	Medulla nuculi XII	Tongue mm.





	GSE	GVE	SVE	SVA GVA	SSA	GSA
	<u>3</u>	<u>3</u>				
	OCULOMOTOR Recti muscles: Medial, Sup., Inf. Levator palpebrae & Inferior oblique.	EDINGER-WESTPHAL Pupil constriction				Facial sensation
	<u>4</u>					<u>5</u>
	TROCHLEAR Superior oblique					MESENCEPHALIC TRIGEMINAL
	<u>6</u>	<u>7</u>	<u>5</u>			<u>5</u>
	ABDUCENS Lateral rectus	SUP. SALIVATORY Lacrimation, Salivation	MOTOR TRIGEMINAL Mastication			PRINCIPAL SENSORY
		<u>9</u>	<u>7</u>			
		INF. SALIVATORY (otic ganglion/ parotid gland)	FACIAL Facial strength		<u>8</u>	
					VESTIBULOCOCHLEAR Hearing & Balance	
	<u>12</u>	<u>10</u>	<u>9, 10</u>	<u>7, 9, 10</u>		<u>5</u>
	HYPOGLOSSAL Tongue protrusion	DORSAL MOTOR NUCLEUS OF THE VAGUS	NUCLEUS AMBIGUUS	SOLITARY TRACT 7: Taste (Ant. 2/3)		SPINAL TRIGEMINAL (also receives CNs 7, 9, & 10)
		 <u>9, 10</u> Cardio-Pulmonary, Swallow, Salivate (9), Gut motility (10)				
	<u>11</u>					
	ACCESSORY Head turn					

- <http://www.anatomyguy.com/the-cranial-nerve-foramen-song/>