



Gaza Ophthalmic Centre

21.3.2 MEDULLA Part 2 Neurosciences I

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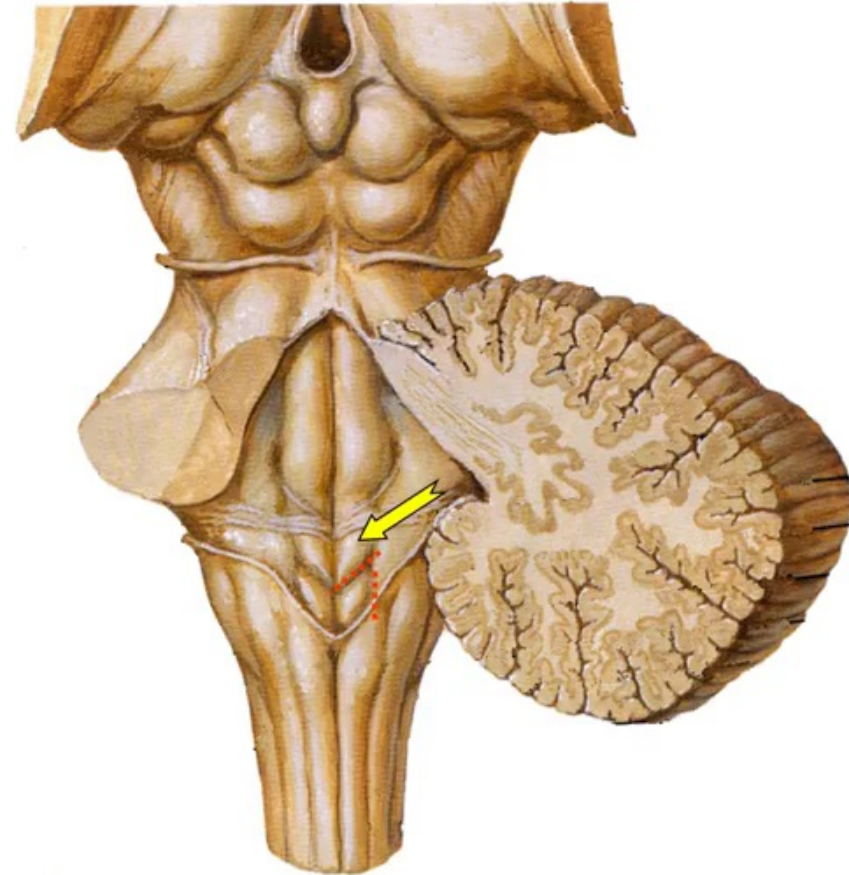
Gaza Ophthalmic Centre

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Medulla: Hypoglossal Nerve

- Single Hypoglossal Nc
- Somatic Efferent F
- Site
 - Hypoglossal trigone
 - Floor of V4



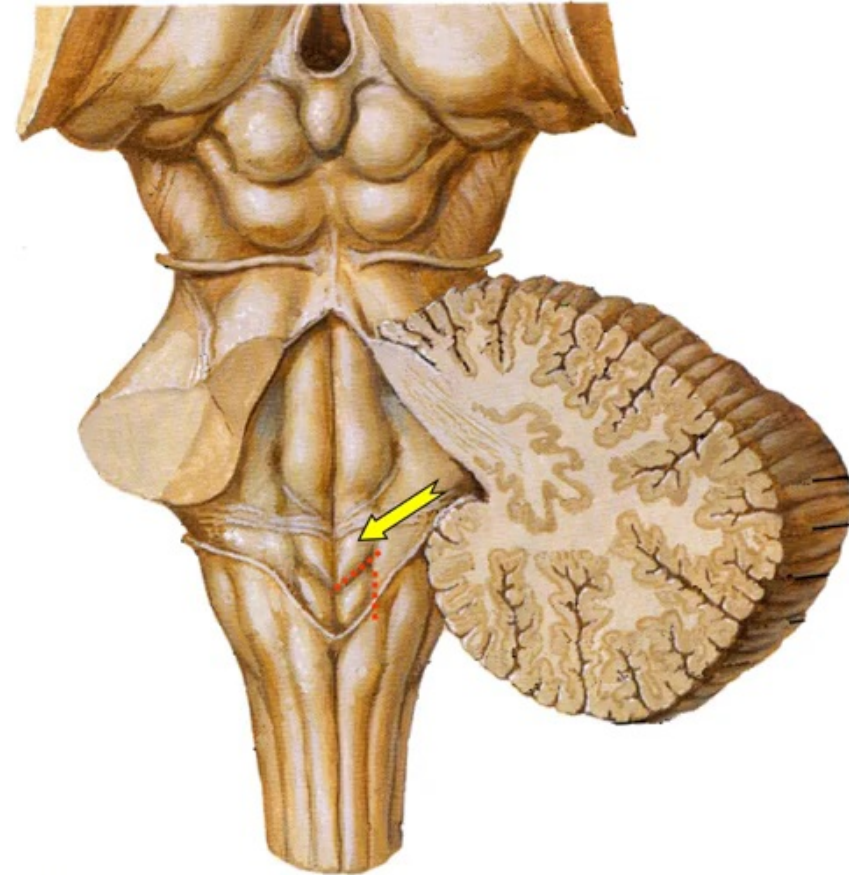
Medulla: Hypoglossal Nerve

- Afferents

- Bil Cortico Nuclear F
 - Except genioglossus
 - → CL side only
- Voluntary movement of Tongue

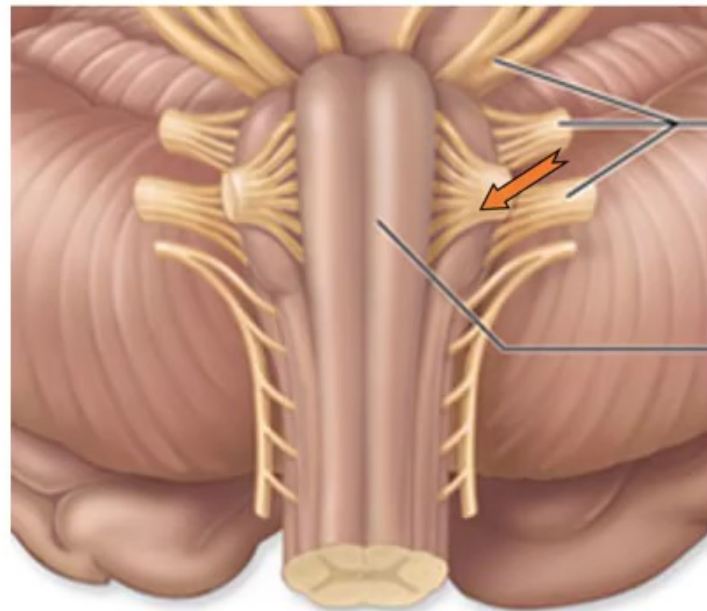
- Efferents

- To all extrinsic &
- intrinsic muscles of the
- tongue
- Except Palatoglossus



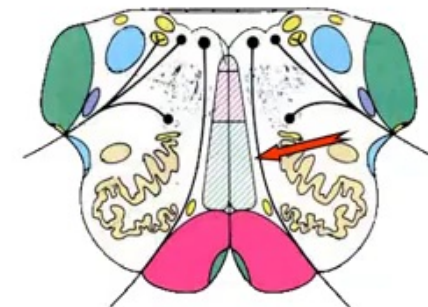
Medulla: Hypoglossal Nerve

- Exit
 - Medulla $\leftrightarrow$
 - Pyramid
 - Olive



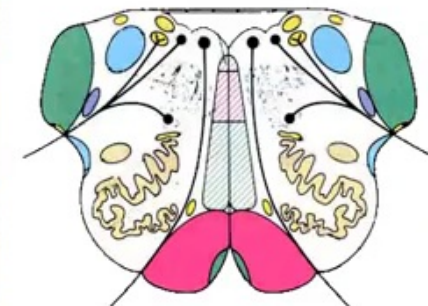
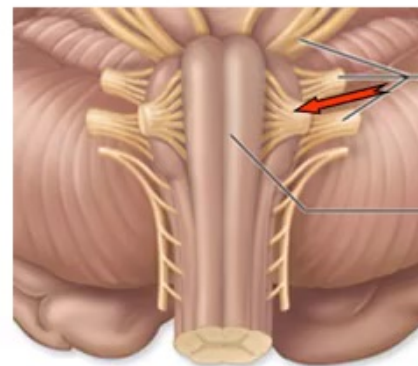
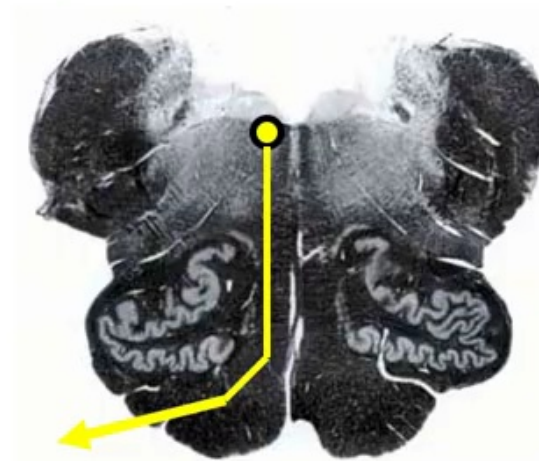
The Hypoglossal Nerve XII

- Purely motor
 - GSM
 - All internal & external tongue muscles
 - Except Palatoglossus
- Hypoglossal Nc in Medulla
- → forward <>
 - the inferior olive & the medial lemniscus
- → laterally <>
 - inferior olive & pyramid



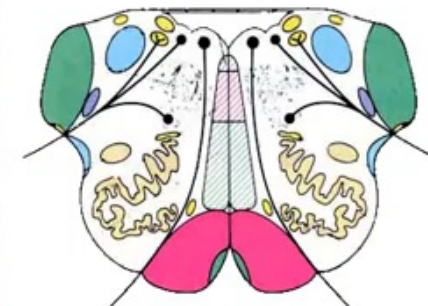
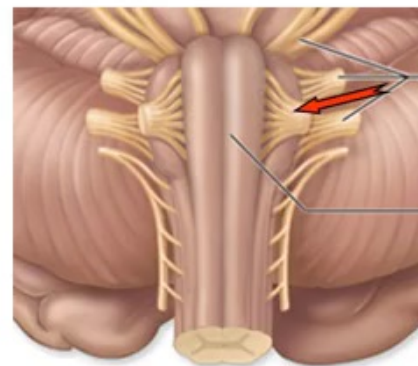
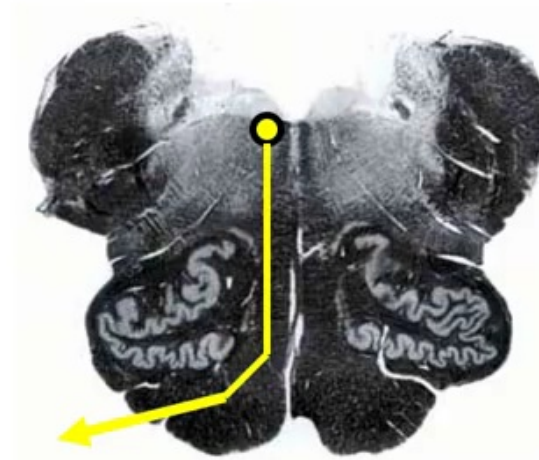
The Hypoglossal Nerve XII

- Emerges at medulla
 - <> olive &
 - Pyramid
- 12 rootlets
 - → unite
- → anterior condylar canal (Hypoglossal canal)



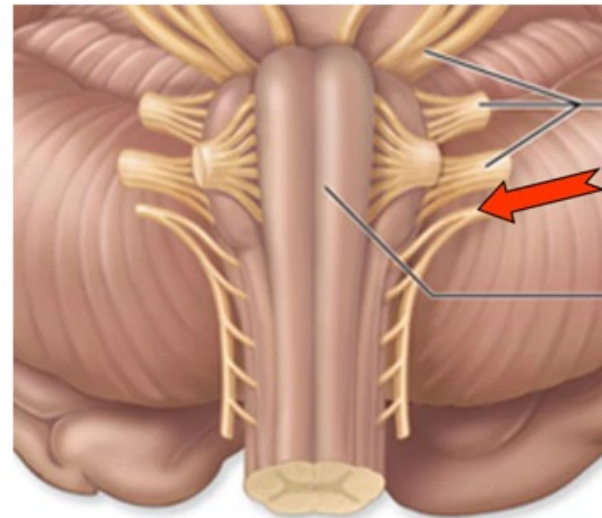
The Hypoglossal Nerve XII

- Unilateral damage
 - → paralysis of
 - genioglossus
 - → deviation of
 - tongue tip to
 - the same side
 - on trial of
 - tongue protrusion



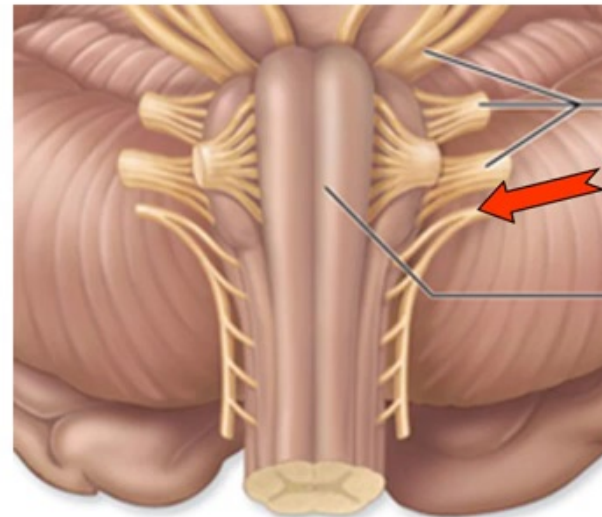
Medulla: Cranial Accessory Nerve

- Arises from
 - Lower part of
 - Nucleus Ambiguus
- Lies in
- Open Medulla



Medulla: Cranial Accessory Nerve

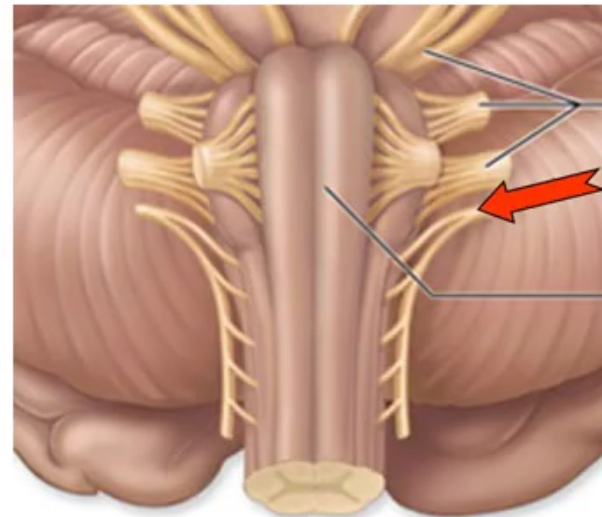
- Afferents
 - Bil Cortico Nuclear f
- Efferents
 - Join Vagus
 - → muscles of
 - Palate except
 - Tensor Palati
 - Pharynx except
 - Stylopharyngeus
 - Larynx
 - Upper Oesophagus



Medulla: Cranial Accessory Nerve

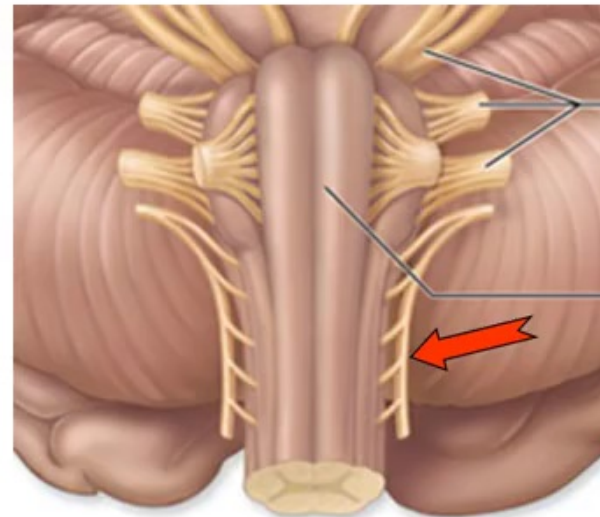
Exit

- **Cranial Root**
 - From Medulla between
 - Olive
 - ICP
- **Spinal Root of Accessory N**
 - Arise from
 - Spinal Nc of Accessory
 - Anterior Horn C1 – C5



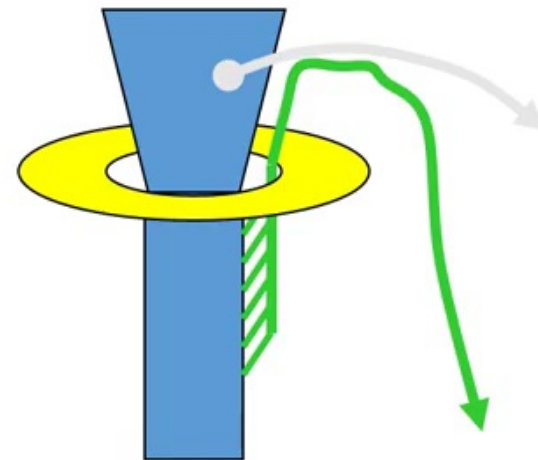
Medulla: Cranial Accessory Nerve

- **Spinal Root of Accessory N**
 - Arise from
 - Spinal Nc of Accessory
 - Anterior Horn C1 – C5
 - **Afferent**
 - Bil Cortico Spinal
 - **Exit**
 - Side of Spinal Cord
 - Between Ventral & Dorsal roots
 - **Ascend via foramen Magnum**
 - **Joins the Cranial Accessory N**
 - Supplies Sternomastoid & Trapezius



The Accessory Nerve XI

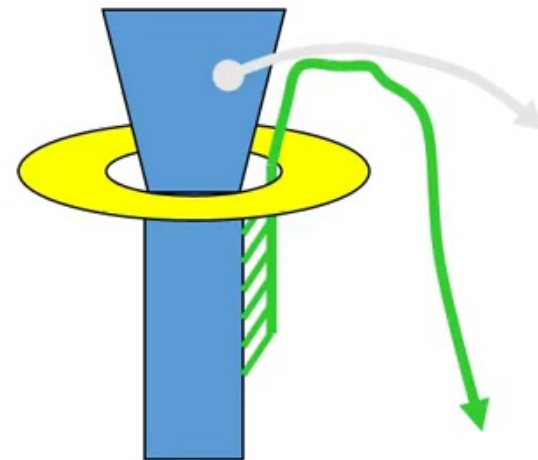
- Large spinal root
 - AHC of upper 6 cervical segments
 - Leave the sc between ant & pos roots
 - Ascend through foramen magnum
 - Joins the cranial root
- Small cranial root
 - Lowest part of nucleus ambiguus
 - Leave the medulla below the vagus
 - 5-6 rootlets
- Roots join for a short distance
- → the accessory nerve
- → Divide again →



The Accessory Nerve XI

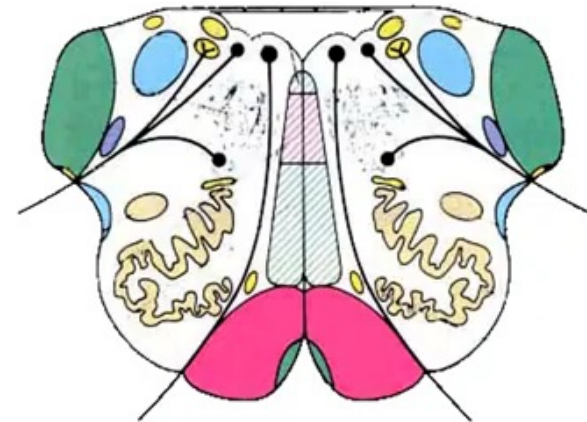
Divide again →

- Spinal part
 - Descends in the neck
 - →
 - Sternomastoid
 - Trapezius
- Cranial part
 - Joins the vagus (→ part of it)
 - → pharyngeal & recurrent laryngeal branches of vagus
- → muscles of
 - Palate
 - Pharynx
 - Larynx



Medulla: Vagus Nerve I

- 2 Sensory Nuclei →
 - Receives
- 3 afferent sensations
 - Spinal Nc of the Trigeminal N
 - 1) Pain & Temp
 - External ear, back of tongue,
 - laryngeopharynx & larynx
 - Nucleus solitarius
 - 2) Visceral sensation
 - Thoracic organs, foregut & midgut
 - 3) Taste sensation
 - Back of tongue & epiglottis

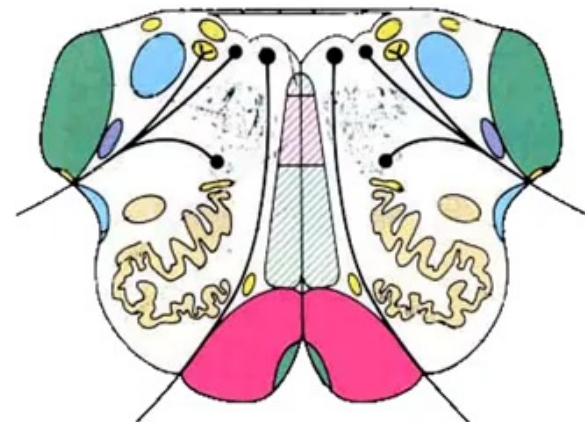


Medulla: Vagus Nerve I

- Sensory fibres are
 - the processes of
 - Unipolar neurons

2 sensory Ganglia

- On Vagus Trunk
- below
- Jugular Fmn



Medulla: Vagus Nerve 2

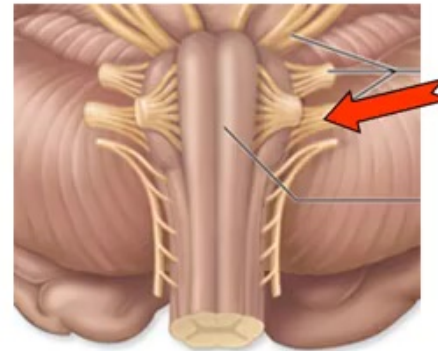
- 2 Motor Nuclei →
- Give 2 Efferent Fibres

Nucleus Ambiguus

- middle part
 - Afferent
 - Bil Cortico Spinal
- Efferents
 - Share
 - Cranial Accessory N →

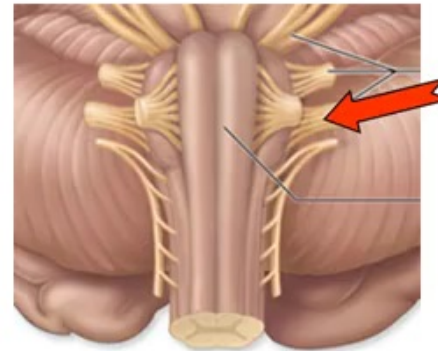
Muscles of:

- Palate
- Pharynx
- Larynx
- Upper Oesophagus



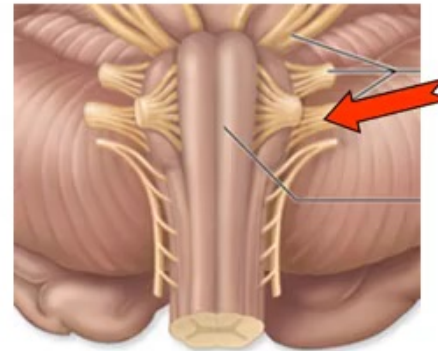
Medulla: Vagus Nerve 2

- 2 Motor Nuclei →
- Give 2 Efferent Fibres
 - Dorsal Vagal Nc
 - In the Vagal Trigone
 - Floor of V4
 - Efferent
 - Preganglionic PS F
 1. Thoracic organs,
 2. foregut &
 3. midgut



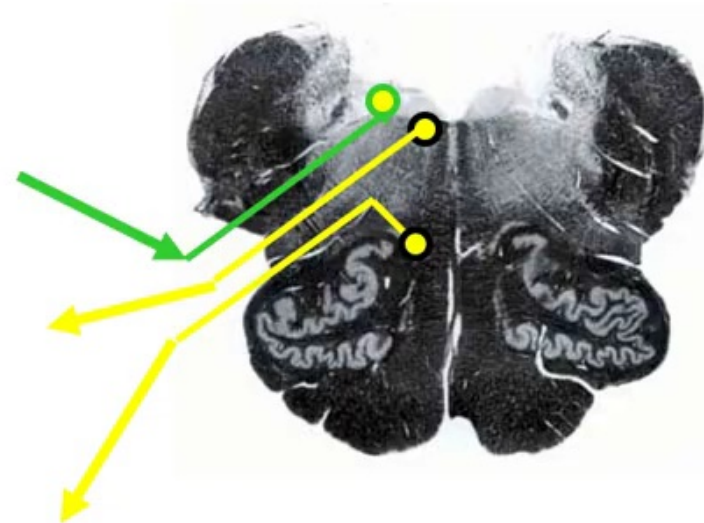
Medulla: Vagus Nerve 2

- Vagus N Exit
 - From Medulla
- Between
 - Olive
 - ICP



The Vagus Nerve

- Mixed nerve M+S+PS
 - Mainly
 - Motor &
 - Parasympathetic
 - The most important
 - parasympathetic nerve
- 3 nuclei
 - 2 motor
 - Dorsal motor Nc of the Vagus
 - Nucleus Ambiguus
 - 1 sensory
 - Nc Solitarius
 - + Trigeminal Nc



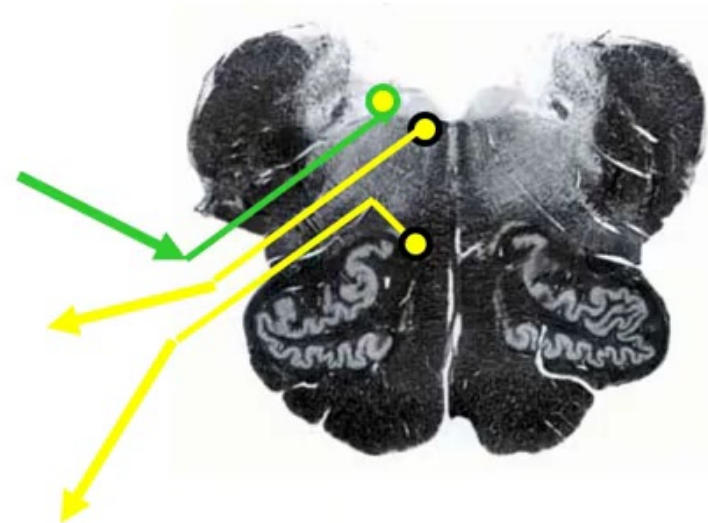
The Vagus Nerve

- Dorsal motor Nc of the Vagus
 - Parasympathetic
 - GVM
 1. GIT: oesophagus → left colonic flexure
 2. Respiratory system
 3. Heart



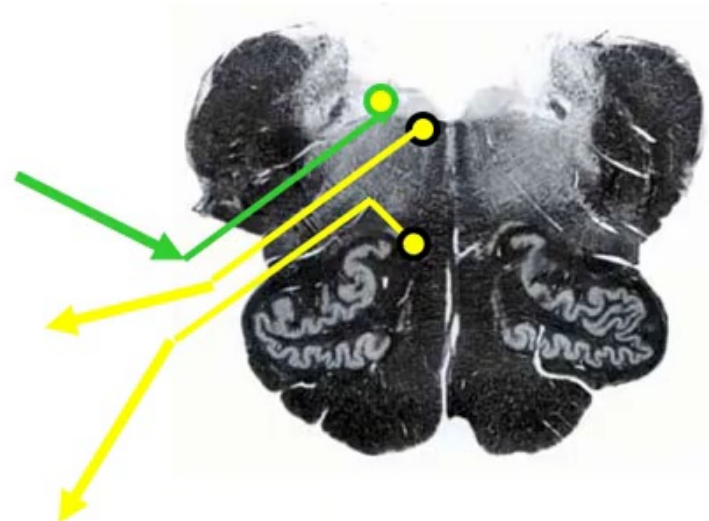
The Vagus Nerve

- Nucleus Ambiguus
 - Main part
 - SVM
- Larynx all muscles
- Pharynx all
 - except
 - stylopharyngeus
- Palate all
 - except
 - tensor palati



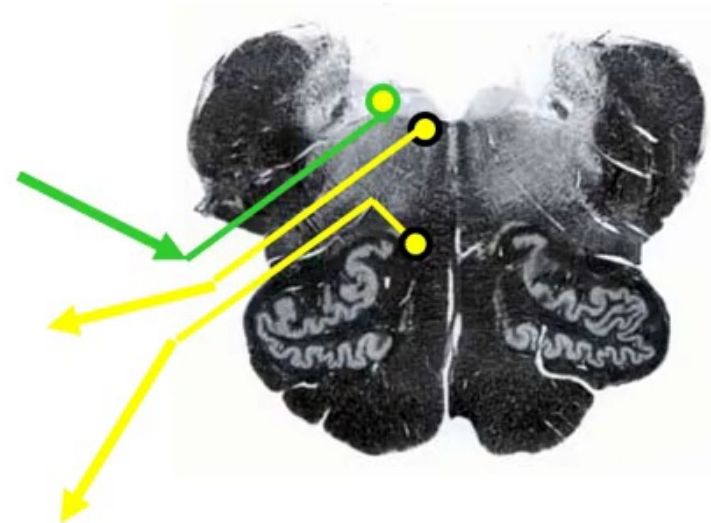
The Vagus Nerve

- Nc Solitarius
 - Areas supplied by
 - autonomic fibres
 - GVS
 - Taste from
 - epiglottis
 - SVS



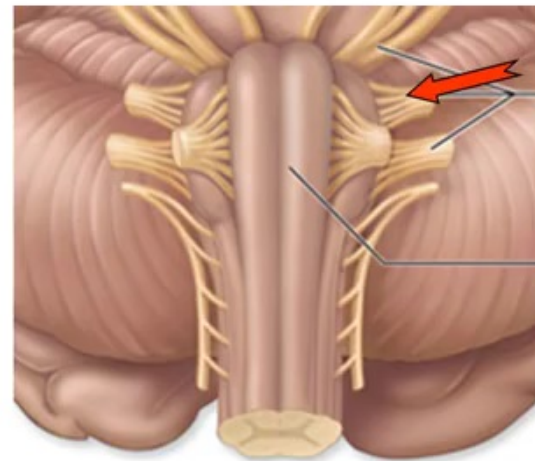
The Vagus Nerve

- Mixed nerve M+S+PS
- Vagus lesion
 - c/o
 - Dysphagia
 - Dysphonia
 - Dysarthria nasal tone
 - Hoarseness of voice larynx
 - Signs
 - Flattening of the palatine arch IL
 - Soft palate & uvula →
 - shift to the normal side



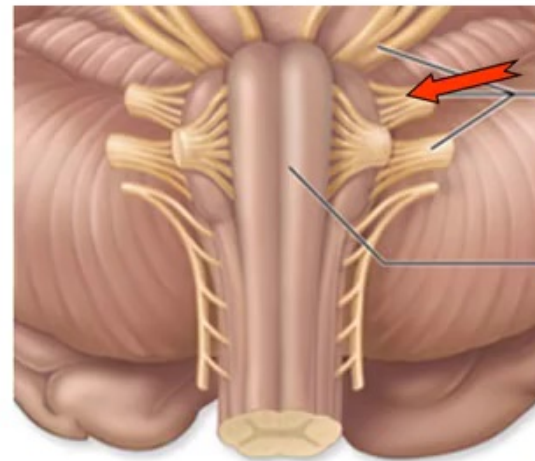
Medulla: Glossopharyngeal Nerve

- 2 Sensory Nc →
 - 2 types of Sensation
 - Spinal Nc of Trigeminal n
 - Nucleus Solitarius
- 2 Motor Nuclei
 - Nucleus Ambiguus upper part
 - Inferior Salivatory Nc
- Exit
 - From Medulla
 - Between
 - Olive
 - ICP



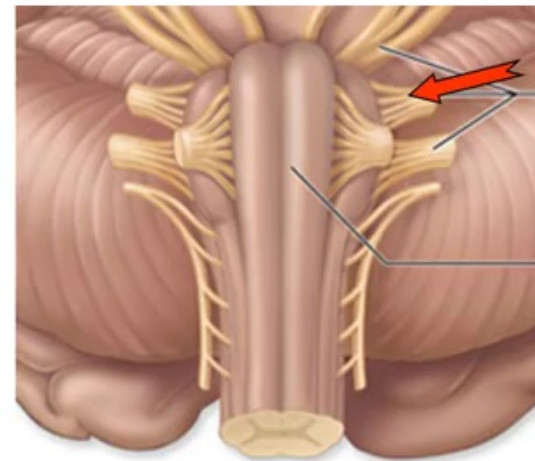
Medulla: Glossopharyngeal Nerve

- 2 Sensory Nc
 - Spinal Nc of Trigeminal n
 - Pain & Temp
 - Pos1/3 of Tongue
 - Oropharynx
 - Middle ear
 - Nucleus Solitarius
 - Taste sensation
 - Pos1/3 of Tongue
 - Circumvallate papillae
 - Sensory fibres are
 - the processes of
 - Unipolar neurons
 - In 2 sensory Ganglia
 - On Glossopharyngeal Trunk
 - below Jugular Fmn



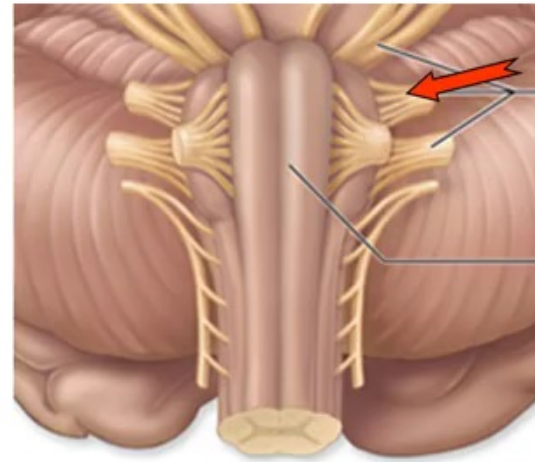
Medulla: Glossopharyngeal Nerve

- 2 Motor Nuclei
 - Nucleus Ambiguus
 - upper part
 - Afferent
 - Bil Cortico Spinal
 - Efferent
 - Branchiomotor eff →
 - Stylopharyngeus
 - Inferior Salivatory Nc
 - Efferent
 - Preganglionic PS
 - → Otic Ganglion
 - → parotid Gland



Medulla: Glossopharyngeal Nerve

- Exit
 - From Medulla
 - Between
 - Olive
 - ICP



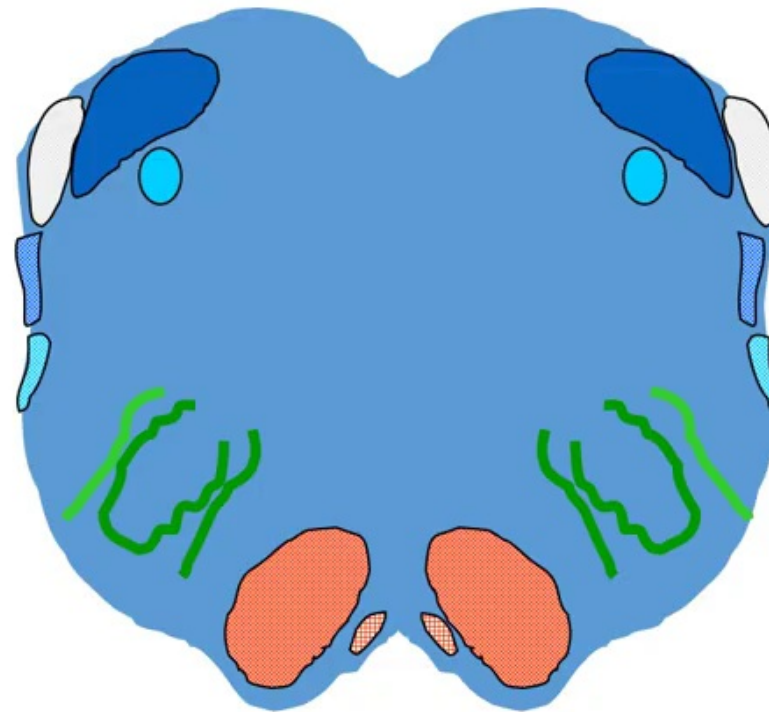
The Glossopharyngeal Nerve

- Mixed nerve M+S+PS
 - Mainly sensory
 - The most important nerve of
 - Taste
- IX lesion
 - Usually involves the
 - Vagus as well
 -
 - Loss of taste of
 - pos 1/3 of tongue
 -
 - Loss of pain, temp & touch of
 - pos 1/3 of tongue &
 - pharynx
 -
 - Pharyngeal weakness
 -
 - Loss of parotid salivation



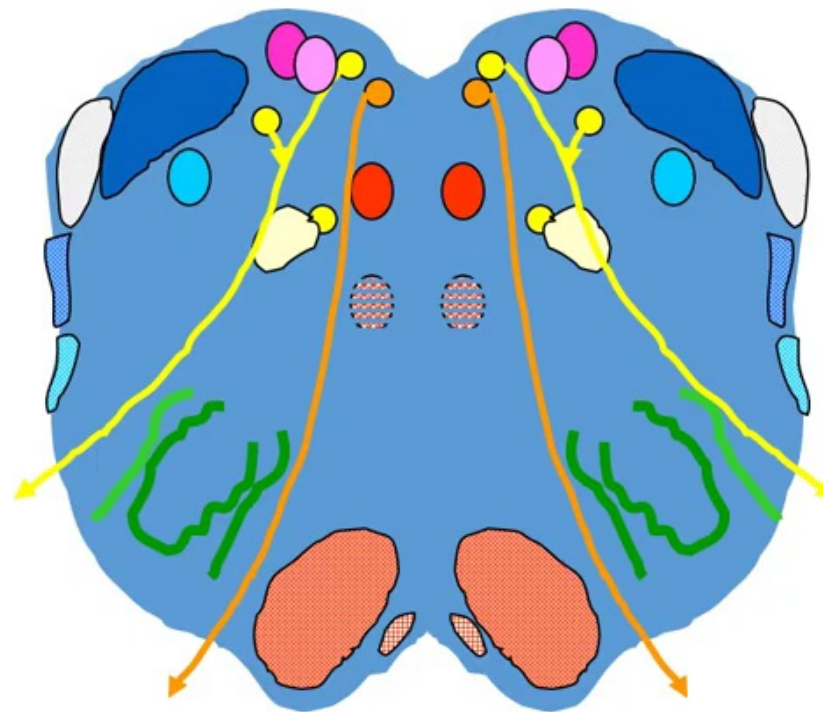
Open Medulla: Inferior Olive Level

- Inferior Olivary Nc
- Medial Accessory Olivary Nc
- Dorsal Accessory Olivary Nc
- ICP
- V Spinal Nc + T
- Dorsal Spinocerebellar T
- Ventral Spinocerebellar T
- Spinothalamic T
- Pyramid
- Arcuate Nc



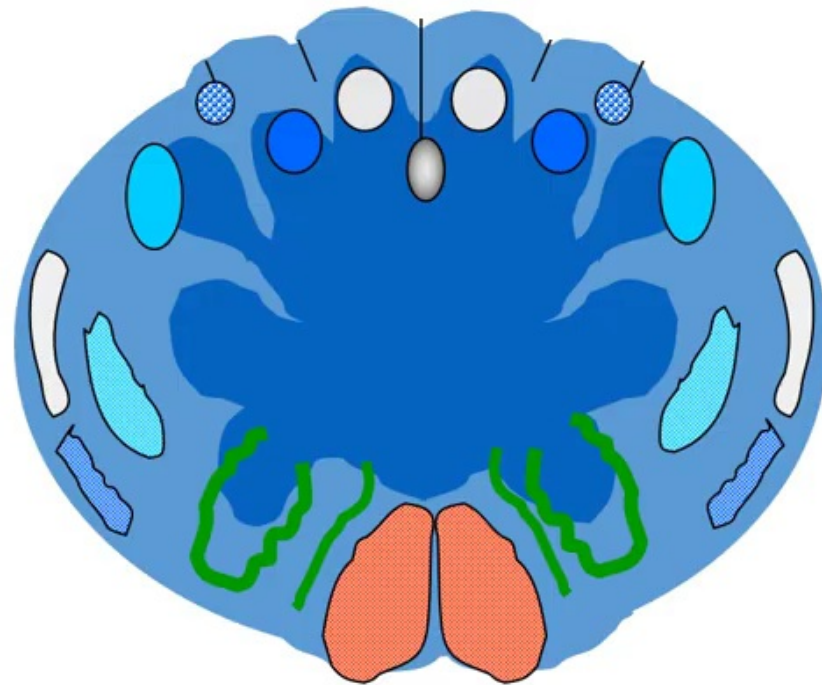
Open Medulla: Inferior Olive Level

- Nc Ambiguous
- Central Tegmental T
- Dorsal Nc of Vagus
- Nc of Tractus Solitarius
- Vagus N
- Hypoglossal Nc
- Hypoglossal N
- Medial Vestibular Nc
- Inferior Vestibular Nc
- MLB
- Tectospinal T



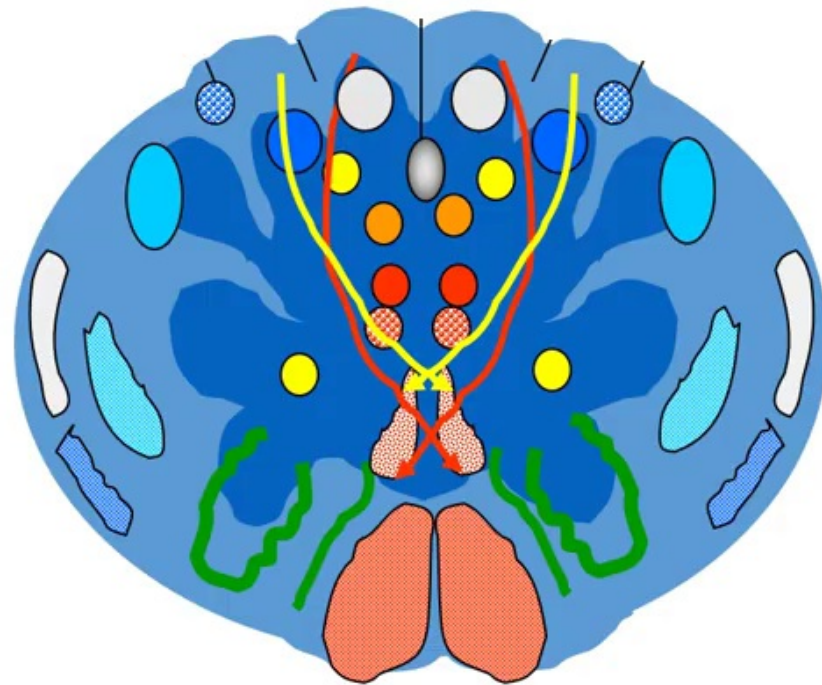
Closed Medulla: Sensory Decussation

- Central Canal
- Gracile Nc
- Cuneate Nc
- Accessory Cuneate Nc
- V Spinal Nc + T
- Dorsal Spinocerebellar T
- Ventral Spinocerebellar T
- Spinothalamic T
- Inferior Olivary Nc
- Medial Accessory Olivary Nc
- Pyramid



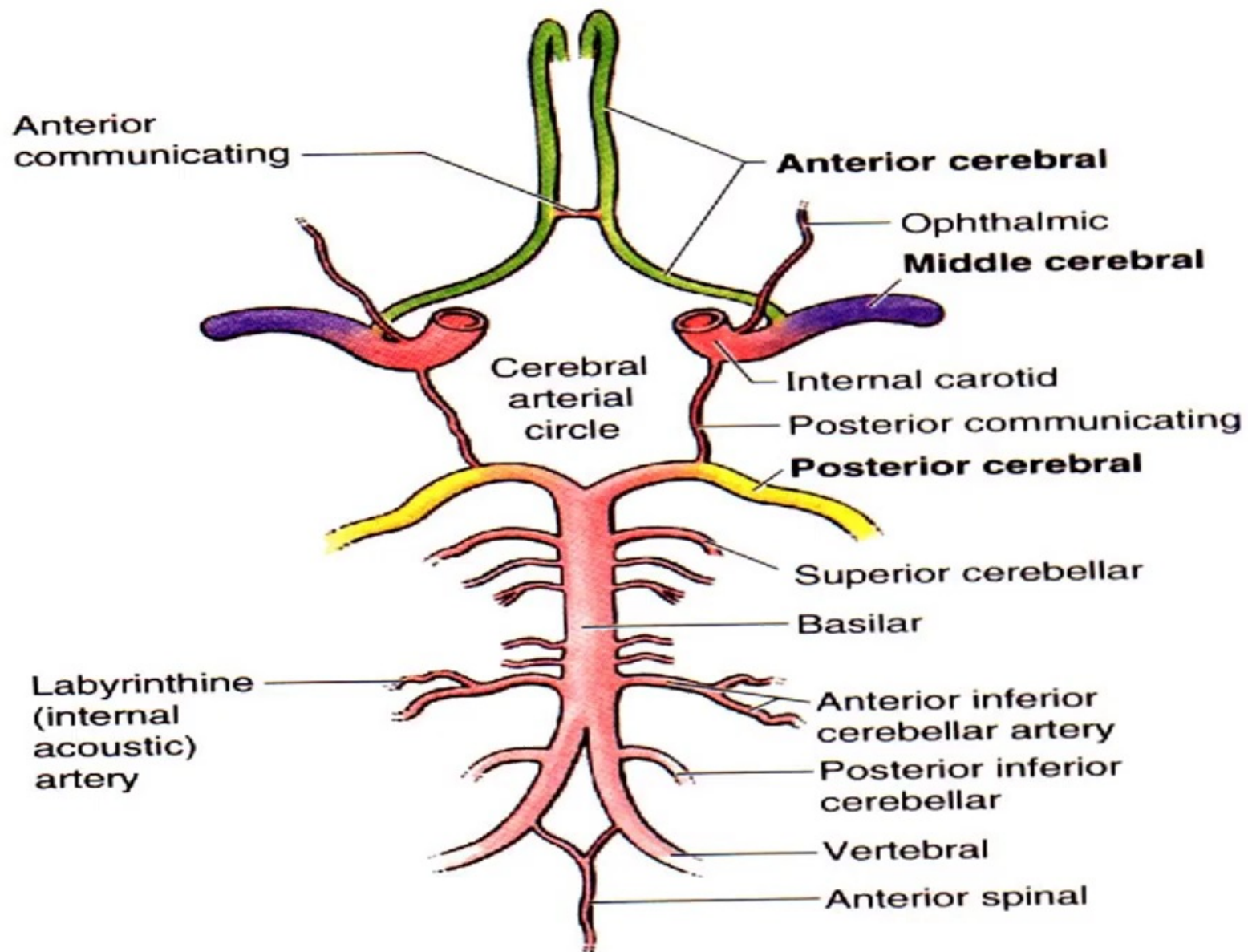
Closed Medulla: Sensory Decussation

- Nc Ambiguous
- Dorsal Nc of Vagus
- Hypoglossal Nc
- MLB
- Tectospinal T
- Medial Lemniscus
- Internal Arcuate Fibres



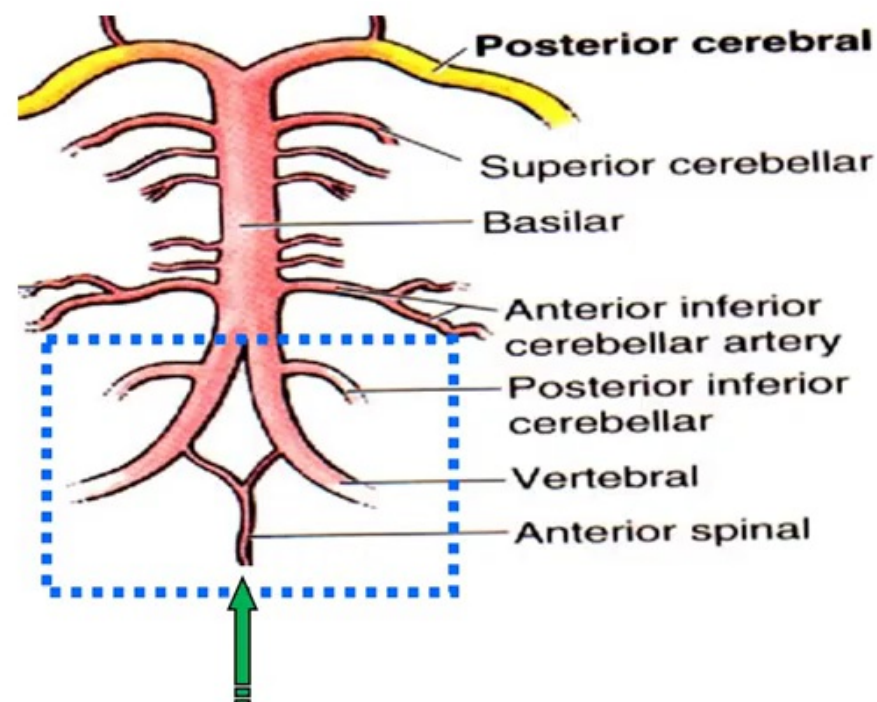
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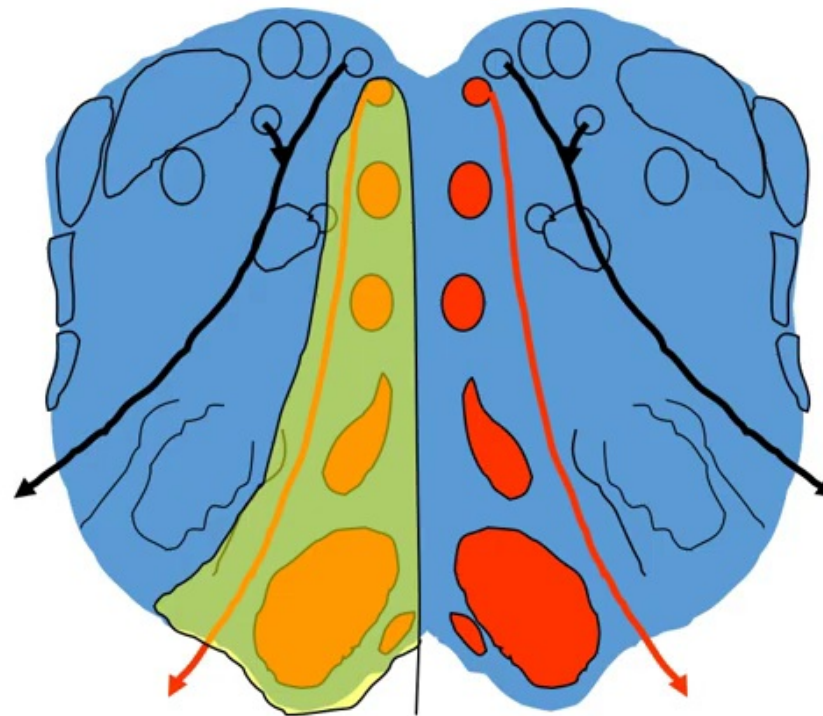
Medulla: Arterial Blood Supply

- 1) Anterior Spinal A
 - Supplies Medial Zone $\leftrightarrow$
 - Anterior median fissure
 - Sulcus of Hypoglossal N
1. MLB
 2. Tectospinal T
 3. Med Lemniscus
 4. Pyramid
 5. Hypoglossal Nc



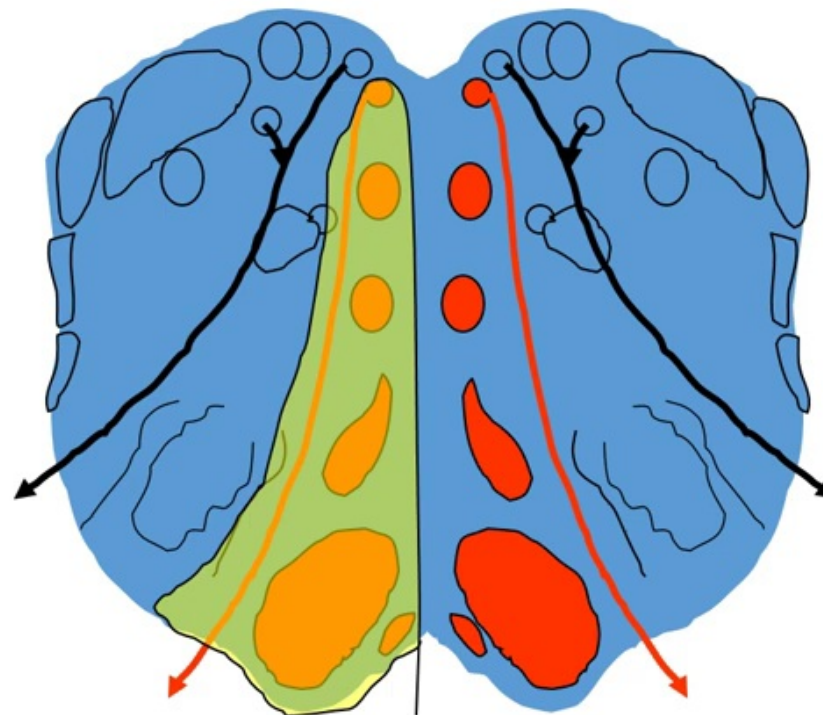
Medulla: Arterial Blood Supply

- 1) Anterior Spinal A Thrombosis
 - →
- Medial Medullary Syndrome
 - Med Lemniscus
 - → CL body loss of
 - proprioception & fine touch
 - Pyramid
 - CL UMN Hemiplegia
 - Flacid paralysis
 - The only site where there is
 - Pyramidal lesion
 - & no Extrapramidal affection
 - Hypoglossal Nc
 - IL LMNL Tongue paralysis



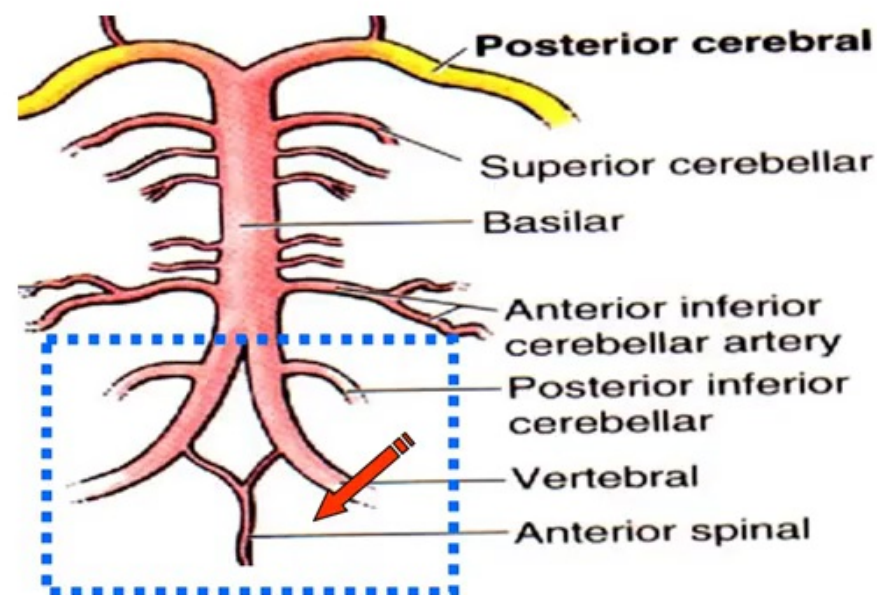
Medial Medullary Syndrome

- Pyramid
- Hypoglossal Nc
- Hypoglossal N
- MLB
- Tectospinal T
- Medial Lemniscus
- Arcuate Nc



Medulla: Arterial Blood Supply

- 2) Medullary branches of Vertebral A
 - Supplies Intermediate Zone $\leftrightarrow$
 - Exit of XII
 - Exit of IX, X & XI



Medulla: Arterial Blood Supply

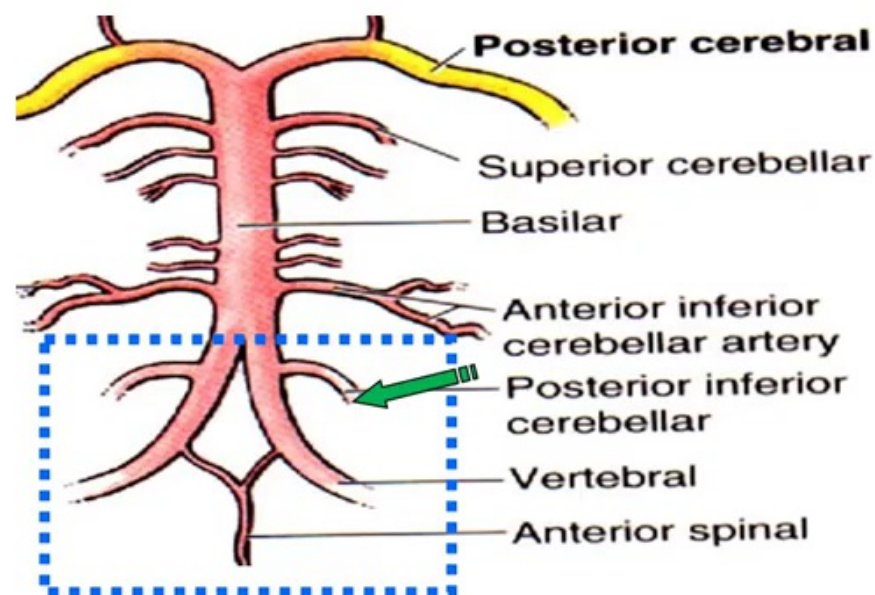
- 3) Posterior Inferior Cerebellar A

- Supplies Lateral Zone

- Lateral to
- exit of IX, X, XI

Thrombosis →

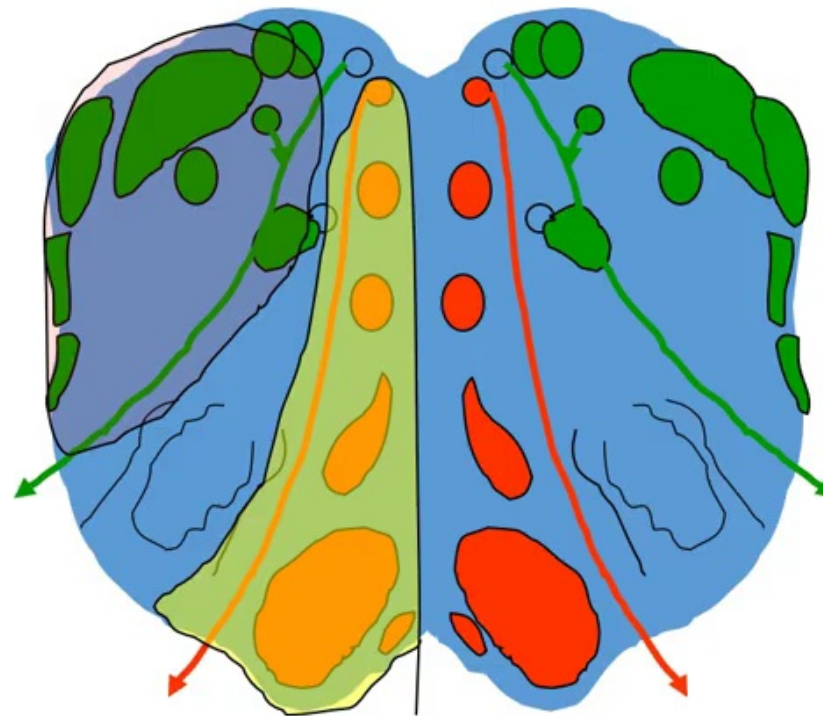
Lateral Medullary Syndrome



Medulla: Arterial Blood Supply

Lateral Medullary Syndrome

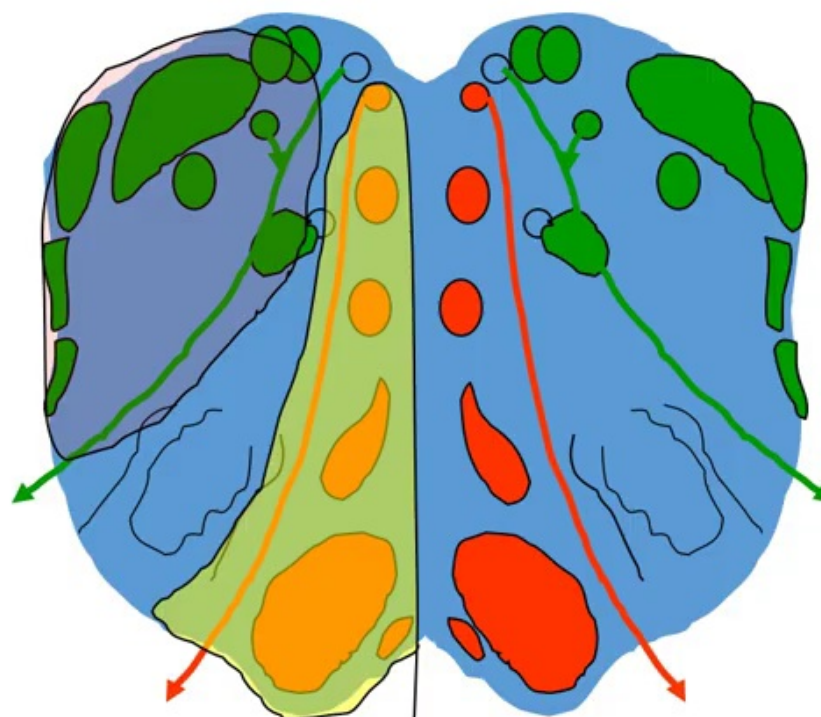
- 1- Spinal Lemniscus
 - → **CL** loss of
 - Pain & Temp
 - from body
- 2- Spinal T & Nc of Trigeminal N
 - → **IL** loss of
 - Pain & Temp from
 - Face & Forehead
- 3- Spinocerebellar t →
 - IL Cerebellar Ataxia



Medulla: Arterial Blood Supply

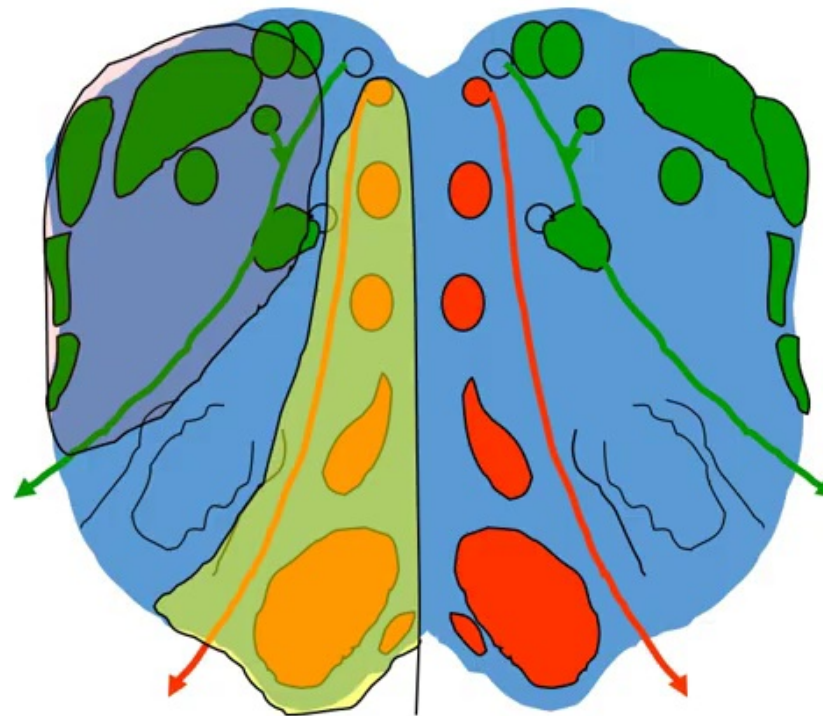
Lateral Medullary Syndrome

- 4- Nucleus Solitarius →
 - IL loss of Taste sensation from
 - pos 1/3 tongue
- 5- Nucleus Ambiguus →
 - IL paralysis of palate pharynx & larynx
- 6- Hypothalamic descending Sympathetic f
• → IL Horner's Syndrome



Lateral Medullary Syndrome

- ICP
- V Spinal Nc + T
- Spinothalamic T
- Nc Ambiguous
- Vagus N
- Medial Vestibular Nc
- Inferior Vestibular Nc



Medulla: Arterial Blood Supply

- 4) Posterior Spinal a
 - Supplies Posterior Zone
 - Closed Medulla
 - Gracile & Cuneate Tracts & nuclei

