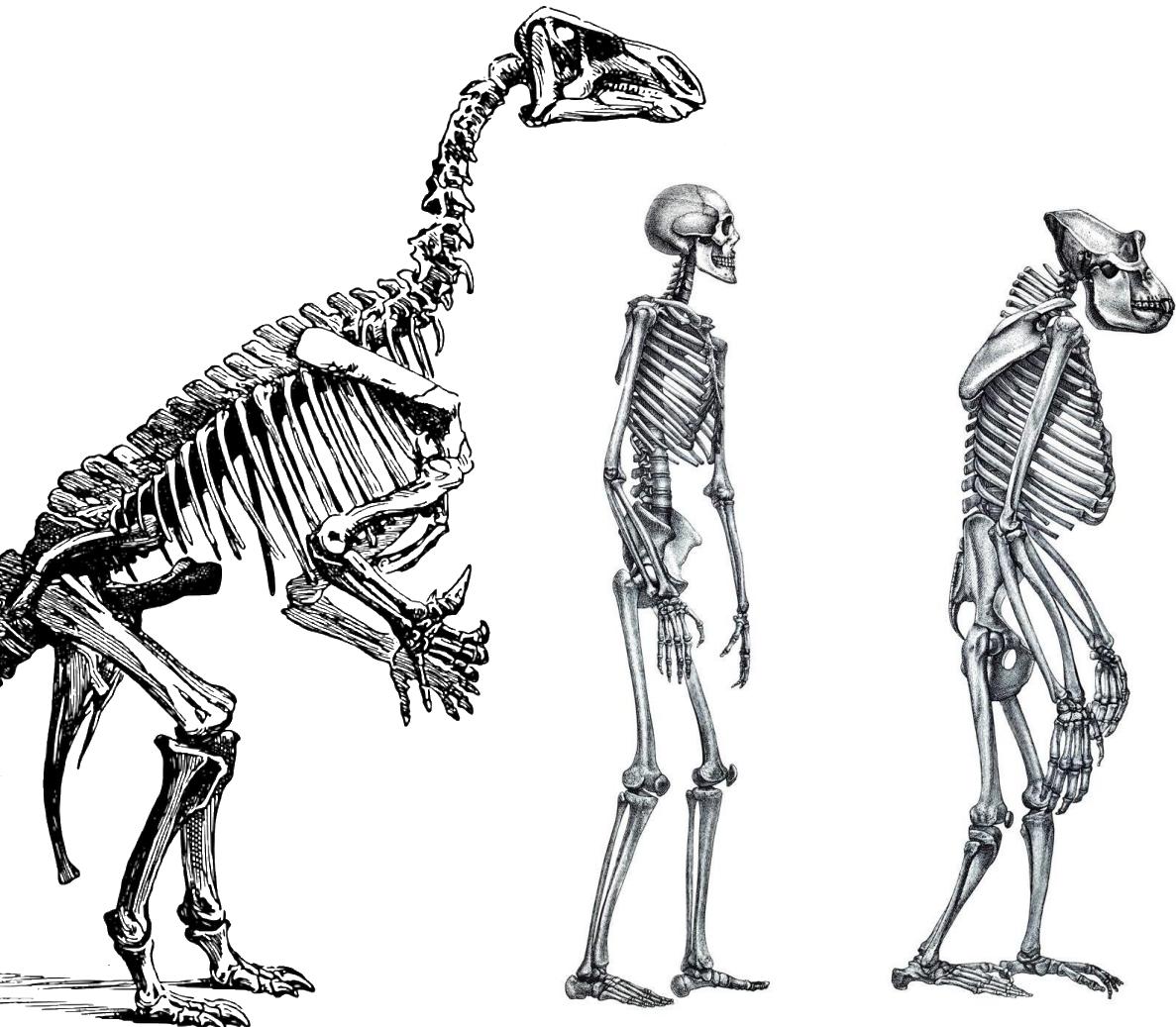


The Head (and neck that supports it) is a Special Region

Full of Unique Features



Doctor-Patient Interface

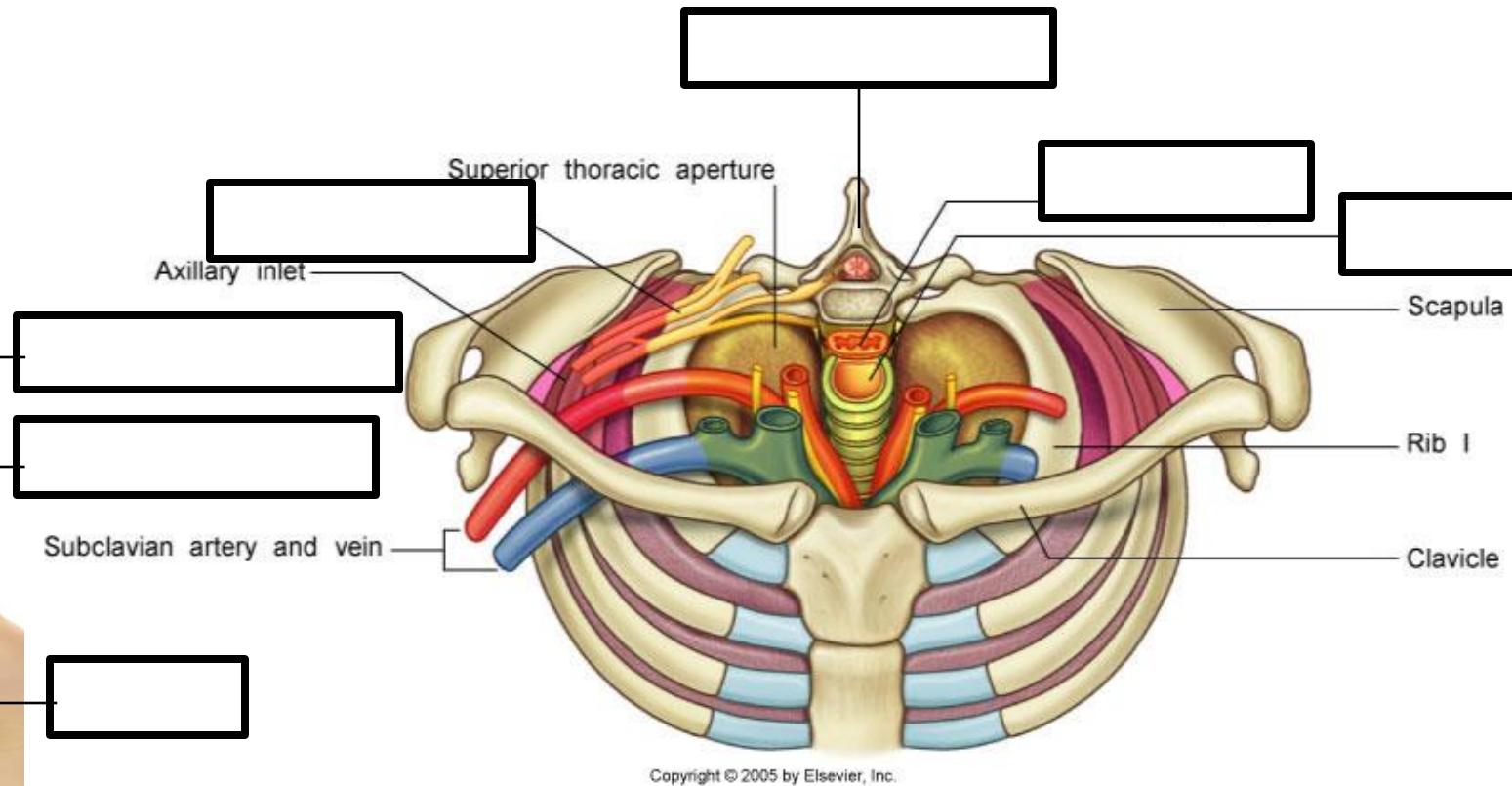
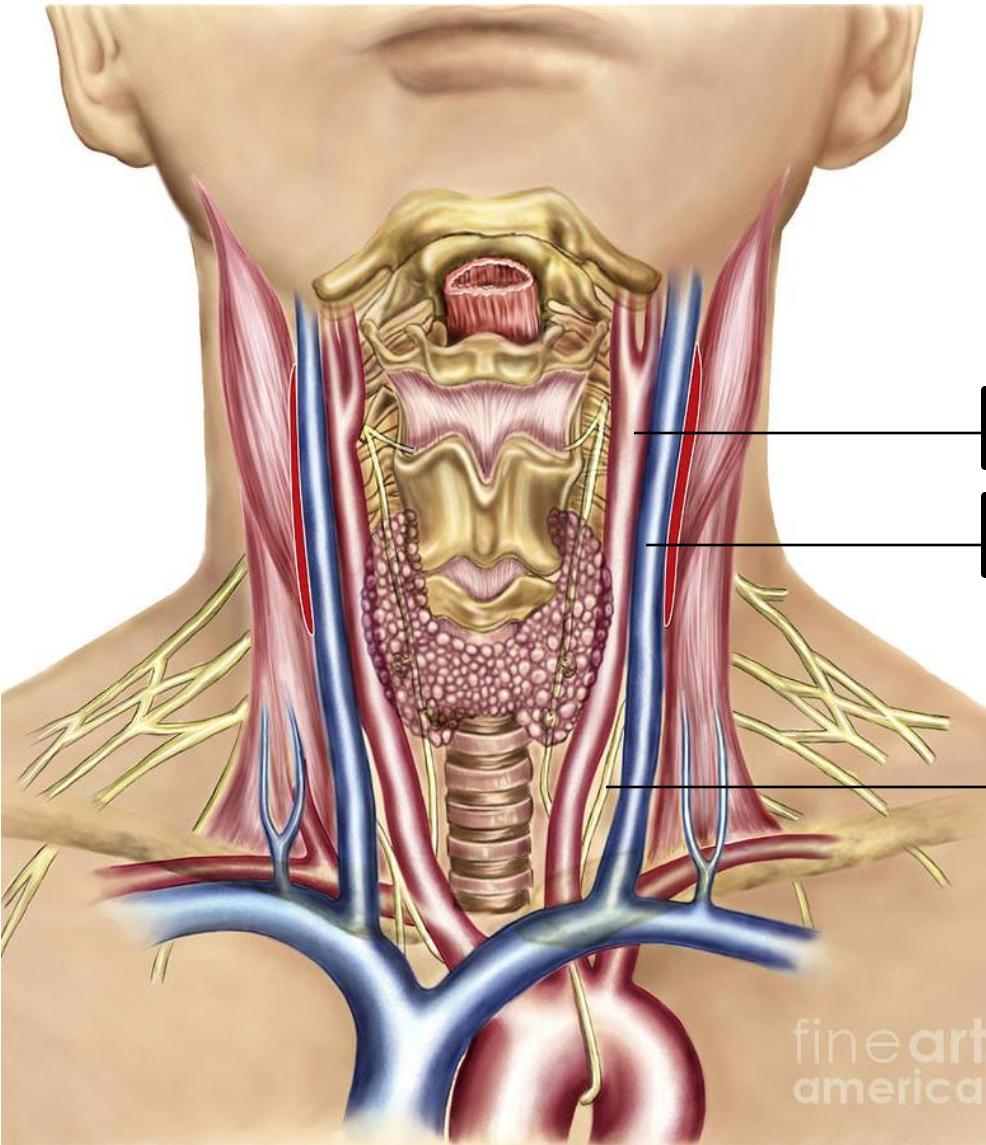


Source: Photo by A. Yahya; Huxley 1863; Dollo

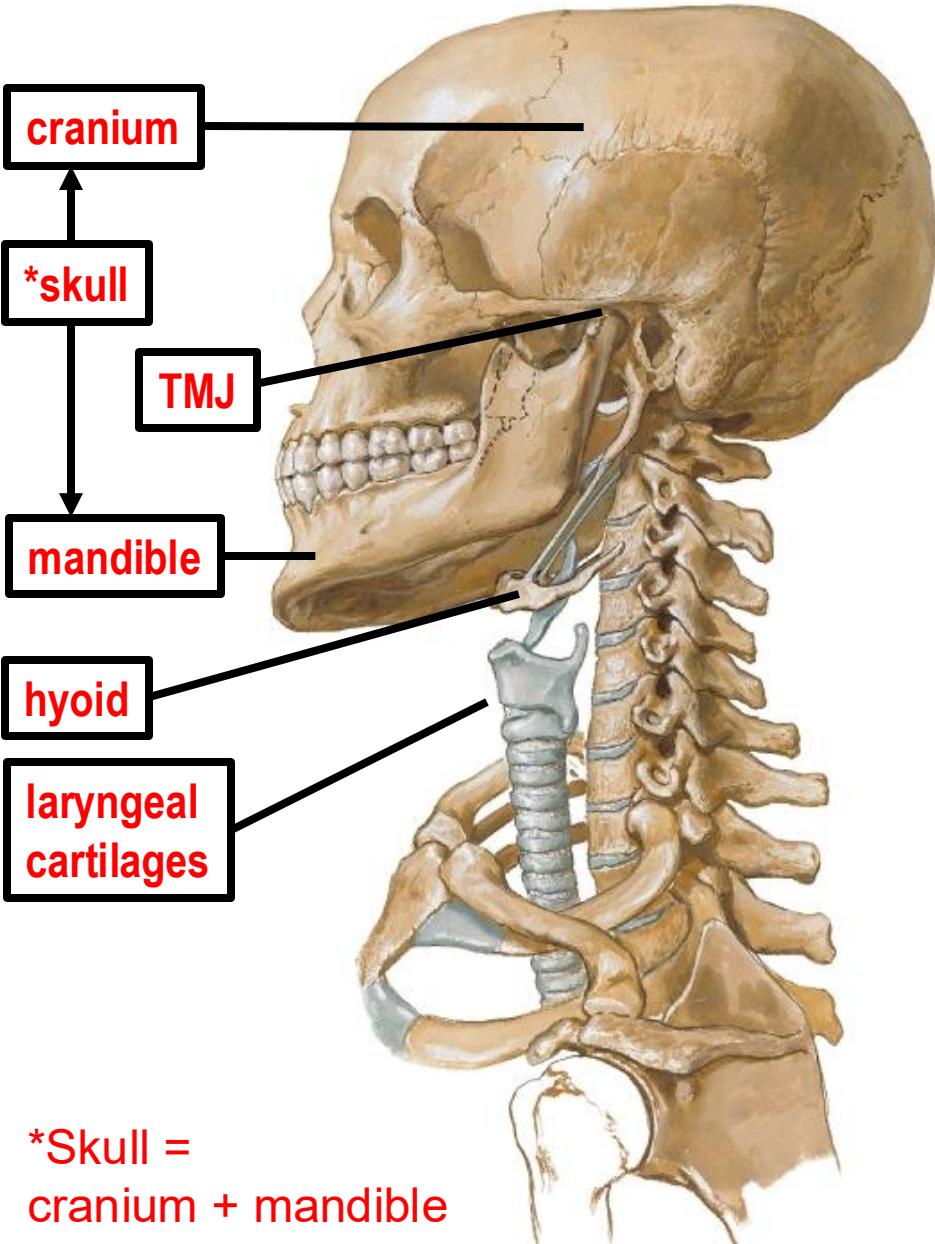
Lecture Content Guide

- Red text on slides = know for exams.
- Anatomical structures labeled in red or red highlight = know for exams. Note: other structures may still be tested on anatomy exam (consult the lab checklist).
- \$ Clinical Correlates \$ = know for exams.
- Go over Learning Objectives in the CPG

Which Structures Pass To or From the Neck?

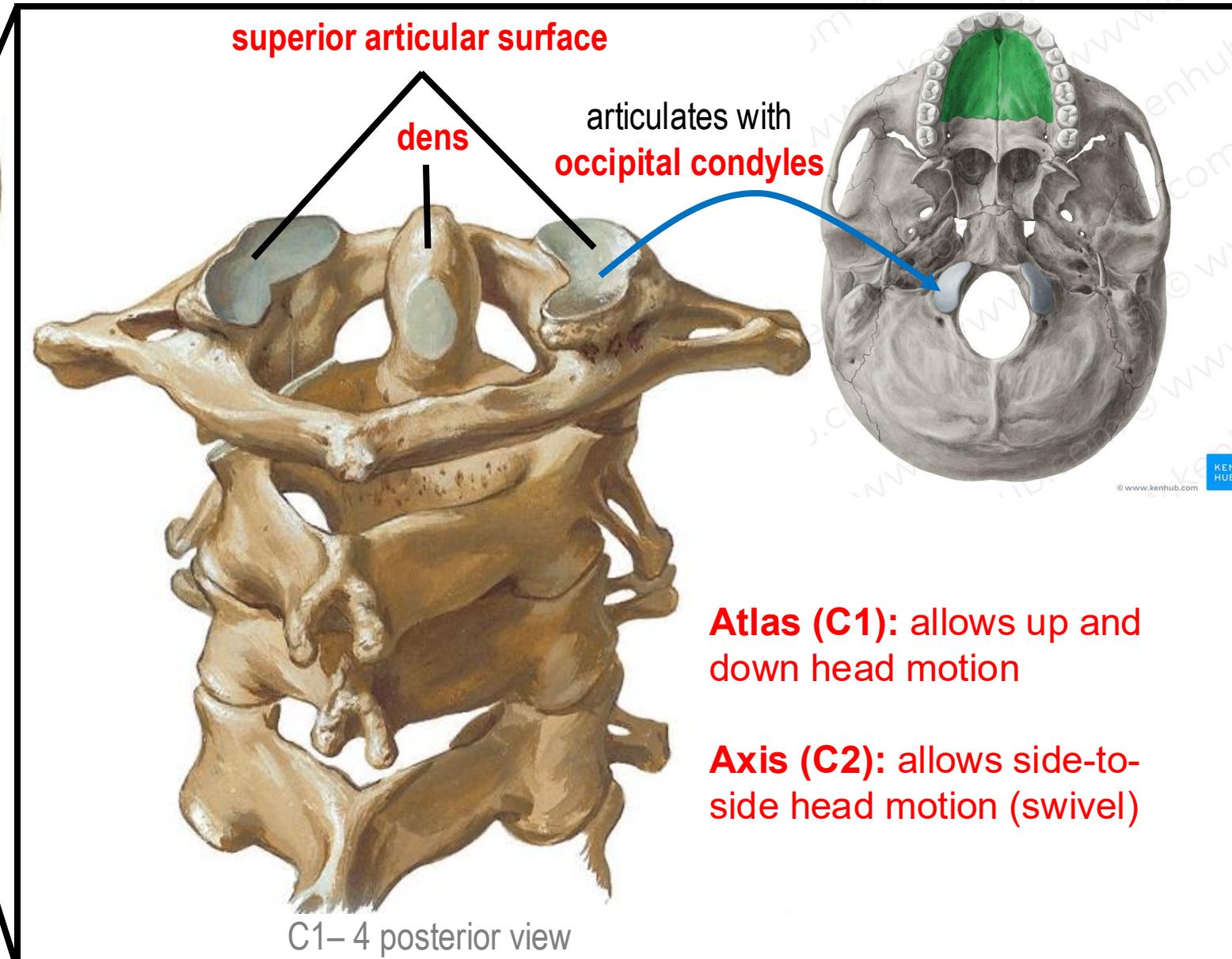
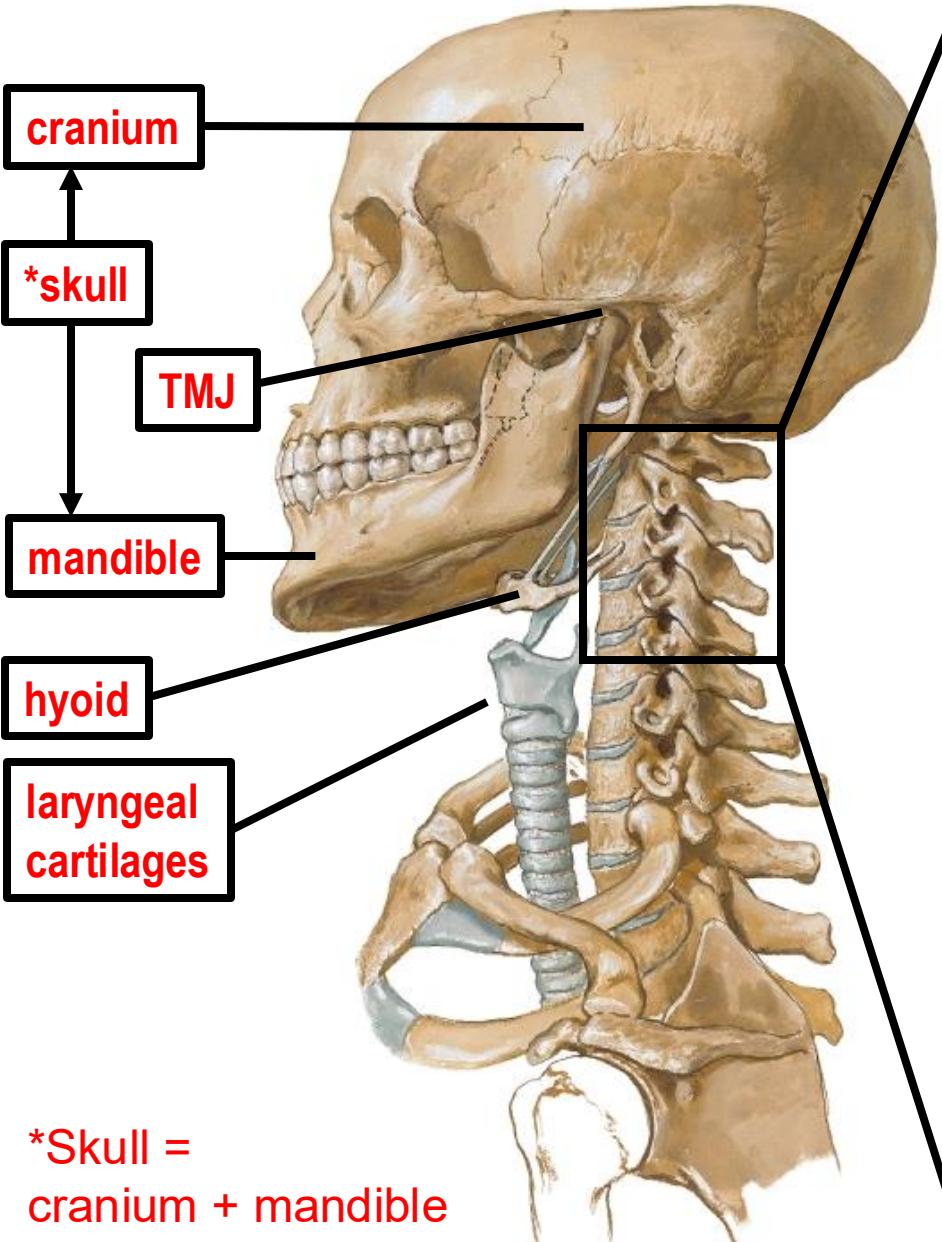


Skeletal System

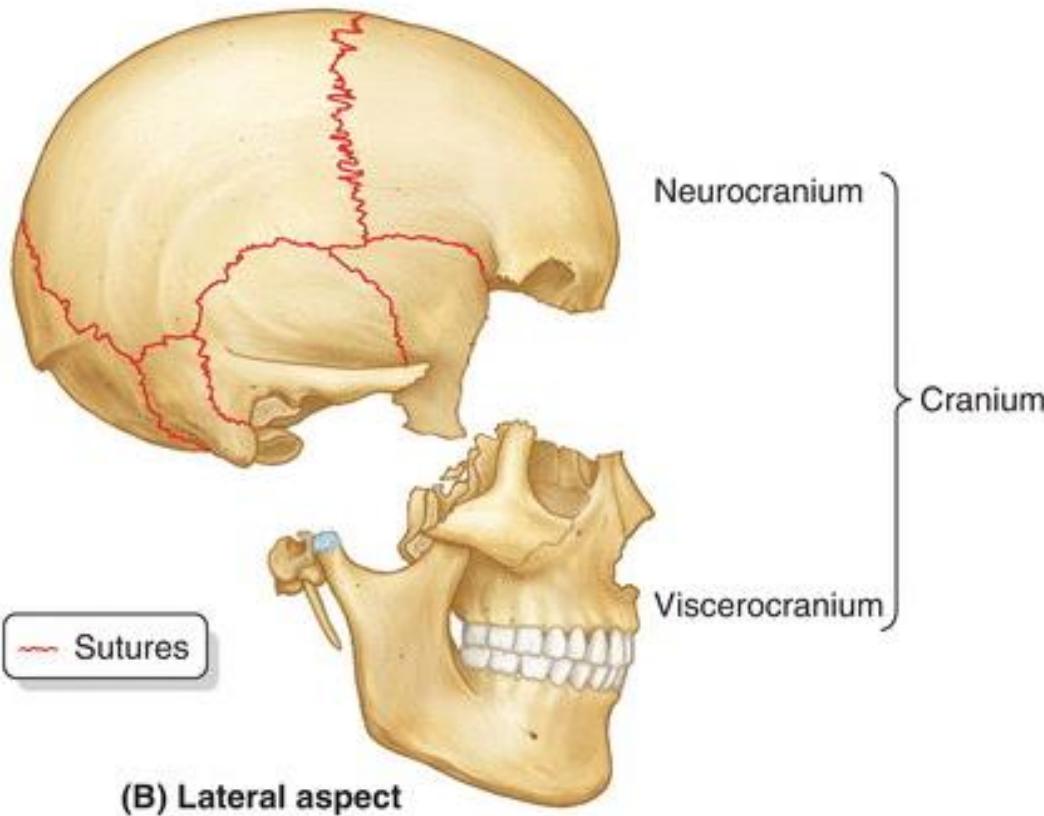


*Skull =
cranium + mandible

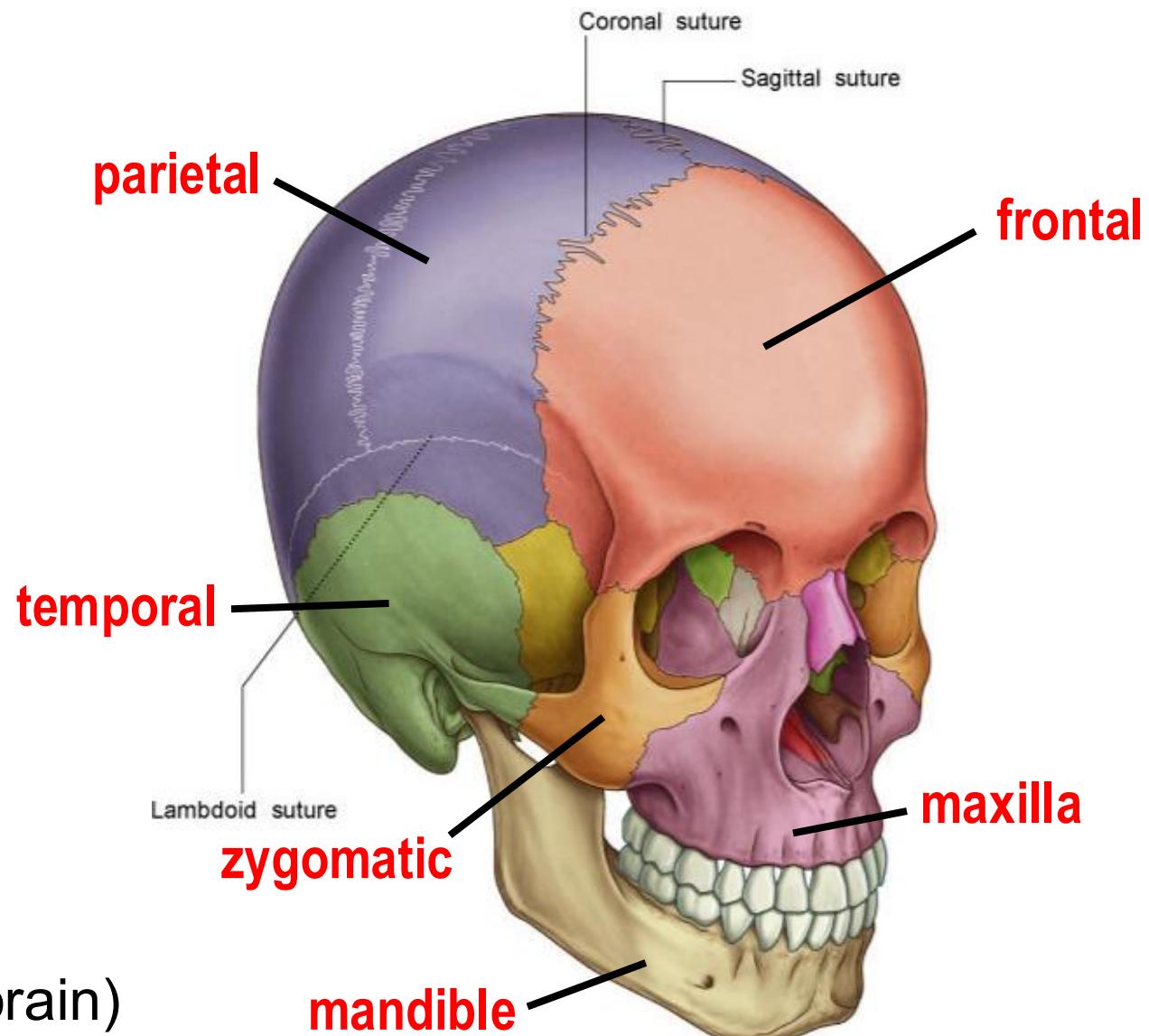
Skeletal System



Skeletal System



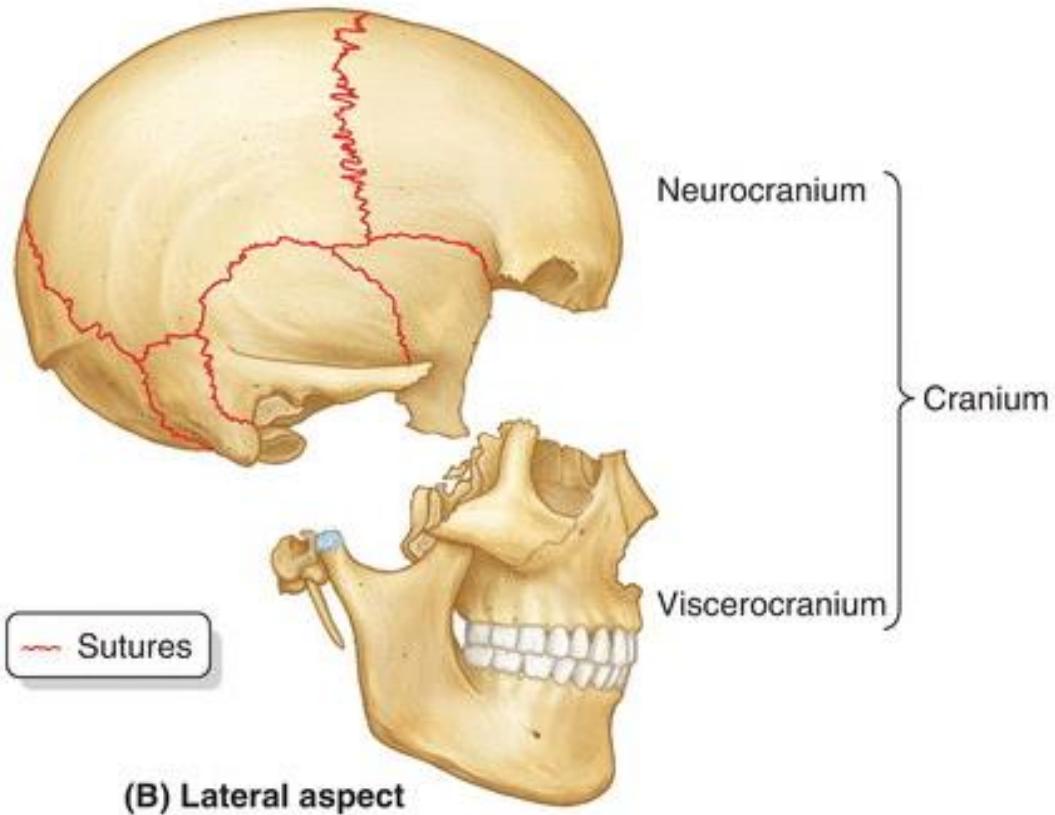
- cranial bones are joined by sutures
- Skull: 22 bones + middle ear ossicles
- **Neurocranium** = braincase (houses the brain)
- **Viscerocranum** = face



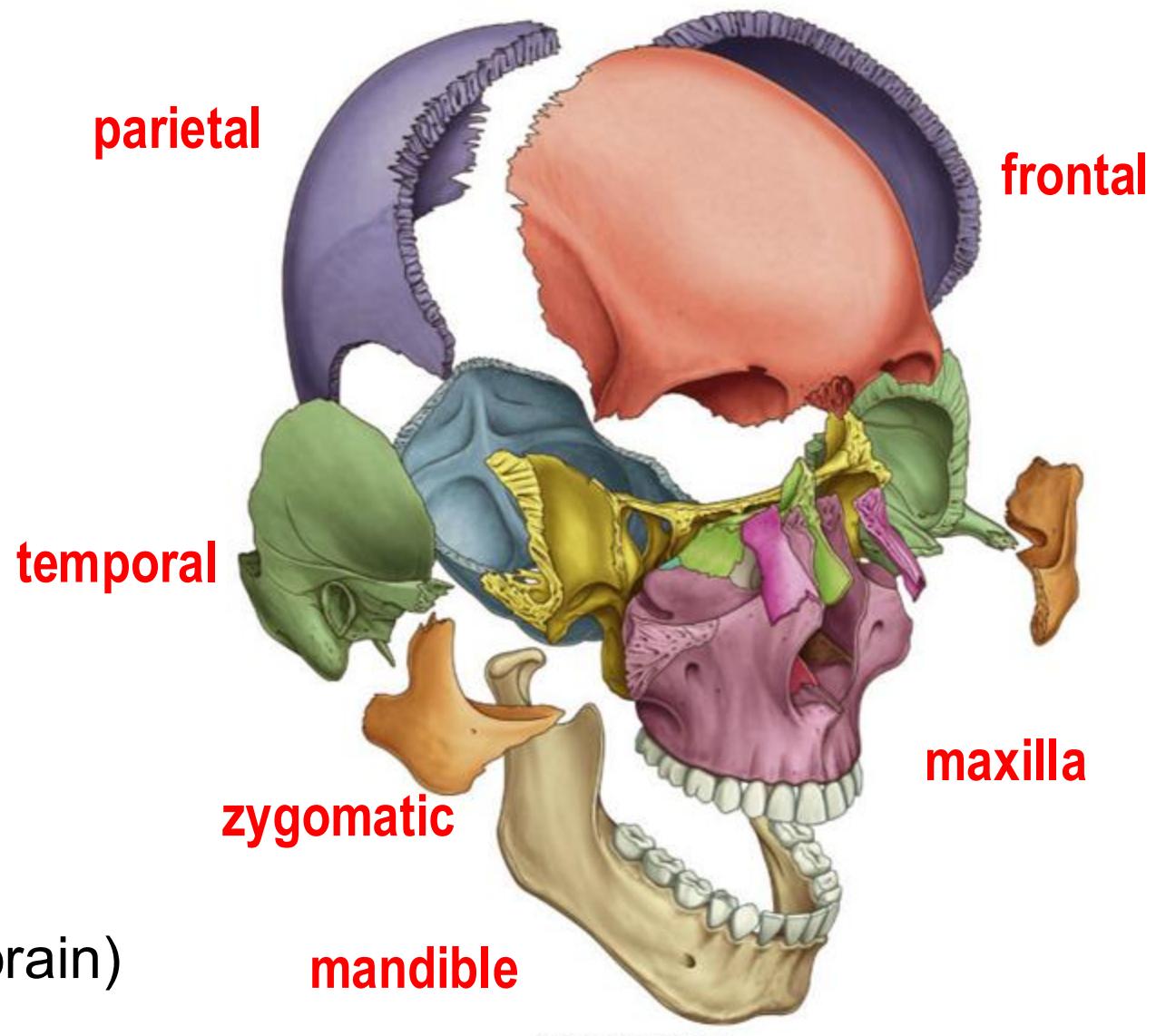
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Source: Clinically Oriented Anatomy 9e

Skeletal System



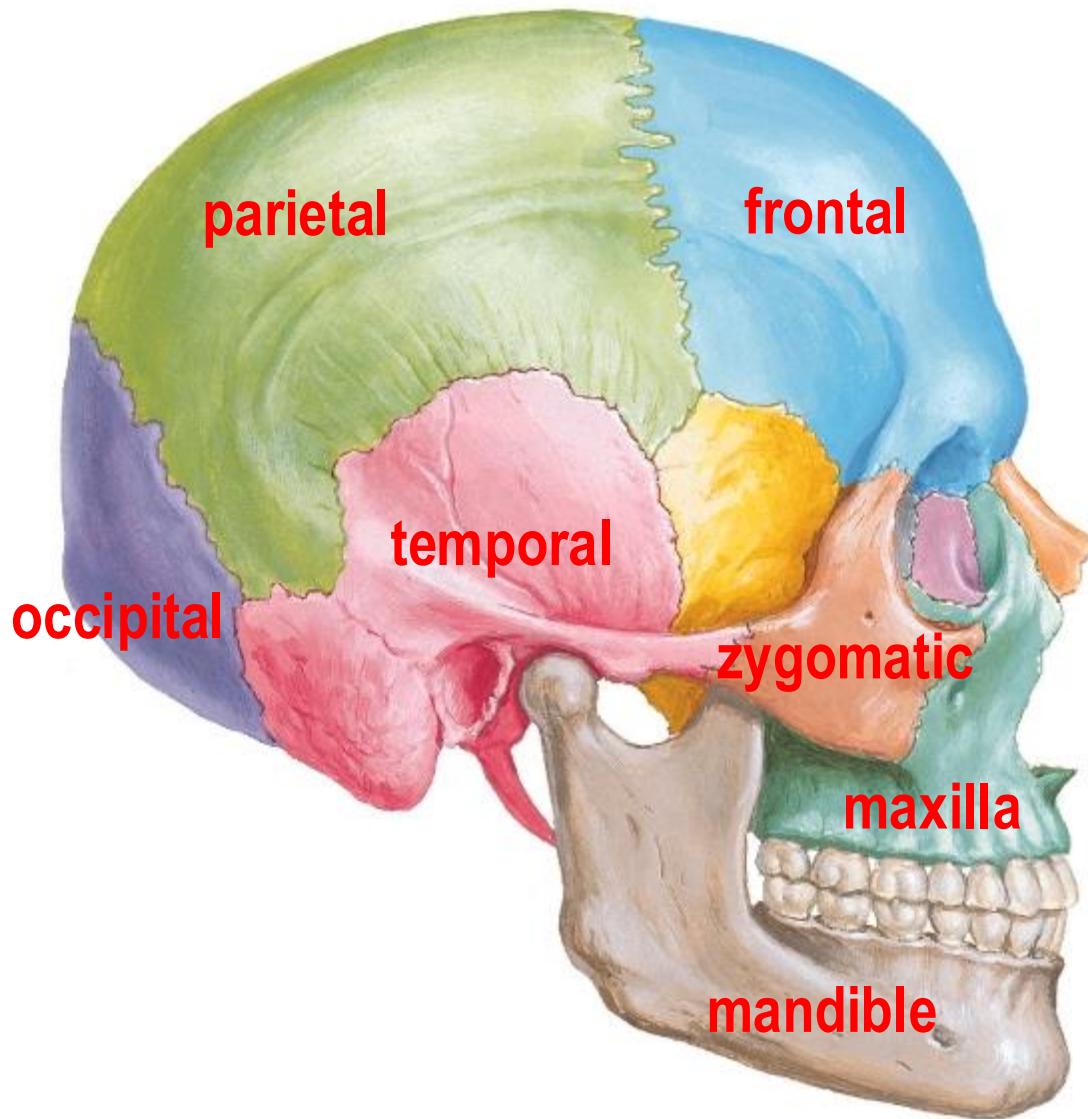
- cranial bones are joined by sutures
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- **Neurocranium** = braincase (houses the brain)
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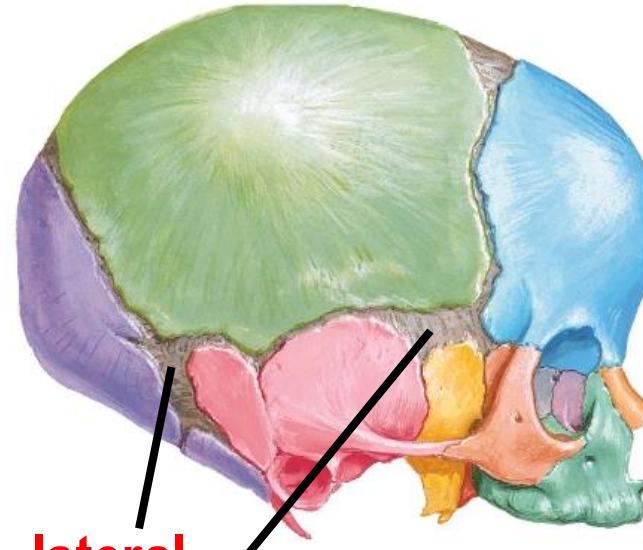
Source: Clinically Oriented Anatomy 9e

Skeletal System



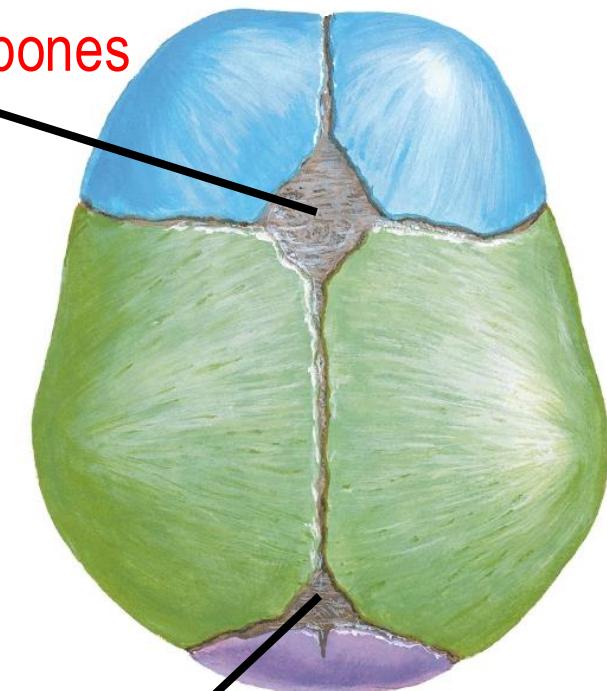
fontanelles: fibrous “soft spots” between cranial bones in infants

anterior fontanelle
between frontal & parietal bones



**lateral
fontanelles**

posterior fontanelle
between parietal & occipital bones

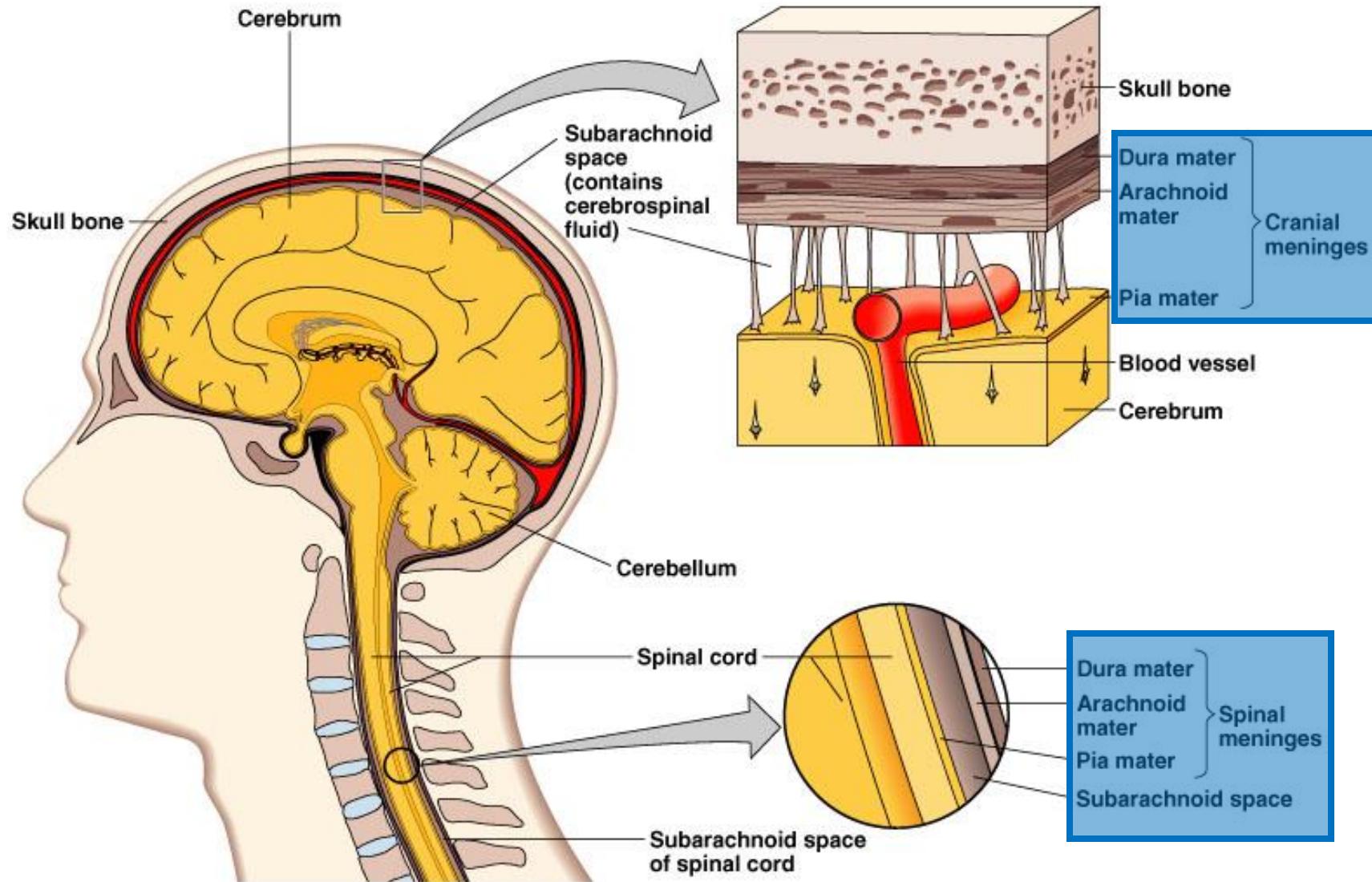


Skeletal System

The skull morphology changes through life



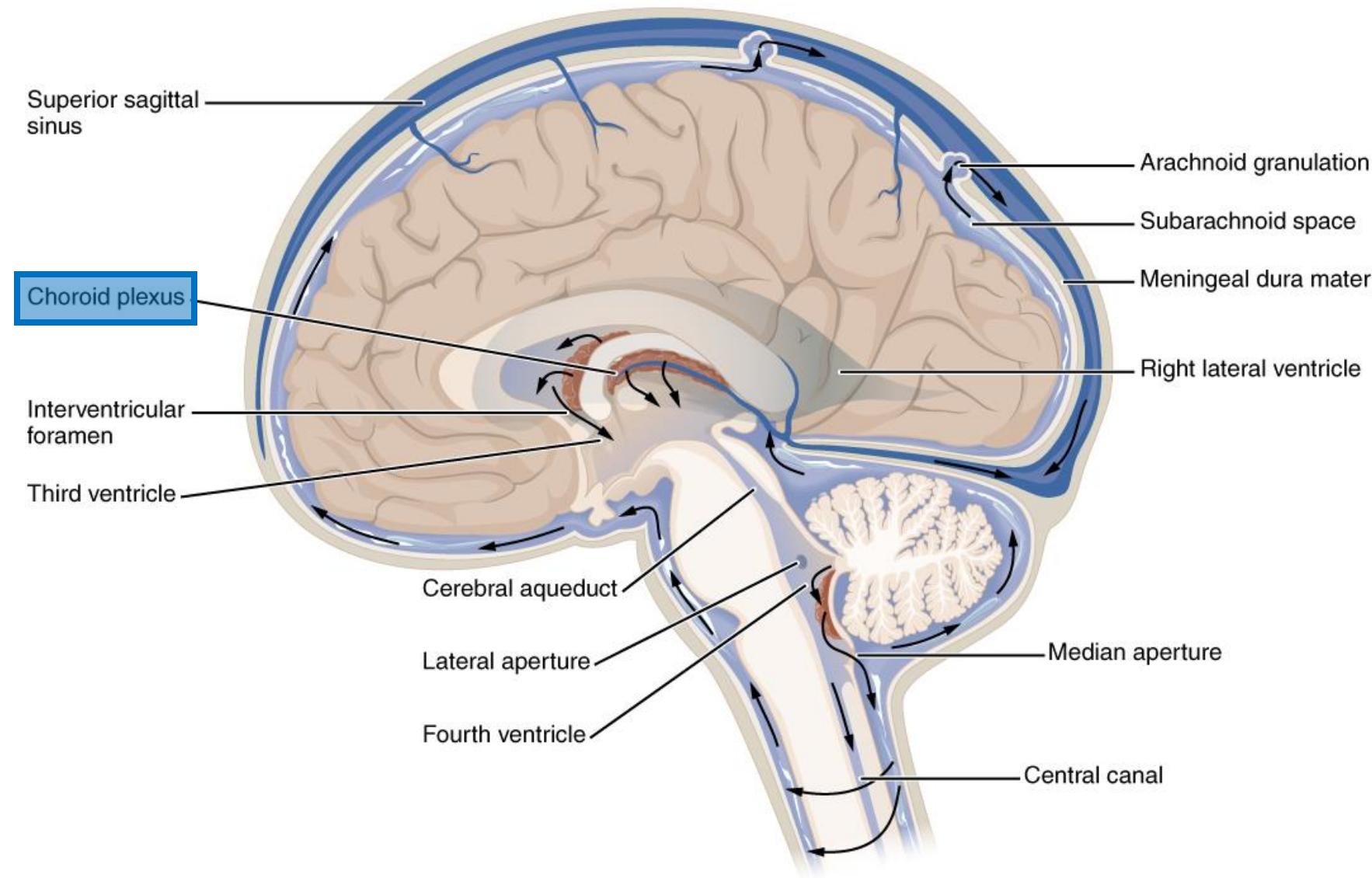
Nervous System: Brain & Spinal Cord



Note: Brain anatomy will be covered in detail in Neuroanatomy next semester.

Meninges (dura, arachnoid, and pia mater) around the brain are continuous with those surrounding the spinal cord.

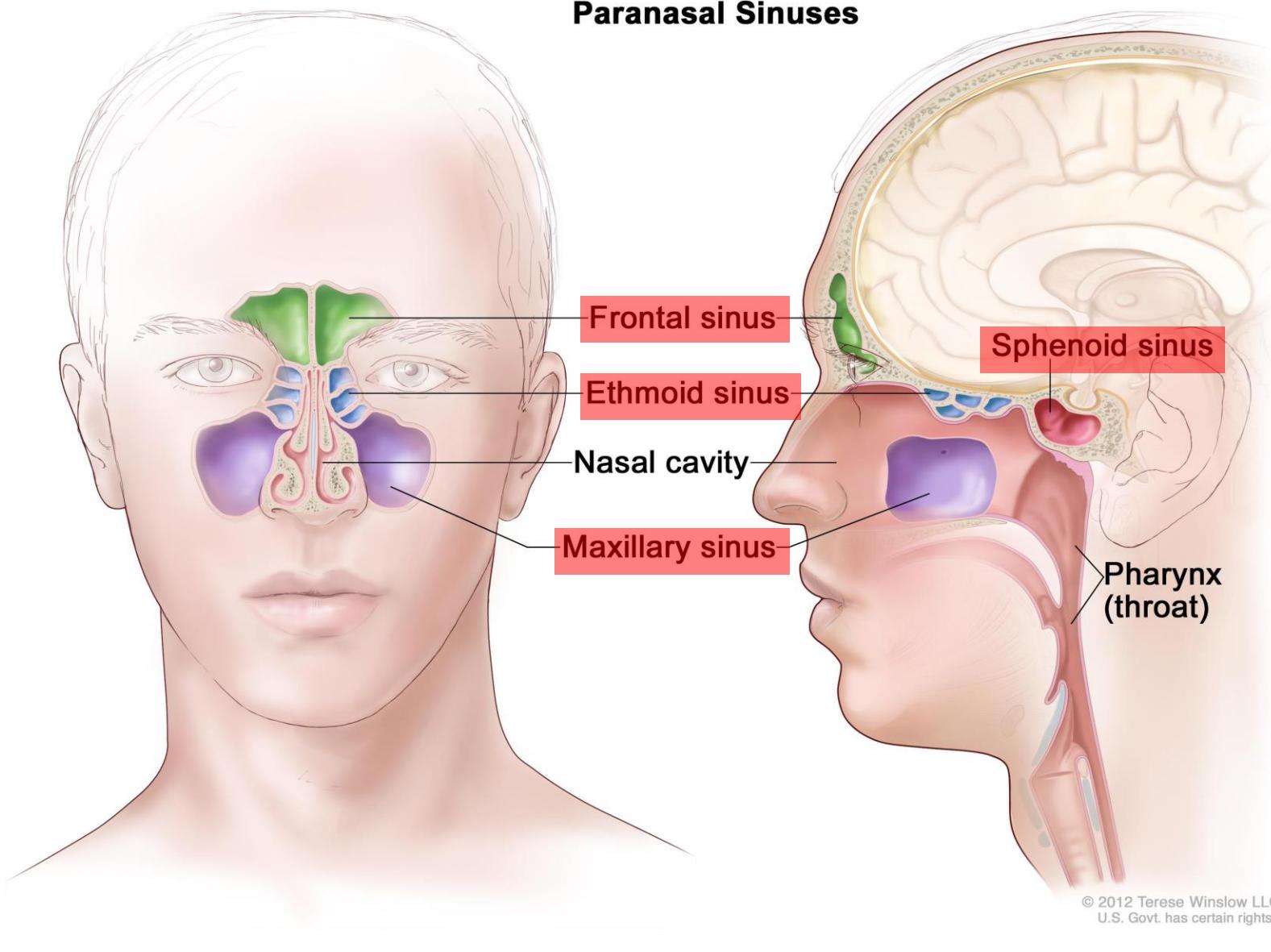
Nervous System: Brain & Spinal Cord



Note: Brain anatomy will be covered in detail in Neuroanatomy next semester.

CSF produced by choroid plexus flows through brain ventricles (spaces within the brain) and subarachnoid space.

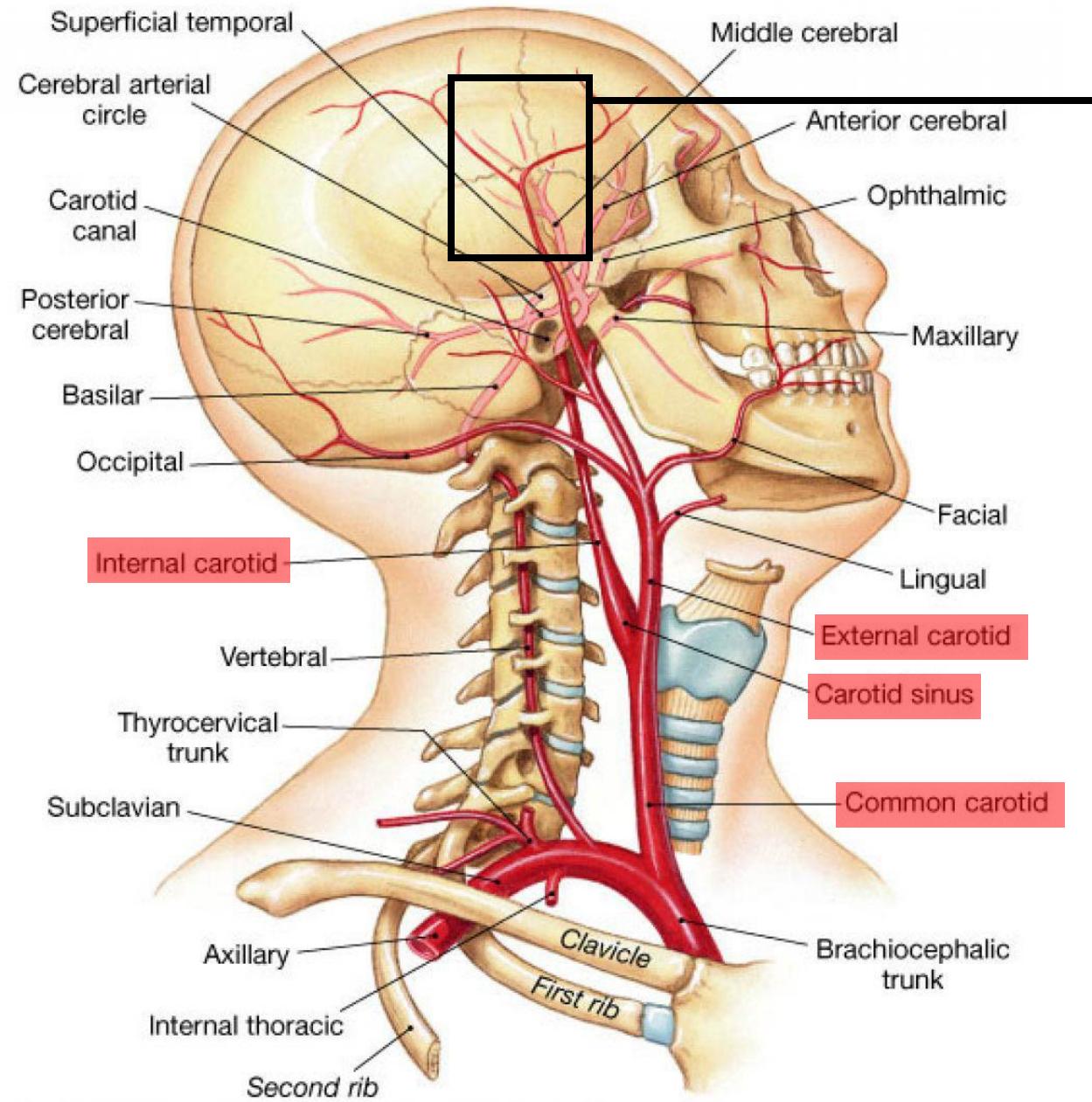
Paranasal Sinuses



4 Paranasal Sinuses:

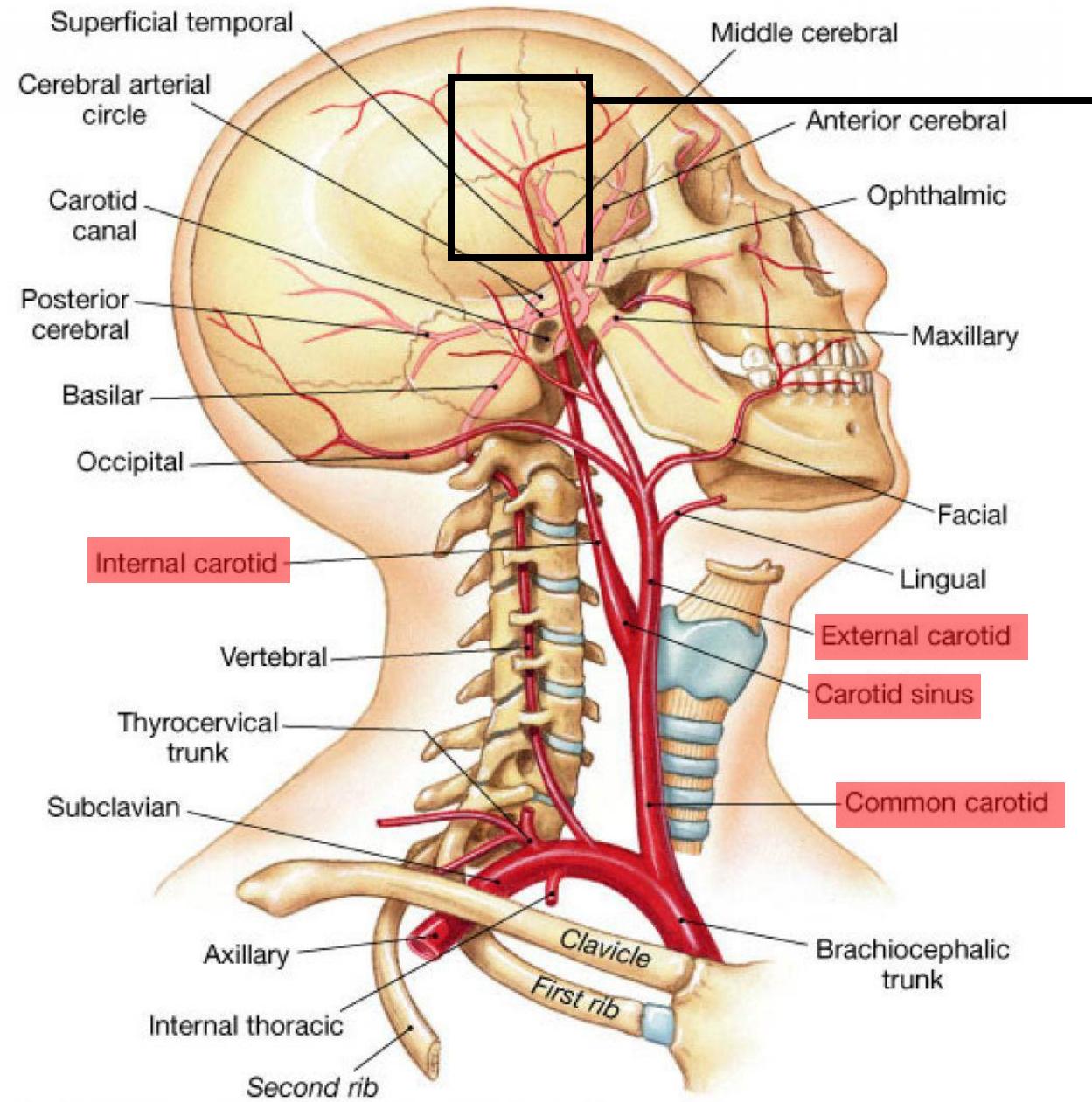
- paired
- connected to nasal cavity via foramina (ostia)
- Functions:
 - lighten skull weight
 - humidify & heat inhaled air
 - Increase resonance for hearing
- Ostia often become blocked by allergic inflammation or swelling of nasal lining from common cold. This prevents drainage of mucus that leads to facial pain.

Clinical Correlate “Danger Zone” #1 (of 3)

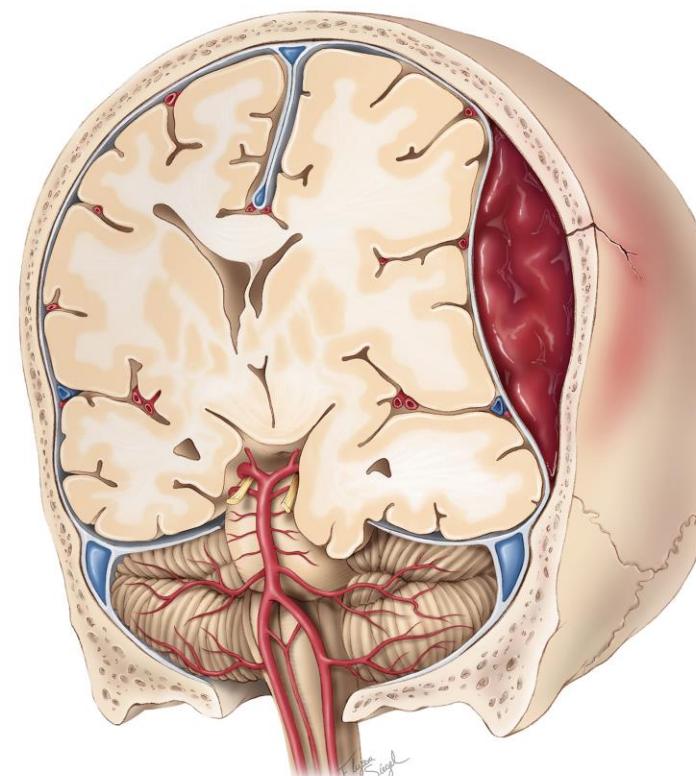


Pterion: junction of frontal, parietal, temporal, sphenoid bones; thin area overlying **middle meningeal a.**

Clinical Correlate § “Danger Zone” #1 (of 3)



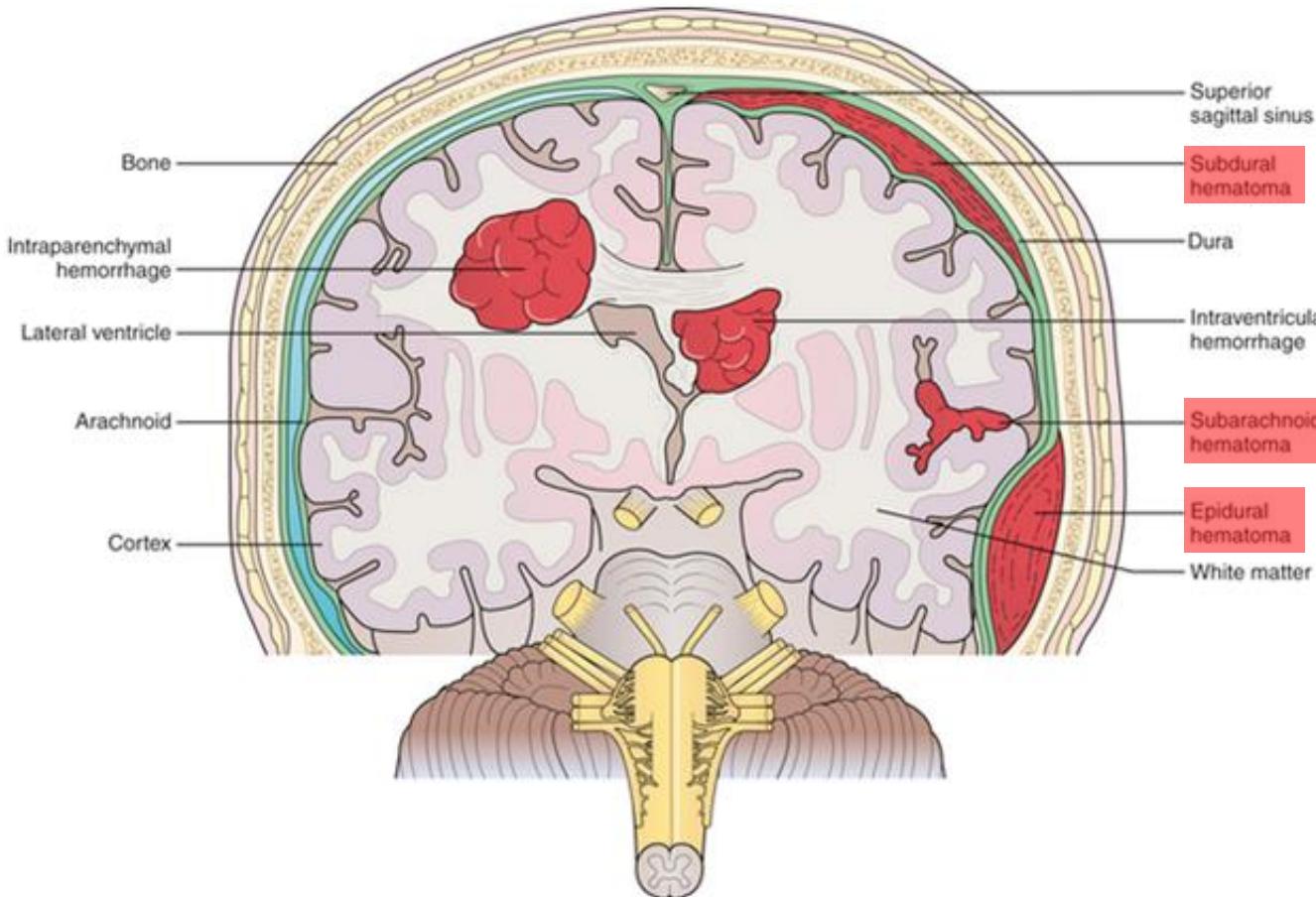
Pterion: junction of frontal, parietal, temporal, sphenoid bones; thin area overlying **middle meningeal a.**



Hard blow to side of the head may fracture thin bones forming the pterion, rupturing the middle meningeal a. which sits between the skull and dura mater.

⌘ Clinical Correlate ⌘ “Danger Zone” #1 (of 3)

Types of Intracranial Hemorrhage/Hematoma

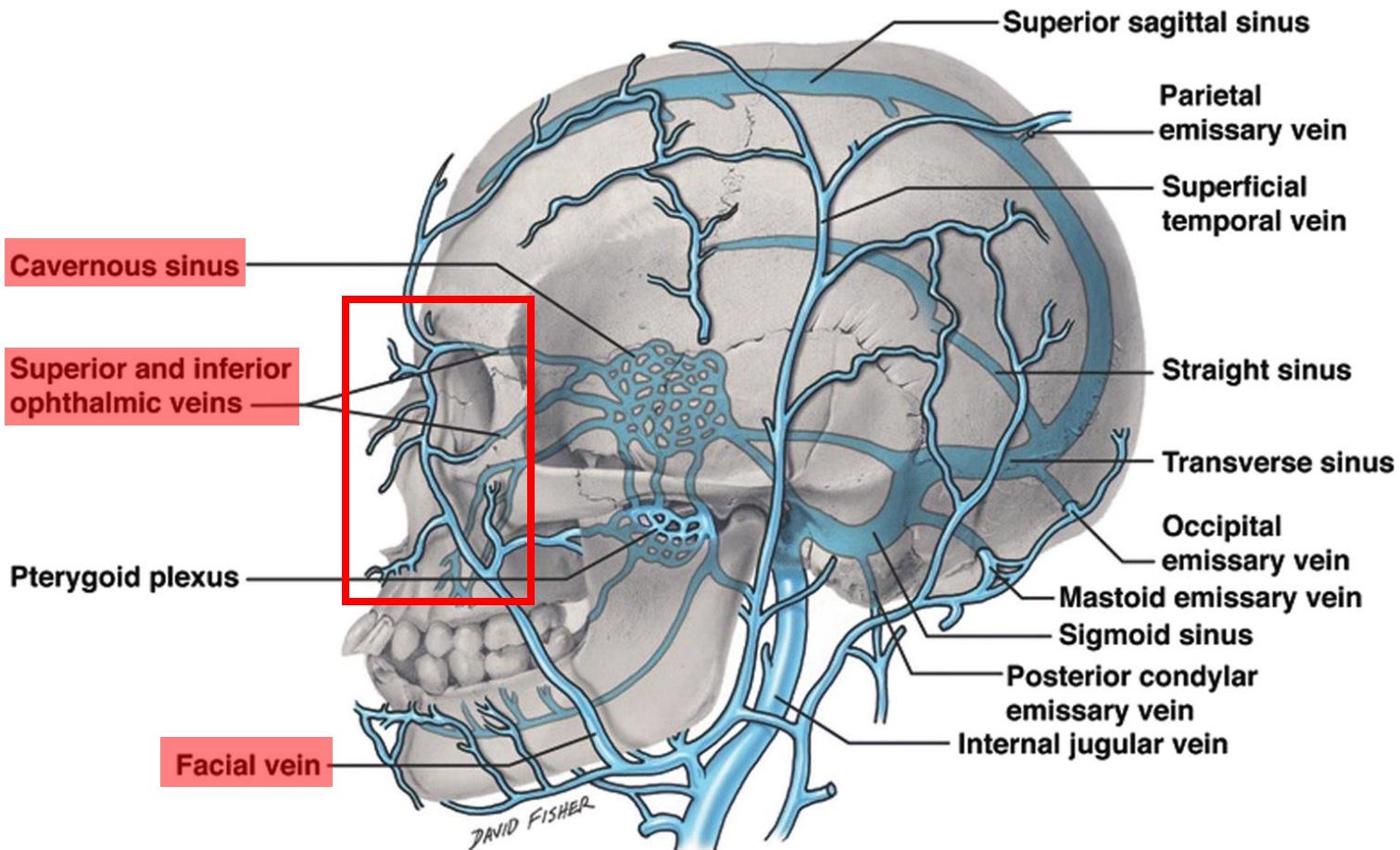


Intracranial hemorrhage/hematoma:

Blood accumulation in the endocranial (brain) cavity, resulting in life threatening compression of the brain.

1. **Epidural hematoma:** between skull and dura mater.
2. **Subdural hematoma:** between dura mater and arachnoid mater. Common when bridging veins and sagittal sinus is torn.
3. **Subarachnoid hemorrhage:** between arachnoid mater and pia mater. Common when cerebral arteries rupture.

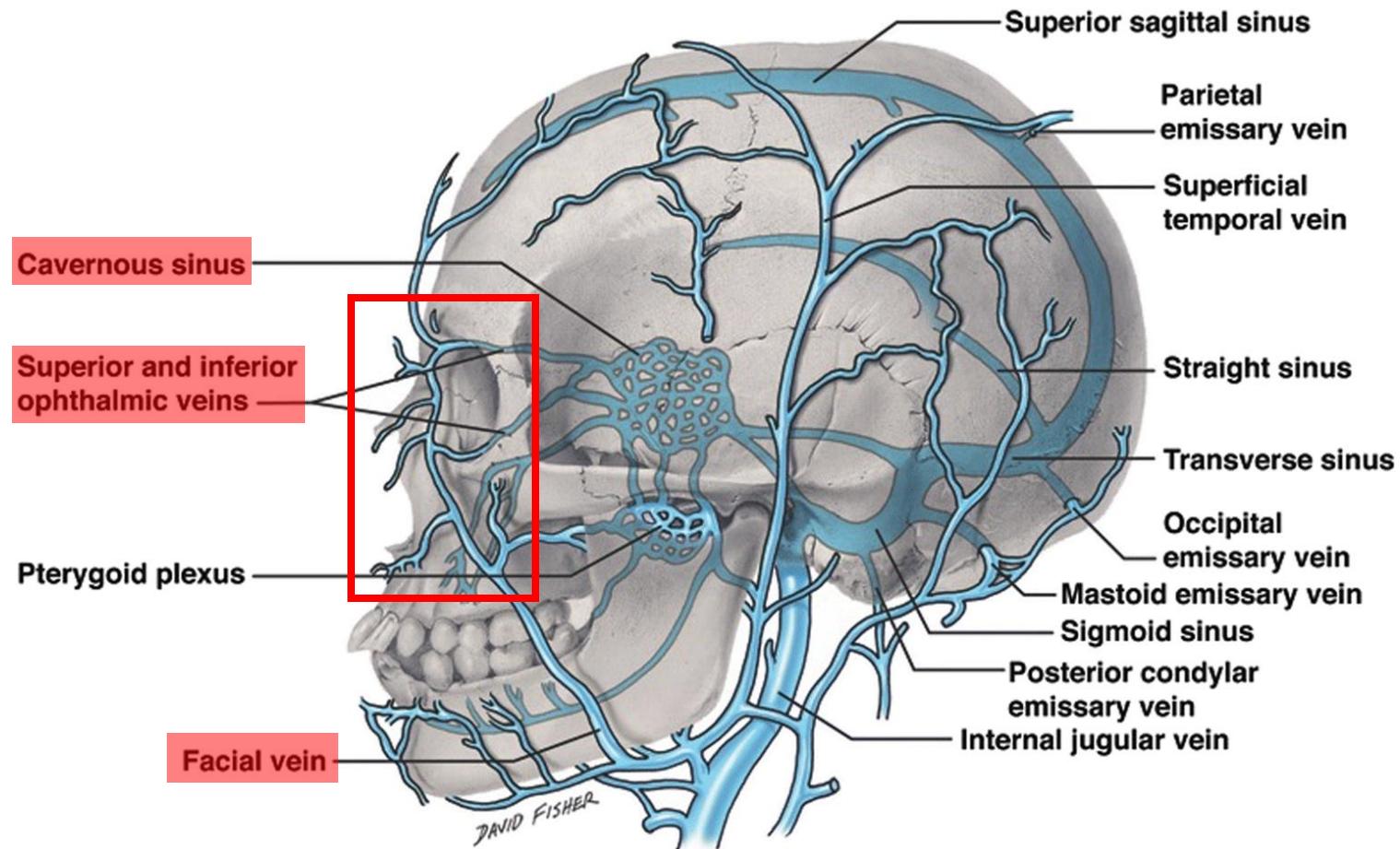
Clinical Correlate “Danger Zone” #2 (of 3)



Facial vein has no valves, so blood may drain superiorly into superior & inferior ophthalmic veins and enter the cavernous sinus.

Infection around the nose (e.g., pimples, boils) can spread into cavernous sinus where important arteries and nerves are located.

⌘ Clinical Correlate ⌘ “Danger Zone” #2 (of 3)



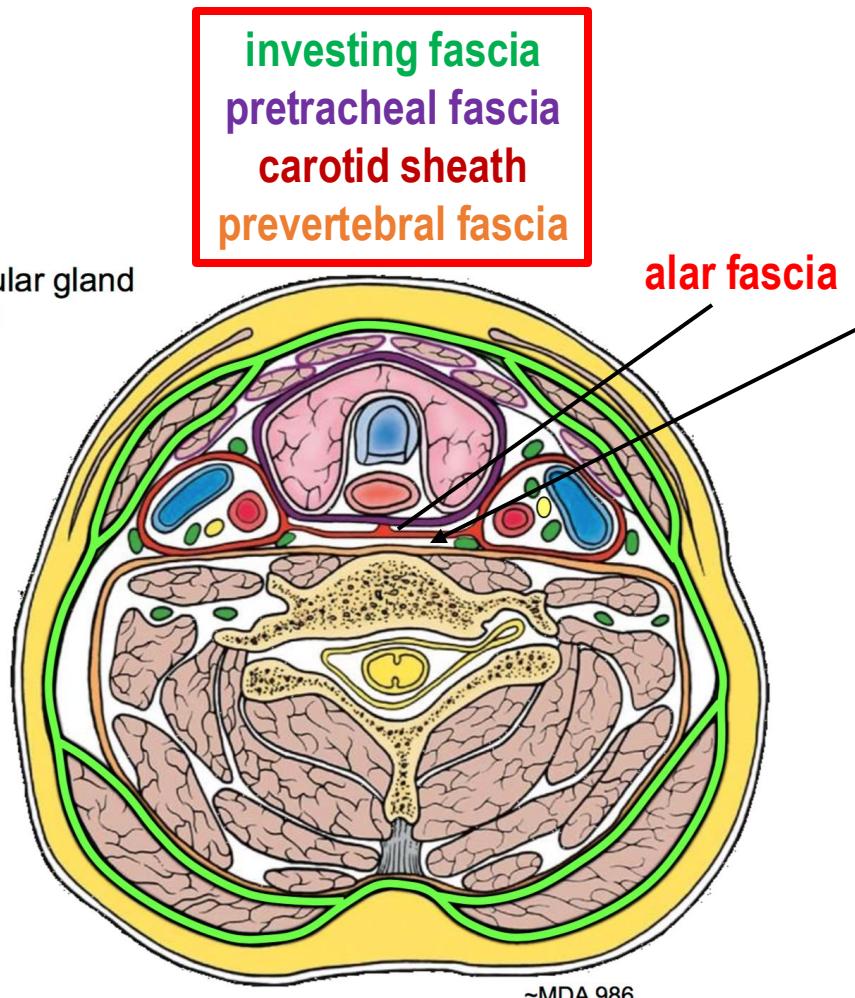
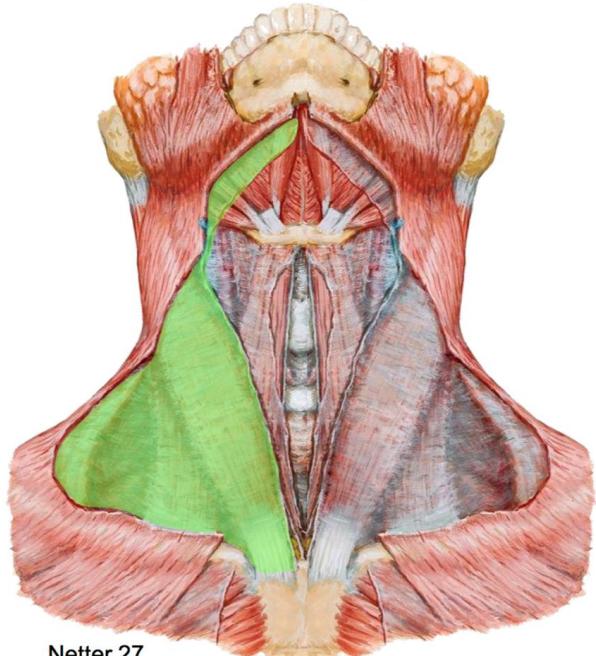
Clinical Correlate “Danger Space” #3 (of 3)

Investing Fascia

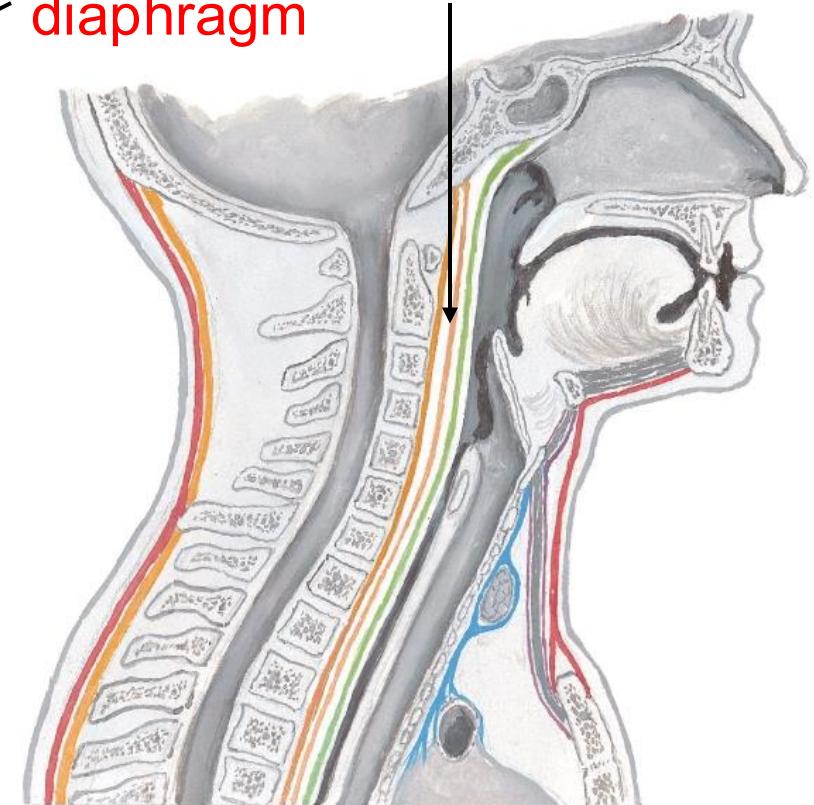
Encircles neck

Invests Trapezius and SCM, submandibular gland

Continuous with capsule of parotid gland



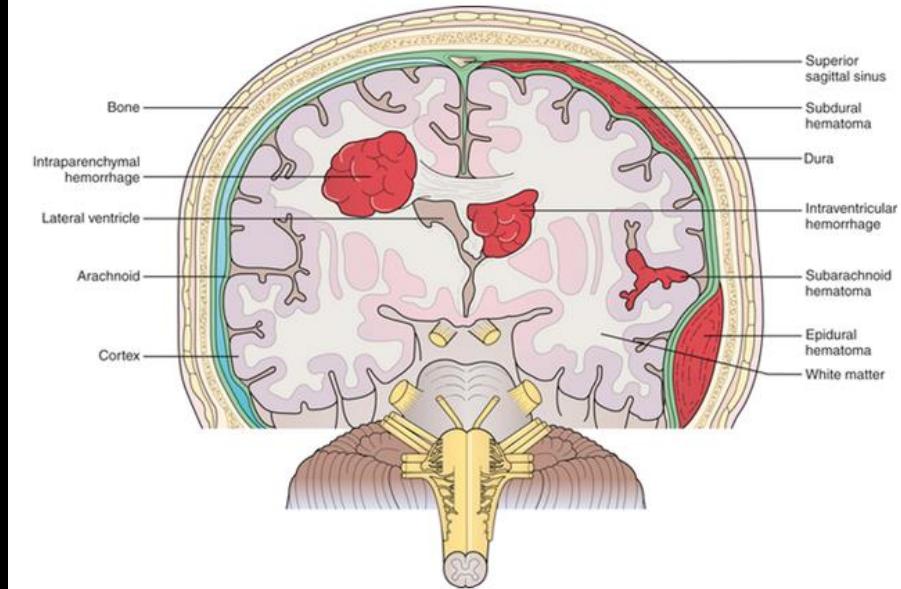
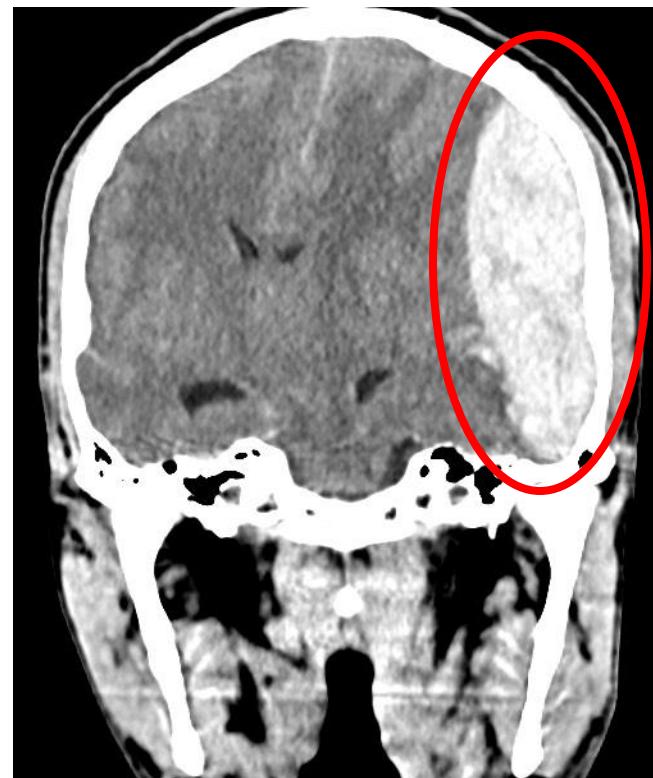
Danger Zone: space between alar fascia and prevertebral fascia. Infections can travel down through mediastinum to diaphragm



Example Question

A 30-year-old patient is admitted to a hospital with a traumatic injury to the head. CT scan reveals that the left middle meningeal artery between the skull and dura mater has ruptured. Which type of intracranial hematoma/hemorrhage describes the injury?

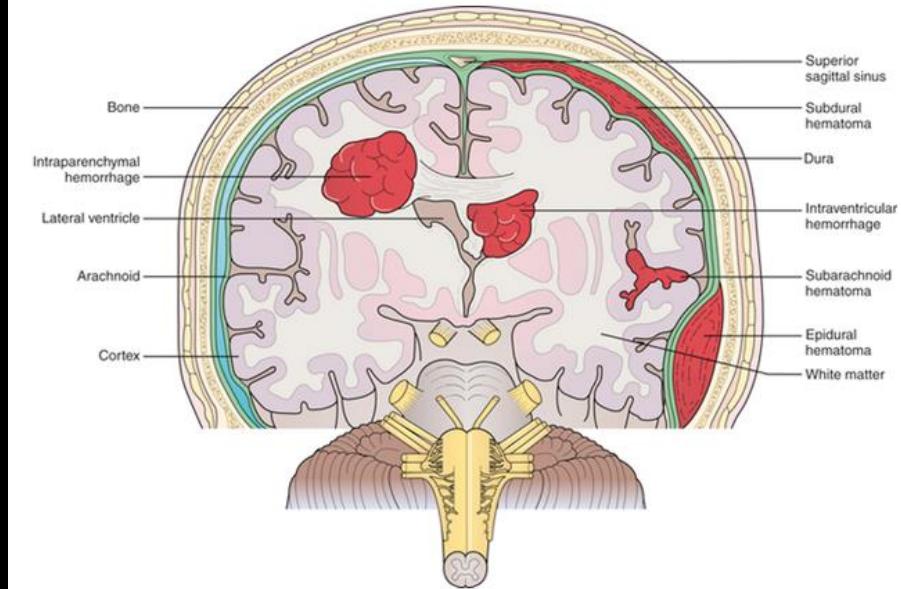
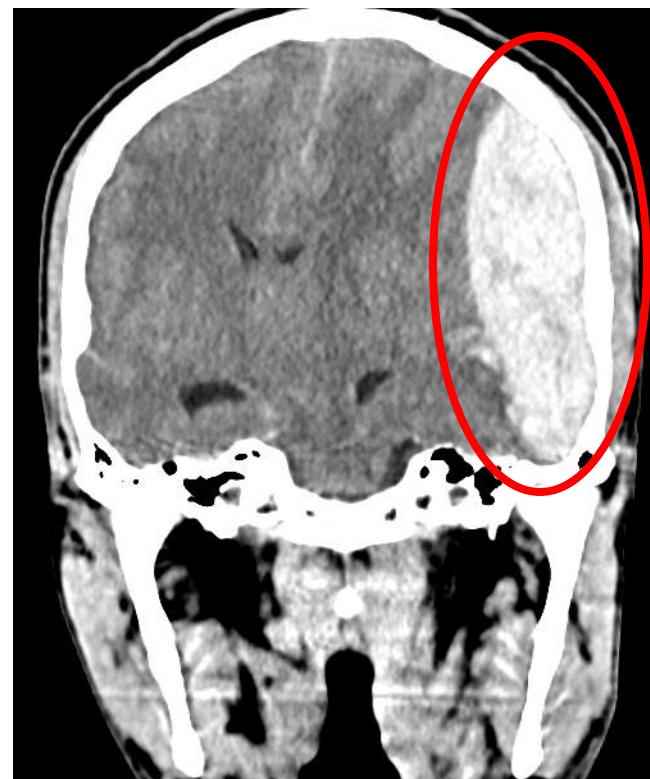
- a. subdural
- b. intraparenchymal
- c. intraventricular
- d. subarachnoid
- e. epidural



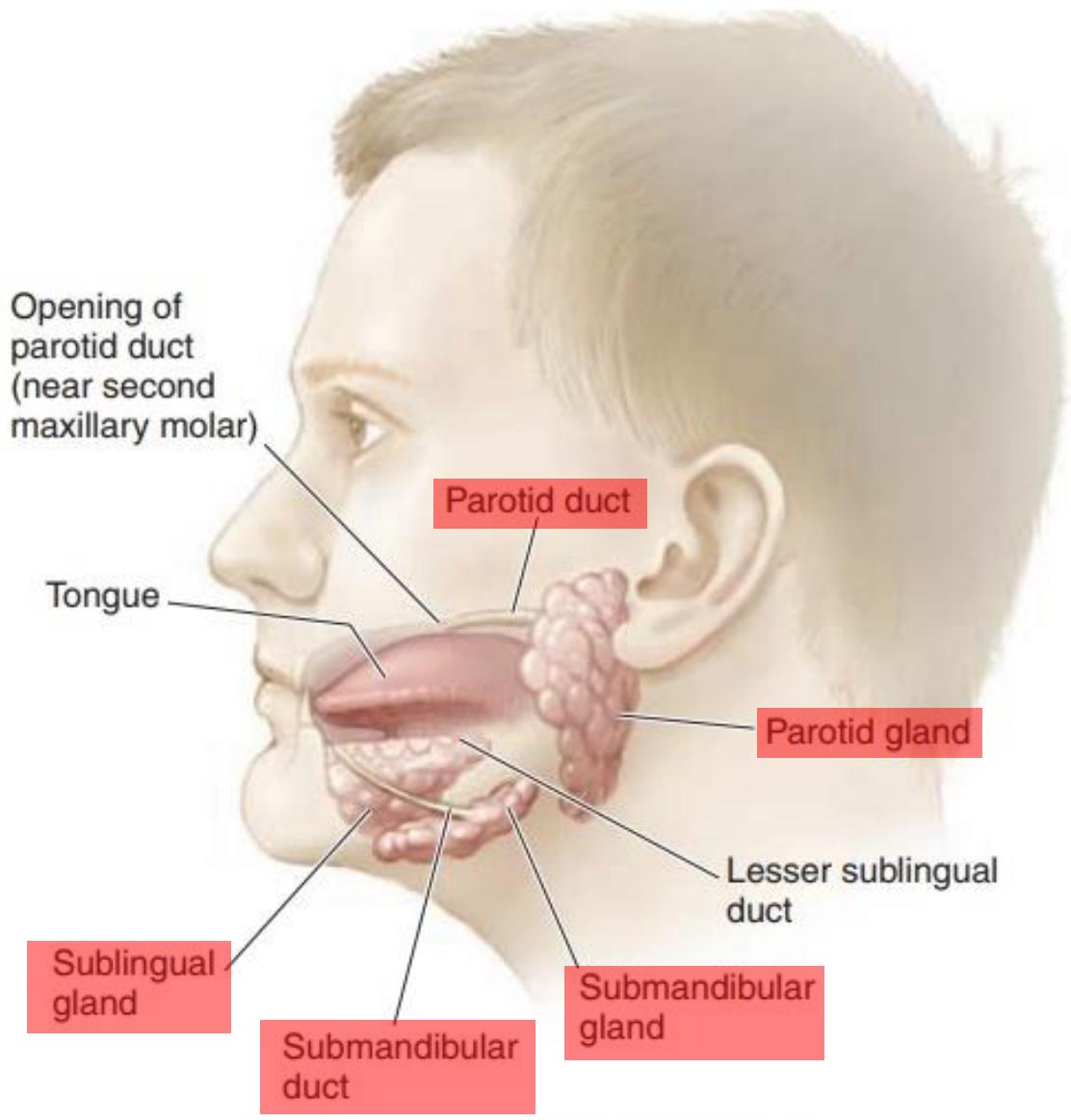
Example Question

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- a. subdural
- b. intraparenchymal
- c. intraventricular
- d. subarachnoid
- e. **epidural**



Salivary Glands



FIGURE

The Salivary Glands

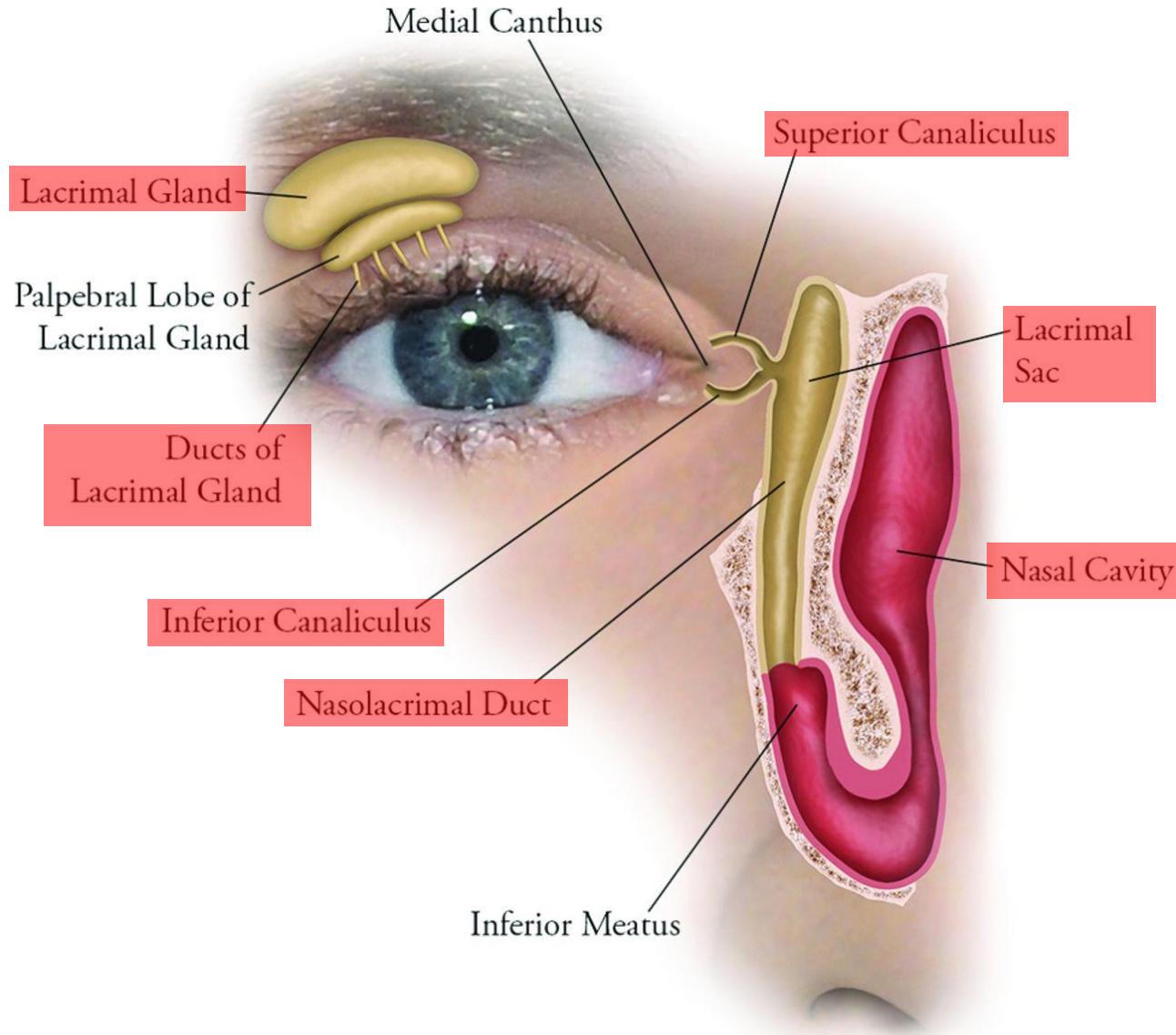
Salivary glands secrete directly into the oral cavity.

Parotid gland: located anterior to the ears in posterior cheek region. Secretes copious watery saliva (parasympathetic); small amount of viscous saliva (sympathetic).

Submandibular gland: located below the mandible. Secretions travel through submandibular duct.

Sublingual gland: located in the floor of the mouth. Secretions travel superiorly through numerous small ducts.

Lacrimal Apparatus



Lacrimal gland: located superior-lateral to the eye. Secretes tears through lacrimal ducts.

Lacrimal canaliculi: drain tears from lacrimal punctum (where two canaliculi meet) into the **lacrimal sac**.

Lacrimal sac: drains tears into the **nasolacrimal duct** which opens inferiorly into the **nasal cavity**.

Drainage can be blocked by injury or infection, which can lead to irritated eye.

Clinical Correlate Thyroid Gland Diseases

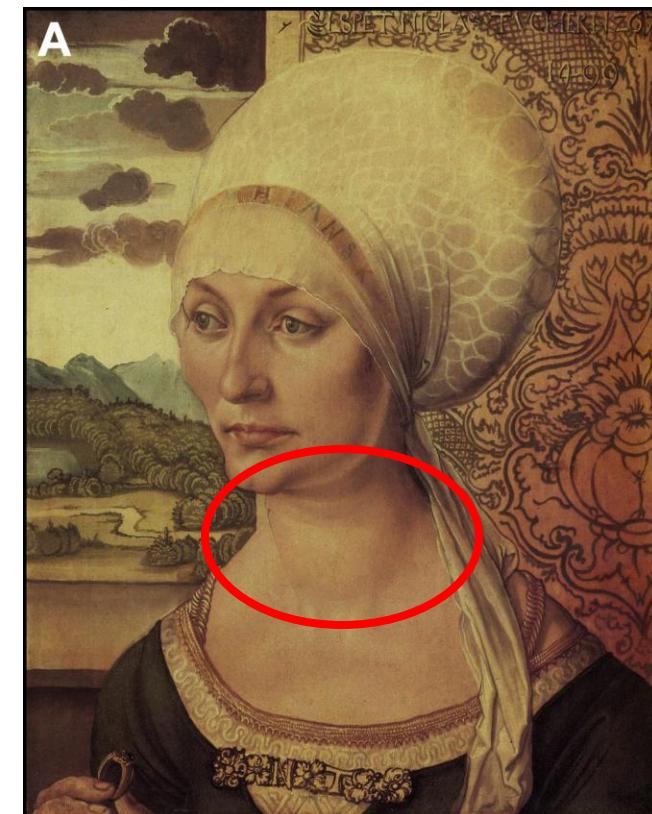
Goiter: enlargement of the thyroid gland, presented as lump on anterior aspect of the neck. Often due to iodine deficiency. Could be associated with:

Hyperthyroidism: overproduction of thyroid hormones.

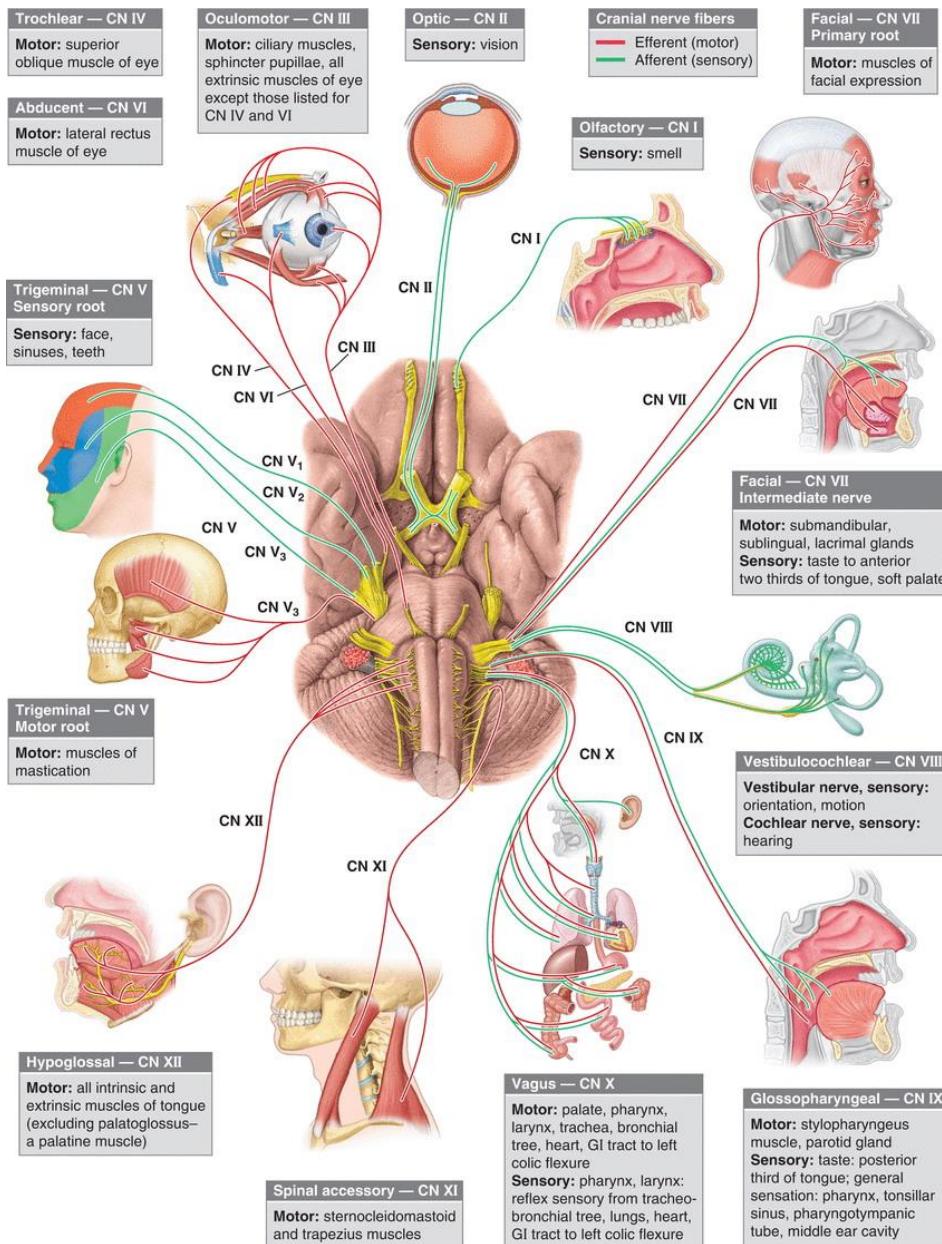
Hypothyroidism: underproduction of thyroid hormones. Glands swell to try to produce more hormones.

Could cause breathing/swallowing difficulties or speech loss due to compression of the trachea, larynx, esophagus, recurrent laryngeal nerve.

Goiter depicted in Renaissance paintings!



Cranial Nerve Overview



Moore Clinically Oriented Anatomy 9e

Fig. 10.4

Recommended Resource

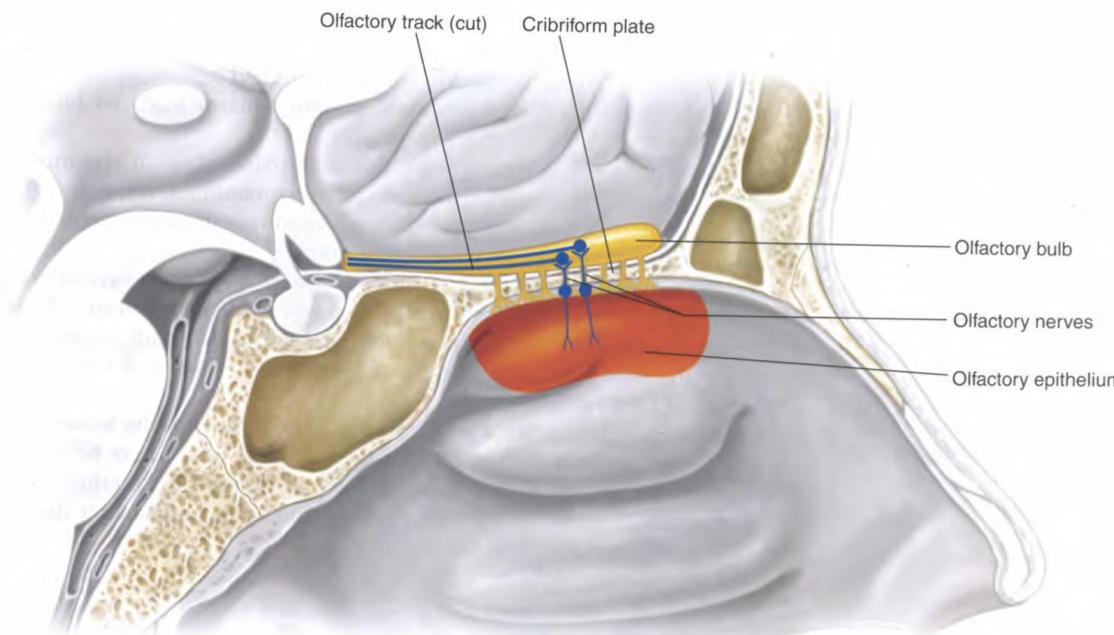
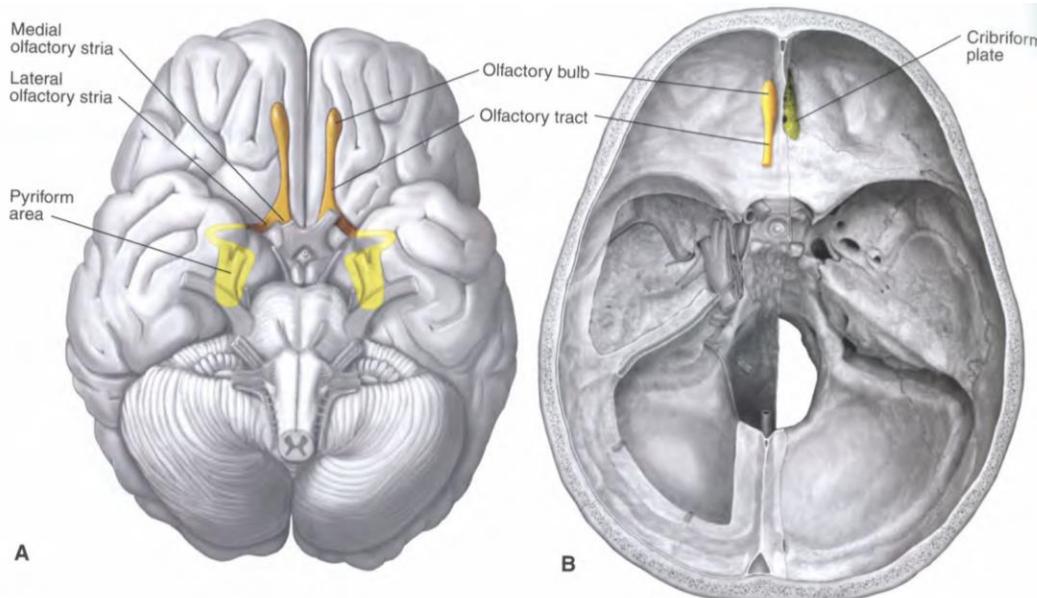
Note: This section will be an introductory overview of all 12 cranial nerves. For this week, learn the names and one function of each cranial nerve. Subsequent lectures will cover these cranial nerves in detail. You will be responsible for learning all functions and fiber types for all 12 nerves for the comprehensive exam.

Cranial Nerve Marathon

Create a Table:

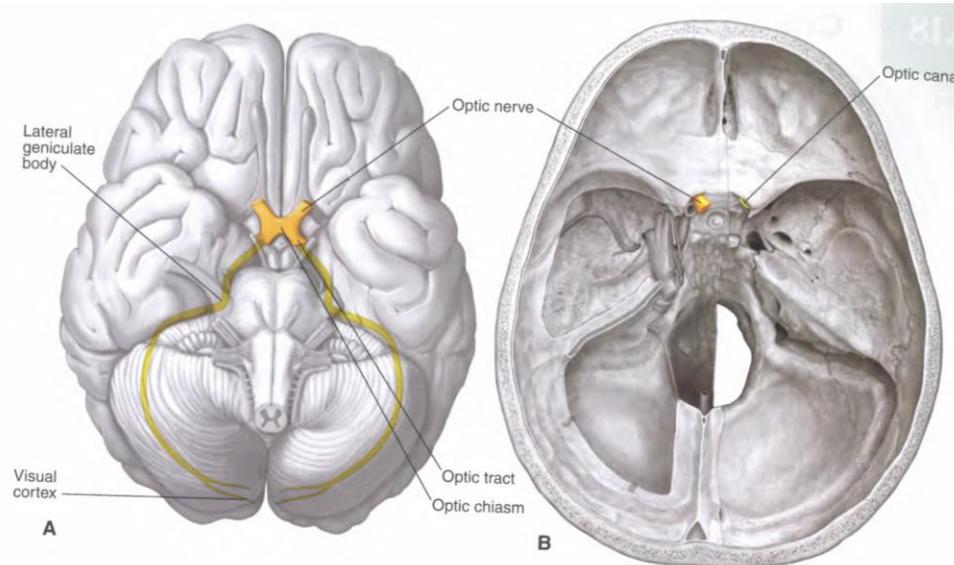
Cranial Nerve	Cranial Exit	Fiber Type(s)	Functions
I: olfactory			
II: optic			
III: oculomotor			
IV: trochlear			
V: trigeminal			
VI: abducens			
VII: facial			
VIII: vestibulocochlear			
IX: glossopharyngeal			
X: vagus			
XI: spinal accessory			
XII: hypoglossal			

CN I: Olfactory Nerve & Tract

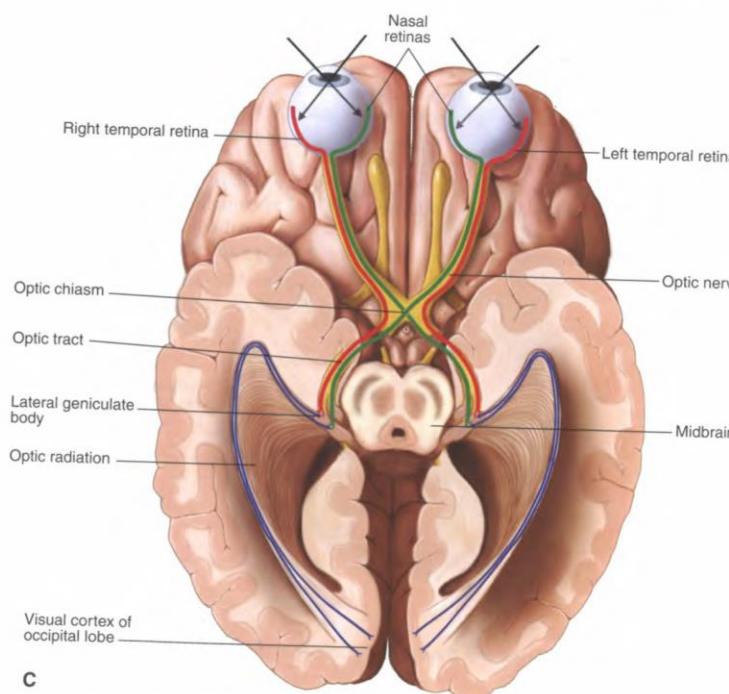


Fiber Type: special sensory
Function: olfaction

CN II: Optic Nerve

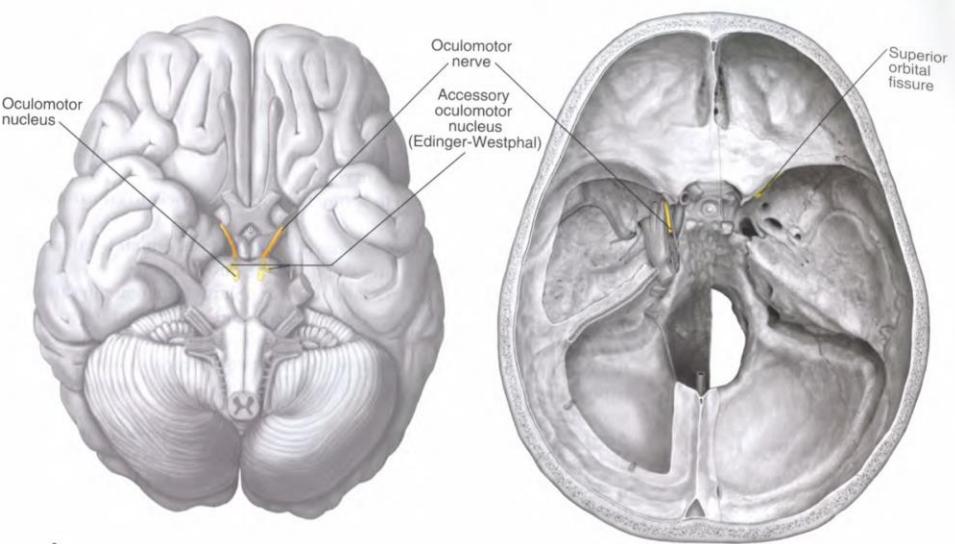


Fiber Type: special sensory
Function: vision



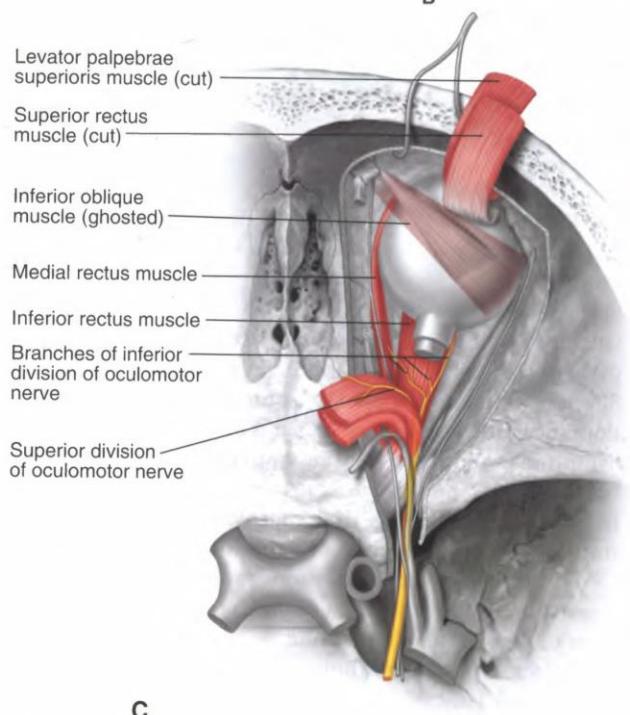
Source: Lippincott's Concise Illustrative Anatomy: Head & Neck

CN III: Oculomotor



A

B



C

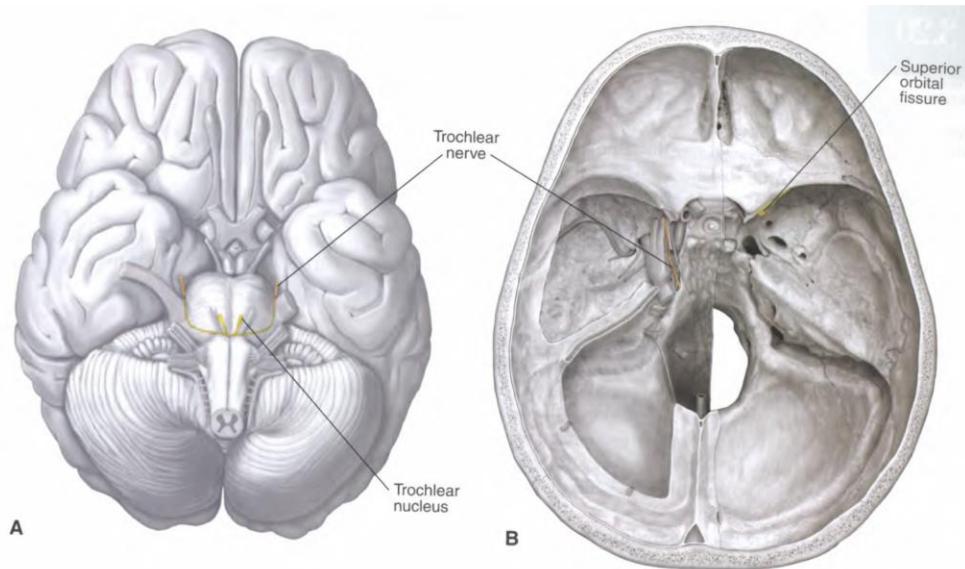
Fiber Type: somatic motor

Function: eye movement
(superior, inferior, and medial recti, inferior oblique, and levator palpebrae superioris m.)

Additional functions to
know for other lectures
and for the comp exam.

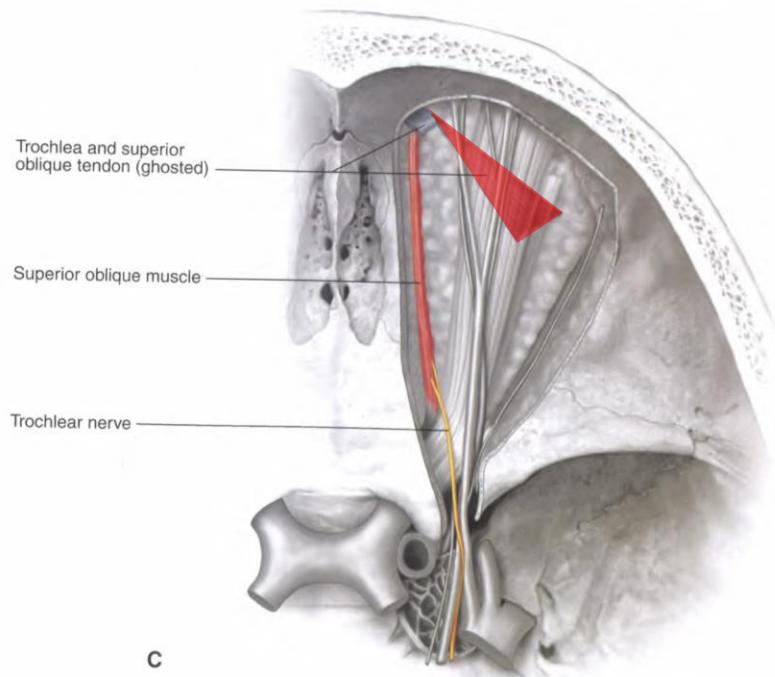
Visceral motor: constriction of pupil
(sphincter pupillae m.) and
accommodation (ciliary m.)

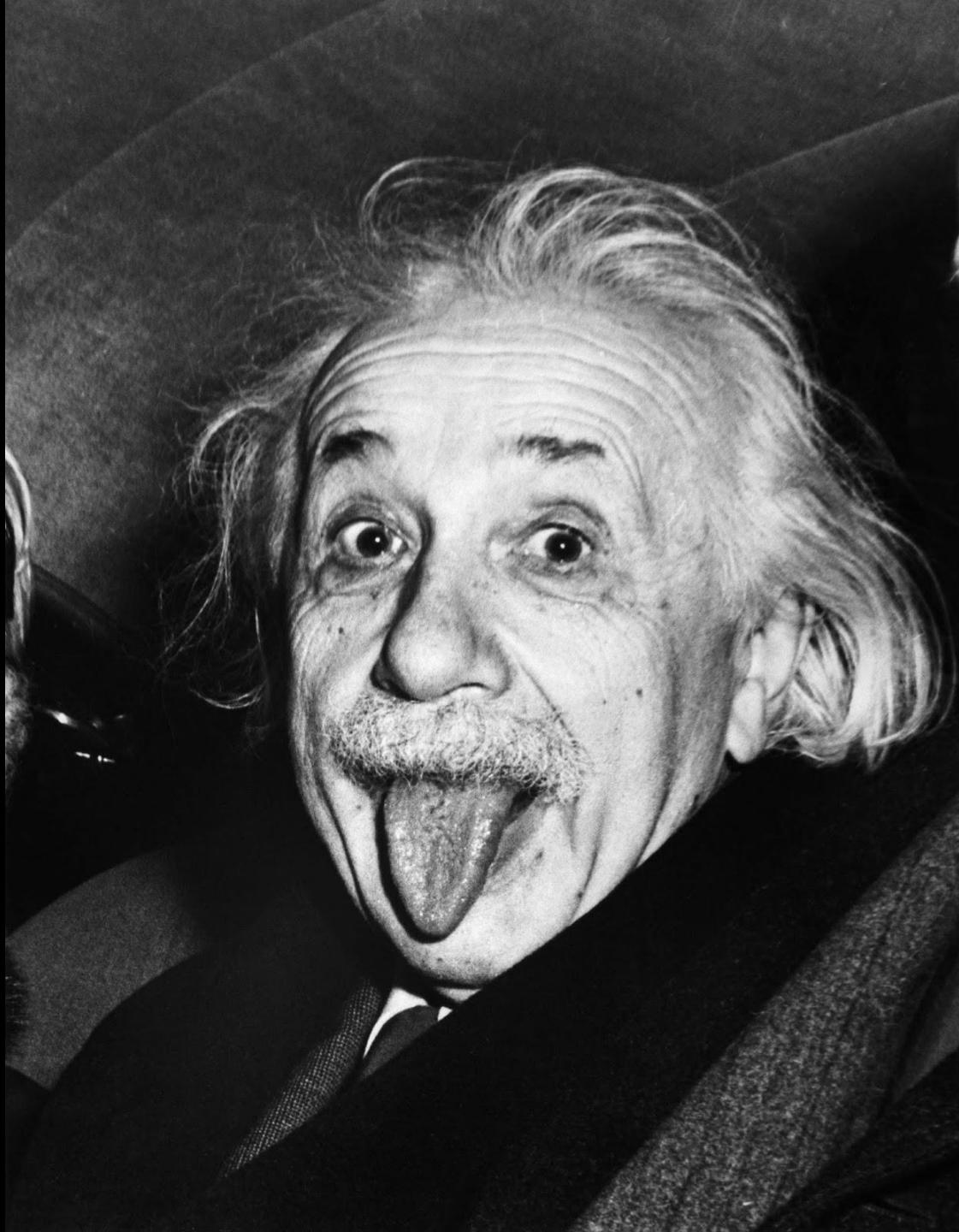
CN IV: Trochlear



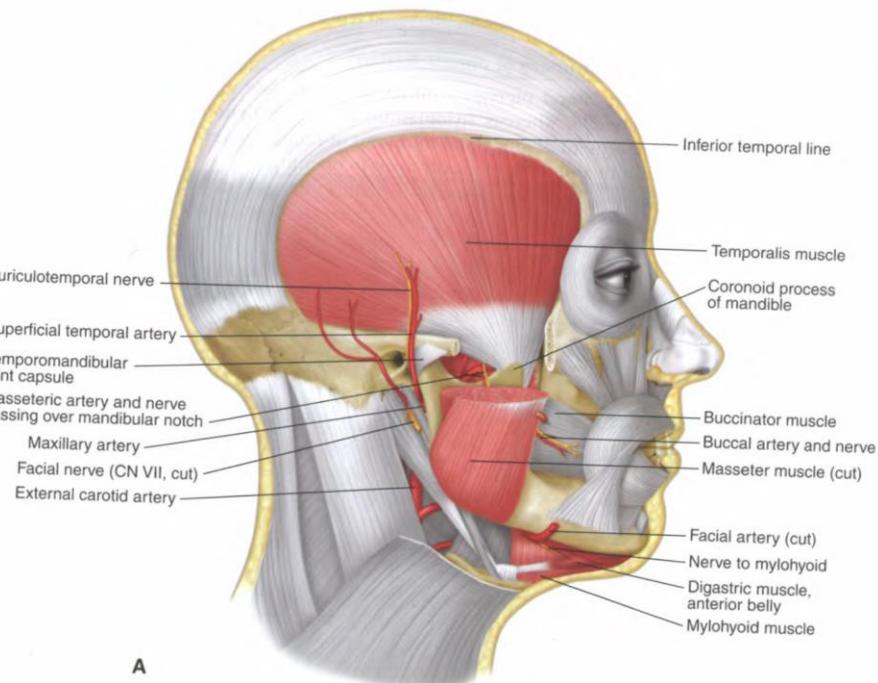
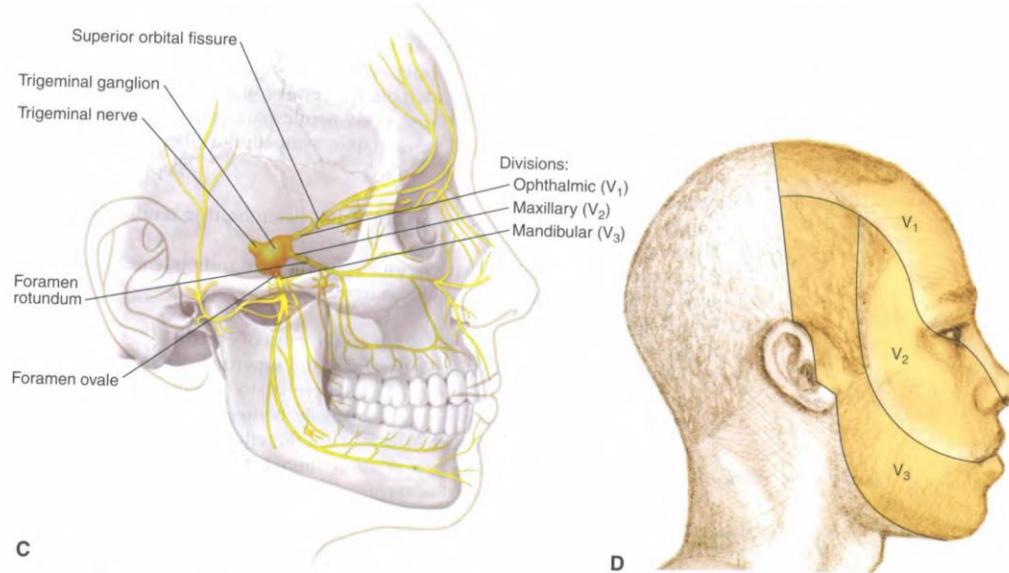
Fiber Type: somatic motor
Function: eye movement
(superior oblique m.)

“Trochlea” (Gr.): pulley





CN V: Trigeminal



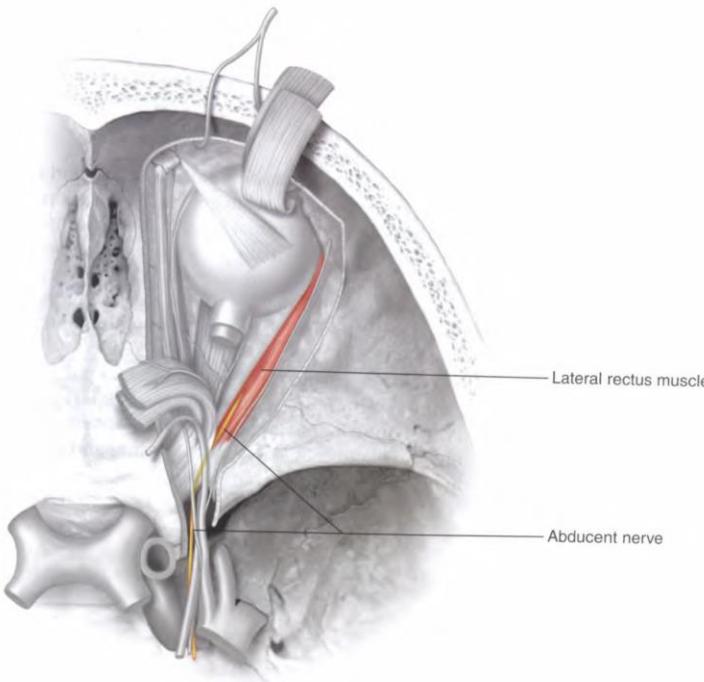
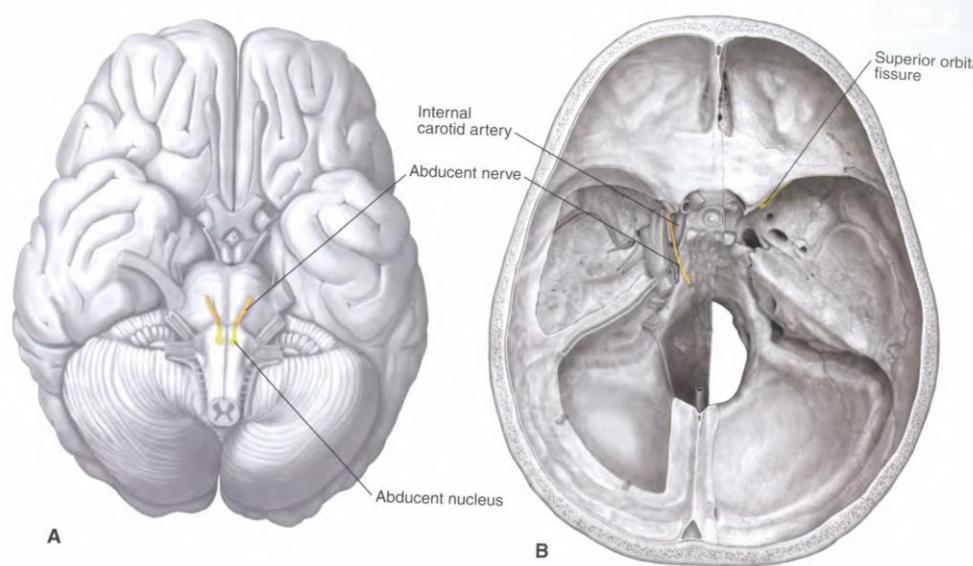
Fiber Type: somatic sensory

Function: sensation of most of head and teeth.

Somatic sensory: touch for anterior 2/3 of tongue

Somatic motor: temporalis, masseter, medial and lateral pterygoids, anterior belly of digastric, tensor veli palatini, tensor tympani

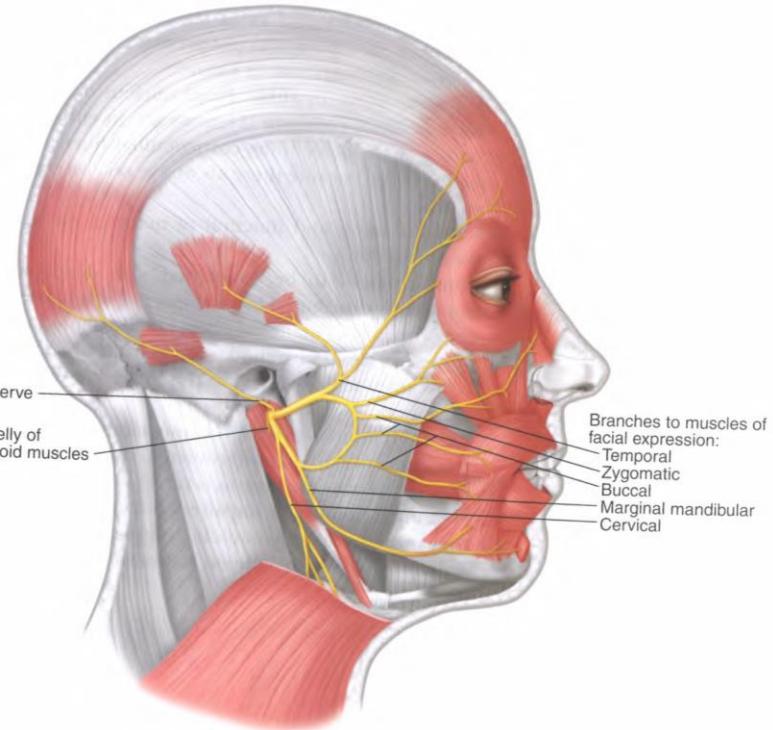
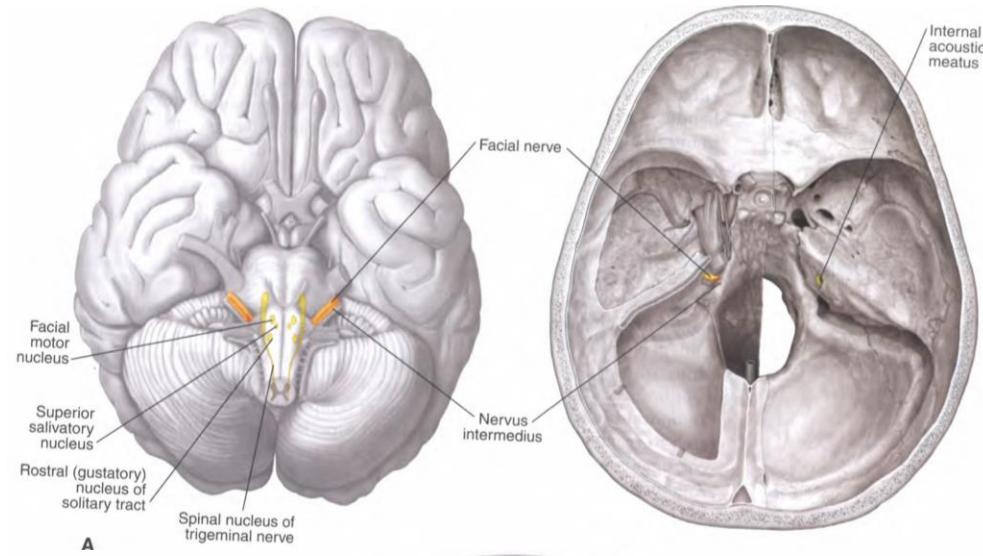
CN VI: Abducens



Fiber Type: somatic motor

Function: abducts eye
(lateral rectus m.)

CN VII: Facial



Fiber Type: somatic motor

Function: muscles of facial expression

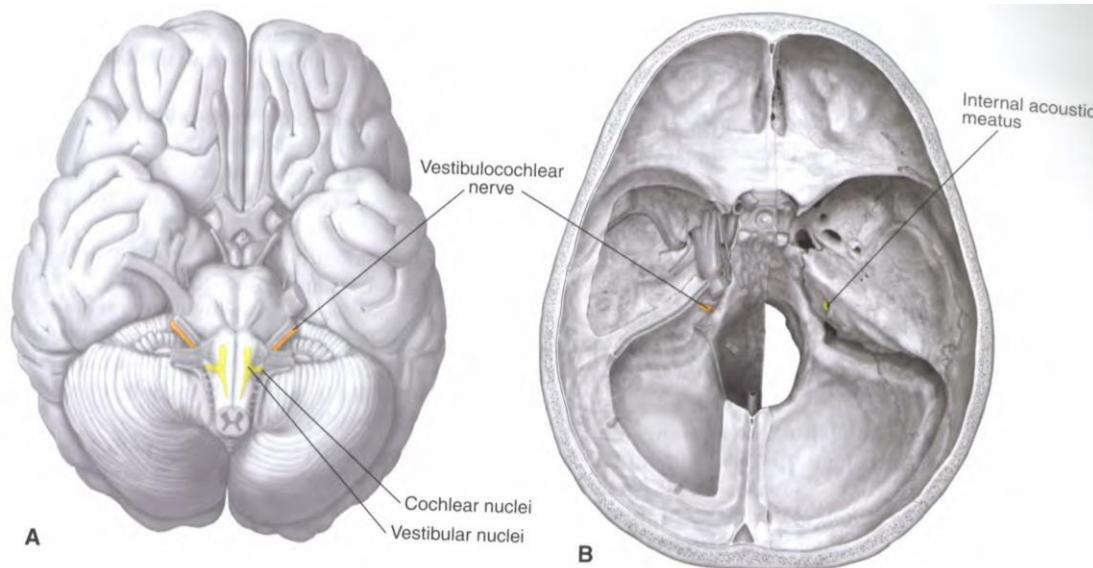
Somatic motor: posterior belly of digastric, stylohyoid, stapedius mm.

Visceral motor: lacrimal, salivary secretion

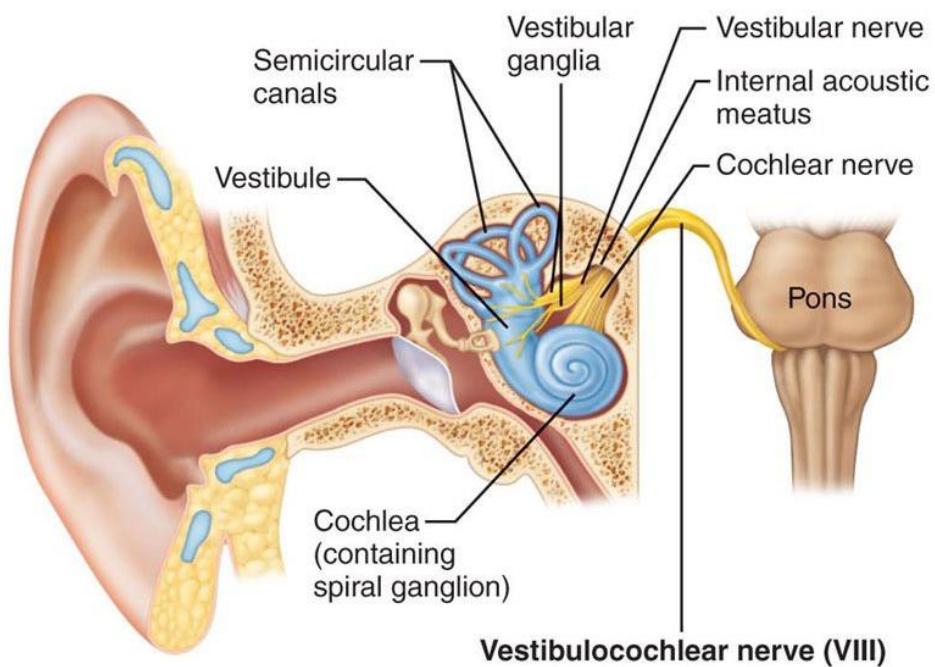
Somatic sensory: auricle, external acoustic meatus

Special sensory: taste for anterior 2/3 tongue

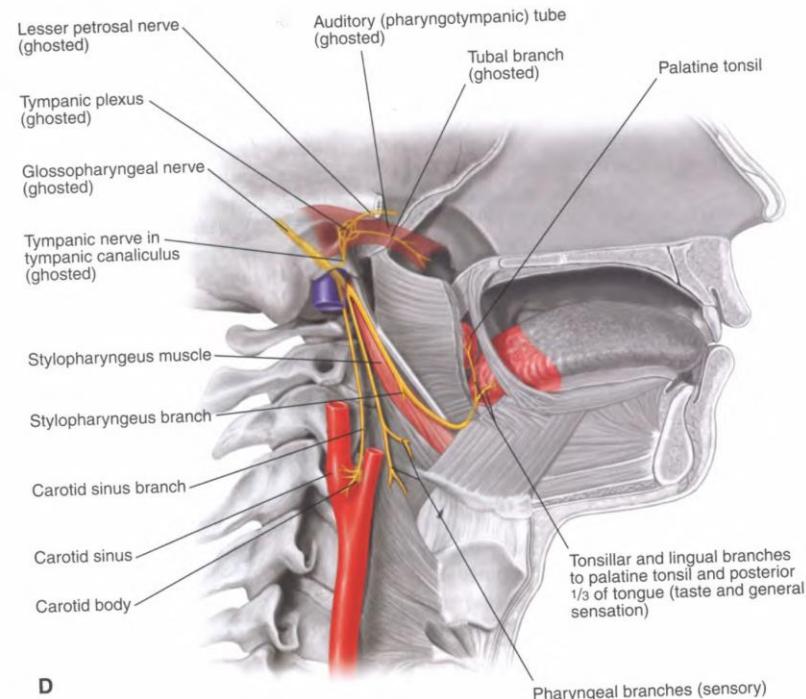
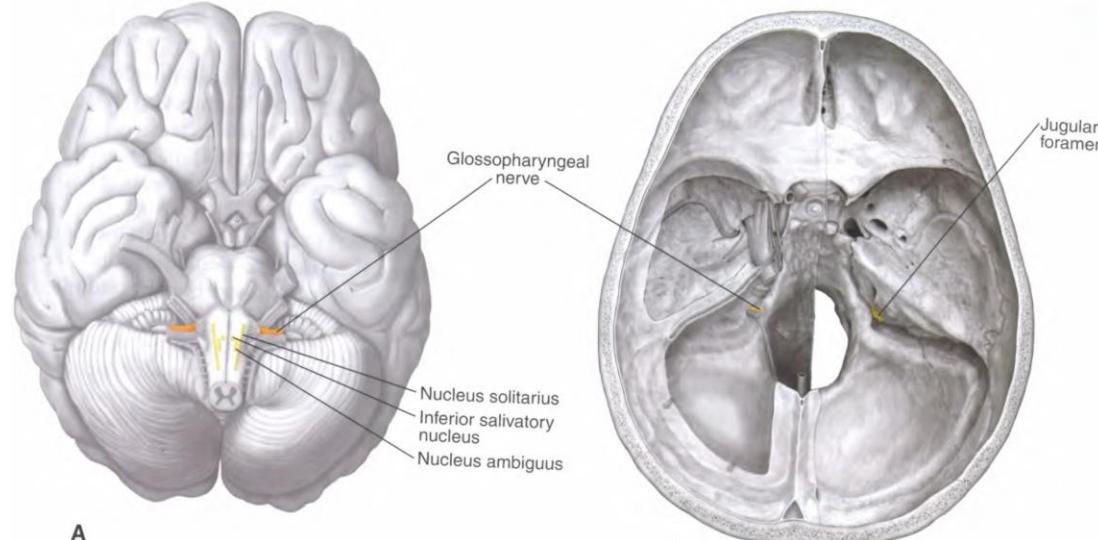
CN VIII: Vestibulocochlear



Fiber Type: special sensory
Function: hearing, balance



CN IX: Glossopharyngeal



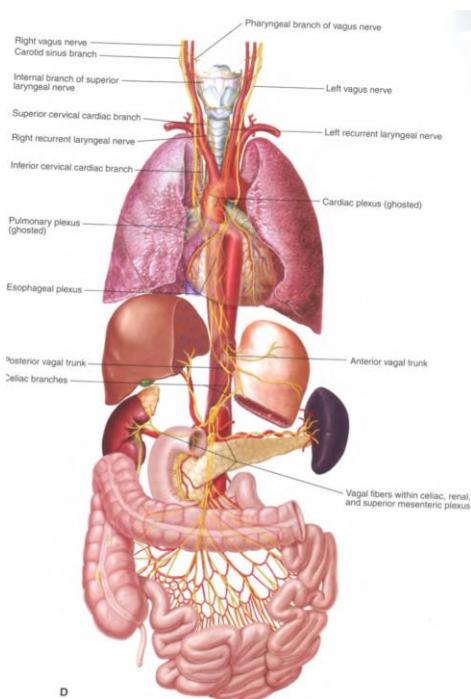
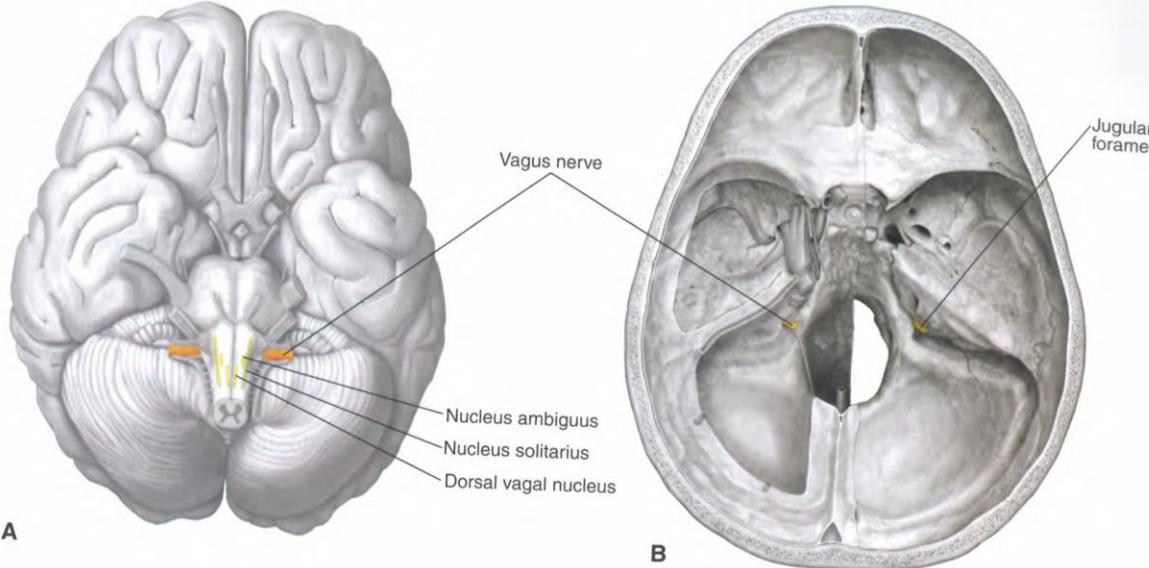
Fiber Type: special sensory
Function: taste from posterior 1/3 tongue

Somatic motor: stylopharyngeus m.

Visceral motor: parotid gland (saliva secretion)

Visceral sensory: carotid sinus & body

CN X: Vagus

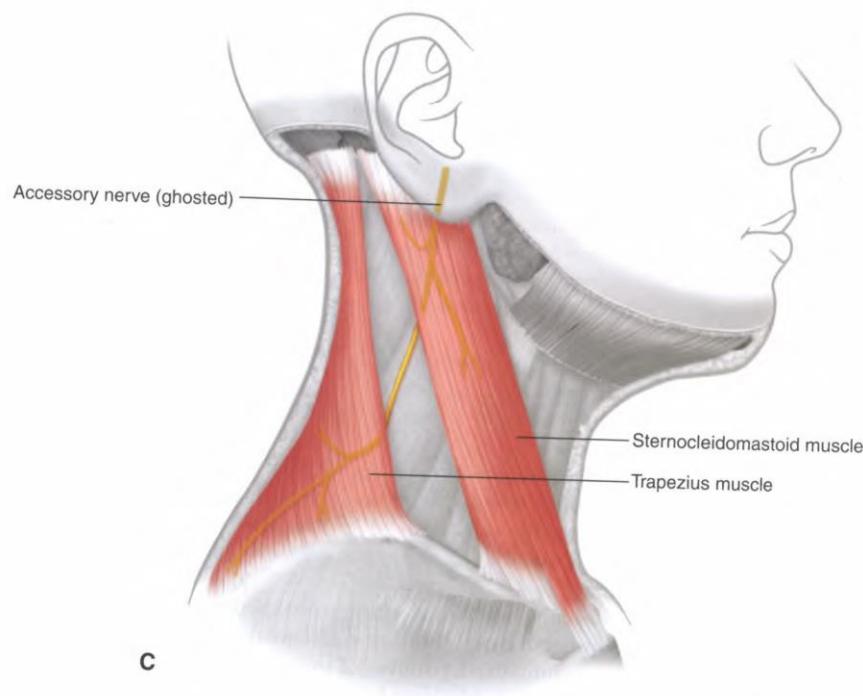
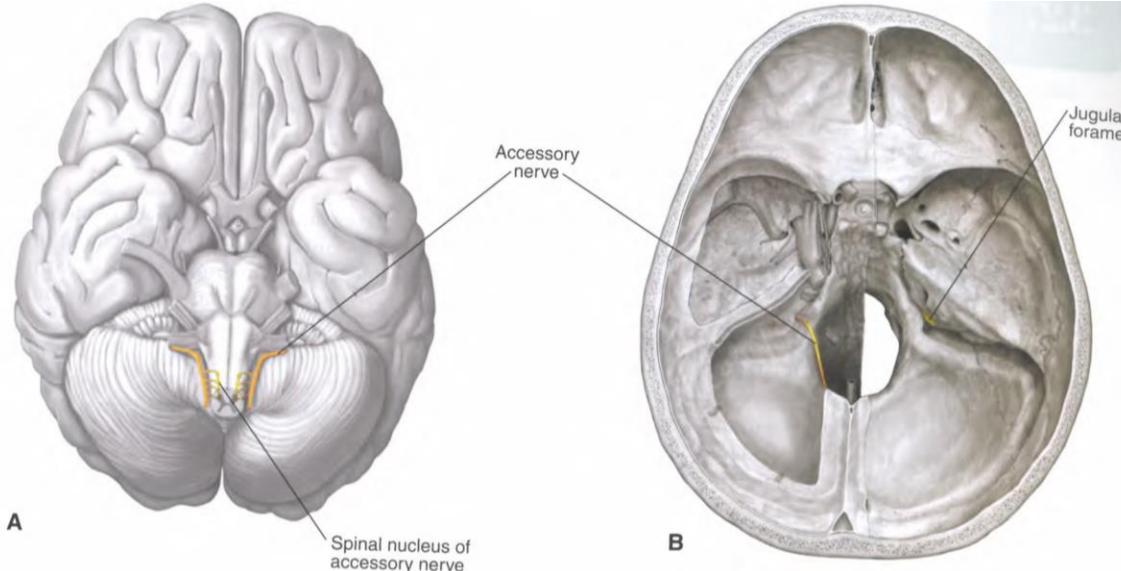


Fiber Type: visceral motor
Function: smooth muscles & glands in thoracic & abdominal visceral organs

Vagus (Latin): “wander”

Somatic motor: pharynx, larynx, palate mm.
Somatic sensory: sensation in lower pharynx, larynx, trachea
Special sensory: taste on epiglottis
Somatic sensory: auricle, external acoustic meatus

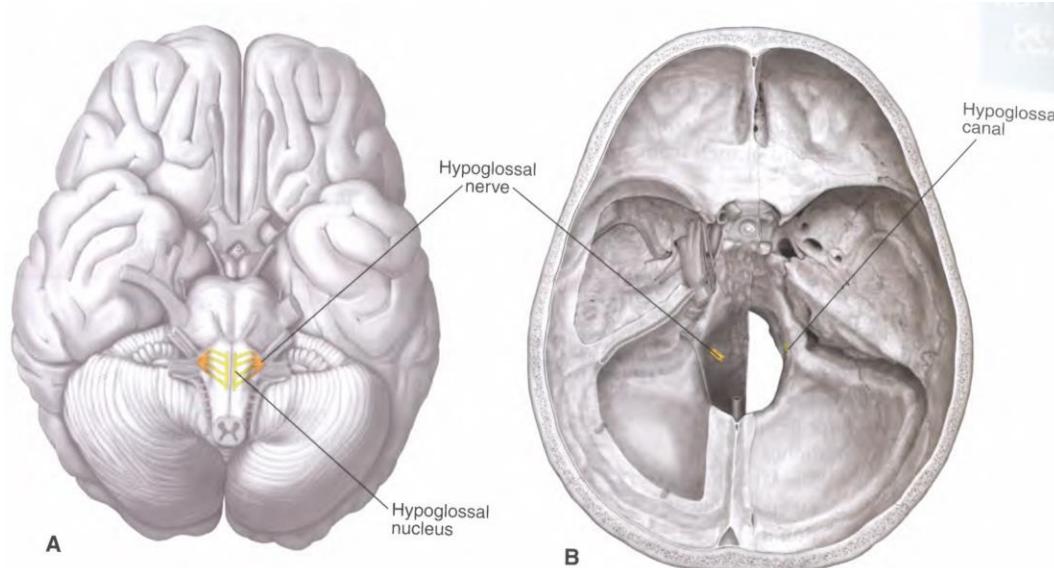
CN XI: Spinal Accessory



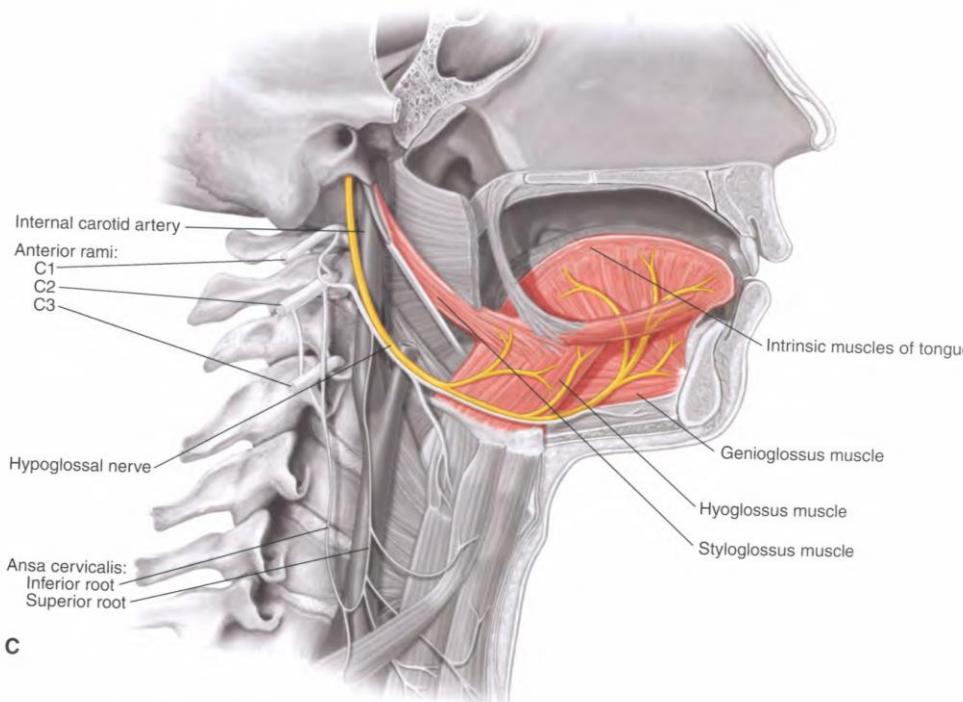
Fiber Type: somatic motor

Function: motor innervation to sternocleidomastoid & trapezius mm.

CN XII: Hypoglossal



Fiber Type: somatic motor
Function: tongue movement



3 Groupings of Cranial Nerves

ONLY Special Sensory Fibers

- CN I: olfactory
- CN II: optic
- CN VIII: vestibulocochlear

ONLY Somatic Motor Fibers

- CN III: oculomotor
- CN IV: trochlear
- CN VI: abducens
- CN XI: accessory
- CN XII: hypoglossal

Branchiomeric Nerves: derived from pharyngeal arches (see “Head & Neck Embryology” lecture)

- CN V: trigeminal
- CN VII: facial
- CN IX: glossopharyngeal
- CN X: vagus

**Note: branchiomeric nerves have more complex functions.

Example Question

A NYITCOM student is about to get her wisdom teeth pulled. Which of the following cranial nerves should be targeted for local anesthesia?

- a. trochlear nerve (CN IV)
- b. trigeminal nerve (CN V)
- c. facial nerve (CN VII)
- d. glossopharyngeal nerve (CN IX)
- e. vagus nerve (CN X)

“High-Yield” Topics

- Anatomical organization of the skeletal, nervous, vascular, digestive, and respiratory systems in the head and neck; and how these change from newborns to adult.
- The three “Danger Zones” in the head and neck and how they’re dangerous.
- Locations and functions of organs that only exist in the head and neck, such as glands.
- Names, fiber types, and functions of each cranial nerve.
- Clinical correlates.

Study Tips

- Head and neck is difficult (but don't panic)!
- Go through CPG “Learning Objectives”
- Cranial nerves, cranial nerves, cranial nerves!
 - Week 1: learn the names of cranial nerves and their numbers.
 - Week 2: learn at least one function of each cranial nerve.
 - Week 3+: keep learning all function of each cranial nerve.