

GROSS ANATOMY OF HEAD AND NECK

Neural Network (NN) Block

Feb 5, 2024

Welcome to Head and Neck

- 1. Overview of next three weeks.**
- 2. Some things to get down in first week before dissections Friday, next Monday**

OVERVIEW OF GROSS ANATOMY THIS BLOCK

**TOO MUCH
MATERIAL,
TOO
LITTLE
TIME**

- This year: very short duration to study Head and Neck (8 days + 1)
- Problem: Cover large amount of material (text: Head and Neck ~300 pages; compared to Upper Extremity ~100 pages);
- This material is needed for study of Neuroanatomy/Neurology, as well as questions on Board Exams

Approach:

- Focus upon **clinical anatomy** and topics related to **board** exams, Neuroanatomy/Neurology

However, also need vocabulary and knowledge anatomy for Neuro and ENT.

Task: Lots of memorizing (particularly, if you have not had material before) but try to maintain clinical focus throughout.

TOPICS: SESSIONS HAVE CLINICAL FOCUS

Face – **Bell's palsy** (Syndrome of damage to Facial nerve, CN VII) – also Intro to Blood Supply and venous drainage, Innervation;

Face development – **Cleft lip**

Cranial nerves – Major lecture – **each cranial nerve has syndrome**, need to know Anatomy to diagnose in Neurology

Skull – skull bones for **fractures and openings (foramina)**; also Scalp Meninges Blood Supply – **Hematomas** (bleeds inside head), also CSF

Orbit – Major lecture – EYES - **many clinical** topics; USED **DIAGNOSTICALLY** focus – Eye Movements chart

Skull Session – openings for cranial nerves for **clinical diagnosis**

Branchial (Gill) Arches – **Embryology essential to understanding adult structure**; **Branchial cleft syndromes**

Neck/Thyroid – Anatomy for **ENT**

Spinal Reflexes – Go over in detail (review) for **Neurological testing**

Cranial Nerve Reflexes – **Board questions**, essential for neurology

Autonomics - **Horner's** syndrome (Oculosympathetic paresis)

Nasal Cavity – fractures, **anosmia**, ENT, cleft palate, palatine tonsils

Larynx – **iatrogenic damage** to Laryngeal nerves during **surgery**

Ear – Middle ear infections (**otitis media**)

Plan: 1) Lecture handouts – arranged by topic (region) and contain basic clinical anatomy; please read carefully.

2) Lecture PowerPoints – illustrate and elucidate material from handouts (plus some other)

3) Clinical Anatomy Charts - summarize material.

Face handout

FACE

I. OVERVIEW: FACE IS UNIQUE - Skin on face is thin and moveable; Facial muscles take origin from underlying bones (mostly) and insert onto skin.

A. **Facial transplant** - In severe damage to face, facial transplants are required because muscles of facial expression insert onto skin rather than tendons (therefore, cannot use grafts of other body muscles); transplants contain muscles and skin.

B. Neural control of Facial muscles - Facial muscles are under both voluntary and involuntary (emotional) control.

C. Detecting action of Facial muscles - Muscles of face have no (or very few) muscle spindles; muscle contractions are thought to be detected by stretching of skin.

D. Facial paralysis - is a defining symptom in Bell's Palsy

Bell's palsy - paralysis of facial muscles; lower motor neuron syndrome of facial nerve (CN VII); thought to be associated with **viral infection** (herpes simplex); **Symptoms unilateral:** sudden onset **paralysis or paresis of all facial muscles on one side;** drooling; inability to close eye; also hyperacusis (sounds seem too loud), loss of taste to anterior tongue; pain in or behind ear.

Face PowerPoint

FACE: 2023

Mona Lisa's Face



'Window of the soul' - Eyes and Face have moveable skin for facial expression

Mona Lisa's Hands



FACE IS UNIQUE - skin of face is thin and moveable



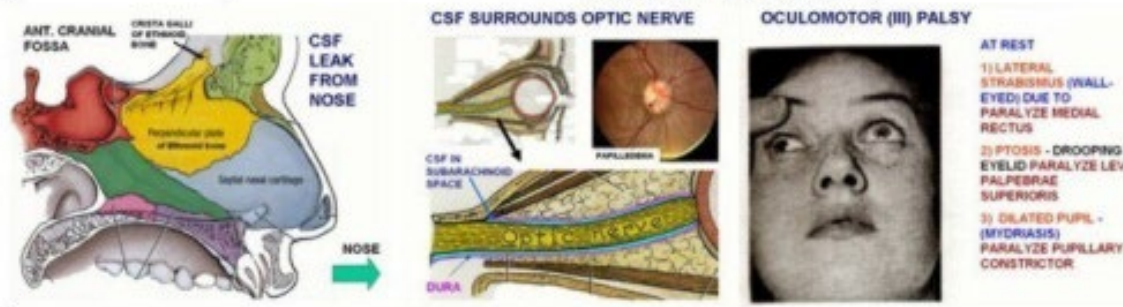
Facial Paralysis - Bell's Palsy

CLINICAL ANATOMY CHARTS; SUMMARIES FOR EXAM AND BOARD REVIEW (TOTAL 8 PAGES INCLUDING REFLEX TESTING AND EMBRYOLOGY)

CLINICAL ANATOMY OF HEAD AND NECK 2023

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Clinical	Anatomy	Cause	Sign/Symptom
Anterior Cranial Fossa - Cranial nerve I, Nasal Cavity			
Fracture of cribriform plate of ethmoid bone	Nasal septum continuous with crista galli of ethmoid bone; Olfactory nerve passes through cribriform plate of ethmoid bone	Blow to nose; fracture produces continuity between subarachnoid space and nasal cavity	Leakage of CSF from nose ('runny nose'); Decreased sense of smell (hyposmia)
Middle Cranial Fossa - Cranial nerves II-VI Orbit, Eye Movements, Face			
Rapid loss of vision in one eye	Central artery of retina (branch of Ophthalmic artery from Int. Carotid) is an normally an end artery with no functional anastomoses (exception: Chorioretinal anastomoses)	Occlusion of Central Artery of Retina	Sudden onset blindness in one eye (one eye only, sign: artery occlusion visible through ophthalmoscope)
Slow loss of vision in one eye	Dura mater and subarachnoid continue over optic nerve; Optic nerve function affected by CSF pressure	Communicating hydrocephalus (many causes)	Decreased visual function both eyes; sign: papilledema in ophthalmoscope view; also other signs of increased intracranial pressure (headache, etc.)
Abducens nerve palsy	Abducens nerve innervates only Lateral Rectus muscle (action: abduction of eye)	Damage Abducens nerve VI (causes ex. increased intracranial pressure. CAVERNOSUS)	Diplopia and Medial strabismus



Plan:

3) Lecture Videos – Videos follow slides in PowerPoints. Note: watching lecture videos is dull; these videos were from lectures given in past years (advantage: live audience reactions).

**Problem: watching all the videos takes time.
Unclear what is really essential.**

Strategy – Lecture/Discussion sessions – Start Wednesday - Go over material extracted from lectures Powerpoints/ videos (particularly things in red boxes in Powerpoints, often with asterisks).

All material (handouts, videos and Powerpoints of are available on my website, zillanatomy.com (currently under Pandemic Anatomy).

**EVERYONE STUDIES AT THEIR OWN PACE:
EITHER GO TO DISCUSSION SESSIONS OR
WATCH VIDEOS/READ POWERPOINTS OF
DISCUSSION SESSIONS.**

EXAM QUESTIONS

- Intended to stress topics emphasized in Lecture/ Discussion sessions (Board relevant) – generally answer from material in handouts and PowerPoints**
- Many questions on exams are clinical vignettes**
- Eliminated practice questions from my website (Pandemic Anatomy) - Many questions were quite similar to those asked on exams/quizzes; this compromised Assessment of student performance**
- Go over some practice questions in Discussion/Lectures - however, questions can be rewritten by Assessment Evaluation Committee immediately prior to exams (not know in advance).**

LABS - 1) PROSECTIONS (DISSECTIONS DONE IN ADVANCE BY MEDICAL STUDENTS), 2) DISSECTIONS BY YOU

PROSECTIONS - All prosections are in Histology lab with labeled photos (laminated) on tables.

All questions on lab part of exam will be on photos. Questions will be about labeled structures.

DISSECTIONS BY YOU IN GROSS LAB - Two - Discuss Wednesday

1) Brain Stem Dissection - this Friday, Feb. 10; (students have been said this is one of the best anatomy labs.

2) Orbit Dissection - next Monday, Feb. 13 - Eye muscles, nerves and blood vessels are complex three dimensional structures; the dissection helps.

LABS PROSECTIONS AND DISSECTIONS (2)

PROSECTIONS - All prosections are on trays in Histology lab with labeled photos (laminated) on tables; All questions on lab part of exam will be on photos. Questions will be about labeled structures.

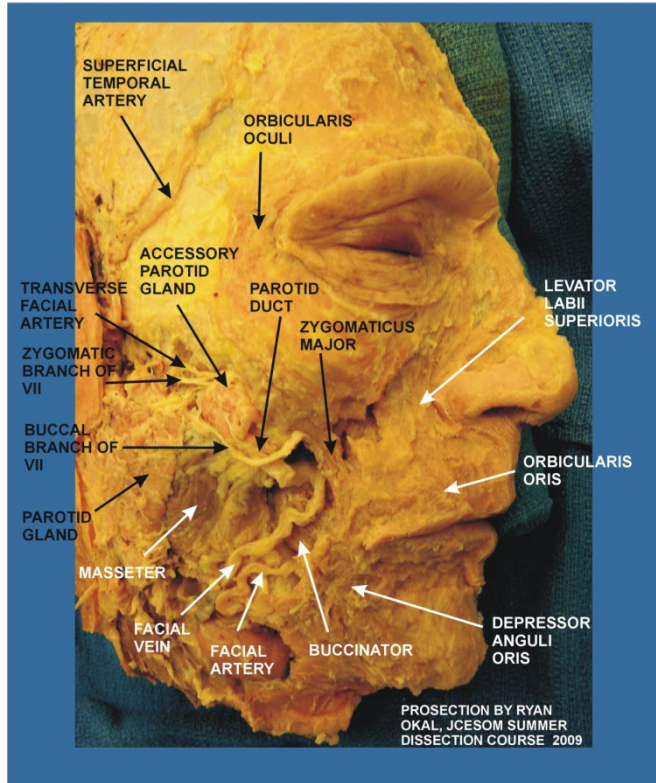


**view of
Histology
Lab
(across
hall from
Gross
Lab)
2023**

HEAD AND NECK PROSECTIONS 2023

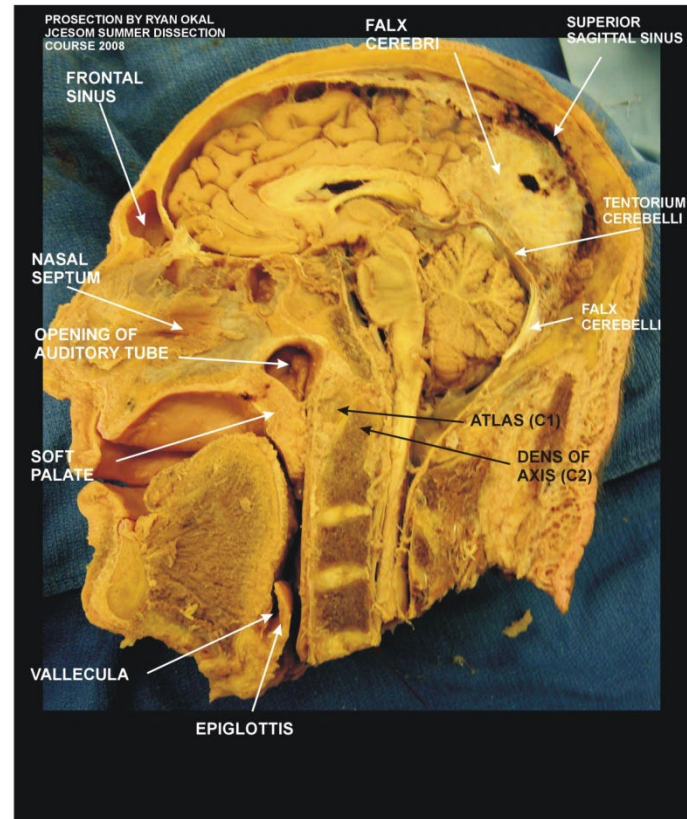
FACIAL MUSCLES

312



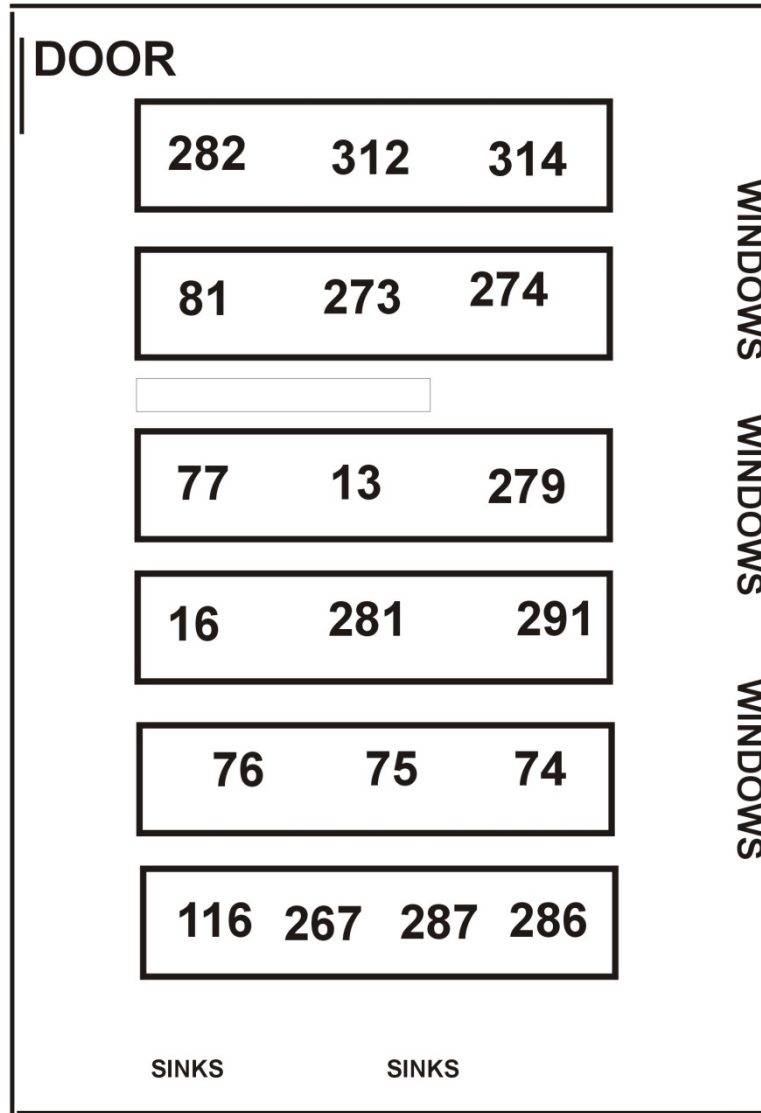
MEDIAL VIEW OF BISECTED HEAD

312



LABELLED PHOTOS OF PROSECTIONS - LAMINATED PICTURES OF THESE PHOTOS NEXT TO PROSECTIONS

MAP OF LOCATION OF PROSECTIONS IN HISTOLOGY AREA 2024



PROSECTIONS

1- Some recently dissected and excellent –

116 - Brainstem/Orbit in Cranial Cavity - This is the view similar to the lab dissections that will be done on Friday (2/9/24) and Monday (2/12/24). Great as a preview.

75 - Bisected Head with Intact Falx Cerebri – great for orientation.

76 – Carotid Endarterectomy Surgical Prosection – One side is surgery to expose Carotid artery; other side is full dissection of neck to fully see structures exposed in surgery

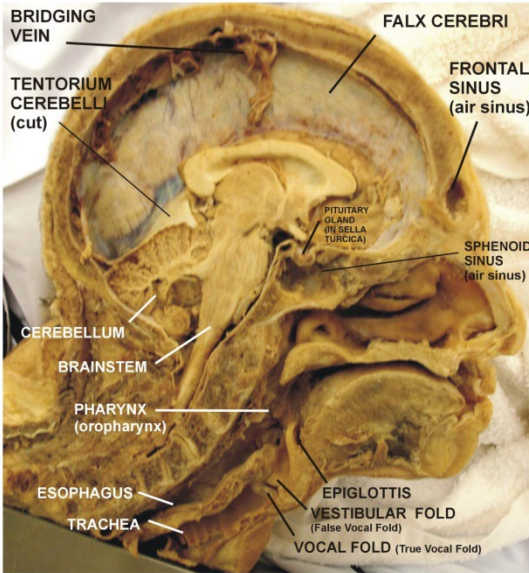
2- Some old, very old but still usable – See what you can find; please let me know about broken structures (I will post file with list of structures at end and exclude anything broken).

75

Good for overall orientation

BISECTED HEAD WITH INTACT FALX CEREBRI

75



Note: Bridging Vein - cut when brain removed but still attached and entering Sup. Sagittal Sinus

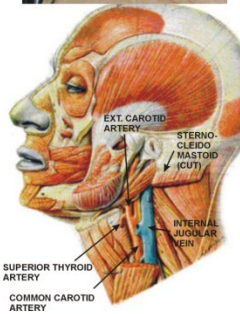
76

One side surgical approach; other side Full Dissection

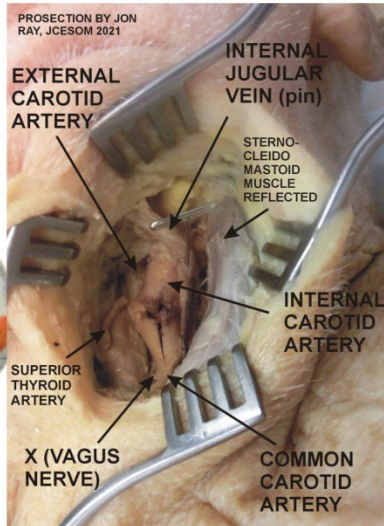
SURGICAL PROSECTION: CAROTID ENDARTERECTOMY

76

SKIN INCISION ANTERIOR TO STERNOCLEIDOMASTOID MUSCLE



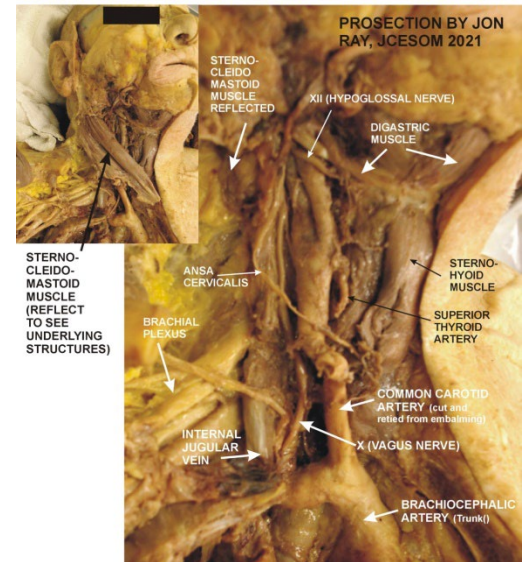
CAROTID SHEATH INCISED TO EXPOSE CONTENTS; ARTERY INCISED FOR PLAQUE REMOVAL



DISSECTION OF ANTERIOR NECK

76

NECK DISSECTED ON RIGHT SIDE OF SURGICAL ANATOMY PROJECTION

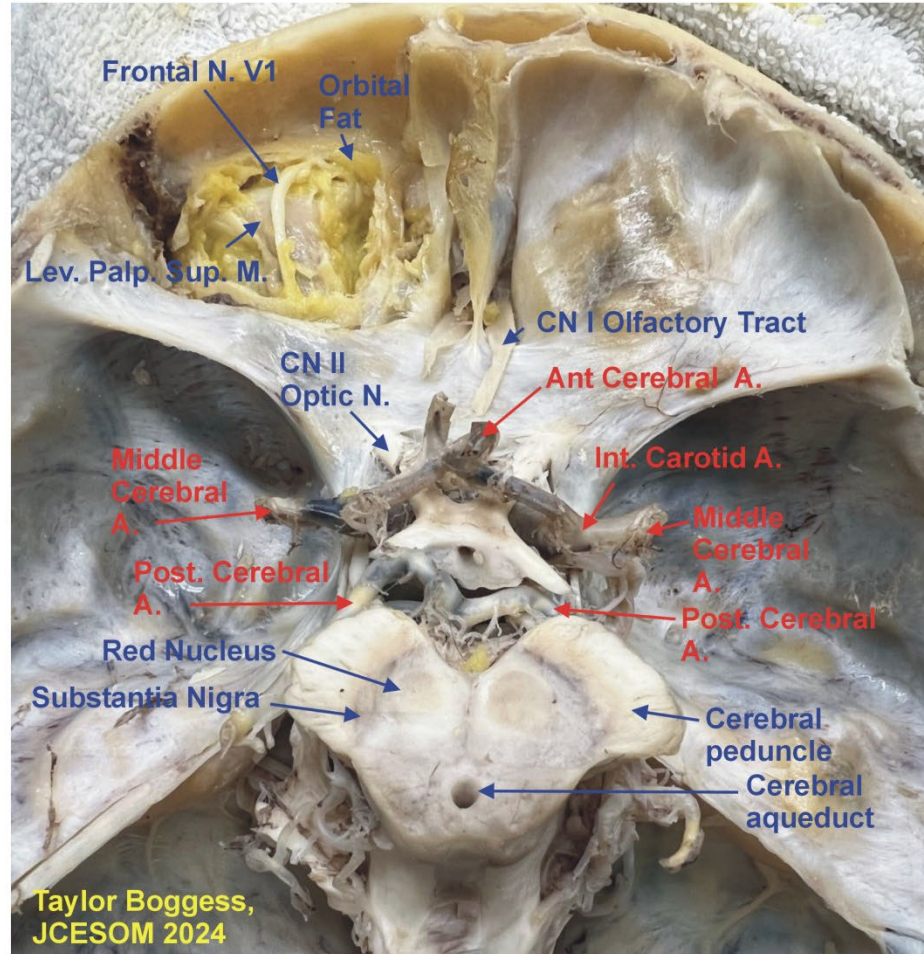


116

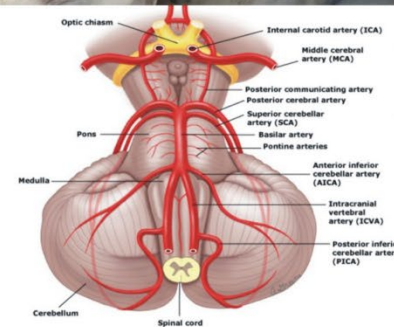
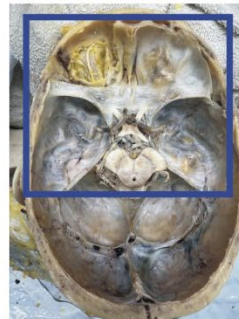
View similar to lab dissections on Friday 2/9/2024 (Cranial Cavity) and Monday 2/12/2024 (Orbit)

BRAINSTEM/ORBIT IN CRANIAL CAVITY

116



ORIENT



LEVEL OF VIEW

LECTURES/VIDEOS

This week heavily front loaded – lots of lectures; eases up somewhat next week.

Wednesday – Skull session (video and live session); go through bones and openings in Skull; board questions; ATTENDANCE IS HIGHLY RECOMMENDED.

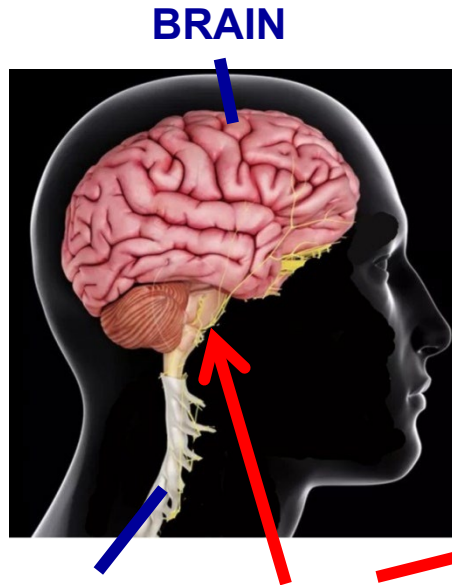
Final Reviews Tuesday Feb 21 and Wednesday Feb 22 – Will go over relevant material from lab (prosections) and Discussion sessions.

THINGS TO GET DOWN RIGHT AWAY

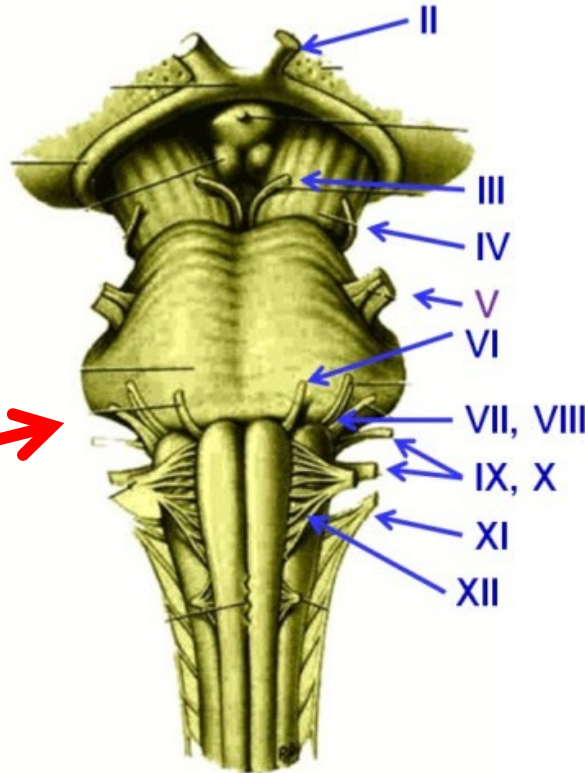
FACE

- 1- **Bell's palsy** – Actions of some facial muscles important – Orbicularis Oculi (close eye – paralysis can damage cornea, Buccinator – board question difficulty eating (actually cheek keeping food between teeth))
- 2- **Arterial Supply and Venous Drainage of Face** – Branches of Carotid Artery (Pulses), infections, later Neck.
- 3- **Embryology** – **Cleft lip**; later Cleft palate; also formation nasolacrimal duct.

LEARN NAMES AND NUMBERS OF CRANIAL NERVES



**CRANIAL NERVES
LEAVE/ENTER
BRAINSTEM
(except CN I)**

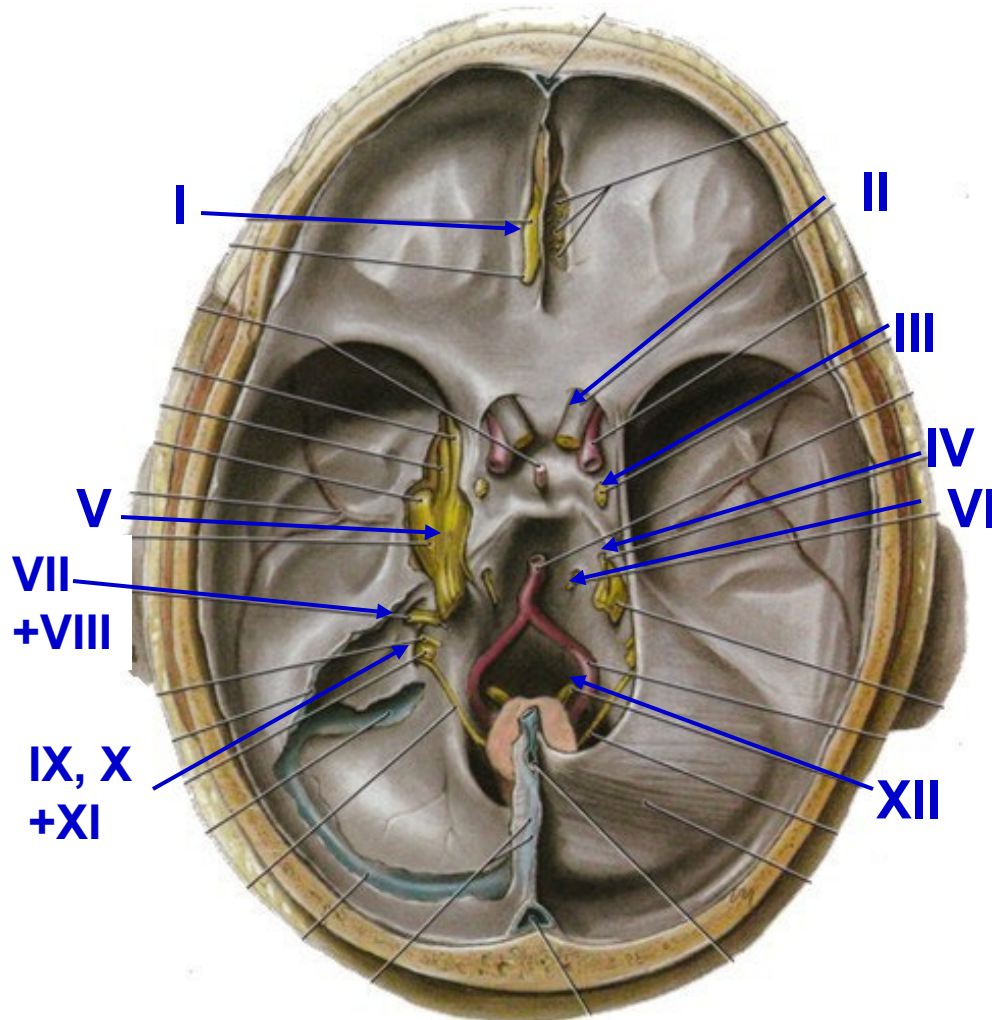


**BRAIN-
STEM**

**CRANIAL NERVES NUMBERED 1-12
(ANTERIOR TO POSTERIOR);
COMMONLY REFERRED TO NUMBER
(ROMAN NUMERALS = I (1) - XII (12))**

- I. OLFACTORY** - sense of smell
- II. OPTIC** - vision
- III. OCULOMOTOR** - eye movement
- IV. TROCHLEAR** - eye movement
- V. TRIGEMINAL** - touch, general sensation to skin, oral cavity, nasal cavity + more
- VI. ABDUCENS** - eye movement
- VII. FACIAL** - muscles of facial expression + lots more
- VIII. VESTIBULO-COCHLEAR** - hearing and balance
- IX. GLOSSOPHARYNGEAL** - sensory to pharynx + more
- X. VAGUS** - larynx, pharynx + rest of body
- XI. ACCESSORY** - sternocleidomastoid, trapezius
- XII. HYPOGLOSSAL** - muscles of tongue

LEARN NAMES AND NUMBERS OF CRANIAL NERVES

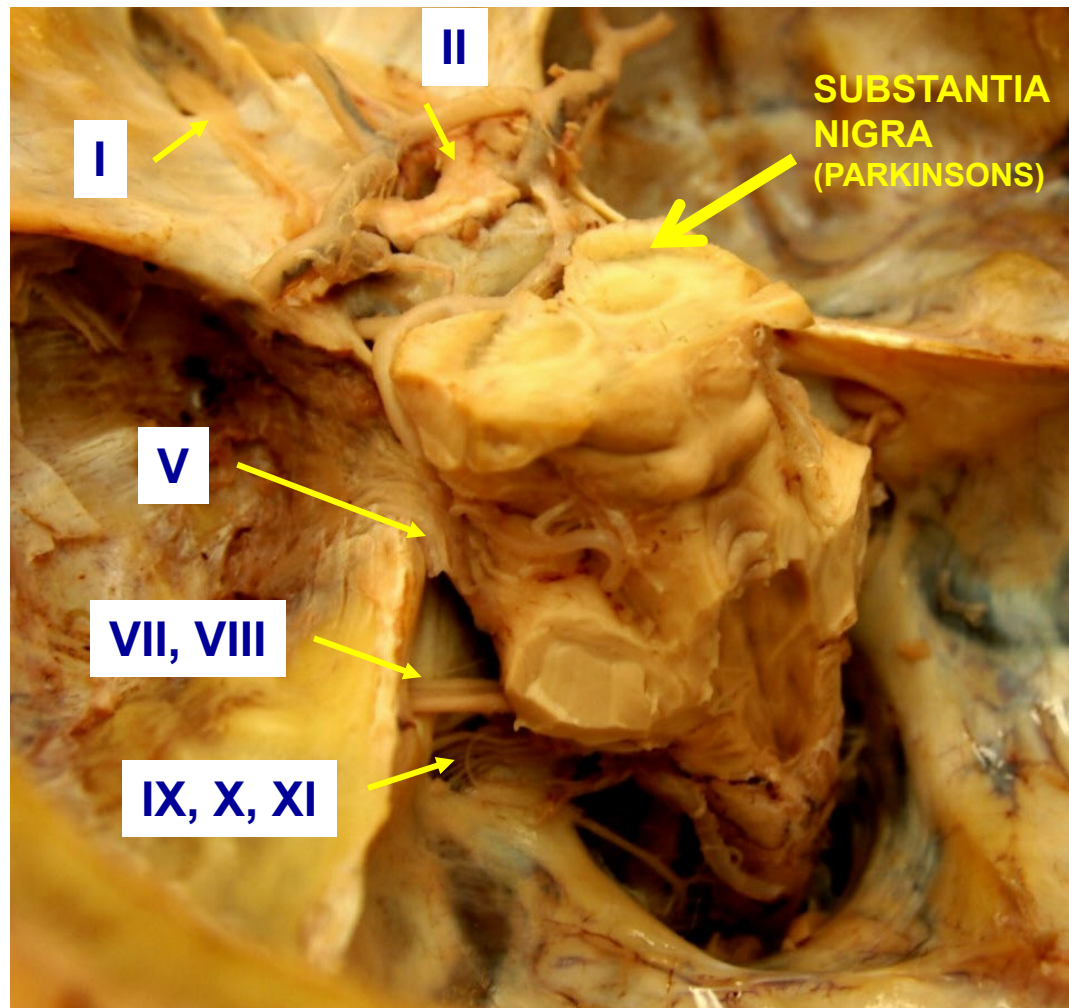


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LEARN NAMES AND NUMBERS OF CRANIAL NERVES

VIEW AFTER DISSECTION FRIDAY



- I. OLFACTORY - sense of smell
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**SKULL SESSION -
WEDNESDAY -
FORAMINA
ASSOCIATED
WITH CRANIAL NERVES**

SELLA TURCICA

**CRIBRIFORM
PLATE ETHMOID - I**

OPTIC FORAMEN - II

**SUP. ORBITAL
FISSURE -
III, IV, V1, VI**

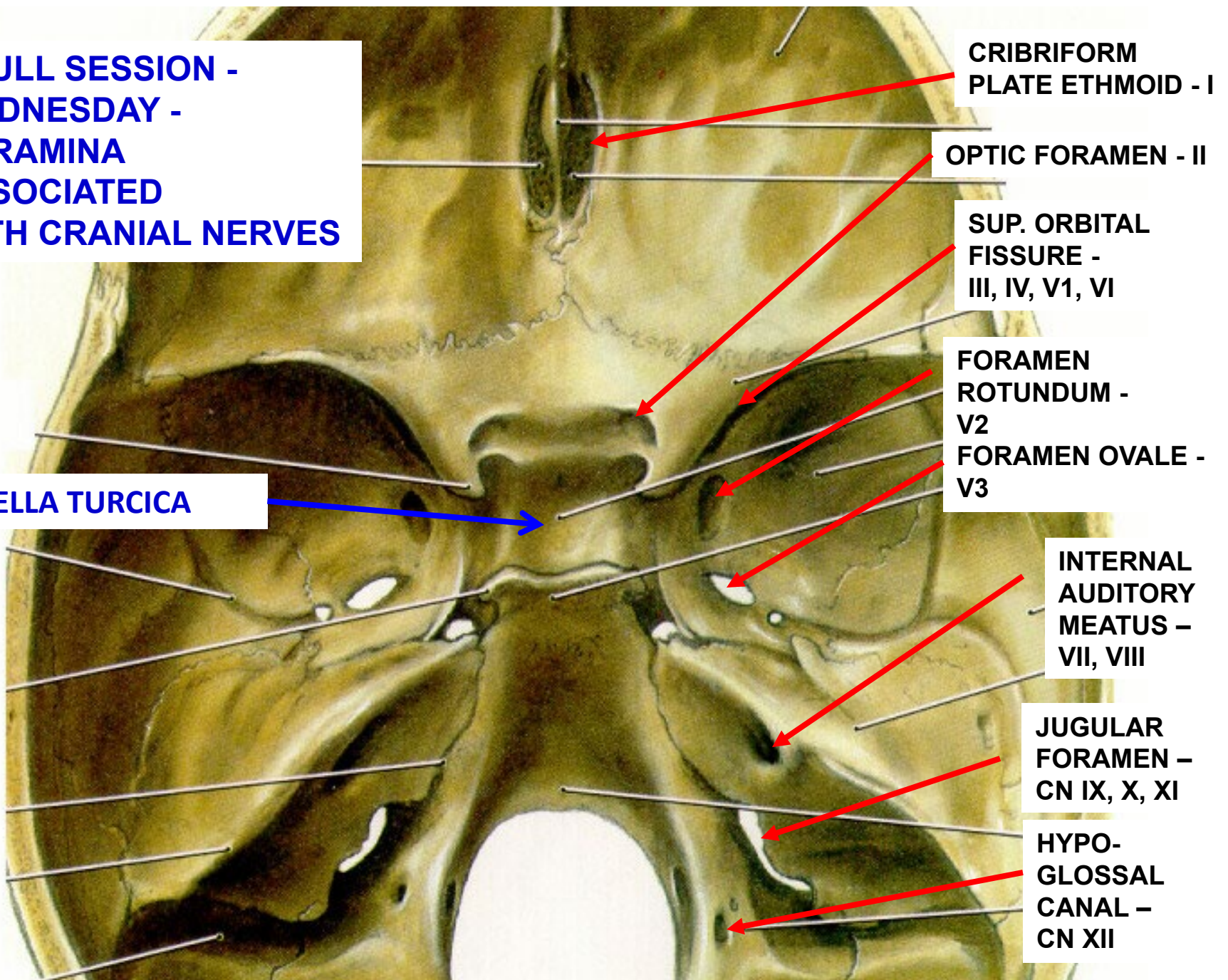
**FORAMEN
ROTUNDUM -
V2**

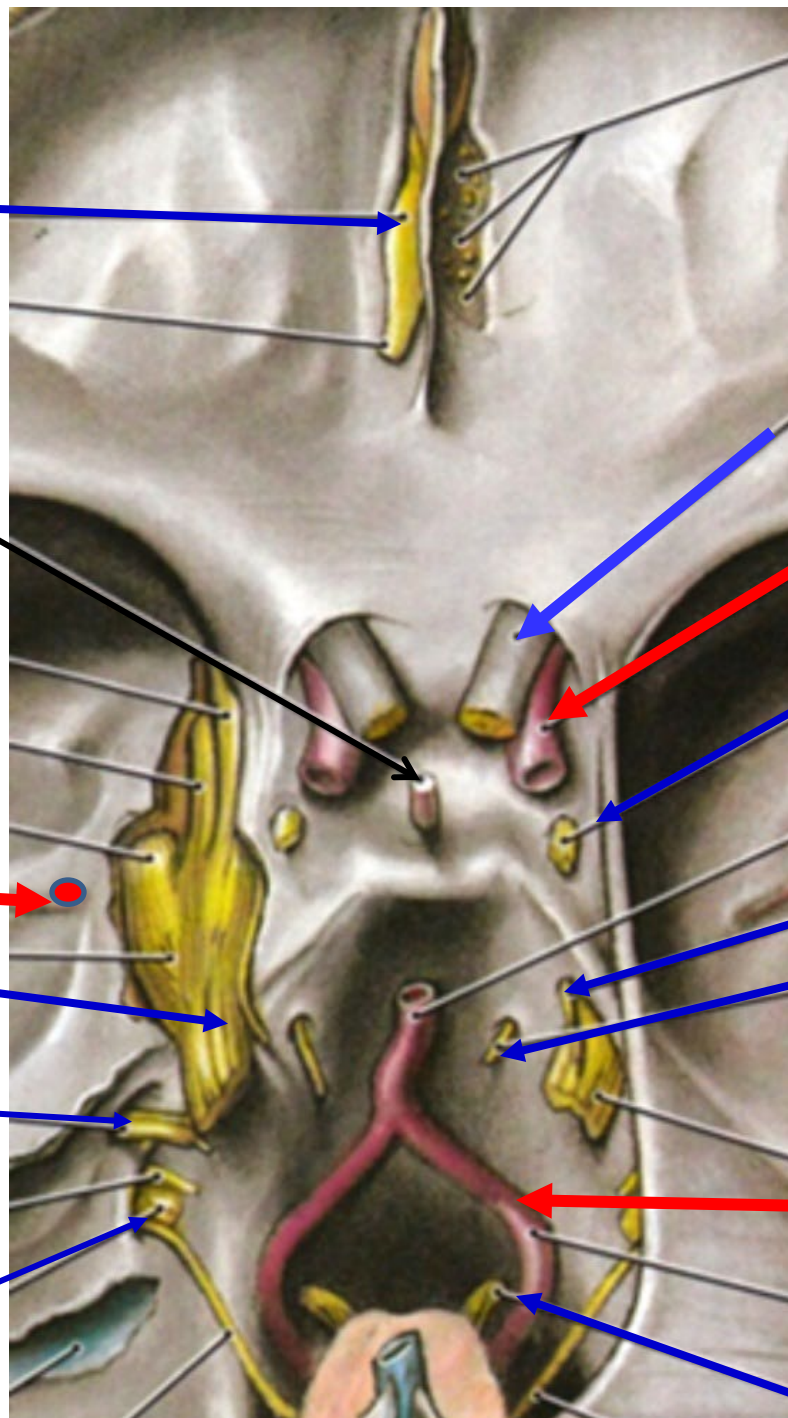
**FORAMEN OVALE -
V3**

**INTERNAL
AUDITORY
MEATUS -
VII, VIII**

**JUGULAR
FORAMEN -
CN IX, X, XI**

**HYPG-
GLOSSAL
CANAL -
CN XII**





**BRAINSTEM
PROSECTIONS
IDENTIFY**

I

II

**PITUITARY
STALK**

INTERNAL CAROTID A.

V1

V2

V3

III

**MIDDLE
MENINGEAL A.**

V

IV

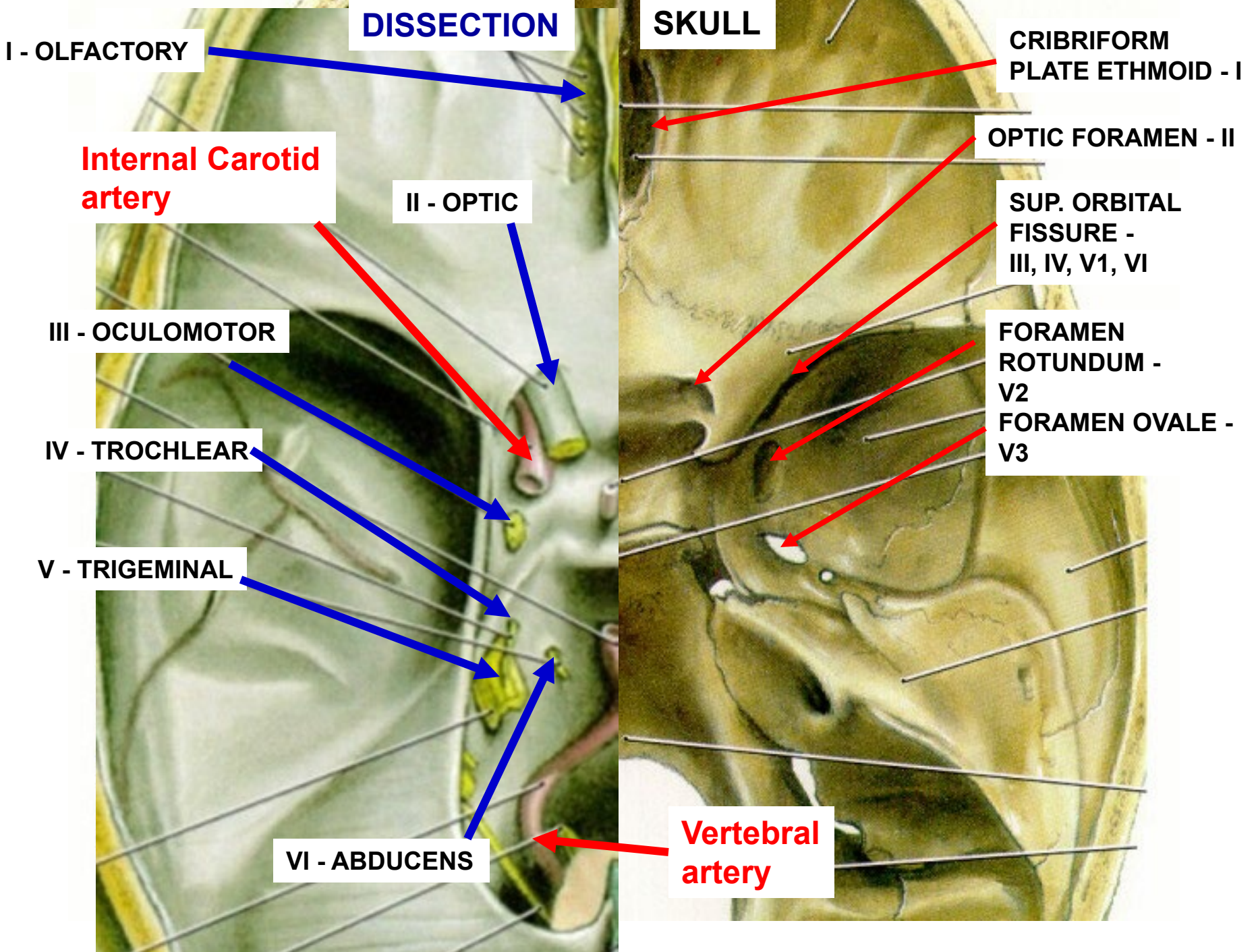
**VII
+VIII**

VI

**IX, X
+XI**

VERTEBRAL A.

XII



DISSECTION

SKULL

I - OLFACTORY

CRIBRIFORM PLATE ETHMOID - I

Internal Carotid artery

II - OPTIC

OPTIC FORAMEN - II

III - OCULOMOTOR

SUP. ORBITAL FISSURE - III, IV, V1, VI

IV - TROCHLEAR

FORAMEN ROTUNDUM - V2

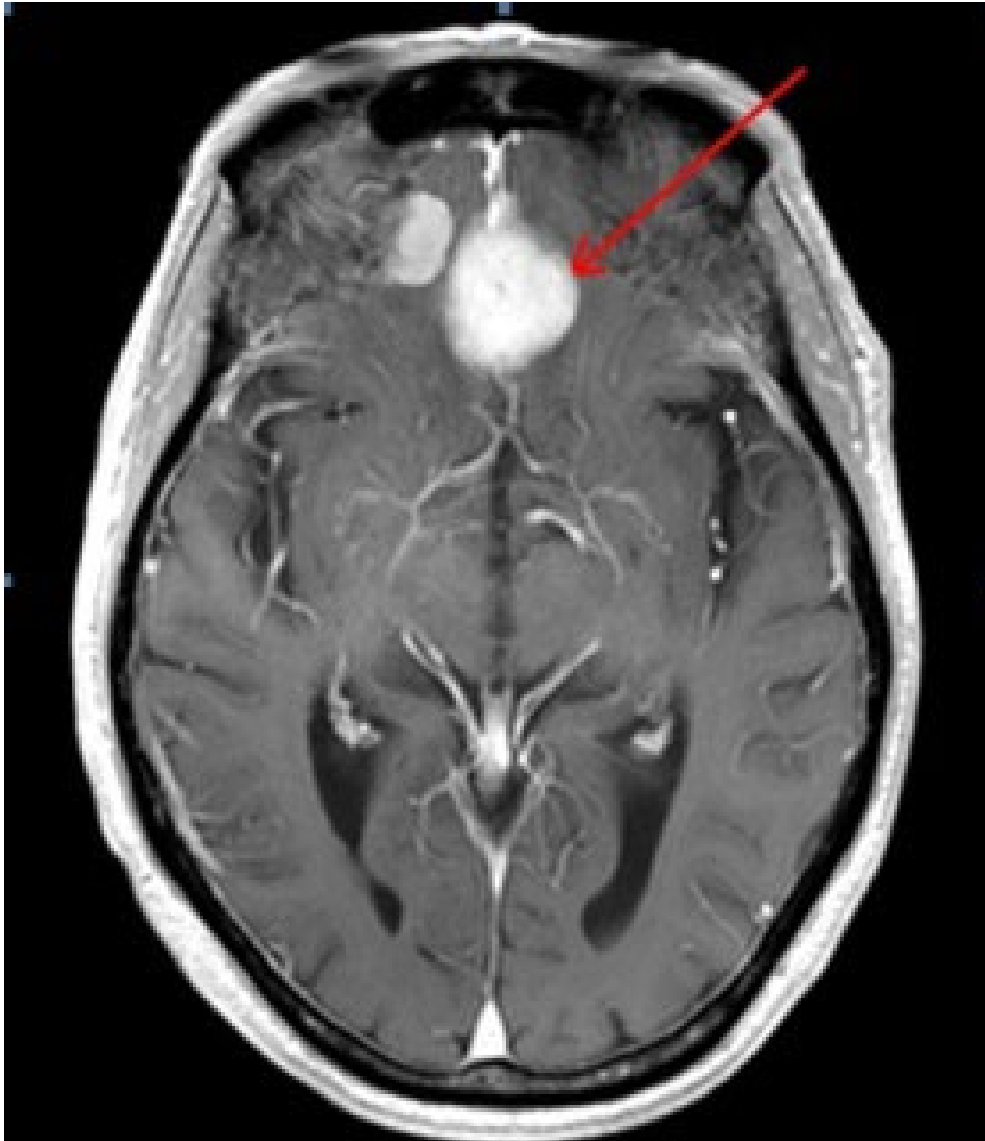
V - TRIGEMINAL

FORAMEN OVALE - V3

VI - ABDUCENS

Vertebral artery

WHY STUDY THIS? DIAGNOSE LESIONS IN CRANIAL CAVITY

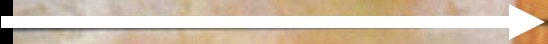


**MENINGIOMA IN
ANTERIOR
CRANIAL FOSSA.**

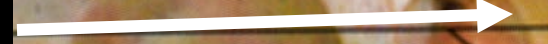
**WHICH CRANIAL
NERVE
AFFECTED?
WHAT IS A
SYMPTOM?**

**HIGHLY RECOMMEND STUDY
THIS PICTURE: SEE FRIDAY**

I Olfactory



II Optic



**III Oculo-
motor**



**VI
Abducens**



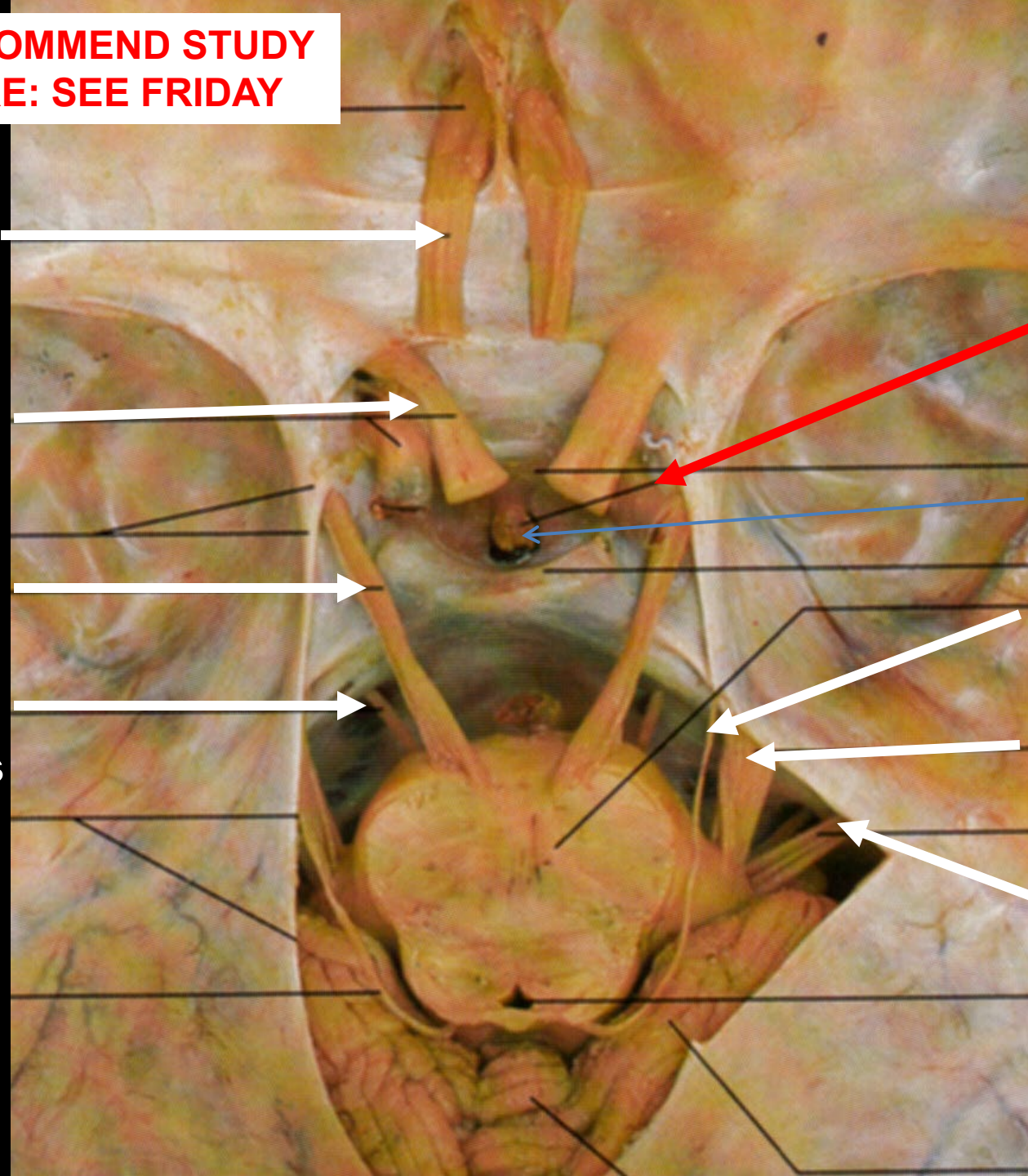
**INTERNAL
CAROTID
A.**

**Pituitary
stalk**

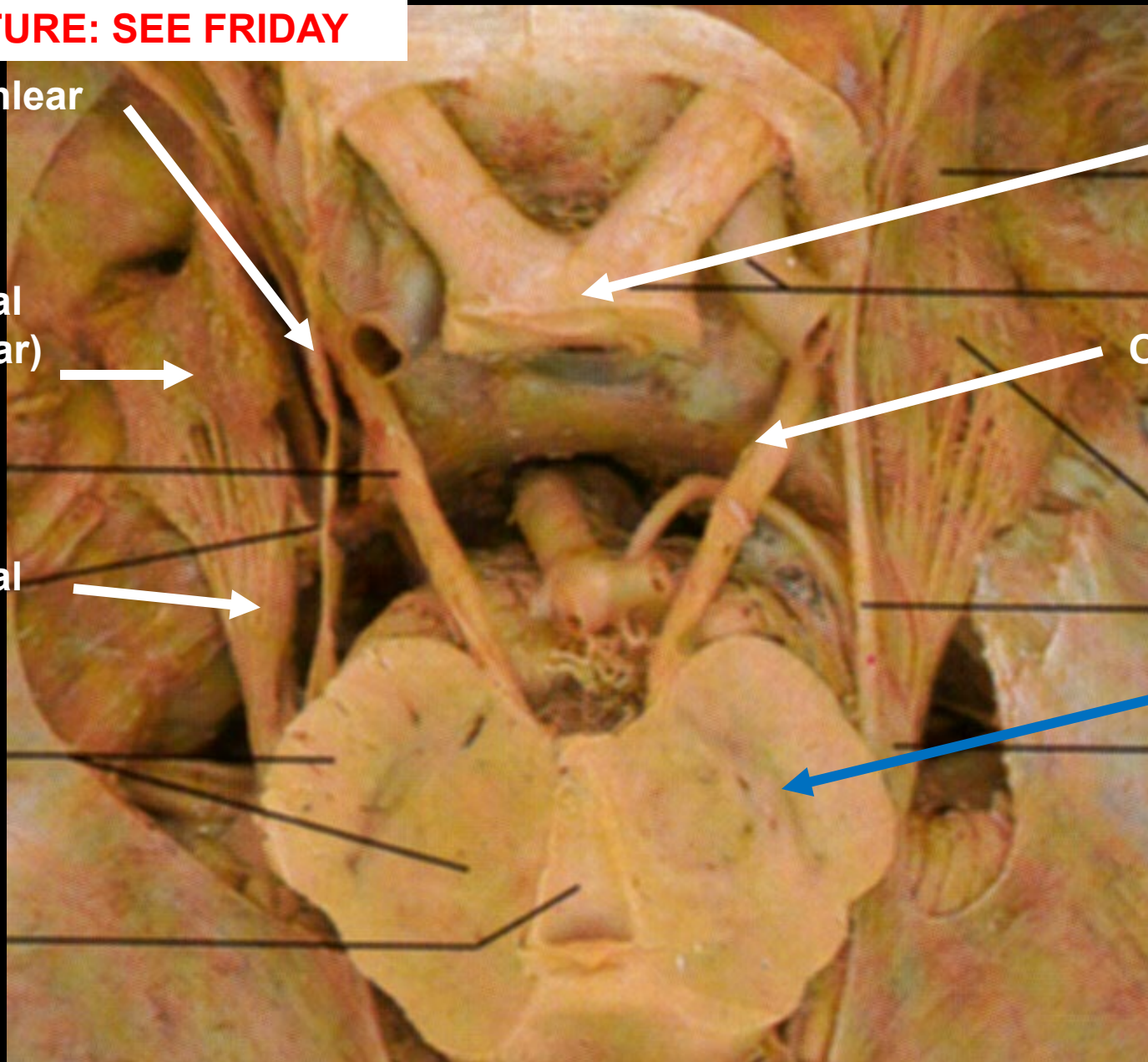
**IV
Trochlear**

**V
Trigeminal**

VII + VIII



**HIGHLY RECOMMEND STUDY
THIS PICTURE: SEE FRIDAY**



Trochlear

**Trigeminal
(Semilunar)
Ganglion**

**V
Trigeminal**

**II Optic
Chiasm**

**III
Oculomotor**

**Substantia
Nigra
in
Midbrain
(Parkinson's
Disease)**