



Anatomy & Embryology

Lecture 2: Axial Skeleton

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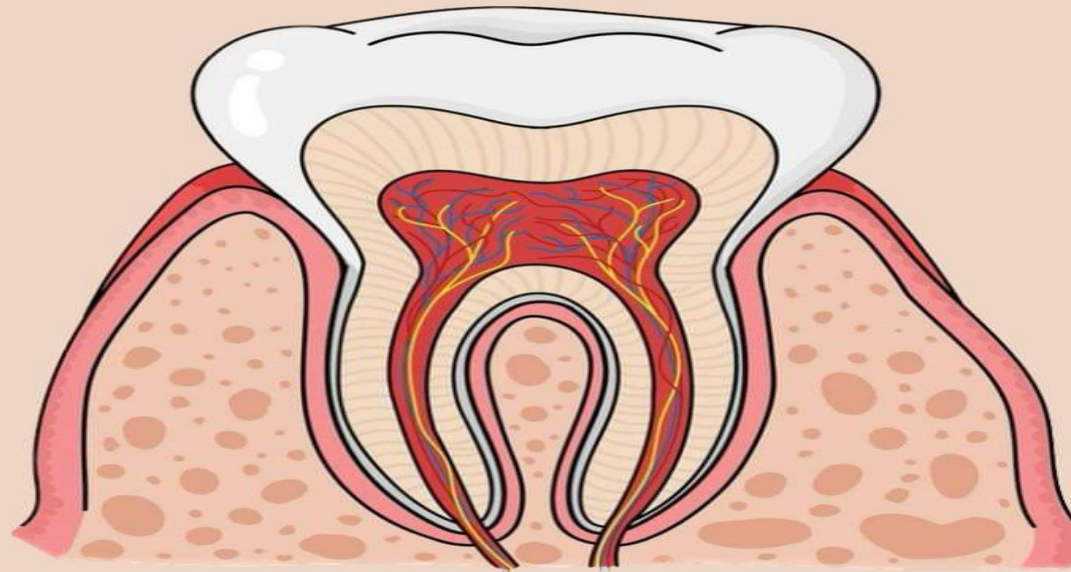
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The Skeletal System



ANATOMY



LEC NO. : 2
DONE BY : Abdullah abu-saraya

وَقُلْ رَبِّ زِدْنِي عِلْمًا

* **Divisions of the skeleton:**

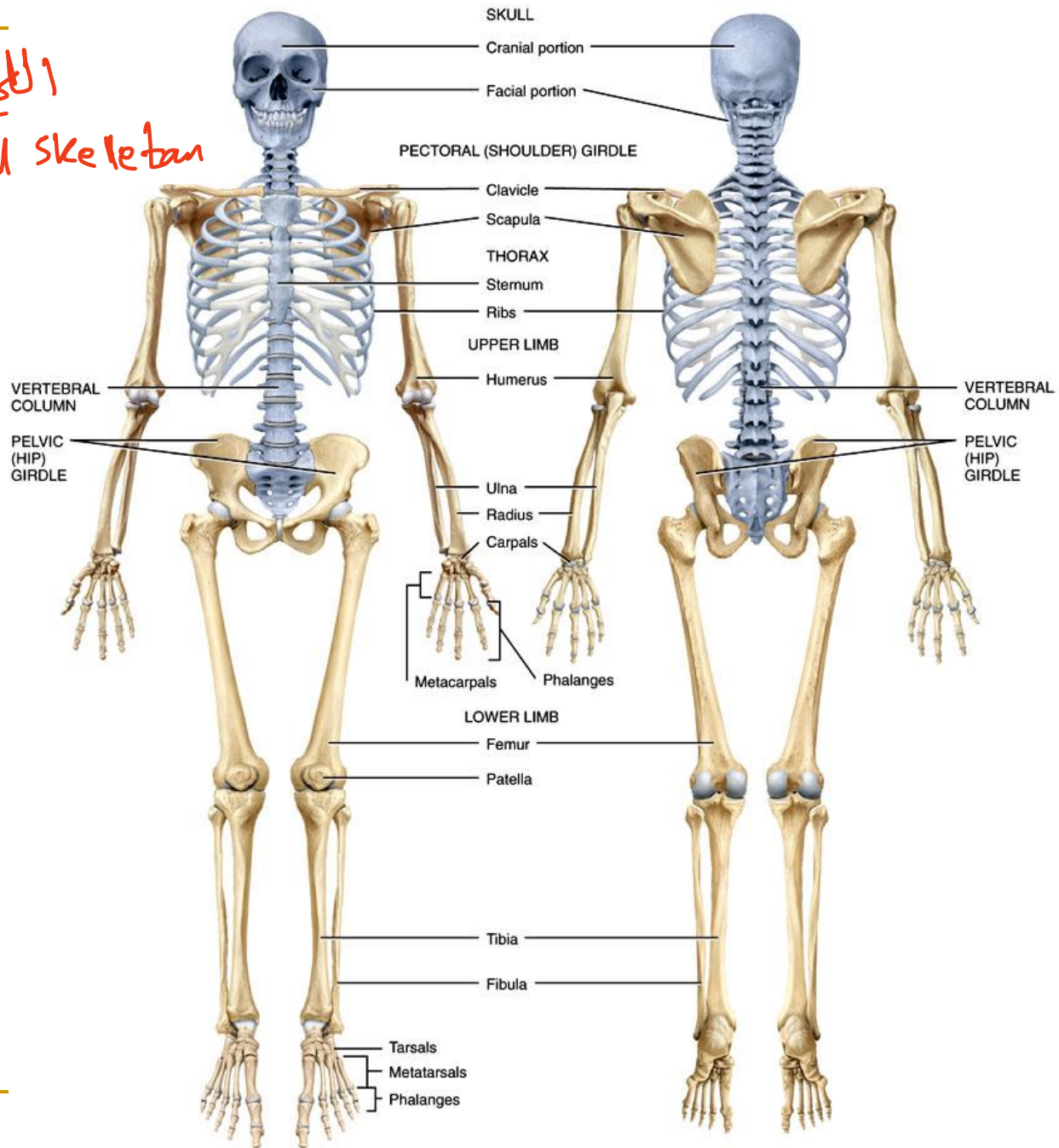
- 1. Exoskeleton:** rudimentary in man.
It is represented by: nails & enamel of teeth .
 - 2. Endoskeleton:** about 206 bones & is formed of:
 - a. The axial skeleton.**
 - b. The appendicular skeleton.**
-

Divisions of the Skeletal System

which more details نفس التفاصيل السابقة

- The human skeleton consists of **206 named bones**
- Bones of the skeleton are grouped into two principal divisions:
 - **Axial skeleton**
 - Consists of the bones that lie around the longitudinal axis of the human body: Skull bones, **auditory ossicles (ear bones)**, hyoid bone, ribs, **sternum (breastbone)**, and bones of the vertebral column.
 - The primary function is protection of **vital organs**.
 - **Appendicular skeleton** الأعضاء الطرفية
 - Consists of the bones of the **upper and lower limbs (extremities)**, plus the bones forming the **girdles** that **connect the limbs to the axial skeleton**. The primary function of this division is movement.

التي بالازرق
Part of axial skeleton



(a) Anterior view

(b) Posterior view

Bones of the Human Body

TABLE 7.1

The Bones of the Adult Skeletal System

DIVISION OF THE SKELETON

STRUCTURE

NUMBER OF BONES

DIVISION OF THE SKELETON

STRUCTURE

NUMBER OF BONES

Axial Skeleton



Skull

Cranium 8
Face 14

Hyoid 1

Auditory ossicles 6

Vertebral column 26

Thorax

Sternum 1
Ribs 24

Subtotal = 80

Appendicular Skeleton



Pectoral (shoulder) girdles

Clavicle 2
Scapula 2

Upper limbs

Humerus 2
Ulna 2
Radius 2
Carpals 16
Metacarpals 10
Phalanges 28

Pelvic (hip) girdle

Hip, pelvic, or coxal bone 2

Lower limbs

Femur 2
Patella 2
Fibula 2
Tibia 2
Tarsals 14
Metatarsals 10
Phalanges 28

Subtotal = 126

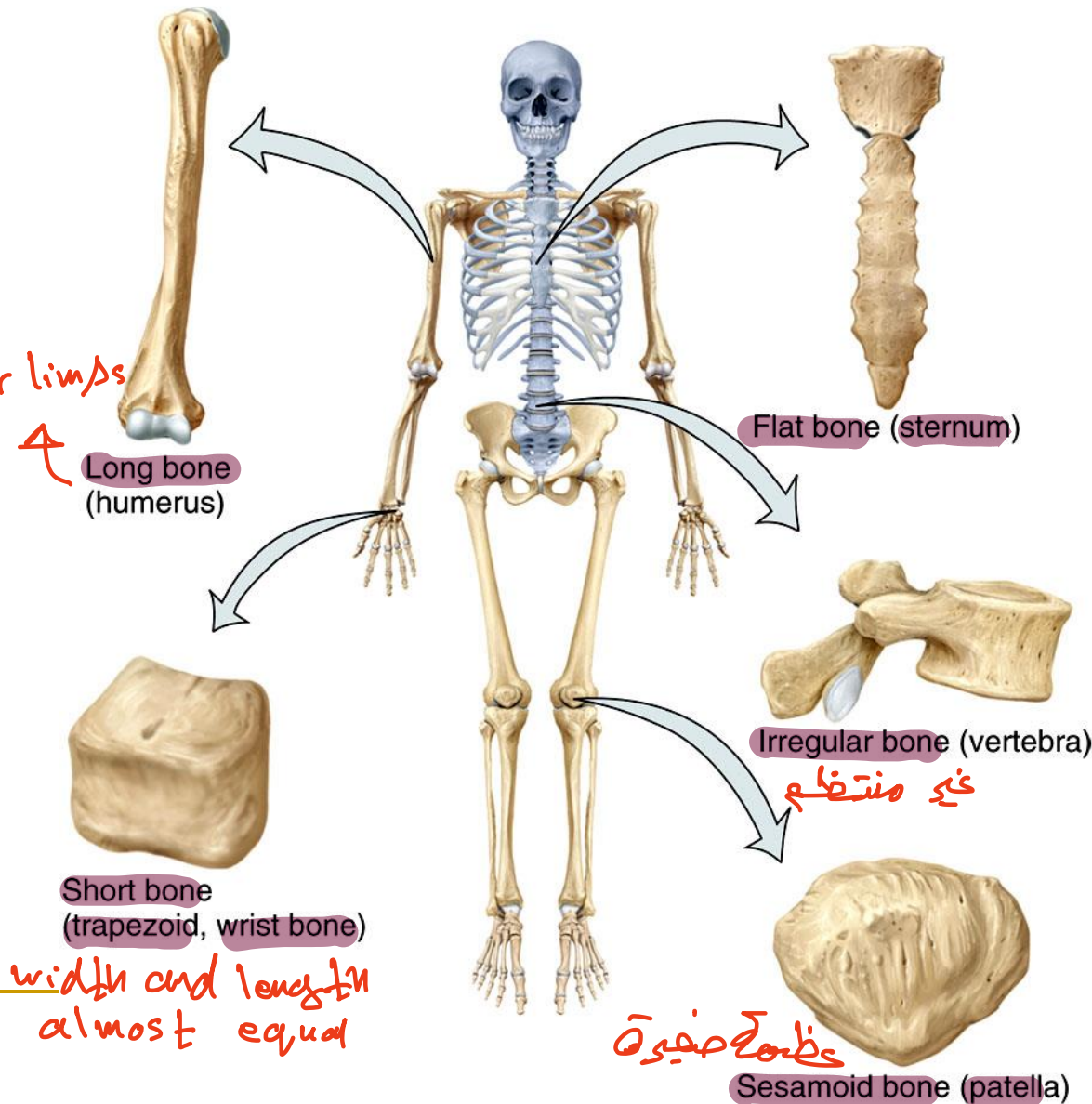
Total in an adult skeleton = 206

axial and appendicular

Classification of Bones According to Shape:

■ Bones can be classified into five types based on shape: *lower and upper limbs*

- 1) Long
- 2) Short
- 3) Flat
- 4) Irregular
- 5) Sesamoid



□ Long Bones

- Greater length than width and are slightly curved for strength
- ▶ **Femur, tibia, fibula, humerus, ulna, radius, phalanges**

□ Short bones

- Cube-shaped and are nearly equal in length and width
- ▶ **Carpal, tarsal** عظام الرسغ و الكاحل

□ Flat bones

- Thin and composed of two nearly parallel plates of compact bone tissue enclosing a layer of spongy bone tissue
- ▶ **Cranial, sternum, ribs, scapulae** عظام القاع و الكاحل

□ Irregular bones

- Complex shapes and cannot be grouped into any of the previous categories
- ▶ **Vertebrae, hip bones, some facial bones, calcaneus**

□ Sesamoid bones

- Protect tendons from excessive wear and tear
- ▶ **Patellae, in foot, in hand**

تمنع احتكاك الوتر والعظام
في المفاصل

■ The Axial Skeleton

Axial Skeleton



The skull

Is formed of 22 separate bones

متحرك

One movable bone

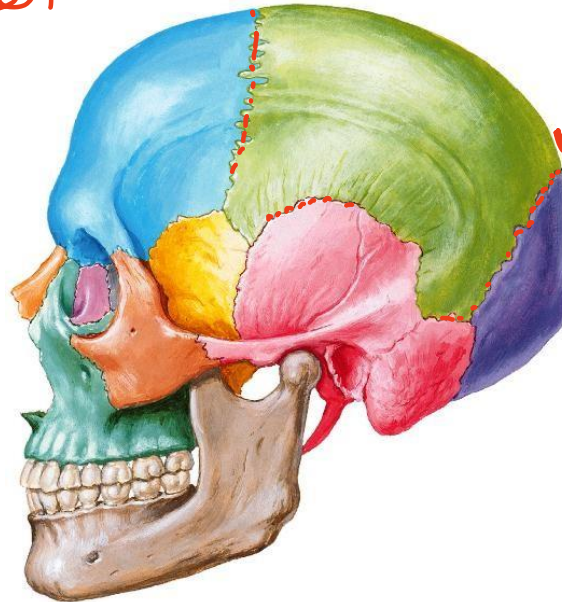
The mandible

الفك السفلي

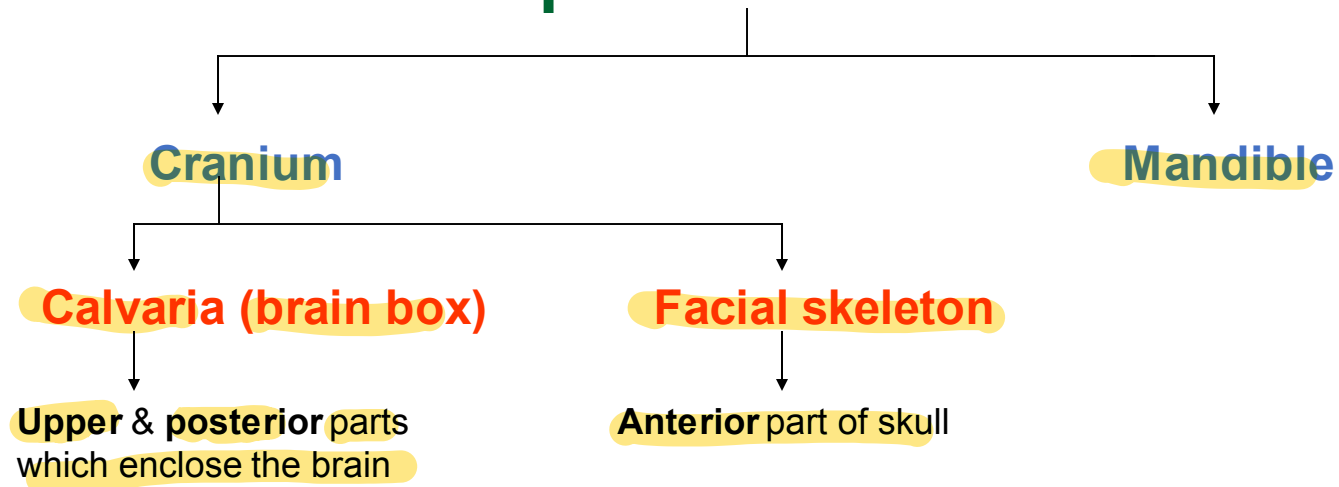
21 immovable bones →

Articulating together by sutures
(which are fibrous joints)

عظام ثابتة
خيوط



The parts of the skull



The Skull

- The skull (Cranium) Consists of 22 bones
- Bones of the skull are grouped into two categories:
 1. Cranial bones
 - Eight cranial bones form the cranial cavity
 - Frontal bone, **two parietal bones**, **two temporal bones**, the occipital bone, the sphenoid bone, ethmoid bone
back of the skull *عظام الجمجمة المتعلقة بالنose* *related to nose*
 2. Facial bones
 - Fourteen facial bones form the face
 - Two nasal bones, two maxillae, two zygomatic bones, the **mandible**, two lacrimal bones, two palatine bones, two inferior nasal conchae, **vomer**

Features of the Skull

- The cranial and facial bones protect and support special sense organs and the brain
- Besides forming the large cranial cavity, the skull also forms several smaller cavities
 - **Nasal cavity**
 - **Orbits (eye sockets)**
 - **Paranasal sinuses** الجيوب الأنفية
 - Small cavities which house organs involved in hearing and equilibrium

- Immovable joints called **sutures** fuse most of the skull bones together
- The skull provides large areas of **attachment for muscles** that move various parts of the head
- Skull and facial bones provide **attachment** for muscles that produce **facial expressions**
- The facial bones form the ^{إطار}framework of the face and provide support for the entrances to the **digestive** and **respiratory** systems _{مدخل}

Cranial Bones:

■ Frontal Bone

- ❑ Forms the forehead

■ Parietal Bones

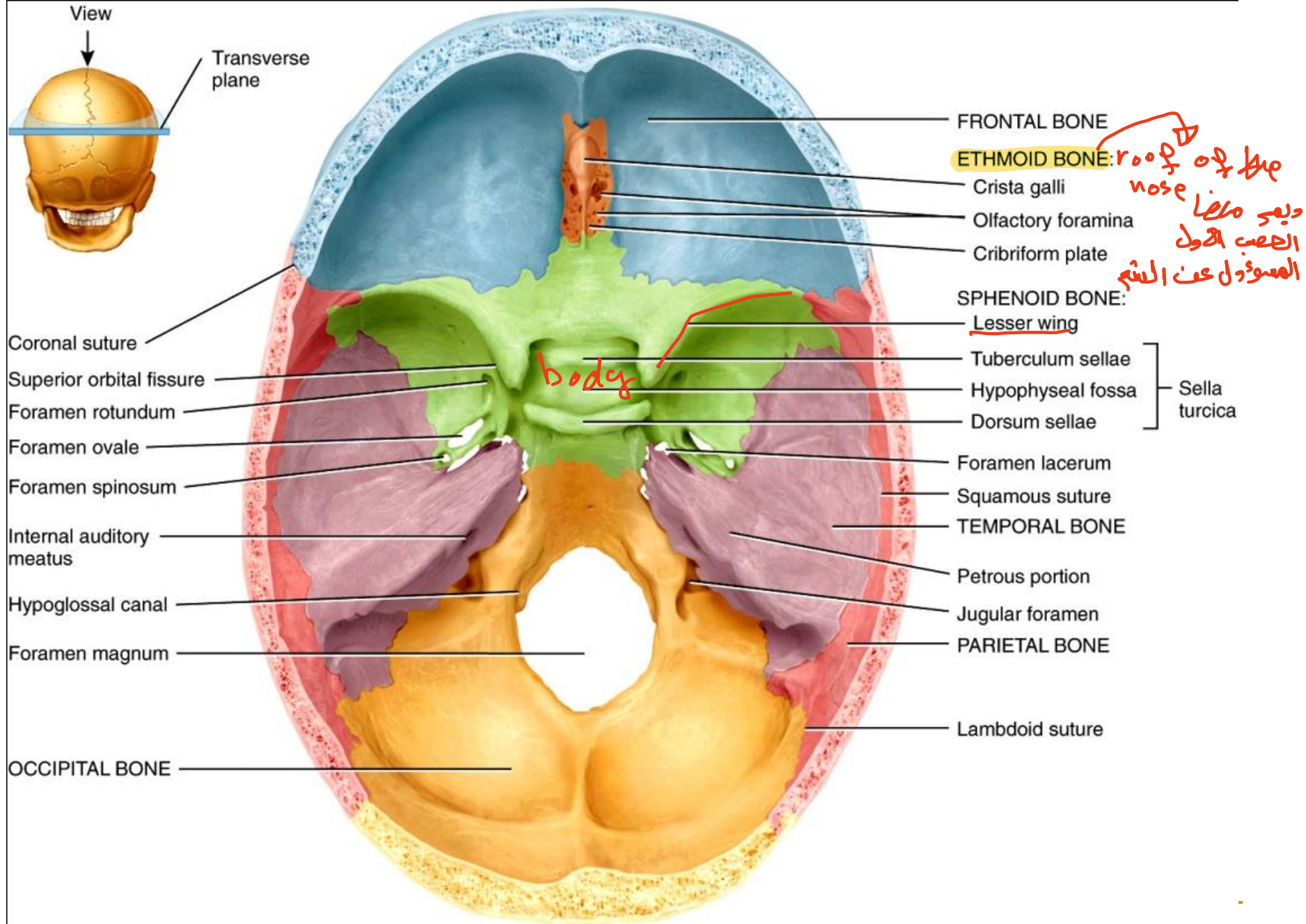
- ❑ Form the sides and roof of the cranial cavity

■ Temporal Bones (Zygomatic process and Mandibular fossa of TMJ)

- ❑ Form the lateral aspects and floor of the cranium
- ❑ Consists of 5 parts: squamous part, petrous part, tympanic part, mastoid part and the styloid process

■ Occipital Bone (foramen magnum?)

- ❑ Forms the posterior part and most of the base of the cranium
 - ❑ The perceptible protrusion on the back of the head is the external occipital protuberance
-



(a) Superior view of sphenoid bone in floor of cranium

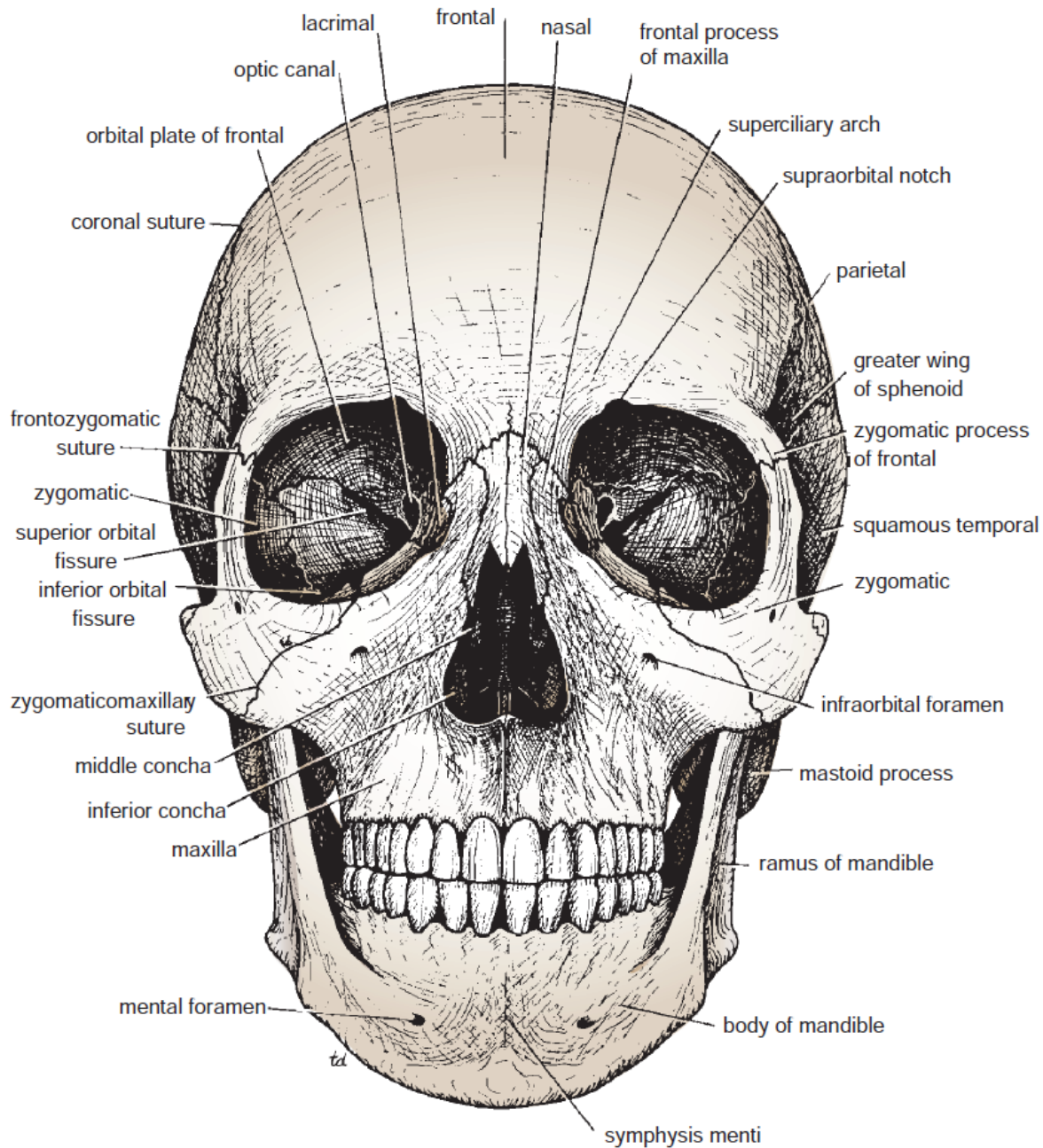
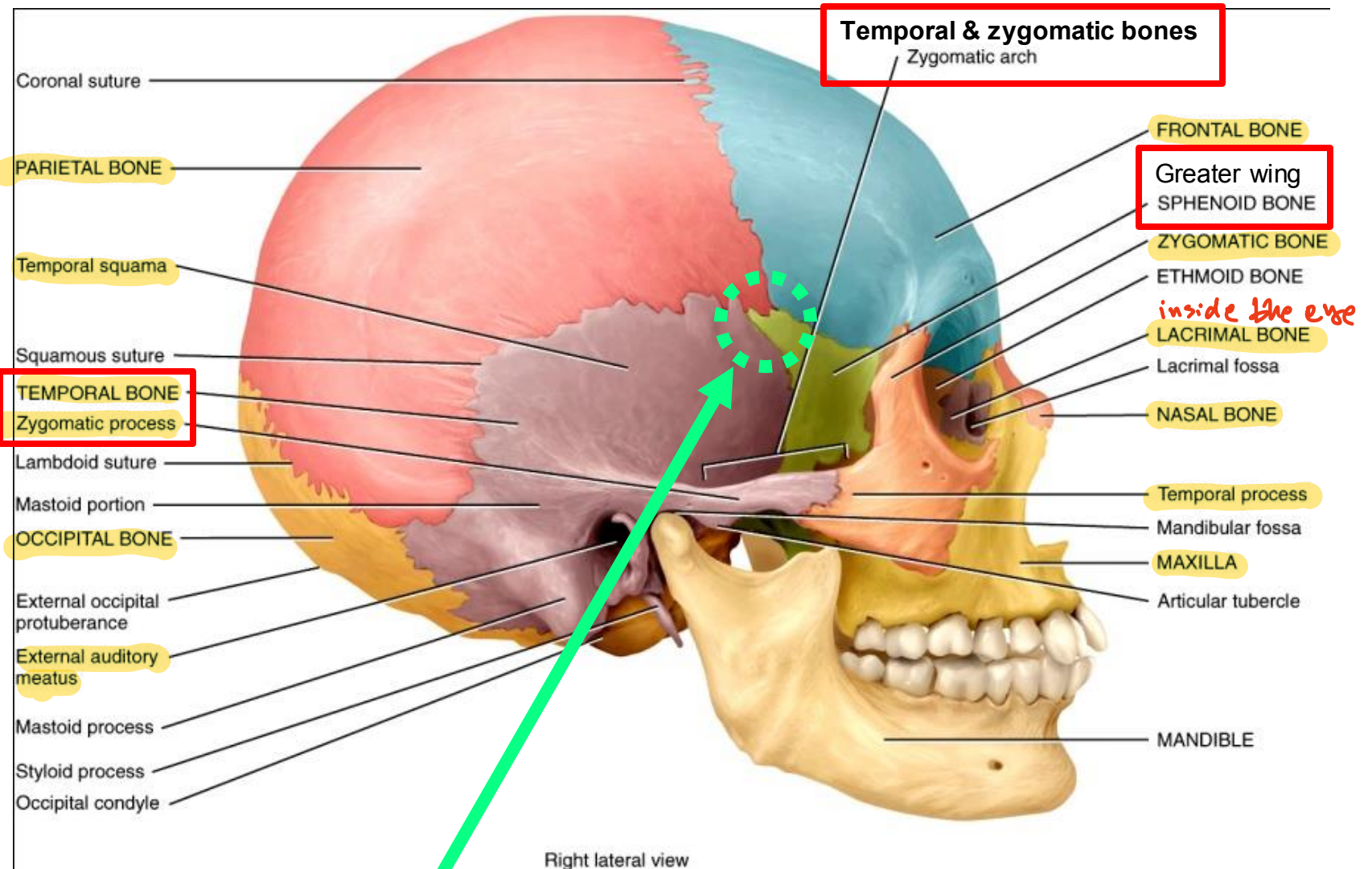


FIGURE 11.1 Bones of the anterior aspect of the skull.



Pterion: middle meningeal artery.

Joint *مفاصل* عبارة عن *سutures* *مفاصل*

Sagittal suture

PARIETAL BONES

Sutural bones

OCCIPITAL BONE

Lambdoid suture

External occipital protuberance

Superior nuchal line

TEMPORAL BONE

Inferior nuchal line

Mastoid process

Foramen magnum

Styloid process

Occipital condyle

Inferior nasal concha

VOMER

Hard palate:

Horizontal plate of palatine bone

MANDIBLE

Palatine process of maxilla

Posteroinferior view

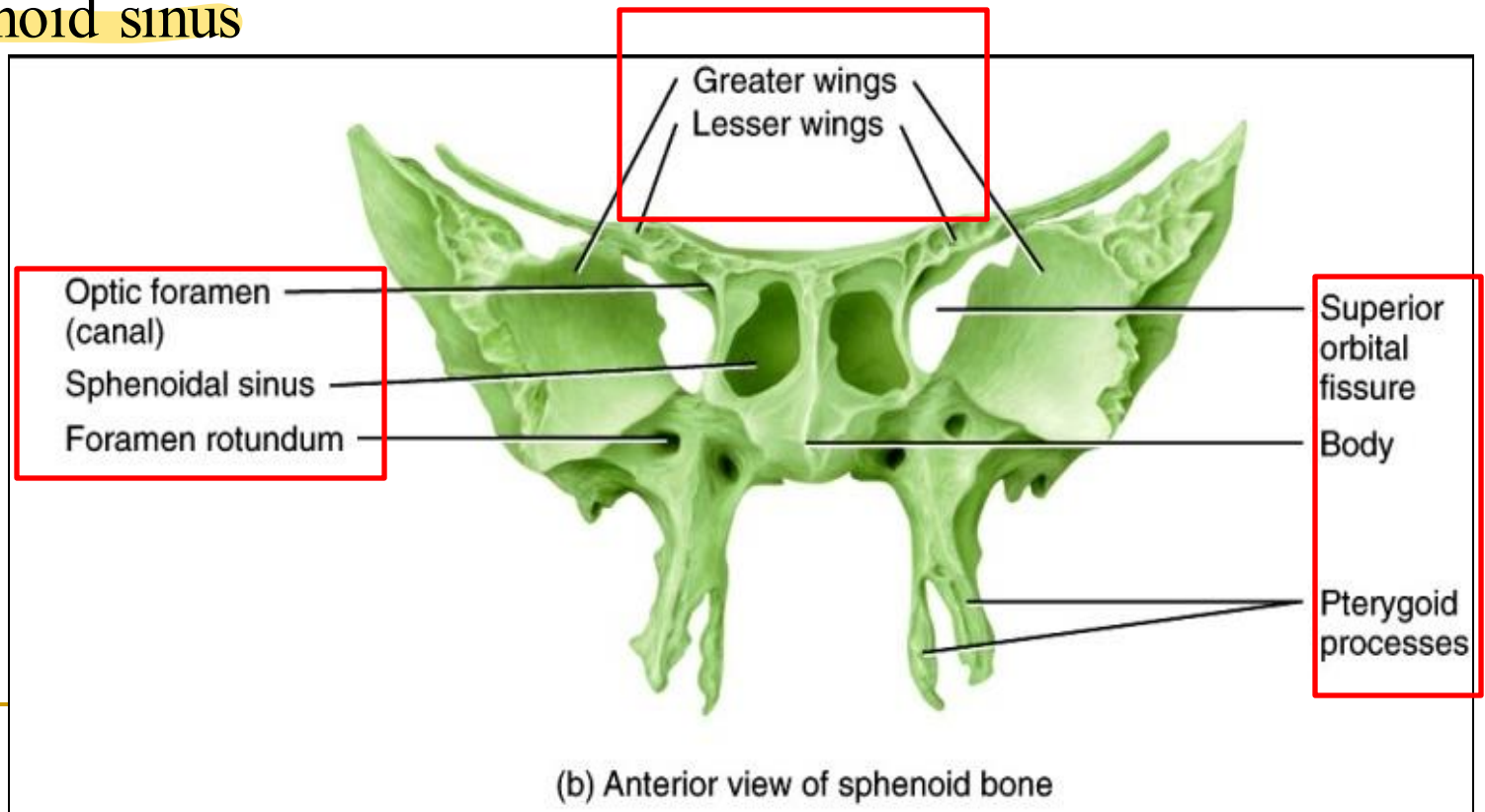
■ Sphenoid Bone (optic nerve) →

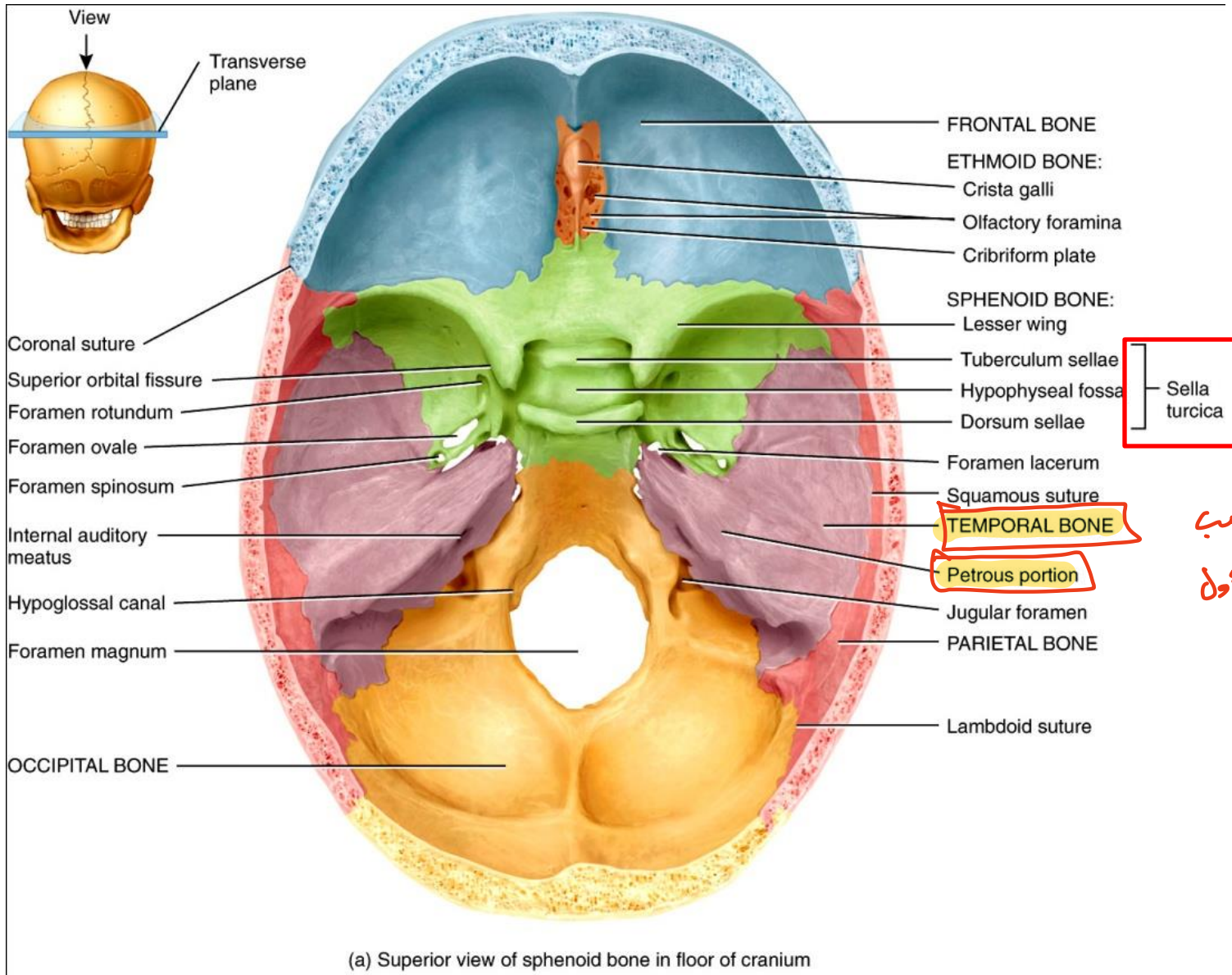
العصب الثاني لعمدها
و هو عصب المسؤول عن النظر

□ Lies at the middle part of the base of the skull

□ It's formed of:

1. **Body (Sella turcica): contain the pituitary gland**
2. Lesser wings
3. Greater wings
4. Pterygoid processes
5. Sphenoid sinus





بجز صفا الذهب
الثالث المسود
عن السمع

(a) Superior view of sphenoid bone in floor of cranium

Ethmoid Bone (olfactory nerve)

□ Located in the midline in the anterior part of the cranial floor and forms the roof of the nasal cavity

Parts:

1. Superior and middle conchae: thin bony projections (nose)
2. Transverse plate
3. Perpendicular plate
4. Crista galli
5. Cribriform plate
6. Ethmoid sinuses

