

# BONE CHALLENGE

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Bone Basic functions ?

A. support

B. protection

C. movement – assistance in

D. RBC formation-hemopoiesis

E. mineral homeostasis

+importance of calcium

F. energy supply -yellow marrow

G. detoxification

four cell types of bone?

1. osteogenic
2. osteoblasts
3. osteocytes
4. osteoclasts

3 Bone disorders ?

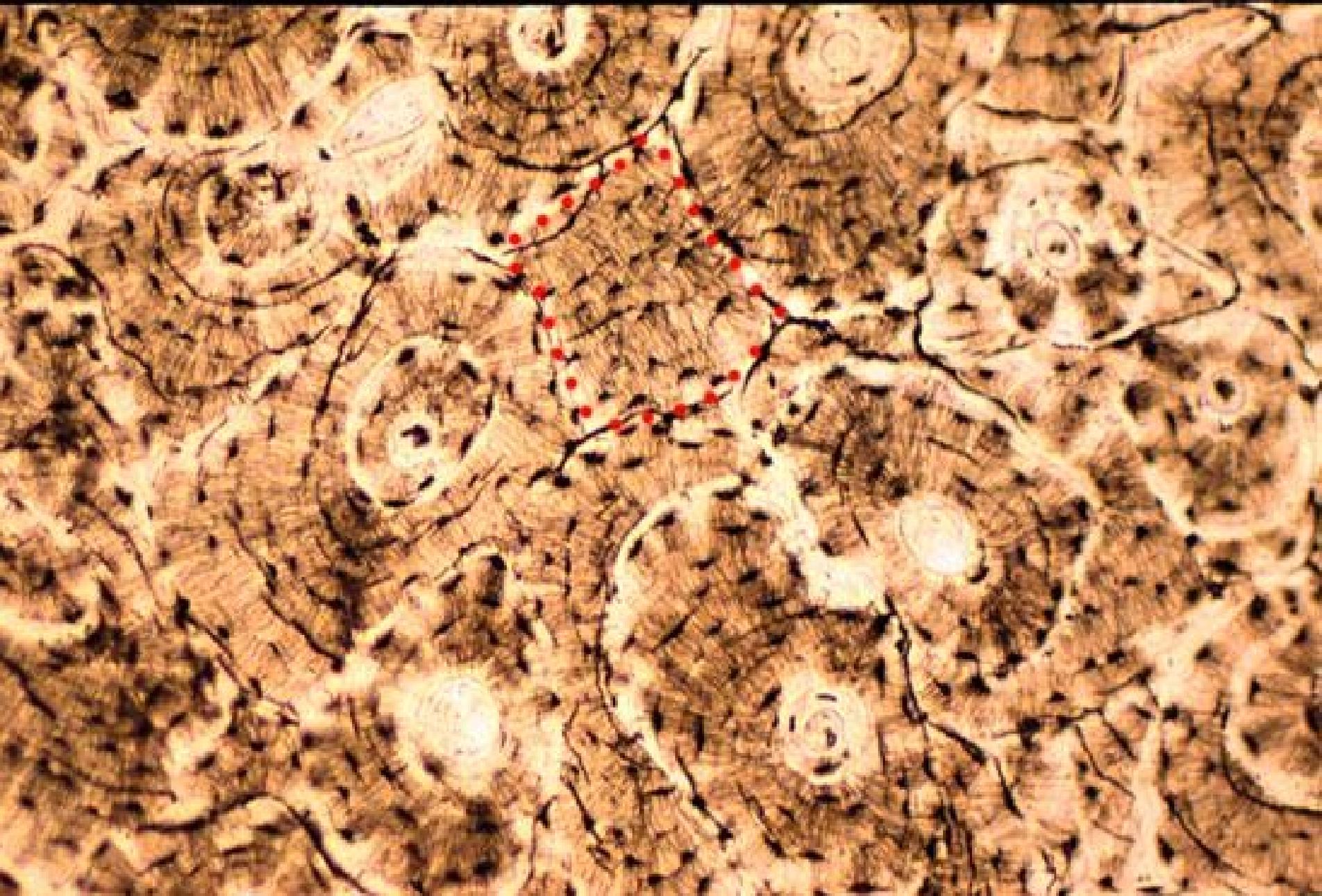
1. Fractures

2. diseases

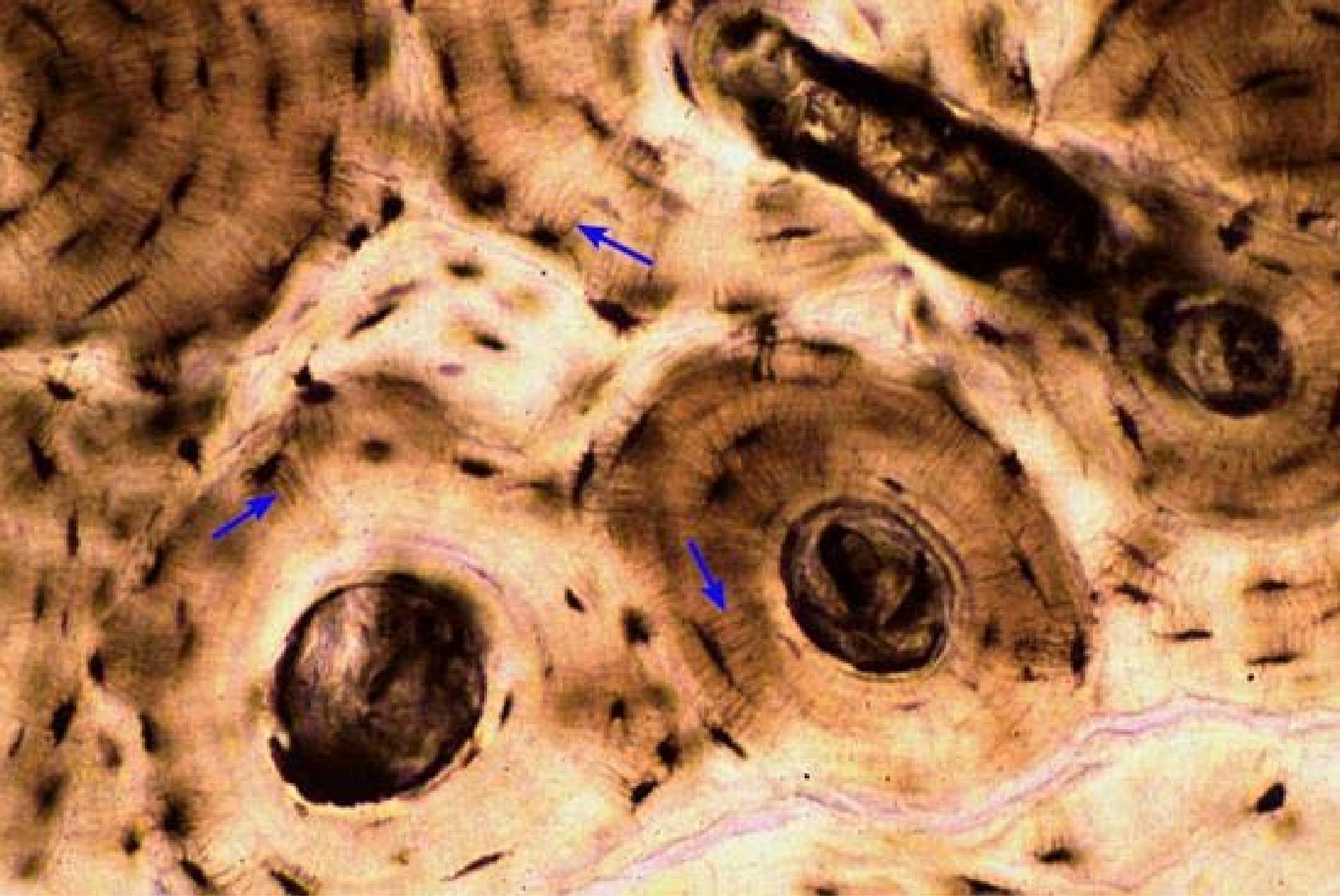
[infection, tumors, others]

3. OSTEOPOROSIS

Identify the structure encircled by the red dots:

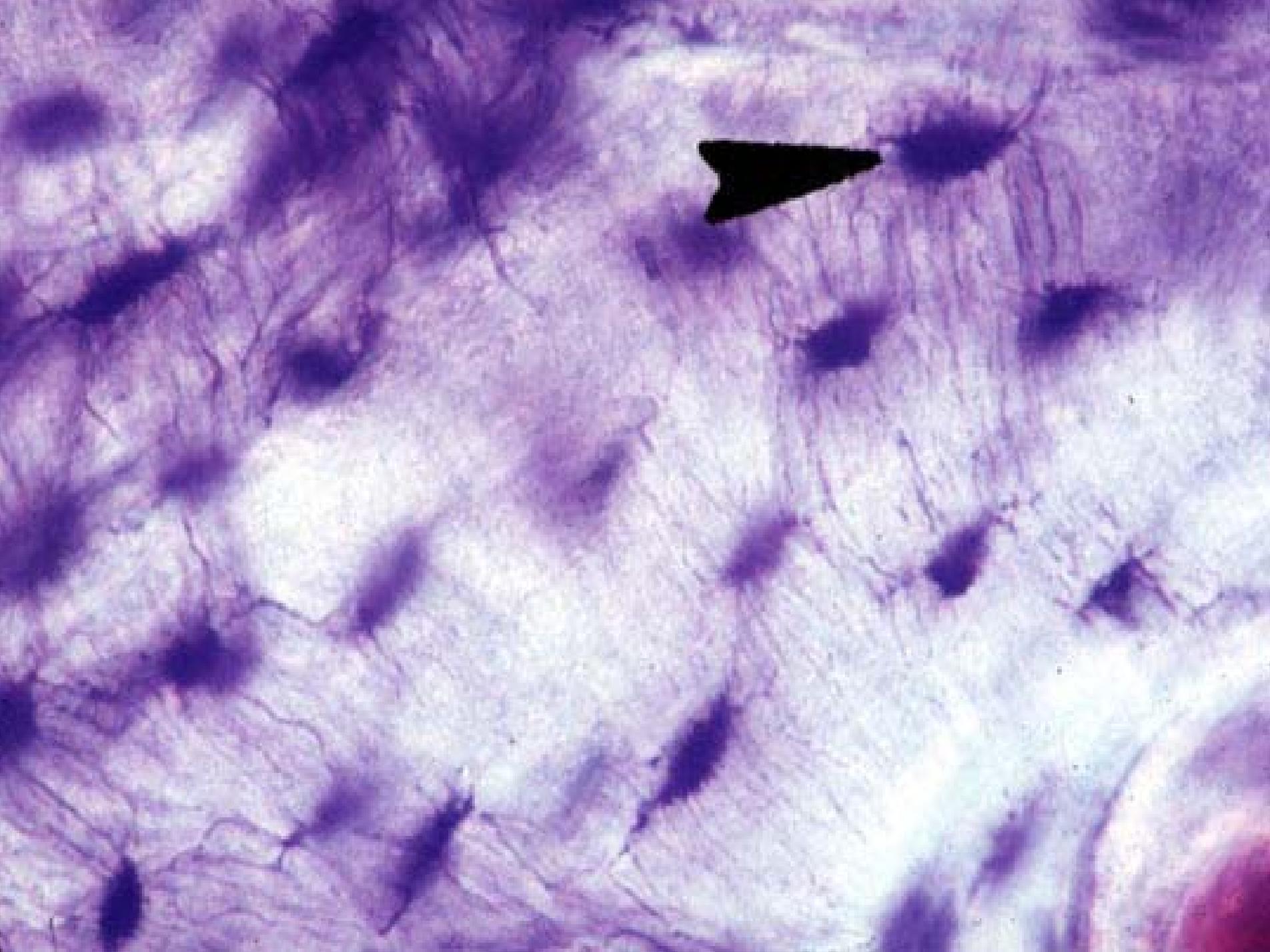


Interstitial lamellae

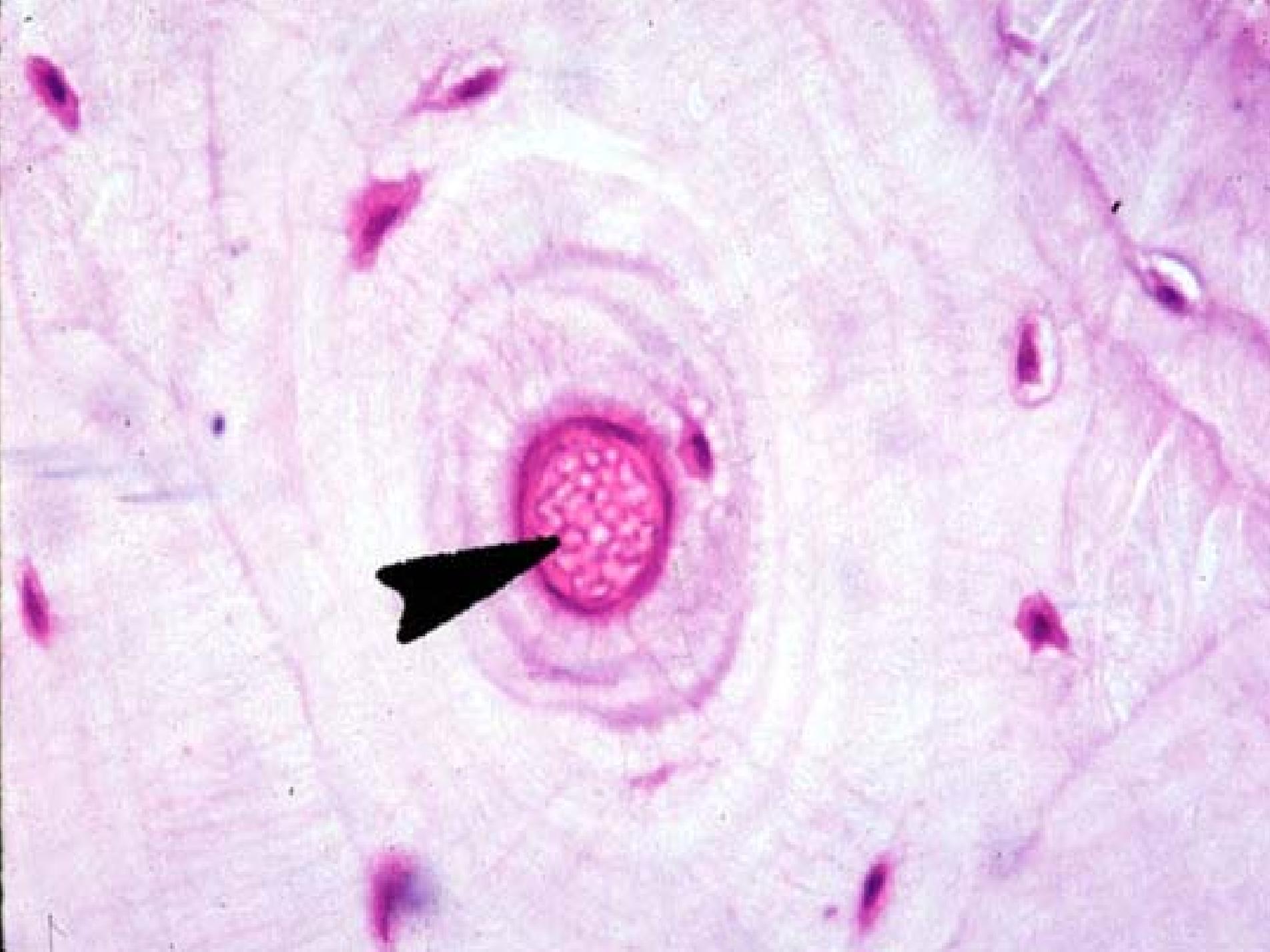


Identify the structure at the tip of the arrow:

Canaliculi

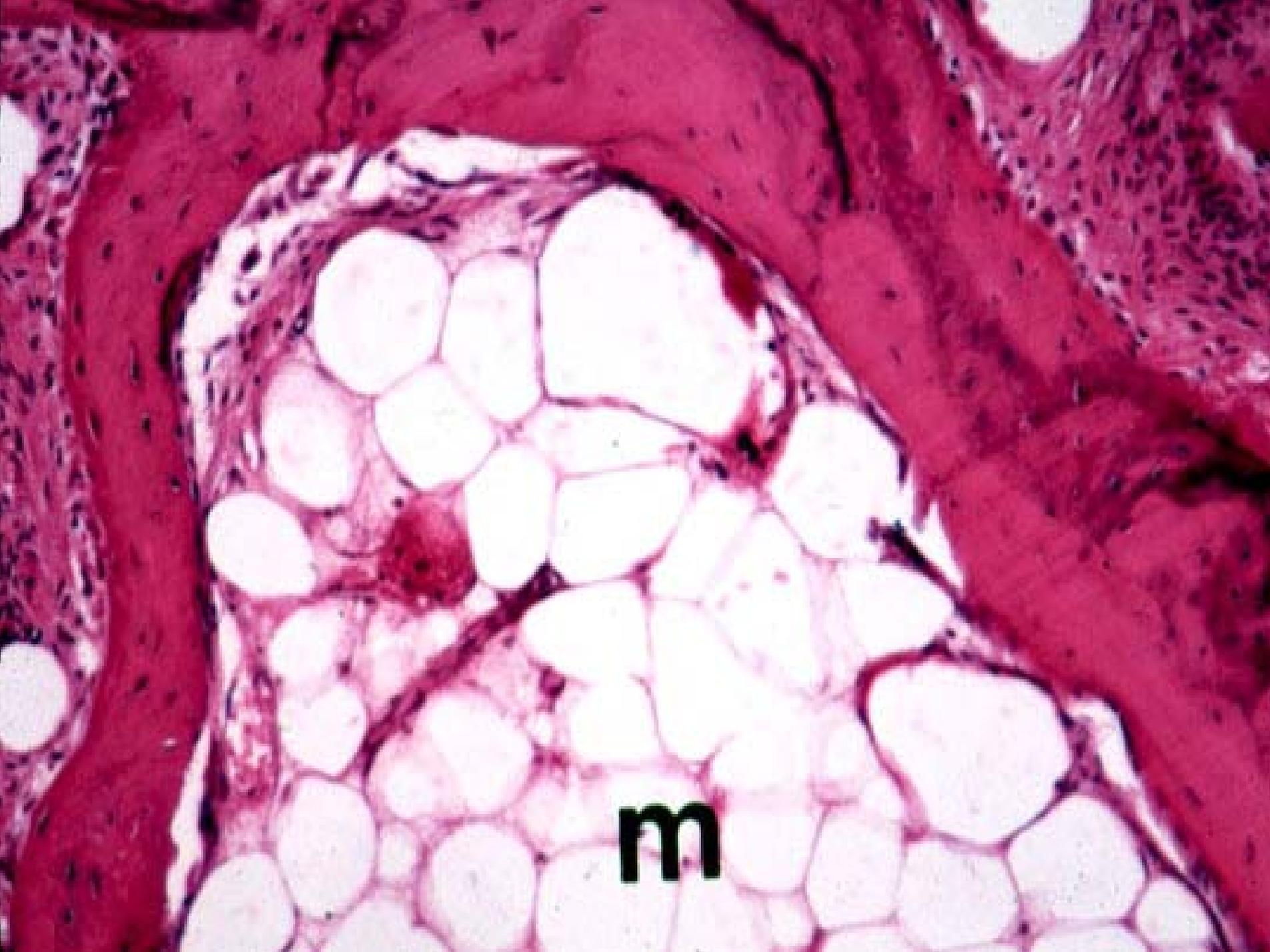


**Lacuna that contained an  
osteocyte**



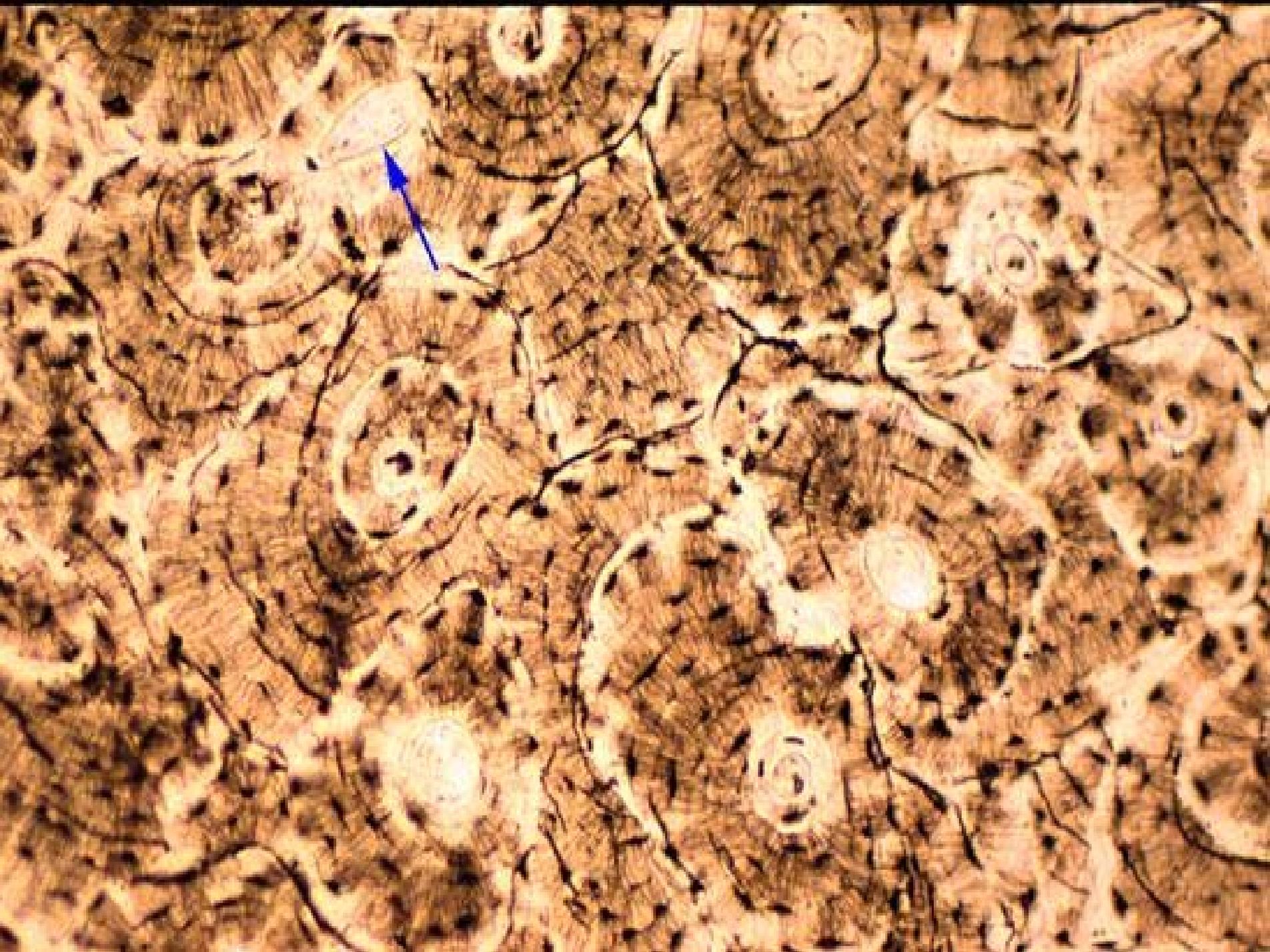
## Haversian canal

Concentric lamellae of the Haversian system and a number of osteocytes within their lacunae.



m

**Fatty marrow or yellow marrow, composed of adipose connective tissue. Note the trabeculus of bone.**



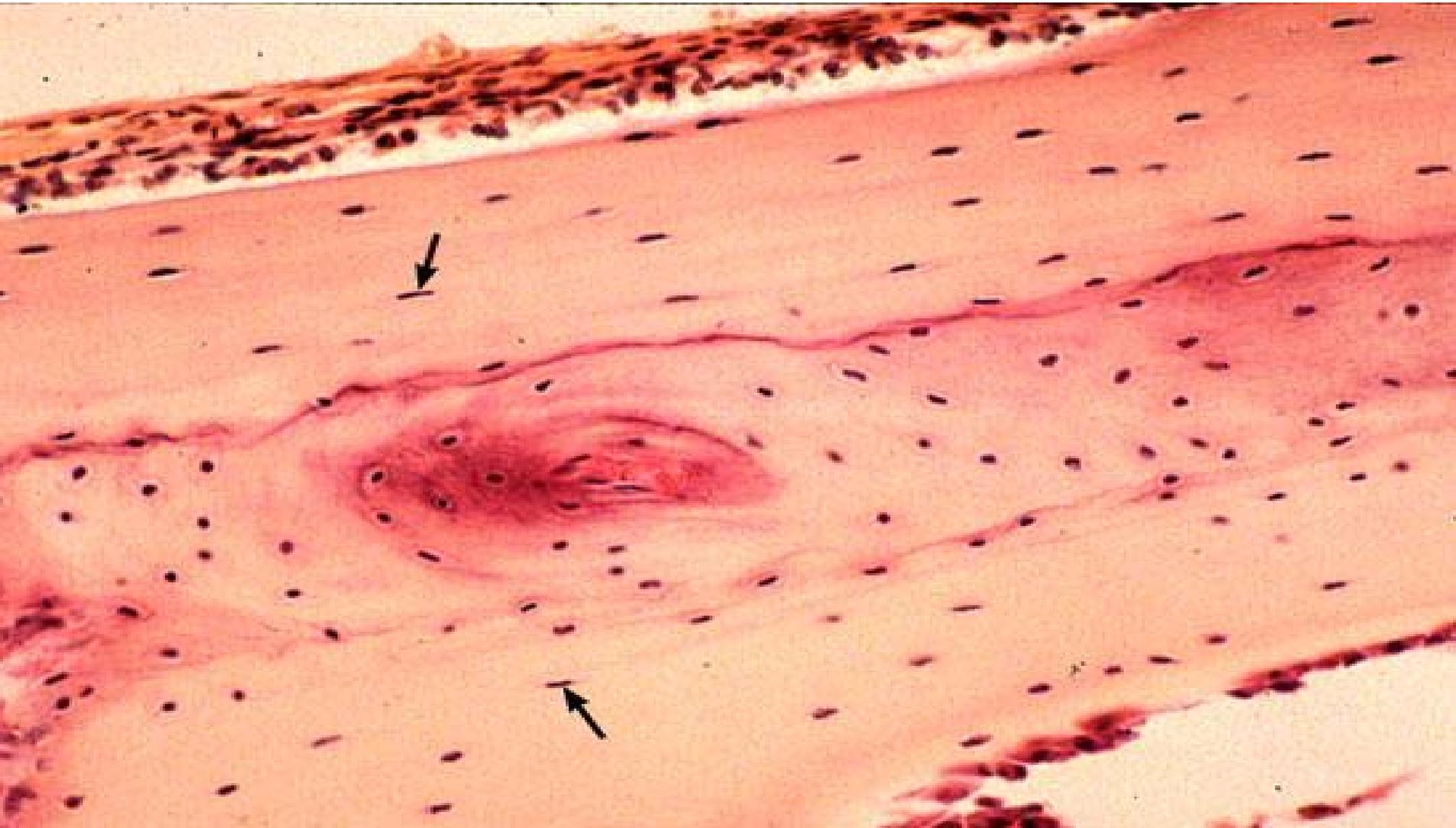
Volkman's canal

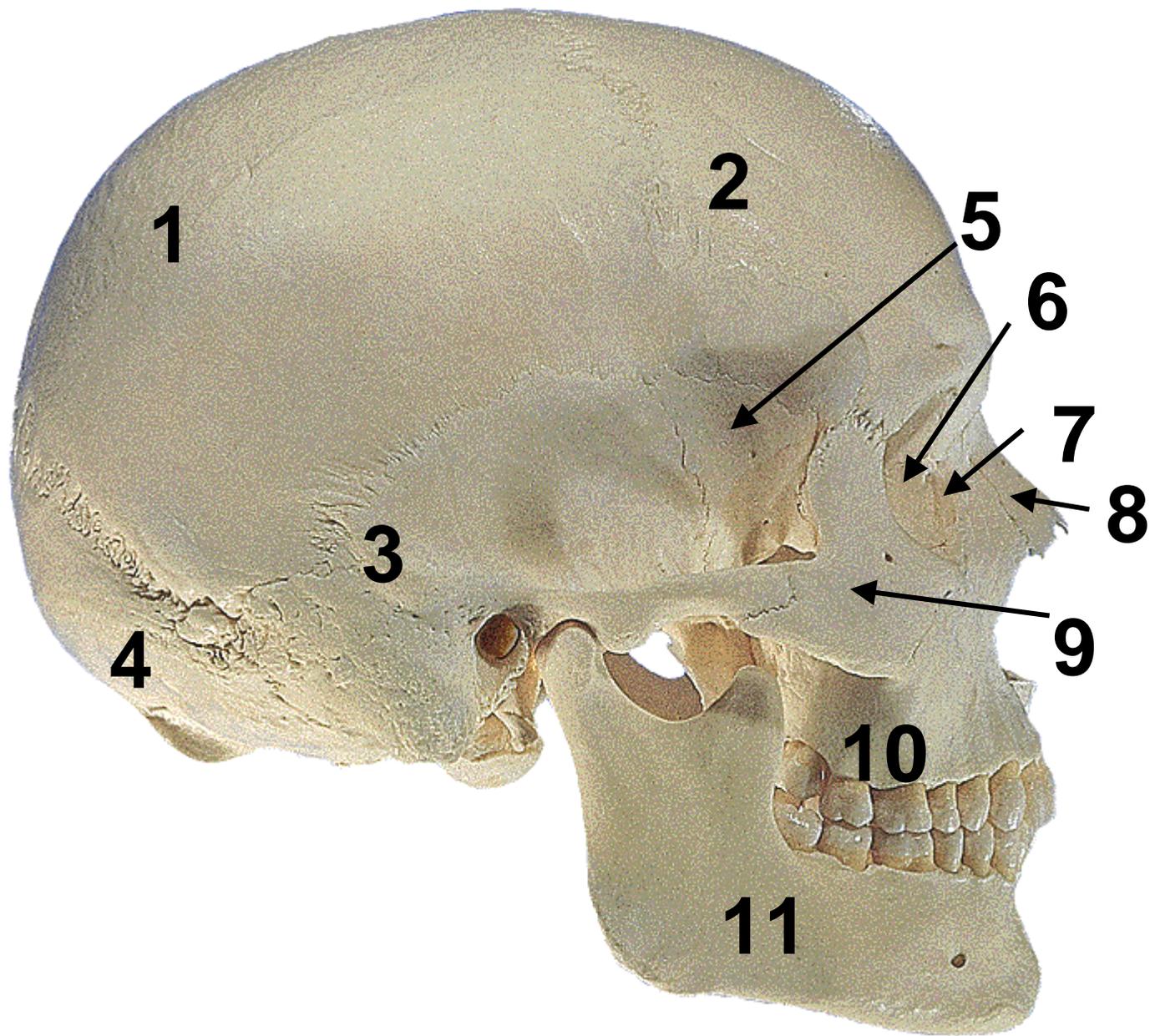
Identify the tissue at the tip of the arrow:



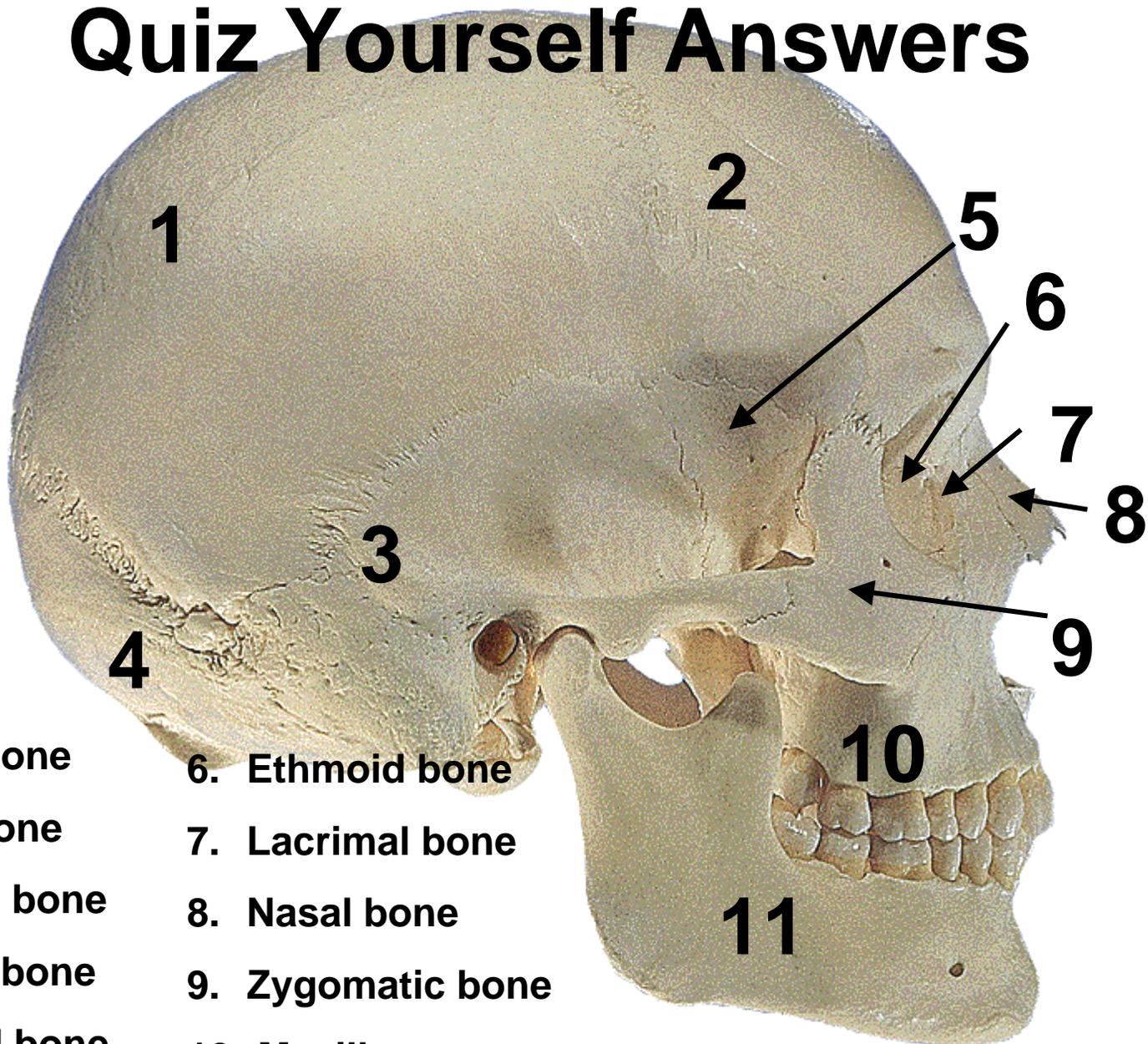
Endosteum

Identify the cell at the tip of the arrow:





# Quiz Yourself Answers



1. Parietal bone

2. Frontal bone

3. Temporal bone

4. Occipital bone

5. Sphenoid bone

6. Ethmoid bone

7. Lacrimal bone

8. Nasal bone

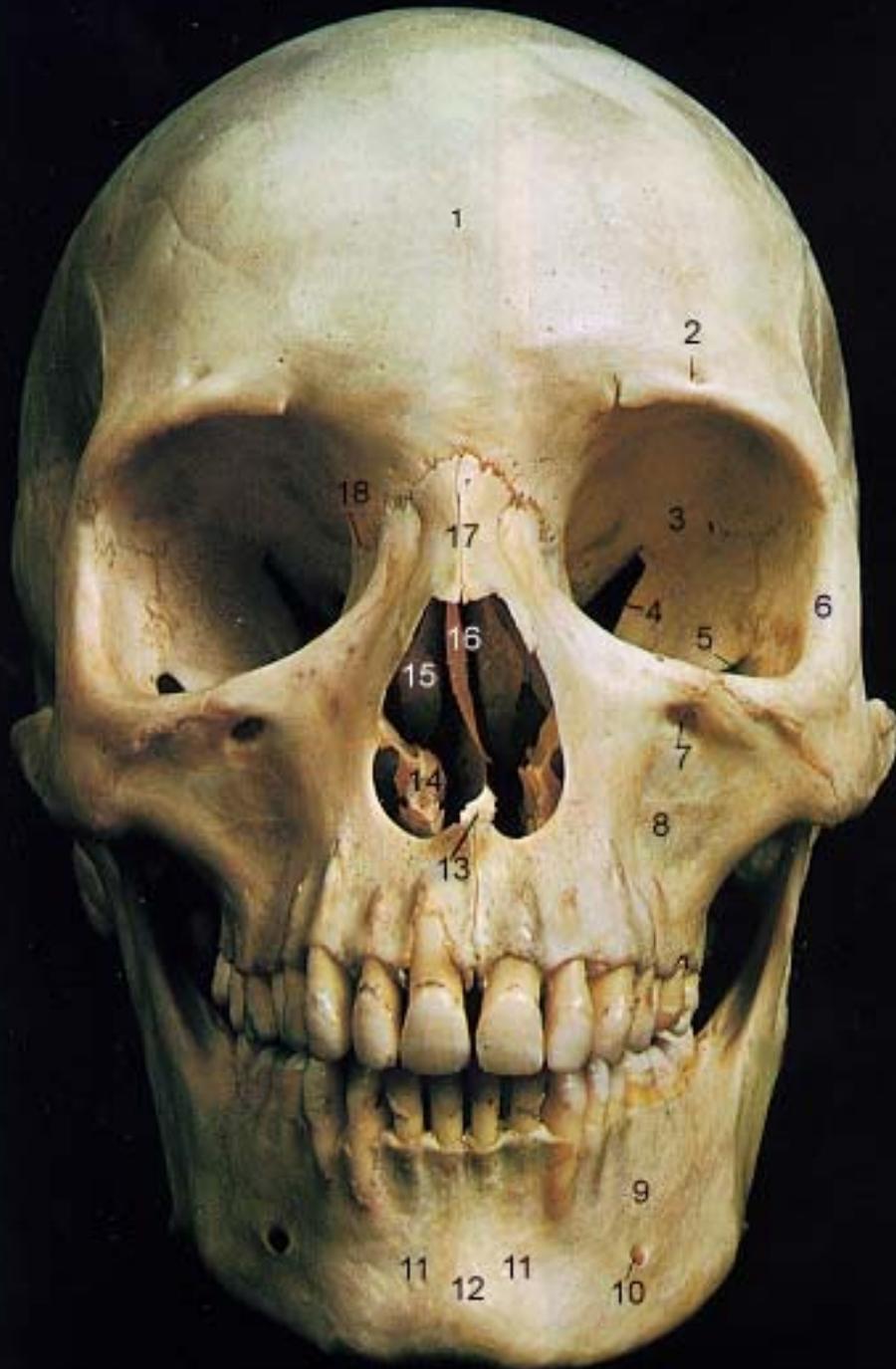
9. Zygomatic bone

10. Maxilla

11. Mandible

osteocyte



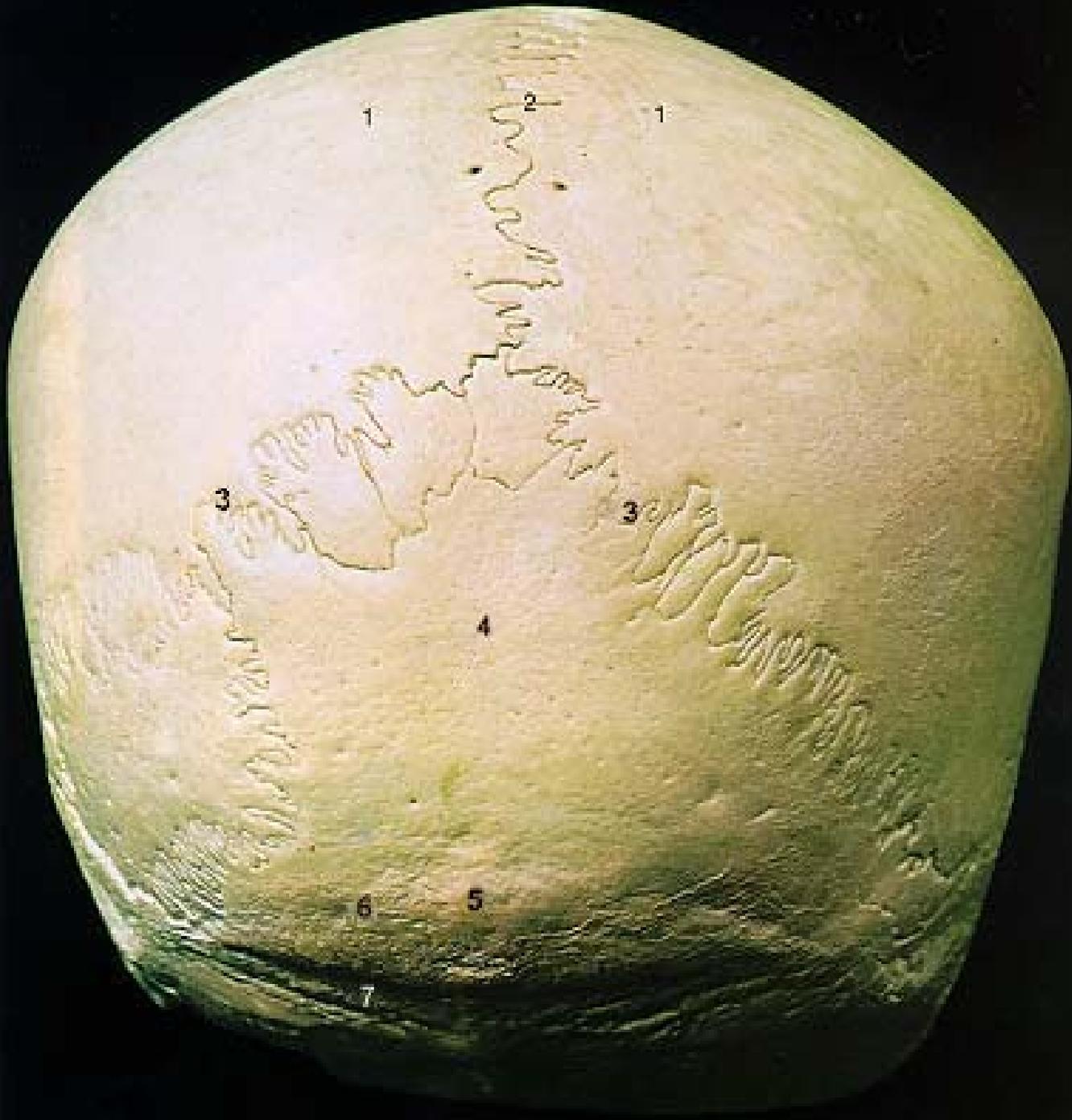


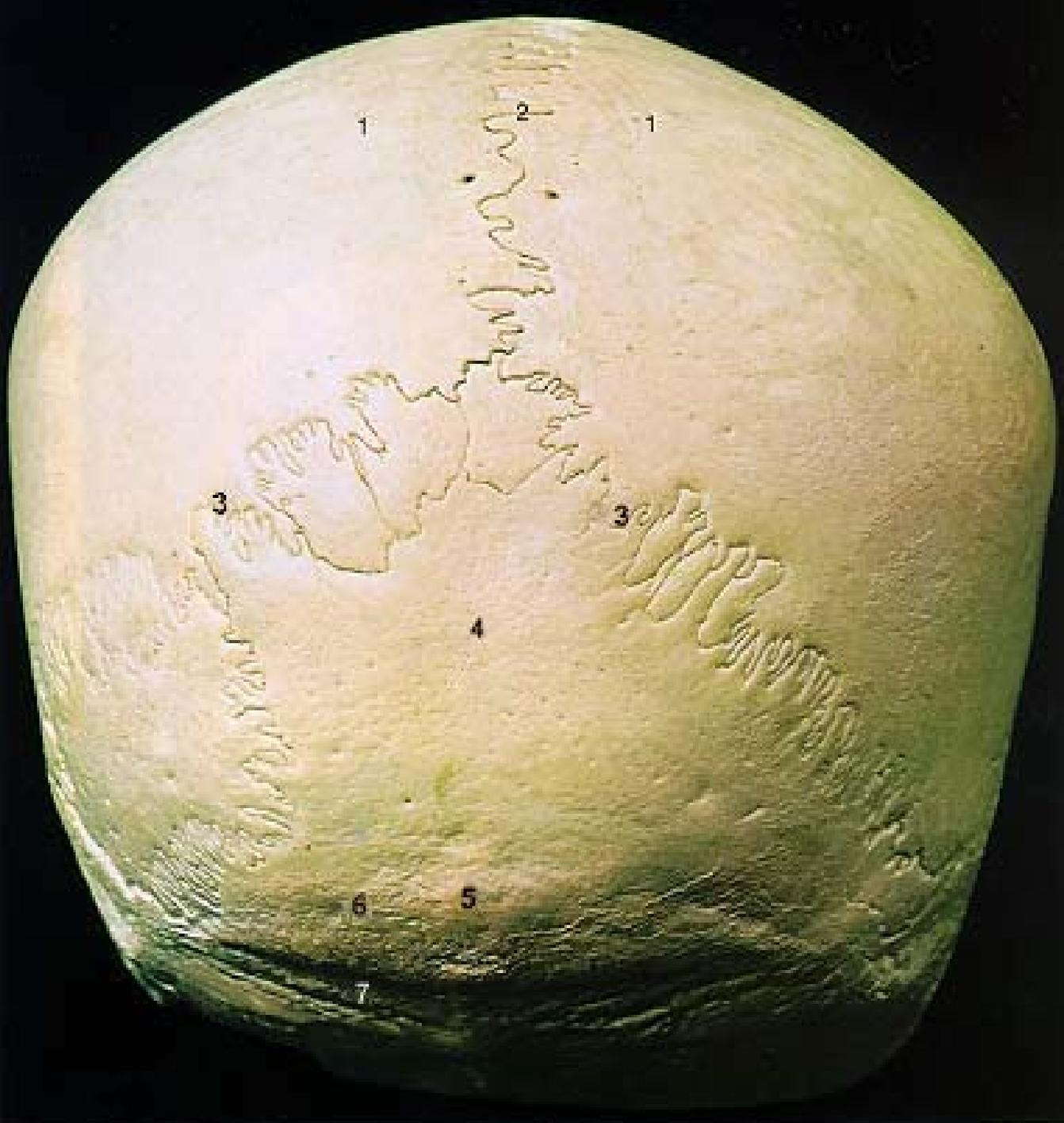
- |     |                                |
|-----|--------------------------------|
| 1.  | Frontal Bone                   |
| 2.  | Supra-Orbital Foramen          |
| 3.  | Orbit (Orbital Cavity)         |
| 4.  | Superior Orbital Fissure       |
| 5.  | Inferior Orbital Fissure       |
| 6.  | Zygomatic Bone                 |
| 7.  | Infra-Orbital Foramen          |
| 8.  | Maxilla                        |
| 9.  | Mandible                       |
| 10. | Mental Foramen                 |
| 11. | Incisive Fossa                 |
| 12. | Symphysis                      |
| 13. | Vomer                          |
| 14. | Inferior Nasal Concha          |
| 15. | Middle Nasal Concha            |
| 16. | Perpendicular Plate of Ethmoid |
| 17. | Nasal Bone                     |
| 18. | Lacrimal Bone                  |



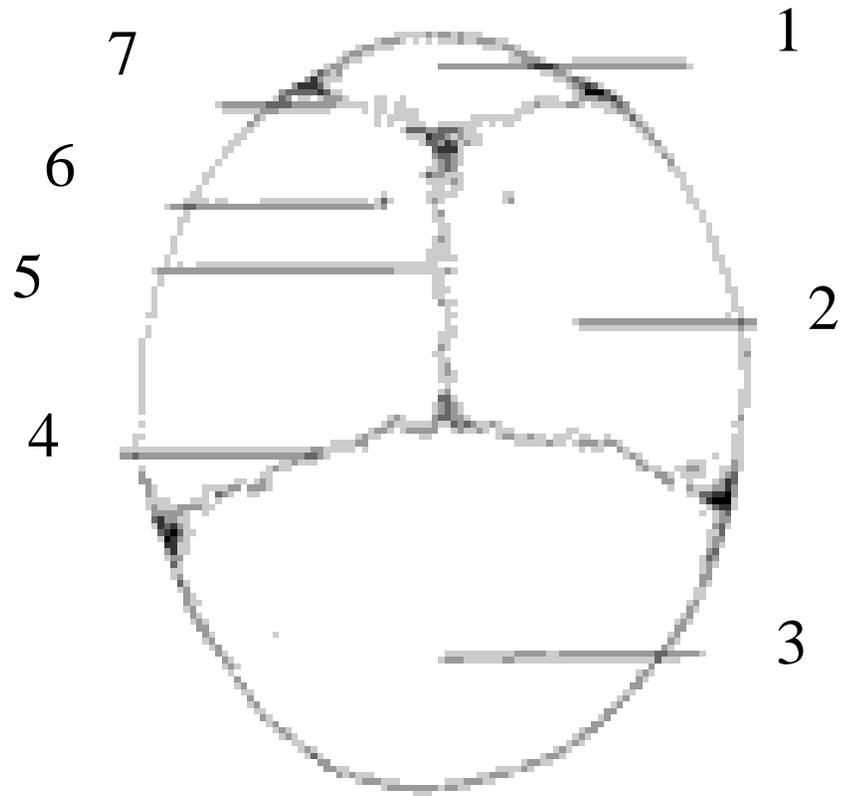


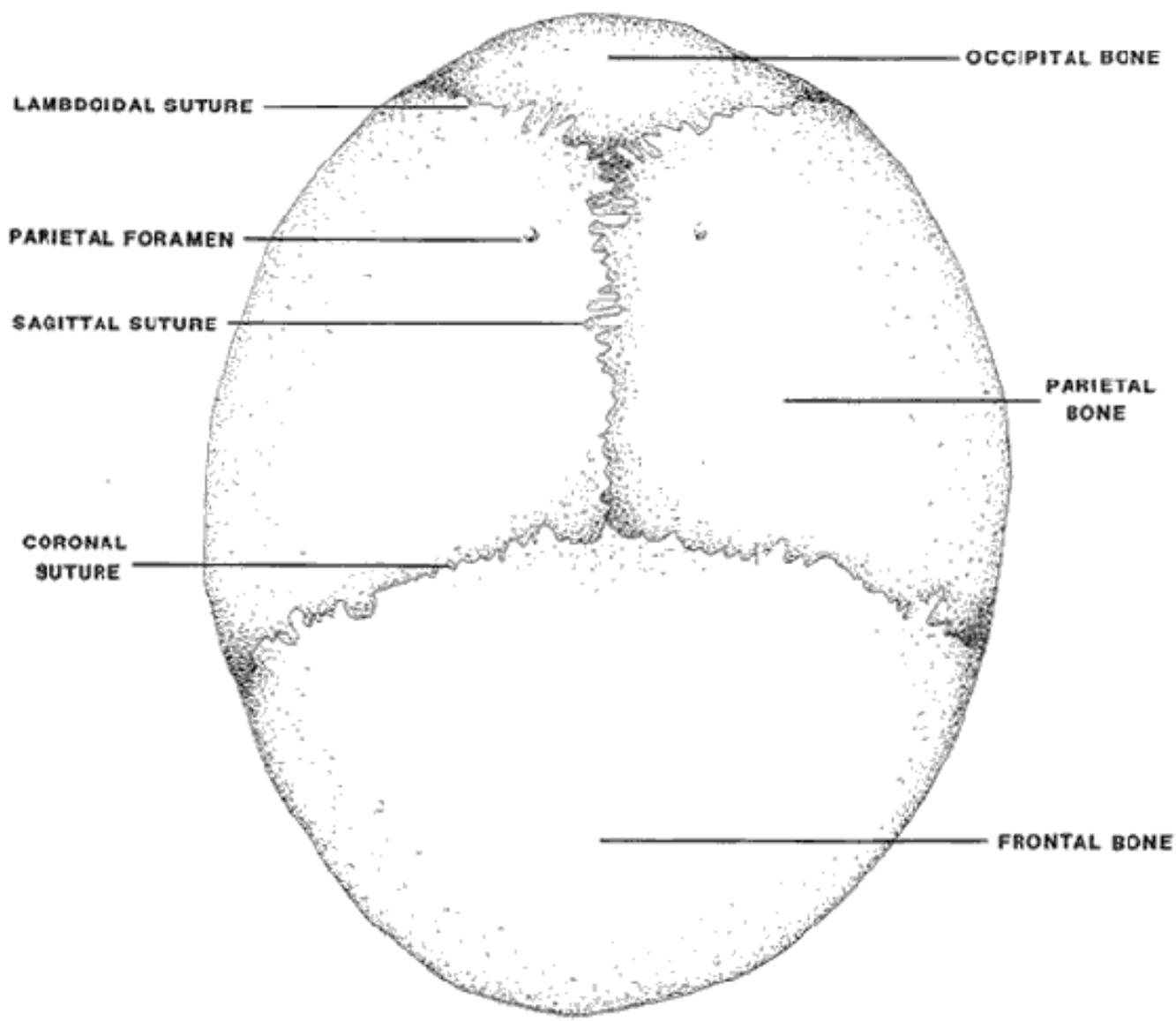
1. Parietal Bone
2. Coronal Suture
3. Frontal Bone
4. Nasal Bone
5. Vomer
6. Lacrimal Bone
7. Orbital Part of Ethmoid
8. Zygomatic Bone
9. Maxilla
10. Body of Mandible
11. Ramus of Mandible
12. Coronoid Process
13. Mandibular Condyle
14. Mental Foramen
15. Styloid Process
16. External Acoustic Meatus
17. Mastoid Process
18. Zygomatic Process
19. Temporal Bone
20. Greater Wing of Sphenoid
21. Inferior Temporal Line
22. Superior Temporal Line
23. Squamosal Suture
24. Lambdoidal Suture
25. Occipital Bone





1. Parietal Bone
2. Sagittal Suture
3. Lambdoid Suture
4. Occipital Bone
5. External Occipital Protruberance
6. Superior Nuchal Line
7. Inferior Nuchal Line





OCCIPITAL BONE

LAMBDROIDAL SUTURE

PARIETAL FORAMEN

SAGITTAL SUTURE

CORONAL SUTURE

PARIETAL BONE

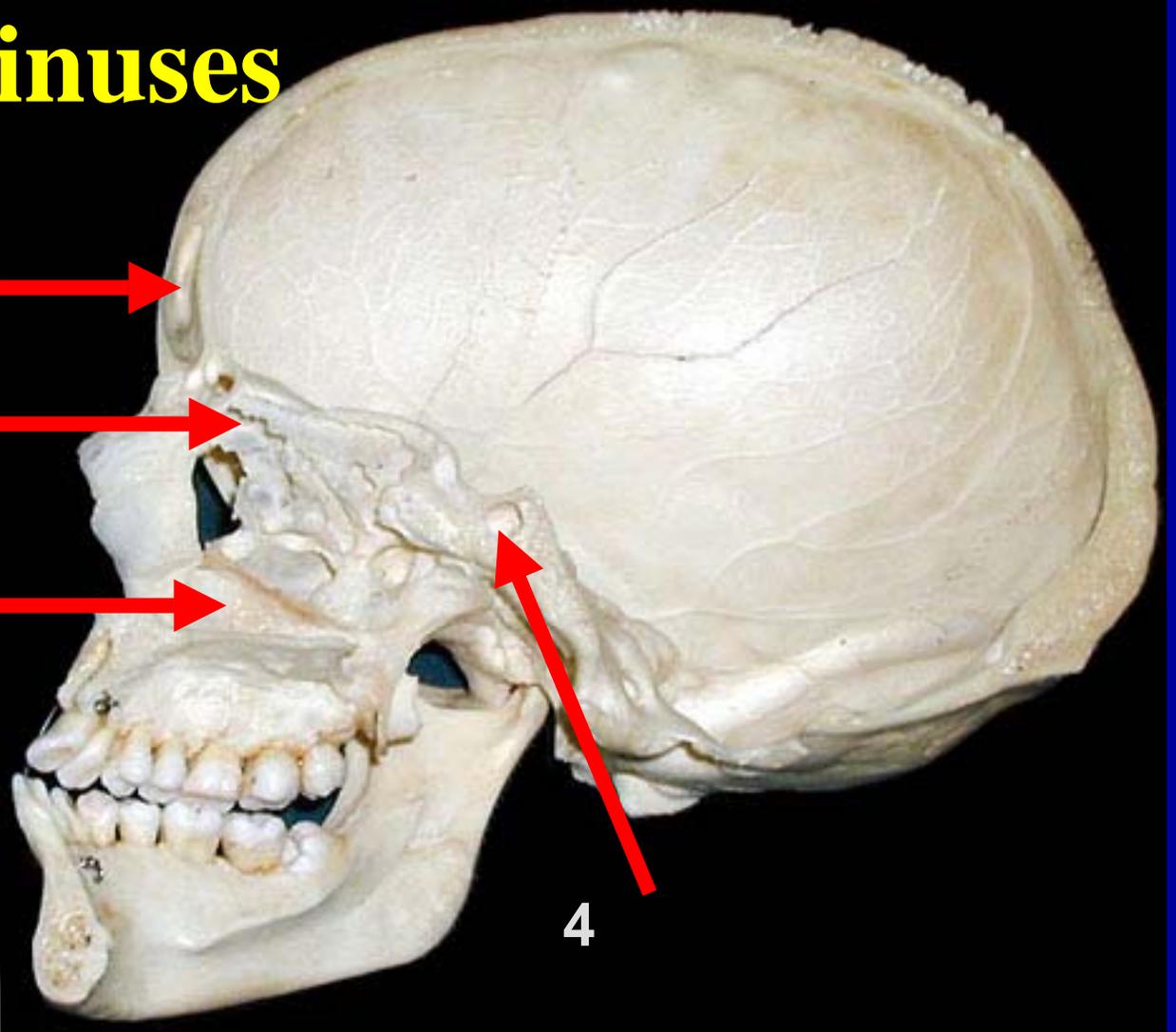
FRONTAL BONE

# Paranasal Sinuses

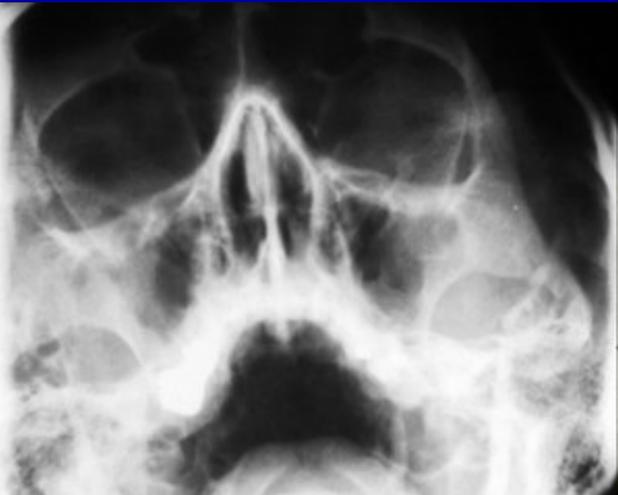
1

2

3



4



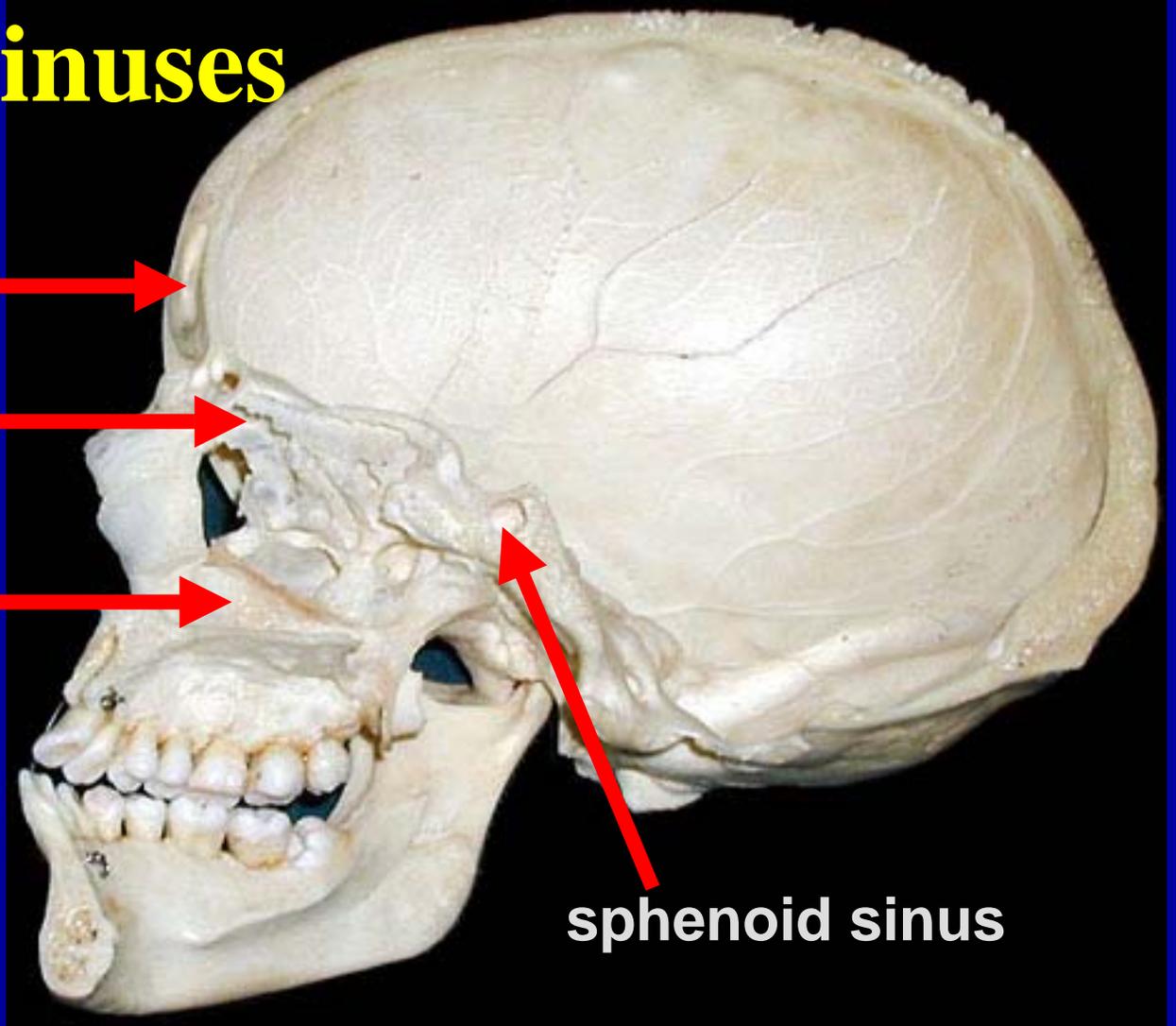
# Paranasal Sinuses

frontal sinus →

ethmoid sinus →

maxillary sinus →

→ sphenoid sinus



# Cranium

1

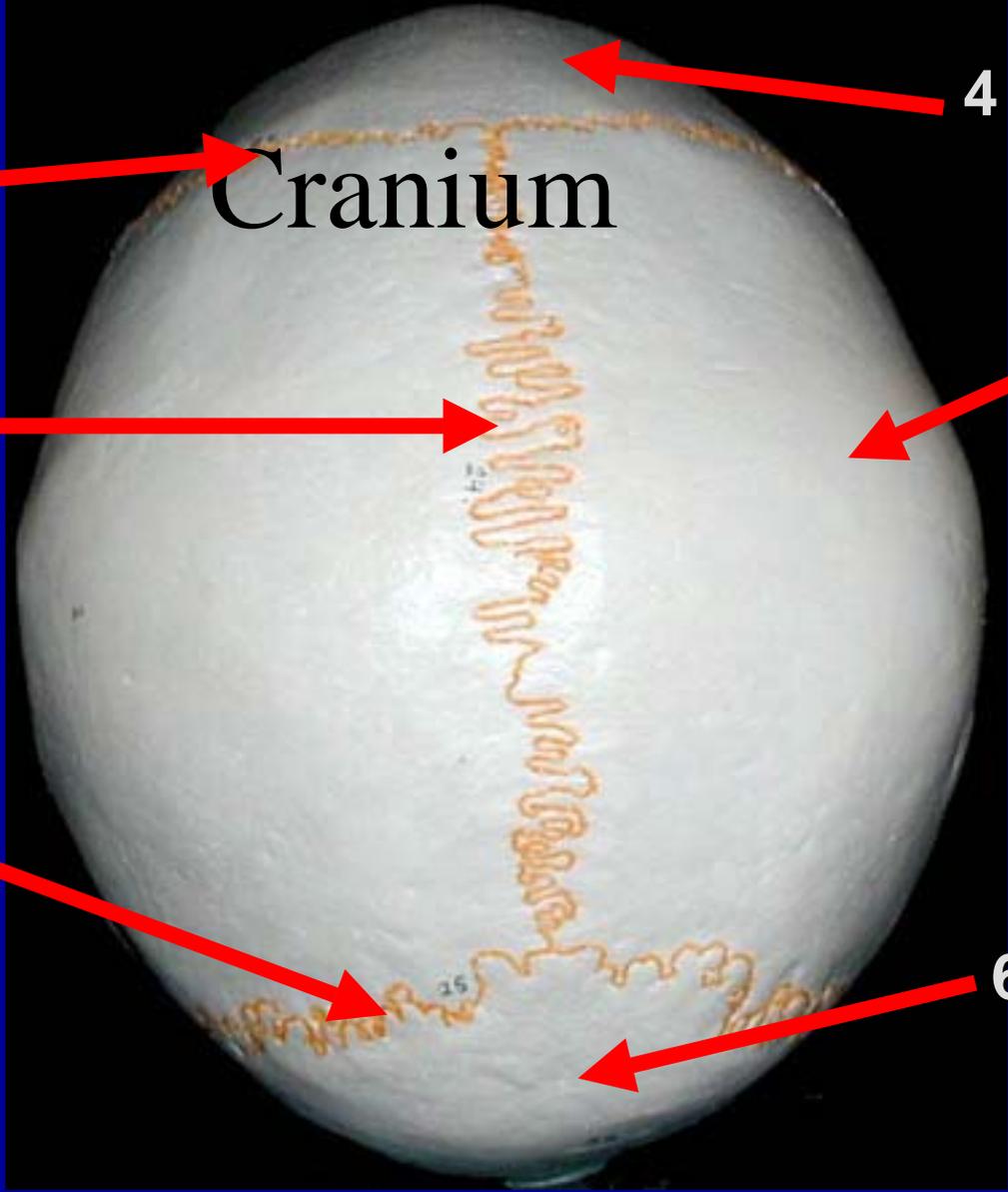
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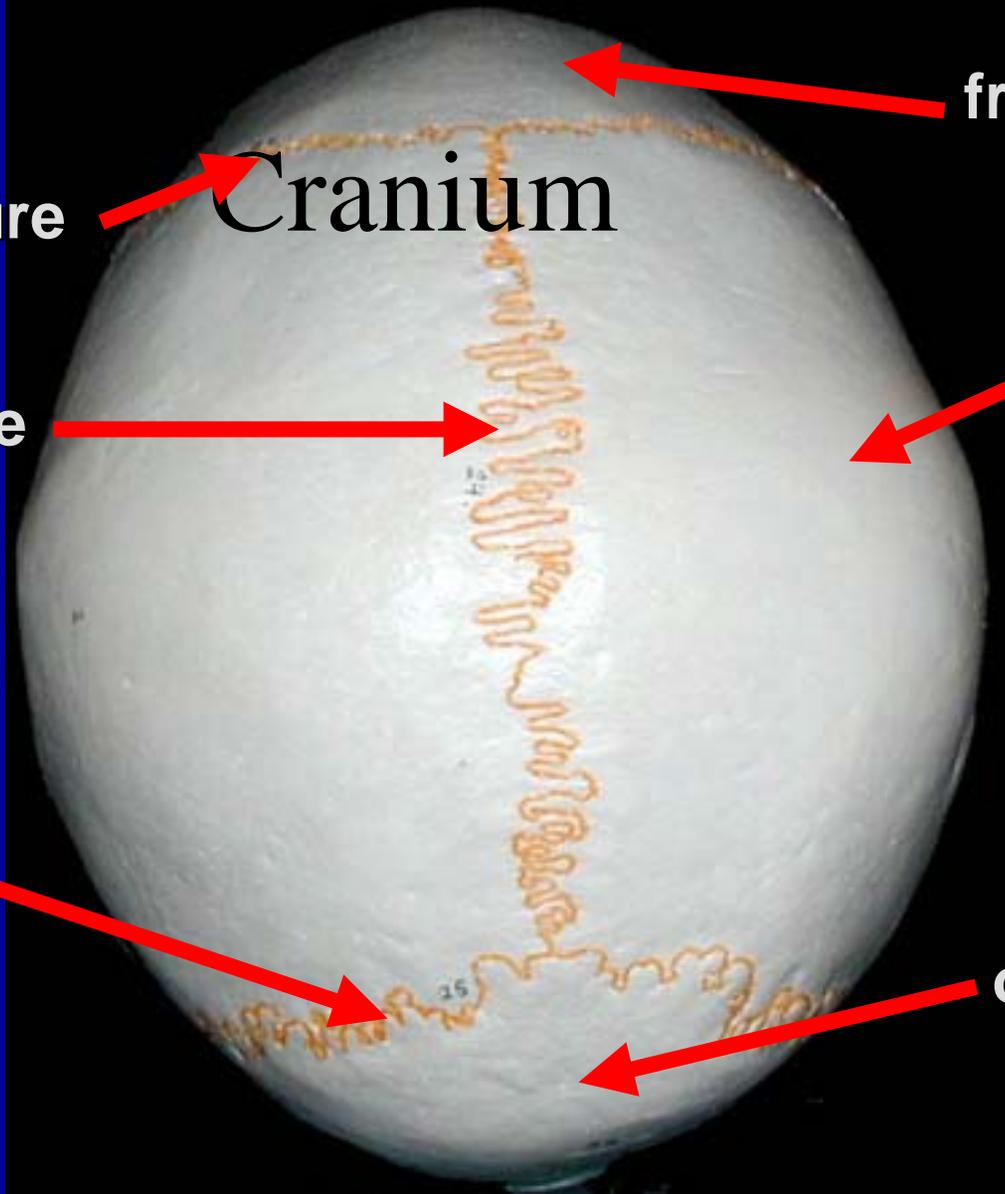
2

5

3

6





coronal suture

Cranium

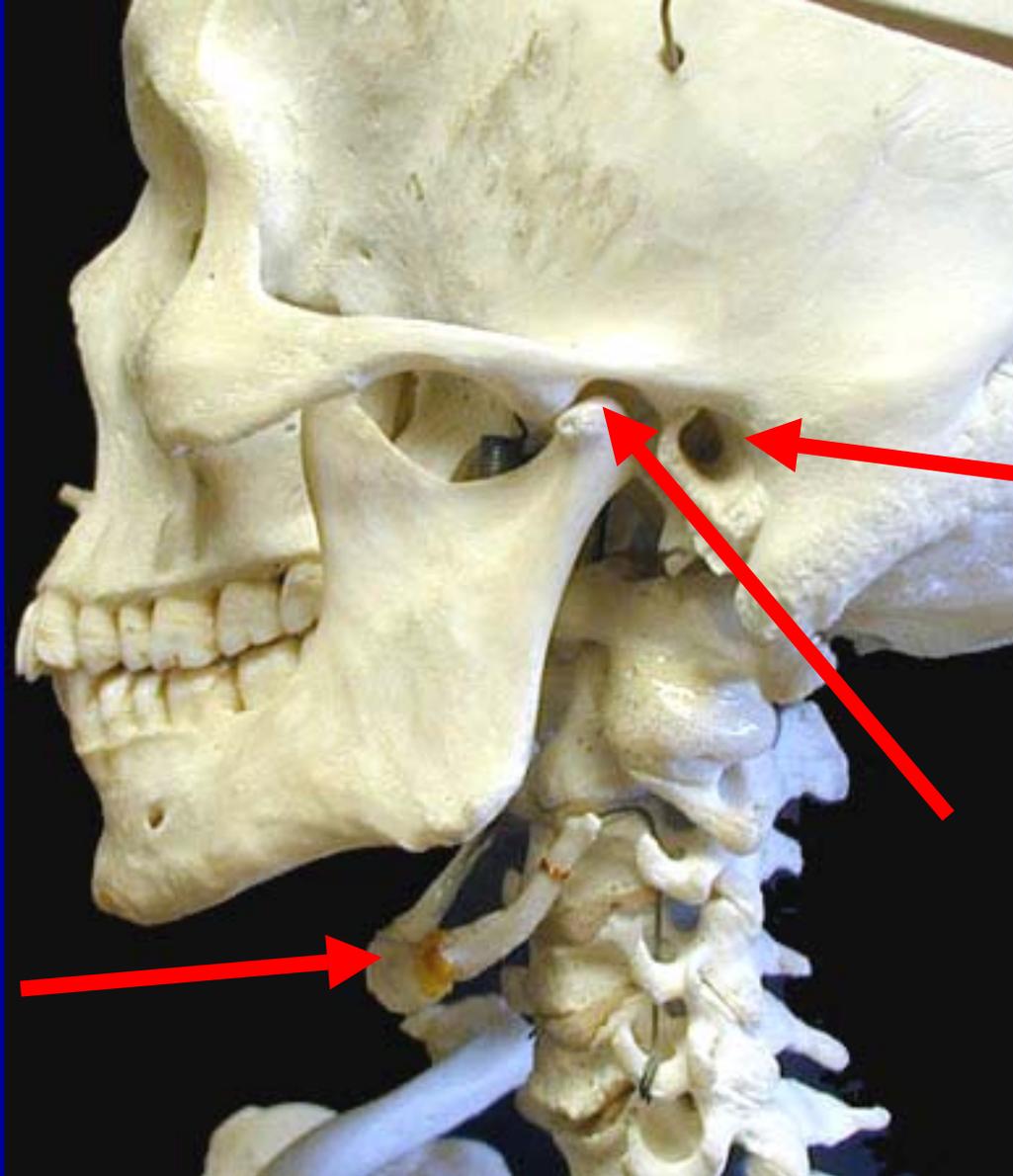
frontal bone

sagittal suture

parietal bone

lambdoidal  
suture

occipital bone



1

3

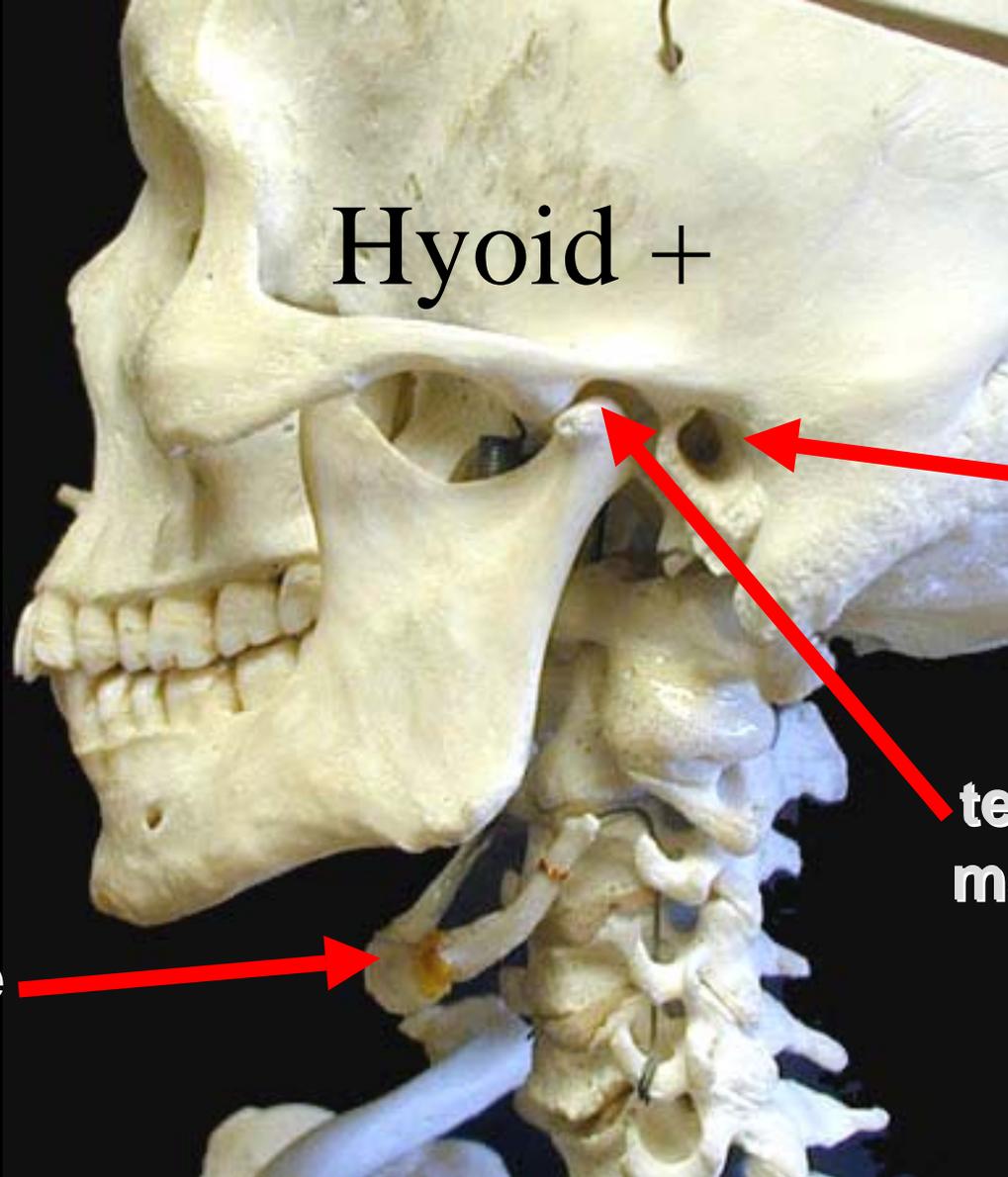
2

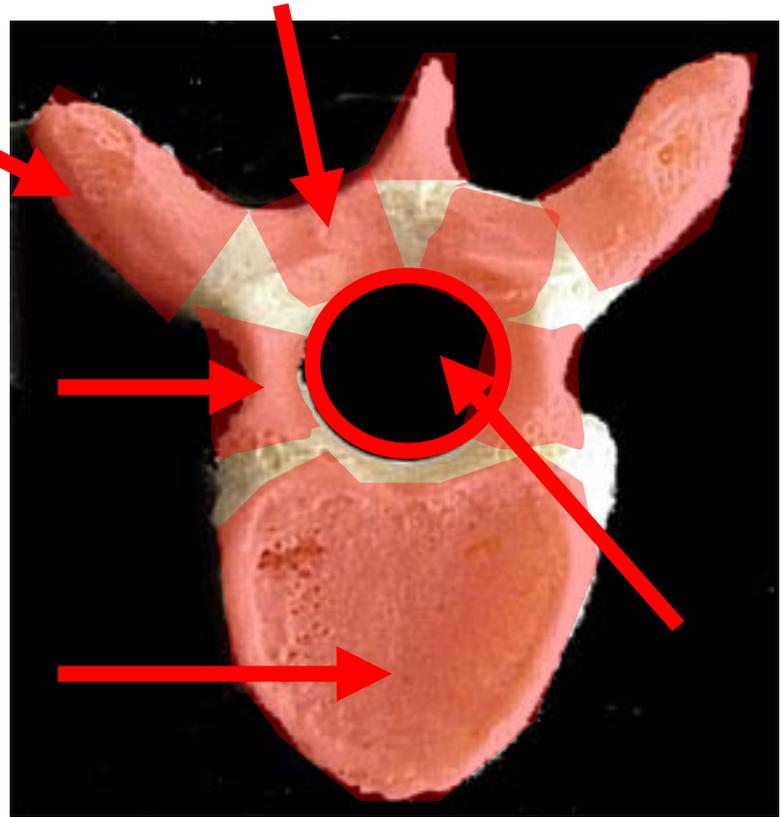
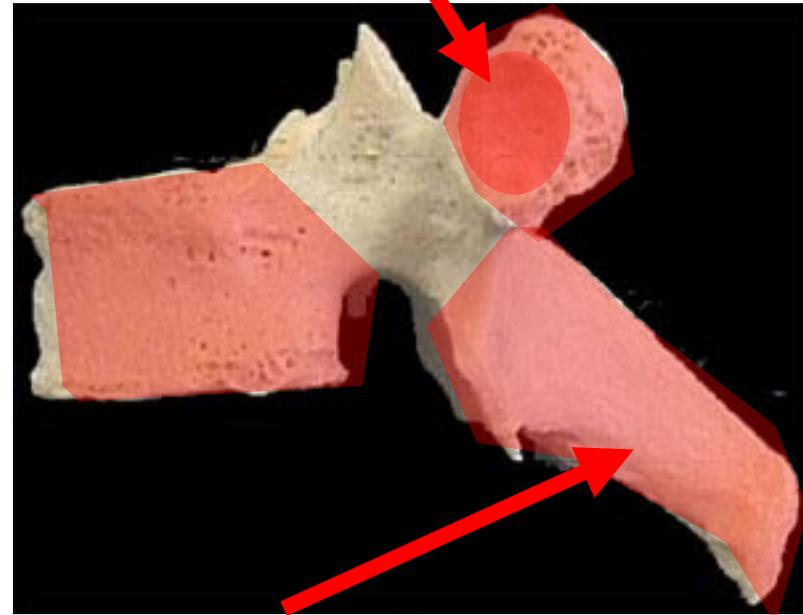
Hyoid +

external  
acoustic  
meatus

temporal  
mandibular  
joint

Hyoid bone





Vertebral  
Parts

transverse process

rib facet

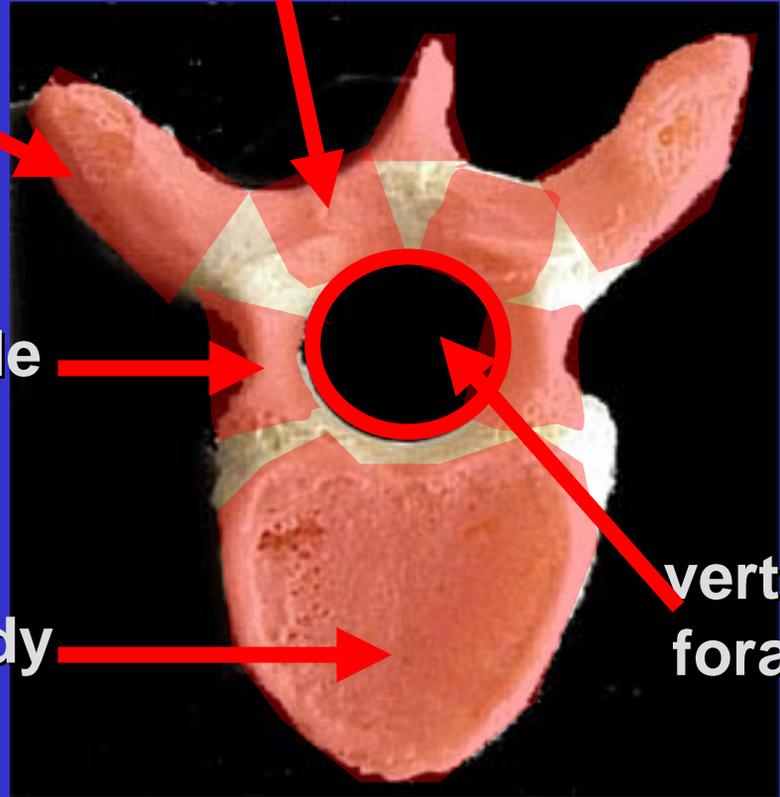
spinous process

lamina

pedicle

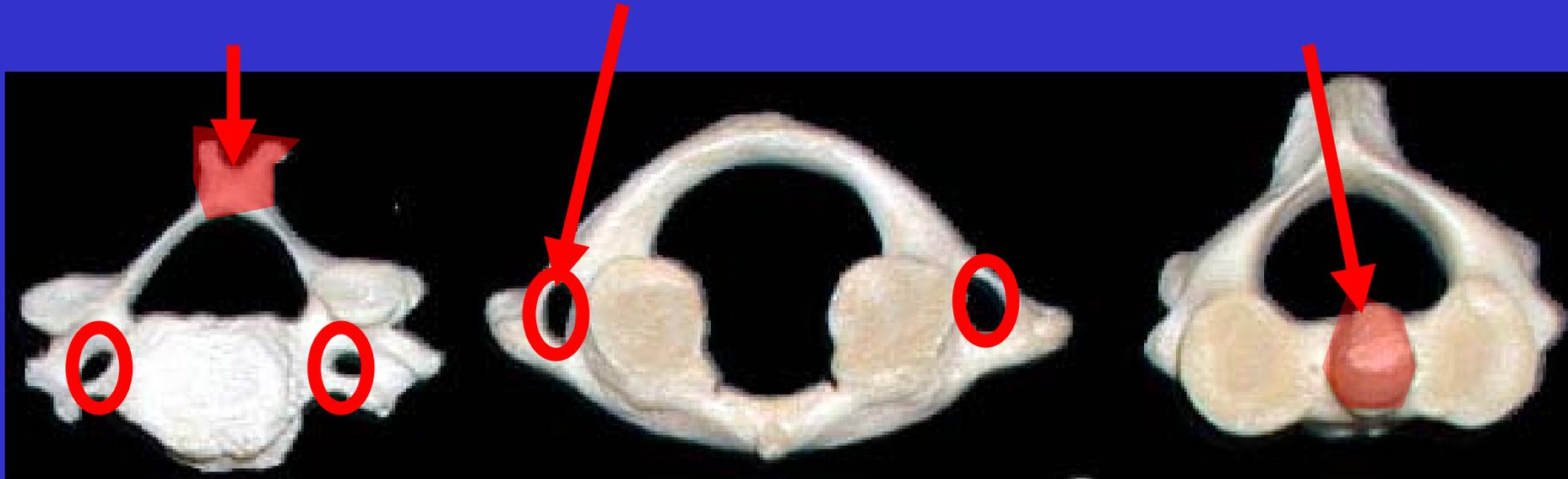
body

vertebral  
foramen



# Vertebral Parts

# [.....?...]Vertebrae



?

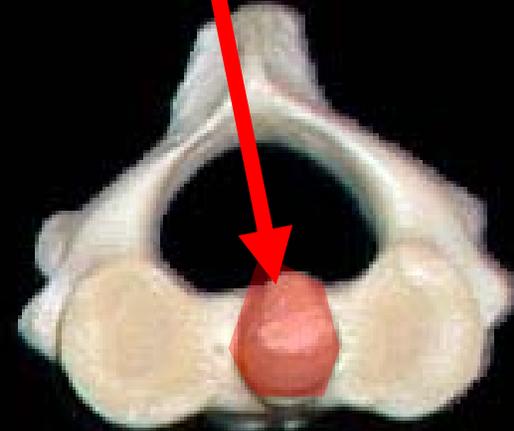
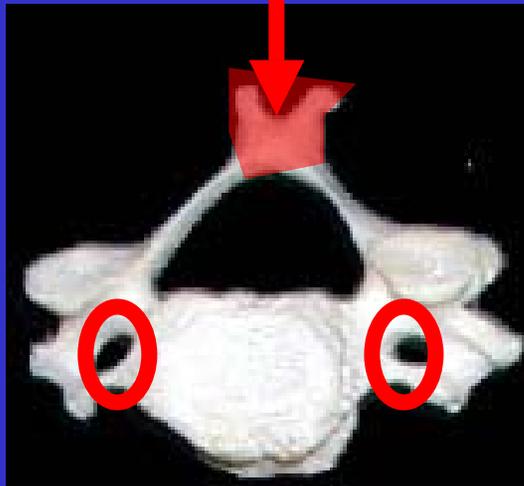
?

# Cervical Vertebrae

bifid  
process

transverse foramen

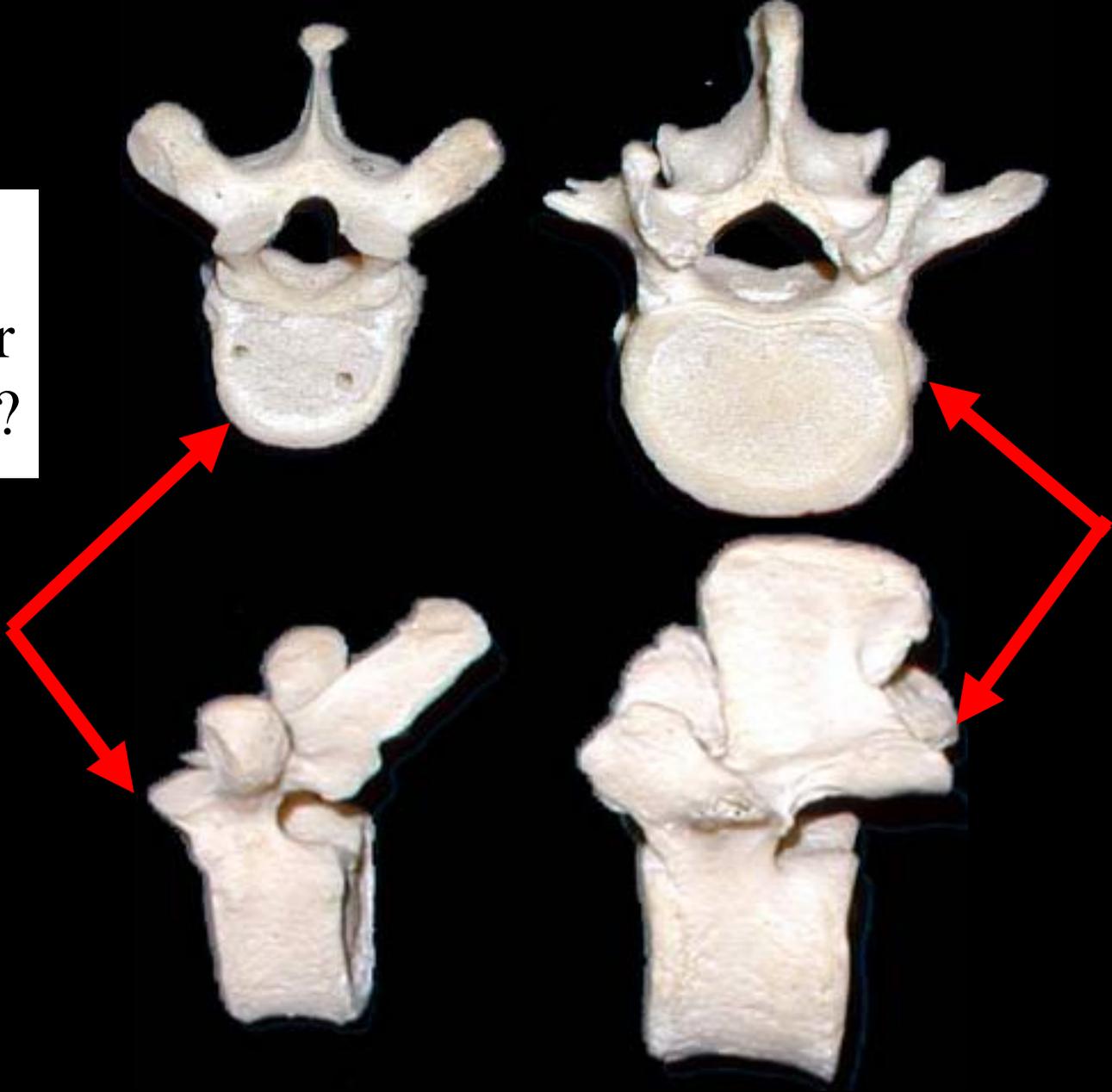
Dens  
(odontoid process)



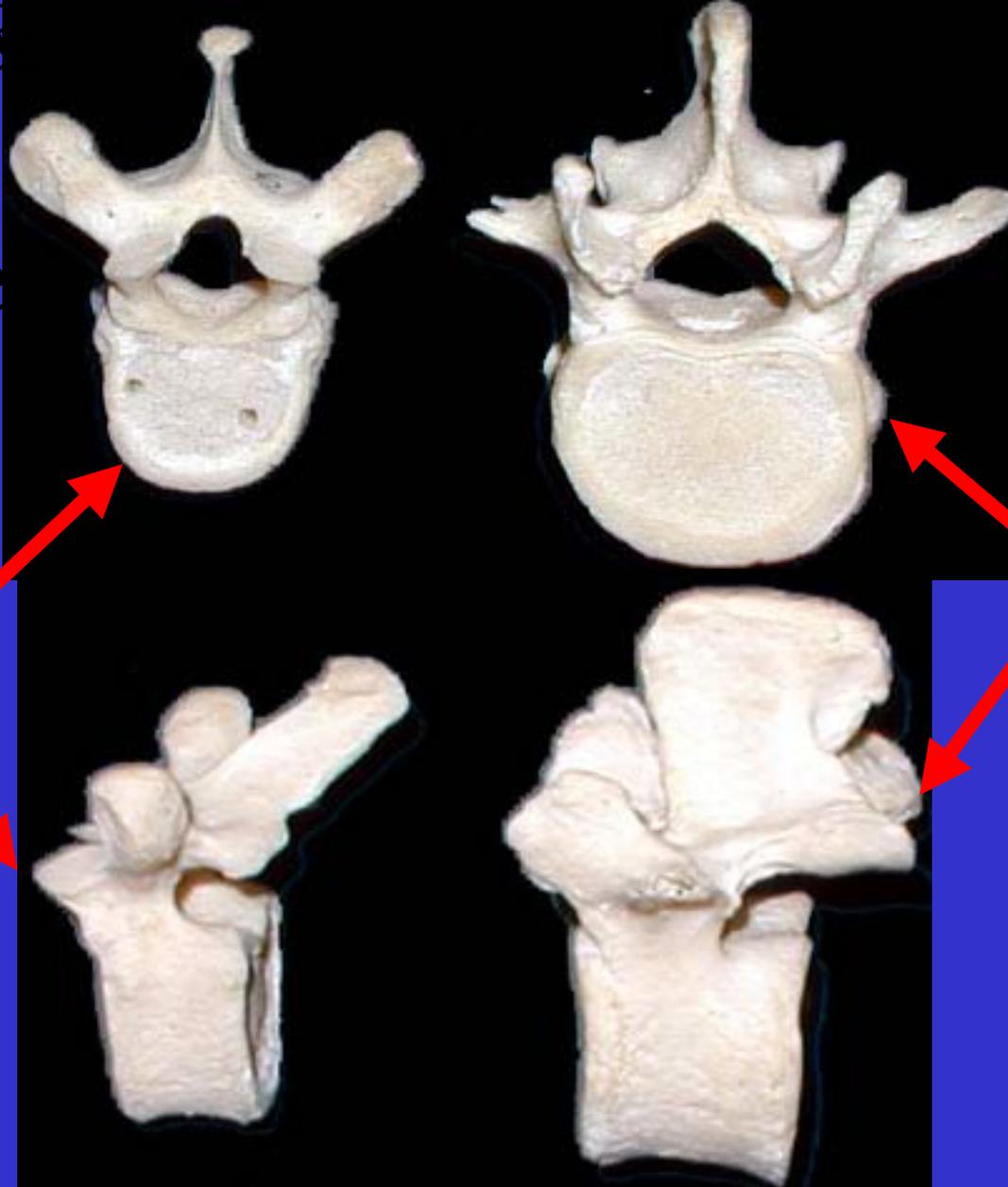
Atlas (C1)

Axis (C2)

Thoracic  
& Lumbar  
Vertebrae?



# Thoracic & Lumbar Vertebrae

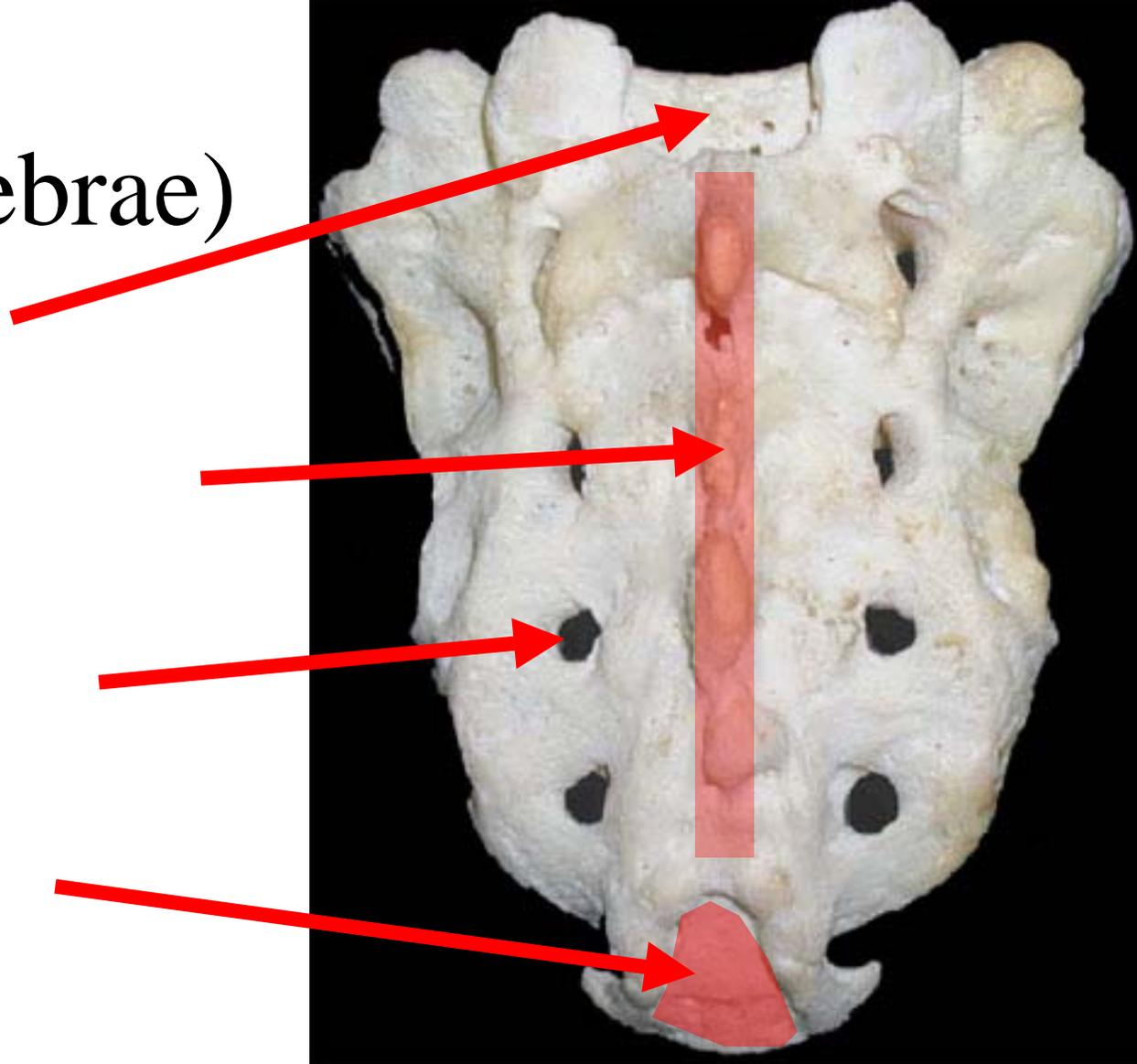


thoracic vertebrae

lumbar vertebrae

# Sacrum

(? fused vertebrae)



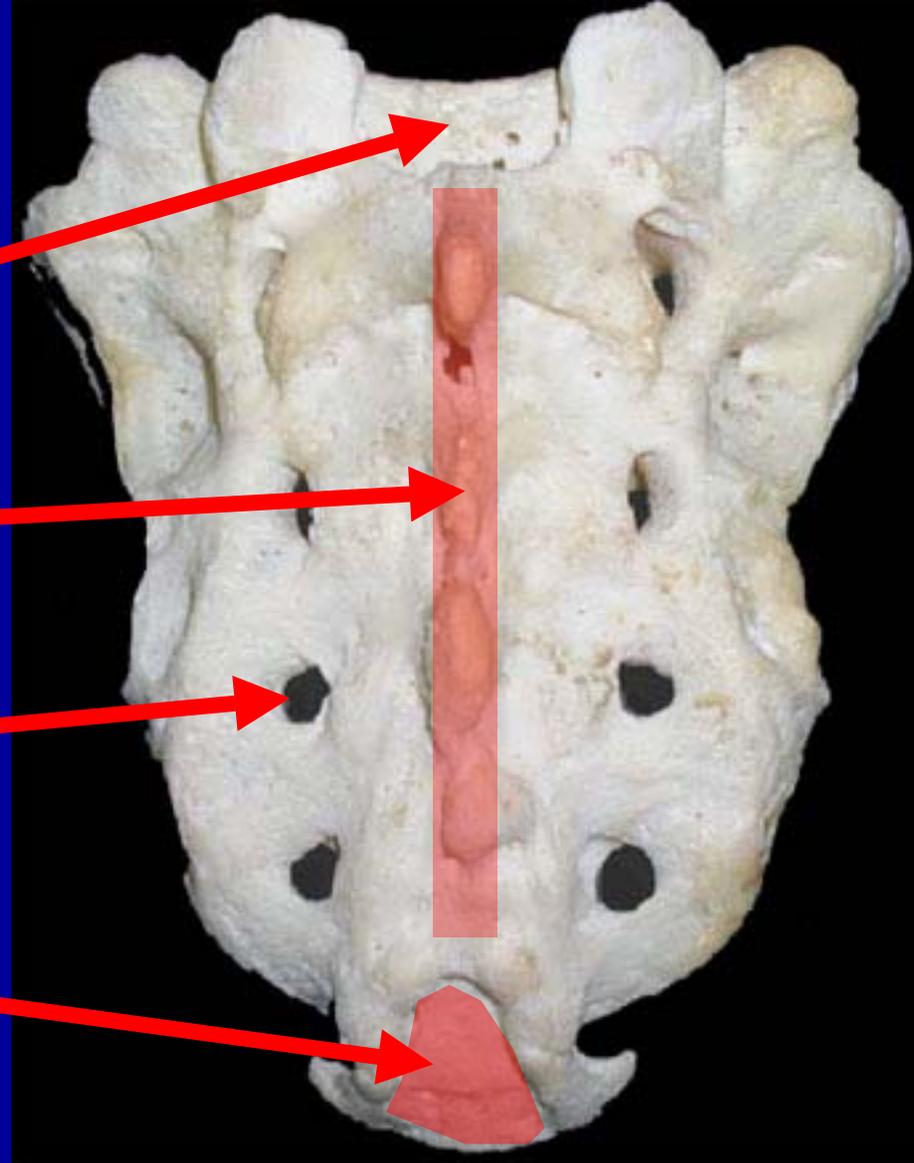
# Sacrum (5 fused vertebrae)

sacral canal

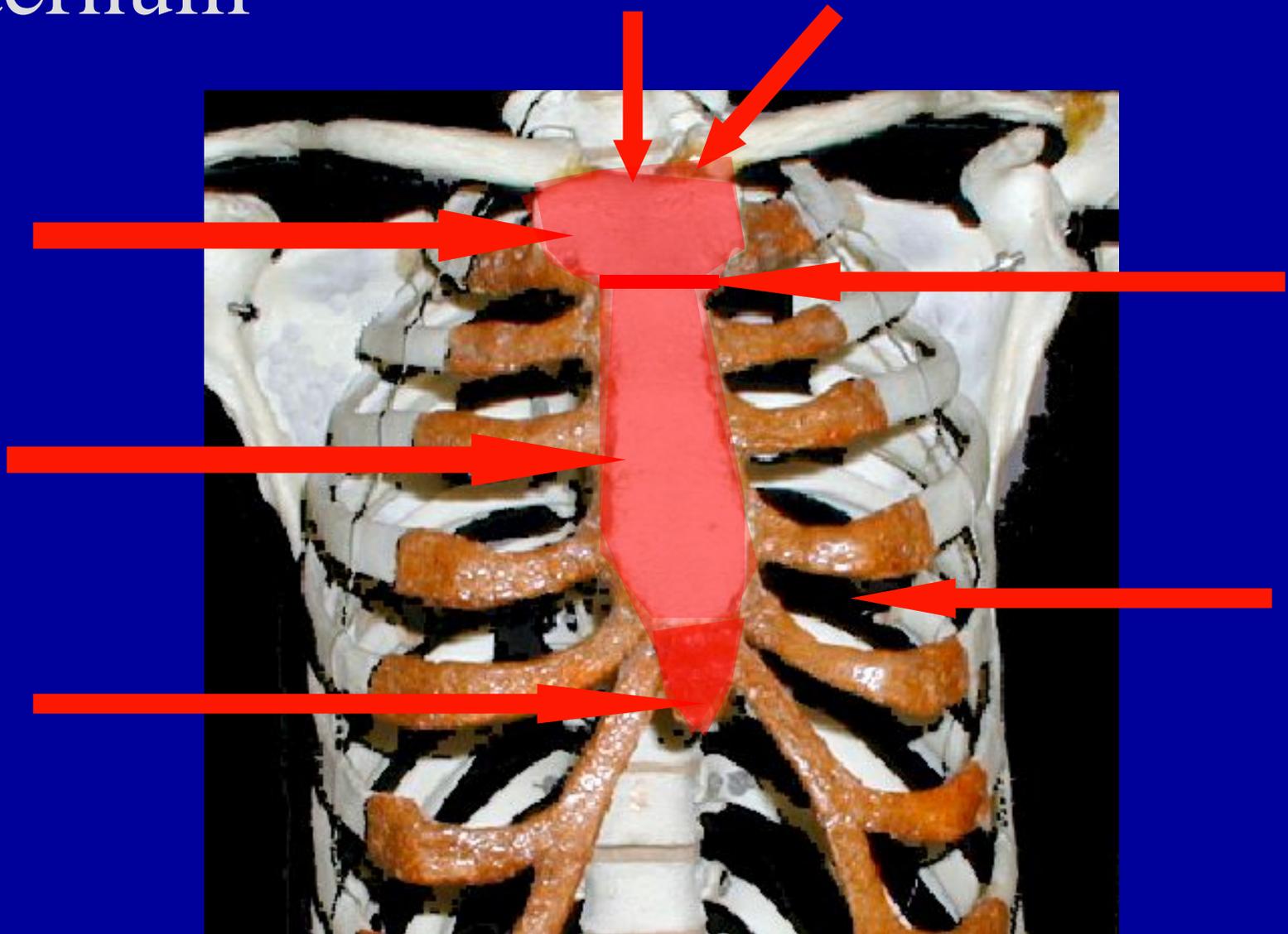
medial sacral  
crest

sacral foramen

sacral hiatus



# Sternum



# Sternum

sternal notch

clavicular notch

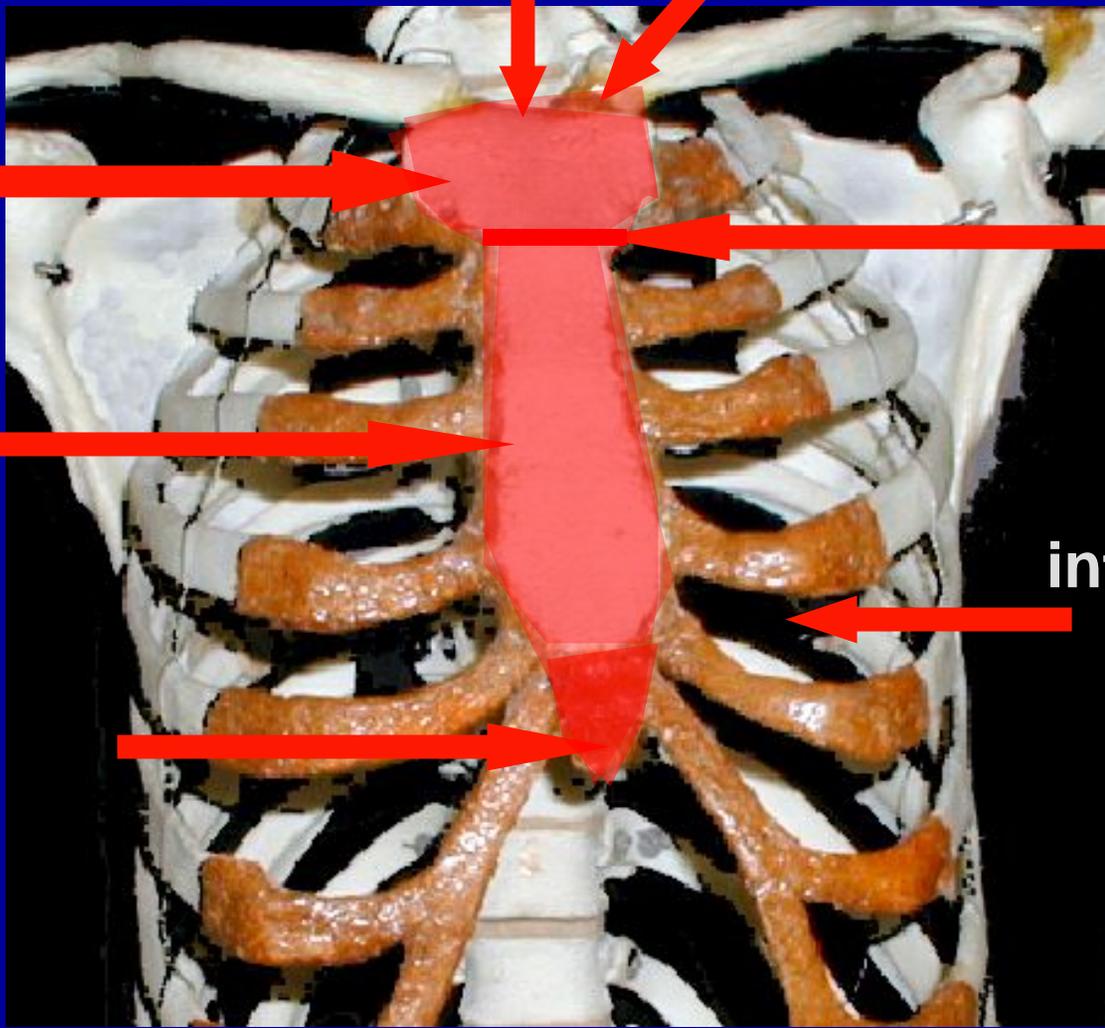
manubrium

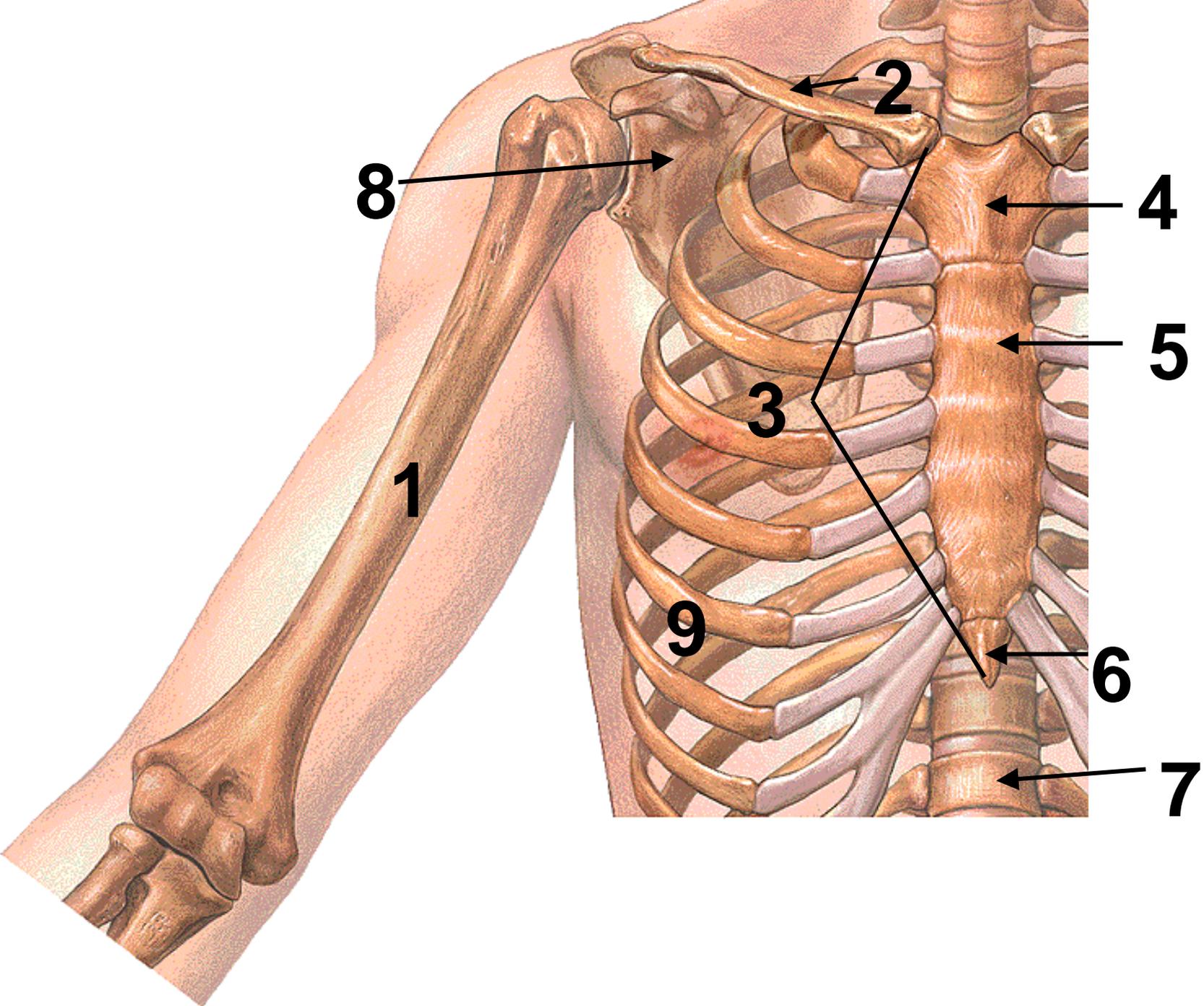
sternal angle

body

intercostal space

xiphoid process





# Human Skeleton: Rib cage and shoulder region

Scapula

humerus

clavicle

manubrium

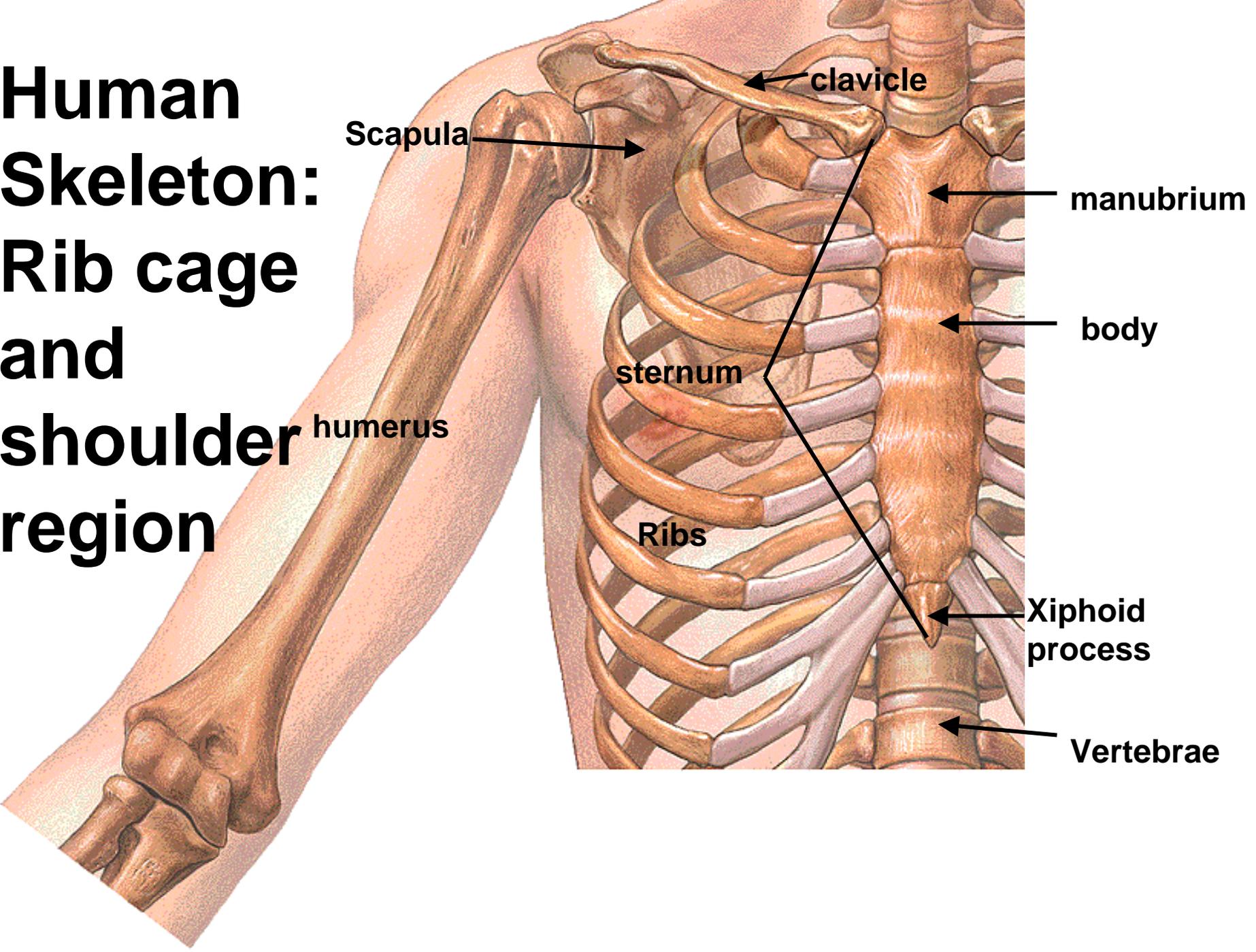
body

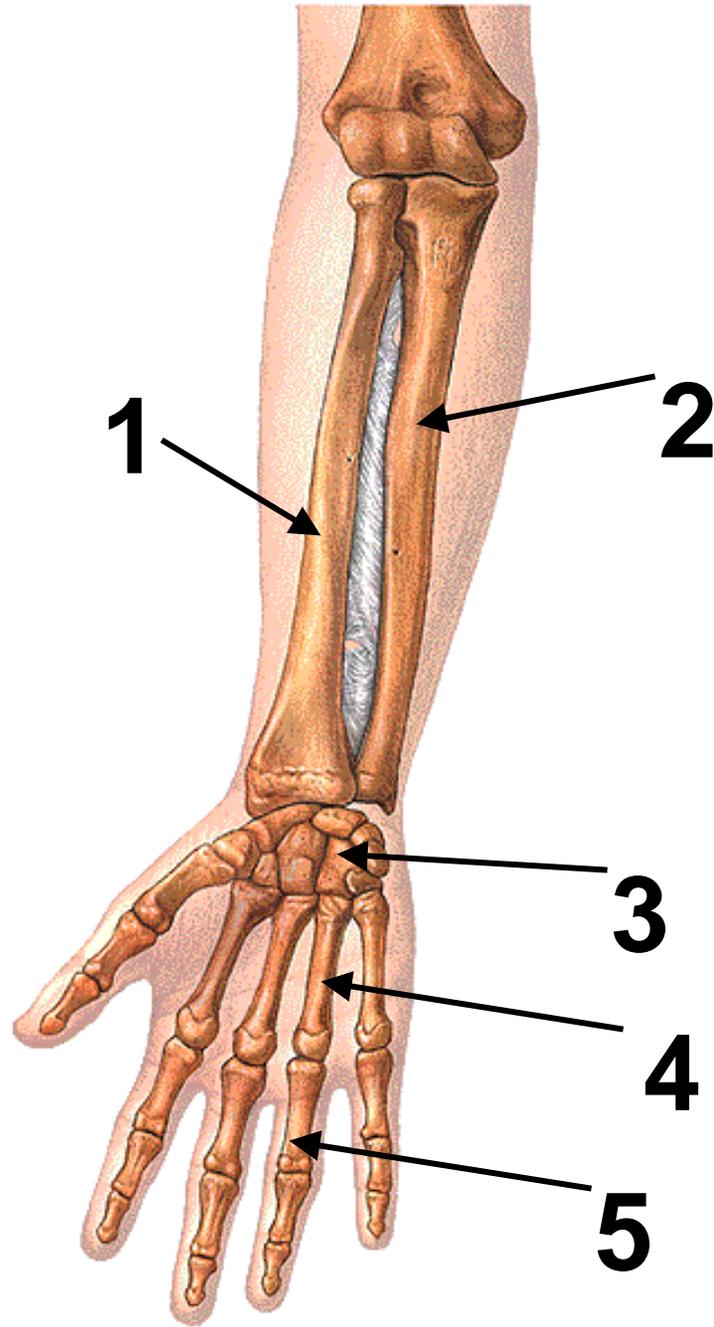
sternum

Ribs

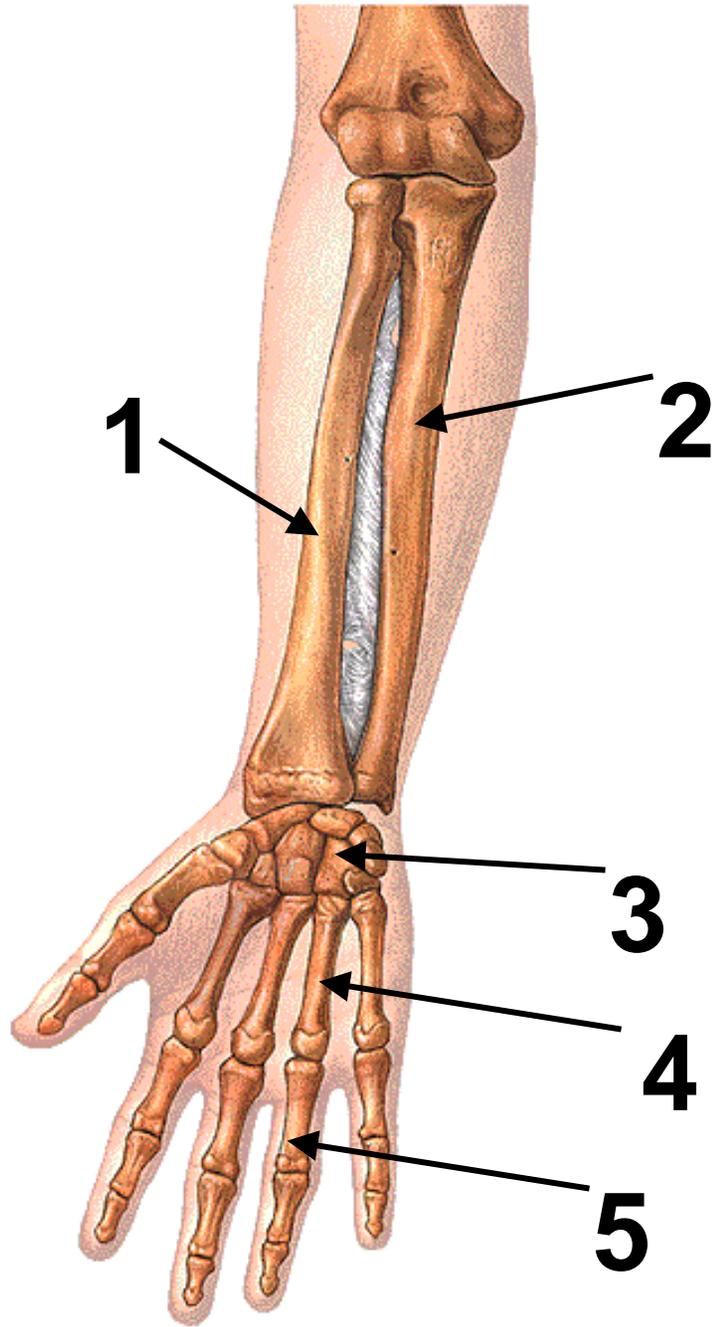
Xiphoid  
process

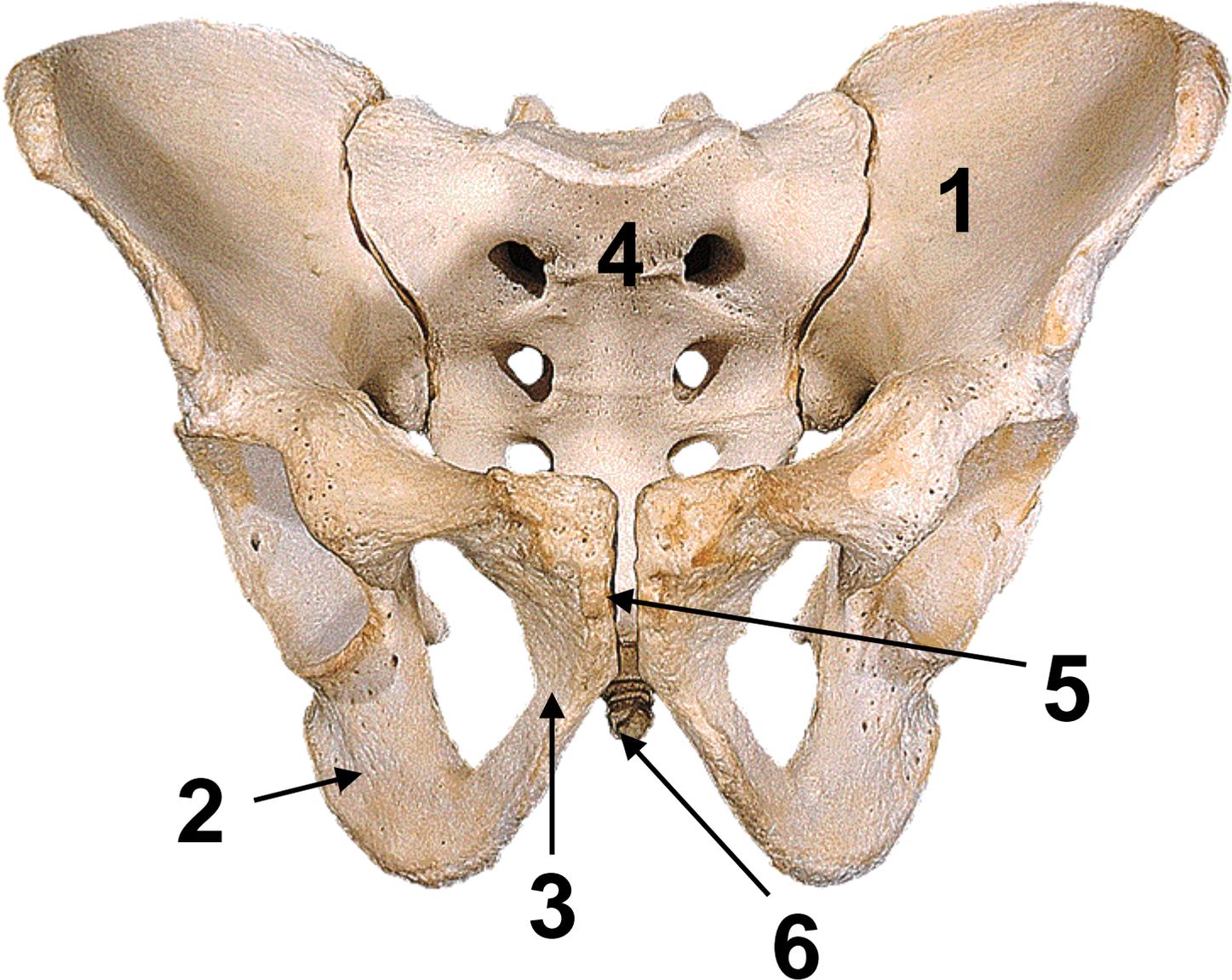
Vertebrae

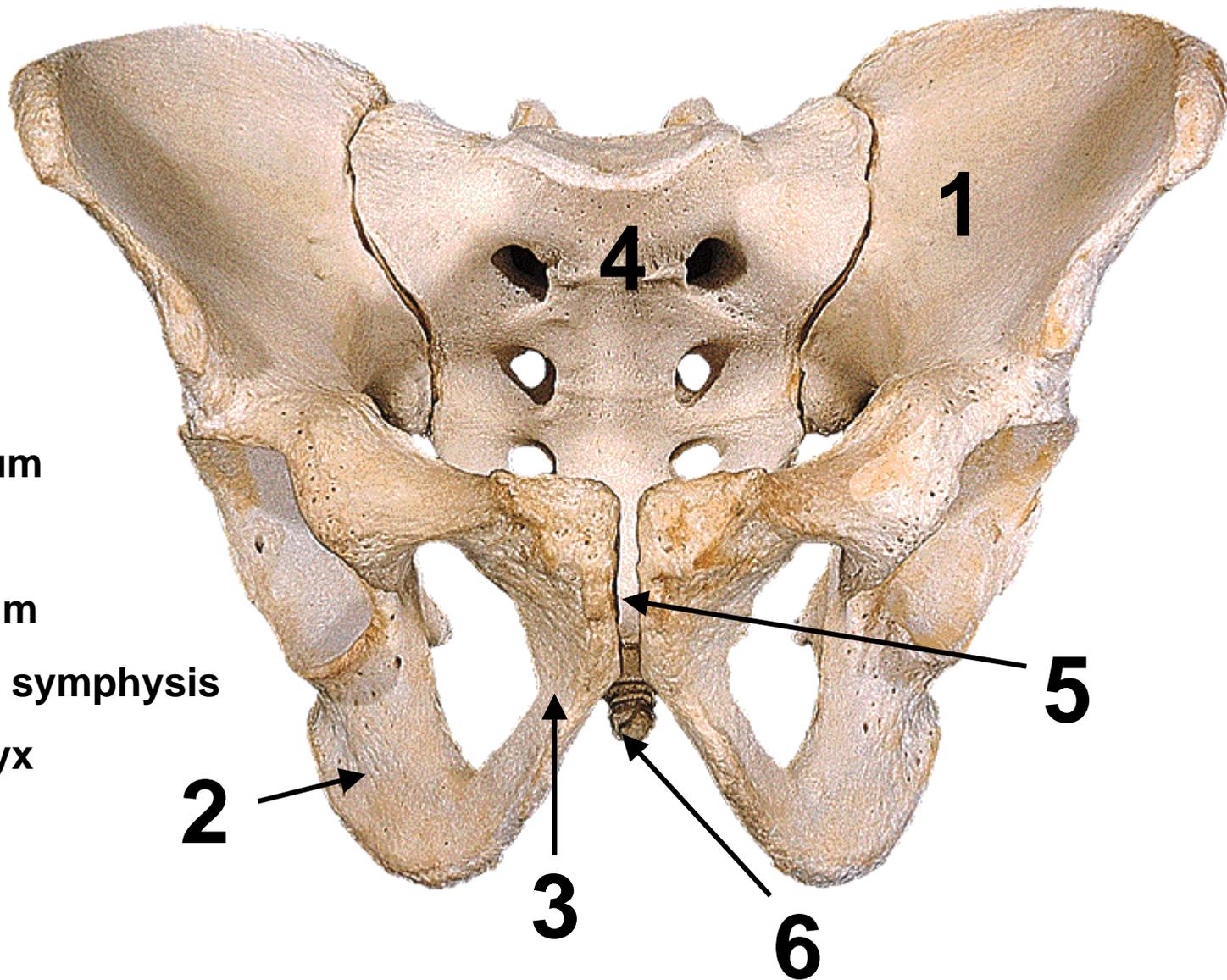




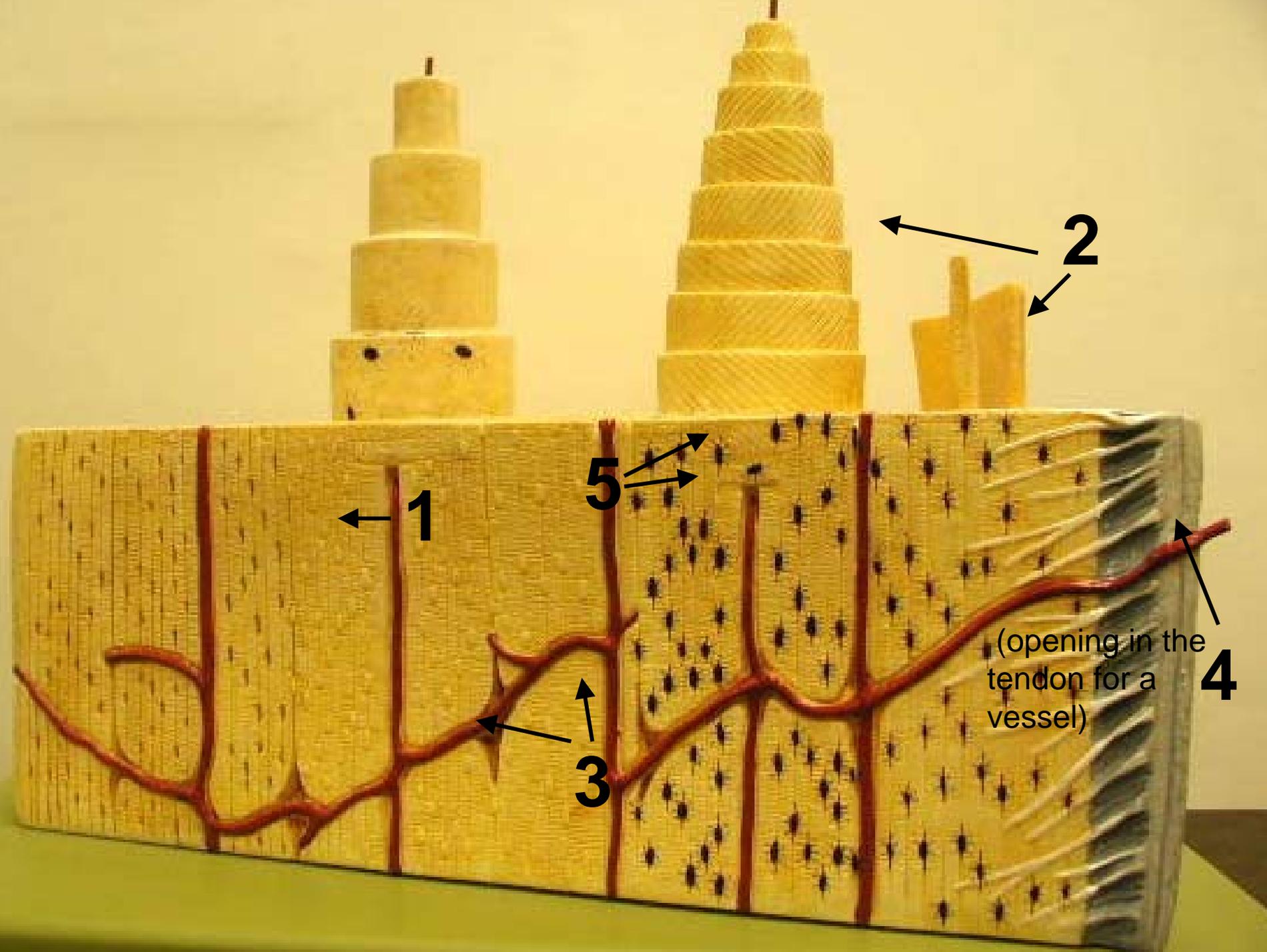
1. Radius
2. Ulna
3. Carpals
4. Metacarpals
5. Phalanges



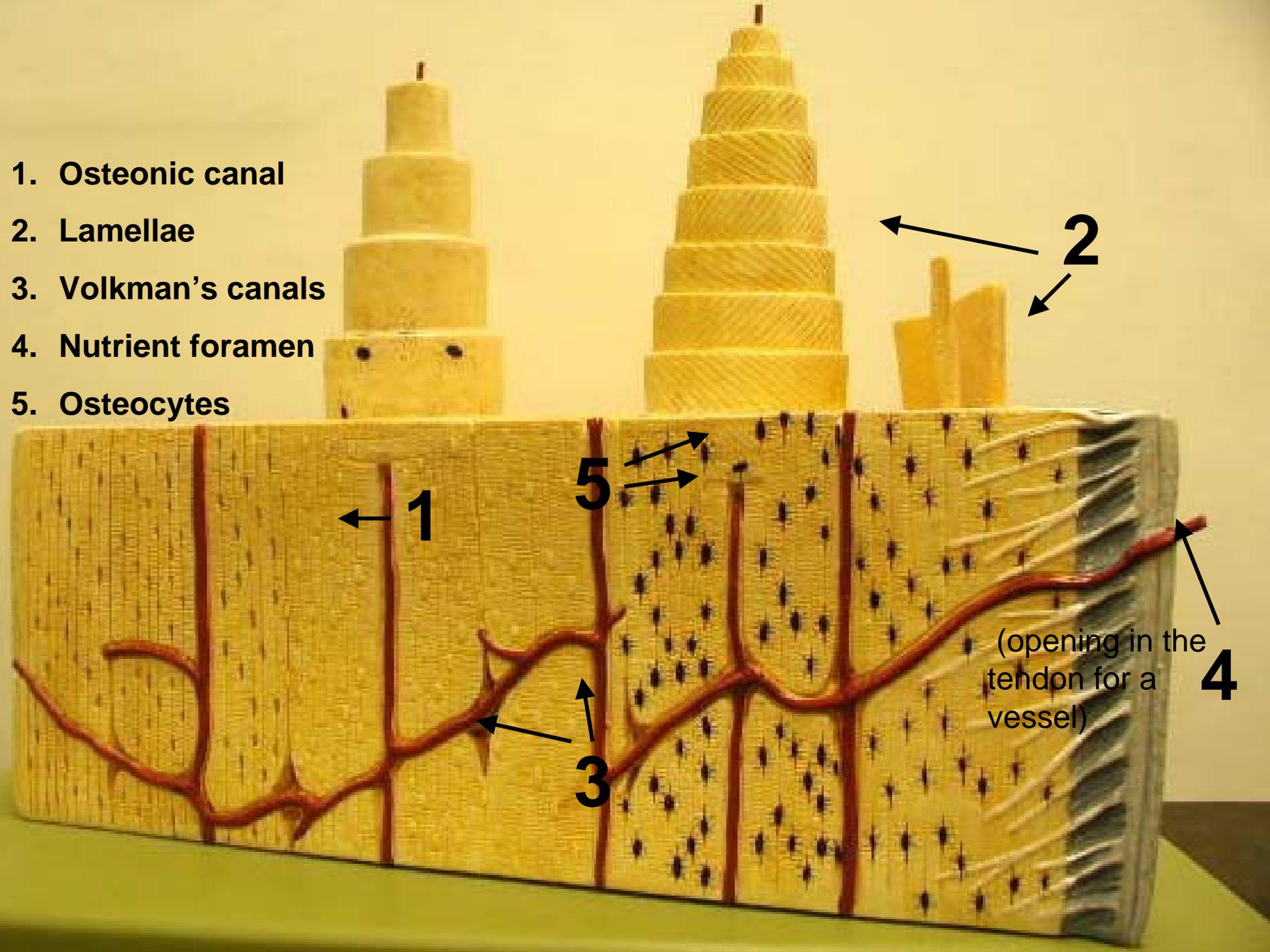




- 1. Ileum
- 2. Ischium
- 3. Pubis
- 4. Sacrum
- 5. Pubic symphysis
- 6. Coccyx



- 1. Osteonic canal
- 2. Lamellae
- 3. Volkman's canals
- 4. Nutrient foramen
- 5. Osteocytes



2

1

5

3

(opening in the tendon for a vessel)

4

# Definition of:

- *spine*
- *Suture*
- *malleolus*

- *spine*
  - A relatively long, thin projection or bump.
- *suture*
  - Articulation between cranial bones.
- *malleolus*
  - One of two specific protuberances of bones in the ankle.

- THE SKULL
- ? BONES
- ALL FUSED EXCEPT ONE.:?
- JOINTS = ?
- CRANIAL CAVITY ? BONES=CRANIAL BONES
- ? LEFT = FACIAL BONES
- ? MORE IN THE EARS

- THE SKULL
- = 22 BONES
- ALL FUSED EXCEPT ONE.:HYOID BONE
- JOINTS = SUTURES
- CRANIAL CAVITY 8 BONES=CRANIAL BONES
- 14 LEFT = FACIAL BONES
- 3 MORE IN THE EARS

**Paired Cranial Bones:**

**Unpaired Cranial Bones:**

## **Paired Cranial Bones:**

- Parietals
- Temporals

## **Unpaired Cranial Bones:**

- Frontal
- Occipital
- Sphenoid
- Ethmoid

# Paired Facial Bones:?

-

## Paired Facial Bones:

- Lacrimals
- Nasals
- Zygomatics
- Maxillae
- Palatines
- Inferior Nasal Conchae

## **Unpaired Facial Bones:**

## **Unpaired Facial Bones:**

- Vomer
- Mandible
- Hyoid

- *In the middle ears bones(6):*

# *middle ears*

- *In the (6):*
  - **malleus (2)**
  - **incus (2)**
  - **stapes (2)**

- What **bone** articulates with:

**Ulna?**

**Radius?**

- What **bone** articulates with:

ulna (articulates with trochlea)

radius (articulates with capitulum)

- **function of a lacunae?**

- **function of a lacunae?**

**It houses osteocytes**

- hip bone is composed of:
- which fuse at the?

The hip bone is composed of three elements:

- the ilium
- ischium
- and pubis

which fuse at the acetabulum (the socket of the hip joint).

1. sagittal suture—?

coronal suture—?

lambdoidal suture—?

squamous suture—?

sagittal suture—left and right parietal bones

coronal suture—frontal bone and both parietal bones

lambdoidal suture—occipital bone and both parietal bones

squamous suture—temporal bone and parietal bone

**Olecranon process ?**

prominent bump elbow

What's wrong with this picture?



# Fracture of the olecranon

1

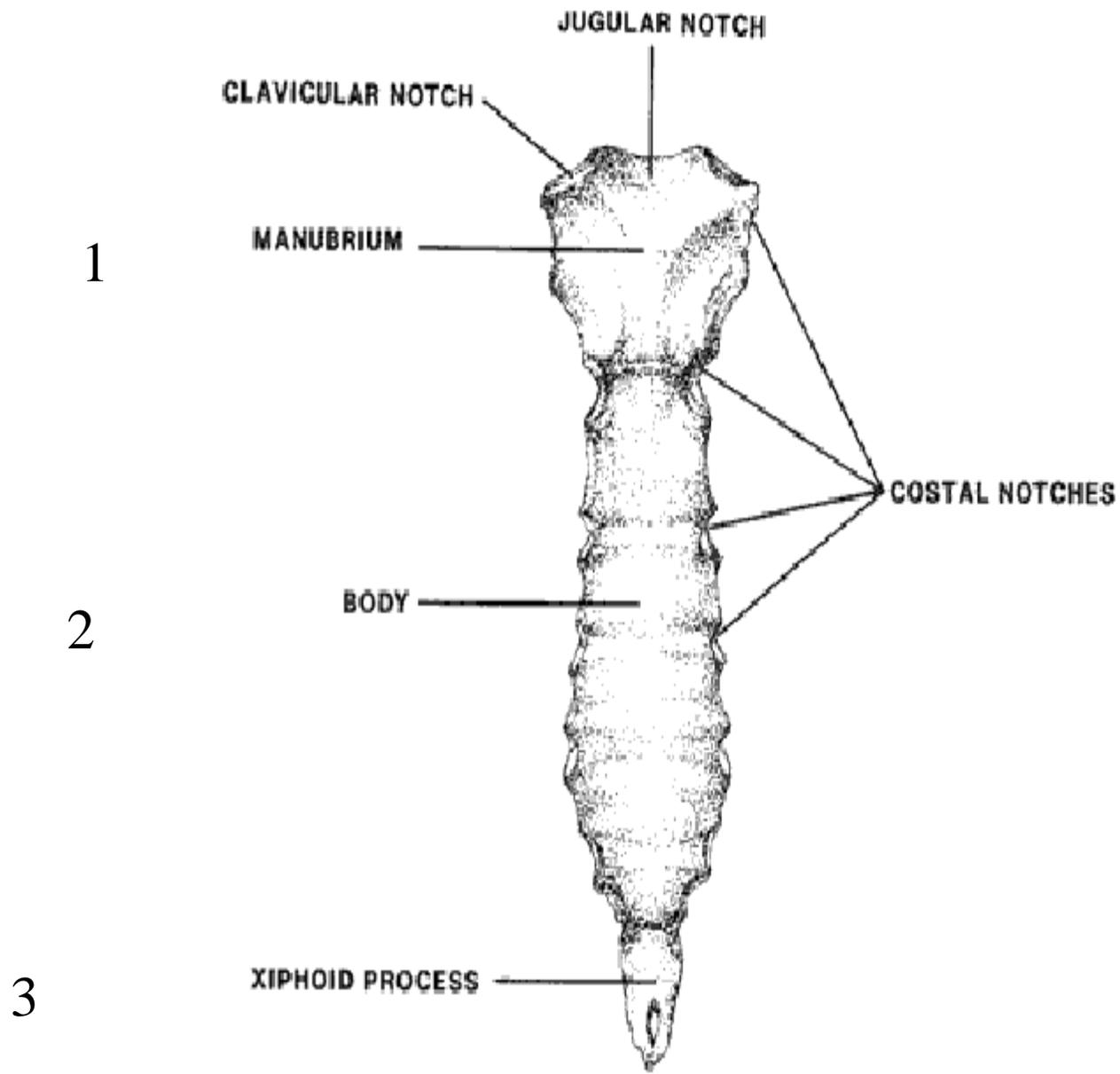


2



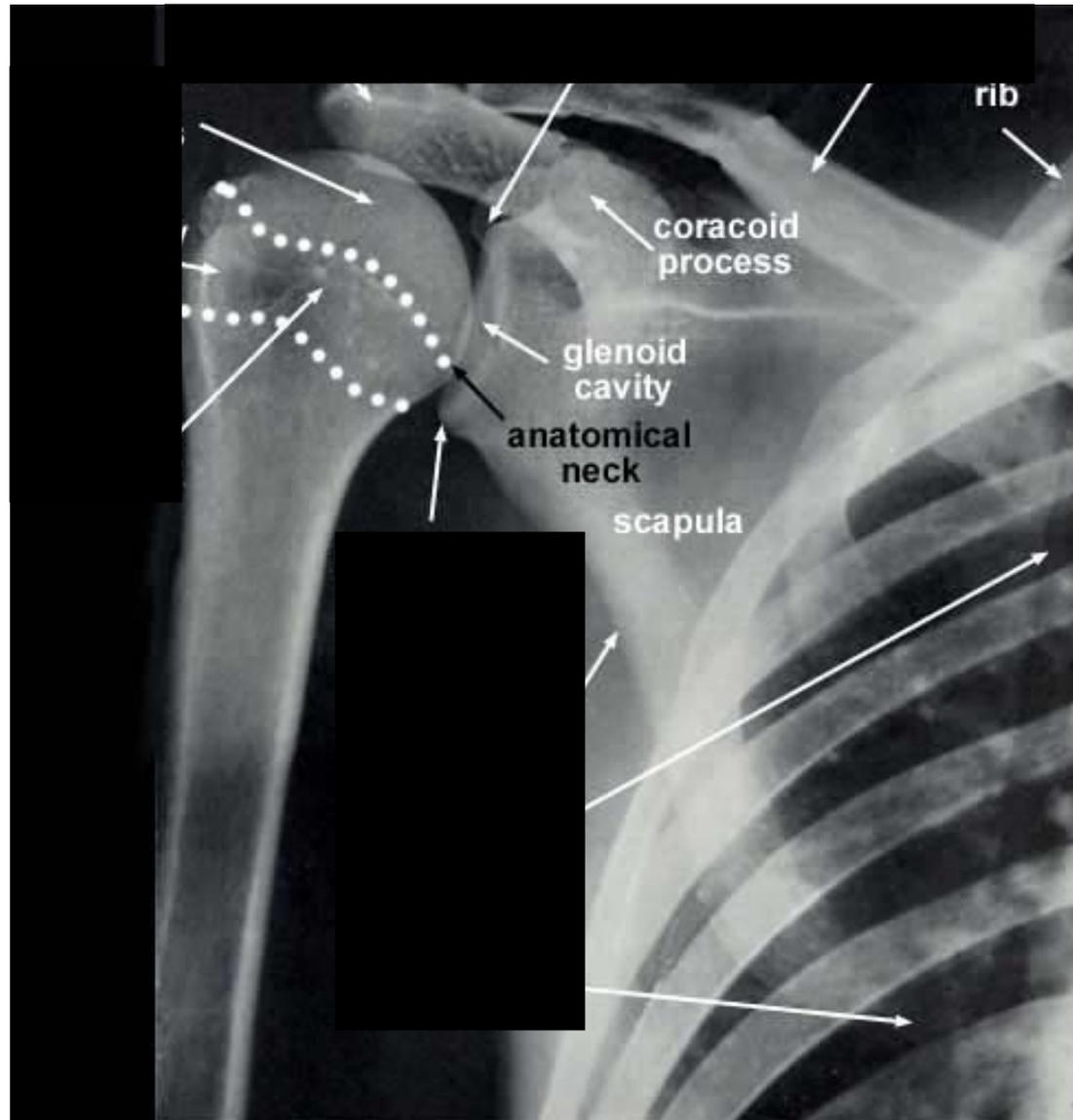
3

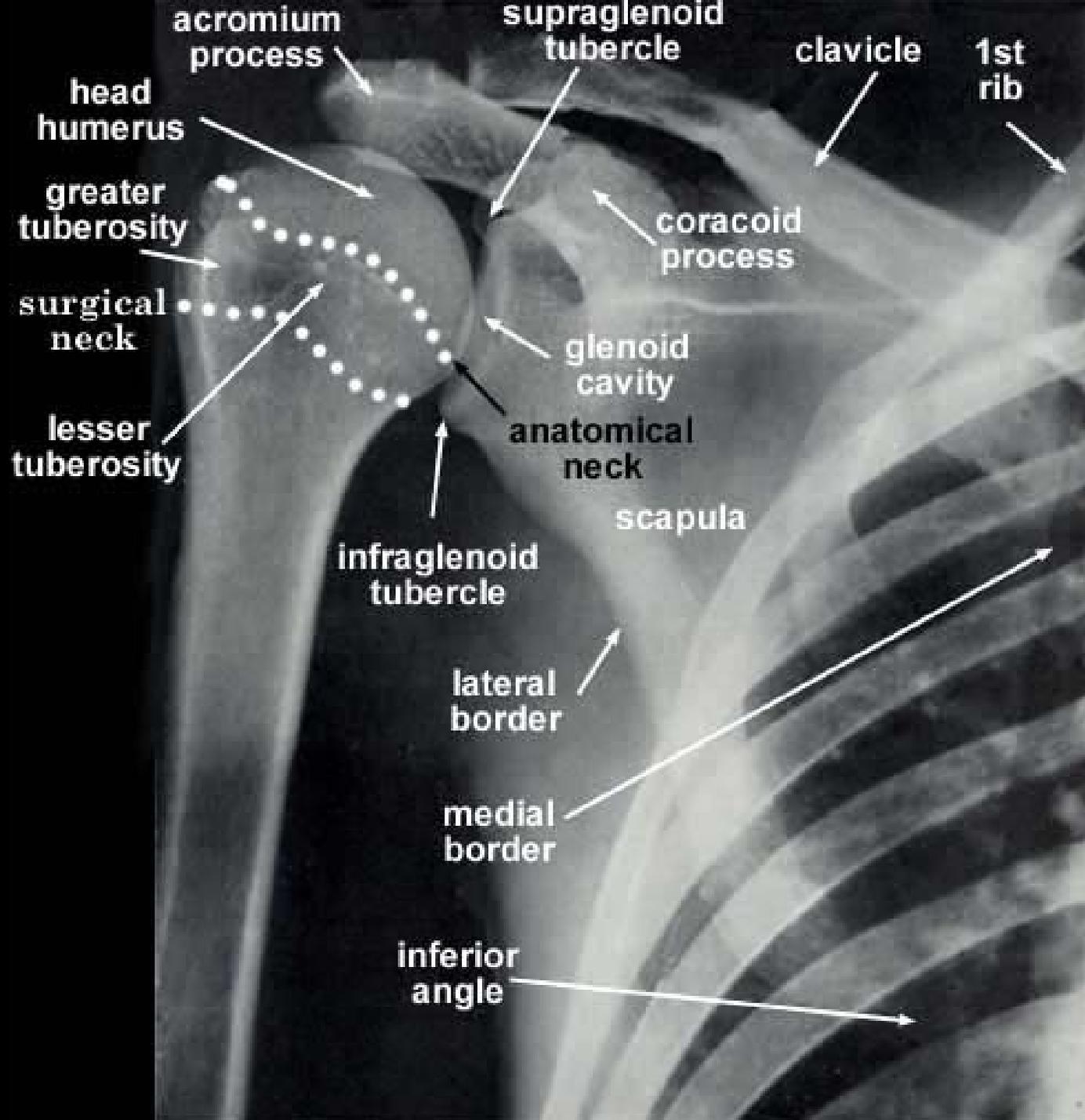


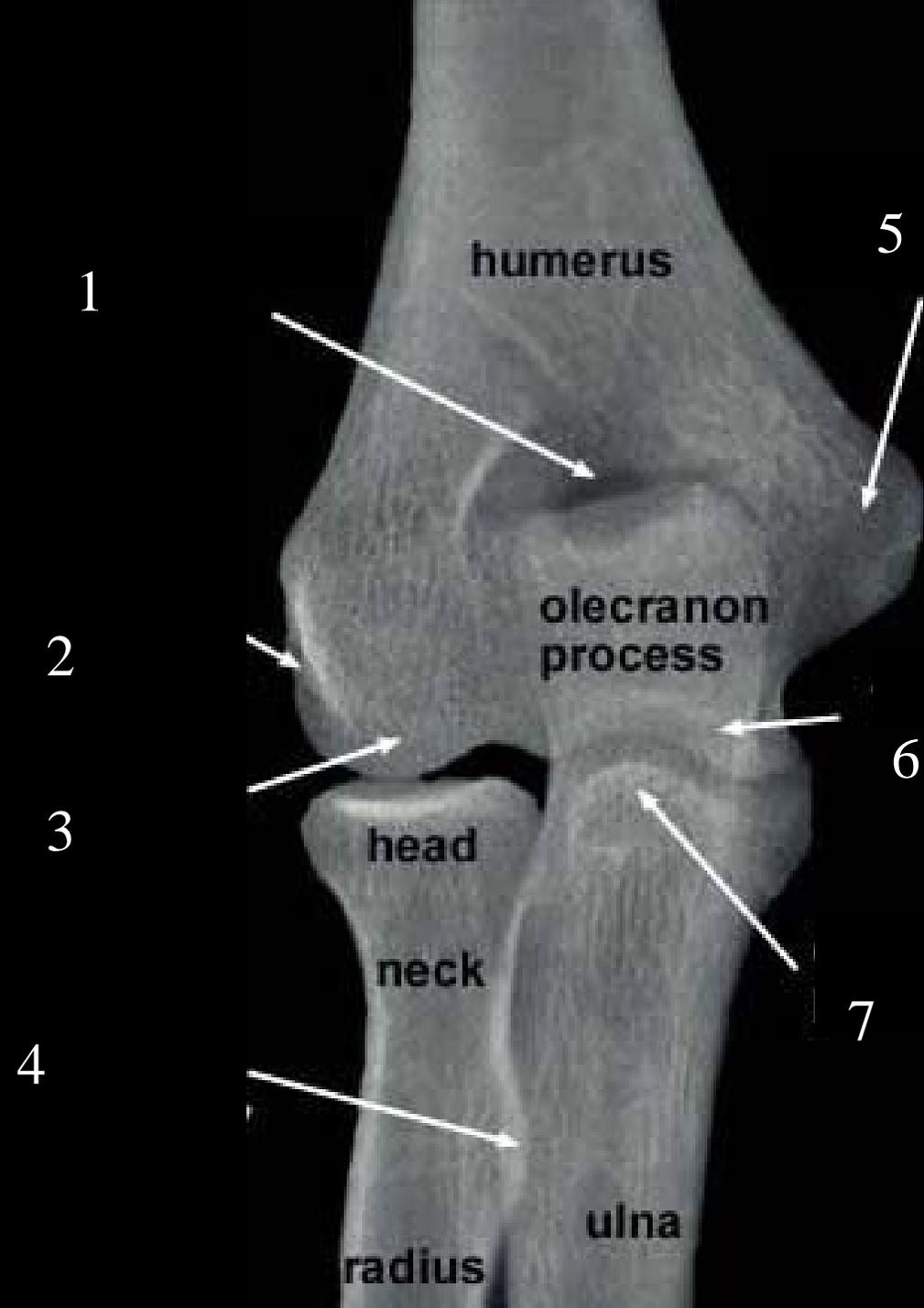


A more complete set up

Do you recognize any bone?





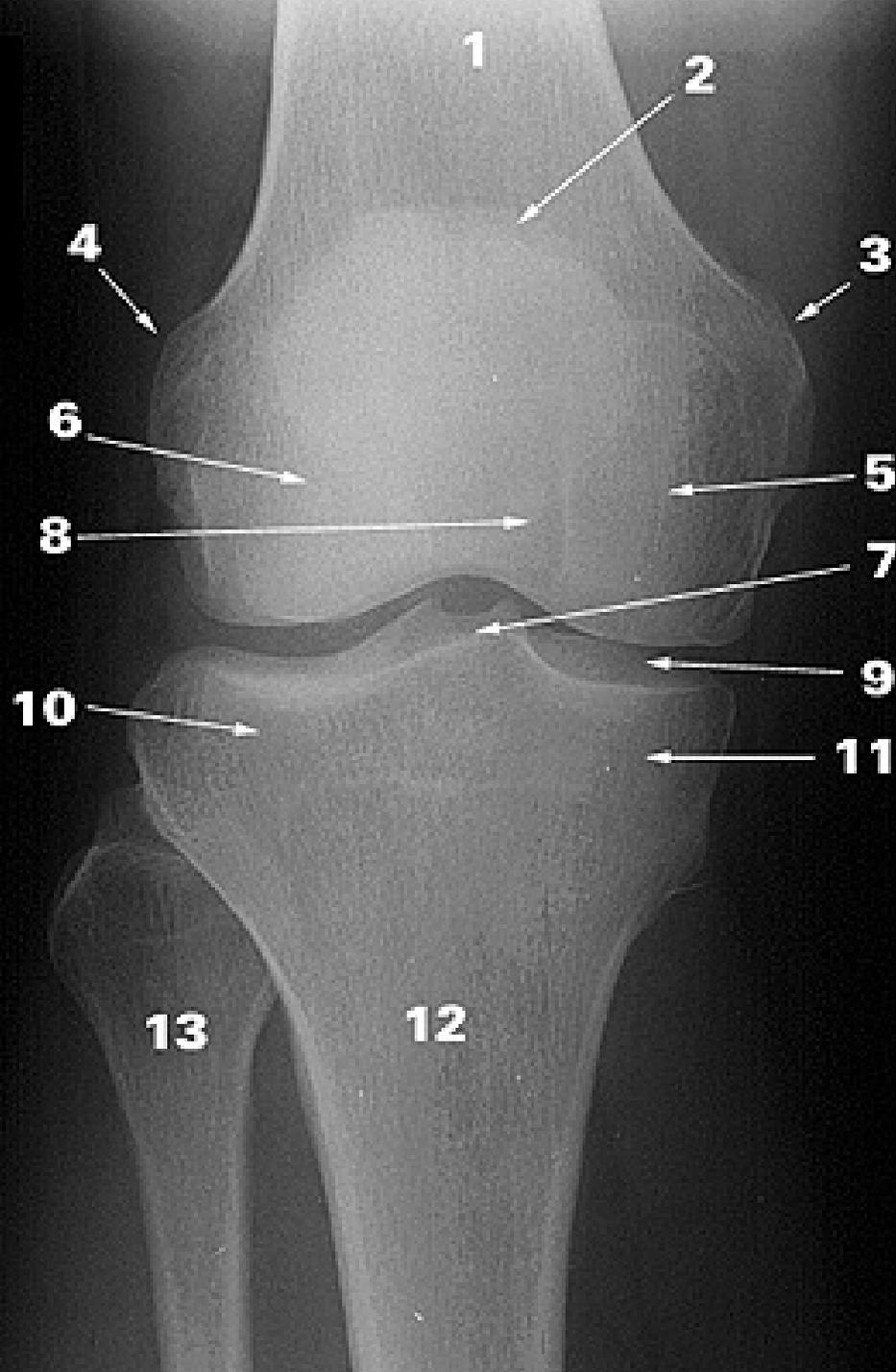




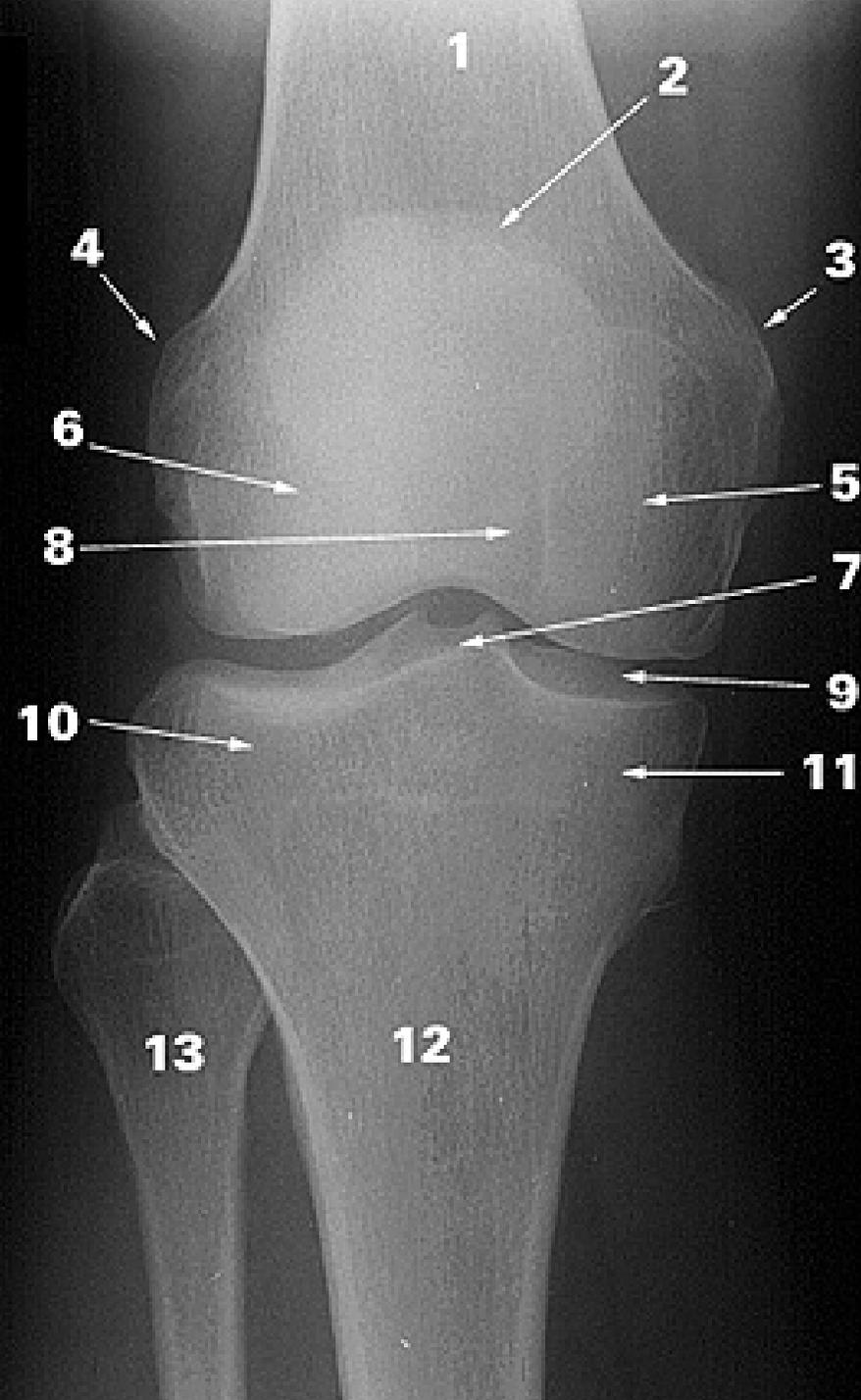


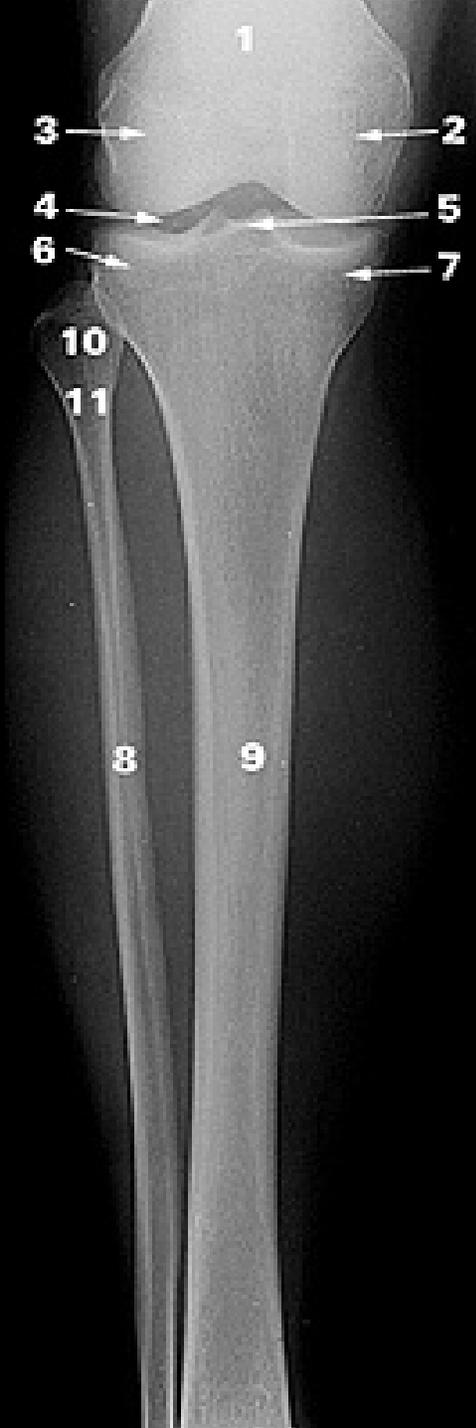
What bone are these?

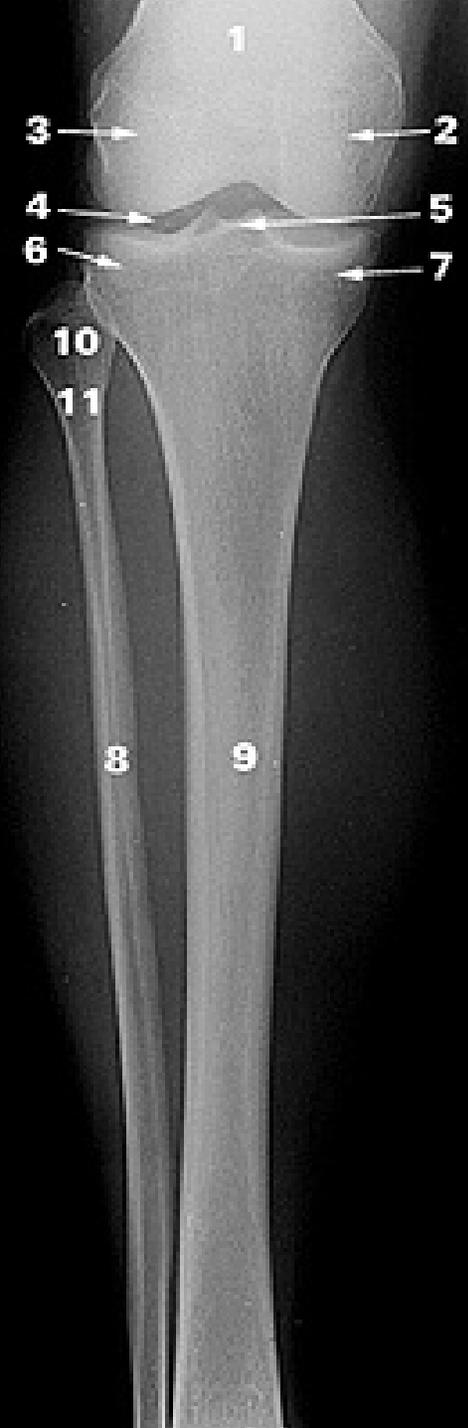
Elbow ,



1. Femur
2. Patella
3. Medial epicondyle of femur
4. Lateral epicondyle of femur
5. Medial condyle of femur
6. Lateral condyle of femur
7. Intercondylar eminence
8. Intercondylar notch
9. Knee joint
10. Lateral condyle of tibia
11. Medial condyle of tibia
12. Tibia
13. Fibula





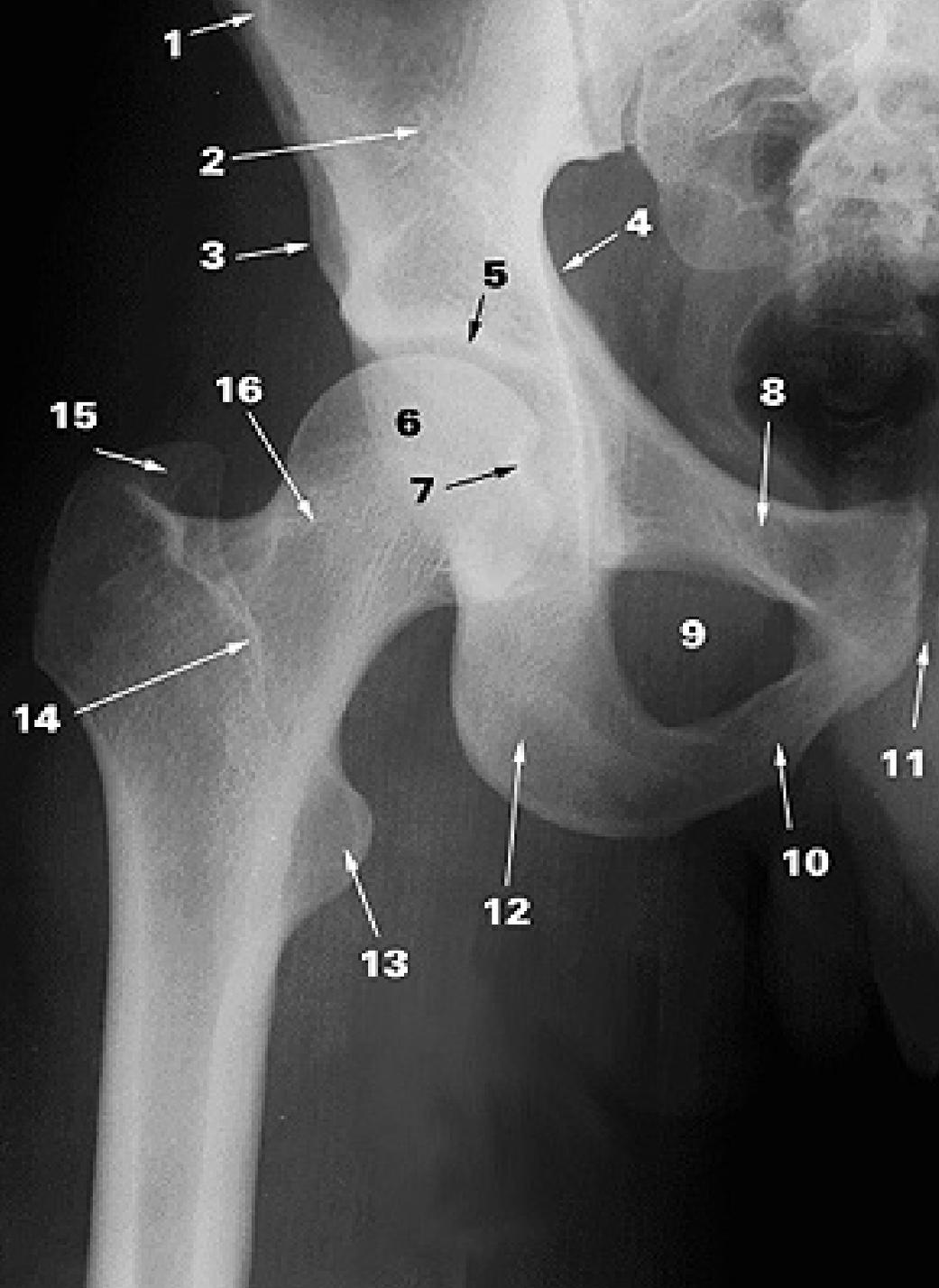


1. Femur
2. Medial condyle of femur
3. Lateral condyle of femur
4. Knee joint
5. Intercondylar eminence
6. Lateral condyle of tibia
7. Medial condyle of tibia
8. Fibula
9. Tibia
10. Head of fibula
11. Neck of fibula



1. Fibula
2. Tibia
3. Distal tibiofibular joint
4. Malleolar fossa
5. Lateral malleolus
6. Ankle joint
7. Medial malleolus
8. Talus





1. Anterior superior iliac spine
2. Ilium
3. Anterior inferior iliac spine
4. Pelvic brim
5. Acetabular fossa
6. Head of femur
7. Fovea
8. Superior ramus of pubis
9. Obturator foramen
10. Inferior ramus of pubis
11. Pubic symphysis
12. Ischium
13. Lesser trochanter
14. Intertrochanteric crest
15. Greater trochanter
16. Neck of femur

