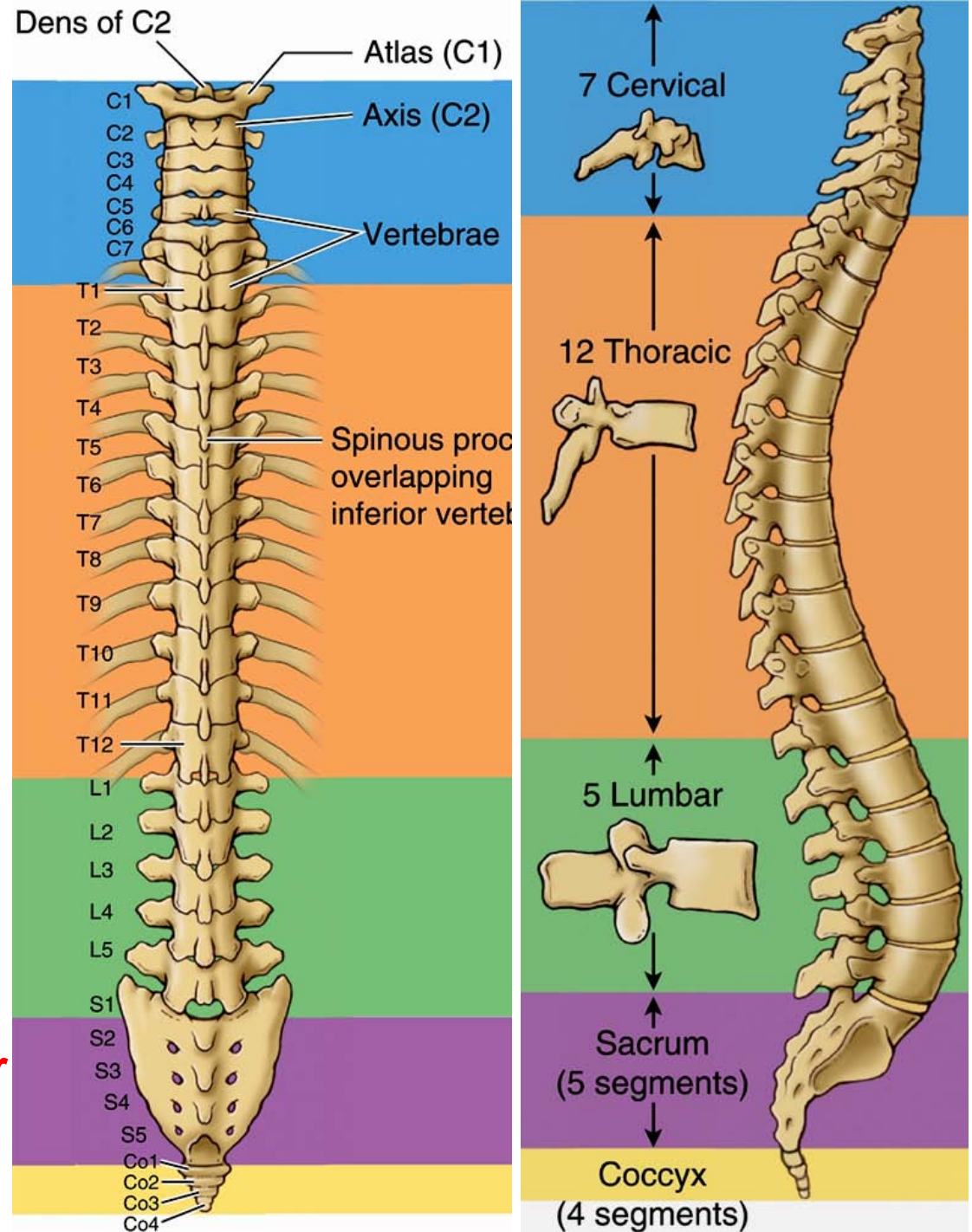


# Vertebral column

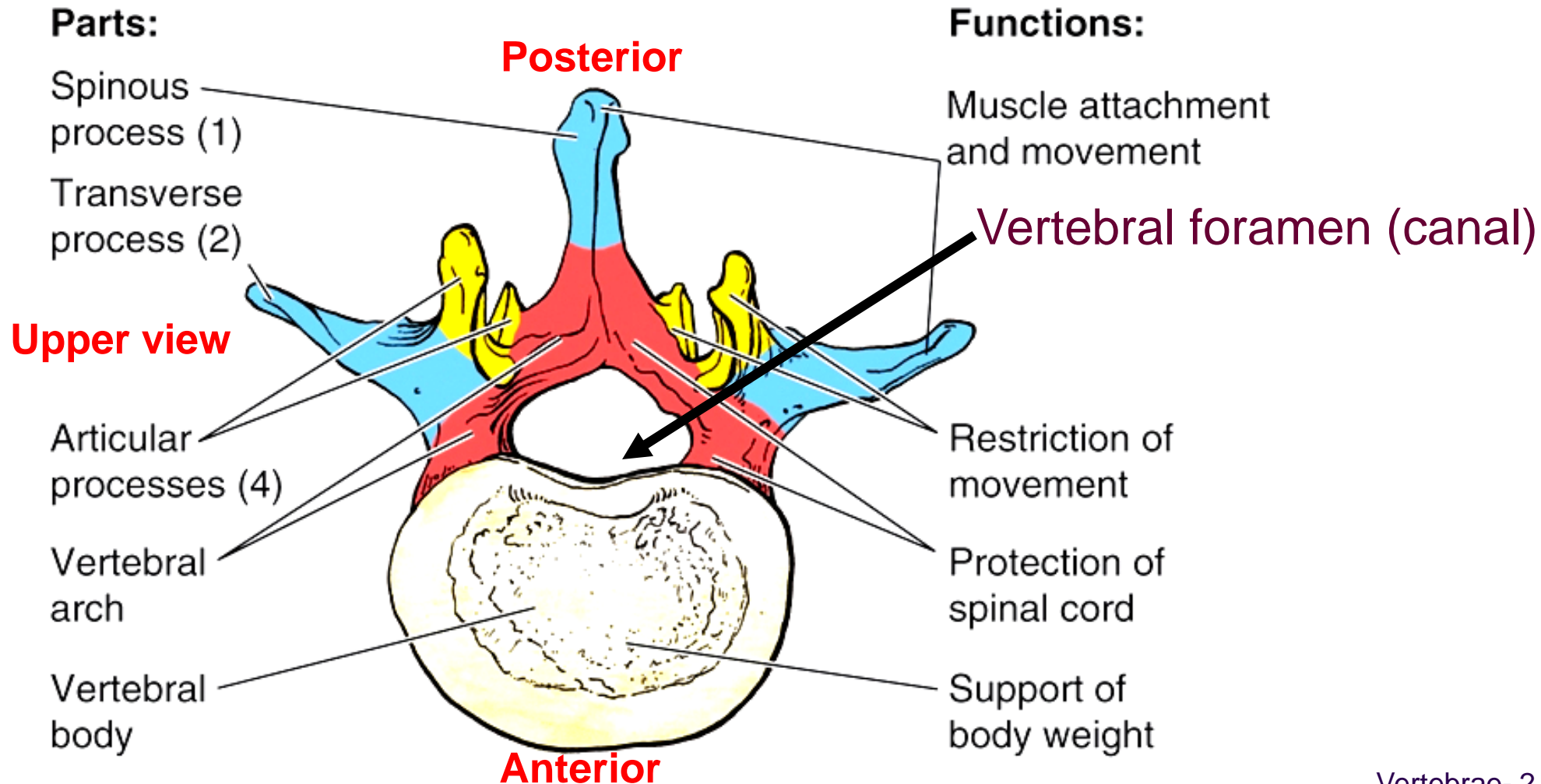
- Cervical (C): Lordosis
- Thoracic (T): Kyphosis (rib)
- Lumbar (L): Lordosis
- Sacral (S) (pelvic bone)
- Coccyx (Cx)
  - Intervertebral joints

Posterior  
view



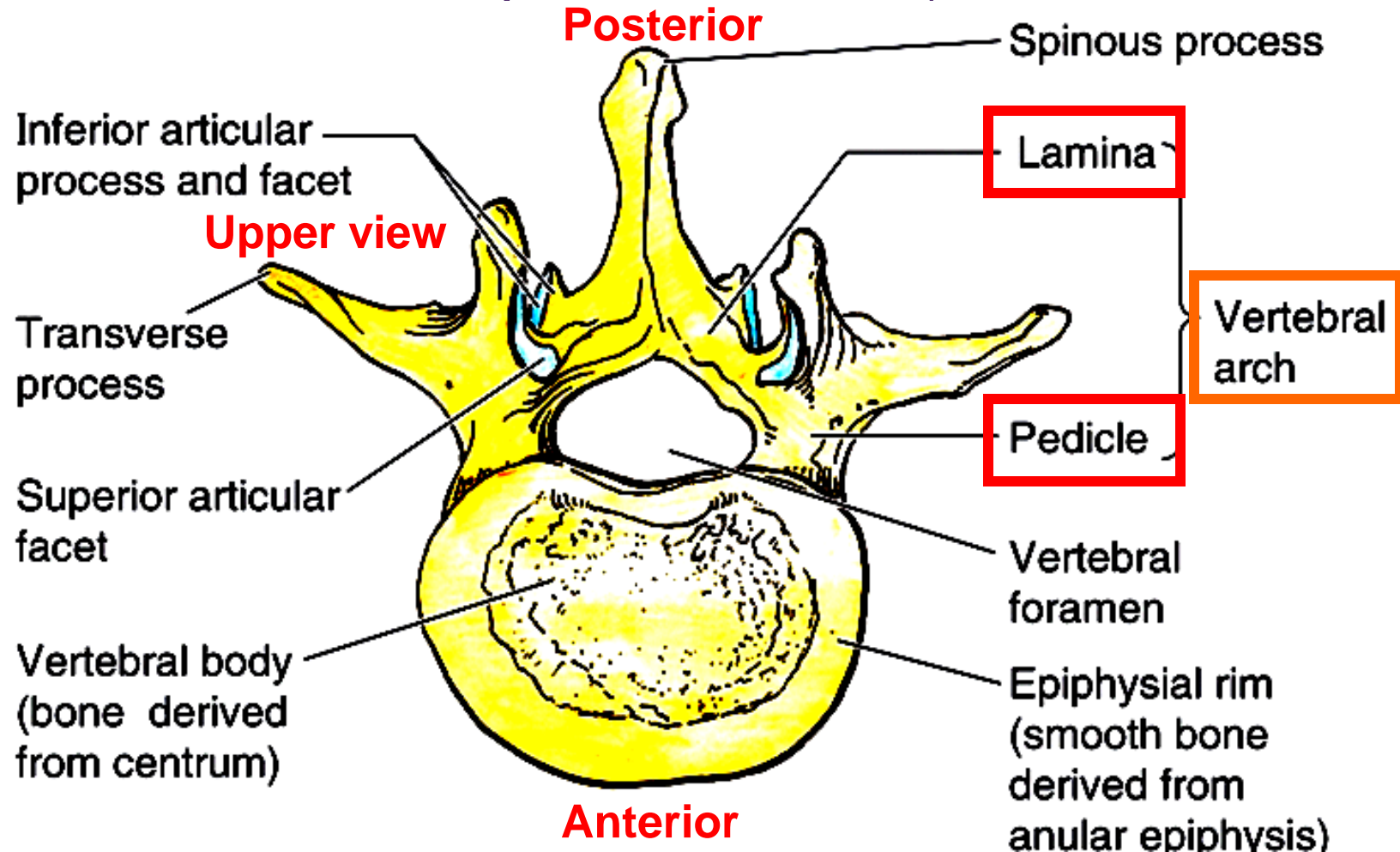
# Vertebra (Spine)

- Vertebral Body; Vertebral foramen (canal)
- Vertebral Arch: Pedicle, Lamina, Process
- Vertebral notch: superior, inferior (intervertebral foramen)

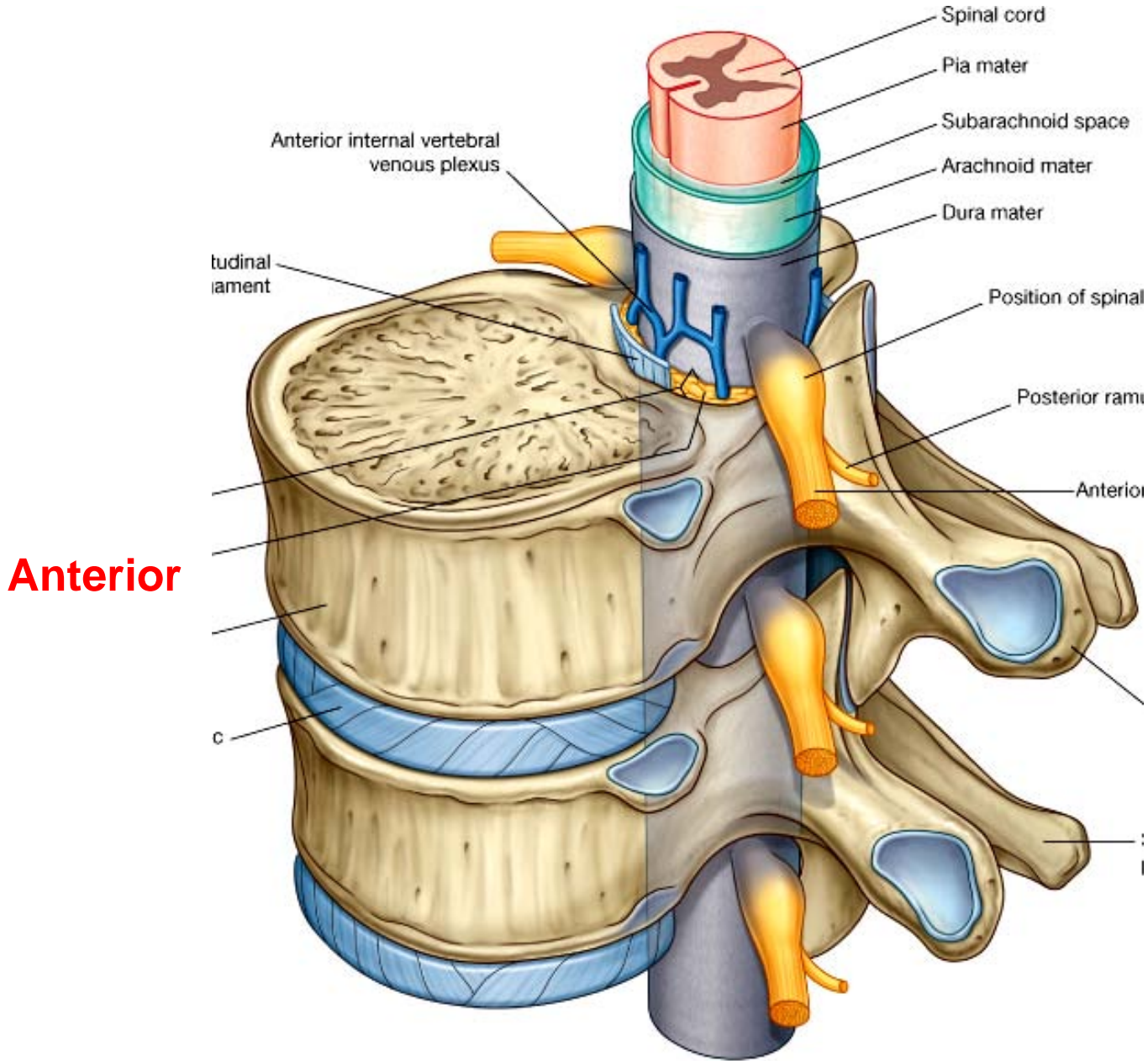


# Vertebra (Spine)

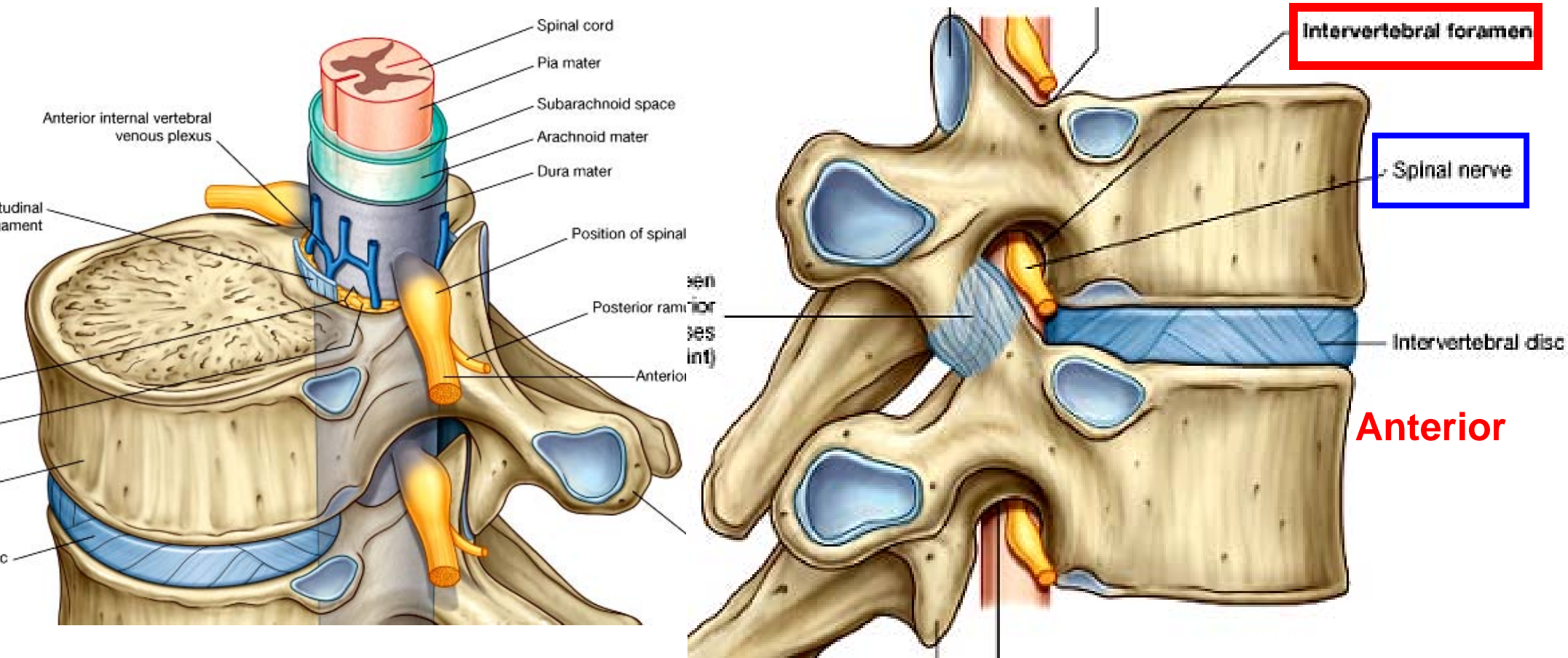
- Vertebral Body; Vertebral foramen (canal)
- Vertebral Arch: Pedicle, Lamina, Process
- Vertebral notch: superior, inferior (intervertebral foramen)



# Vertebral foramen (canal) and spinal cord



# Intervertebral foramen and spinal nerves



Superior articular process

Transverse process

Spinous process

Inferior articular facet

Superior vertebral notch

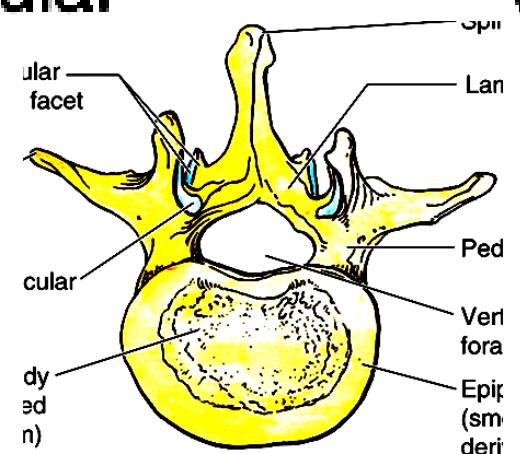
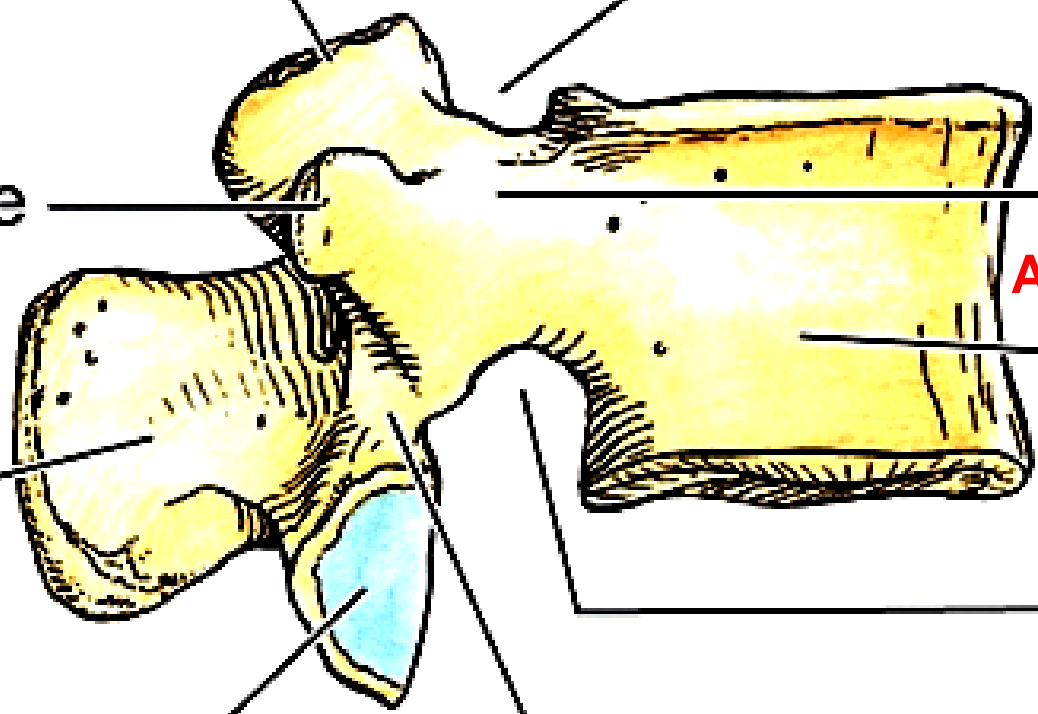
Pedicle

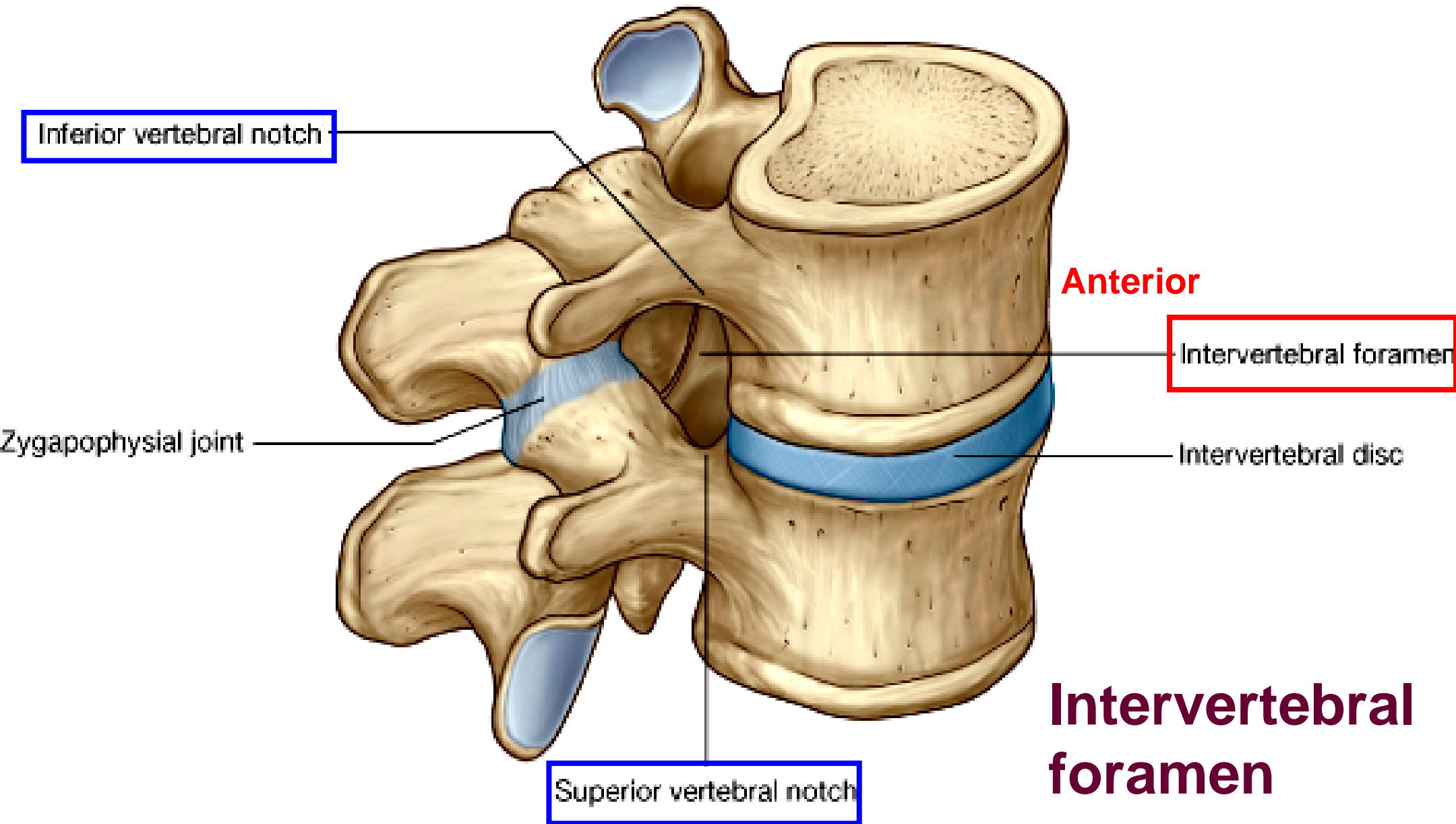
Anterior

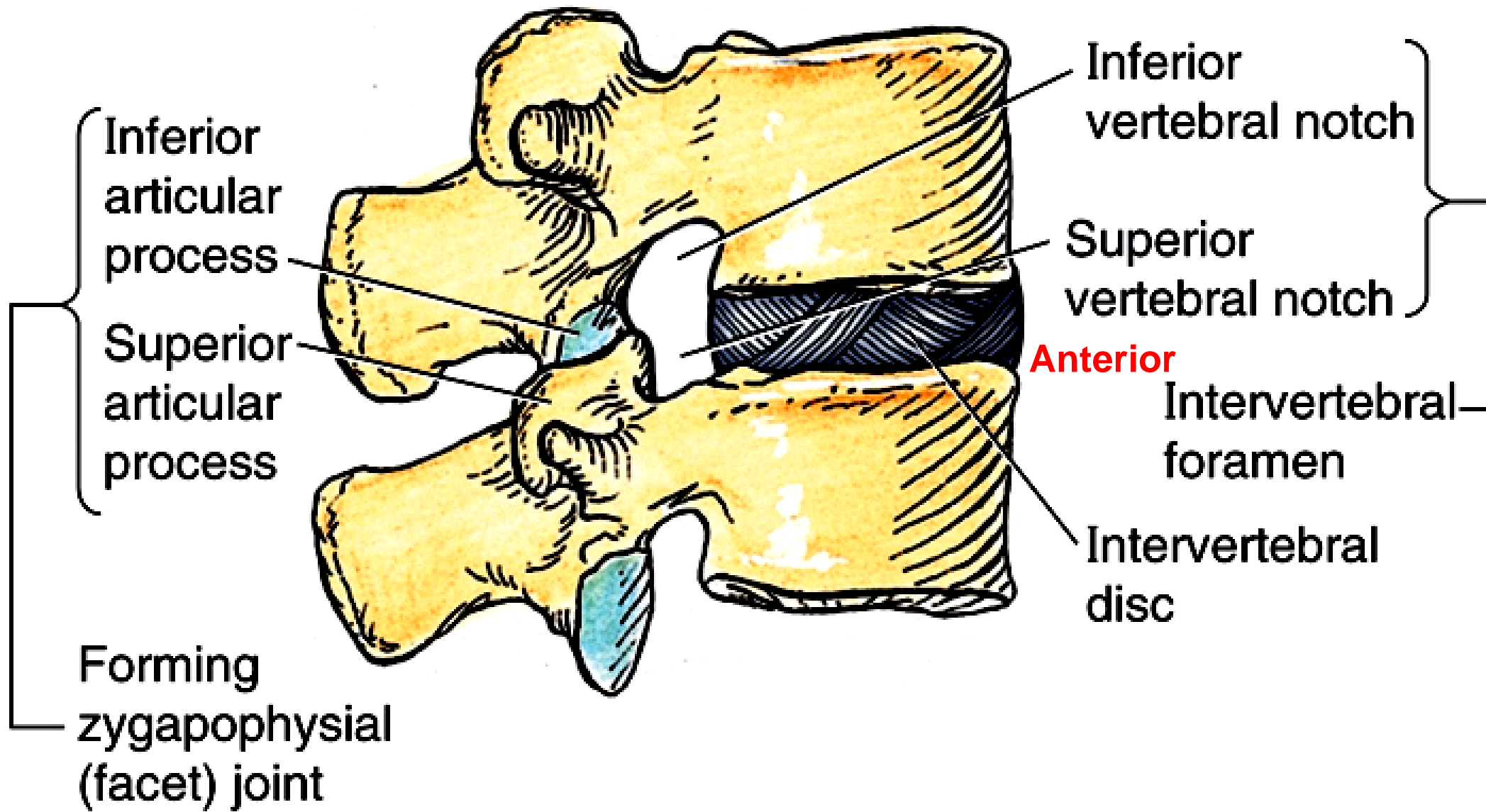
Vertebral body

Inferior vertebral notch

Lamina (interarticular part)

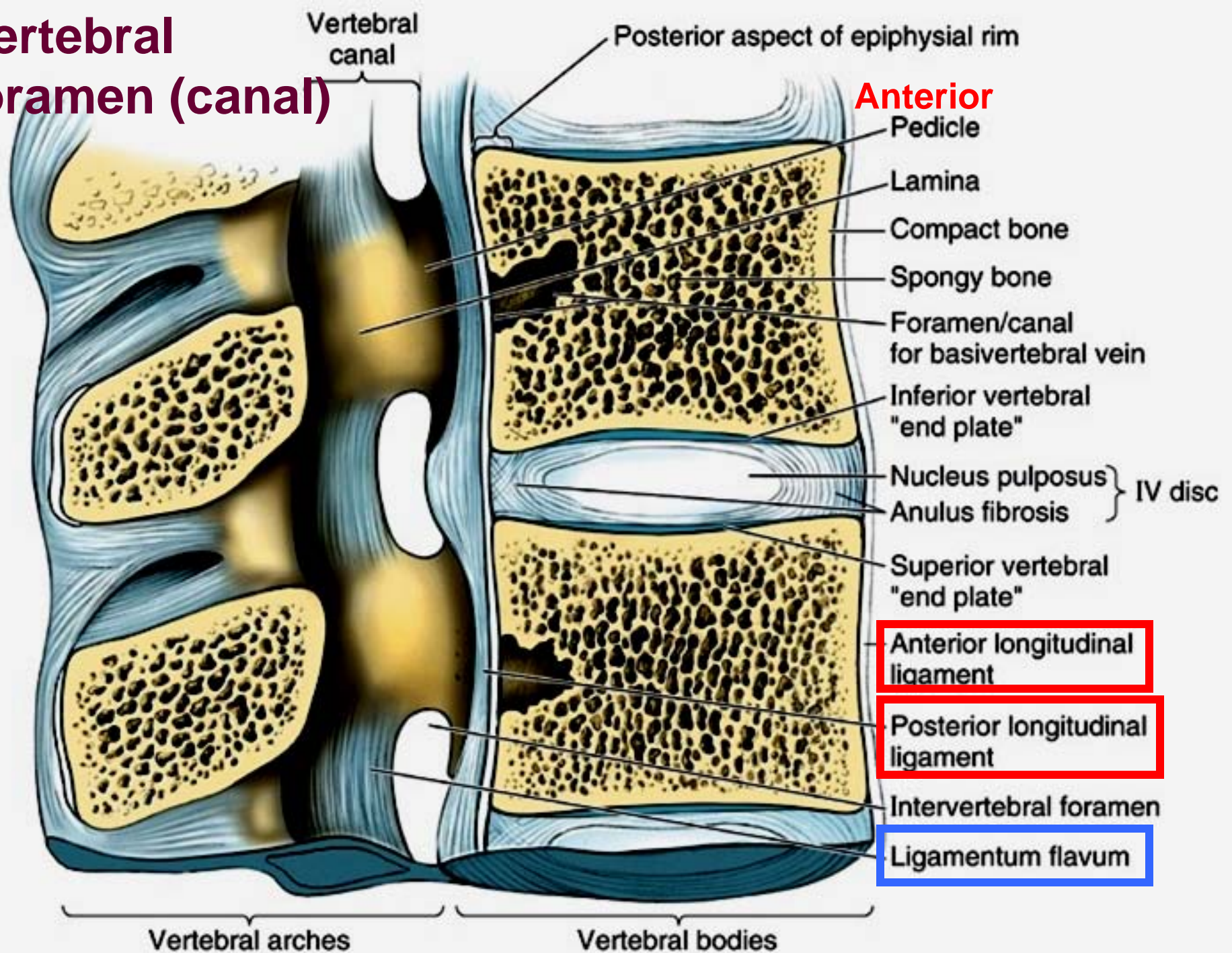






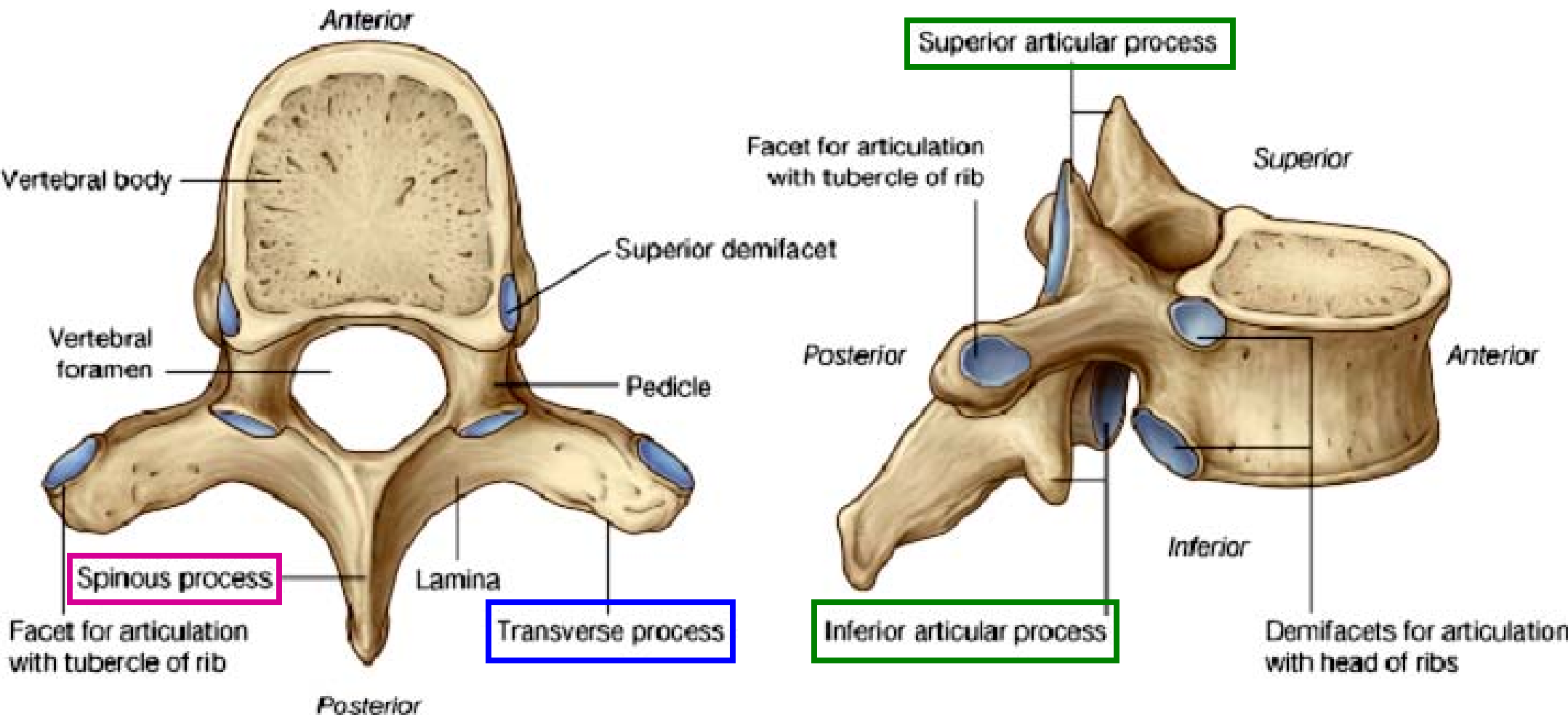


# Vertebral foramen (canal)



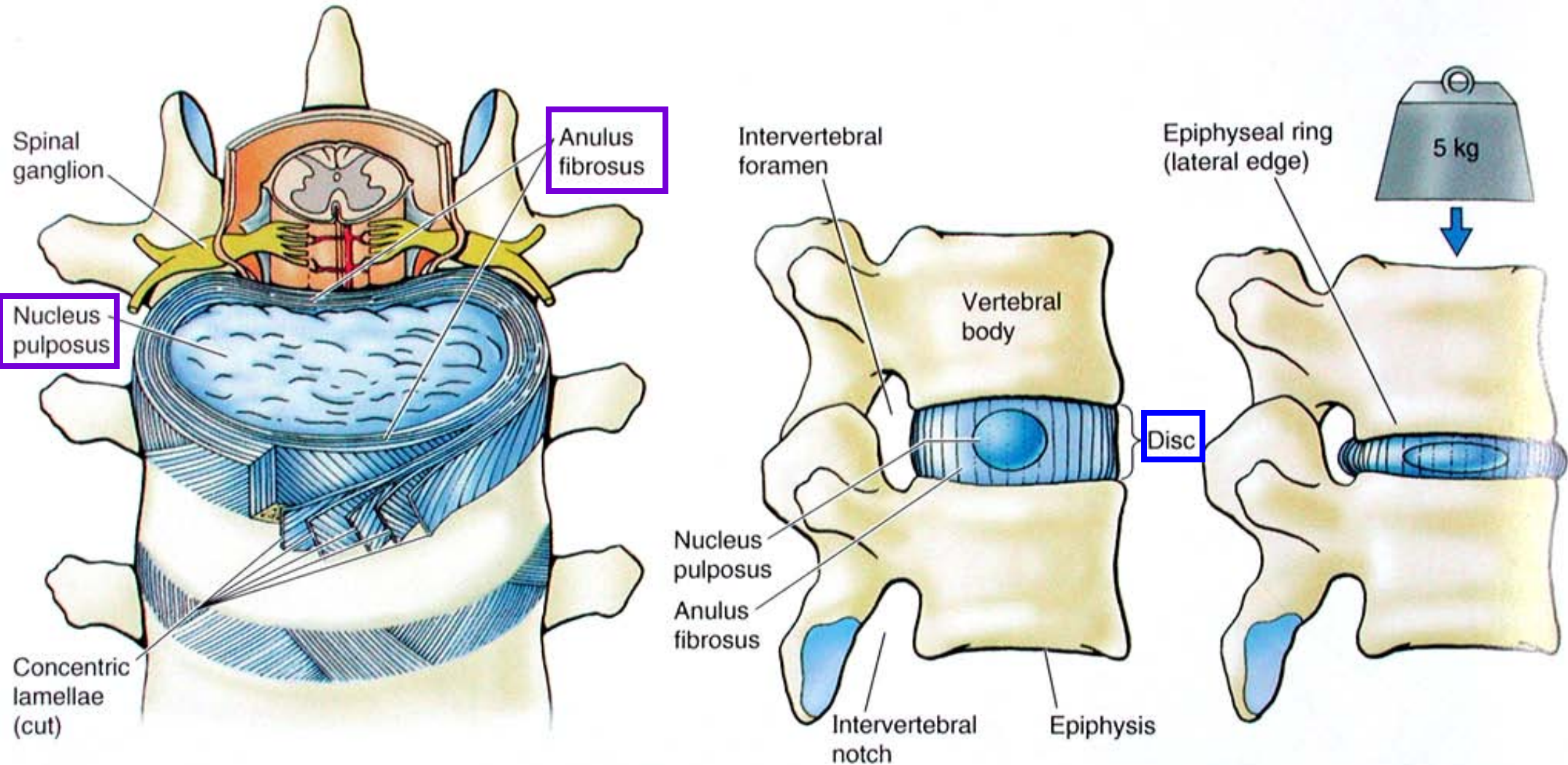
# Vertebral process

- Spinous process, Transverse process
- Articular process (facet): superior, inferior

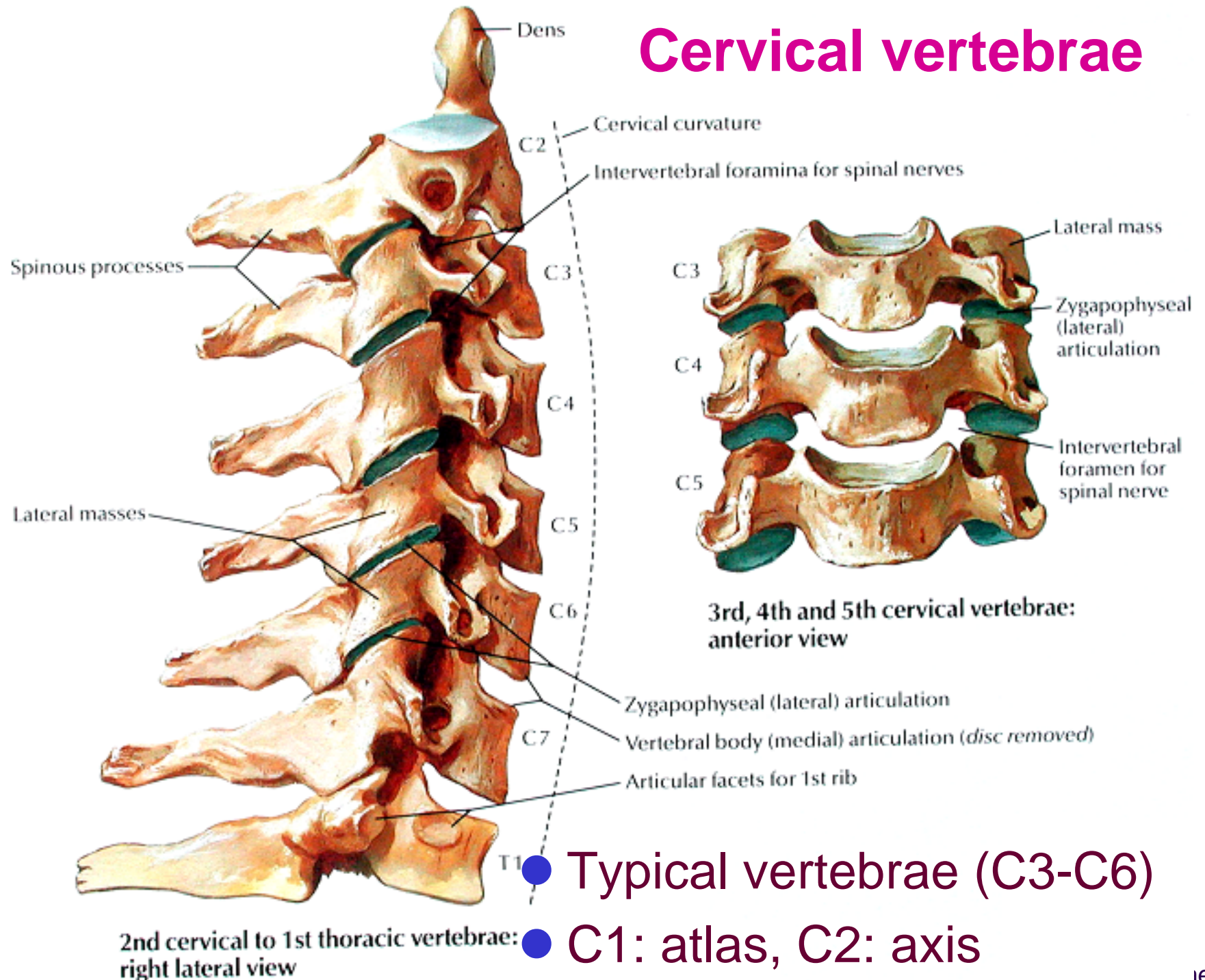


# Intervertebral joints

- Hyaline cartilage
- Intervertebral disc: Annulus fibrosus + Nucleus pulposus

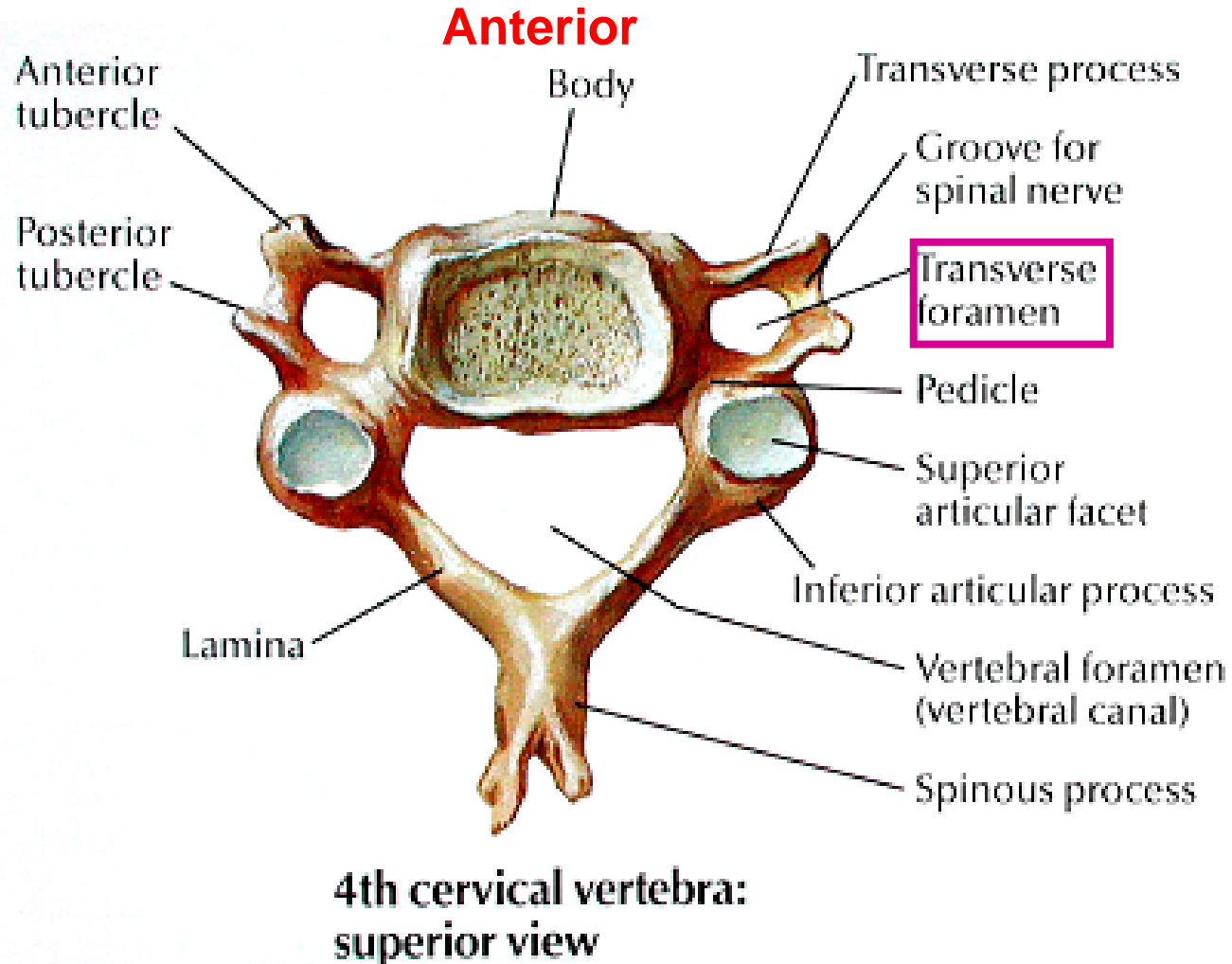


# Cervical vertebrae

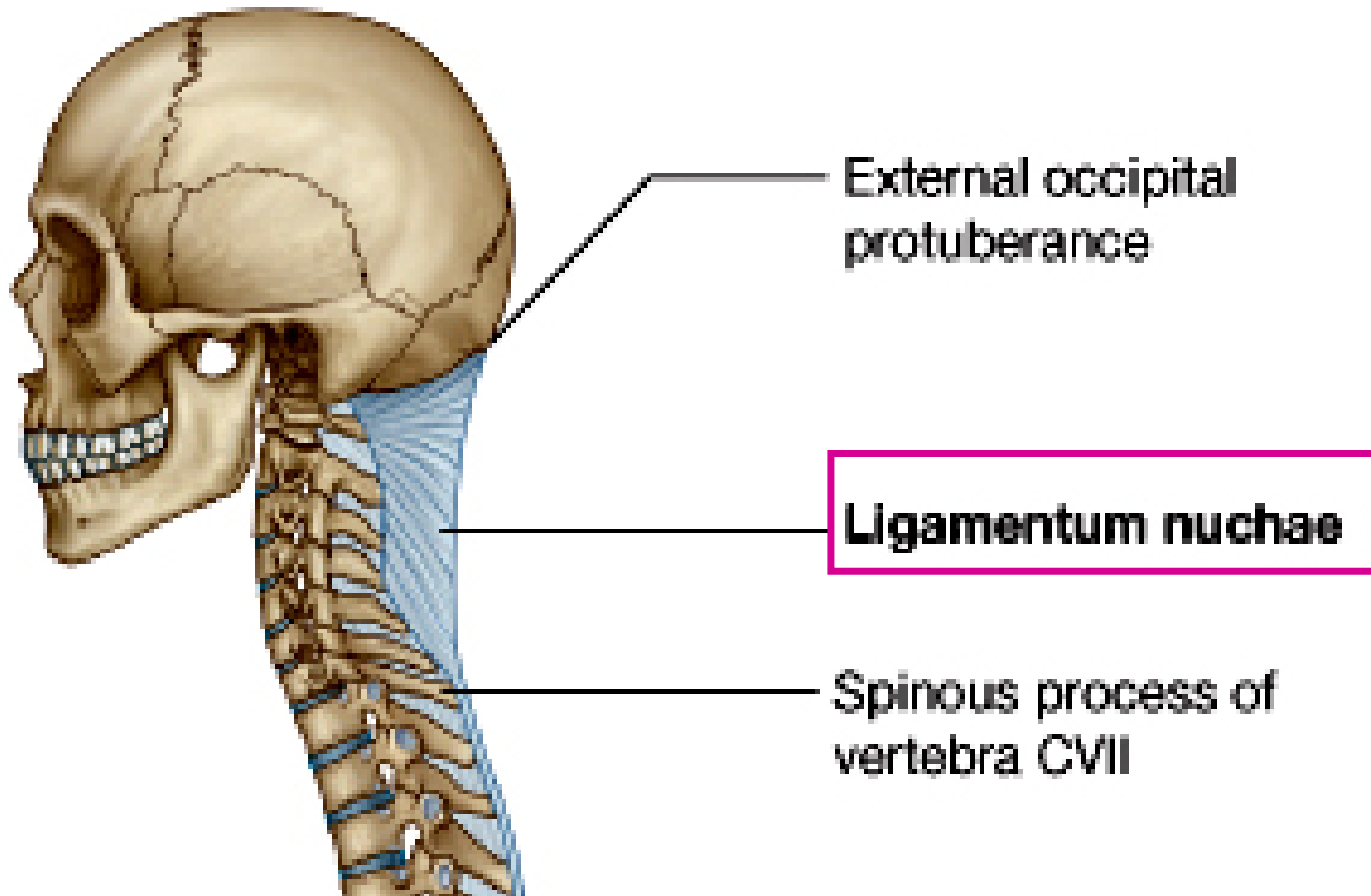


# Cervical vertebrae: Typical (C3-C6)

- small body; large, triangular canal; arch
- Transverse process: end as post. & ant. tubercle; foramen transversarium
- Articular process: sup. & inf.; sup. facet
- Short, bifid spinous process; attachment of ligamentum nuchae

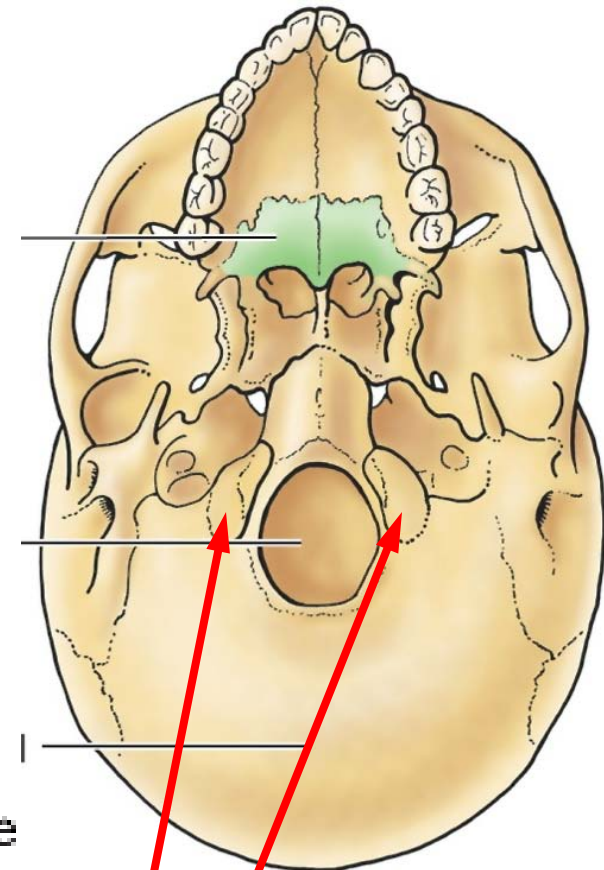
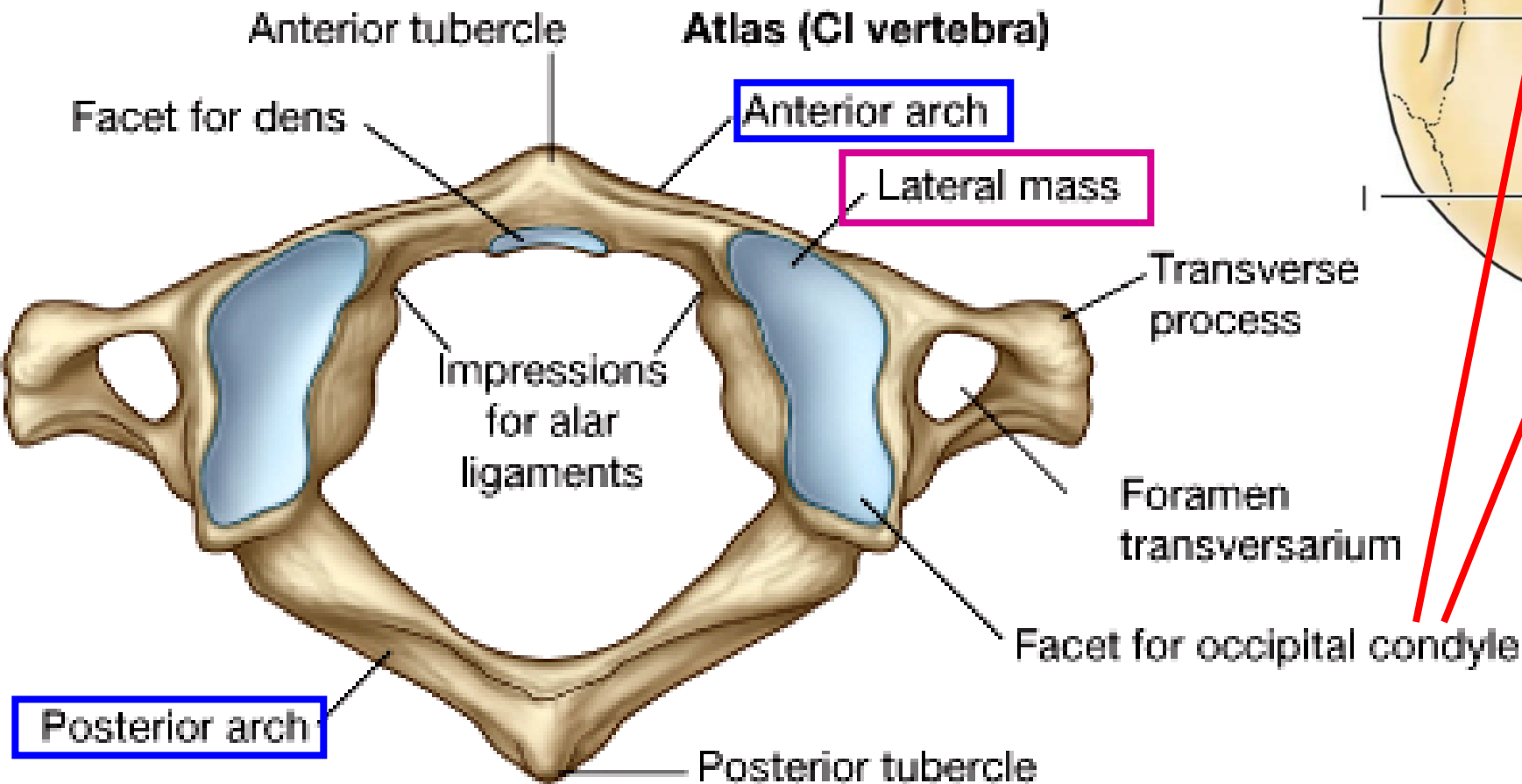


# Ligamentum nuchae



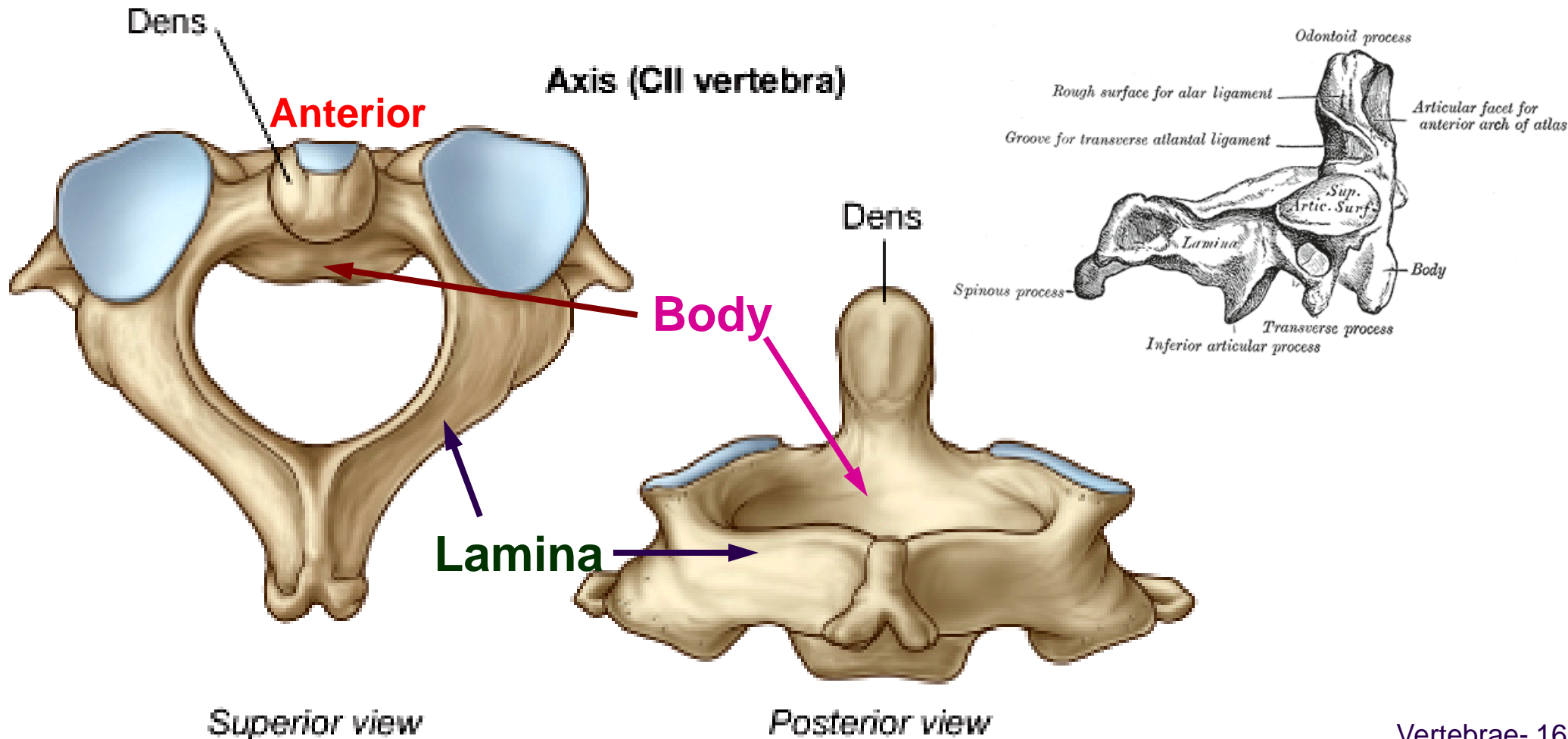
# C1: atlas

- Sup. articular facet; with occipital condyle
- No body; No spinous proc.; Lateral mass: ant., & post. arch
- Long transverse proc.



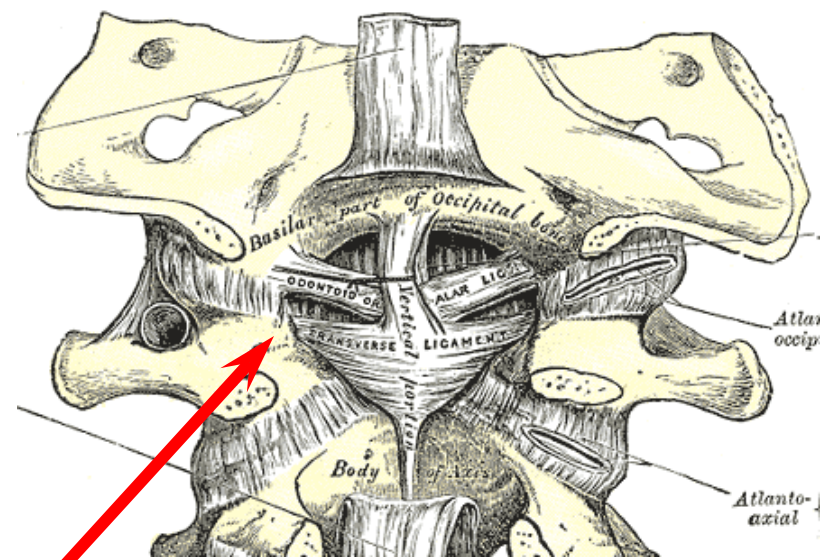
## C2: axis

- Dens (odontoid proc)
- Sup. articular facet; Inf. articular facet
- Body, pedicle; Spinous proc.; Transverse proc.





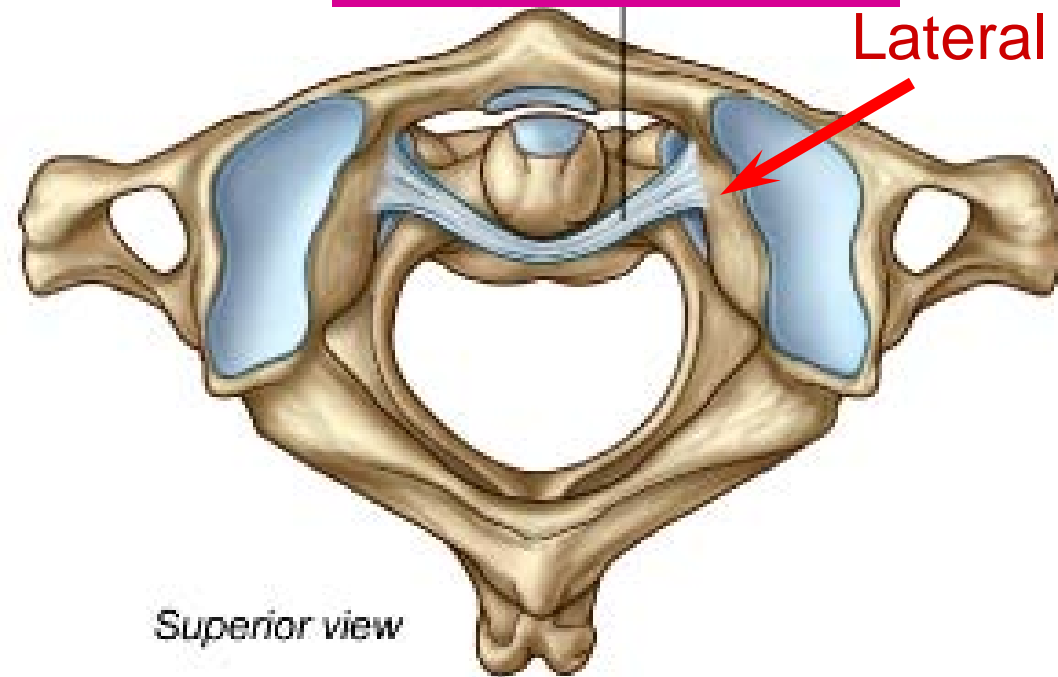
# Assembling of C1 and C2



**Anterior**

Transverse ligament of atlas

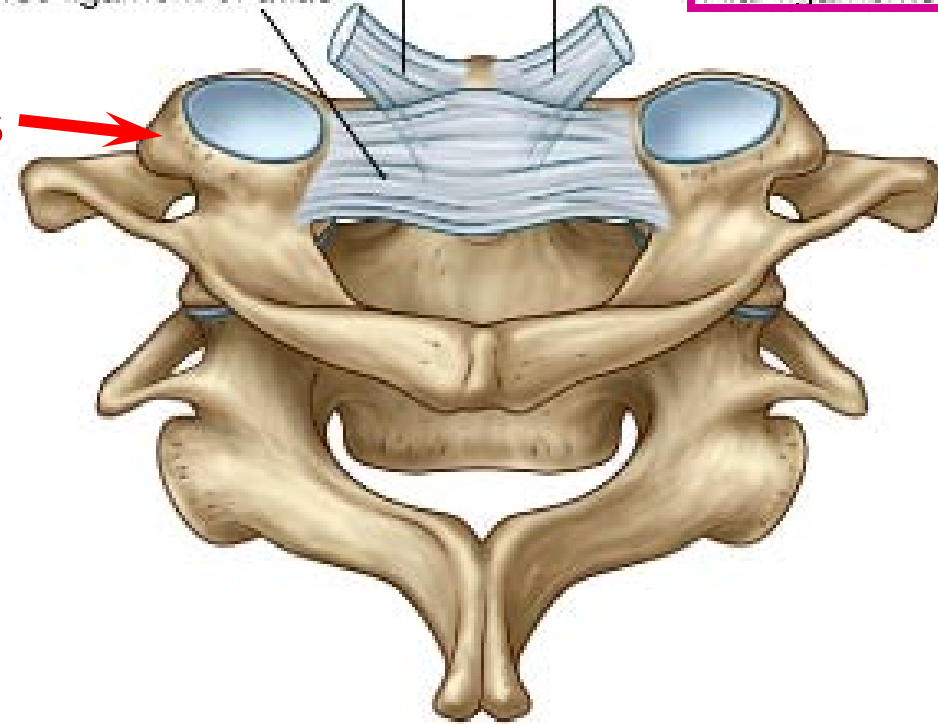
Lateral mass



Superior view

Transverse ligament of atlas

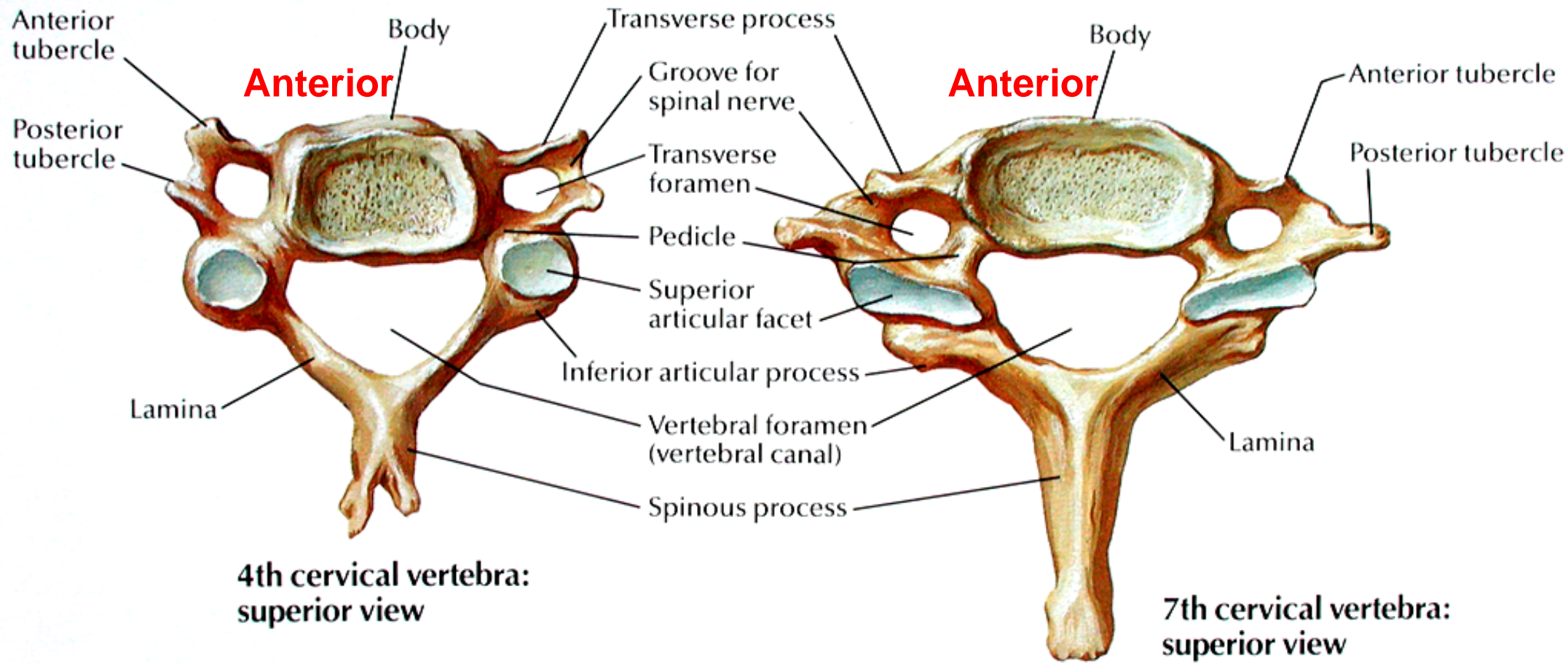
Alar ligaments



Posterosuperior view

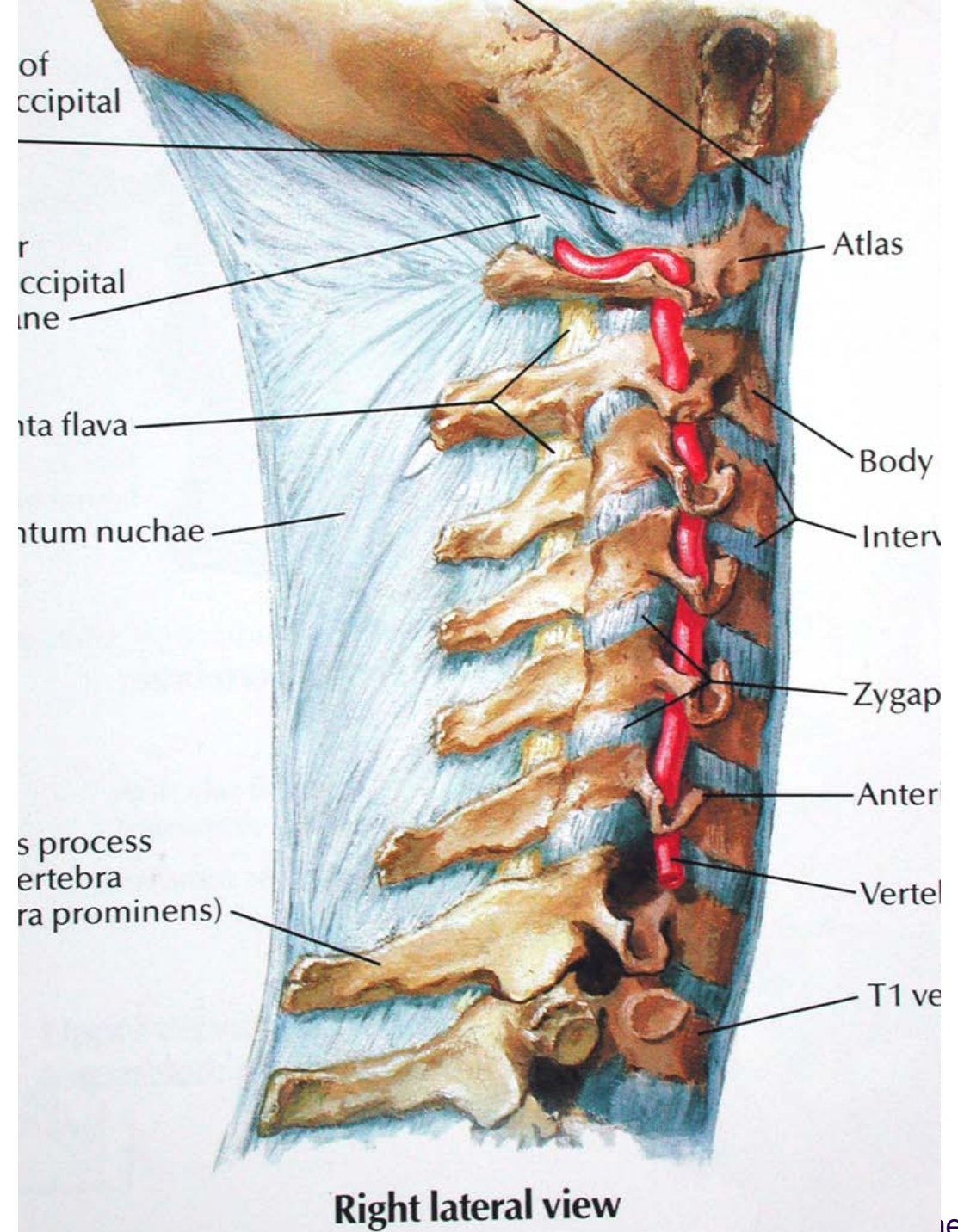
# C7 vertebra

- Large, long spinous process
  - Caudal end of lig. nuchae as a landmark
- No vertebral a. through transverse foramen



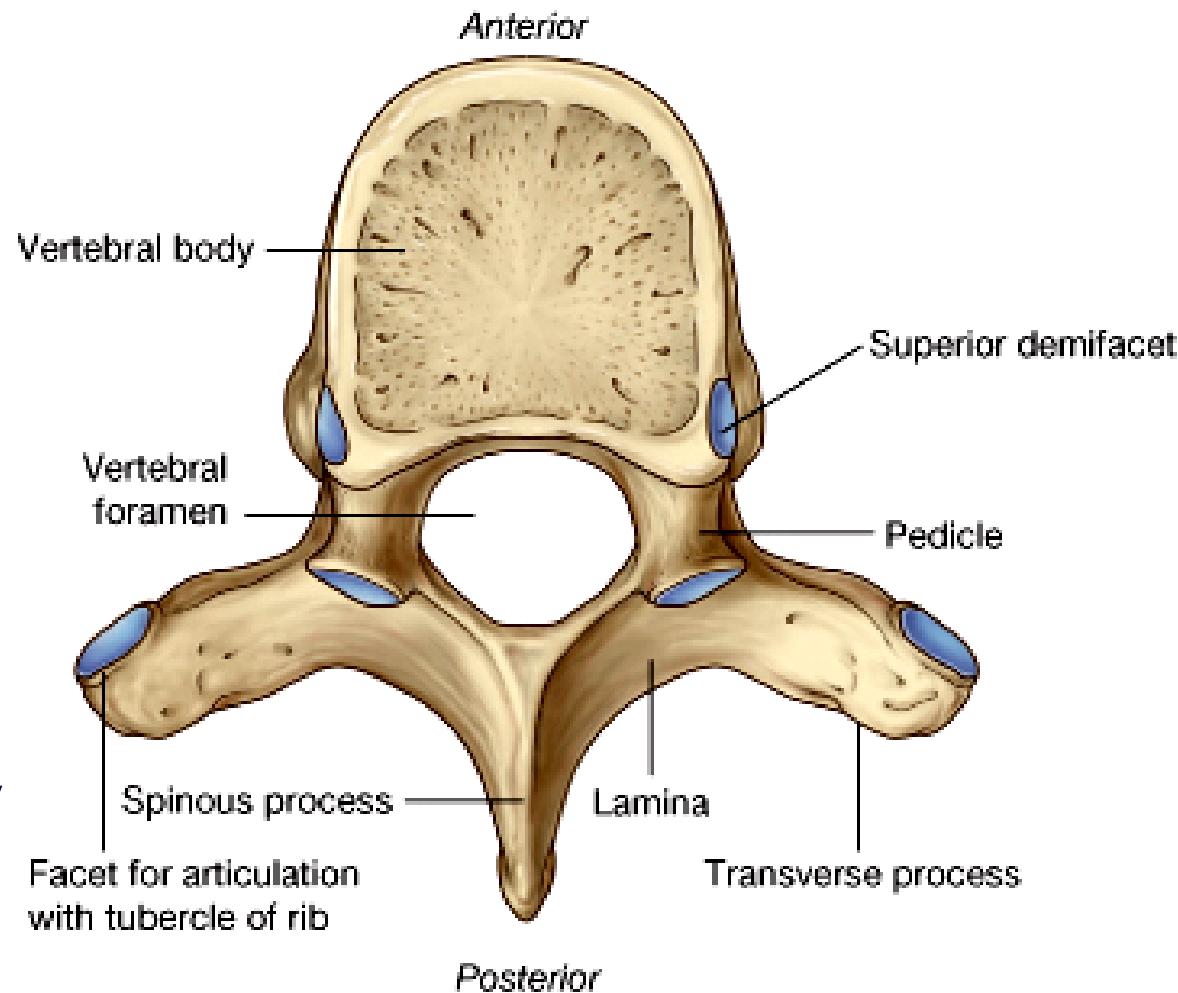
# Vertebral artery in transverse foramens

- Through transverse foramens of C1-6; but no C7 (only for accessory vertebral v.)
- Vascular insufficiency during forceful rotation of vertebral column



# Thoracic vertebrae: “typical” [T2~T10(9-11)] 1/2

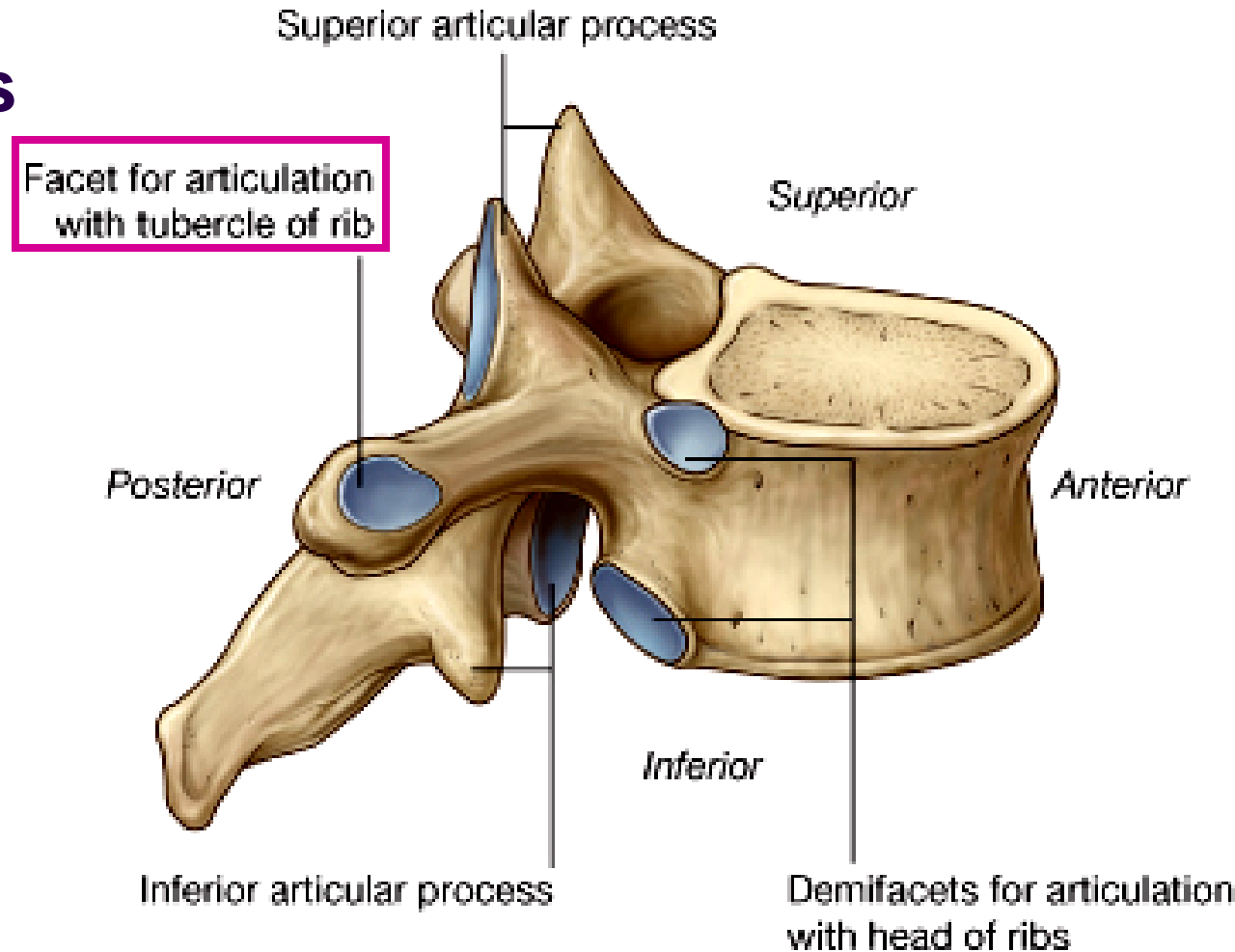
- Body: larger than C-vertebrae; round canal
- Upper and lower surfaces: parallel to each other
- Spinous proc.: directly posteriorly
- Vertical articular facets: sup. facet faces posteriorly



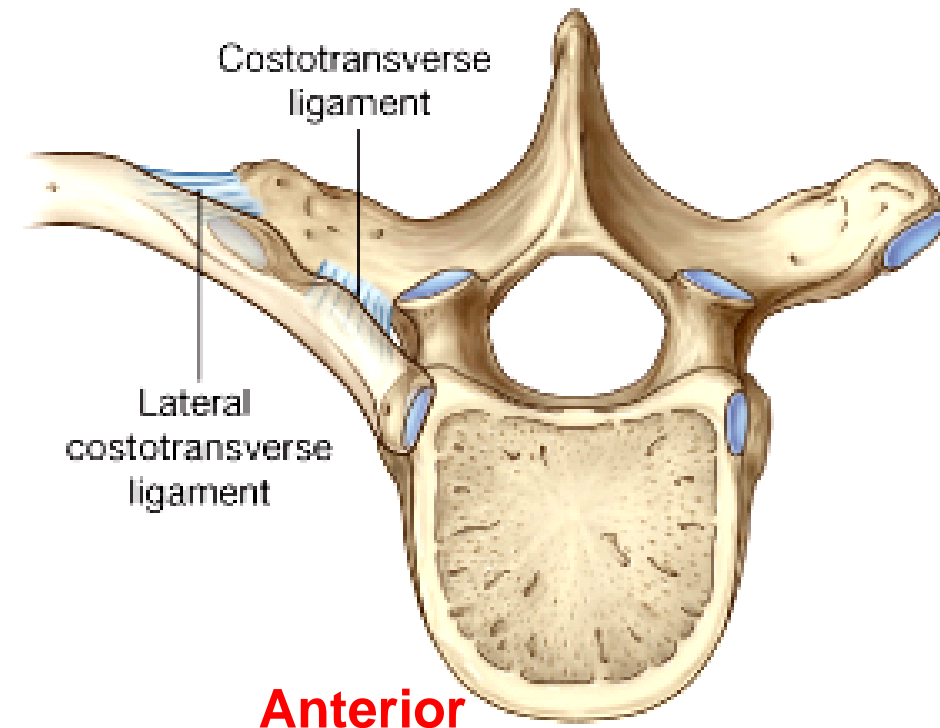
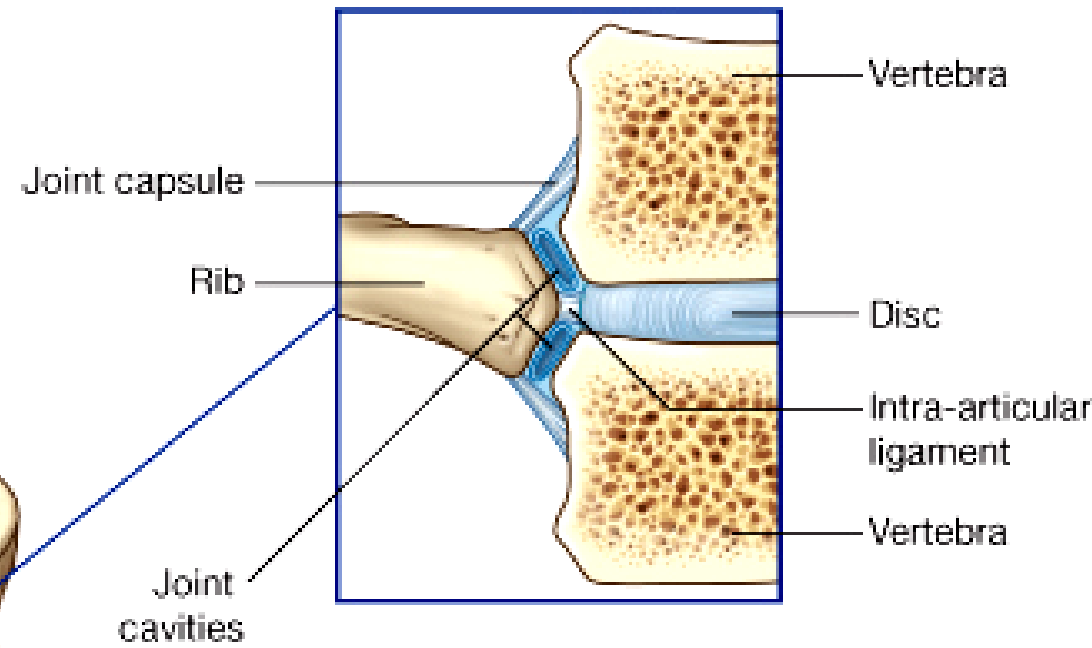
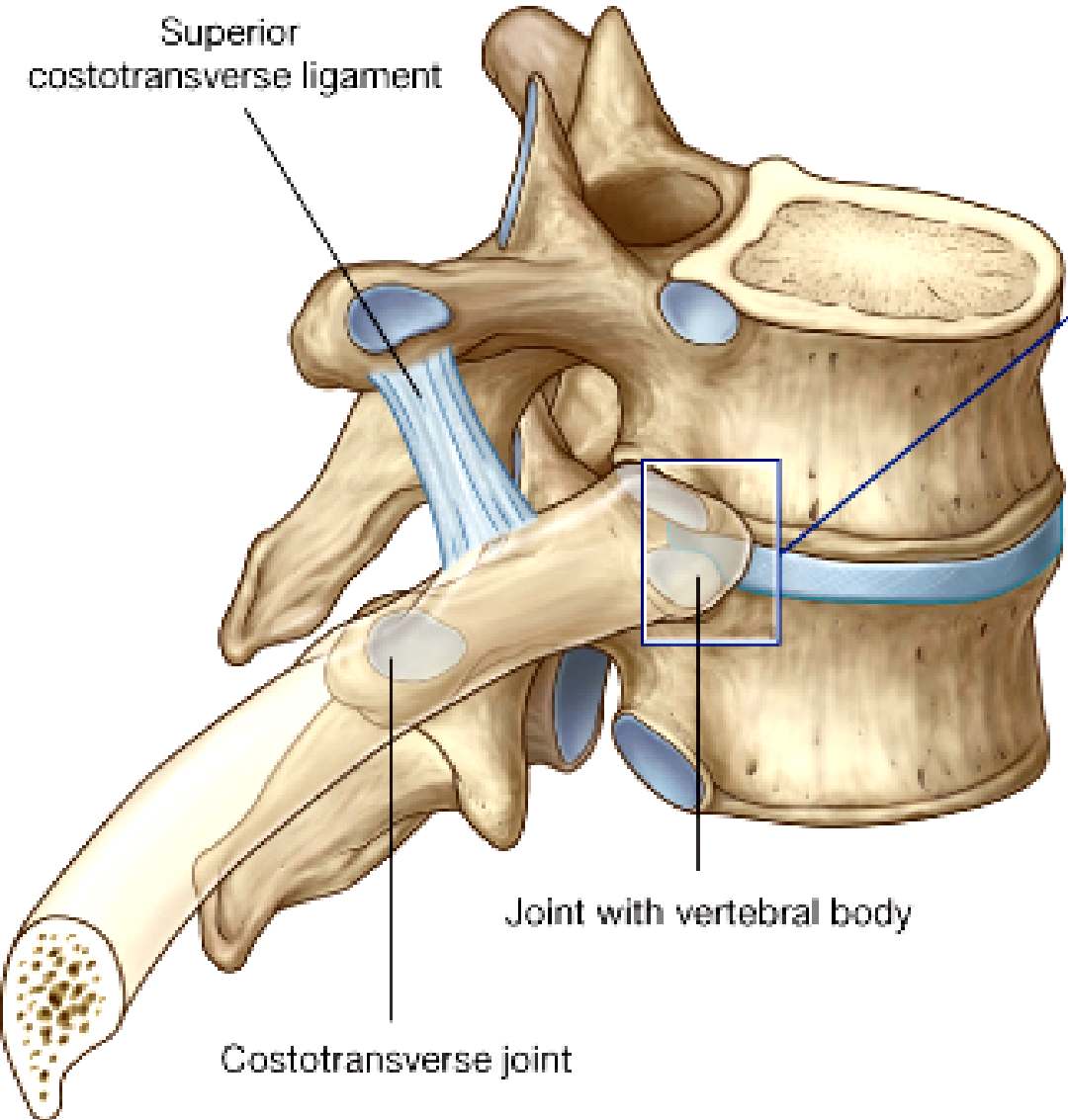
# Thoracic vertebrae: “typical” [T2~T10(9-11)] 2/2

## ● Articular facets for ribs

- With rib head: sup. & inf. costal demifacet at upper & lower border of body
- With tubercle of rib: costal facet on trans. proc.



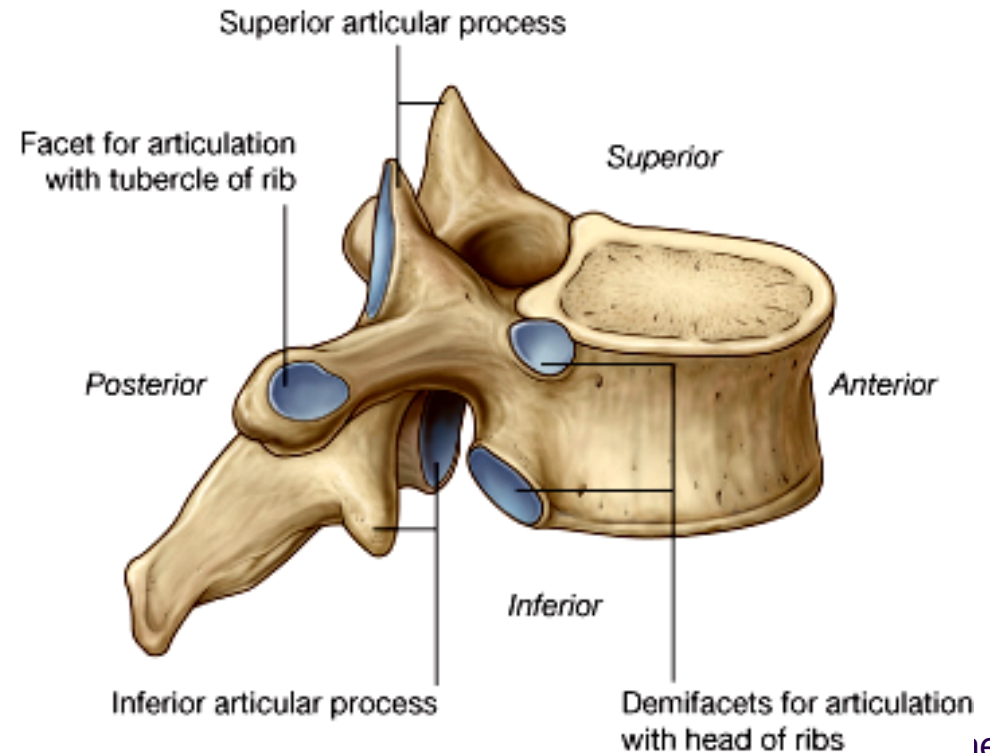
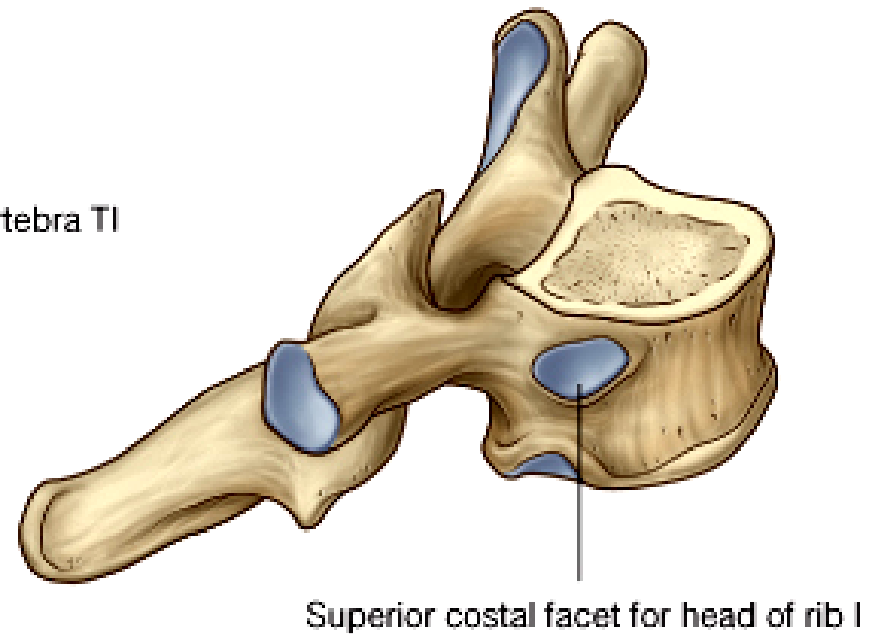
# Vertebra and rib



# Vertebra T1

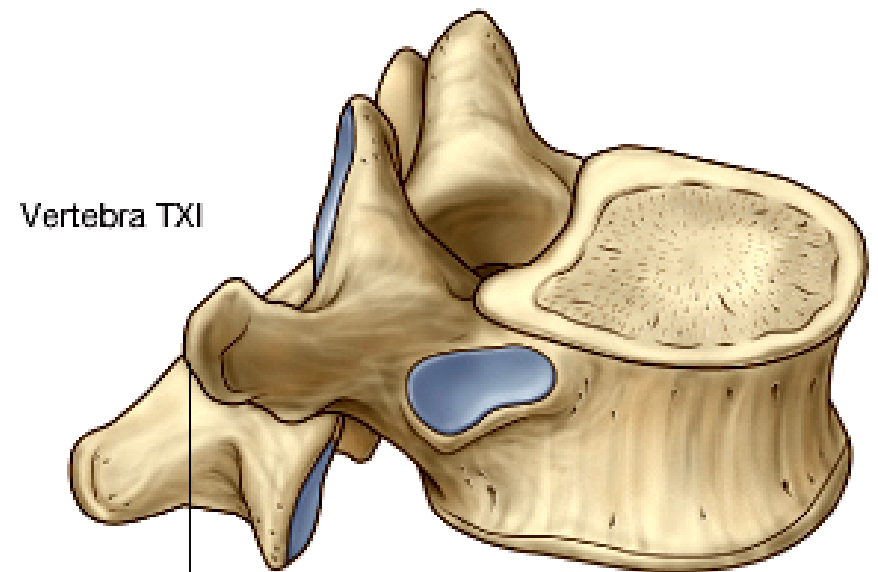
- Upper surface of body: saddle-shaped
- Intermediate between C and T
- Triangular canal
- Rib1 contact T1 body only

Vertebra T1

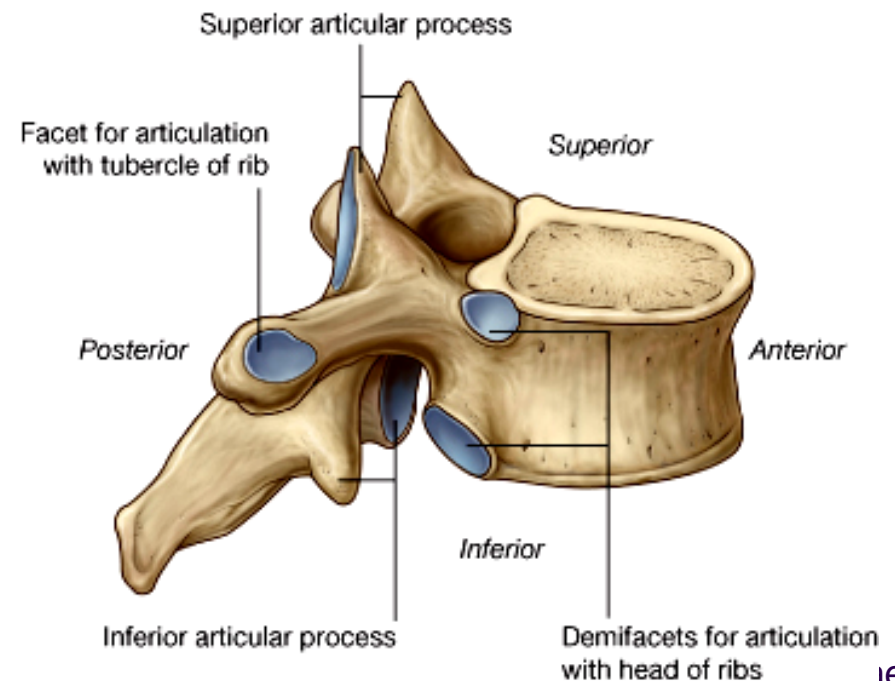


## Vertebra T11-T12

- Single rib articular facet; no rib articular facet on trans. proc.
- T12: intermediate between T and L
- Sup. articular facet: resembles T-vertebrae
- Inf. articular facet: resembles L-vertebrae



No costal facet on transverse process

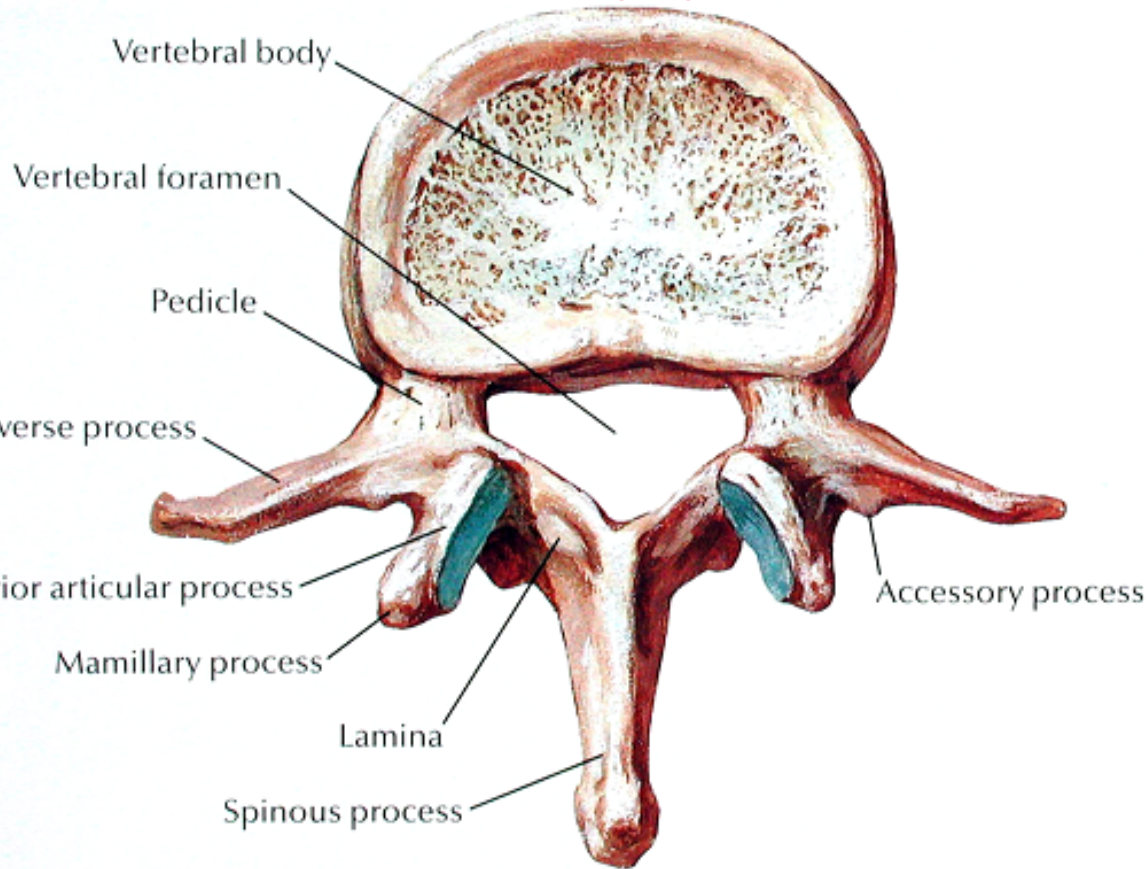




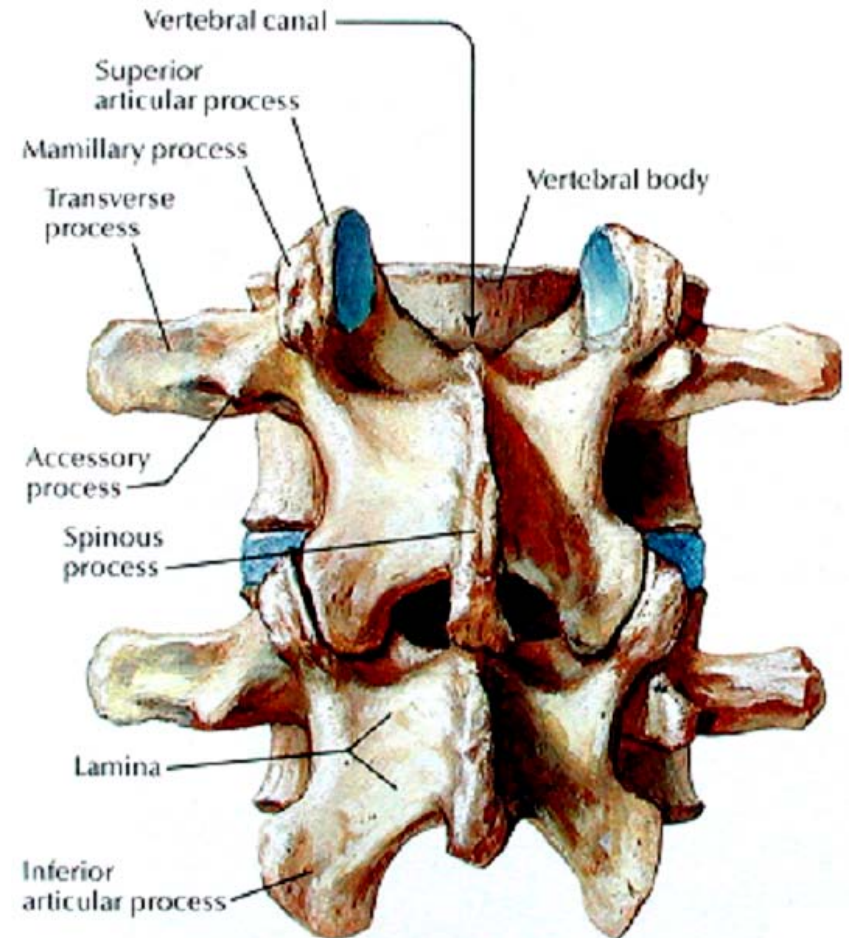
# Lumbar vertebrae: typical L1-L4

- Massive body; Small, triangular canal
- Short, square spinous proc.; sup. facet: faces medially

**Anterior**



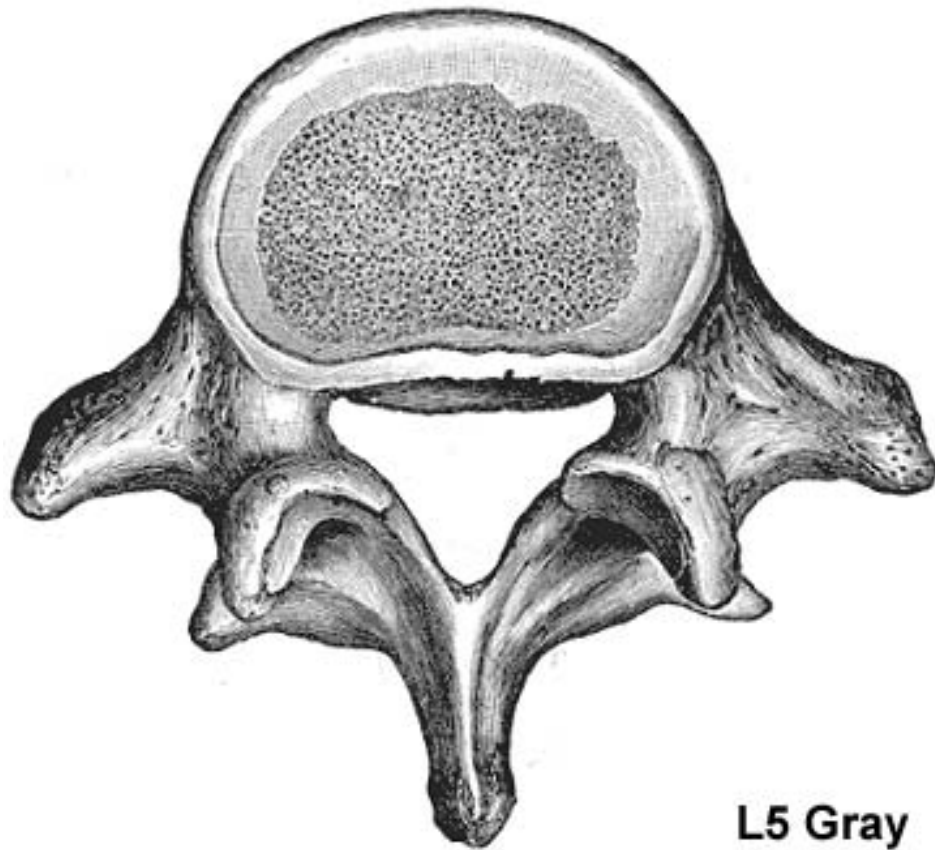
2nd lumbar vertebra:  
superior view



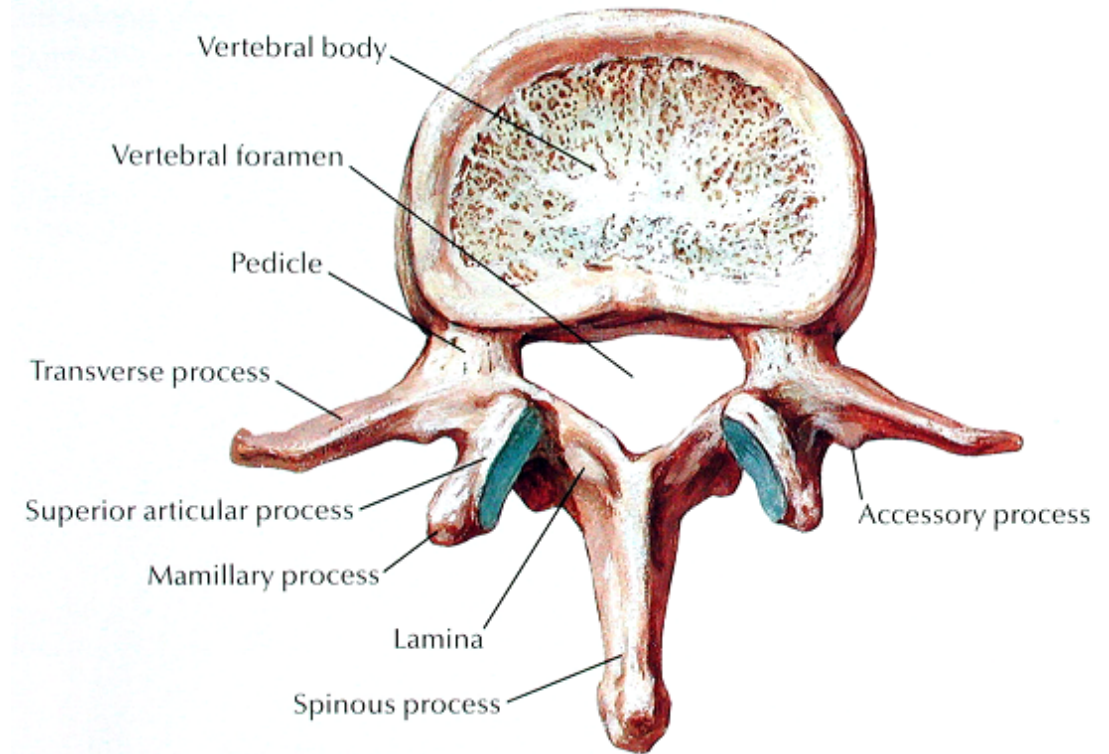
3rd and 4th lumbar vertebrae:  
posterior view

# Lumbar vertebra: L5

- body: deeper anteriorly than posteriorly; lordosis
- Short massive transverse proc.; attached by ilio-lumbar lig



L5 Gray

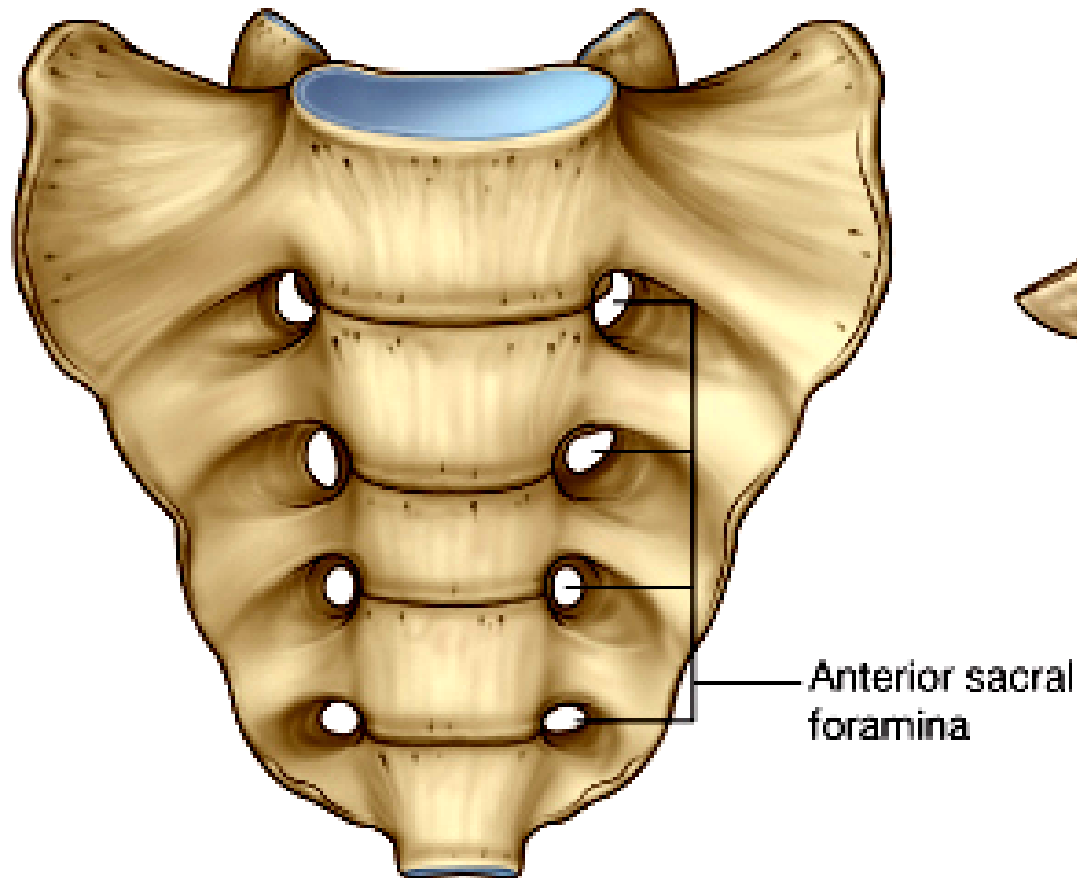


2nd lumbar vertebra:  
superior view

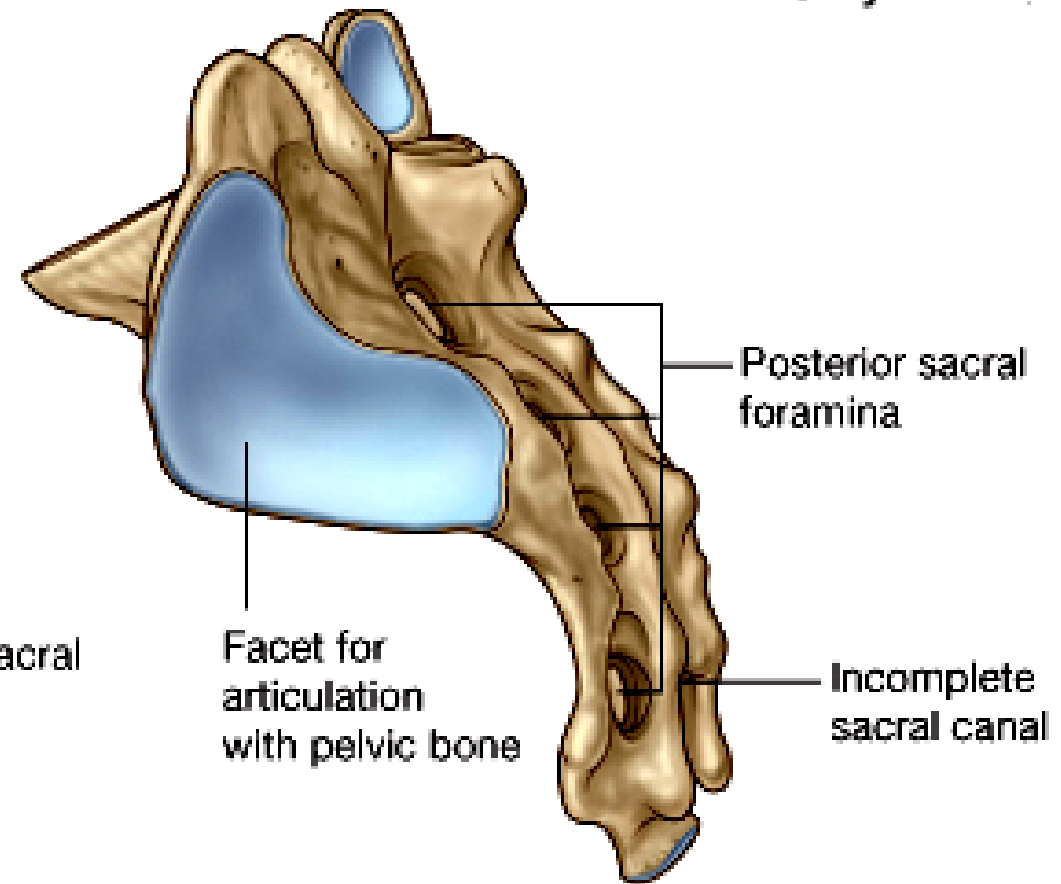
# Sacrum and Coccyx: Sacrum

- Sacrum (5)
- Transfer body weight from vertebrae to pelvis

E



*Anterior view*

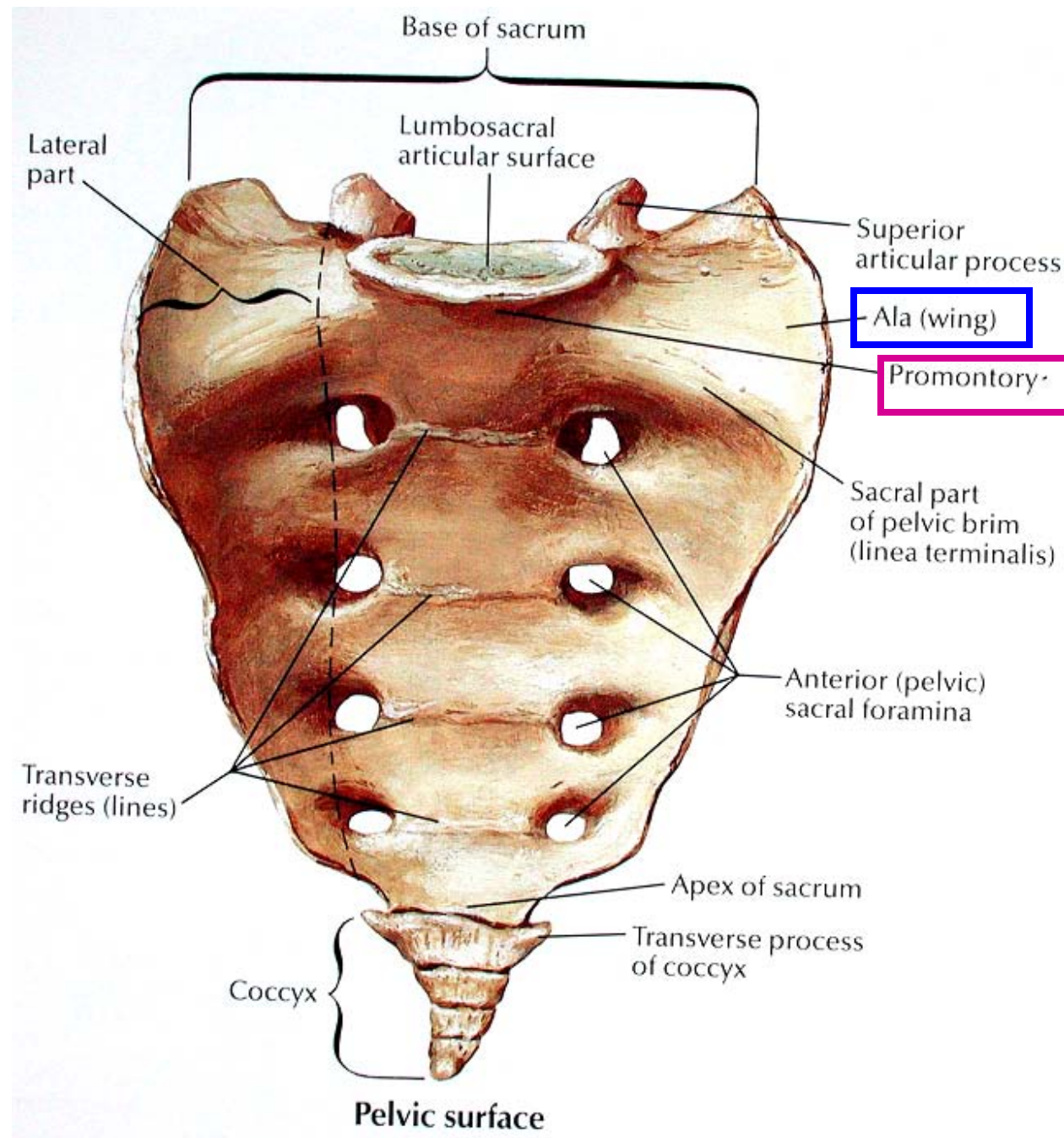


*Dorsolateral view*

Gray 2-21 E

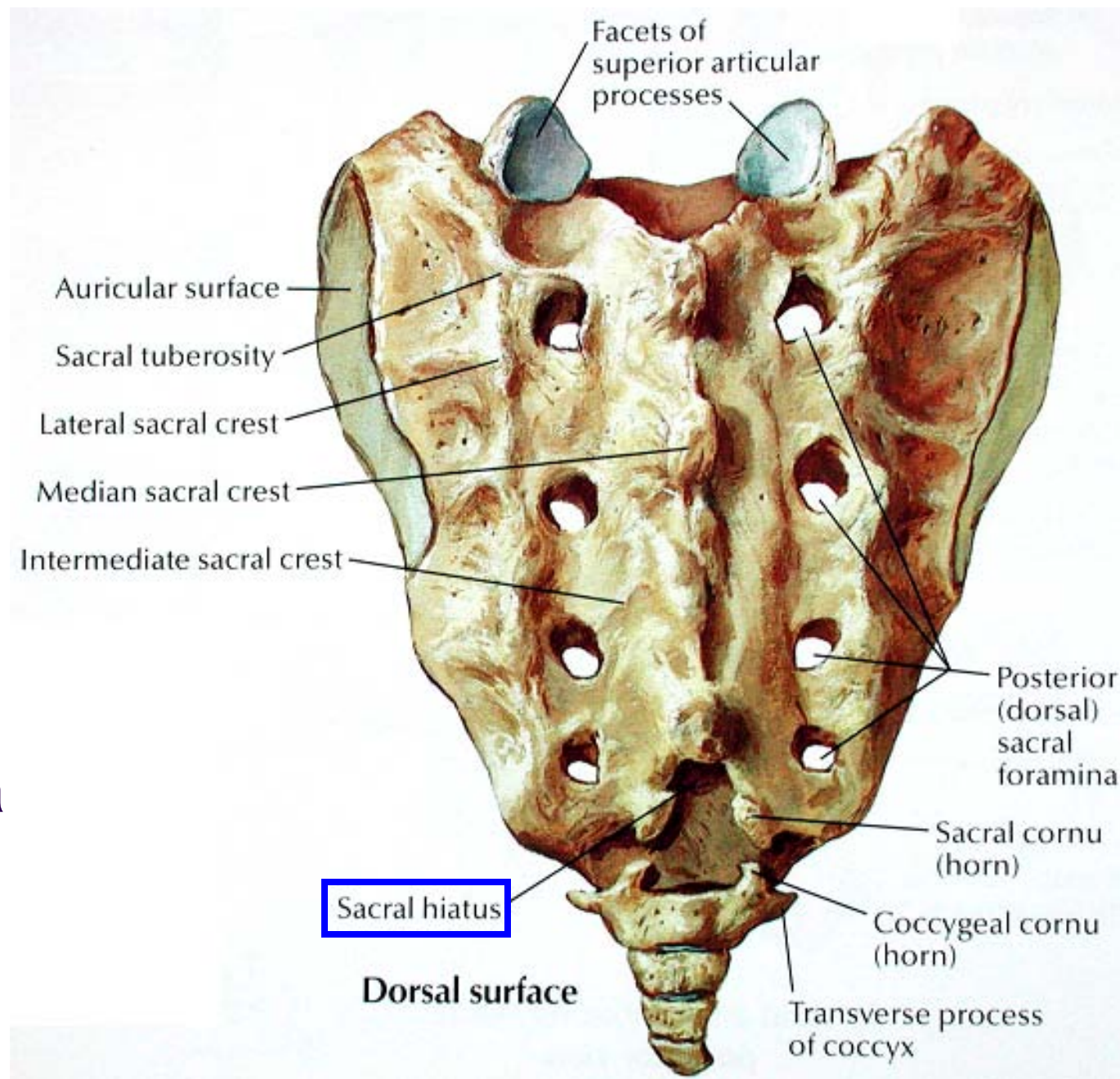
# Sacrum: ant. surface

- Ala of sacrum
- Promontory
- Sacro-iliac joint: articular surface
- 4 ant. sacral foramina: S1-4 ant. primary rami



## Sacrum: post. surface

- Sacral hiatus
- Median sacral crest
- Intermediate sacral crest
- Lateral sacral crest
- Post. sacral foramina



# Coccyx

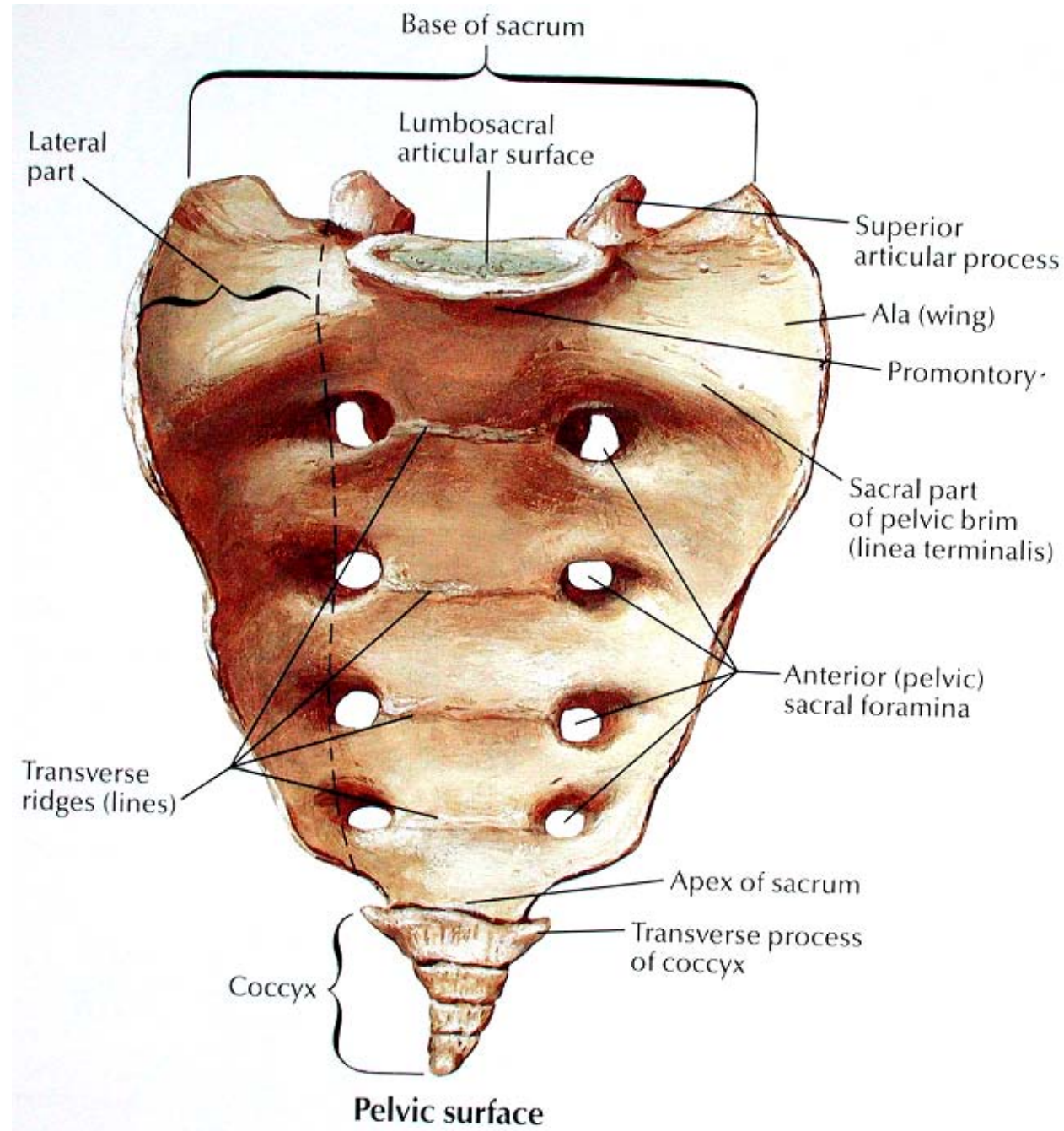
- Formed by 3-5 fused vertebrae

F Gray 2-21

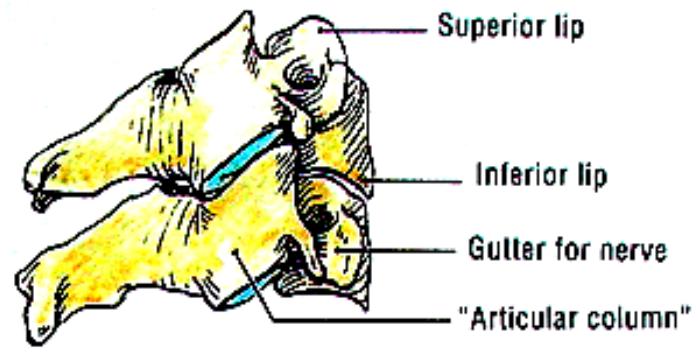
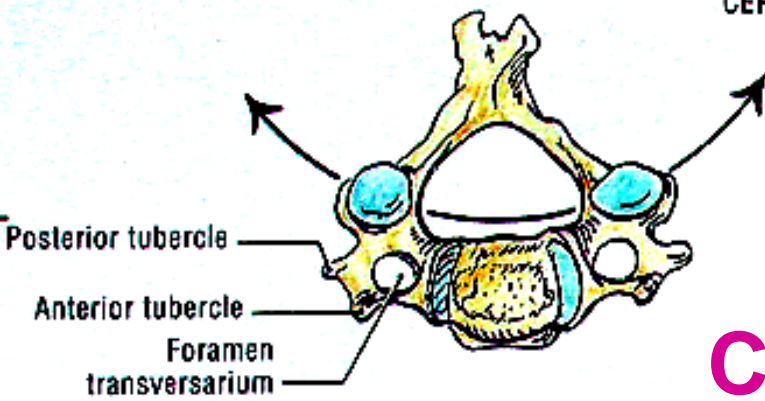
Coccygeal cornu



Posterior view

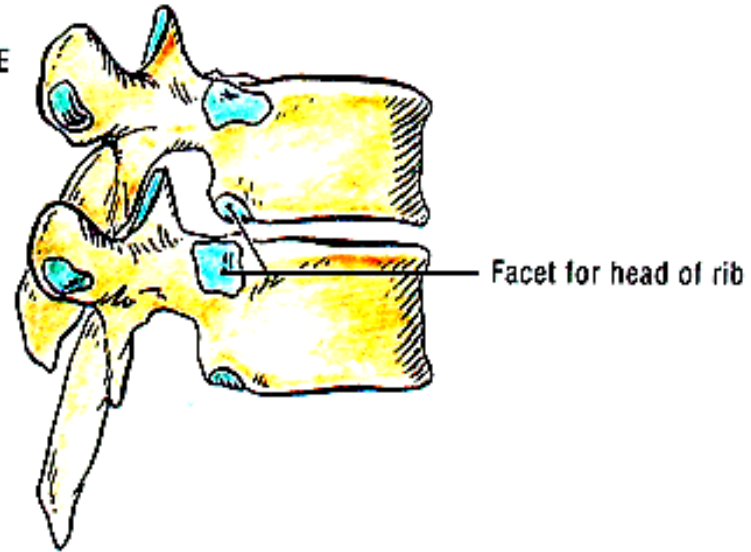
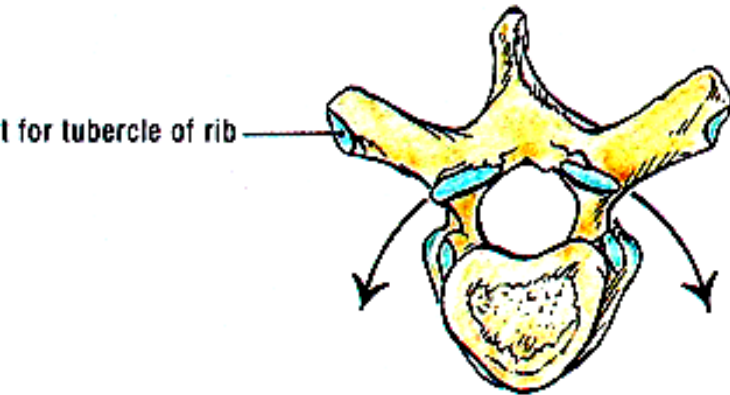


### CERVICAL VERTEBRAE

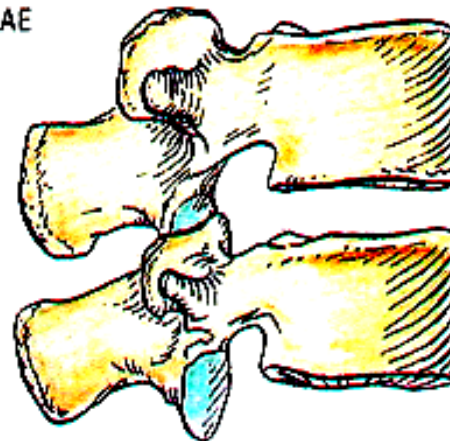
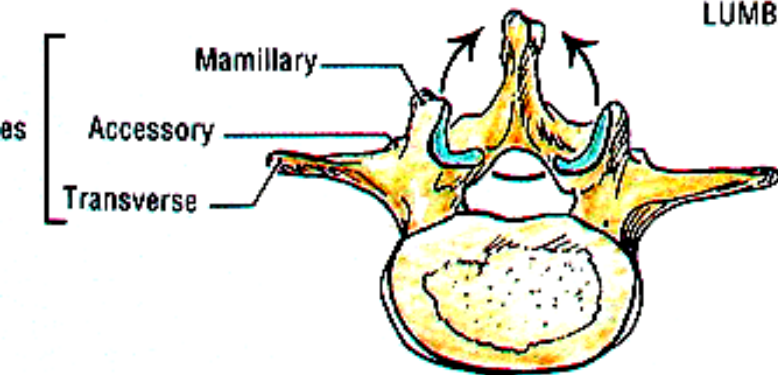


## Comparison of vertebrae

### THORACIC VERTEBRAE

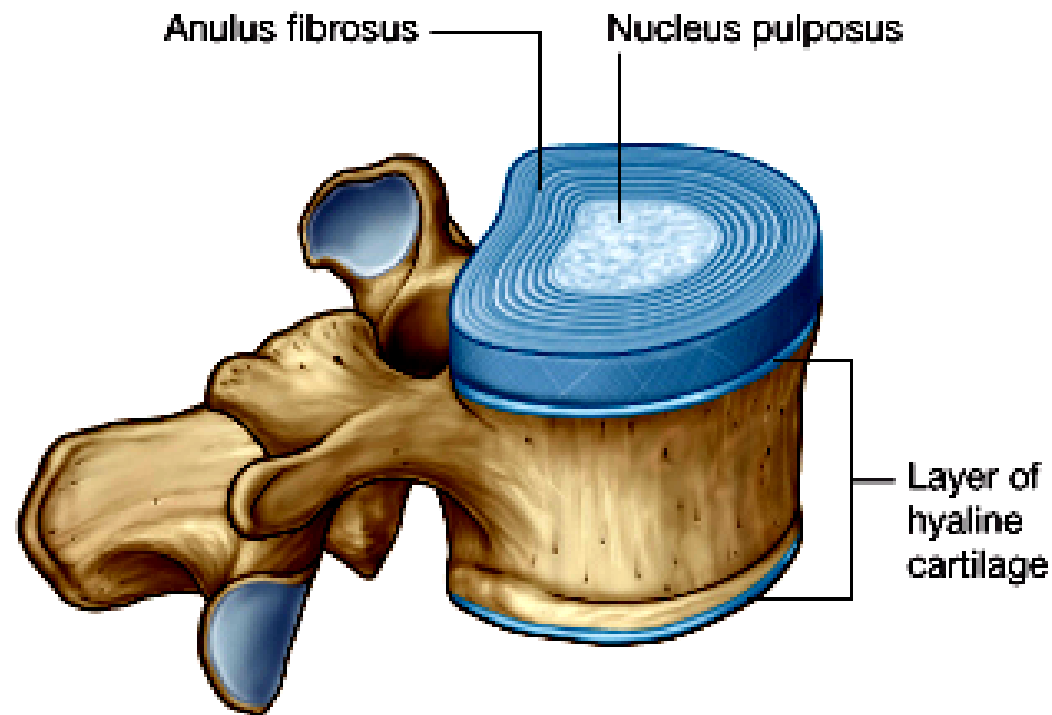
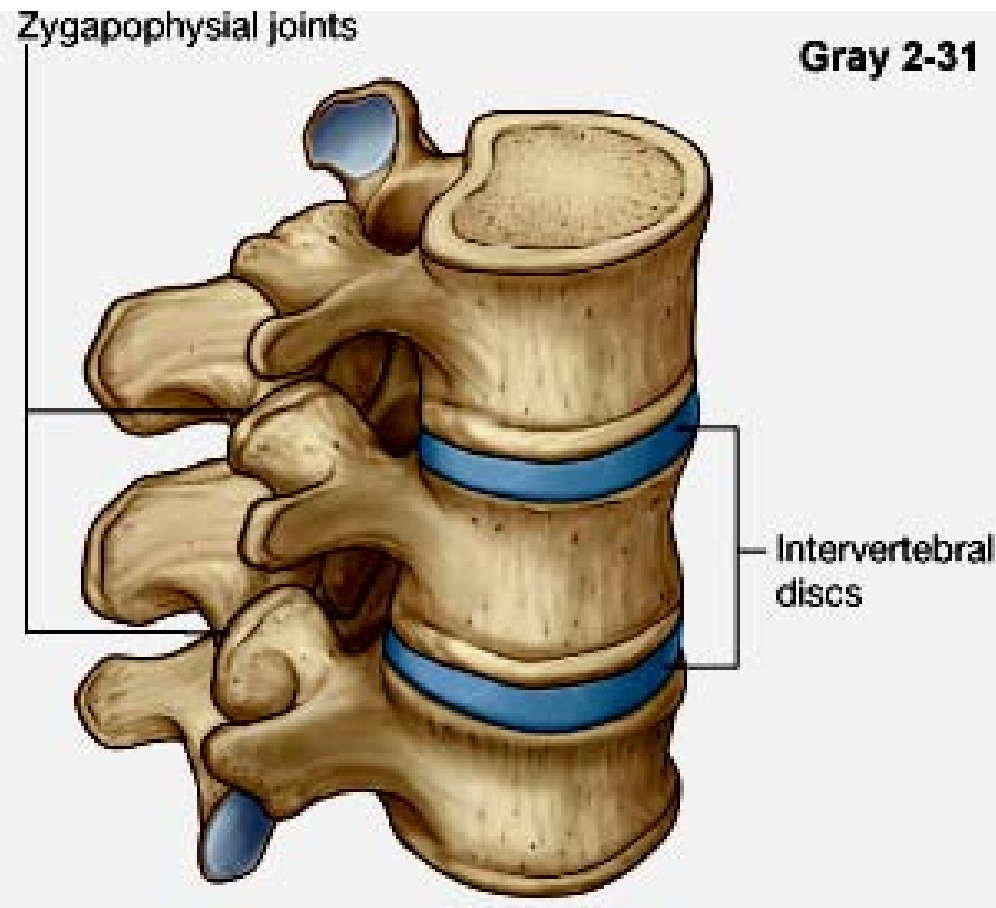


### LUMBAR VERTEBRAE



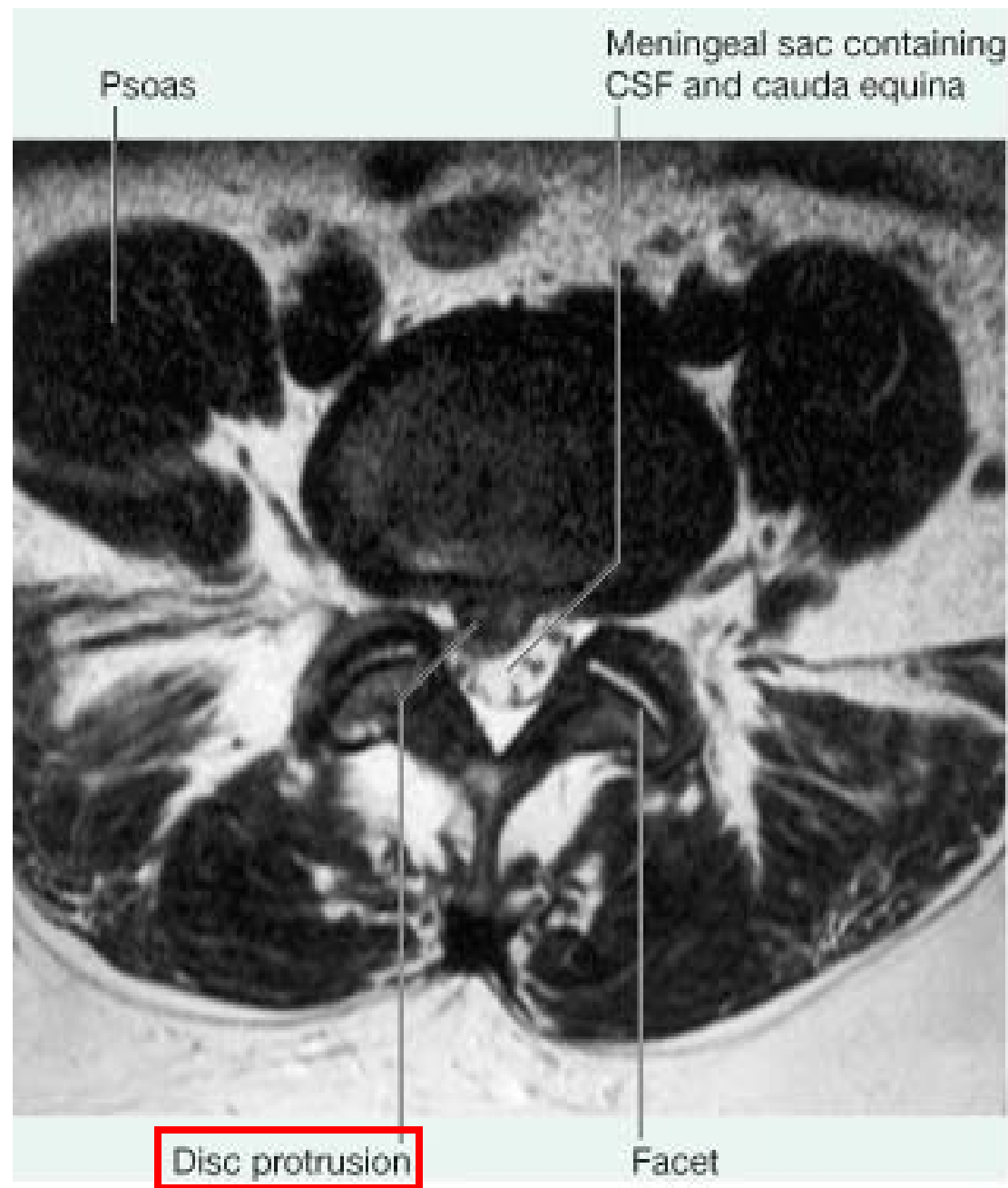
# Intervertebral disc

- between bodies, cartilaginous joint
  - Annulus fibrosus (fibrocartilage) + nucleus pulposus



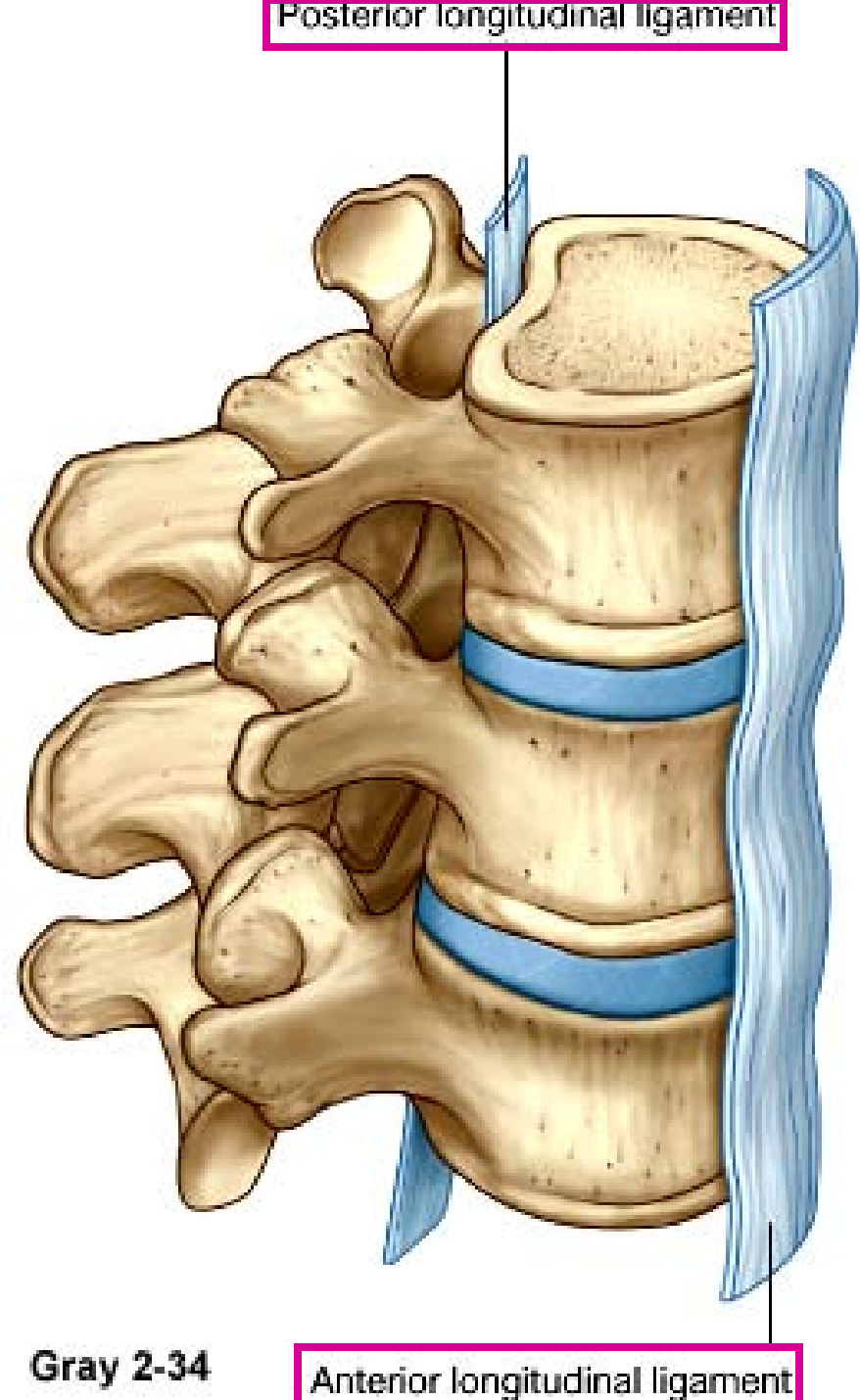


# Herniation of intervertebral disc (HIVD)



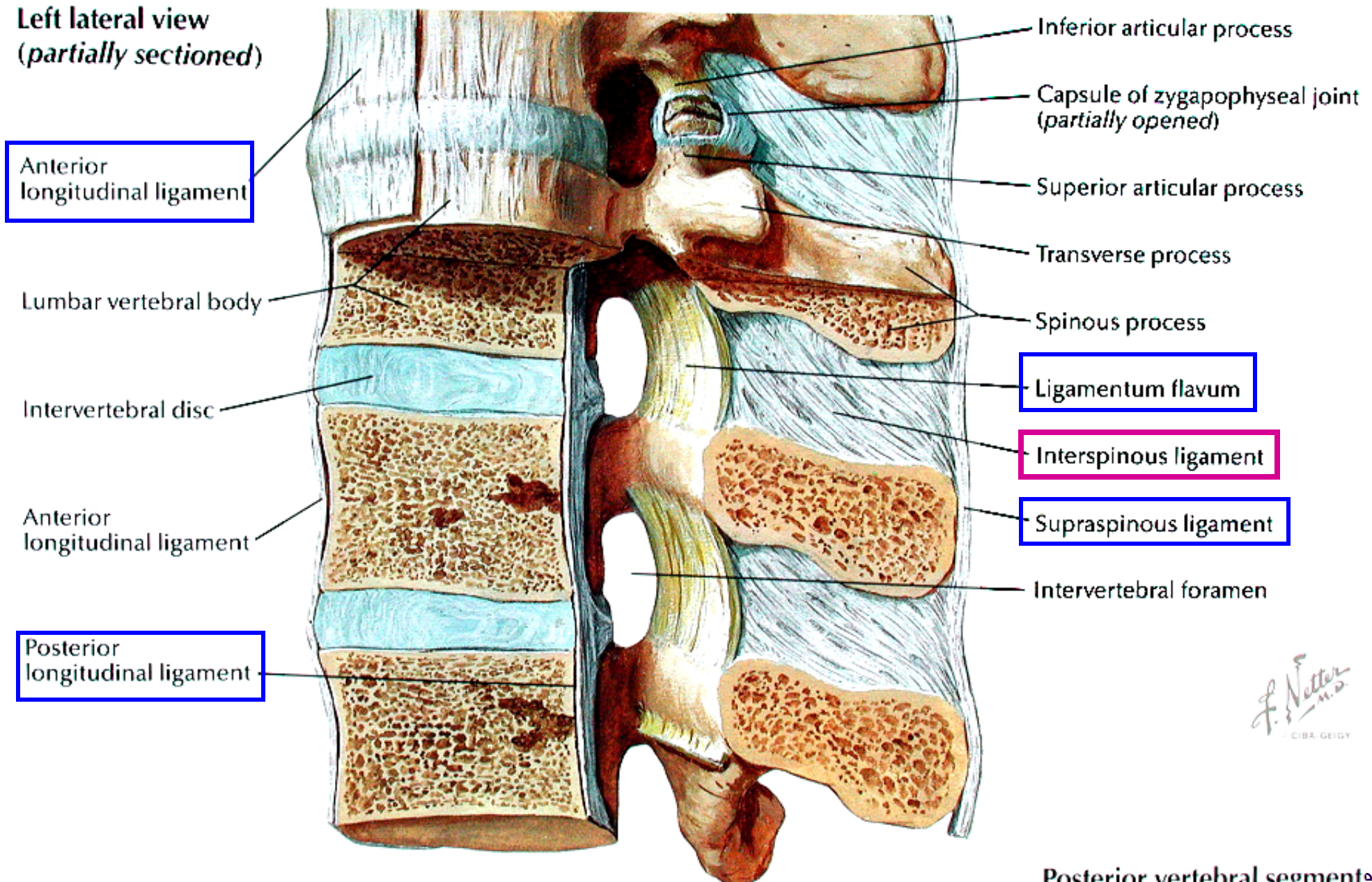
# Lig. between adjacent vertebrae

- body
  - Ant. Longitudinal lig.
  - Post. Longitudinal lig.
- lamina
  - Ligmentum flavum
- Spinous proc
  - Interspinous lig.
  - Supraspinous lig.:  
ligamentum nuchae of  
cervical region



# Interspinous ligament

Left lateral view  
(partially sectioned)



# Review on Vertebrae

- Common features of vertebrae
  - Characters of C, T, L, S vertebrae
  - Typical vs. Atypical vertebrae for different levels