Course material for 19.03.2020

VERTEBRAE OF FOWL

Course: B.Sc.(H) Zoology IV semester

Paper: Comparative Anatomy

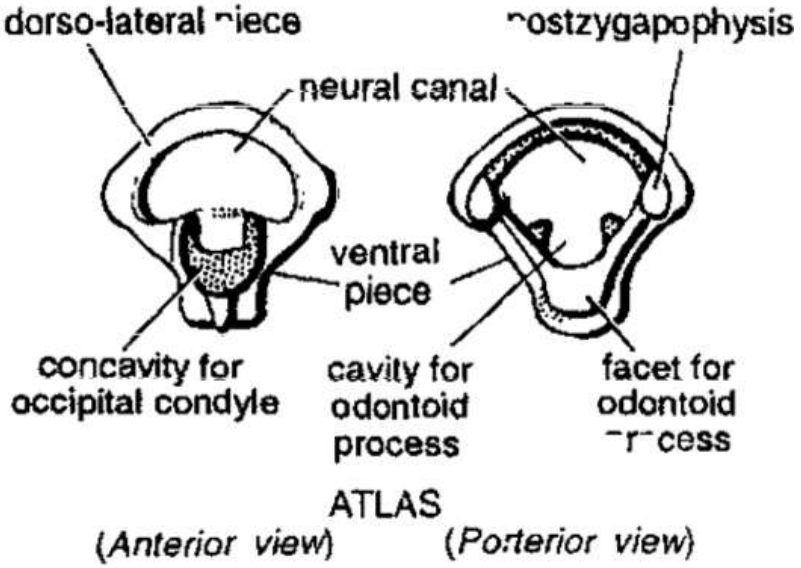
Faculty: Dr. Priya Goel

FOWL

- **Neck is long and mobile resulting in an INCREASE in the number of CERVICAL vertebrae**
- **THORACIC, LUMBAR & ABDOMINAL are FIRMLY UNITED to afford rigidity to help in flight**
- **CAUDAL vertebrae FUSED to form the pygostyle which supports the large tail feathers since the tail is short**
- **Epiphyses (ends of bones) are lacking**
- **Centra heterocoelous or saddle-shaped**
- **Vertebral column differentiated into 4 regions**
  - **Cervical (14 to 16):** due to long neck, the cervical region is also long
    - **forms nearly the anterior ½ of vertebral column**
    - **allows greater freedom of movement of the long neck and head**
  - **Thoracic (7):** shorter than cervical vertebrae
    - **2nd to 5th remain free**
    - **7th fuses with synsacrum**
  - **Synsacral:** a composite bone of 16 fused vertebrae of different regions
  - **Caudal:** includes a few free vertebrae & a pygostyle

1st cervical vertebra: ATLAS

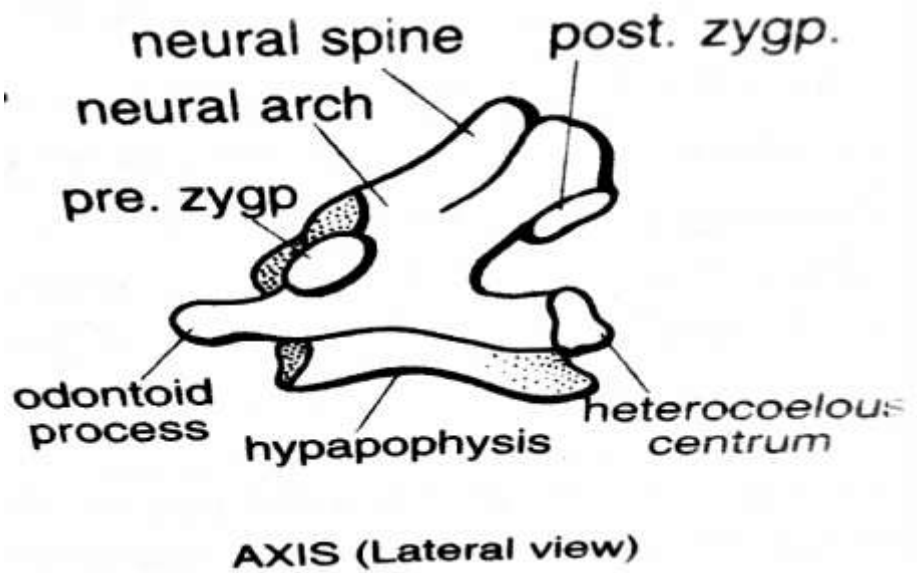
- **Small, ring-like or roughly triangular**
- **Centrum, Neural spine, ribs, transverse processes and prezygapohyses absent**
- **Consists of 3 elements**
  - **two dorso-lateral:** join mid-dorsally to form the neural arch
  - **a single ventral:** thick, anteriorly bears a deep cup-like cavity to receive the single occipital condyle of skull & is notched above to receive the odontoid process of axis
- In live condition, neural canal is divided by a thin ***transverse ligament*** into an upper **spinal canal**, through which spinal cord passes, and a lower **odontoid canal** for the odontoid process of axis
- Neural arch posteriorly bears small post-zygapophyses for articulation with the prezygapophyses of axis



FOWL

2nd cervical vertebra: AXIS / Epistropheus

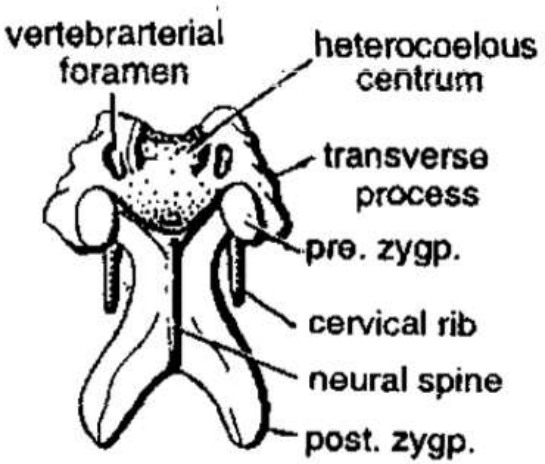
- Slightly bigger than the atlas
- no transverse processes
- neural spine blunt
- pre-and postzygapophyses present
- odontoid process present *(it is actually the detached centrum of atlas, but fused with the centrum of axis)*
- Axis forms the pivot on which atlas and head can be turned



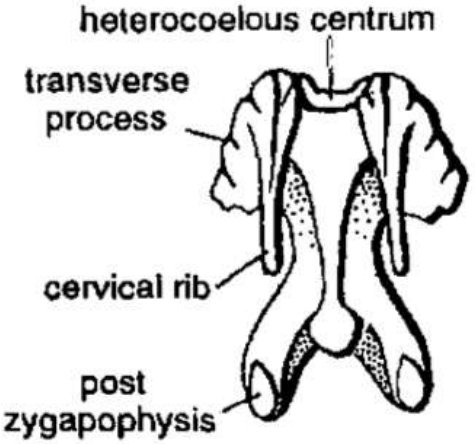
AXIS (Lateral view)

TYPICAL CERVICAL (3rd – 10th)

- Centrum: long, heterocoelous
- Neural arch: short with a rudimentary neural spine
- Transverse processes: Short and irregular, fused with thin, backwardly directed reduced cervical ribs
- Prezygapophyses flat
- Postzygapophyses project downward & outwards



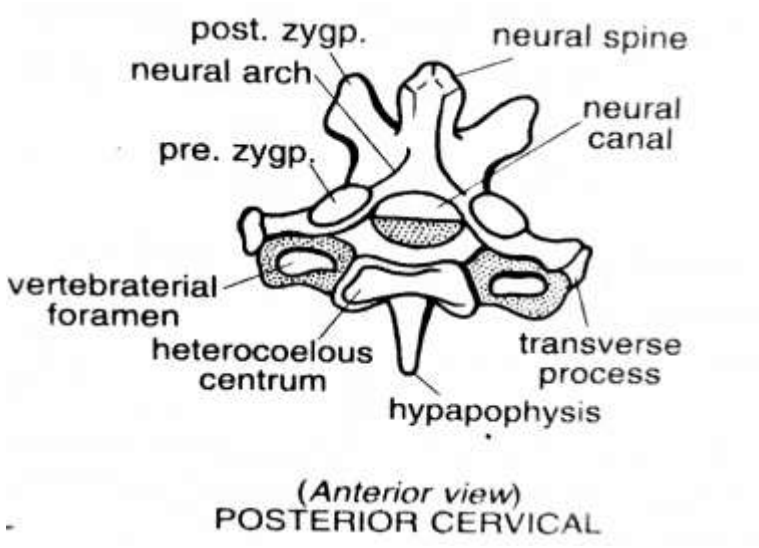
TYPICAL CERVICAL
(*Dorsal view*)



TYPICAL CERVICAL
(*Ventral view*)

Posterior cervical (behind the 10th vertebra)

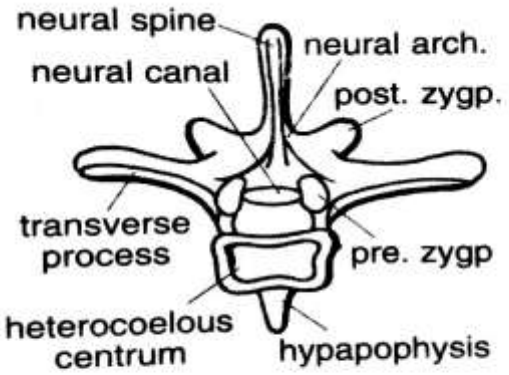
- shorter
- more massive
- Neural spine & Hypapophysis present
- Last 1-2 cervical vertebrae bear large, movably articulative, double-headed ribs



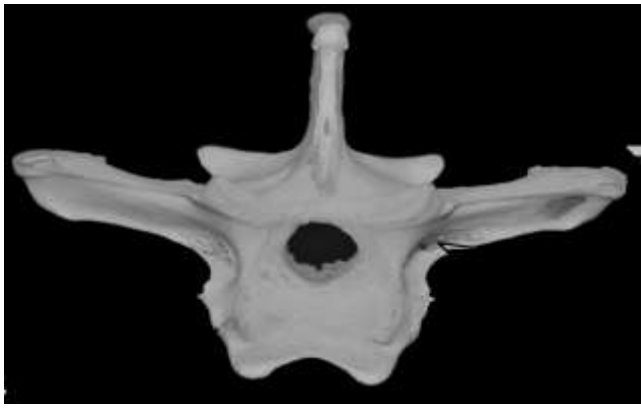
Thoracic vertebrae (7)

- shorter than cervical vertebrae
  - 1st and 6th are free
  - 2nd to 5th are fused together
  - 7th fuses with synsacrum

- Free thoracic: 1st and 6th
  - slightly smaller than a typical cervical
  - Centrum: saddle-shaped
  - Hypapophysis present: helps in attachment of flexor muscles of neck
  - Neural spine: elongated
  - Pre- and Post-zygapophyses: well developed
  - a pair of double-headed thoracic ribs are carried by each vertebra
  - Transverse processes & Centrum bear facets for attachment of the tuberculum and capitulum of rib



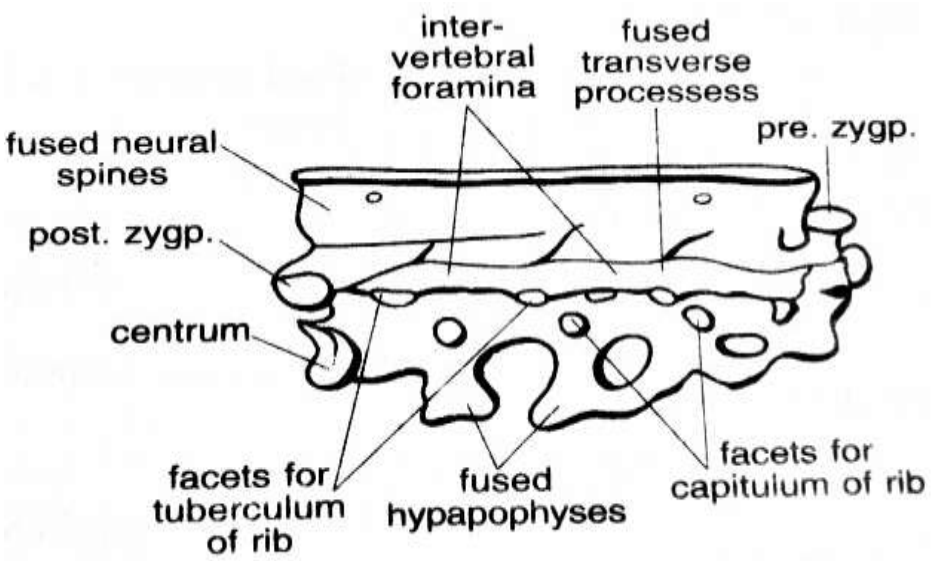
(*Anterior view*)
FREE THORACIC



Fused thoracic vertebrae: 2nd to 5th

- **Fused such that their neural spines, transverse processes & hypapophyses become confluent to form prominent plate-like ridges pierced by intervertebral gaps**

- **Fused centra and transverse processes bear on either side facets for articulation with capitula and tubercula of thoracic ribs**

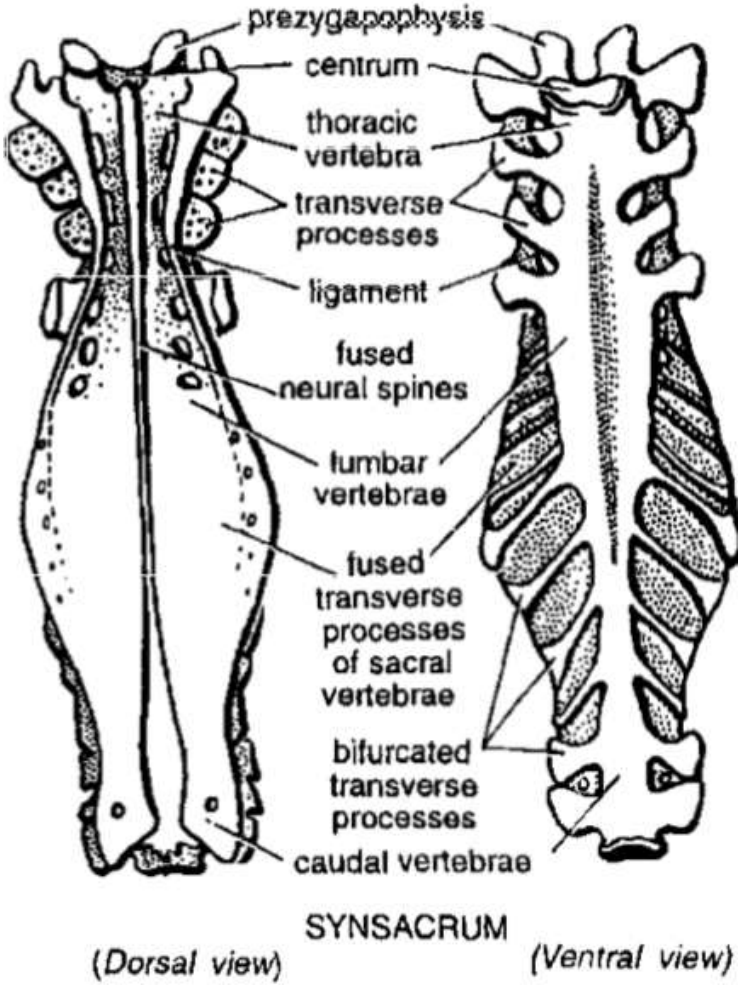


FUSED THORACIC (*Lateral view*)

FOWL

Synsacrum

- a composite bone
- gives support to iliac bones of immense pelvic girdle
- consists of about 16 fused vertebrae of different regions: last thoracic, 6 lumbar, 2 sacral & 7 caudal vertebrae
- 1st vertebra = last thoracic vertebra, bearing a pair of free thoracic ribs
  - lacks hypapophysis
- Lumbar vertebrae are firmly fused together
  - Lack hypapophyses
  - Transverse processes are free, stout and stand against the ilia
- Sacral vertebrae are firmly fused together to form a bony plate
- Caudal vertebrae
  - Transverse processes, except in the last, are bifurcated into dorsal and ventral processes
  - Dorsal processes unite to form bony plates continuous with those of vertebrae in front.
  - On either side between the bodies of sacral and caudal vertebrae of ilia are deep hollows in which are embedded the lobes of kidneys.

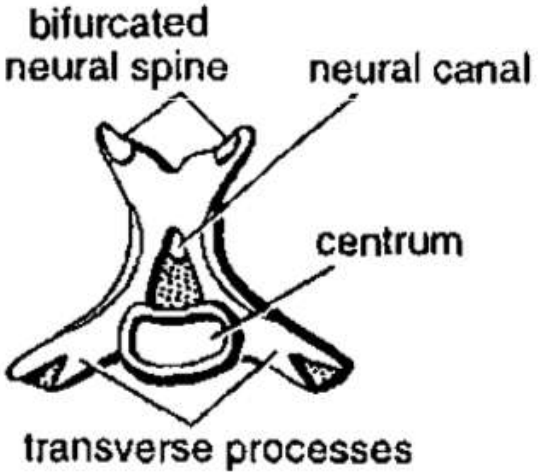


THE SYNSACRUM

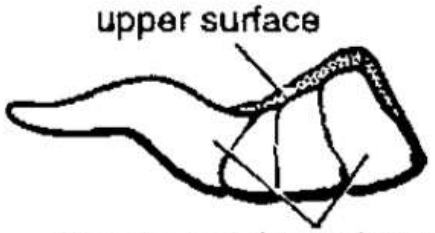
Caudal Vertebrae

Caudal region is short and includes a few free vertebrae and a pygostyle.

1. **Free caudal (4 or 5)**
   - **small, rudimentary, with a centrum, transverse processes**
   - **neural spines is bifurcated**
   - **free caudal vertebrae make possible the movements of tail and tail feathers**
2. **Pygostyle**
   - **last caudal vertebra**
   - **formed by the fusion of ~4 last caudal vertebrae**
   - **laterally compressed**
   - **provides attachment to caudal muscles and supports the large tail feathers**



FREE CAUDAL



PYGOSTYLE
(*Lateral view*)