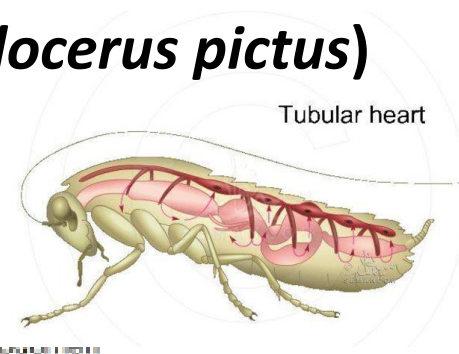
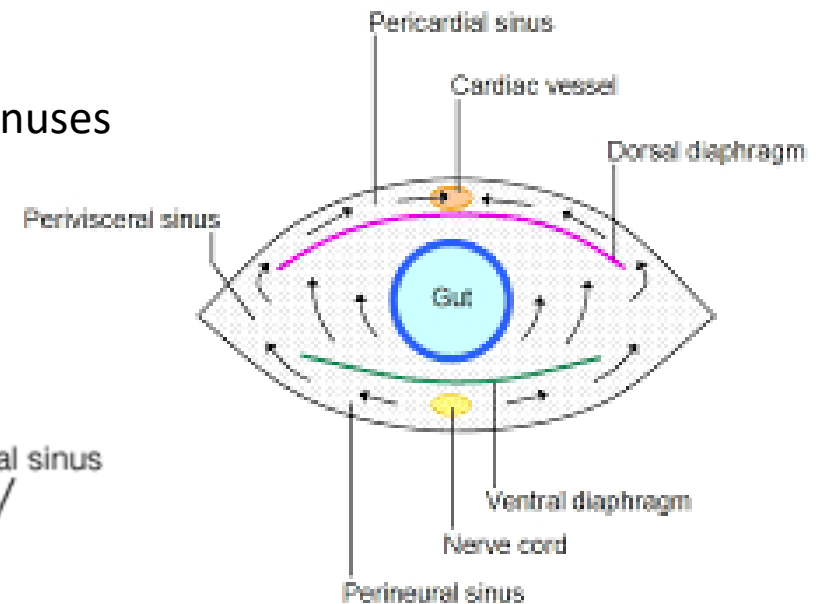


Internal Morphology Ak Grasshopper (*Poekilocerus pictus*)

Circulatory system

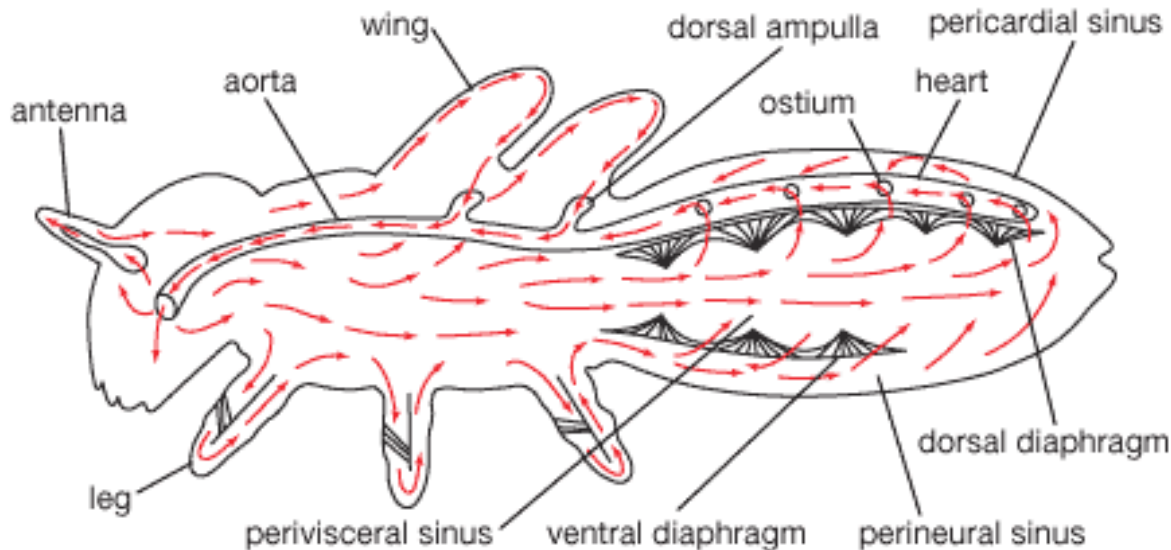


Circulation across the insect



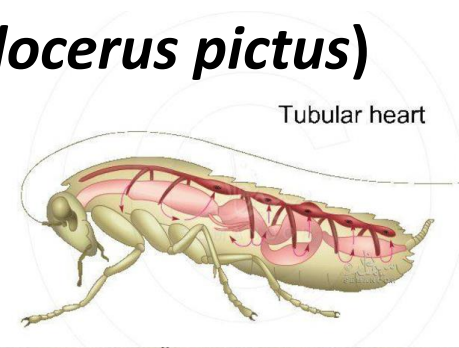
Dorsal blood Vessel and accessory pulsating organs

- Open circulatory system
- Haemocoel has two longitudinal diaphragms
 - Dorsal diaphragms
 - Ventral diaphragms
- The diaphragms divide the body cavity into three sinuses
 - The dorsal (pericardial) sinus
 - The large central (perivisceral) sinus
 - The ventral (perineural) sinus



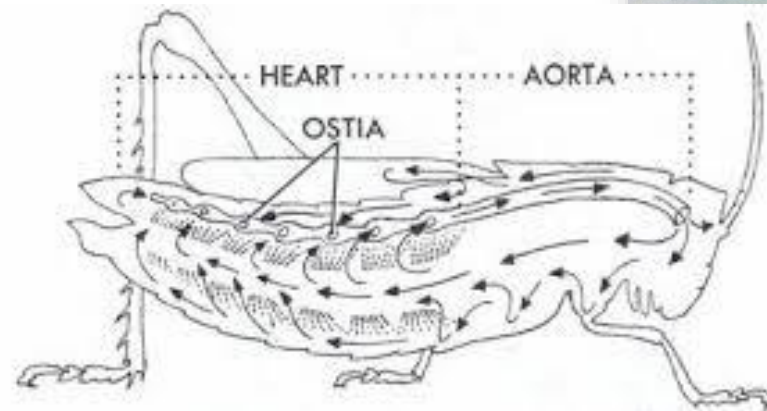
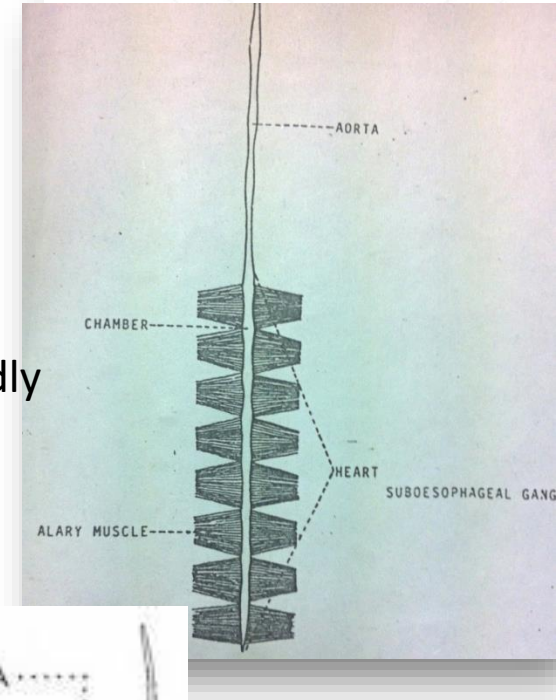
Internal Morphology Ak Grasshopper (*Poekilocerus pictus*)

Circulatory system



Dorsal Blood Vessel

- lies along the midline in the pericardial sinus
- It is a long, straight, white tube extending from the head to the 10th abdominal segment.
- It consists of two parts.
 - Posterior part (**heart**)
 - Anterior part (**aorta**)
- Segmentally dilated to form chambers (ampullae) having paired dorsolateral openings, the Ostia with valves
- Eight pairs of **alary muscles** which arise from the sides meet broadly beneath the heart.
- **Haemolymph** enters the hearts through Ostia from the haemocoel, carried anteriorly in the heart and aorta and again returned to the haemocoel in the head.

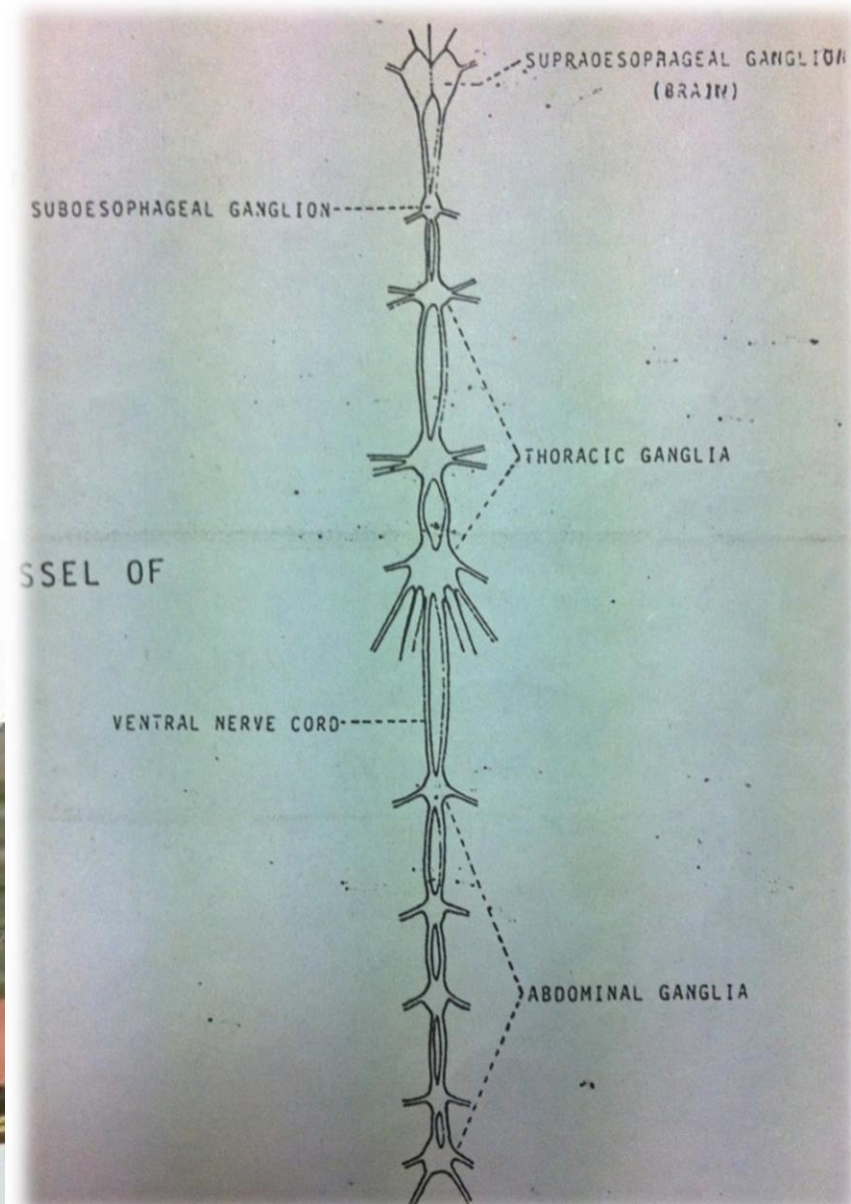
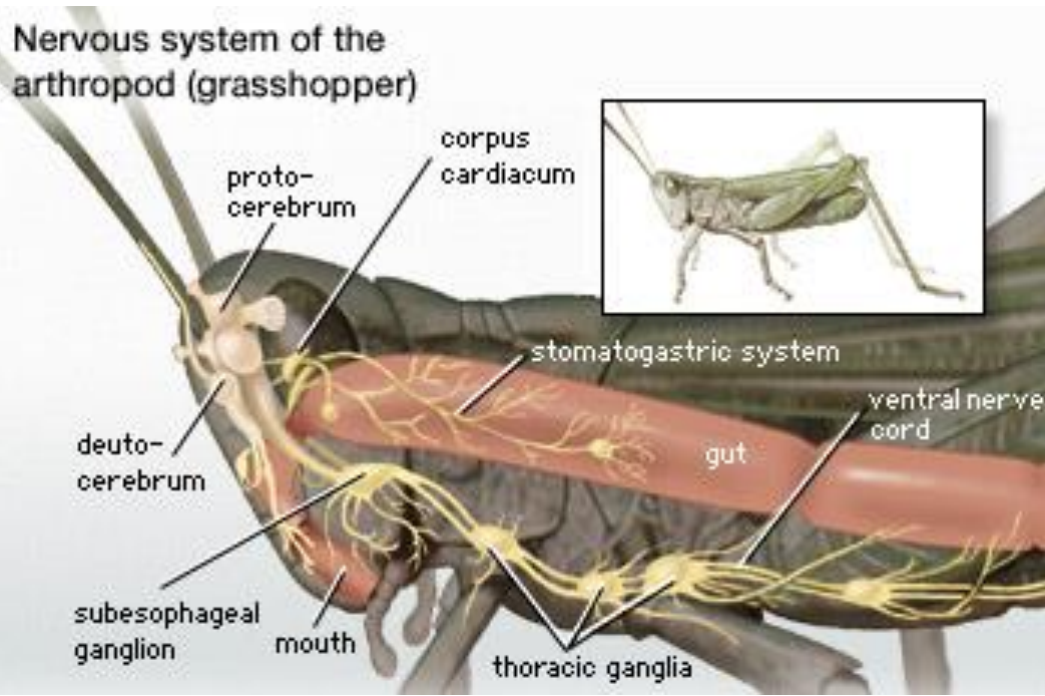


CIRCULATORY SYSTEM

Internal Morphology Ak Grasshopper (*Poekilocerus pictus*)

Nervous system

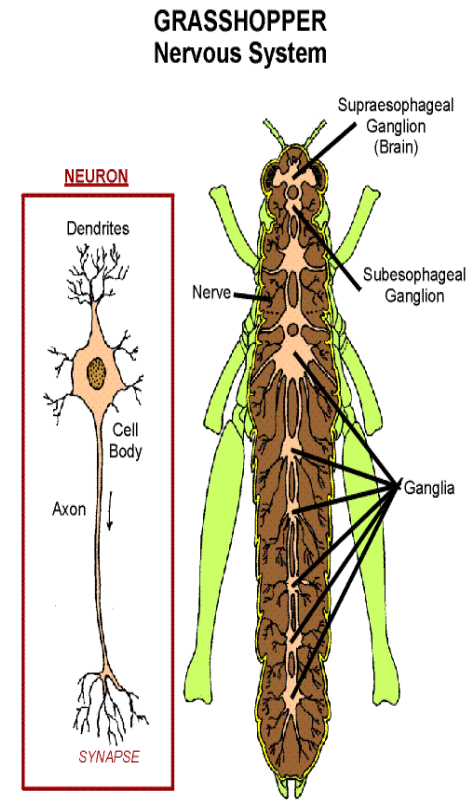
- Central nervous system
- Peripheral nervous system
- Visceral nervous system



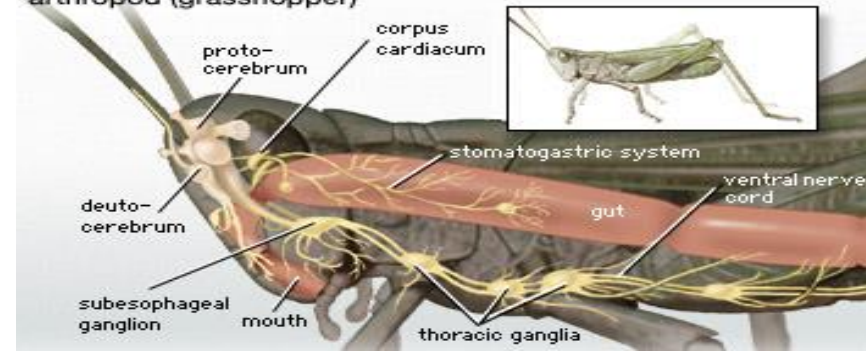
Internal Morphology Ak Grasshopper (*Poekilocerus pictus*)

Nervous system

- CNS lies below alimentary canal except the brain which is dorsal.
- It extends from the head to the 8th abdominal segment.
- CNS consists of a large compound **supraesophageal ganglion** (brain) which lies in the head above the esophagus.
- The brain has three pairs of lobes:
 - **Protocerebrum** (fore brain)
 - **Deutocerebrum** (mid brain)
 - **Tritocerebrum** (hind brain)
- The brain is connected with **subesophageal ganglion** which lies in the head below the esophagus.
- **Ventral nerve cord** which has three thoracic and five abdominal ganglia.
- **Ganglia** of segments are connected by means of paired connectives.
- In each segment there are actually two ganglia which are transversely connected by means of commissures and fused into a single ganglion.
- All ganglia innervate to the different body organs.



Nervous system of the arthropod (grasshopper)



Internal Morphology Ak Grasshopper (*Poekilocerus pictus*)

Respiratory system

- Spiracles, tracheae and tracheoles.
- **Spiracles** are the paired lateral external opening (10 pairs).
- **Trachea** are elastic internal tube for Spiracles openings.
- The tracheae from the adjoining spiracles unite the form six **longitudinal trunks**.
 - **Dorsal Trunk**
 - **Lateral Trunk**
 - **Ventral Trunks**
- Tracheae from spiracles extend into inner sides, branch and dilate to form white air-sacs.
- Longitudinal trunks give numerous branches which divide and subdivide into finer branches known as **tracheoles**.

