

General Entomology

Lecture (7)

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Lecture Topics

- **Insects Body parts**

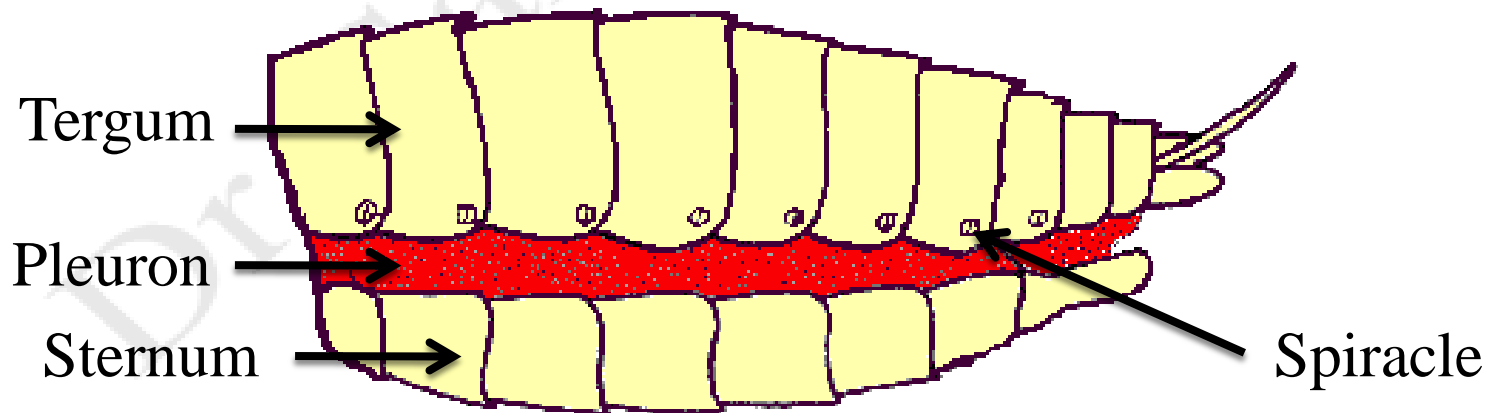
III. Abdomen

- **Insects systems**
 - **Circulatory System**

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Abdomen

- 3rd insect body part.
- Originally consists of 11 segments.
- Mostly reduced e.g., to 7 in the Honeybee.
- Each segment consist of
 - **Tergum** > dorsal sclerite.
 - **Sternum** > ventral sclerite.
 - **Pleural membrane** > join the tergum with the sternum.
 - A spiracle (opening to the respiratory system) on each side of the first eight abdominal segments in adult insects.



Circulatory System

- **Open circulatory system**

- In Insects and other Arthropods
- Haemolymph is flowing freely within body cavities
- **Haemolymph**
 - Watery yellowish- green colour.
 - No haemoglobin (except few aquatic midges).
 - Is not responsible for the transmission of oxygen
 - Haemocyte (25000 - 100,000) in mm^3 .

- **Closed circulatory system**

- In humans and other vertebrates
- Blood is contained within vessels (arteries, veins, capillaries and heart)
- **Blood**
 - Red colour.
 - Contain haemoglobin.
 - Responsible for oxygen transmission.
 - 5 million RBC, 300,000 platelets & 7000 WBC in mm^3 .

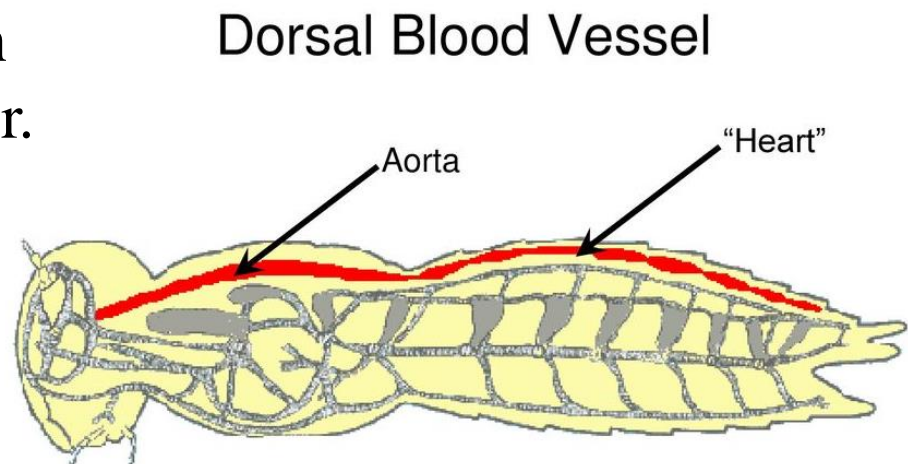
Circulatory System

- **Functions of the circulatory system**

- Responsible for movement of nutrients, salts, hormones, and metabolic wastes throughout the insect's body.
- Defense: e.g., encapsulates and destroys parasites or invaders.
- Seals off wounds through a clotting reaction.
- Haemolymph hydrostatic pressure is used to facilitate hatching, molting, physical movements (larvae), reproduction (e.g. insemination and oviposition).
- Haemolymph aid in thermoregulation >cooling & warming the body

Circulatory System

- Insect's circulatory system consist of **dorsal vessel** (tube runs longitudinally through the thorax and abdomen).
- **Dorsal vessel** collects haemolymph from the body and conducts it forward to the head.
- In the abdomen, the dorsal vessel is called the **heart**.
- **Heart** consist of chambers that are separated by valves (ostia) to ensure one-way flow of haemolymph.
- Pair of alary muscles are attached laterally to the walls of each chamber to push the haemolymph forward from chamber to chamber.
- Heart's peats vary (30-300) with species, temperature & activity.



Circulatory System

- In the thorax and brain, the **dorsal vessel** is called the **aorta**.
- **Aorta** does not have valves or lateral muscles.
- Haemolymph bathes the organs and muscles of the head as it emerges from the aorta, and then haphazardly percolates back over the alimentary canal and through the body until it reaches the abdomen and re-enters the heart.
- Body cavity is divided into three compartments (called blood sinuses) by two thin sheets of muscle and/or membrane to facilitate circulation of haemolymph.

Usfel websites

<http://www.entomologa.ru/outline/24.htm>
https://projects.ncsu.edu/cals/course/ent425/library/tutorials/external_anatomy/abdomen.html
<https://genent.cals.ncsu.edu/bug-bytes/circulatory-system/>

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Thanks for listening

