23/02/12





Topics

- Do insects have a heart?
- Closed and open components
- Circular and alary muscles
- Link between circulation and respiration
- Importance of haemolymph pressure

The Haemolymph

The haemolymph has multiple functions:

- nutrient transport, for example, from gut to tissues, from fat body to tissues.
- metabolite store: reservoirs of water, proteins, excretory material
- distribute hormones: corpora cardiaca are situated adjacent to the dorsal vessel, and neurohemal organs release neurosecretions into haemolymph
- pigments: some insects have pigmented haemolymph

Important: Insects don't use haemolymph for gas exchange





The tubular closed component Dorsal vessel is segmentally arranged.

Abdominal component generally referred to as the *heart* Head/thoracic component as the *aorta*. The division between heart and aorta varies among the insect groups. Dorsal vessel is composed of a single cell layer of striated myocardial cells, i.e. it takes the form of a muscular tube

Ostial valves

Ostial valves are slit-like openings in the wall of the dorsal vessel, usually also segmentally distributed.

Excurrent ostia can be simple non-contractile openings allowing passive flow from the dorsal vessel, e.g. in the grasshopper.

Excurrent ostia can open into segmental vessels (non-muscle, connective tissue tubes which guide the outflowing haemolymph into particular regions of the body).

A. Longitudinal section. B. Transverse section of thorax. C. Transverse section of abdomen (modified from Chapman, 1982, based on Wigglesworth, 1972)















Haemolymph pressure

Role in ecdysis, unfurling of wings, oviposition.

The ptilinum of Diptera is everted under haemolymph pressure, allowing the still-flexible and unsclerotised adult to crawl through the pupation substrate. It later collapses into the head.



Alex Wild http://www.alexanderwild.com.

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