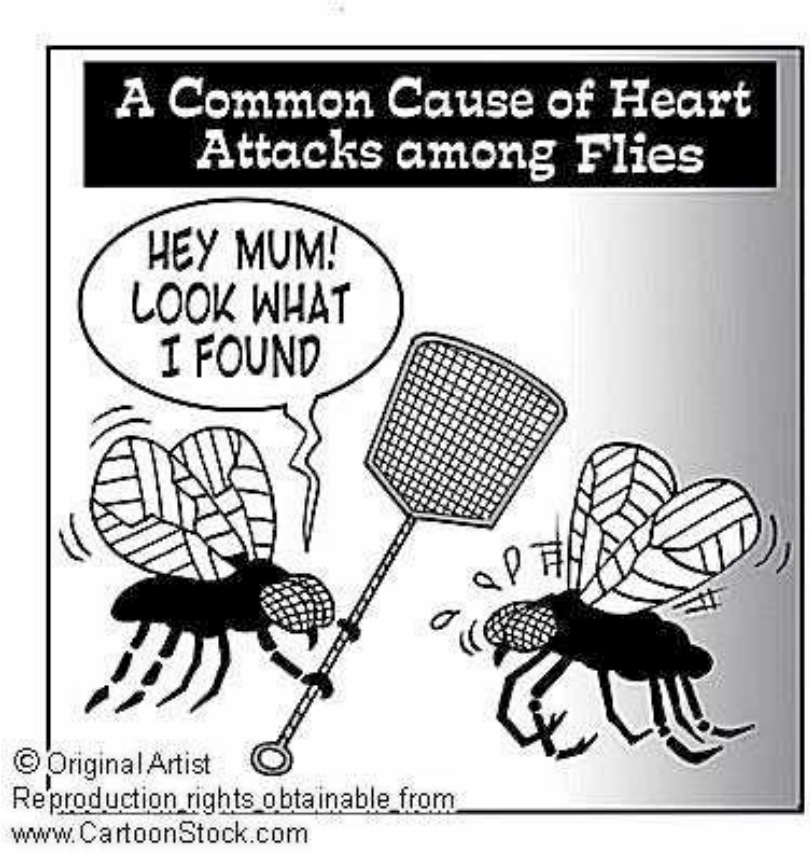
Cardioacceleratory Activity by the Hypertrehalosemic Hormone

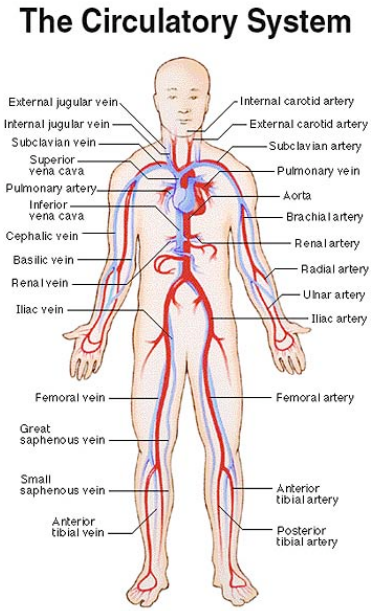


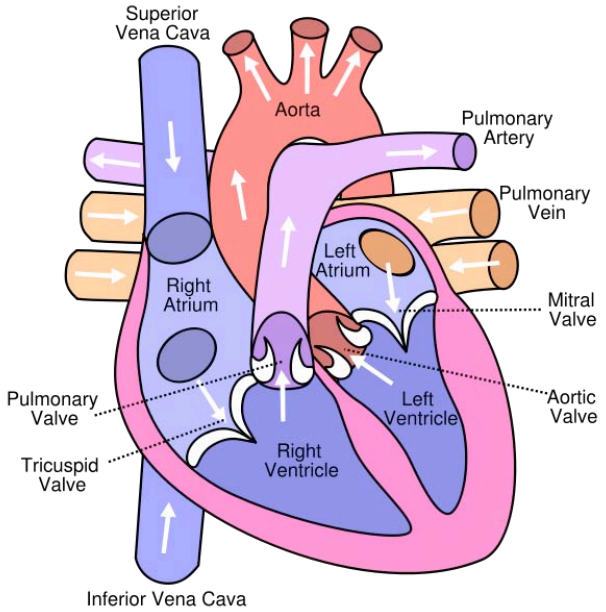
Introduction to the “scientific method”

1. Define the question
2. Gather information and resources (observe)
3. Form hypothesis
    - Null hypothesis
    - Alternative hypothesis
4. Perform experiment and collect data
5. Analyze data (involves statistical analysis)
6. Interpret data and draw conclusions - this can serve as a starting point for developing new hypotheses
7. Publish results (in the case of this lab - write a scientific report)
8. Retest (frequently done by other scientists; or different classes)

A closed circulatory systems

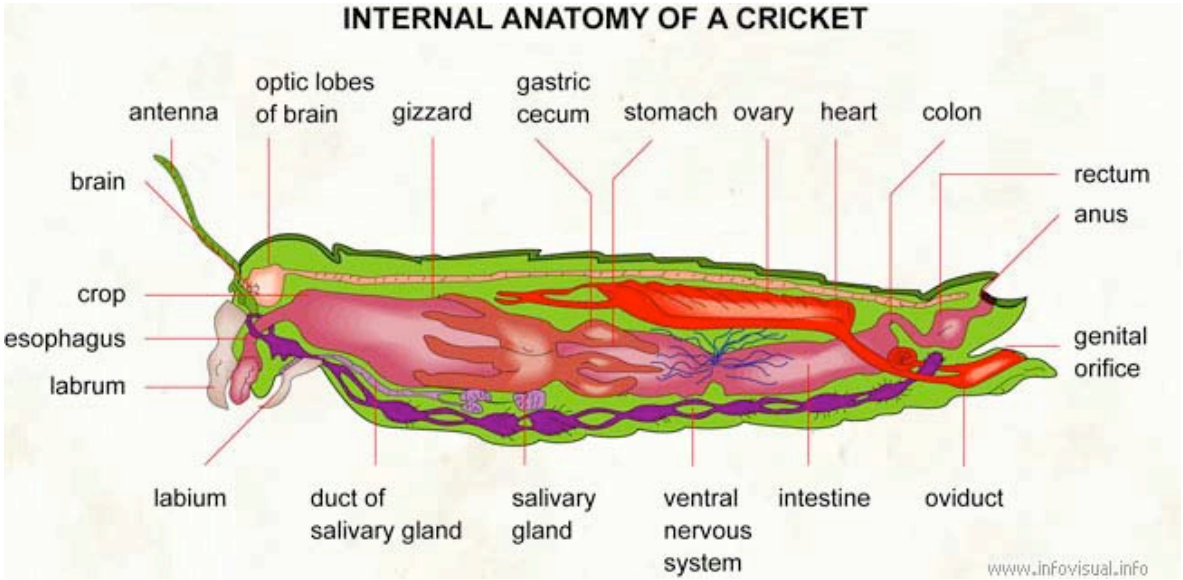
1) Common in vertebrates but only a few invertebrates
2) Blood carried within vessels of different size and wall thickness
3) Blood is pumped by a heart through vessels, and does not normally fill body cavities

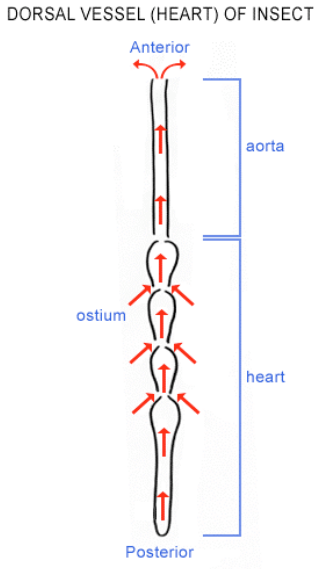




An open circulatory systems

1) Found in arthropods and molluscs
2) Hemolymph is pumped forward by the heart
3) It bathes the tissues, and acts as a carrier of various nutrients and carrier proteins (e.g. lipophorin)



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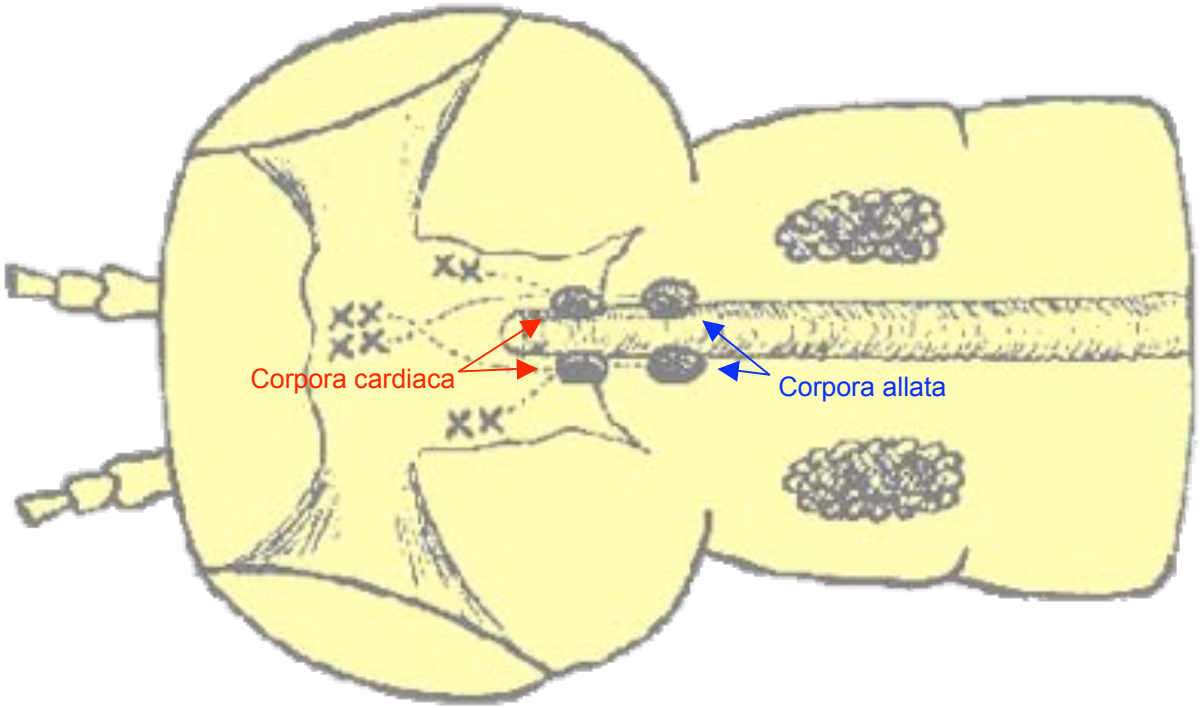
Hypertrehalosemic hormone and circulation

How does hypertrehalosemic hormone (HTH) influence circulation? HTH acts as a cardioaccelerator that increases the rate of heart beats.

Question: Why might HTH increase heart beat rate?

Where does HTH come from?

HTH is secreted by paired neurosecretory cells called the corpora cardiaca



Laboratory objectives

- Demonstrate the effect of hypertrehalosemic hormone (HTH) on the heart
- Illustrate a hormone bioassay
- Illustrate how physiologists can work with insect tissue *in vivo*

Blaberus discoidalis

(false death head roach)

Data collection and analysis

- You will work in pairs, and each pair will work with a roach
- You will record heartbeat counts for three treatments. Counts will be scored over 60 seconds, and each count will be replicated 3X for each treatment

    1) Basal Count

    2) HTH Count

    3) Post HTH Count

- The class data will be analyzed by the TA, and you will receive a print out of the results posted on the web (in the form of a PDF file)

Specific questions to answer

- What is the effect of adding HTH to insect fat body?
- Was the mean count rate for the basal treatment the same as for the after wash count rate? If so, why? If not, why not?

What we would like from you (content)

- Introduction (brief, 4-5 sentences)
- Materials and Methods (as subheadings)
  - Something about the insect
  - A brief description of the protocol used
  - A quick description of the statistics used
- Results (brief summary of key findings)
  - When possible, present the data as a figure (bar graphs, with standard errors)
- Discussion (short, about 8-10 sentences)
- References