This week in 206

I. Physiology of the Crayfish

II. Human cardiovascular physiology

Animal respiration and circulation.

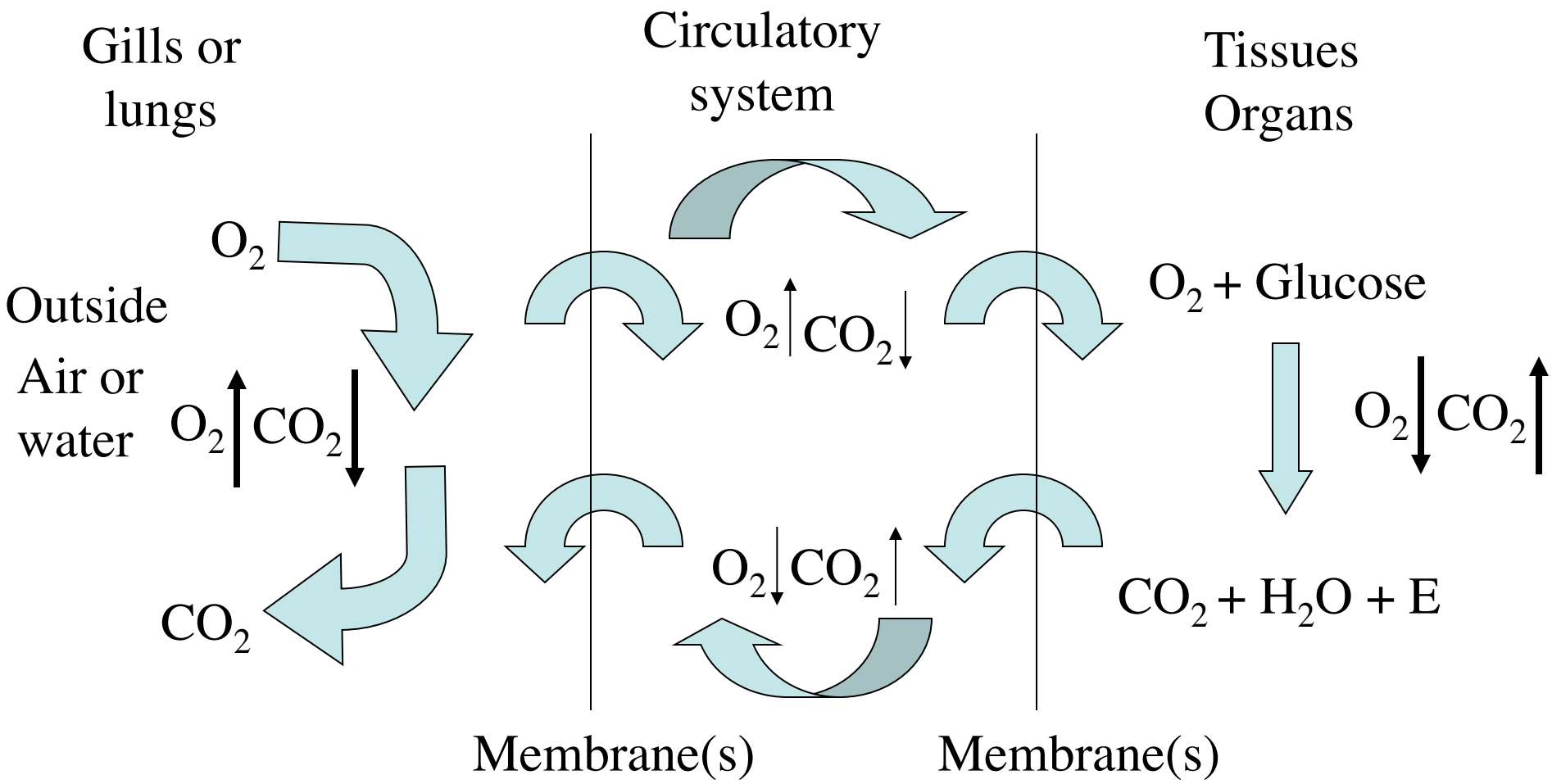
What is respiration?

Animal respiration and circulation.

What is respiration?

$$\text{Glucose} + O_2 \longrightarrow CO_2 + H_2O + E$$

Breathing.


Gills or lungs
Circulatory system
Tissues Organs
O2
Outside Air or water
O2 CO2
CO2
O2 CO2
O2 + Glucose
O2 CO2
O2 CO2
CO2 + H2O + E
Membrane(s)
Membrane(s)

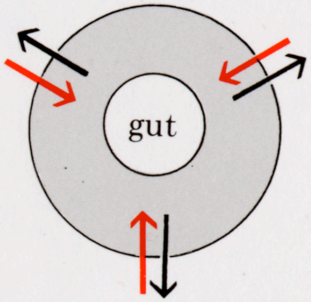
O_2 21%
CO_2 <1%

Circulatory systems

Open	vs.	**Closed**
Arthropods/crustacea Crayfish		Vertebrates human
Blood pumped out to tissues, dumped in sinuses		Blood pumped in pipes and Never touches tissues-arteries/veins
Tissues ~bathed Comes back to heart Through sinuses and Reenters through ostia		Trend is to separate oxygenated From non-oxygenated blood
Low pressure-low resistance High volume		High pressure-high resistance Low volume

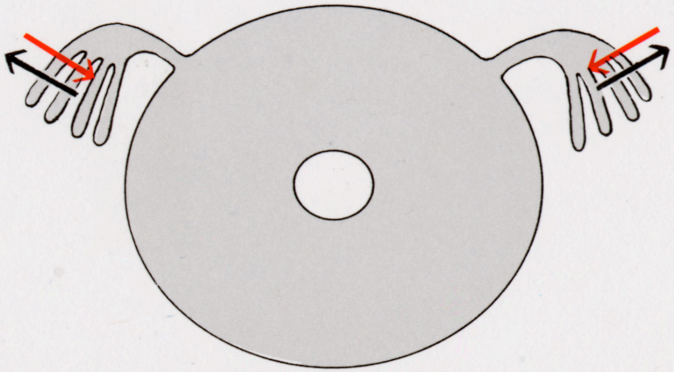
Transparency 114
Figure 35–8, page 737
Respiratory systems

Respiratory systems



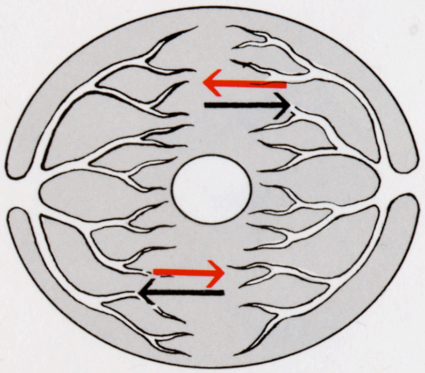
skin
(a)

(b)

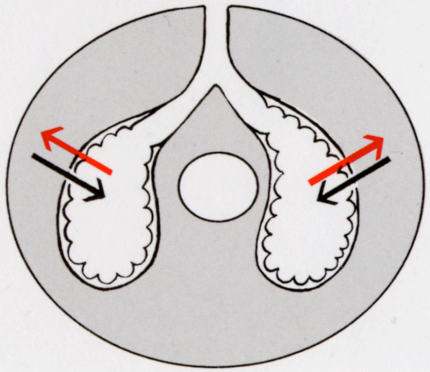


external gills
(c)

internal gills
(d)



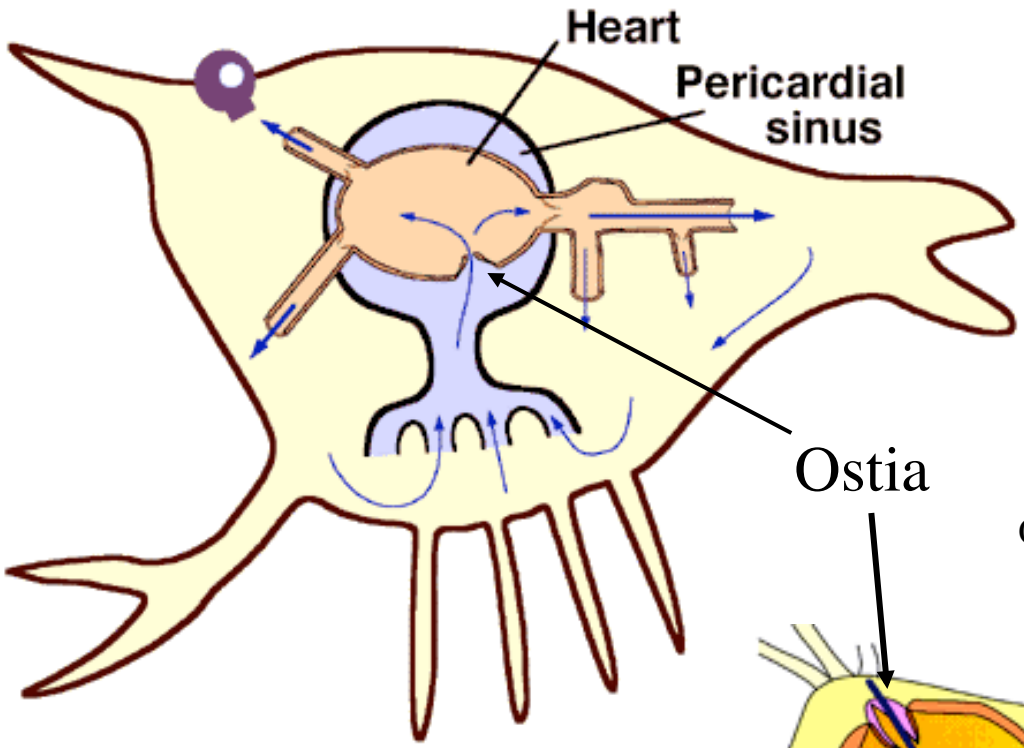
tracheae
(e)



lungs
(f)

O_2
CO_2

Open circulatory system

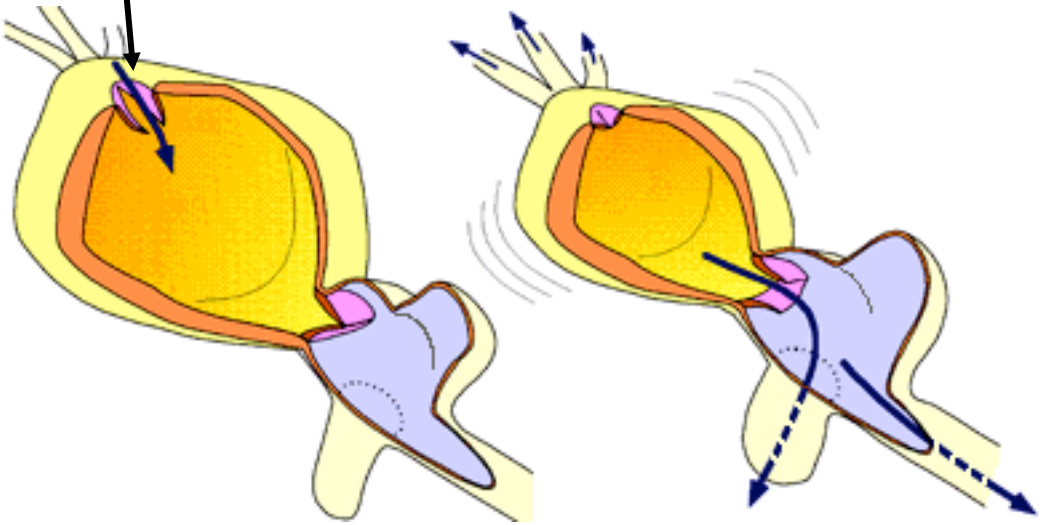


Arteries

Antennal- antennae, antennules, green glands

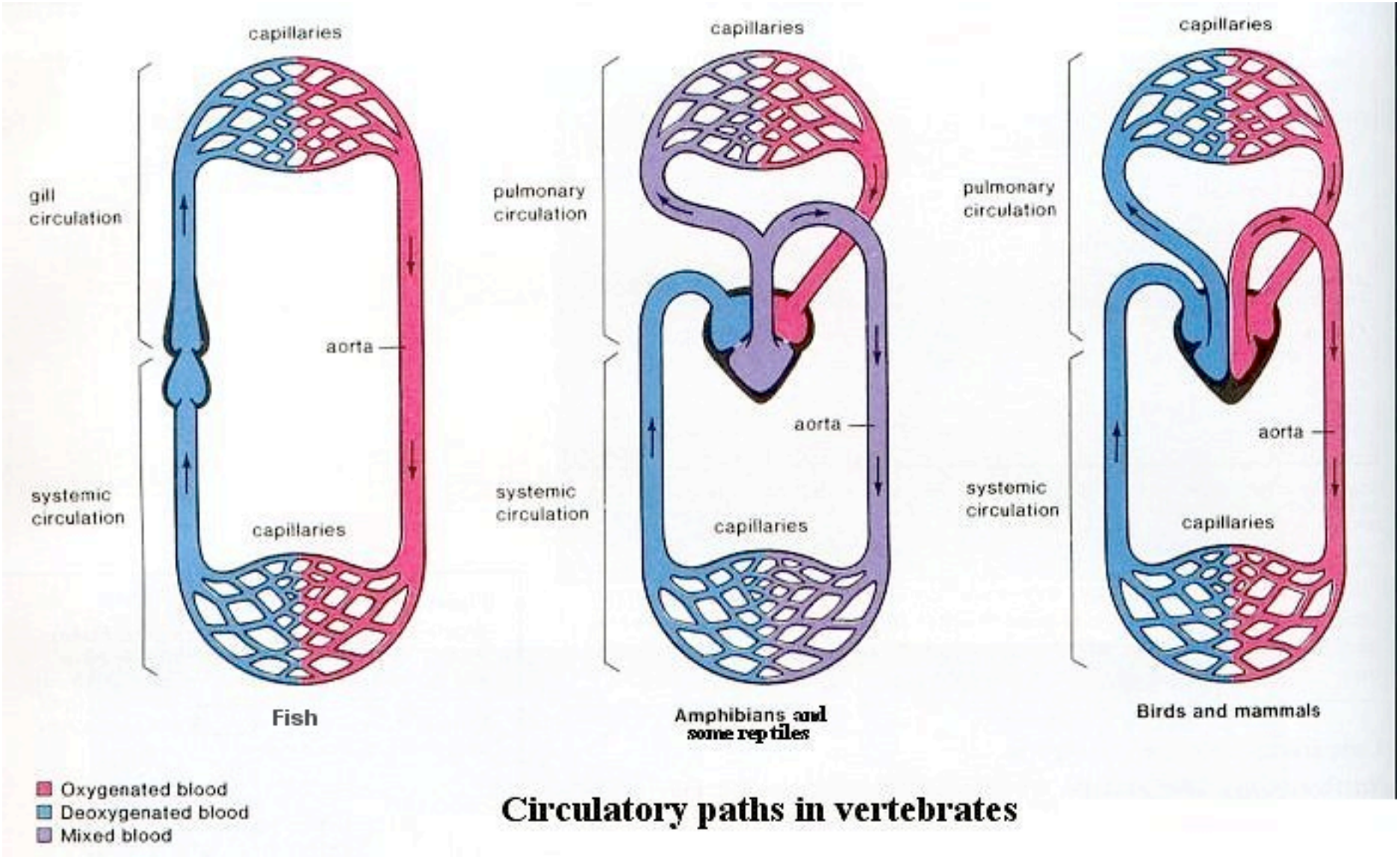
Ophthalmic- eyes

Hepatic- digestive gland



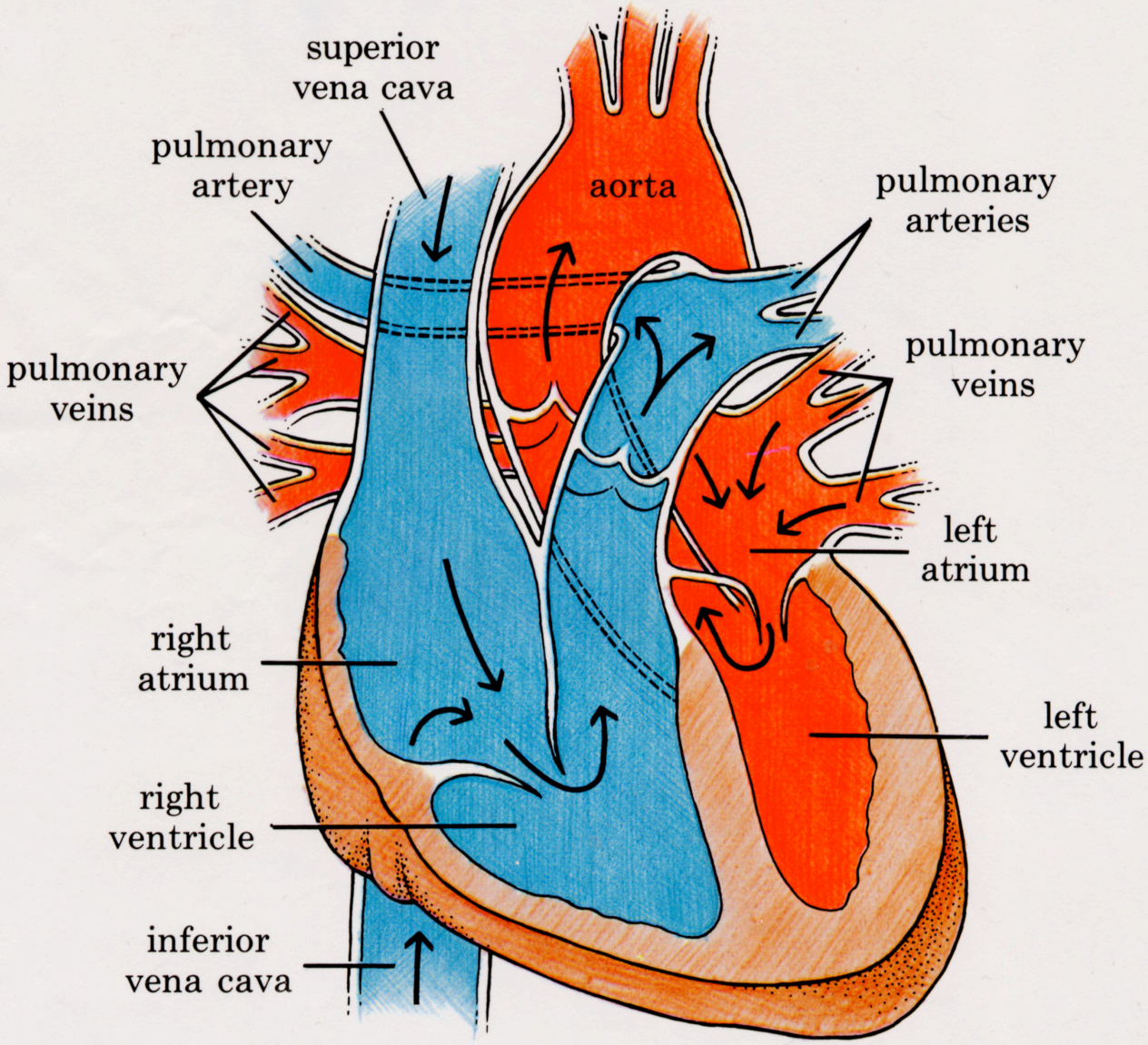
Heart → Sinuses → Heart

arteries ostia



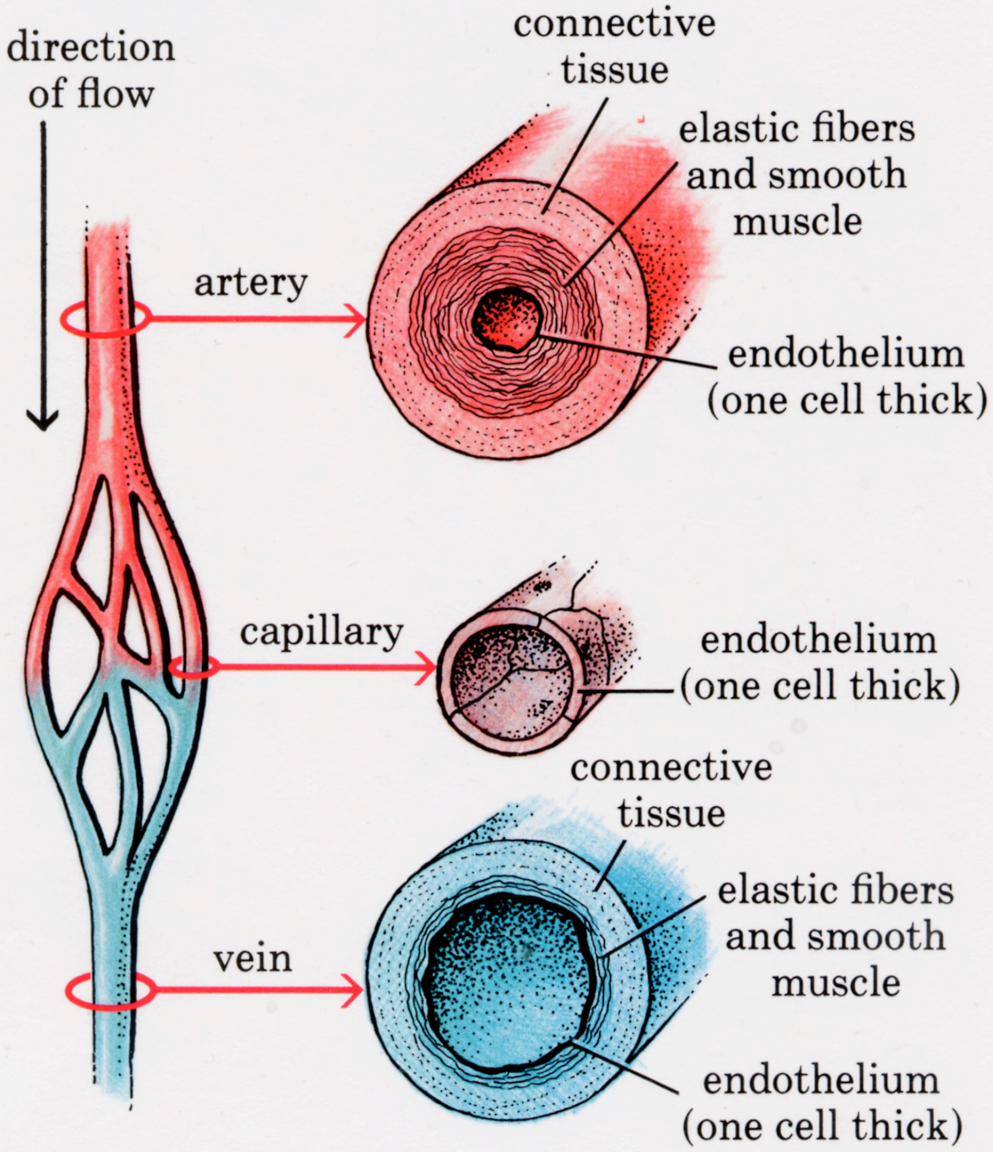
Circulatory paths in vertebrates

Human heart



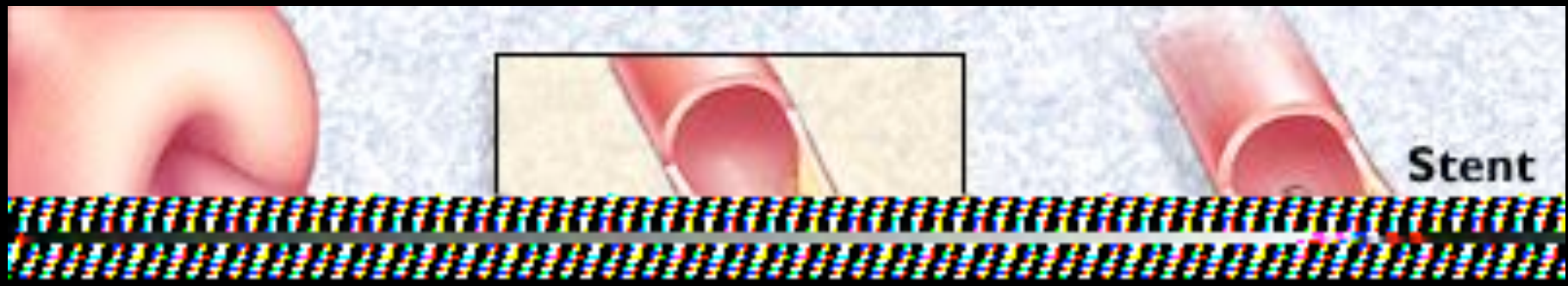
2 systems- pulmonary and systemic.

Structure of blood vessels



Human respiratory system

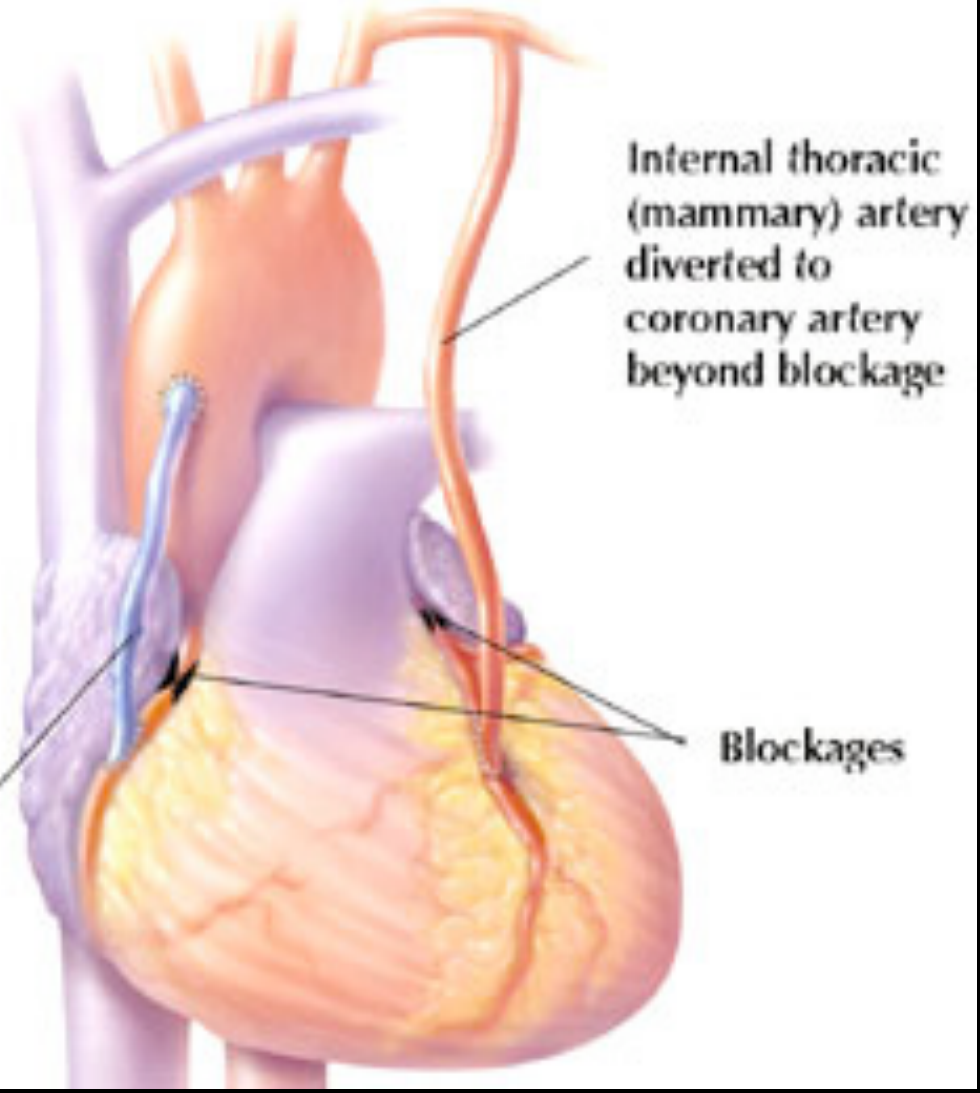
Angioplasty



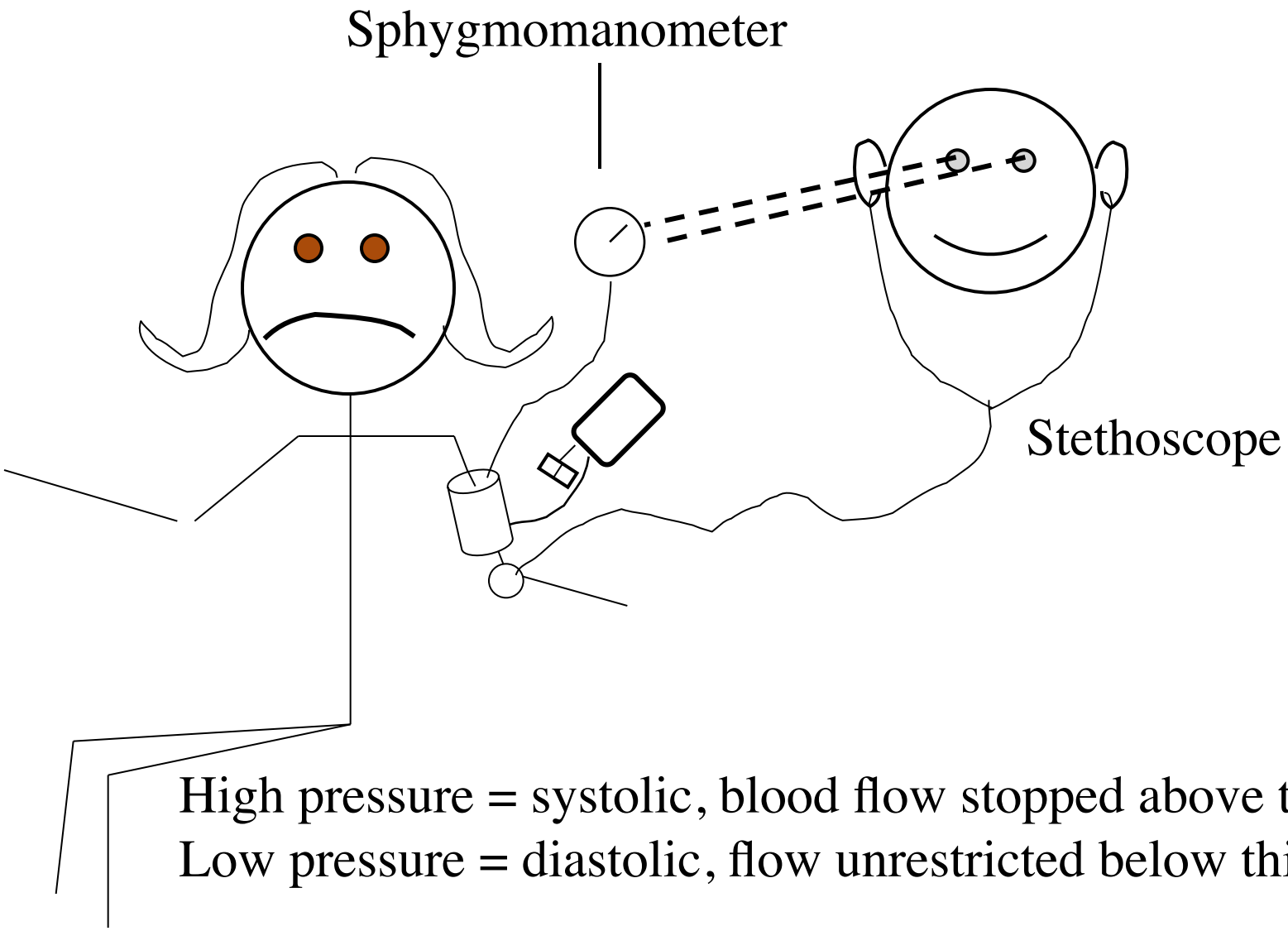
Coronary bypass

Coronary bypass

When arteries that serve the heart (coronary arteries) become blocked, the flow of oxygen-rich blood to heart muscle is impaired. A heart attack can result. Bypass surgery uses arteries or veins diverted or taken from other locations to bypass obstructions and improve blood supply to heart muscle beyond the blockages. Often, several arteries at a time must be bypassed.



Measuring Blood Pressure

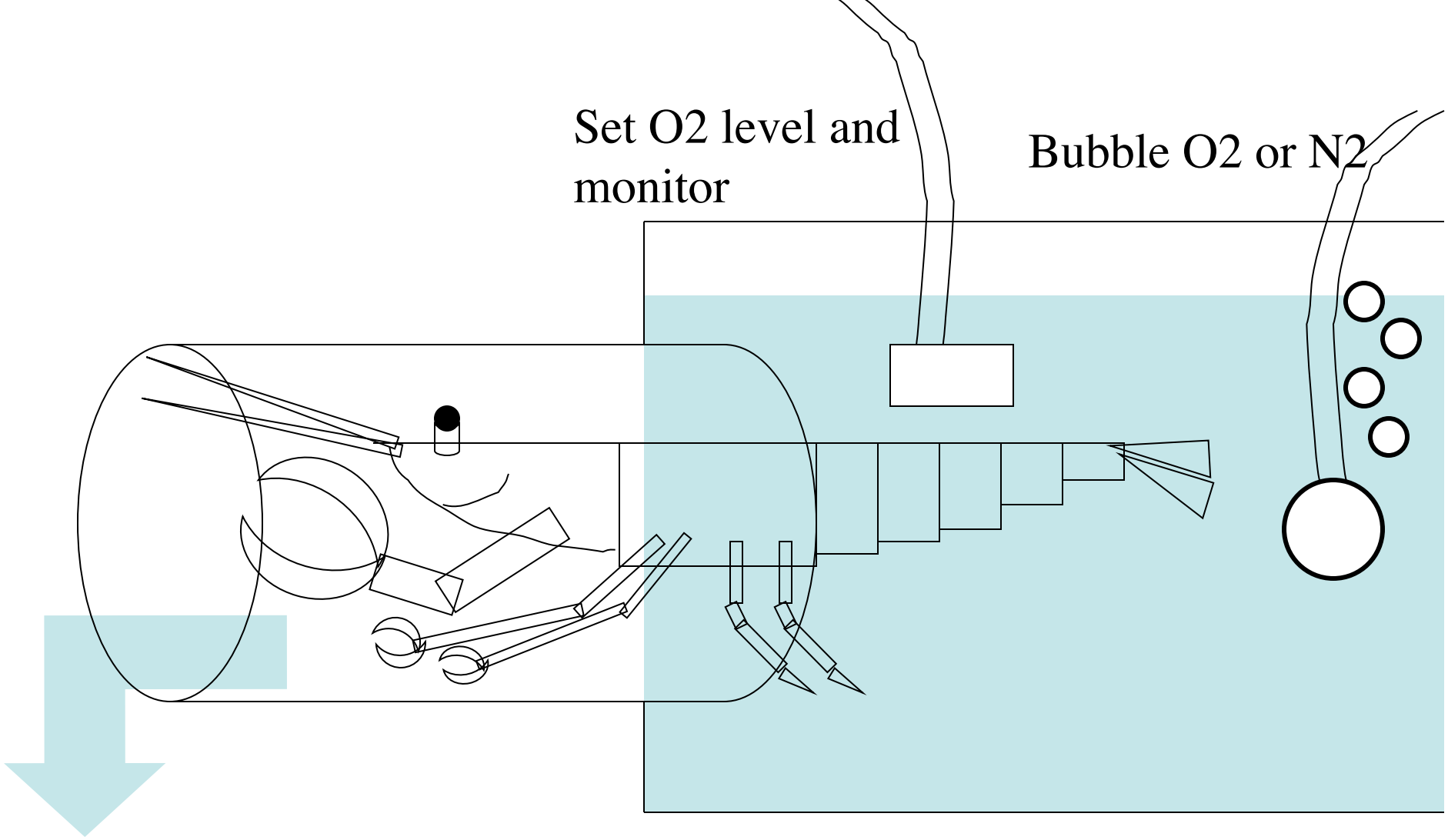


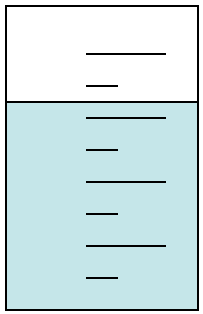
High pressure = systolic, blood flow stopped above this
Low pressure = diastolic, flow unrestricted below this

$$\frac{120 \text{ mm Hg}}{80 \text{ mm Hg}}$$

Crayfish respiration

Dr. James L. Larimer
UT-Austin professor 1959 - 2005
Zoology / Neurobiology





Measure ventilation rate