

Final Exam

Homeostasis and the Organization of the Animal Body

Homeostasis: Tendency of living things to try to maintain their structure and regulate their internal environments.

Negative Feedback: Change in opposite direction compared to original feedback.

Positive Feedback: Initial change in one direction sets off a series of events that intensifies a change in that same direction.

Pregnancy:

- 1) Pressure on cervix
- 2) Pressure signal sent to hypothalamus
- 3) Hypothalamus tells post pituitary gland to release oxytocin
- 4) Uterus Contracts

(Oxytocin → positive feedback)

Organization of the animal body

- **Epithelial, connective, muscle**, and nervous tissues (4) Stomach = green
- Cells → Tissues → Organs → Organ Systems
- Tissues: cells and/or non-cellular components
 - o 1) Epithelial: cells from continuous sheets called membranes cover body and line all body cavities; FORM BARRIER
 - A) Columnar: lining of lungs and blood vessels
 - B) Squamous: Lining of trachea, esophagus, etc.
 - o 2) Connective: surrounded by large quantities of extracellular substances (between the living cells) which are secreted from the cells of the connective tissue. Cartilage, collagen, blood/platelets, ears and tip of nose
 - Dermis (skin), fat cells (adipose tissue), blood and lymph, tendons and ligaments (holds together skeletal muscle), bone

- o 3) Muscle: tissue specialized for contraction. Cells that contain ACTIN and MYOSIN (cardiac muscle = heart)
 - Many muscle cells lining up one and the other to form a muscle fiber
- o 4) Nerve: specialized to generate and conduct electrical signals
 - Nerve Cell: Neuron
 - Action Potential

Organs:

- Formed from two or more tissue types
- Different organs have different proportion of tissue types

Circulatory System

Parts of circulatory systems

- 1) Pump (heart) to keep fluid moving
- 2) Fluid that circulates (blood)
- 3) Channel (vessels) that fluid circulates through
 - o 1) Open circulatory Systems
 - o 2) Closed circulatory Systems
 - o 3) NO circulatory System

Vertebrate Circulatory System

- 1) Carry oxygen, nutrients, and waste
- 2) Distribute hormones
- 3) Regulate body temperature
 - o Frost bite, blood tends to stay in core for organs → toes and extremities to lose blood flow
- 4) Prevent blood loss
- 5) Defend against disease

Vertebrate Hearts

- 2 Chambers – Fish [1 atrium and 1 ventricle]
- 3 Chamber – Amphibians, and some Reptiles [2 atria and 1 ventricle]
- 4 Chambers – Birds and Mammals [2 of each]
 - o Chambers are atria or ventricle
 - Deoxygenated blood is “blue”
 - Oxygenated blood is red → to body
 - Pulmonary: Heart to lungs
 - Systemic: Heart to Body
 - No known active oxygen transporters

- 20% air is Oxygen
- Systemic blood flow
 - Deoxygenated blood flows from the body back to the heart
- Pulmonary blood flow
 - Lungs to heart

4-chambered heart

- 2 chambers for deoxygenated heart
- 2 chambers for oxygenated
- o AV Valves

Flow of blood through body:

Body → right atrium → right ventricle → lungs → left atrium → left ventricle → body

Heart pumping action:

1. Atria contract
2. Ventricles contract
3. Both relax

Blood

1. Plasma
 - a. Proteins and hormones
 - b. Nutrients
 - c. Gases
 - d. Ions
 - e. Waste
 - i. Generated by all body parts
 - ii. Sugar is dissolved in the plasma of your blood
2. Cells (major component of blood are red blood cells)
 - a. Red blood cells
 - i. No nuclei
 - ii. They comprise 99% of all blood cells.
 - iii. 1 ml of blood has over 5 billion RBCs (teaspoon = 5ml)
 - iv. 90 days to 3 months lifespan
 - v. Concave shape
 - vi. A1C – blood test that looks at sugar levels over the last 90 days. Good measure for diabetes
 - vii. Red because of hemoglobin (polypeptide chains and heme groups)
 - viii. 4 heme groups bind to oxygen more strongly for each successive heme group
 - b. Platelets (not alive)