

Topic: Homeostasis and organization in animals

Reading: Chapter 31

Main concepts:

- Living things have systems to help maintain an internal environment: stable pH, blood volume, temperature, etc.
- Homeostasis is maintained by a complex interaction between the nervous system and the endocrine (hormone-producing) system, which affect and regulate other body systems.
- Negative feedback loops are designed to keep the internal environment stable. Example: internal temperature is regulated in a system similar to a thermostat. If internal temperature is too low, metabolism may be increased or shivering may help raise the temperature. If internal temperature is too high, we sweat to cool off.
- Positive feedback loops increase an effect to reach a conclusion. Example: During labor, the hormone oxytocin increases, causing uterine contractions, which stimulates more oxytocin production, until contractions are hard enough for birth to occur.
- Living organisms are organized as: cells > tissues > organs > organ systems > organism
- Tissues are made up of similar cell types. Organs are usually made up of multiple tissues.
- Main categories of tissues:
 - Epithelial: Tissues that surround the outside of the body and line internal cavities. Includes skin, glands, mucous membranes.
 - Connective: Cells are arranged in a matrix of secreted material. Includes bone, cartilage, blood.
 - Muscle tissue: Cells contain specialized contractile fibers. Includes striated (voluntary) muscle, smooth (involuntary) muscle, cardiac muscle.

Common misconceptions:

- As they study animal systems, students sometimes have an underlying belief that animals can “choose” to carry out various physiological functions, and may make statements such as, “Well, why doesn’t the camel just sweat to cool off?” A camel can’t choose to sweat any more than people can choose to. Our physiological functions are determined by our genetics. Our genes code for sweat glands in the skin. A camel’s do not.
- Students may think of homeostasis as keeping conditions in the body exactly the same. In fact, homeostasis usually keeps our internal environment within a particular ideal range. Our body temperature, for example, changes throughout the day. It may drop low while we sleep, or may be high during exercise.

Reading notes:

- Describe the difference between negative and positive feedback loops. Give living and non-living examples.
- List the four classes of body tissues, state the overall functions, and give some examples of each.
- List the major systems of the human body, and the major structures associated with each.

Useful websites:

- “Homeostasis” <http://health.howstuffworks.com/adam-200092.htm> explains negative feedback loops.
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