

Physiology

* Human Body Systems

*Targets:

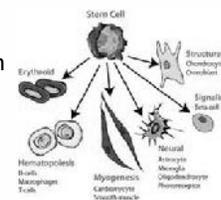
1. I can define homeostasis
2. I can explain how homeostasis maintains the internal environment of an organism
3. I can explain the function and give an example of a negative feedback loop
4. I can list the 5 levels on organization in an organism

- | | |
|--------------|----------------|
| *Nervous | *Excretory |
| *Endocrine | *Skeletal |
| *Respiratory | *Muscular |
| *Circulatory | *Integumentary |
| *Immune | *Reproductive |
| *Digestive | |

*Major Organ systems:

Differentiation: process which turns embryonic *stem cells* into specialized cells

After egg is fertilized by sperm, the cells begin to divide. Early in this process, what each cell will become has not been determined. These are stem cells.



Then Differentiation begins, which causes cells to develop into specific types of cells like nerve cells that make up the spinal cord or cardiac tissue for the heart.

1. Cells = each type of specialized cell has specific structure and task
2. Tissues = groups of similar cells work together to perform a specific function
3. Organs = various tissues function together to form an organ
4. Organ systems = 2 or more organs work in coordination
5. Organism = made up of organ systems

*5 Levels of organization

- In a different color, write an example of each level of organization

***Homeostasis** = regulation and maintenance of the body's internal environment.

*Ex. - Temperature, fluids, salts, pH, nutrients, gases

Feedback loops monitor body systems and make adjustments when the body moves to far away from its set point

- Negative feedback = stabilizing

Ex. Sweating to cool body down

- Positive feedback = destabilizing

Ex. After injury, increase in blood flow

* **Homeostasis disruption: diabetes**

*Glucose levels are controlled by 2 hormones:

*Insulin and Glucagon (both released by pancreas)

*When glucose levels are *too high*, pancreas releases insulin (makes cells take in more glucose, stores extra as glycogen in the liver)

*When glucose *levels fall*, pancreas releases glucagon (stimulates liver to release stored glycogen)

*Diabetes is when the pancreas fails to do its job:

A build up of glucose in the blood can damage cells in every organ and every body system.

*Feedback Loops

* **Body systems must coordinate to keep organism healthy**

*Thermoregulation = maintain steady body temperature

*At rest = body heat produced by liver, heart, brain and endocrine glands

*In motion = skeletal muscles produce 30-40 times the heat generated by rest of body

*Hypothalamus monitors body temperature. Endocrine and nervous systems make adjustments when hot; muscular, respiratory and circulatory adjust when too cold.

* **Exercise requires more energy**

*To make more energy, cells must:

* convert glucose into ATP (endocrine)

*Bring more oxygen to the cell and remove carbon dioxide (respiratory and circulatory)

*Monitor and remove excess heat produced by cell respiration (nervous, circulatory and endocrine)