

## Regulation of the body - How do systems interact to regulate all animals Body?

- Nervous system is the master control center for regulation of our bodies. Brain and spinal chord are part of the central nervous system.

- The brain sends out signals down the spinal chord telling our muscles to contract.

muscular + skeletal + Nervous systems } Ex: When you touch a hot area by accident, your hand will jerk away from the hot area it touched to prevent further damage.

Ex#2: Mouse sees, smells, and hears a cat approaching it so, it runs away. Brain sends signals to the muscles to contract to allow it to run. Other system involved is endocrine, sending chemicals to body/muscles to run faster + survive. → Adrenaline

Ex#3: Body Temperature is controlled by Nervous System - Brain sends signals to release hormones to travel through the blood and cause sweating if temp is too hot, or cause shivering if temp is too low.

- Remember: The Nervous system work very fast but does not last very long, while the endocrine system works slower, but has a longer effect on the body.

Ex: Adrenaline is a hormone that speeds up our heart rate and makes more glucose available for cells to access energy, therefore increases muscle availability allowing more muscle contraction.

## How do systems interact to absorb Nutrients?

- Heterotrophs = Consumer
- \* Heterotrophs → Are animals that have to find food for energy.
    - In order to obtain food, animals use their, nervous, muscular, and skeletal systems. Senses - come from nervous system, muscles and bone help with movement towards food as well as chewing.
  - \* For complex animals like humans, digestion occurs with the help of multiple organs that process and digest food until it can be absorbed and delivered to cells throughout the body by the circulatory system.

Ex: Nervous system - controls muscles that move food through digestive organs.

Endocrine system - hormones stimulate pancreas to release enzymes that break down food. Saliva is produced in the mouth to break down food.

## How do systems interact in reproduction?

- \* Largely influenced by the nervous and endocrine system, brain sends signals to the reproductive system when conditions are right for reproduction.
- \* Many systems work in mother's body to allow the embryo to develop.
  - Reproductive - Placenta grows in uterus as well as embryo.
  - Circulatory - Blood vessels in placenta carry food and oxygen to embryo and move waste away from it.
  - Endocrine system - stimulates milk production to feed the offspring after birth.

Digestion - 2 types - Chemical → saliva + stomach acid.

mechanical/physical Digestion → Break food down to smaller pieces

Nervous system give us our senses → <sup>①</sup> smell, taste, which then cause

Endocrine system to release hormones that make you salivate.

Muscular system, helps us chew our food + swallow it.

Then, stomach of the digestive system breaks down the food further, with stomach acid from the digestive system,

Food will travel down the intestines, to be absorbed by cilia (little hair structures on the intestines.) Absorbed by cilia and travels to the blood to be taken where needed, via circulatory system.

## How do systems interact to defend the body?

- \* The immune system is the main system that defends the body from illness with a variety of white blood cells that recognize and attack pathogens.
- \* The digestive system also has stomach acid that has the ability to help kill pathogens that enter the body through our food.
- \* The integumentary system (skin) - Acts as a barrier (main) between pathogens and our internal body tissues.
  - Mucus membranes (also part of the integumentary system) line the nose, mouth, and other body cavities, releasing mucus to help trap pathogens and small foreign objects.
- \* The nervous system also protects us from physical injury.
  - If a person feels threatened, brain processes sensory information of danger & reacts.
- \* Adrenaline from the endocrine system and messages from the nervous system help the person/animal flee or fight its attacker.
- \* The circulatory, respiratory, and muscle system all work harder and faster than normal to give the animal/person oxygen & energy to flee or fight.