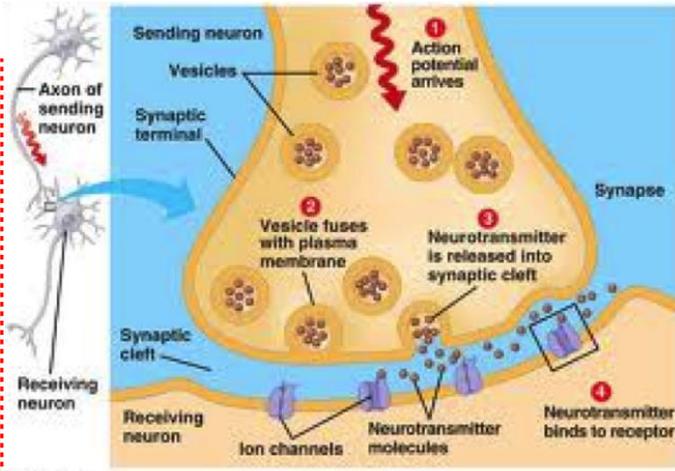
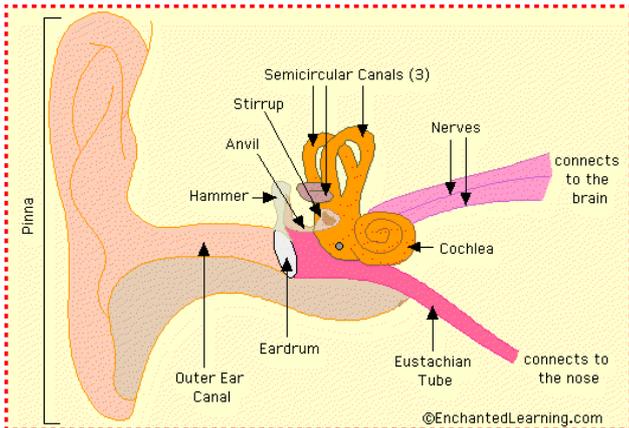
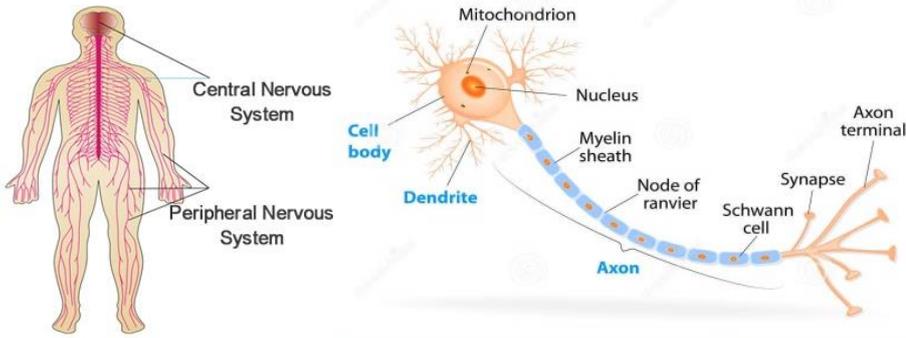


Nervous System | Topic Notes

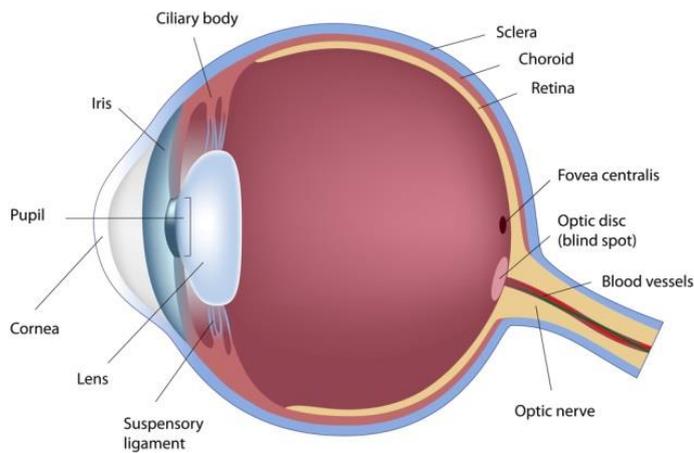
The nervous system allows animals to *sense and respond quickly* to changes in their environment by use of neurons which carry *electrochemical signals*.

- Sensory neurons carry impulses toward the central nervous system.
- Interneurons carry impulses from one neuron to another completely within the CNS.
- Motor neurons carry impulses from an interneuron to an effector, which is an organ or tissue that carries out an action in response to a signal from the nervous system.

NEURON



Human Eye Anatomy

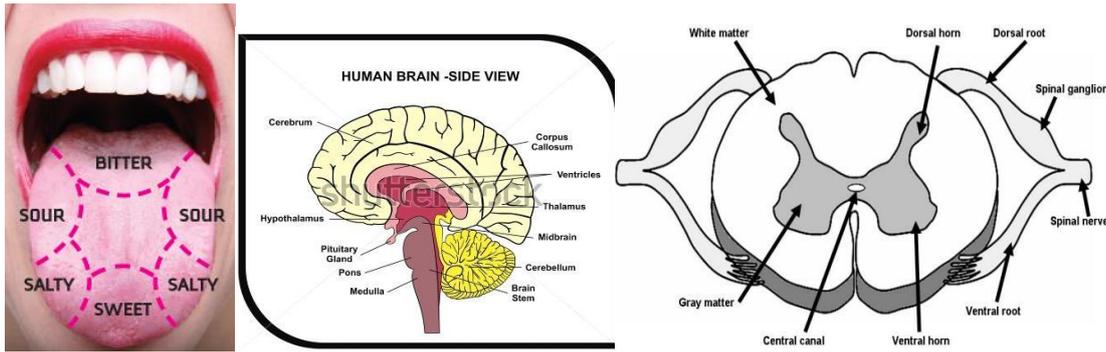


- A **neurotransmitter** is a chemical substance released by a neuron to transmit a nerve impulse to another neuron or effector. Examples include *acetylcholine* and *dopamine*.
- A **synapse** is a structure where two neurons come into close contact so that a nerve impulse can be transmitted between the two neurons.
- **Hyperopia** occurs when the *image is being focused behind the retina*. It is corrected by **convex lenses**. **Myopia** is when the *image is being focused in front of the retina*. It is corrected using

concave lenses.

Cross-section of Spinal

chord:



Homeostasis

Homeostasis is the maintenance of a constant internal environment.

- Plants increase **transpiration** on hot days to cool themselves down.
- Some insects can produce **glycerol** (which acts as an antifreeze in cold weather).
- **Endotherms** (AKA warm-blooded) are those animals that maintain constant internal body temperature despite fluctuations in external temperature.
- **Ectotherms** (AKA cold-blooded) are those animals that cannot maintain a constant internal body temperature. Their temperature fluctuates with the environmental temperature.
- In endothermic animals the main source of heat is metabolism in organs such as the liver and brain. Metabolism is controlled by the hormone **thyroxine**.
- **Sweating, rapid breathing** and **vasodilation** (widening of blood vessels) help cool the body when it's too hot.
- **Shivering, goose bumps, vasoconstriction** and **secretion of thyroxine** help keep the body warm when it's cold.
- Animals must maintain a constant blood **PH of 7.4**, if the PH drops (i.e. the blood becomes acidic) due to an increase of CO₂, animals respond by **increasing their breathing rate** and by **excreting Hydrogen ions via the kidneys**. Plants demonstrate **chemotropism** and their roots will grow to their preferred PH.

- **Glucose levels** in the blood are controlled by two hormones; **insulin**, which is released when glc levels are too high and **glucagon**, which is released when glc levels are too low.
- **Osmoregulation** (water and salt balance) is controlled by the kidneys which excrete excess water. **Hydrotropism** occurs when plants roots grow in search of water.
- If blood **calcium levels** decrease, the **parathyroids** (glands in the neck) secrete **parathormone** that increases calcium levels.