

# The Endocrine System

- Main Function:

It releases hormones into the blood to signal other cells to behave in certain ways. It is a slow but widespread form of communication.

**Chemical  
Communication**

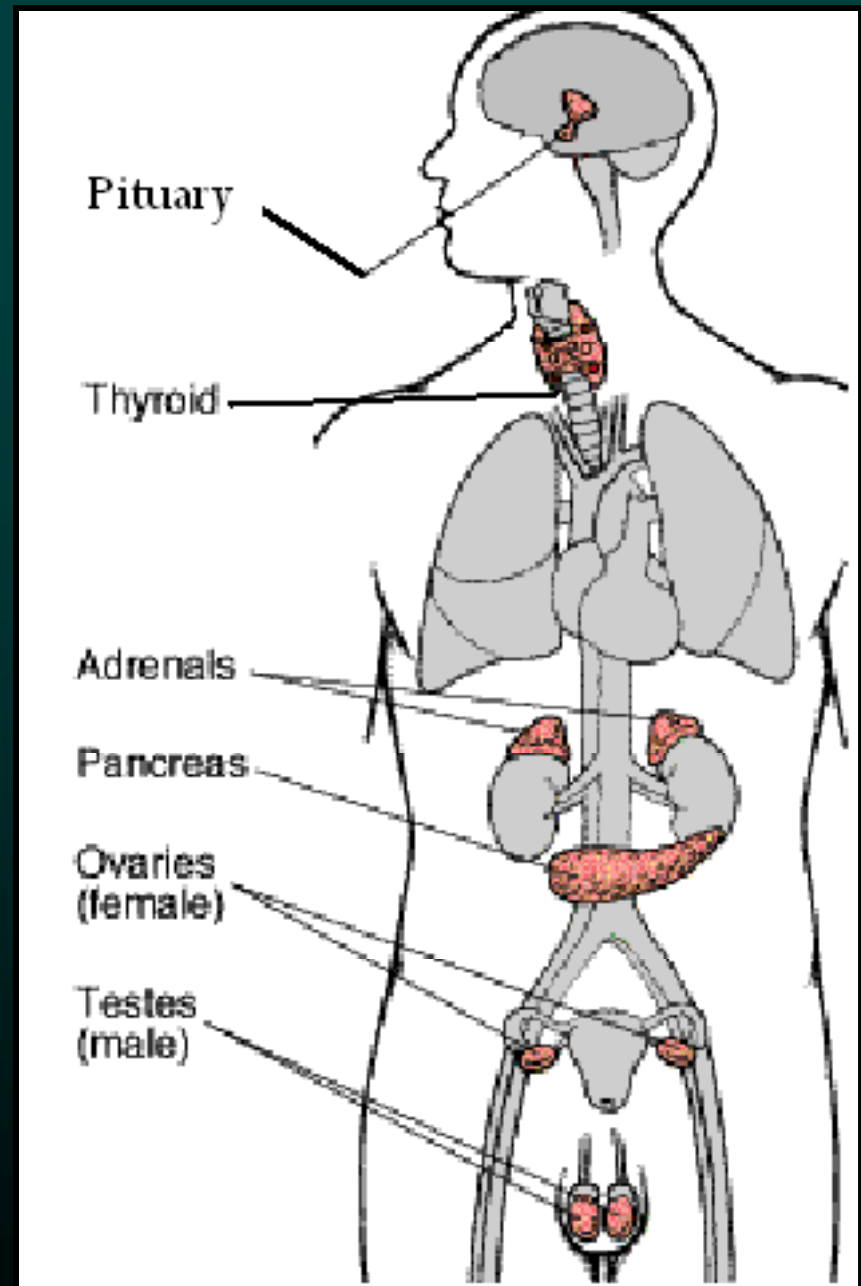
# The Endocrine System

Consists of:

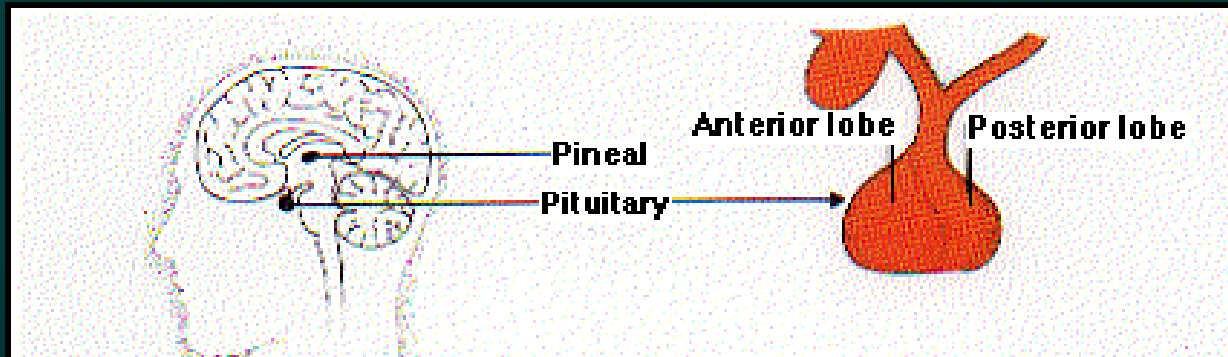
## Endocrine glands

Release hormones into the bloodstream.

**Hormones** are chemicals released in one part of the body that travel through the bloodstream and affect the activities of cells in other parts of the body.

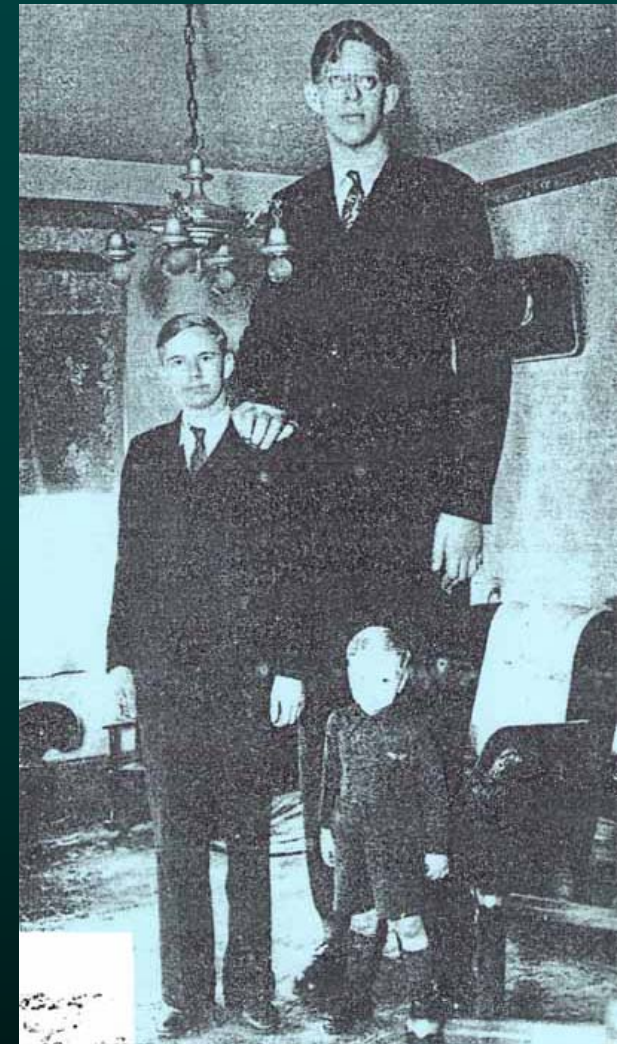


# Pituitary Gland



**Function:** It secretes nine hormones that directly regulate many body functions and controls functions of other glands.

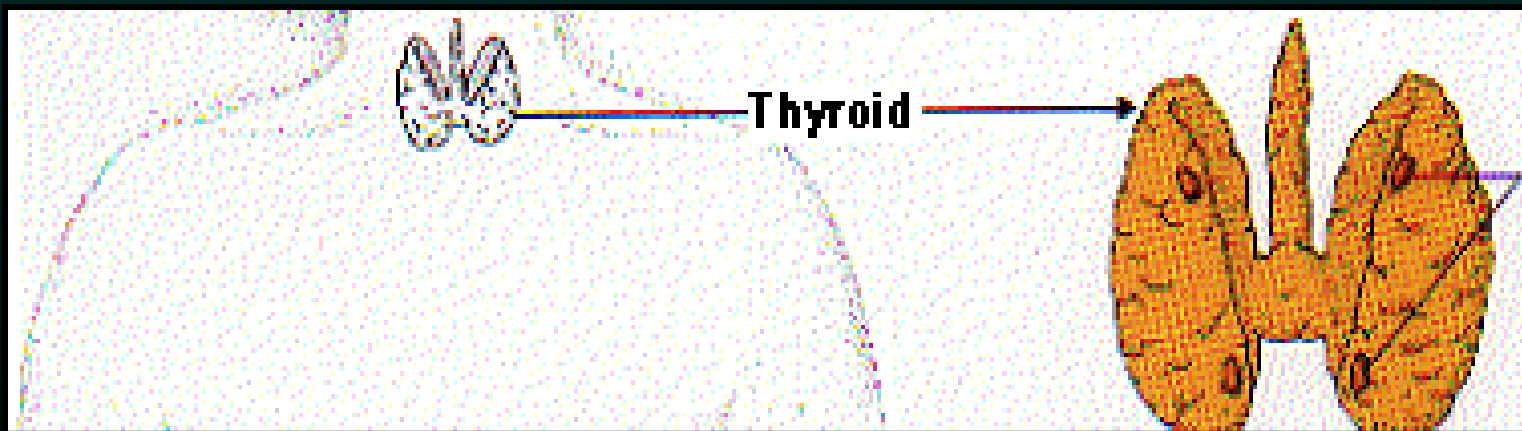
**Disorders:** Too much growth hormones (GH) in early childhood can result in a condition called gigantism. Too little GH can result in Pituitary Dwarfism.



Robert  
Wadlow

# Thyroid Gland

- **Function:** plays a major role in regulation the body's metabolism.
- **Disorders:** If the Thyroid Gland produces to much **Thyroxin**, it can cause a condition known as Hyperthyroidism. If to little **thyroxin** produces it is called Hypothyroidism.



# Pancreas

- **Function:** The Insulin and Glycogen in the Pancreas help to keep the level of glucose in the blood stable.
- **Disorders:** When the Pancreas fails to produce or properly use Insulin, it can cause a condition known as Diabetes Mellitus.

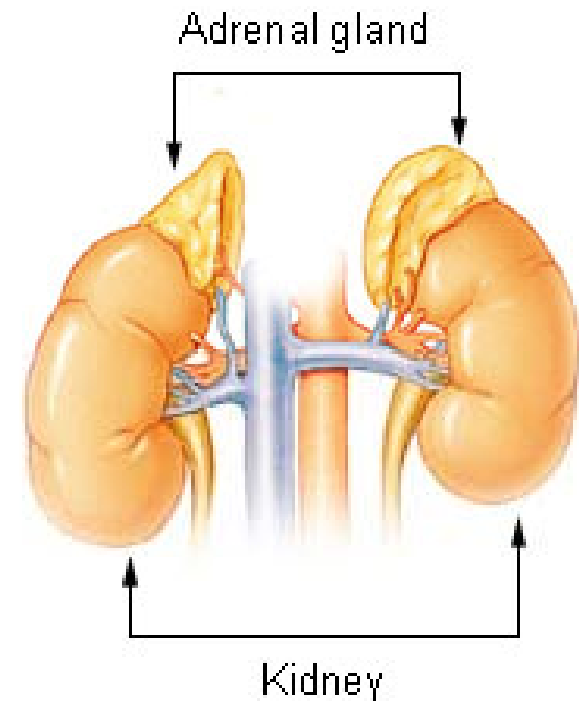
# Adrenal Gland

- **Functions:**

- The adrenal glands release Adrenaline in the body that helps prepare for and deal with stress.

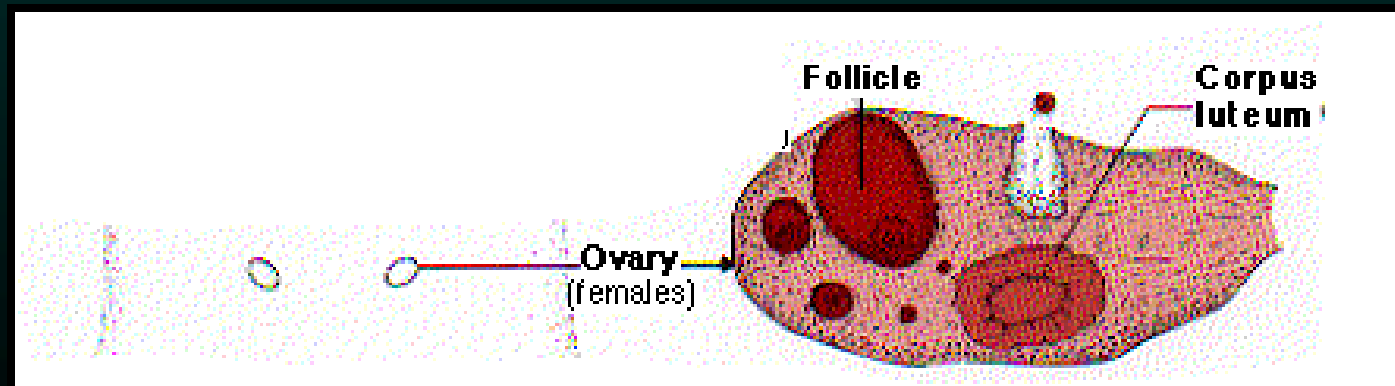
- Also regulates kidney function.

**Adrenal Gland**



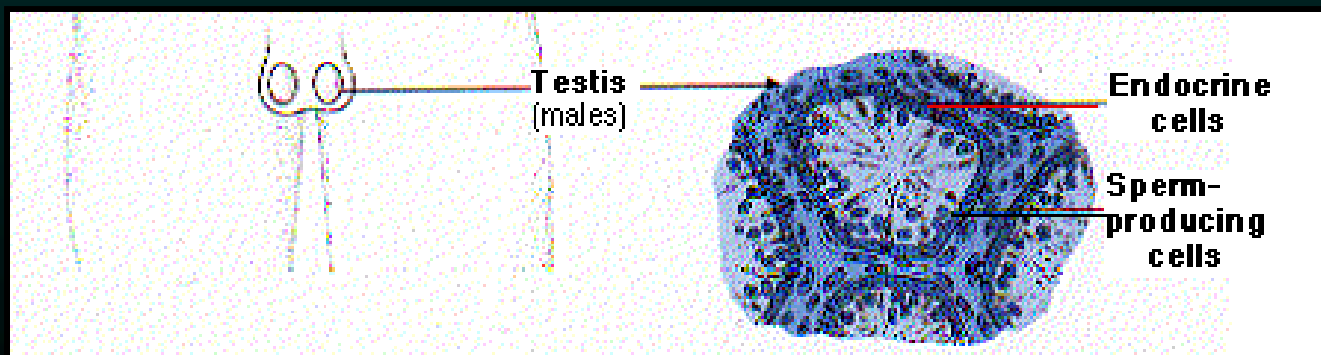
# Ovaries

- **Functions:**
  - Pair of reproductive organs found in women that produce eggs.
  - Also secrete estrogen and progesterone, which control ovulation and menstruation.



# Testes

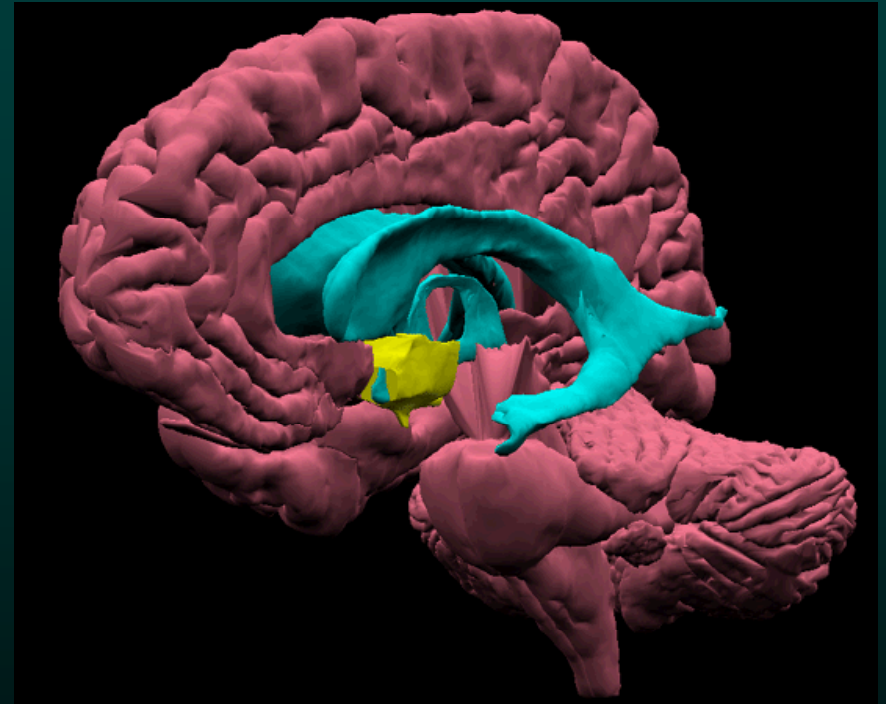
- **Functions:**
  - Pair of reproductive glands that produces sperm.
  - Also secrete Testosterone to give the body its masculine characteristics.





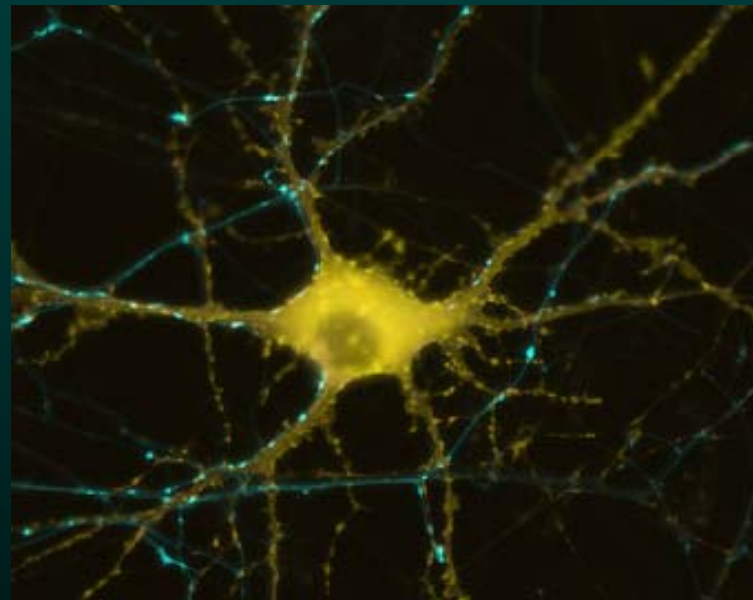
# Interaction of Glands

The hypothalamus is located in the **brain** and controls the release of hormones from the **pituitary** gland. It is an important link between the endocrine and **nervous** systems.



<http://www.biocfarm.unibo.it/aunsnc/images/3D%20Objects/hypothalamus.gif>

# The Nervous System

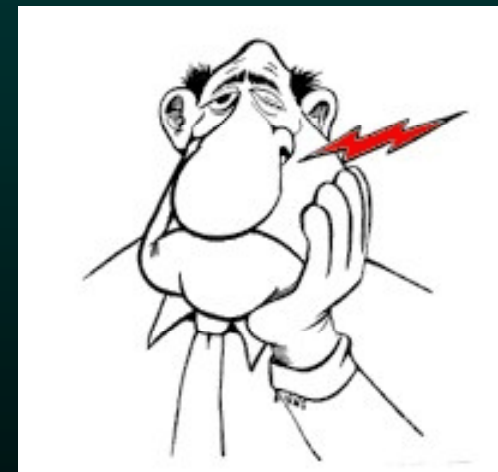


**Electrical  
Communication**

# The Nervous System

## *Main Function:*

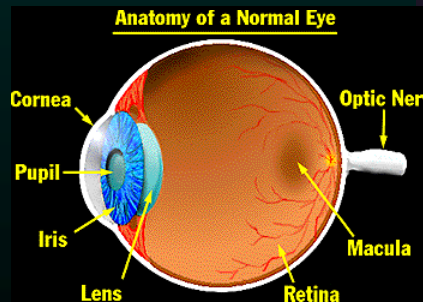
This communication system controls and coordinates functions throughout the body and responds to internal and external stimuli.



Our nervous system allows us to feel pain.

# The Nervous System

**Consists of:** brain, spinal cord, nerves and sense organs



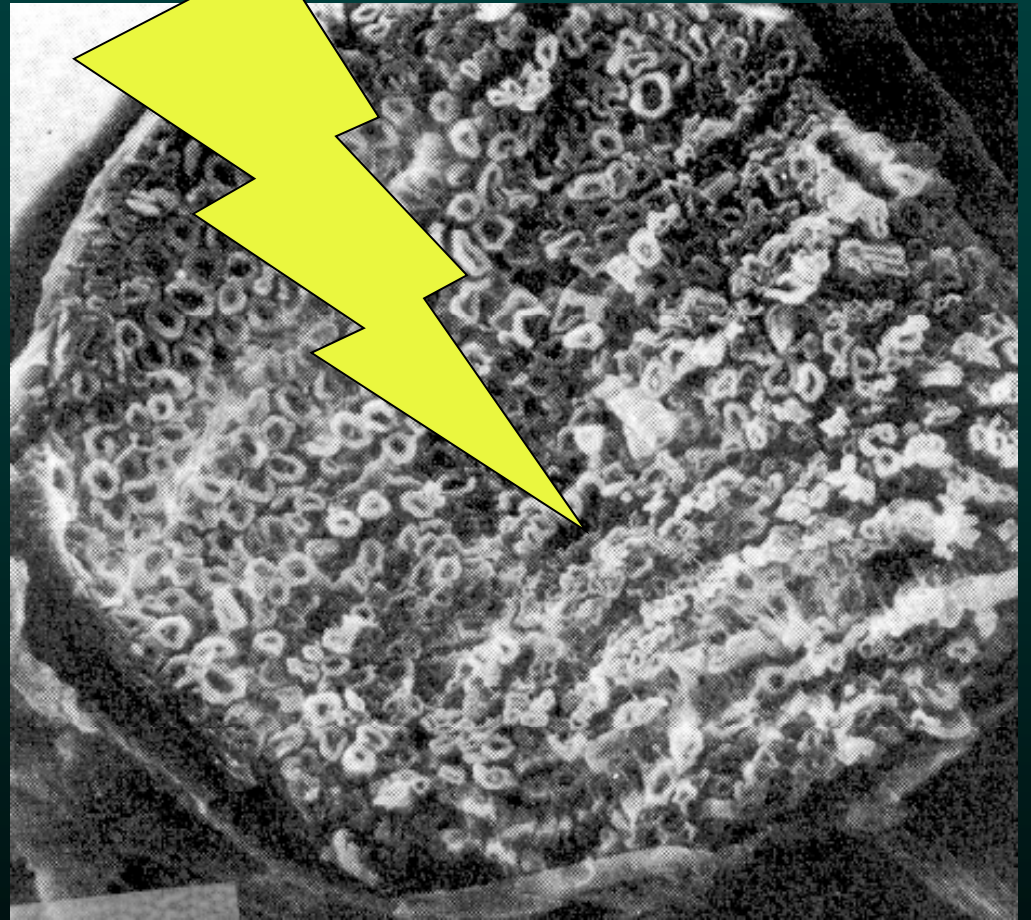
**Sense Organs: Eyes, Skin, Ears, Nose & Tongue**



# The Nerve

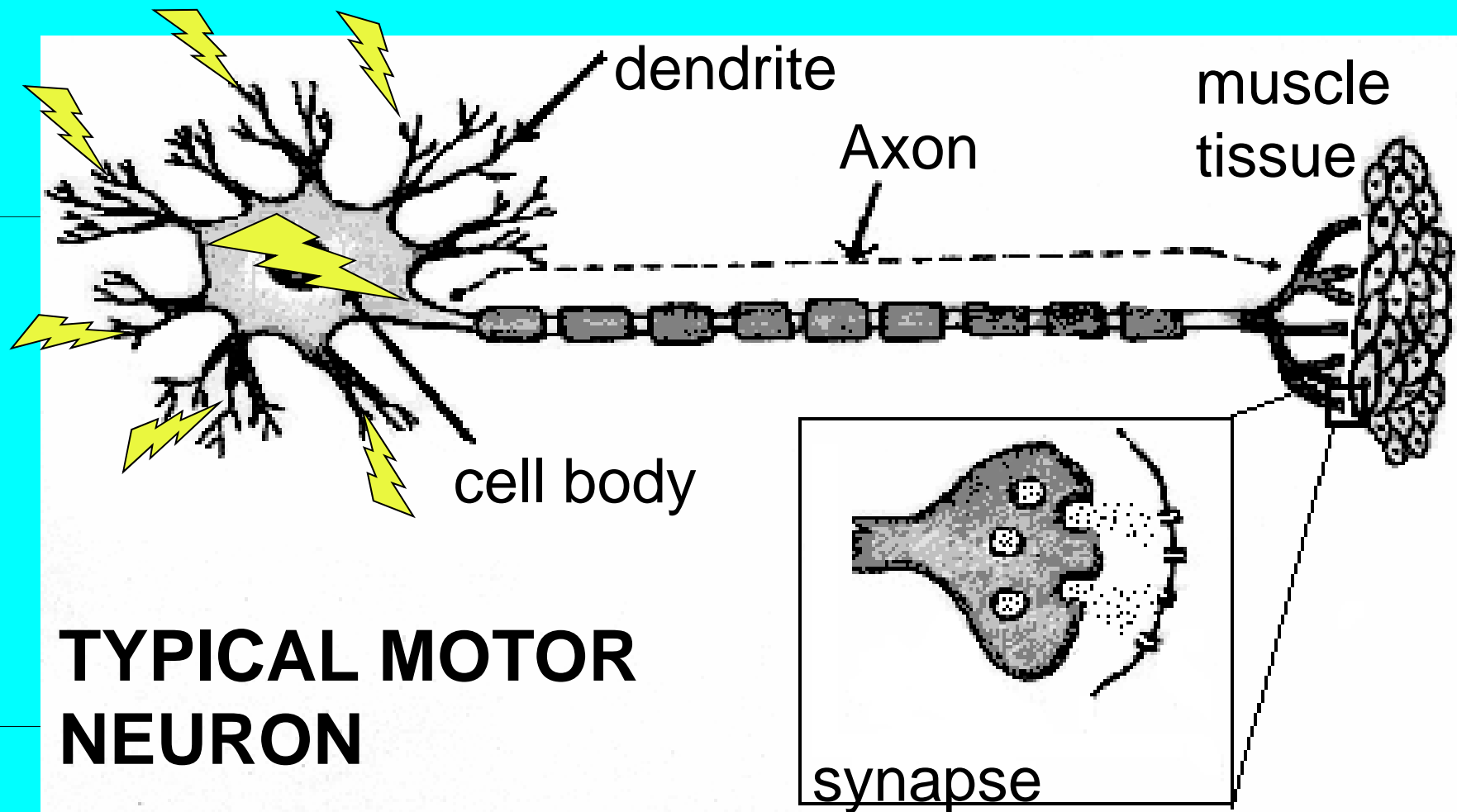
A nerve is an organ containing a bundle of nerve cells called neurons.

Neurons carry *electrical* messages called impulses throughout the body.

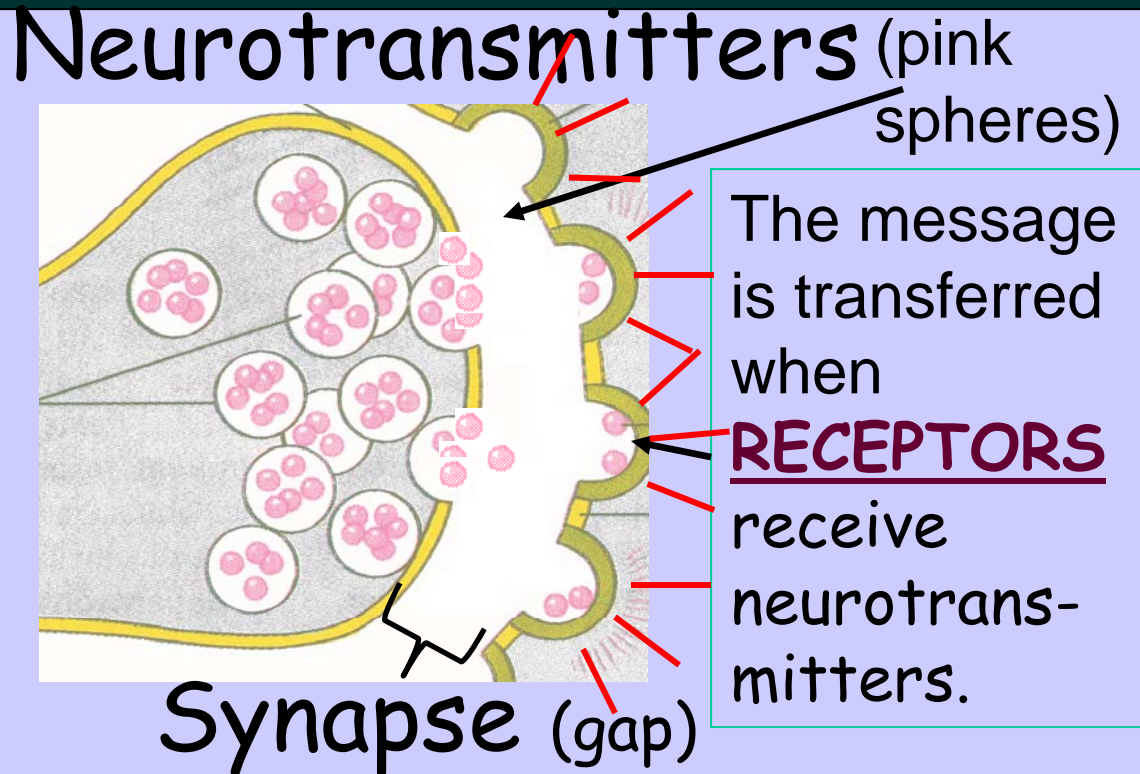


Picture shows hundreds of severed neuron axons

# Impulse in a Neuron

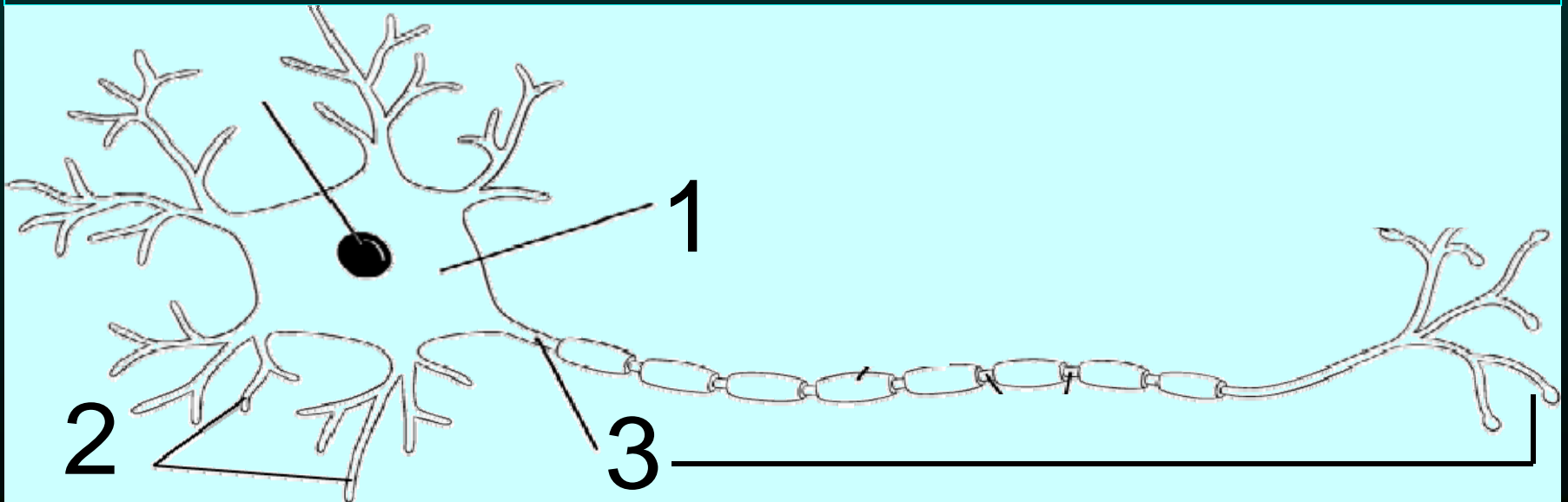


Because neurons never touch, chemical signalers called neurotransmitters must travel through the space called synapse between two neurons.



# Parts of a Neuron

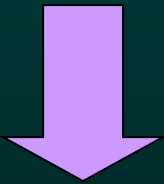
1. **Cell body:** contains nucleus & most of the cytoplasm
2. **Dendrites:** projections that bring impulses into the neuron to the cell body.
3. **Axon:** long projection that carries impulses away from cell body



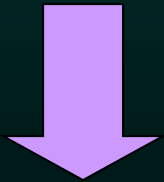


# Types of Neurons

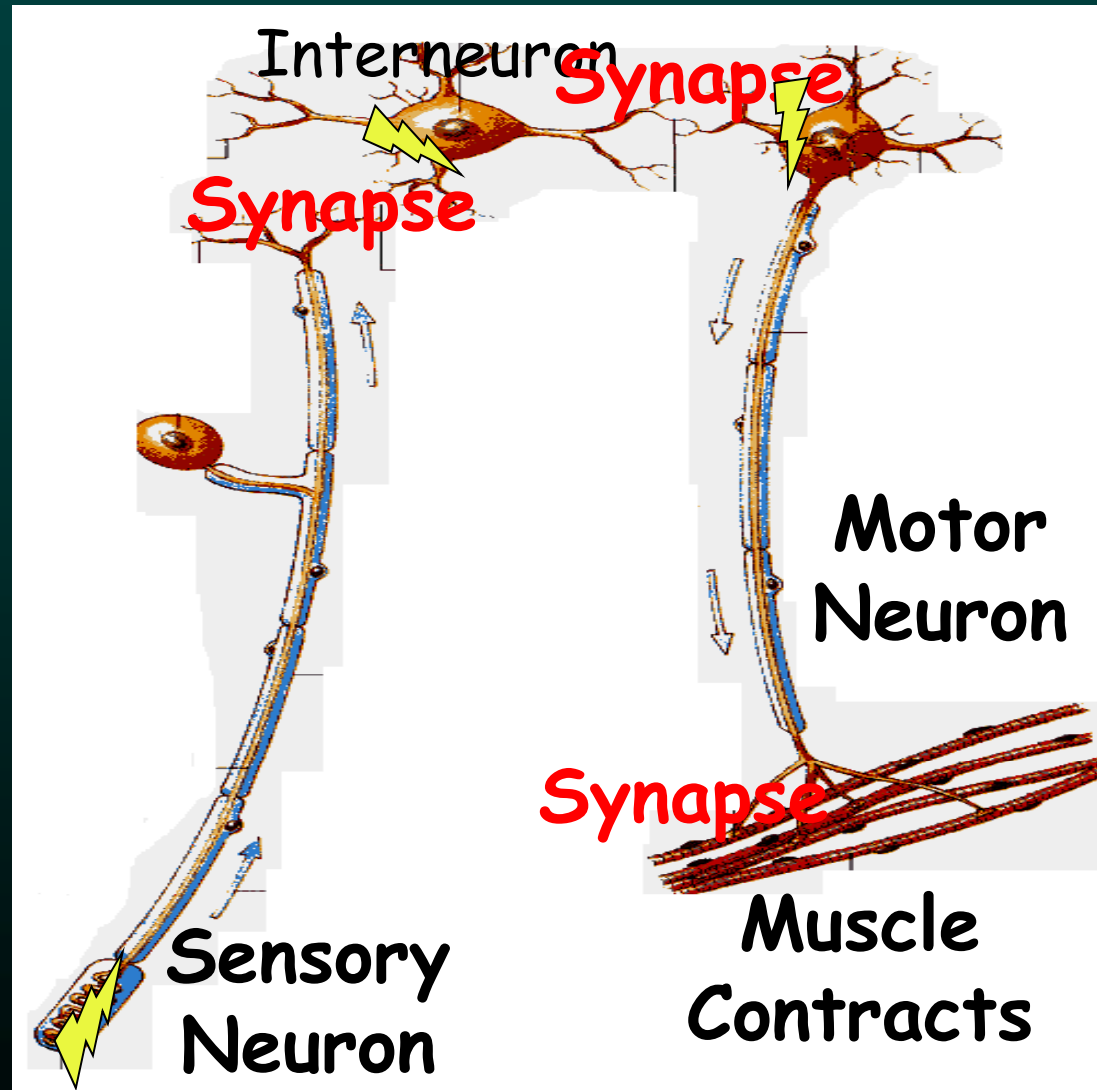
Sensory  
Neuron



Interneuron



Motor  
Neuron



## Sensory Neuron

carry impulses from  
sense organs to  
spinal cord & brain

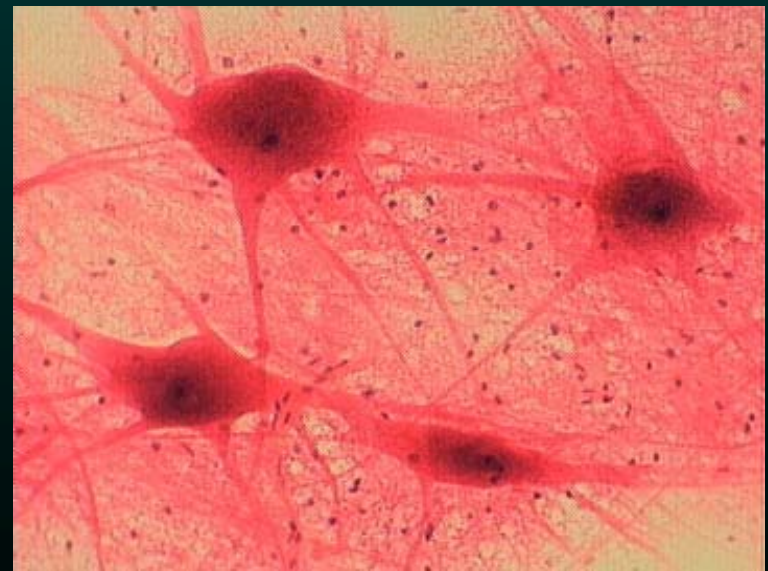
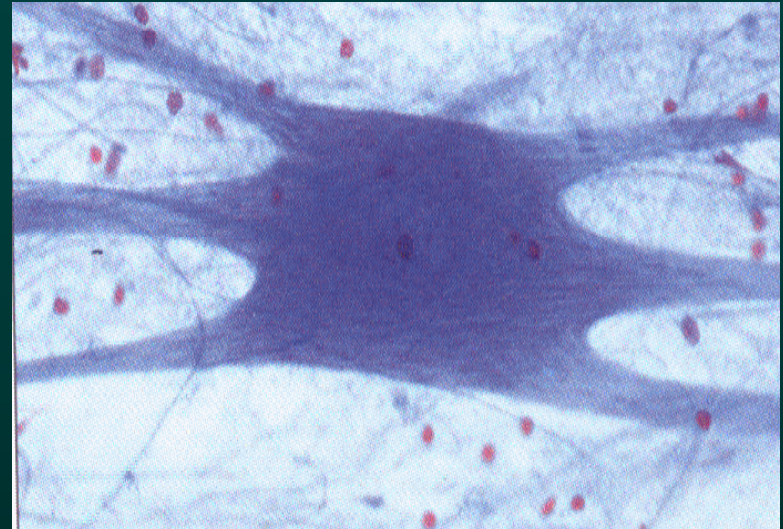
## Fun Fact:

*Where can the  
largest cells in the  
world be found?*

The giraffe's sensory and  
motor neurons! Some  
must bring impulses from  
the bottom of their legs  
to their spinal cord  
several meters away!!

# Interneuron

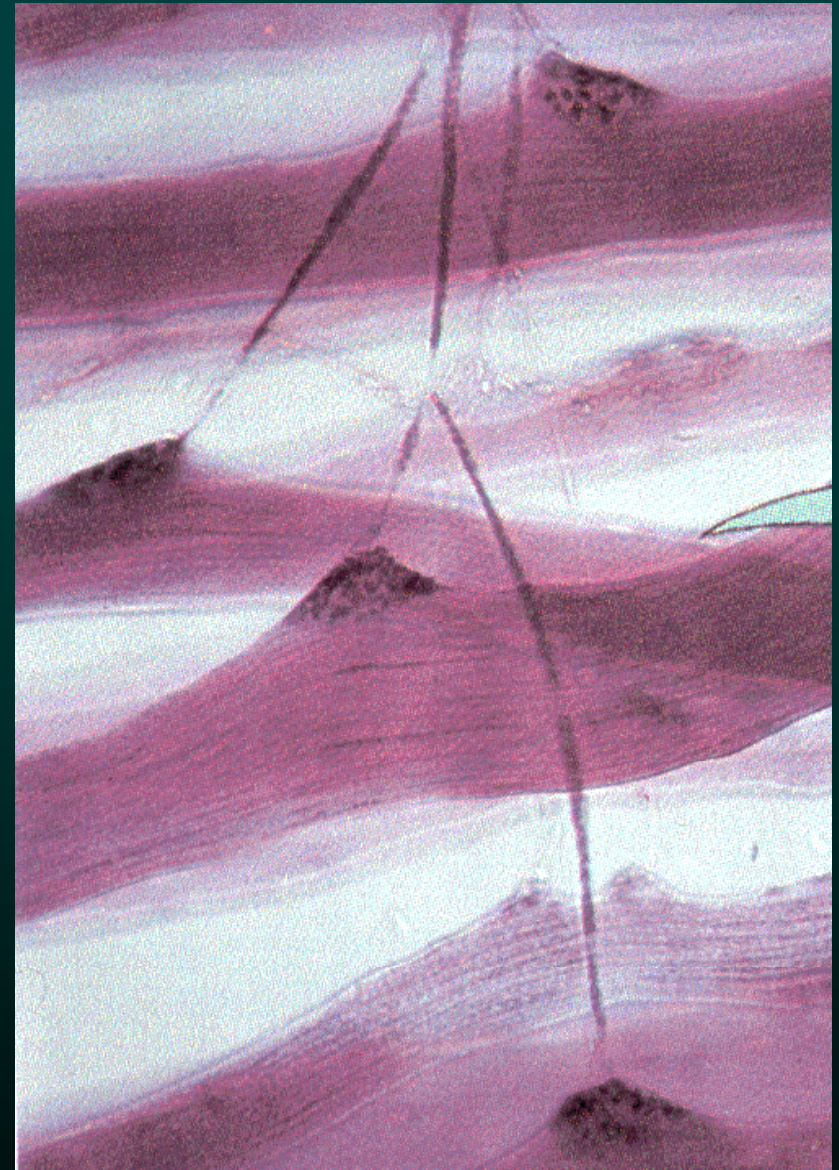
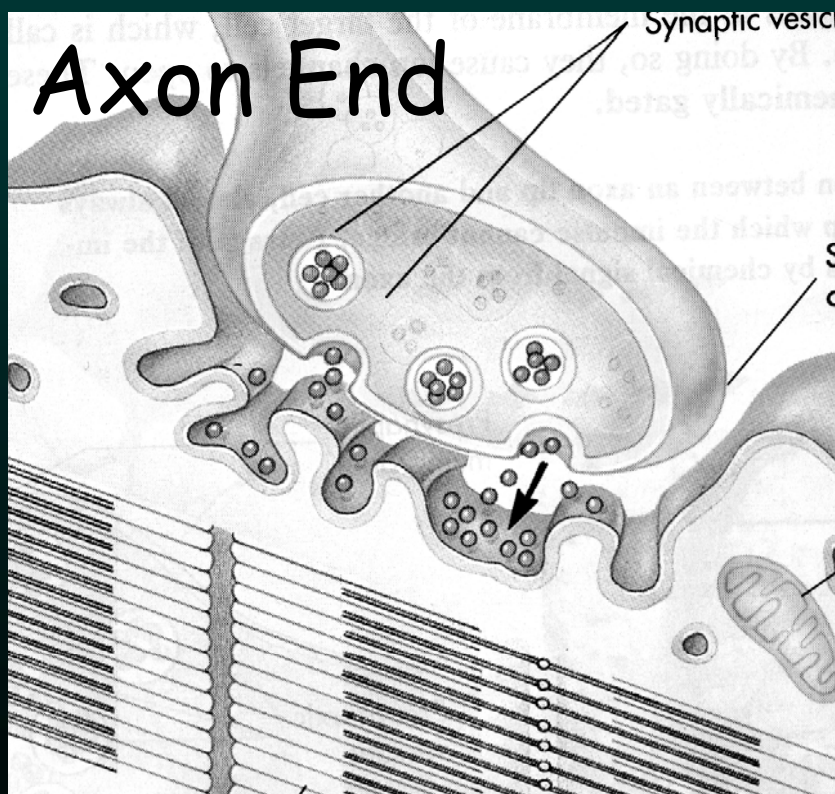
- processes impulses in brain and spinal cord
- connect sensory and motor neurons





# Motor Neurons

carry impulses from the brain & spinal cord to muscles & glands



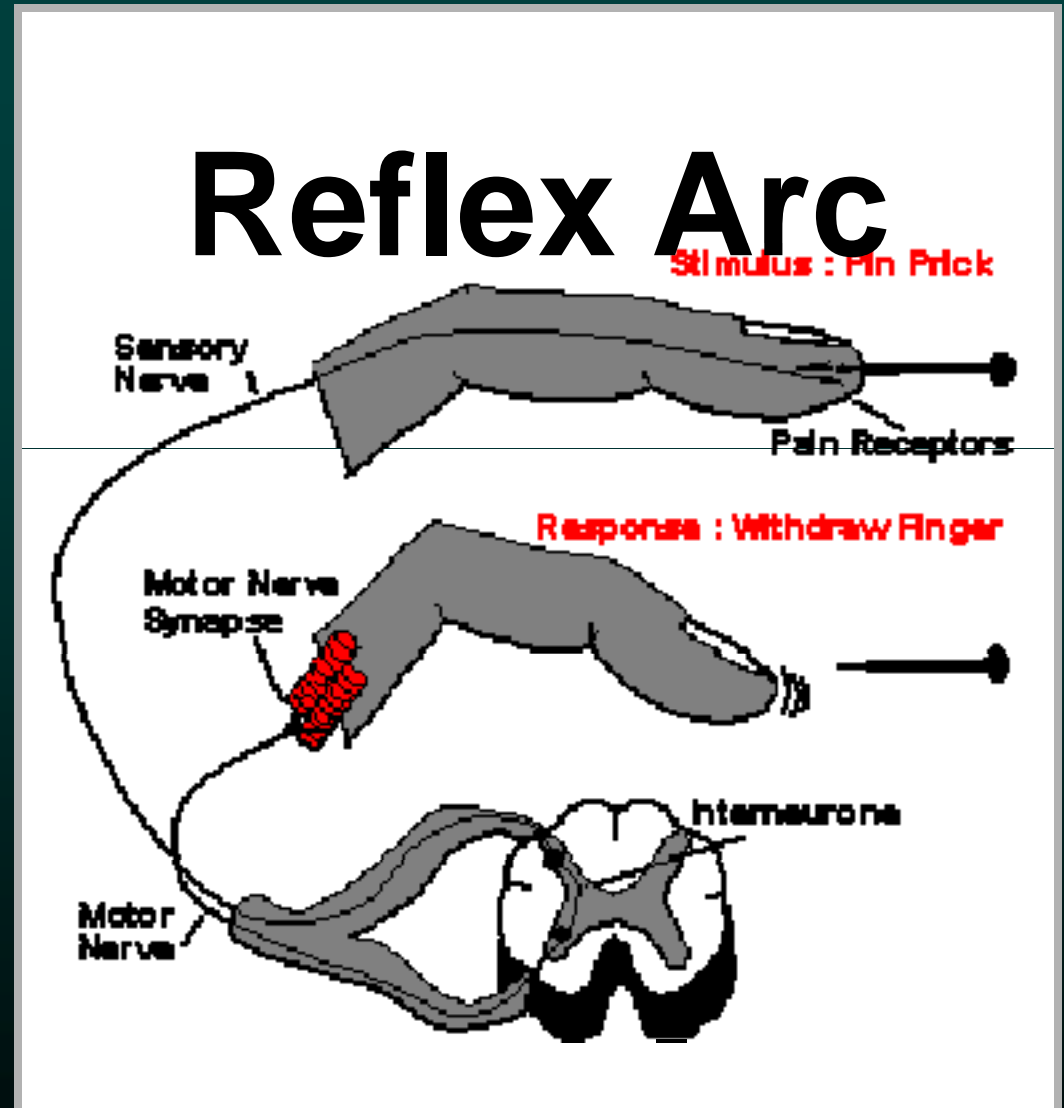
Axons branching out to muscle fibers

# Communication with Neurons

- Nerves work together with muscles for movement. An **impulse** begins when one neuron is stimulated by another neuron or by the sense organs.
- The **impulse** travels down the axons of Sensory neurons to the brain cells called Interneurons.
- The brain will then send an **impulse** through **motor neurons** to the necessary muscle or organs, telling it to contract.

A **reflex** is an involuntary response that is processed in the spinal cord not the brain.

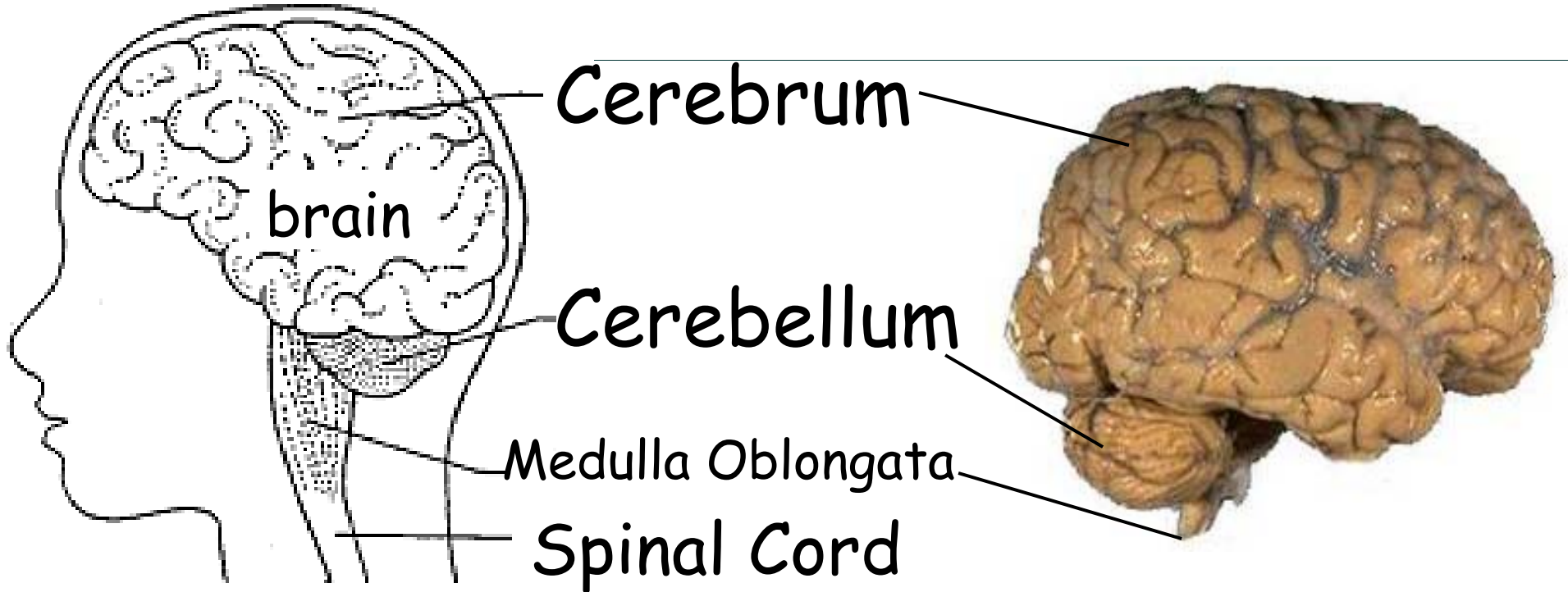
Reflexes protect the body before the brain knows what is going on.





# Central Nervous System

Consists of: Brain and Spinal Cord



# Central Nervous System

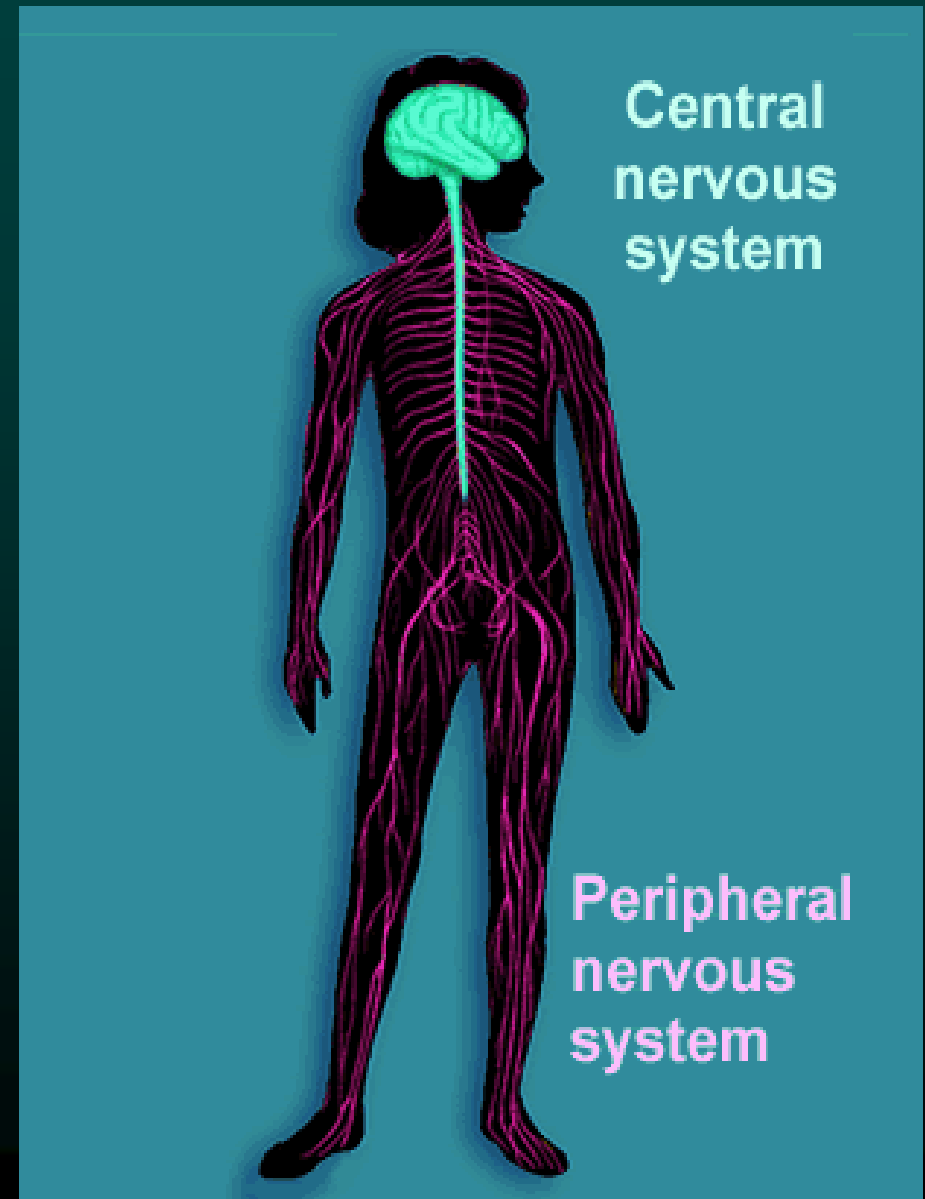
<b>Cerebrum</b>	Voluntary or conscious activities of the body-learning, judgment
<b>Cerebellum</b>	Coordinates and balances the actions of the muscles
<b>Medulla Oblongata (Brain Stem)</b>	Controls involuntary actions like blood pressure, heart rate, breathing, and swallowing
<b>Spinal Cord</b>	The main communications link between the brain and the rest of the body



# Peripheral Nervous System

**Consists of:**  
Sensory division  
and Motor  
division

-includes all  
sensory neurons,  
motor neurons,  
and sense organs



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