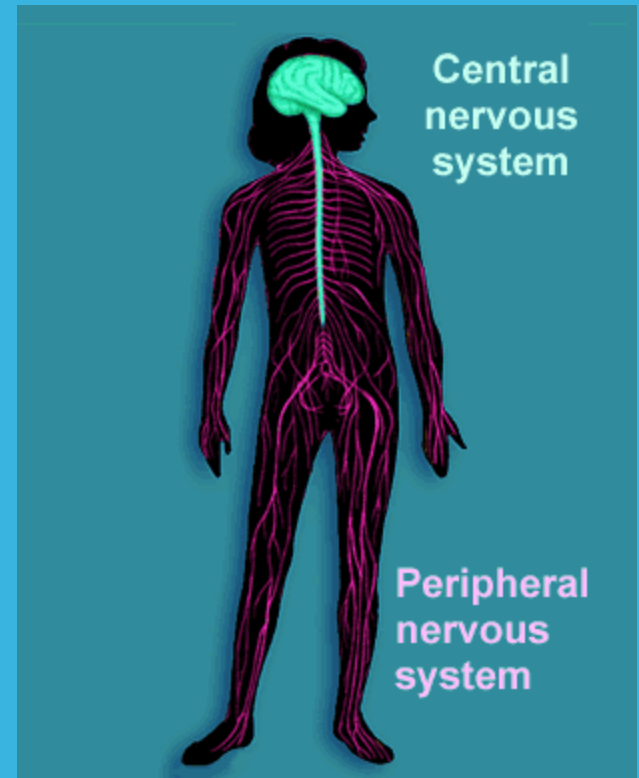


Why do you think psychologists
need to understand the body?
Nervous System? Brain?

THE NERVOUS SYSTEM: THE BASIC STRUCTURE

LEARNING ABOUT THE NERVOUS SYSTEM HELPS US KNOW HOW
MESSAGES THAT ARE SENT TO AND FROM THE BRAIN CAUSE BEHAVIOR.



HOW THE NERVOUS SYSTEM WORKS

Central Nervous System: the brain and the spinal cord

Peripheral Nervous System: nerves that branch beyond the spinal cord into the body.

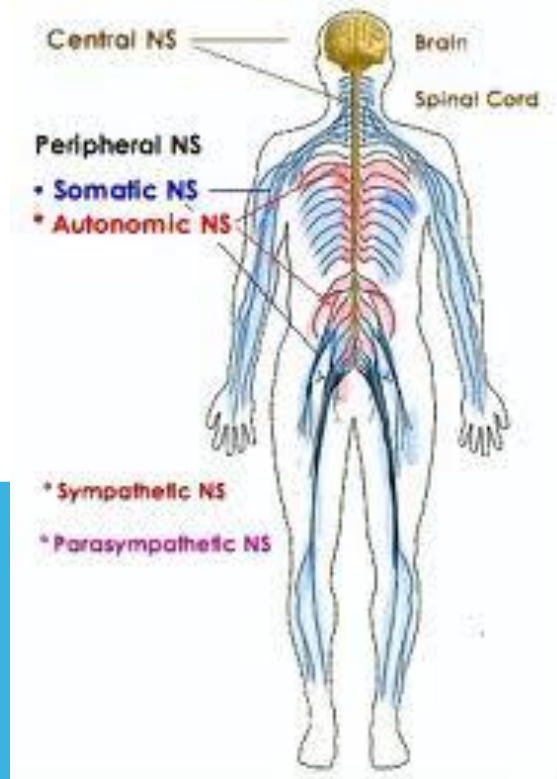
Somatic: voluntary muscles

Automatic: involuntary muscles

Sympathetic: expands energy

Parasympathetic: conserves energy

What are some involuntary activities that take place within your body?

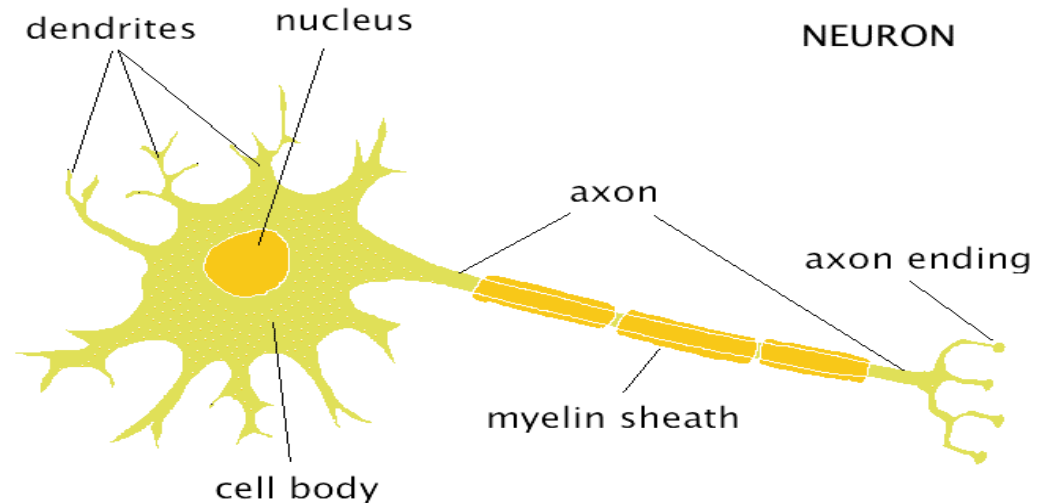


NEURONS:

Long, thin cells of nerve tissue along which messages travel to and from brain.

Three main parts of Neurons...


1. Cell Body (which contains the nucleus)
2. Dendrites
3. axon



Myelin Sheath: insulates and protects the axon from some neurons.

TYPES OF NEURONS

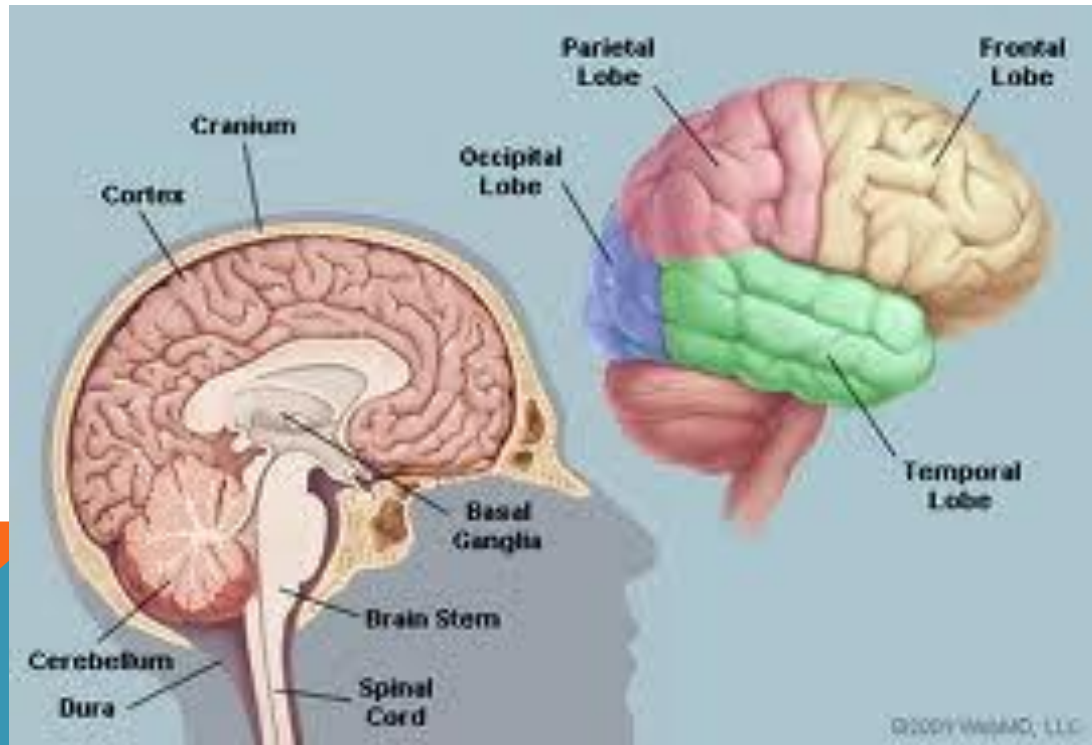
While there are many different kinds of neurons, there are three broad categories based on function:

1. **Sensory neurons** are sensitive to various non-neural stimuli.
 - A. There are sensory neurons in the skin, muscles, joints, and organs that indicate pressure, temperature, and pain.
 - B. There are more specialized neurons in the nose and tongue that are sensitive to the molecular shapes we perceive as tastes and smells.
 - C. Neurons in the inner ear are sensitive to vibration, and provide us with information about sound. And the rods and cones of the retina are sensitive to light, and allow us to see.
 2. **Motor neurons** are able to stimulate muscle cells throughout the body, including the muscles of the heart, diaphragm, intestines, bladder, and glands.
 3. **Interneurons** are the neurons that provide connections between sensory and motor neurons, as well as between themselves. The neurons of the central nervous system, including the brain, are all interneurons.
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STUDYING THE BRAIN

Why study?

There are many parts in the human brain that work together to coordinate movement and stimulate thinking and emotions.

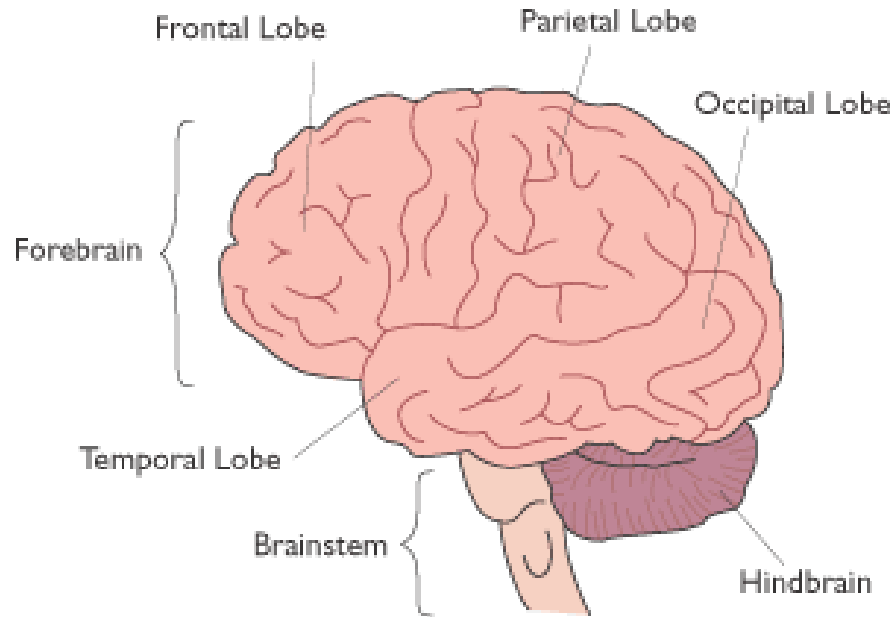


3 MAIN PARTS OF BRAIN

Forebrain

Midbrain

Hindbrain



THE LOBES OF THE BRAIN

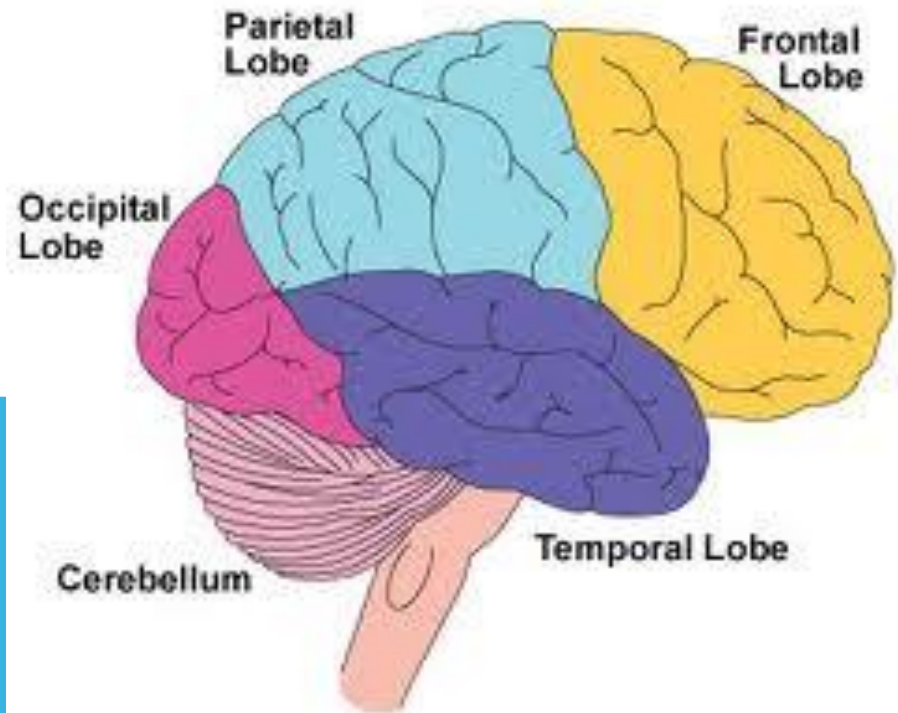
Occipital Lobe: visual

Parietal Lobe: body sensations

Temporal Lobe: concerned with hearing, memory, emotion and speaking

Frontal Lobe: organization, planning and creative thinking

Cerebellum : is a region of the brain that plays an important role in motor control. It may also be involved in some cognitive functions such as attention and language, and in regulating fear and pleasure responses



Awareness Test



WHY OR HOW DOES THIS HAPPEN?

PERCEPTION WITHOUT AWARENESS

- In psychology, to perceive (understand) something includes having awareness of it.
 - If sensory information enters the brain and is processed, but was not perceived (understood to have occurred), then psychologists would say that there was no memory of it and perception did not occur.
- Information enters the occipital lobe (visual) but not completely in the temporal lobe (memory).

Perception without awareness occurs under the following conditions:

- A stimulus is present in the environment, strong enough so that a person could perceive it if attention was drawn to it.
- The person does not pay attention to the stimulus and does not remember it later. However, the stimulus affects the person's behavior or thought process.

EXAMPLE OF PERCEPTION WITHOUT AWARENESS

Suppose you are singing a popular song. You go out of the room for a minute, and then you come back in and start singing it again. Your friend says, "Hey, I was just thinking of that song!" No doubt your friend heard you singing it a few moments earlier, but if your friend might not remember this. It seems like an amazing coincidence or ESP:

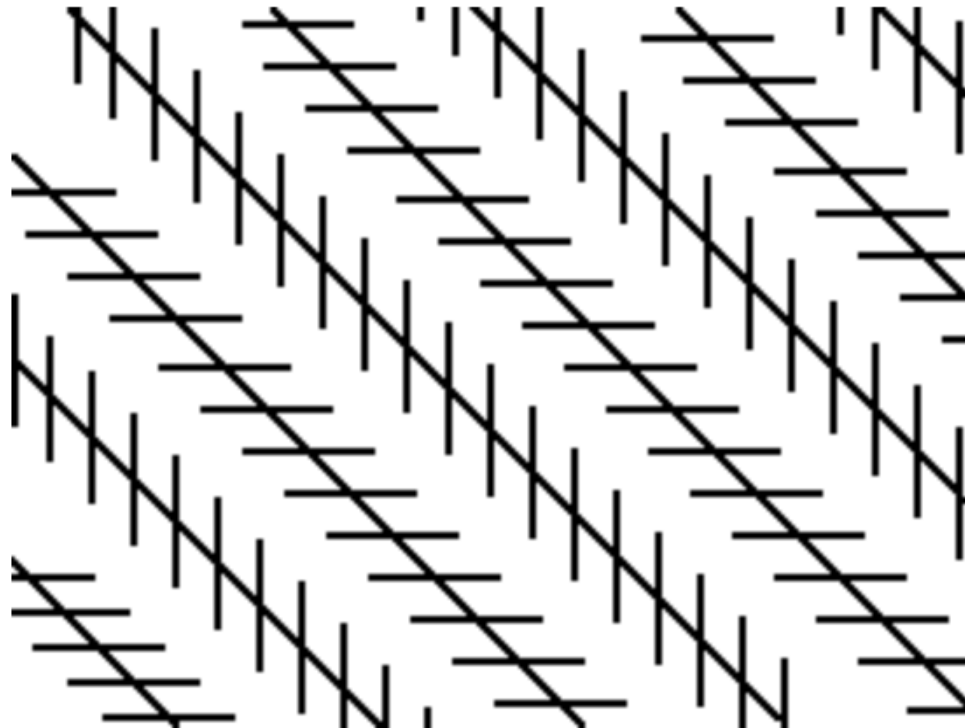
"We were both thinking of the same song."



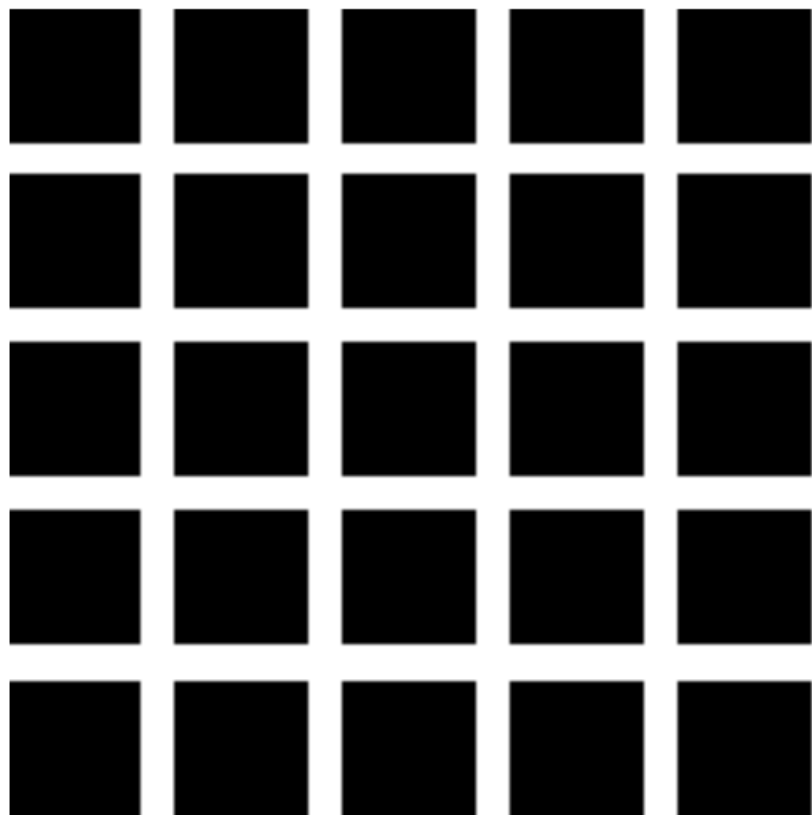
TRY TO READ THE FOLLOWING....

Aoccdrnig to a rseeach sduty at Cmabrigde Uinervtisy, it deosn't mttar in waht oredr the ltteers in a wrod are, the olny iprmoetnt tihng is taht the frist and lsat ltteer be in the rghit pclae. The rset can be a toatl mses and you can sitll raed it wouthit porbelm. Tihs is bcuseae the huamn mnid deos not raed ervey lteter by istlef, but the wrod as a wlohe.

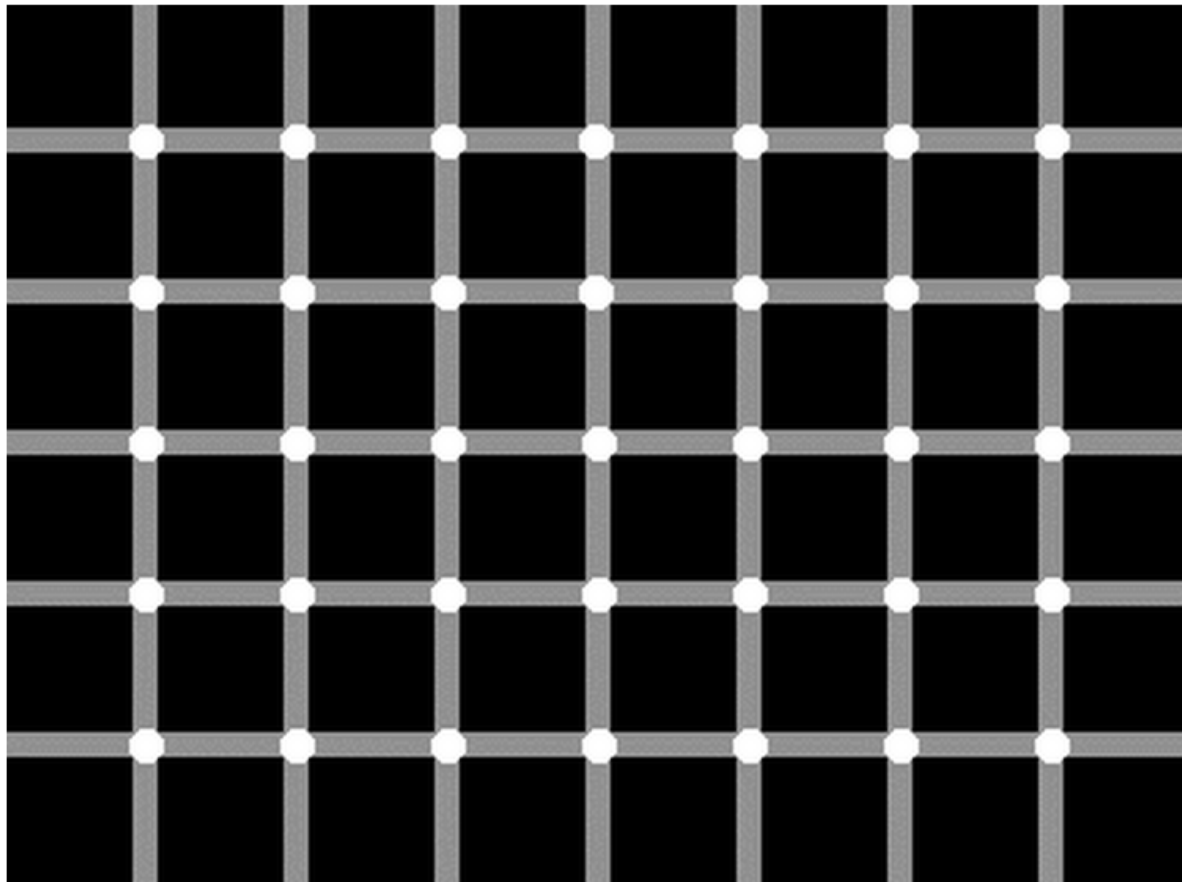
The diagonal lines are parallel. (Zöllner illusion)



There are no gray spots at the corners of the squares.



There are only white circles at the intersections



Blind Spot Experiment

The retina is the part of the eye covered with receptors that respond to light. A small portion of the retina where the optic nerve connects to the brain has no receptors. An image that falls on this region will not be seen. Close your right eye. With your left eye, look at the **L** below. Slowly move your head closer or further away from the screen while looking at the **L**. The **R** will disappear when your head is approximately 50 cm (20 in) from the screen. You can repeat the experiment with your right eye by looking at the **R**.

R

L



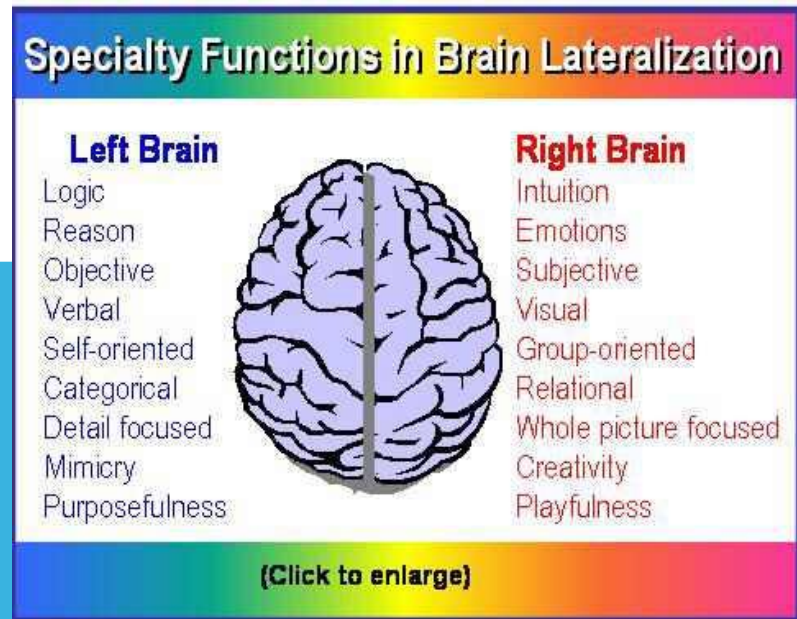
CORPUS CALLOSUM:

Corpus Callosum:

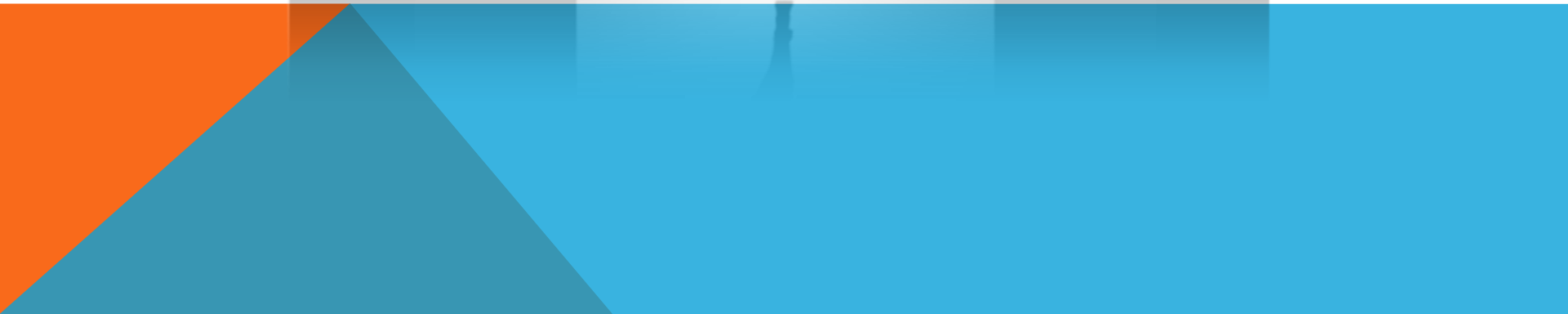
The corpus callosum is a thick band of nerve fibers that divides the cerebrum into left and right hemispheres.

It connects the left and right sides of the brain allowing for communication between both hemispheres. They work together. Left hemisphere controls right side of body. Right Hemisphere controls the left side of body.

The corpus callosum transfers motor, sensory, and cognitive information between the brain hemispheres.





ARE YOU LEFT BRAIN OR RIGHT BRAIN?




THE BRAIN AND NERVOUS SYSTEM SIMPLIFIED

- **The nervous system is broken down into two major systems:**
 - Central Nervous System
 - Peripheral Nervous System
- **The Central Nervous System consists of the brain and the spinal cord.**
- **The Cerebral Cortex- higher cognitive, emotional, sensory, and motor functions**
 - The brain is divided into two symmetrical hemispheres:
 - Left → language, the 'rational' half of the brain, associated with analytical thinking and logical abilities
 - Right → more involved with musical and artistic abilities

- The brain is also divided into four lobes:
 - Frontal lobe– (motor cortex) motor behavior, expressive language, higher level cognitive processes, and orientation to person, place, time, and situation
 - Parietal lobe –involved in the processing of touch, pressure, temperature, and pain
 - Occipital lobe– (visual cortex) interpretation of visual information
 - Temporal lobe– (auditory cortex) receptive language (understanding language), as well as memory and emotion
- 

- **The spinal cord consists of the Brainstem which is involved in life sustaining functions.**
 - Damage to the brainstem is very often fatal.
 - **Other parts of the brainstem include the**
 - Medulla Oblongata: controls heartbeat, breathing, blood pressure, digestion
 - Reticular Activating System: involved in arousal and attention, sleep and wakefulness, and control of reflexes
 - Pons – regulates states of arousal, including sleep and dreaming.
- 

- **Cerebellum – balance, smooth movement, and posture**
 - **Hypothalamus –maintains the body’s homeostasis, which we will discuss later (controls body temperature, metabolism, and appetite. Translates extreme emotions into physical responses.)**
 - **Limbic System – emotional expression, particularly the emotional component of behavior, memory, and motivation**
 - **Amygdala – attaches emotional significance to information and mediates both defensive and aggressive behavior**
 - **Hippocampus – involved more in memory, and the transfer of information from short-term to long-term memory**
- 

- **The Peripheral Nervous System is divided into two sub-systems.**
 - The Somatic Nervous System –regulates the actions of the skeletal muscles. Often thought of as mediating voluntary activity.
 - Autonomic Nervous System- regulates primarily involuntary activity such as heart rate, breathing, blood pressure, and digestion.
- **These systems are further broken down into two complimentary systems:**
 - Sympathetic and Parasympathetic Nervous Systems.

The Sympathetic Nervous System controls what has been called the "Fight or Flight" phenomenon because of its control over the necessary bodily changes needed when we are faced with a situation where we may need to defend ourselves or escape.

Now, imagine you are walking down a dark street at night by yourself...

Suddenly you hear what you suspect are footsteps approaching you rapidly... What happens?



First, your Sympathetic Nervous System kicks in to prepare your body...

Your heart rate quickens to get more blood to the muscles...


Your breathing becomes faster and deeper to increase your oxygen...

Blood flow is diverted from the organs so digestion is reduced

Then the skin gets cold and clammy and rerouted so to speak to the muscles

Lastly, your pupils dilate for better vision to see your attacker or to look for a route to escape.

**In an instant, your body has become prepared
to either defend itself or escape.**



Now imagine that the footsteps belong to a good friend who catches up to you and offers to walk you home.

You feel relief instantly, but your body takes longer to adjust.

In order to return everything to normal, the Parasympathetic Nervous System kicks in.

This system is slow acting, unlike its counterpart, and may take several minutes or even longer to get your body back to where it was before the scare.



These two subsystems are at work constantly shifting your body to more prepared states and more relaxed states.

Every time a potentially threatening experience occurs

(e.g., someone slams on their breaks in front of you, you hear a noise in your house at night, you hear a loud bang, a stranger taps you on the shoulder unexpectedly), your body reacts.

The constant shifting of control between the parasympathetic and sympathetic systems keeps your body ready for any situation.