Jonathan Quang 12/24/14

Biology - Ms.Prabhu

Homework #14

Part A:  
1.neuron, dendrite, cell body, axon, synaptic terminal  
4.somatic nervous system, automatic nervous system, sympathetic, parasympathetic  
5.cerebellum, pons, medulla, cerebellum  
6.frontal, parietal, temporal, occipital, occipital frontal.

Part B:  
1. The typical structures of a neuron are the synaptic terminals, dendrites, cell body and the axon. The synaptic terminals transmit signals from other neurons. The dendrites receive signals from other neurons. The cell body integrates or "processes" signals. The axon conducts the action potential.

6. The central nervous system consists of the brain and spinal cord. It receives and processes information as well as initiates action. The peripheral nervous system consists of the neurons and axons that lies outside the brain and spinal cord. It transmits signals between the central nervous system and the rest of the body. The somatic nervous system consists of motor nerves that form synapses with skeletal muscles and control voluntary movement. Most cell bodies of these neurons are located in the spinal cord. The autonomic nervous system are the neurons that interact with the organs, smooth muscles, and glands.

9.Short-term memory involved retaining information for a short period of time. The front and parietal lobes of the cerebral cortex and some of the basal ganglia in the cerebrum are the main sites of short-term memory. Short-term memory relies on the repeated activity of a particular neural circuit or short-lived biochemical changes. Long-term memory involves retaining information permanently. Long-term memory utilizes structural changes through the formation of new, long-lasting synaptic connections or the long-term strengthening of existing but weak synapses.

Part C:  
Check attached paper

Part D:  
1.A neuron is a specialized cell that transmits signals in the nervous system.  
2.Neurons bundle together to form nerves, which transmit electrochemical signals around the body.  
3. The main divisions of the nervous system are the central nervous system and the peripheral nervous system. The central nervous system consists of the brain and spinal cord which analyze and interpret data. The peripheral nervous system consists of all nerves outside the brain and spinal cord which transmits information to the rest of the body.   
4. The different types of neurons are afferent and efferent neurons. Afferent neurons carry information to a central point. Efferent neurons carry information away from a central point.  
5.Afferent (sensory) neurons are stimulated by the senses.  
6.Motor neurons can be either transmitters to muscles or organs.  
7.The reflex loop involves sending information, such as being in contact with a dangerously hot object, to the spinal cord instead of the brain, then sending information to the muscles to contract the hand away from the hot object.  
8. The autonomic is broken into two more divisions because the processes each controls functions better without the other one active, sometimes doing the opposite of what the other division does. The two divisions are the sympathetic and the parasympathetic systems. The two divisions vying for control allows for homeostasis.  
9. Another name for the flight or fight response is stress.  
10. The branch like extensions on a neuron are called dendrites. They receive information from other neurons.  
11. The purpose of myelin is to insulate portions of the axon.  
12.Saltatory conduction is the hopping of a signal from one node of Ranvier to the next.   
13. A synapse is where the neurotransmitters pass information. Axon terminals are very close to the dendrites of another neuron.  
14. Membrane potential is the difference in electrical charge between the inside and outside of a cell membrane.  
15. A sodium potassium pump generates a resting potential by generating a voltage differential through the movement of three positively charged sodium ions out for every two potassium ions in. The resting potential is about -70 millivolts.  
16. The inside of the neuron has a negative charge.  
17. Ion channels are different from sodium potassium pumps because ion channels are simpler, do not require ATP to function, and tailored to one specific ion.  
18. When an input reaches the axon and causes a change in charge, it is called an action potential.  
19.In ordinary conduction of an action potential, a stimulus would cause more sodium channels to open up, allowing more sodium inside. Once a certain voltage has been reached, the next set of sodium channels open up, traveling down the neuron like a wave. However, with the myelin sheets in Saltatory conduction leave little nodes exposed. The action potential only has to jump from node to node instead of having to travel the entire length of the axon.  
20. When an action potential travels to the end of a neuron, it causes the release of neurotransmitters by exocytosis. These neurotransmitters flow across the synapse to the next neuron where another action potential is triggered.  
21.The neuron returns to resting potential by closing sodium channels and opening potassium channels. Positive potassium ions rush out due to diffusion. The sodium potassium pumps then begin to work.

22.

Pizza Eating and the Nervous System

23.

Tells the muscles in the neck to move to get another bite of pizza.

Tells muscles in the throat and esophagus to constrict to perform peristalsis.

Tells the muscles in the jaw to constrict repeatedly to chew the pizza.

The brain processes the information, and signals efferent path ways to do several things.

Action potentials are generated in each afferent neuron that are sent to the brain.

Chemicals in the pizza stimulate dendrites on afferent neurons in each taste bud.

Chemicals in the pizza dissolve in saliva.

Nervous System Summary Chart

Parasympathetic Division

Controls parts of the body during times of rest. It controls activities that involve the upkeep of the body

Sympathetic Division

Prepares the body for strenuous activities or stress/fight or flight responses.

Autonomic Nervous System

Controls involuntary responses by influencing organs, glands, and smooth muscle.

Somatic Nervous System

Controls voluntary movements by activating skeletal muscles.

Afferent/Sensory Neurons

Carry signals to the central nervous system from sensory organs.

Efferent/Motor Neurons

Carry signals from the central nervous system to muscles, glands, and organs.

The Peripheral Nervous System

Transmits signal between the central nervous system and the rest of the body. Consists of the nerves outside of the brain and spinal cord.

The Central Nervous System

Receives information, processes information, and initiates action. Consists of the brain and spinal cord.

The Nervous System