Integumentary system - lab report example

Integumentary System

Neural Communication The way in which neurons communicate is fundamental to understanding the physiology of the psychological functioning. Communication is based off of an electrochemical signal. This is created by the movement of ions between the outside and inside of the membranes which produce the electrical charge that carries the electrical signals throughout the body. This is accomplished by the sodium potassium pump. The membranes are semi permeable which allows ions to polarize and depolarize the neuron. This is what creates the electrical charge necessary for communication between neurons. Once an electrical signal is passed through a neuron, a refractory period will occur. This occurs after the neuron has reached action potential and it is the time that is necessary before the neuron is ready to stimulate the movement of ions for another electrical charge. There are two different kinds of refractory periods: absolute and relative. Absolute refractory periods are when it is impossible to initiate another transmission of electrical charge after action potential is reached. Relative refractory periods are which transmission of another electrical charge is inhibited, but it is not impossible to initiate. There are three different states in which neurons must exist in order to produce neural communication: depolarization, repolarization and hyperpolarization. Depolarization is when the inside of the cell becomes more increasingly positive as ions move in and out. If there is enough movement of ions to create a large change in electrical potential, action potential will result. Repolarization occurs after depolarization and action potential have occurred. During this, ions move back into the cell which causes it to be

negative again. Hyperpolarization is when the cell becomes increasingly negative which can inhibit action potential from being reached which inhibits the cell from transmitting an electrochemical signal. Inhibition is necessary in some instances to control and regulate physiological function. An example is in heart beat regulation. In order to keep a steady pace and to make sure not to stroke out, neurons and electrochemical signals must maintain a constant pace to make sure blood pressure and circulation are constant. It is also important in motor coordination. If there was no inhibition, we would experience the inability to control muscle spasms all the time making walking impossible. The larger the diameter of the neuron, the faster a neural connection can be made. The myelin sheath is a layer of fat and proteins which are formed around the axons of neurons. They help increase the speed of transmission of the electrochemical signals. The more myelinated the axon is, the faster the neural communication is. Hyperkalemia is a condition in which there is an abnormally high concentration of potassium ions in the blood. This can cause many problems with the electrochemical signals of the neurons. Since cell communication is based off of the movement of ions in order to create the electrical charge, altering even one of the ions concentrations could create an equilibrium problem causing a difficulty in cell communication. The rise in potassium levels would cause an increasingly negative charge in the cell which could inhibit the cell from depolarizing in order to fire off an electrical signal. Another important basis of communication is made possible by neurotransmitters. These are chemicals which specifically interact with the postsynaptic membrane which either make them excitatory neurotransmitters or inhibitory neurotransmitters. Excitatory

neurotransmitters promote action potential for the neuron through depolarization. Inhibitory neurotransmitters stop action potential from occurring by hyperpolarizing the cell. Examples of some inhibitory neurotransmitters are dopamine and GABA. Some excitatory neurotransmitters in the body are Acetylcholine and Glutamate. Facilitation in neurons helps increase the postsynaptic potential in cells. This is accomplished by increasing the second pulse. This can be extremely helpful in increasing the neural plasticity in one’s brain. An application of this technique would be useful in those suffering from degenerative neurological conditions such as Parkinson’s disease or Alzheimer’s disease.