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Biology - Ms.Prabhu

Pre-lab #11

1. Stimuli in each receptor of the human body is converted into what humans describe as sensation. In general, sensation of the five senses are provided by sensory neurons that respond to a specific stimulus. The sensory neurons pick up the stimulus via sensory cells in a process called transduction. In the case of sight, the sensory cells are photoreceptors. These are located at the very back of the retina in the eyes. These are divided into rod and cone cells. When light falls on one of these cells, it causes a chemical reaction in light-sensitive pigments that generates the electrochemical pulses that nervous system interprets as light. The sensory cells for hearing are hair cells, tiny bulb-like structures with bristly hair-like projections. The base of the hair cells are connected to a bundle of nerves. Motion of the basilar membrane which carries wave-like vibrations bends the hairs. This excites the associated nerve fibers. These fibers will come together to form the auditory nerve which will carry the sensation humans experience as hearing. The third sense, gestation (tasting), the sensory cells are found on the tongue in the papillae, which are small projections containing the taste buds. Within the papillae are the actual sensory cells of taste. However, some taste receptor cells are also found in the throat, pharynx and epiglottis. The taste receptor cells, sense the presence of chemicals in the mouth and connect to axons which relay the information to the brain. Some taste receptors also directly activate ion channels, while others utilize proteins in structure. They respond to chemicals in the environment by depolarizing the membrane, which leads to release of neurotransmitters. In the fourth sense, smelling, olfactory receptor cells send cilia-like nerve dendrites up to a layer of mucus. Chemicals in the air dissolve in the mucus lining the nasal cavity, and then bind to the surface of the dendrites and activate the olfactory receptor cells. The fifth sense, touch originates in the bottom layer of your skin, the dermis. It is filled with the various sensory cells that activate nerve cells when the skin is touched.

2. Rods and cones are the sensory cells used in sight. Cone cells are used for detailed, colored vision in environments with bright light.. There are 6 million of them in each human eye. Most of them are located in the fovea area, which is the center area at the back of the retina. There are three types of cone cells: one sensitive to red light, another to green light, and the third sensitive to blue light. They require bright light to activate their respective photopigments. Rod cells are about 500 times more sensitive to light then cone cells. They give dim light or night vision, which is perceived as grayscale like vision with hints of a purple-bluish color. They are more sensitive to motion then cone cells. There are 120 million rod cells in the human eye, most located in to the sides of the back of the retina.

3. Food tastes more flavorful when it is hot rather than cold for various reasons. One is that fat and oils become more volatile when hotter. Fat and oil are (usually) good at carrying some chemicals that stimulate taste buds. Hot food also releases a certain aroma that is composed of chemicals that can also be smelled. In addition, the tongue becomes numb when it is cold, which lowers the amount of action potentials caused by nerves.

4.The inner ear helps maintain balance with three semicircular canals that contain fluid (endolymph) and sensory cells that detect rotational movement of the head. Each canals lies at a different angle and is situated at a right angle to each other. The semicircular canals deal with different movement: up-and-down, side-to-side, and tilting from one side to the other. These canals are filled with endolymph that move sensory hair cells. These hair cells send information back to the brain.

5. Gestation and olfactory senses are considered to be chemical senses because they information they send to the brain is in reaction to certain chemicals. By chemicals binding to dendrites, the sensation of smell is produced. Chemicals activating ion channels, binding to proteins, or getting rid of the difference in charge between the inside and outside of the plasma membrane of a cell (depolarization) will create the sensation of taste.

6. The ability to “habituate” or “get used” to certain stimuli can be advantageous because it allows for a better awareness of changes, or recognizing what is out of place. For example, say a human was staring at a still forest for a few minutes. The brain would eventually stop "seeing" the forest as a whole. Now say there is a rustle in a tree. The human would acknowledge that there is something there. If the human were just casually turning his head, he or she might have missed the rustling.

7. Proprioceptors are any biological sensors that provide information about changes in position or movemet. These measurements include joint angle, muscle length, and muscle tension. These measurements can be combined to give information about the position of the limb in space. Proprioceptors are located in the inner ear, muscles, tendons, and joints.

8.Check attached paper.

Works Cited

1."How Our Balance System Works." *How Our Balance System Works*. American Speech-Language-Hearing Association, n.d. Web. 13 Dec. 2014. http://www.asha.org/public/hearing/How-Our-Balance-System-Works/.

2."Proprioceptors." *Proprioceptors*. University of Washington, n.d. Web. 13 Dec. 2014. http://courses.washington.edu/conj/bess/spindle/proprioceptors.html

3. Salinas. "Sensation & Perception." *Sensation & Perception*. University of Texas, n.d. Web. 13 Dec. 2014.http://homepage.psy.utexas.edu/HomePage/Class/Psy301/Salinas/12Sensation&Perception.htm.