

Special sense and digestive system



**ASSIGN
BUSTER**

1. Describe the pathway of light through the eye and the process of light refraction. 4 points

Light enters through the cornea, which is the first step in refraction. The iris then modulates the amount of the light that enters the eye. The light then passes through the pupil, which regulates light entry into the inner eye and brings objects into focus. Light then passes through the lens which focuses the light on the retina (made of rods and cones). The retina turns light into nerve impulses and sends it to the brain through the optic nerve.

2. Explain static and dynamic equilibrium. 6 points static equilibrium - The special sense which interprets the position of the head when not moving, allowing the CNS to maintain stability and posture. These levels are detected by mechanoreceptors in the vestibule of the inner ear; the macula of utricle. When the head moves, the membrane shifts and the mechanoreceptors in the macula detect this movement and send the information along the vestibular nerve to the brain.

dynamic equilibrium - The special sense which interprets balance when one is moving. The mechanoreceptors for dynamic equilibrium reside in the semicircular canals. These mechanoreceptors help tell the brain whether or not a person has their balance during body movements or if their body is in motion.

3. Explain the meaning of an "odor snapshot" and its relevance to human beings. 4 points.

When the olfactory receptors located on the cilia are stimulated by chemicals dissolved in the mucus, they transmit impulses along the olfactory filaments, which comprise the olfactory nerve; this nerve conducts the impulses to the olfactory cortex of the brain. An “odor snapshot” is made in the olfactory cortex, which then becomes part of our long-term memory. The olfactory pathways are closely tied to the limbic system, the emotional-visceral part of the brain. Odors elicit strong emotional responses.

4. Explain the various processes of food propulsion. 6 points.

Propulsion is the process that moves food through the alimentary canal, and includes swallowing and peristalsis, which its function is to squeeze food from one organ to the next.

Propulsion involves all of the actions involved in moving food along the alimentary canal from the mouth to the anus, including swallowing, peristalsis, segmentation, and mass movements. Swallowing has two phases, buccal (voluntary) and pharyngeal-esophageal (involuntary). The buccal phase involves movement by the tongue and pharynx, and the pharyngeal-esophageal phase involves the blockage of all routes except the esophagus while food is being passed through it. Peristalsis involves alternate waves of contraction and relaxation of muscles in the stomach and intestines to move chyme along, which then mixes with digestive juices. Mass movements typically occur just after eating. They are powerful contractions that move over the colon and force contents toward the rectum to be stored until defecation. The presence of feces in the rectum initiates the defecation

reflex, which causes the walls of the sigmoid colon and rectum to contract while relaxing the anal sphincters.

5. Explain the role of the hormones cholecystokinin and secretin in regulating the release of bile and pancreatic juices.

When chyme enters the small intestine, it stimulates the mucosa cells to produce the hormones cholecystokinin and secretin. These hormones travel through the bloodstream to the pancreas, liver, and gallbladder. The pancreas responds by releasing pancreatic juice that is rich in enzymes and bicarbonate. The liver responds to secretin by releasing bile while cholecystokinin stimulates the gallbladder to release stored bile.

6. What nutrients in particular nourish the eyes? What could you suggest for retinopathy? Macular degeneration? Failing eyesight with aging?

Retinopathy seems to be most commonly found in individuals who suffer from Diabetes. The presence of inflammatory proteins within the retina is the major feature of retinopathy as well as macular degeneration. So, focusing on an anti-inflammatory diet is of utmost importance. Foods that raise blood glucose levels and levels of inflammation in body tissues are to be avoided like potatoes, processed breads and grains, rice, simple sugars. Avoiding high amounts of fat, especially saturated fats is recommended. A diet that emphasizes low glycemic-index foods, and is high in fiber would be preferable.

Proper levels of vitamins including Vitamins A and Beta-carotene, B, C D and E as well as minerals zinc is crucial in helping fight against free radicals,

providing anti-oxidant and anti-inflammatory benefits, hydrating eyes, and maintaining overall eye health.

7. Why do young children often have tubes put in their ears? Where within the ear are the tubes placed? Are there alternative protocols for this procedure? What nutritional protocols could you suggest for this situation? 8 points

During an ear infection, fluid builds up behind the eardrum in the middle ear. Normally, when the ear infection has run its course the fluid drains out of the middle ear into the back of the nose through the Eustachian tube.

Sometimes this tube remains swollen and does not drain, trapping fluid behind the eardrum and preventing the eardrum from vibrating, causing hearing loss. Ear tubes are inserted into the eardrum (tympanic membrane), allowing air to get into the middle ear, which is necessary in order for fluid to drain out. An alternative option to this surgical procedure would be to emphasize a diet that is restrictive in mucus building foods like dairy and gluten. Vitamin C, vitamin A, and zinc may also be helpful in warding off infections. Often times when a child suffers from repeated and severe ear infections it points to an allergy so staying away from the most common allergens (dairy, eggs, wheat, peanuts, corn) is recommended as well as getting an allergy test.

8. What nutrients are important for keeping the lining of the GI tract healthy and capable of regenerating itself efficiently? 10 points

Zinc is an important component in cell membrane structure and function, functions as an antioxidant, and is important to cells with a high rate of

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turnover, such as GI epithelia. Vitamin A plays a central role in epithelial cell integrity, immune function, and retinal function.

Probiotics promote improved balance in intestinal microflora. Prebiotics (food for the bacteria in the gut) promote healthy gut flora. Common prebiotics include: fructans and inulin naturally found in artichoke, asparagus, bananas, garlic, leek, onion, tomatoes rye, barley, chicory root, and dandelion root.