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Matric number: 18/mhs07/025

Department: pharmacology

Assignment Title: Special senses

Course Title: Renal Physiology, Body fluid & Temperature Regulation and Autonomic Nervous System

Course Code: PHS 212

Question

Write short note on the physiology of balance

The sense of balance also known as equilibrioception is the perception of balance and spatial orientation. It prevents humans from tumbling over when standing or moving. Balance is controlled by the connection between the vestibular, visual and proprioception system. The balance system works with the visual and skeletal systems (the muscles and joints and their sensors) to maintain balance. Visual signals are sent to the brain about the body's position in relation to its surroundings are processed by the brain and compared to information from the vestibular and skeletal systems.

The vestibular system is one of the key factors in coordinating and maintaining balance. The peripheral apparatus for the vestibular system consists of the semicircular canals, which sense head rotation; and the otoliths, which sense gravity and linear acceleration.

The central vestibular pathways form a large network from the vestibular nuclei, ocular motor nuclei, integration centers in the pons and rostral midbrain, vestibulocerebellum, thalamus, to the multisensory vestibular cortex areas in the temporoparietal cortex. The most important structures for the central vestibular pathways are those mediating the vestibulo-ocular reflex (VOR), and the descending pathways into the spinal cord along the medial and lateral vestibulospinal tract which mediate postural control. The cortical structures involved in vestibular function are the parietoinsular vestibular cortex, the retroinsular cortex, the superior temporal gyrus and the inferior parietal lobule. Activation of the cortical network during vestibular stimulation is not symmetrical; dominance is stronger in the nondominant hemisphere, in the hemisphere ipsilateral to the stimulated ear and in the hemisphere ipsilateral to the slow phase of the vestibular caloric nystagmus.