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COURSE TITLE: RENAL PHYSIOLOGY, BODY FLUID & TEMPERATURE REGULATION AND AUTONOMIC NERVOUS SYSTEM.

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ASSIGNMENT: WRITE SHORT NOTE ON THE PHYSIOLOGY OF BALANCE

PHYSIOLOGY OF BALANCE

Balance is mediated by the vestibular nuclei in the brain stem. The labyrinth which is a part of the inner ear is a major organ of the vestibular (balance system) system. The three semicircular canals of the labyrinth is associated with sensing rotary motion. The brain senses the direction and speed of rotation of the head by the movement of fluid in the semicircular canals. Balance is maintained by the interactions between the labyrinth and other systems in the body such as the visual and skeletal system.

Postural balance is controlled by intricate connection between the vestibular, visual and the proprioception system. The vestibular is one of the key factors in maintaining balance. The peripheral apparatus for the vestibular system consist of the semicircular canals which sense head rotation, the otoliths senses gravity and linear acceleration. The sense of balance is the perception of balance and spatial; orientation. It helps prevent humans and nonhuman animals from falling over when standing or moving. The vestibular system, the region of the inner ear where three semicircular canals converge, works with the visual system to keep objects in focus when the head is moving. This is called the vestibule-ocular reflex (VOR). The functions of the vestibular system include the sensation of orientation and acceleration of the head in any direction with associated compensation in eye movement and posture. These reflexes are referred to as the vestibule-ocular and vestibule-spinal reflexes respectively. The centrally located vestibular system involves neural pathways in the brain that respond to afferent input from the peripheral vestibular system in the inner ear and provide efferent signals that make these reflexes possible. The body's balance system works through a constant process of position detection, feedbacks and adjustment using

communication between the inner ear, eyes, muscles, joints and the brain. Deep inside the ear, positioned just under the brain, is the inner ear. While one part of the inner ear enables hearing, another part called the vestibular system is designed to send information about the position of the head to the brains movement control centre, the cerebellum. The cerebellum is a small part of the brain positioned at the back of the head, where it meets the spine which acts as the body's movement and balance control centre. It receives messages about the body's position from the inner ear, eye, muscles, joints and sends messages to the muscles to make any postural adjustment required to maintain balance. It also coordinates the timing and force of muscles movements initiated by other part of the brain. The vestibular system works with the visual system to stop objects blurring when the head moves. It also helps us maintain awareness of positioning when for examples walking, running or riding in a vehicle. The brain sends messages to instruct muscles to move and make the adjustments to body position that will maintain balance and coordination.