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QUESTIONS

Discuss the physiology of balance

ANSWER

The vestibular system is the sensory apparatus of the inner ear that helps the body maintain its postural equilibrium. The information furnished by the vestibular system is also essential for coordinating the position of the head and the movement of the eyes. There are two sets of end organs in the inner ear, or labyrinth: the semicircular canals, which respond to rotational movements (angular acceleration); and the utricle and saccule within the vestibule, which respond to changes in the position of the head with respect to gravity (linear acceleration). The information these organs deliver is proprioceptive in character, dealing with events within the body itself, rather than exteroceptive, dealing with events outside the body, as in the case of the responses of the cochlea to sound. Functionally these organs are closely related to the cerebellum and to the reflex centers of the spinal cord and brainstem that govern the movements of the eyes, neck, and limbs.

The semicircular canals and the vestibule (utricle and saccule) are concerned with balance. Any change of position of the head causes movement in the perilymph and endolymph, which bends the hair cells and stimulates the sensory nerve endings in the utricle, saccule and ampullae. The resultant nerve impulses are transmitted by the vestibular nerve which joins the cochlear nerve to form the vestibulocochlear nerve. The vestibular branch passes first to the vestibular nucleus, then to the cerebellum.

The cerebellum also receives nerve impulses from the eyes and the proprioceptors (sensory receptors) in the skeletal muscles and joints. Impulses from these three sources are coordinated and efferent nerve impulses pass to the cerebrum and to the skeletal muscles. This results in awareness of body position, maintenance of upright posture and fixing the eye on the same point, independently of head movements.

