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QUESTION: DISCUSS THE PHYSIOLOGY OF BALANCE

The sense of balance or equilibrioception is the perception of balance and spatial orientation.[1] It helps prevent humans and nonhuman animals from falling over when standing or moving. Equilibrioception is the result of a number of sensory systems working together: the eyes (visual system), the inner ears (vestibular system), and the body's sense of where it is in space (proprioception) ideally need to be intact.

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 vestibulo-ocular reflex (VOR).[2] The balance system works with the visual and skeletal systems (the muscles and joints and their sensors) to maintain orientation or balance. Visual signals 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. In the vestibular system, equilibrioception is determined by the level of a fluid called endolymph in the labyrinth, a complex set of tubing in the inner ear.

When the sense of balance is interrupted it causes dizziness, disorientation and nausea. Balance can be upset by Ménière's disease, superior canal dehiscence syndrome, an inner ear infection, by a bad common cold affecting the head or a number of other medical conditions including but not limited to vertigo. It can also be temporarily disturbed by quick or prolonged acceleration, for example riding on a merry-go-round. Blows can also affect equilibrioception, especially those to the side of the head or directly to the ear.

Most astronauts find that their sense of balance is impaired when in orbit because they are in a constant state of weightlessness. This causes a form of motion sickness called space adaptation syndrome.

Some animals have better equilibrioception than humans, for example a cat uses its inner ear and tail to walk on a thin fence.[20]

Equilibrioception in many marine animals is done with an entirely different organ, the statocyst, which detects the position of tiny calcareous stones to determine which way is "up".

