The semicircular canals are three pretzel-like curved tubes arranged at angles roughly perpendicular to each other, with the two vestibular sacs located at their base. Both the canals and sacs contain fluid and tiny hair cells, which act as receptors. When a person’s head moves, the fluid disturbs the hair cells, which stimulate a branch of the auditory nerve, signaling the brain to make adjustments in the eyes and body. A movement at any given angle will have its primary effect on one of the three canals. Overstimulation from extreme movements will produce dizziness and nausea. Our sense of body position when we are at rest is provided by the vestibular sacs, which contain small crystals called otoliths (literally, “ear stones”) that exert pressure on the hair cells. In their normal position, the otoliths inform our brains that we are standing or sitting upright. When the head is tilted, the position of the otoliths changes, and the signal sent to the brain changes accordingly. The neural connections of the vestibular system lead to the cerebellum, the eye muscles, and a part of the autonomic nervous system involved in digestion (which accounts for the link between dizziness and nausea).

Further Reading

Erik Erikson
1902-1979
German-born American psychoanalyst best known for his work with children and adolescents.

Erik Erikson was born in Frankfurt, Germany, to Danish parents. As a youth, he was a student and teacher of art. While teaching at a private school in Vienna, he became acquainted with Anna Freud, the daughter of Sigmund Freud. Erikson underwent psychoanalysis, and the experience made him decide to become an analyst himself. He was trained in psychoanalysis at the Vienna Psychoanalytic Institute and also studied the Montessori method of education, which focused on child development. Following Erikson’s graduation from the Vienna Psychoanalytic Institute in 1933, the Nazis had just come to power in Germany, and he emigrated with his wife, first to Denmark and then to the United States, where he became the first child psychoanalyst in Boston. Erikson held positions at Massachusetts General Hospital, the Judge Baker Guidance Center, and at Harvard’s Medical School and Psychological Clinic, establishing a solid reputation as an outstanding clinician. In 1936, Erikson ac-

Fortunate side effect of being addictive. Other commonly used drugs include phenytoin, carbamazepine, and sodium valproate. All have the possibility of causing such undesirable side effects as drowsiness, nausea, or dizziness. Several new drugs are being studied to determine their efficacy and safety.

The epileptic patient needs to be protected from self-injury during an attack. Usually for the patient having a petit mal seizure, little needs to be done. Occasionally these individuals may lose their balance and need to be helped to the ground to avoid hitting their heads, but otherwise need little attention. The individual in a grand mal seizure should not be restrained, but may need some help to avoid striking his limbs or head on the floor or nearby obstruction. If possible, the patient should be rolled onto his side. This will maintain an open airway for breathing by allowing the tongue to fall to one side.

Epilepsy can be a recurrent, lifelong condition. Medication can control seizures in a substantial percentage of patients, perhaps up to 85% of those with grand mal manifestations. Some patients will experience seizures even with maximum dosages of medication, and these individuals need to wear an identification bracelet to let others know of their condition.

Further Reading

Further Information
American Epilepsy Foundation. 638 Prospect Avenue, Hartford, CT 06105–2498, (203) 232–4825.
Epilepsy Foundation of America. 4351 Garden City Drive, Landover, MD 20785, (800) 332–1000.

Equilibrium sense
One of two proprioceptive sensory systems that provide us with input about the positions of our own bodies.

The equilibrium sense, generally associated with balance, provides feedback about the positions and movements of our heads and bodies in space. The other system—the kinesthetic sense—tells us about the orientation of different parts of our bodies in relation to each other. While the kinesthetic information needed by the brain comes from joints and muscle fibers throughout the body, the receptors for equilibrium are located in the semicircular canals and vestibular sacs of the inner ear. (The equilibrium sense is also called the vestibular sense, and the relevant parts of the inner ear are sometimes called the vestibular system or apparatus).
cepted a position at Yale University, where he worked at the Institute of Human Relations and taught at the Medical School. After spending a year observing children on a Sioux reservation in South Dakota, he joined the faculty of the University of California at Berkeley, where he was affiliated with the Institute of Child Welfare, and opened a private practice as well. While in California, Erikson also studied children of the Yurok Native American tribe. After publishing the book for which he is best known, Childhood and Society, in 1950, he left Berkeley to join the staff of the Austen Riggs Center, a prominent psychiatric treatment facility in Stockbridge, Massachusetts, where he worked with emotionally troubled young people. In the 1960s, Erikson returned to Harvard as a professor of human development and remained at the university until his retirement in 1970.

Much of Erikson’s work is concerned with the formation of individual identity, the creative operation of consciousness in a well-adjusted personality, and societal influences on child development. He differs from more traditional Freudians by assigning a significantly greater importance to development after the first few years of life, and by arguing that the ego plays a highly positive role in that development. Erikson is also noted for the illumination of his concept of the adolescent “identity crisis,” a term which he coined. Erikson’s theory of personality covers the entire human lifespan, which he divides into eight distinct stages, each with its own tasks and crisis. In infancy, the basic conflict is between trust and mistrust. A sense of trust is established according to the quality of the infant’s relationship with its care-givers. Achievement of trust is considered especially important for development in the following stages. The crisis in early childhood, the next stage, is between the child’s need for autonomy and the sense of doubt and shame brought on by learning to deal with rules and social demands for self-control, including physical control such as toilet training. Successfully negotiated, this stage leads to the emergence of independence and will power. Later in the preschool period comes the third stage, when the child begins to actively explore his or her environment. At this stage, there is a crisis over initiative and a possible sense of guilt about asserting control over his or her own activities. A sense of purpose, leading to the ability to pursue goals in spite of risks and possible failure, emerges with the resolution of this conflict. During the fourth stage, the early school years, the social context expands to include the school environment, where skills and mastery of tasks become a primary focus of attention. A conflict arises between industry, or the ability to work, and feelings of inferiority, and the former must triumph in order for the development of competence.

The goals of the first four stages—trust, autonomy, initiative, and industry—create the foundation for the successful negotiation of the fifth stage, in which the adolescent must form a stable identity and achieve a sense of self. While social issues such as “fitting in with the group” are important at this point, Erikson emphasizes the importance of achieving an individual identity based on self-knowledge and continuity of experience. Failure to resolve the conflicts of this stage results in identity or role confusion and affects the experiences of the three adult stages which follow. In young adulthood, the primary issue is intimacy, or the ability to love. In middle adulthood, it is generativity, or the ability to be productive, whether in work, parenting, or other activities, rather than stagnating. The key quality at this stage is the ability to care for others. Finally, at maturity, the challenge is to achieve a sense of integrity and wisdom with which to overcome despair over physical disintegration and death.

Erikson’s mapping of the life cycle has had a profound impact on developmental psychology, especially in the area of adolescent behavior and in the shift to a life-span perspective among students of human development. He won both the Pulitzer Prize and the National Book Award for his writings, which include the psychobi-