chapter 2

Theories of Aging

evolve

http://evolve.elsevier.com/Wold/geriatric

Objectives

1. Discuss how a theory is different from a fact.
2. Describe the most common biologic theories of aging.
3. Describe the most common psychosocial theories of aging.
4. Discuss the relevance of these theories to nursing practice.

Key Terms

antioxidants (ăn-tē-ŎK-sĭ-dănts) (p. 29)
biologic (bī-ō-LŎJ-ĭk) (p. 28)
free radical (p. 29)
immunologic (ĭm-ū-nō-LŎJ-ĭk) (p. 29)
psychosocial (sī-kō-SŌ-shŭl) (p. 28)
theory (p. 28)

There is no single universally accepted definition of *aging*. Aging is best looked at as a series of changes that occur over time, contribute to loss of function, and ultimately result in the death of a living organism. Like other living organisms, humans age and then die. The maximal life expectancy for humans today appears to be 110 years, but why is this the case? Theories of aging have been considered throughout recorded history as mankind has sought to find ways to avoid aging. The quest for a "fountain of youth" has motivated explorers such as Ponce de Leon. The search for the extension of youth has led some people to seek the potions of conjurers, which were often more poisonous than beneficial.

To date no one has identified a single unified rationale for why we age and why different people live different length lives. Theories abound to help explain and give some logical order to our observations. Observations, including physical and behavioral data, are collected and studied to scientifically prove or disprove their effects on aging.

Studies of families and identical twins show that there is a strong correlation in the life expectancies of genetically related people. If your grandparents and parents live to be 60, 70, 80, or 90 years of age, you are likely to have a similar life span. This is not always the case, however. Some individuals fail to meet genetic expectations, whereas others significantly exceed expectations. **Biologic** and environmental factors are being studied to explain these variations.

Although there is no question that aging is a biologic process, sociologic and psychological components play a significant role. All of these areas—genetic, biologic, environmental, and **psychosocial**—have produced theories that attempt to explain the changes seen with aging. Despite extensive interest in this topic, the specific causes and processes involved in aging are not yet completely understood. Because we do not have definitive and reproducible evidence indicating exactly why we age, all of the following remain theories.

BIOLOGIC THEORIES

Biologic theories of aging attempt to explain why the physical changes of aging occur. Researchers try to identify which biologic factors have the greatest influence on longevity. It is known that all members of a species suffer a gradual, progressive loss of function over time because of their biologic structure. Many of the biologic theories of aging overlap because most assume that the changes that cause aging occur at a cellular level. Each **theory** attempts to describe the processes of aging by examining various changes in cell structures or function.

Some biologic theories look at aging from a genetic perspective. The *programmed theory* proposes that every person has a "biologic clock" that starts ticking at the time of conception. In this theory, each individual has a genetic "program" specifying an unknown but predetermined number of cell divisions. As the program plays out, the person experiences predictable changes such as atrophy of the thymus, menopause, skin changes, and graying of the hair. A closely related theory is the *run-out-of-program theory*, which proposes that every person has a limited amount of genetic material that will run out over time, and the *rate of living theory*, which proposes that individuals have a finite number of breaths or heartbeats that are used up over time. The *gene theory* proposes the existence of one or more harmful genes that activate over time, resulting in the typical changes seen with aging and limiting the life span of the individual.

The molecular theories propose that aging is controlled by genetic materials that are encoded to predetermine growth and decline. The *error theory* proposes that errors in ribonucleic acid protein synthesis cause

Get Ready for the NCLEX® Examination!

Key Points

- Chronologic age is not always the most reliable way to measure aging because the number of years a person has lived provides little information about his or her physiologic or functional ability.
- A large segment of today's aging population lives a more dynamic, positive lifestyle than ever before.
- Stereotyping and negative perceptions of aging and older persons appear to be on the decline, yet subtle forms of ageism still exist and need to be addressed.
- The United States will face significant challenges to meet the costs of providing adequate health care to an aging population.
- As older adults become an increasingly larger segment of the population, they are having a significant impact on politics, economics, housing, and social family dynamics.
- Providing quality care for an increasingly large aging population places increased demands on both family and professional caregivers.
- Although many positive changes have occurred, the frailest older adults remain vulnerable to physical, emotional, and financial abuse.

Additional Learning Resources

SG Go to the Study Guide on pp. 379–397 for additional learning activities to help you master the chapter content.

Evolve Go to your Evolve website (http://evolve.elsevier.com/Wold/geriatric) for the following FREE learning resources:

- Animations
- Answer Guidelines for Nursing Care Plan Critical Thinking Questions
- Answers and Rationales for Review Questions for the NCLEX® Examination
- Glossary with pronunciations in English and Spanish
- Video Clips

Review Questions for the NCLEX® Examination

1. Myths related to aging include that most elderly: (Select all that apply.)
   1. Live in institutional settings
   2. Suffer from a significant loss of intellectual function
   3. Have frequent interaction with family and friends
   4. Experience significant personality changes
   5. Are seriously depressed
   6. Are sick, frail, and dependent on others

2. The Baby Boom generation:
   1. Was born between 1940 and 1960
   2. Is better off financially than previous generations
   3. Shares many social goals and political values with each other
   4. Often provides care to aging parents and grandchildren

3. Medicare legislation was established in the:
   1. 1940s
   2. 1950s
   3. 1960s
   4. 1970s

4. The percentage of senior citizens who live independently in a family setting is approximately:
   1. 70%
   2. 50%
   3. 30%
   4. 10%

5. Durable Power of Attorney for health care enables the health care agent to:
   1. Decide whether the elderly person should be resuscitated
   2. Act only when the elderly person is unable to act for himself or herself
   3. Determine when the elderly person should be hospitalized
   4. Change care decisions if he or she thinks these will benefit the elderly person

6. One of the most significant changes that impact the elderly person and his or her family is:
   1. Loss of independence
   2. Change in physical appearance
   3. Decreased financial resources
   4. Sensory and cognitive decline

7. When assessing an alert for an elderly woman who was admitted to the emergency room accompanied by her daughter with whom she resides, the nurse would become suspicious of abuse if: (Select all that apply.)
   1. Bruises are observed on the arms and upper body.
   2. The daughter answers all questions for her mother.
   3. She has body odor and soiled clothing.
   4. The woman states that she does not like to see the doctor.
   5. The daughter states her mother does not get along with the grandchildren.
   6. Skin is intact with good turgor.

8. A student nurse observes caregivers in a long-term care facility where she is employed. Which of the following observations might indicate abusive behavior? (Select all that apply.)
   1. Failing to close bedside curtains during care activities
   2. Use of physical restraints to decrease wandering behavior
   3. Providing extra snacks as a reward for good behavior
   4. Laughing and talking with co-workers while providing care
   5. Speaking negatively about an elderly client while in the break room
   6. Responding slowly to the call light of a demanding elderly person

errors to occur in cells in the body, resulting in a progressive decline in biologic function. The *somatic mutation theory* is similar but proposes that aging results from deoxyribonucleic acid (DNA) damage caused by exposure to chemicals or radiation and that this damage causes chromosomal abnormalities that lead to disease or loss of function later in life.

Cellular theories propose that aging is a process that occurs because of cell damage. When enough cells are damaged, overall functioning of the body is decreased. The **free radical** *theory* provides one explanation for cell damage. Free radicals are unstable molecules produced by the body during the normal processes of respiration and metabolism or following exposure to radiation and pollution. These free radicals are suspected to cause damage to the cells, DNA, and the immune system. Excessive accumulation of free radicals in the body is purported to cause or contribute to the physiologic changes of aging and a variety of diseases such as arthritis, circulatory diseases, diabetes, and atherosclerosis. One free radical, named *lipofuscin*, has been identified to cause a buildup of fatty pigment granules that cause age spots in older adults. Individuals who support this theory propose that the number of free radicals can be reduced by the use of **antioxidants** such as vitamins A, C, and E, carotenoids, zinc, selenium, and phytochemicals.

One variation of this theory is the *crosslink* or *connective tissue theory*, which proposes that cell molecules from DNA and connective tissue interact with free radicals to cause bonds that decrease the ability of tissue to replace itself. This results in the skin changes typically attributed to aging such as dryness, wrinkles, and loss of elasticity. Another variation, the *Clinker theory*, combines the somatic mutation, free radical, and crosslink theories to suggest that chemicals produced by metabolism accumulate in normal cells and cause damage to body organs such as the muscles, heart, nerves, and brain.

The *wear-and-tear theory* presumes that the body is similar to a machine, which loses function when its parts wear out. As people age, their cells, tissues, and organs are damaged by internal or external stressors. When enough damage occurs to the body's parts, overall functioning decreases. This theory also proposes that good health maintenance practices will reduce the rate of wear and tear, resulting in longer and better body function.

The *neuroendocrine theory* focuses on the complicated chemical interactions set off by the hypothalamus of the brain. Stimulation or inhibition of various endocrine glands by the hypothalamus initiates the release of the various hormones from the pituitary and other glands, which, in turn, regulate bodily functions, including growth, reproduction, and metabolism. With age, the hypothalamus appears to be less precise in regulating endocrine function, leading to age-related changes such as decreased muscle mass, increased body fat, and changes in reproductive function. It is proposed that hormone supplements may be designed to delay or control age-related changes.

Complementary and Alternative Therapies

Alternative and Complementary Therapies to Slow or Reverse Aging

ANTIOXIDANT THERAPY
- Proposed as a method of neutralizing free radicals, which may contribute to aging and disease processes
- Includes a number of vitamins and minerals, including vitamins A, B_6, B_{12}, C, and E; beta carotene; folic acid; and selenium
- Generally safe when consumed as fruits and vegetables as part of the overall diet
- High doses of some antioxidants may cause more harm than benefits
- No proof that antioxidants are effective
- Discuss with physician before starting use

HORMONE THERAPY
- Proposed to replace a reduction in hormones, which naturally decrease with aging
- Includes hormones such as dehydroepiandrosterone (DHEA), estrogen, testosterone, melatonin, and human growth hormone (HGH)
- Little evidence to support claims made by advocates
- May actually cause more harm than provide benefits
- Usually requires prescription or supervised medical administration

SUPPLEMENTS
- Proposed to replace or enhance nutritional status; often marketed as "natural" remedies
- Include substances such as ginseng, coral calcium, Echinacea, and other herbal preparations
- No proof of effectiveness
- Not regulated by the Food and Drug Administration, so there is no control regarding amount of active ingredients
- High risk for interaction with prescription medications; physician must be notified if these products are used

CALORIE-RESTRICTED DIET
- Proposes that significant calorie reduction can extend life; based on studies in rats, mice, fish, and worms; not proven in humans
- Severe calorie restriction can result in inadequate consumption of necessary nutrients
- Studies show that severely underweight persons have a higher risk for some diseases and even death
- Dietary changes should be discussed with a physician or nutritionist to ensure that adequate nutrition is maintained

The **immunologic** *theory* proposes that aging is a function of changes in the immune system. According to this theory, the immune system—an important defense mechanism of the body—weakens over time, making an aging person more susceptible to disease. The immunologic theory also proposes that the

increase in autoimmune diseases and allergies seen with aging is caused by changes in the immune system.

A fairly new theory of aging correlates aging to calorie intake. Animal research has shown that a point of metabolic efficiency can be achieved by consuming a high-nutrient but low-calorie diet. It is hypothesized that this diet, when combined with regular exercise, may extend optimal health and life span.

PSYCHOSOCIAL THEORIES

Psychosocial theories of aging do not explain why the physical changes of aging occur; rather they attempt to explain why older adults have different responses to the aging process. Some of the most prominent psychosocial theories of aging are the disengagement theory, the activity theory, life-course or developmental theories, and a variety of other personality theories.

The highly controversial *disengagement theory* was developed to explain why aging persons separate from the mainstream of society. This theory proposes that older people are systematically separated, excluded, or disengaged from society because they are not perceived to be of benefit to the society as a whole. This theory further proposes that older adults desire to withdraw from society as they age, so the disengagement is mutually beneficial. Critics of this theory believe that it attempts to justify ageism, oversimplifies the psychosocial adjustment to aging, and fails to address the diversity and complexity of older adults.

The *activity theory* proposes that activity is necessary for successful aging. Active participation in physical and mental activities helps maintain functioning well into old age. Purposeful activities and interactions that promote self-esteem improve overall satisfaction with life, even at an older age. "Busy work" activities and casual interaction with others were not shown to improve the self-esteem of older adults.

Life-course theories are perhaps the theories best known to nursing. These theories trace personality and personal adjustment throughout a person's life. Many of these theories are specific in identifying life-oriented tasks for the aging person. Four of the most common theories—Erikson's, Havighurst's, Newman's, and Jung's—are worth exploring.

Erikson's theory identifies eight stages of developmental tasks that an individual must confront throughout the life span: (1) trust versus mistrust, (2) autonomy versus shame and doubt, (3) initiative versus guilt, (4) industry versus inferiority, (5) identity versus identity confusion, (6) intimacy versus isolation, (7) generativity versus stagnation, and (8) integrity versus despair. The last of these stages is the domain of late adulthood, but failure to achieve success in tasks earlier in life can cause problems later in life. Late adulthood is the time when people normally review their lives and determine whether they have been negative or positive overall. The most positive outcomes of this life review are wisdom, understanding, and acceptance; the most negative outcomes are doubt, gloom, and despair.

Havighurst's theory details the process of aging and defines specific tasks for late life, including (1) adjusting to decreased physical strength and health, (2) adjusting to retirement and decreased income, (3) adjusting to the loss of a spouse, (4) establishing a relationship with one's age group, (5) adapting to social roles in a flexible way, and (6) establishing satisfactory living arrangements.

Newman's theory identifies the tasks of aging as (1) coping with the physical changes of aging; (2) redirecting energy to new activities and roles, including retirement, grandparenting, and widowhood; (3) accepting one's own life; and (4) developing a point of view about death.

Jung's theory proposes that development continues throughout life by a process of searching, questioning, and setting goals that are consistent with the individual's personality. Thus, life becomes an ongoing search for the "true self." As individuals age, they go through a reevaluation stage at midlife, at which point they realize there are many things they have not done. At this stage, they begin to question whether the decisions and choices they have made were the right choices for them. This is the so-called *midlife crisis*, which can lead to radical career or lifestyle changes or to the acceptance of the self as is. As aging continues, Jung proposes that the individual is likely to shift from an outward focus (with concerns about success and social position) to a more inward focus. Successful aging, according to Jung, includes acceptance and valuing of the self without regard to the view of others.

IMPLICATIONS FOR NURSING

Physical theories of aging indicate that, although biology places some limitations on life and life expectancy, other factors are subject to behavior and life choices. Nursing can help individuals achieve the longest, healthiest lives possible by promoting good health maintenance practices and a healthy environment.

Psychosocial theories help explain the variety of behaviors seen in the aging population. Understanding all of these theories can help nurses recognize problems and provide nursing interventions that will help aging individuals successfully meet the developmental tasks of aging.