Test 3 Study Guide

Chapter 7

- Vocabulary
  - Vitamins: organic compounds that are vital to life and indispensable to body functions but are needed only in minute amounts; noncaloric essential nutrients.
  - Precursors, provitamins: compounds that can be converted into active vitamins.
  - Beta-carotene: an orange pigment with antioxidant activity; a vitamin A precursor made by plants and stored in human fat tissue.
  - Retinol: one of the active forms of vitamin A made from beta-carotene in animal and human bodies; an antioxidant nutrient. Other active forms are retinal and retinoic acid.
  - Retina: the layer of light-sensitive nerve cells lining the back of the inside of the eye.
  - Cornea: the hard, transparent membrane covering the outside of the eye.
  - Rhodopsin: the light-sensitive pigment of the cells in the retina; it contains vitamin A (rod refers to the rod-shaped cells; opsin means "visual protein").
  - night blindness: slow recovery of vision after exposure to flashes of bright light at night; an early symptom of vitamin A deficiency.
  - Keratin: the normal protein of hair and nails.
  - Keratinization: accumulation of keratin in a tissue; a sign of vitamin A defi ciency.
  - Xerosis: drying of the cornea; a symptom of vitamin A deficiency.
  - Xerophthalmia: progressive hardening of the cornea of the eye in advanced vitamin A deficiency that can lead to blindness
  - Epithelial tissue: the layers of the body that serve as selective barriers to environmental factors. Examples are the cornea, the skin, the respiratory tract lining, and the lining of the digestive tract.
  - cell differentiation: the process by which immature cells are stimulated to mature and gain the ability to perform functions characteristic of their cell type.
  - Carotenoid: a member of a group of pigments in foods that range in color from light yellow to reddish orange and are chemical relatives of beta-carotene. Many have a degree of vitamin A activity in the body.
  - retinol activity equivalents (RAE): a new measure of the vitamin A activity of beta-carotene and other vitamin A precursors that refl ects the amount of retinol that the body will derive from a food containing vitamin A precursor compounds.
  - IU (international unit): a measure of fat-soluble vitamin activity sometimes used on supplement labels.
  - macular degeneration: a common, progressive loss of function of the part of the retina that is most crucial to focused vision. This degeneration often leads to blindness.
  - dietary antioxidants: compounds typically found in plant foods that significantly decrease the adverse effects of oxidation on living tissues. The major antioxidant vitamins are vitamin E, vitamin C, and beta carotene.
  - Rickets: the vitamin D–deficiency disease in children; characterized by abnormal growth of bone and manifested in bowed legs or knock-knees, outward-bowed chest, and knobs on the ribs.
  - Osteomalacia: the adult expression of vitamin D–deficiency disease, characterized by an overabundance of unmineralized bone protein. Symptoms include bending of the spine and bowing of the legs.
  - Osteoporosis: a weakening of bone mineral structures that occurs commonly with advancing age.

- Tocopherol: a kind of alcohol. The active form of vitamin E is alpha-tocopherol.
- free radicals: atoms or molecules with one or more unpaired electrons that make the atom or molecule unstable and highly reactive.
- erythrocyte hemolysis: rupture of the red blood cells, caused by vitamin E deficiency
- jaundice: yellowing of the skin due to spillover of the bile pigment bilirubin from the liver into the general circulation.

- Key Points
  - The only disease a vitamin can cure is the one caused by a deficiency of that vitamin.
  - Vitamins are essential, noncaloric nutrients that are needed in tiny amounts in the diet and help to drive cell processes in the body. Vitamin precursors in foods are transformed into active vitamins by the body. The fat-soluble vitamins are vitamins A, D, E, and K; the water-soluble vitamins are vitamin C and the B vitamins.
  - Vitamin A is essential to vision, integrity of epithelial tissue, bone growth, reproduction, and more. Vitamin A deficiency causes blindness, sickness, and death and is a major problem worldwide. Overdoses are possible and cause many serious symptoms. Foods are preferable to supplements for supplying vitamin A.
  - The vitamin A precursor in plants, beta-carotene, is an effective antioxidant in the body. Brightly colored plant foods are richest in beta-carotene, and diets containing these foods are associated with good health.
  - Key bone vitamins:
    - Vitamin A
    - vitamin D
    - vitamin K
    - vitamin C
  - Key bone minerals:
    - Calcium
    - Phosphorus
    - Magnesium
    - Fluoride
  - Vitamin D raises mineral levels in the blood, notably calcium and phosphorus, permitting bone formation and maintenance. A deficiency can cause rickets in childhood or osteomalacia in later life. Vitamin D is the most toxic of all the vitamins, and excesses are dangerous or deadly. People exposed to the sun make vitamin D from a cholesterol-like compound in their skin; fortified milk is an important food source.
  - Factors affecting sun exposure and vitamin D synthesis:
    - Air pollution. Particles in the air screen out the sun's rays.
    - City living. Tall buildings block sunlight.
    - Clothing. Most clothing blocks sunlight.
    - Geography. Lack of direct sunlight prevents vitamin D synthesis:
      - September through March at latitudes above 50 degrees (most of Canada).
      - November through February at latitudes between 35 and 50 degrees (most U.S. locations).
    - In locations south of 35 degrees (northern borders of Alabama and Georgia) direct sun exposure is sufficient for vitamin D synthesis year-round.
    - Homebound. Living indoors prevents sun exposure.
    - Season. Warmer seasons of the year bring more direct sun rays.

        - Sunscreen. Use reduces or prevents skin exposure to sun's rays.
        - Time of day. Midday hours provide maximum direct sun exposure.
    - The USDA Food Guide recommends small daily intakes of foods supplying uncooked oils to supply vitamin E. Cooking methods using high heat, such as frying, destroy vitamin E.
    - Key antioxidant vitamins:
        - Beta-carotene, vitamin E, and vitamin C.
        - A key antioxidant mineral: selenium.
    - Vitamin E acts as an antioxidant in cell membranes and is especially important for the integrity of cells that are constantly exposed to high oxygen concentrations, namely, the lungs and red and white blood cells. Vitamin E deficiency is rare in human beings, but it does occur in newborn premature infants. The vitamin is widely distributed in plant foods; it is destroyed by high heat; toxicity is rare.
    - Vitamin K is necessary for blood to clot; deficiency causes uncontrolled bleeding. The bacterial inhabitants of the digestive tract produce vitamin K. Toxicity causes jaundice.
    - ALSO see Table 7.5

Chapter 8

- Vocabulary
    - Minerals: naturally occurring, inorganic, homogeneous substances; chemical elements.
    - major minerals: essential mineral nutrients found in the human body in amounts larger than 5 grams.
    - trace minerals: essential mineral nutrients found in the human body in amounts less than 5 grams.
    - water balance: the balance between water intake and water excretion, which keeps the body's water content constant.
    - Dehydration: loss of water. The symptoms progress rapidly, from thirst to weakness to exhaustion and delirium, and end in death.
    - water intoxication: a dangerous dilution of the body's fluids resulting from excessive ingestion of plain water. Symptoms are headache, muscular weakness, lack of concentration, poor memory, and loss of appetite.
    - metabolic water: water generated in the tissues during the chemical breakdown of the energy-yielding nutrients in foods.
    - Diuretic: a compound, usually a medication, causing increased urinary water excretion; a "water pill."
    - hard water: water with high calcium and magnesium concentrations.
    - soft water: water with a high sodium concentration.
    - bottled water: drinking water sold in bottles.
    - Aquifers: underground rock formations containing water that can be drawn to the surface for use.
    - Groundwater: water that comes from underground aquifers.
    - surface water: water that comes from lakes, rivers, and reservoirs.
    - Salts: compounds composed of charged particles (ions). An example is potassium chloride (KCl).
    - Ions: electrically charged particles, such as sodium (positively charged) or chloride (negatively charged).
    - Electrolytes: compounds that partly dissociate in water to form ions, such as
    - the potassium ion (K) and the chloride ion (Cl).