Pg. 557
Problems of Refraction

1. Normal= emmetropic eye → focal point is on retina
2. Myopic eye (nearsighted) → focal point is in front of retina (uncorrected)
   →bi-concave lens moves focal point further back (corrected)

- good near vision
    1. Ciliary muscle fibers contracted
    2. Suspensory ligaments relaxed
    3. Lens thick

3. Hyperopic eye (hypermetropia) (farsighted) → focal point is behind retina (uncorrected)
   → bi-concave lens moves focal point forward (corrected)

- Good far vision
    1. Ciliary muscle fibers relaxed
    2. Suspensory ligaments taut
    3. Lens thin

Pg. 558
Photoreceptors of the retina

- **Opsin complex** (only in rods) is called rhodopsin
    - Function: absorb the retinal (which is a light absorbing molecule derived from vit. A--- in carrots)

Pg. 568
Location and structure of taste buds on the tongue

- Taste buds are associated with fungiform (surface of tongue), foliate (side back of tongue), and vallate papillae (big circles back of tongue)

Pg. 571
Structure of Ear

1. External
    a. Auricle (pinna)—collect and direct sound waves into the ear
    b. Helix
    c. Lobule
    d. External acoustic meatus—transmit sound waves through the outer ear to tympanic membrane
    e. Tympanic membrane—transmits pressure waves to the malleus (vibration)
2. Middle
    a. Tympanic cavity—connects with auditory tube, contains auditory ossicles

        - complex problem solving
        - judging the consequence of behavior
    - Parietal
        - Sensory areas
            - Sensations of—involving the skin:
                - Temperature
                - Touch
                - Pressure
                - Pain
        - Association areas
            - Functions:
                - Understanding speech
                - Using words to express thoughts and feelings
    - Temporal
        - Sensory areas
            - hearing
        - Association areas
            - Interpret sensory experiences
            - Remember:
                - visual scenes
                - music
                - other complex sensory patterns
    - Occipital
        - Sensory areas
            - vision
        - Association areas
            - Combine visual images with other sensory experiences
- Fissures:
    - Longitudinal fissure (separates both C.H.S)
    - Central fissure (front/parietal)
    - Peri-occipital fissure (back by occipital lobe)
    - Lateral fissure (temporal/all three other lobes)
- Functions of the cerebral cortex neurons:
    - Speech
    - Memory
    - Logical and emotional responses
    - Consciousness
    - Interpretation of sensation
    - Voluntary movement
- Basal Nuceli/ Basal Ganglia= several islands/patches of gray matter, buried deep within the white matter of the CHS
    - They help regulate voluntary motor activity/ important in motor coordination

- Diencephalon

Generation and propogation of an action potential in a skeletal muscle

(Depolarization--→ to repolarization ---→ Action Potential (Nerve Impulse)

electrical conditions of a resting (polarized) stage sarcolemma

- outside face positive, inside face negative
- Sodium (Na+) = predominant extracellular ion
- Potassium (K+) = predominant intracellular ion
- The sarcolemma is relatively impermeable to both ions

Step 1: Depolarization and generation of the action potential

- Production of an end plate potential at the motor end plate causes djacent areas of the sarcolemma to become permeable to sodium (voltage gated sodium channels open).
- As sodium ions diffuse rapidly into the cell, the resting potential is decreases (i.e., depolarization occurs).
- If the stimulus is strong enough, an action potential is initiated.

Step 2: Propogation f the action potential

- The positive charge inside the initial patch of sarcolemma changes the permeability of an adjacent patch, opening voltage-gated Na+ channels there.
- Consequently, the membrane potential in that region decreases and depolarization occurs there as well.
- Thus, the action potential travels rapidly over the entire sarcolemma.

Step 3: Repolarization

- Immediately after the depolarization wave passes, the sarcolemma's permeability changes once again: Na+ channels close and K+ channels open, allowing K+ to diffuse from the cell.
- This restores the electrical conditions of the resting (polarized) state.
- Repolarization occurs in the same direction as depolarization, and must occur before the muscle fiber can be stimulated again.
- The ionic concentrations of the resting state are restored later by the sodium-potassium pump.
    - Repolarization

active process

- Na+ / K+ pump eliminate excess Na+ ions
- **Refractory period**= return to polarized state
- **Saltatory conduction**= propogation of action potential along a myelingted fiber is from internode -> to -> internode
    - a nerve impulse is conducted in an **all-or-none response**:
        - whenever a stimulus of **threshold intensity (-55 miliwatts)** is applied to a fiber, all of the impulses conducted on a fiber are of the same strength (not cause of a larger impulse)

Ch. 11

Classification/ Organization of the Nervous System Pg. 387

- Nervous System
  - Most important system for homeostasis (maintain internal environment)
  - Parts:
    - Brain
    - Spinal chord
    - Nerves
  - Functioning:
    - Sensory receptor
    - Sensory input (SN)
      - Gathers information—transmits it to the brain and spinal chord
    - Integration
      - Brain and spinal chord
      - Makes thoughts and decisions
    - Motor output
      - Effects of the thoughts and decisions
    - Effector

iii. Parietal pleura
iv. Visceral pleura
v. Parietal peritoneum
vi. Visceral peritoneum

4. **synovial**

Ch. 5

Gig. 5.1 (pg. 151)
Skin Structure

- from most outer to inner—
  - Epidermis
    - Hair shaft
    - Swear pore
  - Dermis
    - Papillary layer (above)
      - Dermal papillae
      - Subpapillary plexus
    - Reticular layer (below)
      - Cutaneous plexus
      - Appendages of the skin
        - Eccrine sweat glands
        - Arrector pili muscle—causes goose bumps
        - Sebaceous –oil—gland
        - Hair follicle
        - Hair root
      - Nervous structures
        - Sensory nerve fibers with free nerve endings
        - Lamellar corpuscle
        - Hair follicle receptor (root hair plexus)
  - Hypodermis—also called superficial (subcutaneous tissue, not part of skin)
    - Mostly fat, adipose tissue and lose ct

Cells of the Epidermis (pg .153)
--from most outer to inner--

1. Stratum corneum
2. Lucidum
3. Stratum granulosum
4. Stratum spinosum
5. Stratum basale

4. **pseudostratified columnar epithelium**
    a. description: single layer of cells of differing heights, some not reaching the free surface; nuclei seen at different levels; may contain mucus-secreting cells and bear cilia.
    b. function: secrete substances, particularly mucus. Mucus propulsion by ciliary action.
    c. location: **non-ciliated type in male's sperm-carrying ducts and ducts of large glands; ciliated variety lines the trachea, most of the upper respiratory tract.**
5. **stratified squamous epithelium**
    a. description: thick membrane composed of several cell layers; basal cells are cuboidal or columnar and metabolically active; surface cells are flattened (squamous); in keratinized type, the surface cells are full of keratin and dead; basal cells are active in mitosis and produce the cells of the more superficial layers.
    b. function: protects underlying tissues in areas subjected to abrasion.
    c. location: **non-keratinized type forms the moist linings of the esophagus, mouth, and vagina; keratinized types form the epidermis of the skin, a dry membrane.**
6. **transitional epithelium**
    a. description: resembles both stratified squamous and stratified cuboidal; basal cells cuboidal or columnar; surface cells dome shaped or squamous-like, depending on degree of organ stretch.
    b. function: stretched readily, permits stored urine to distend urinary organ.
    c. location: **lines the ureters, bladder, and part of the urethra.**

Endocrine/ Exocrine glands (pg. 124, 128)

1. **Endocrine glands (no ducts/tubes):** eventually lose their ducts (ductless glands). They produce hormones which secrete by exocytosis directly into the extracellular space
2. **Exocrine glands (ducts/tubes):** secrete their products onto body surfaces (skin) or onto body cavities. (unicellular and multicellular glands).

Types of multicellular exocrine glands

	Simple duct structure (duct does not branch)	Compound duct structure (duct branches)
Tubular secretory structure	1. Simple tubular (intestinal glands) 2. Simple branched tubular (stomach – gastric—glands)	1. Compound tubular (duodenal glands of small intestine)
Alveolar secretory structure	1. Simple alveolar (no important example in humans)	1. Compound alveolar (mammary glands)

Bases	Adenine, guanine, cytosine, thymine	Adenine, guanine, cytosine, uracil
structure	Double strand coiled into a double bond	Single strand. Straight or folded

Carbohydrates: organic molecules which are made of sugars and their polymers, ex: sugars, starch, glycogen, and cellulose

- only 1-3 % of the body weight
- contain C, H, and O with slight variations
- ratio of H and O → 2 H: O → 2:1 (same as water)
- Glucose ($C_6H_{12}O_6$) Fructose ($C_6H_{12}O_6$) Sucrose ($C_{12}H_{22}O_{11}$)
- Monosaccharides: monomers or building block molecules are simple sugars
- Are classified based upon the number of simple sugars (mono, di, poly)
- 1. Monosaccharides: (mono= one; sacchar= sugar)
    - are referred to as a simple sugar
    - are major nutrients for cells. Glucose is the most common.
    - They are single chain or single ring structure, which contain from 3 to 7 carbon atoms
    - Ex: glucose, fructose, galactose, ribose, and deoxyribose
        - Blood glucose (blood sugar) is the main energy supplying molecule of the body
    - Monosaccharides are classified generally according to the number of carbon atoms they contain:
        - Ex: pentose (ribose)
        - Ex: hexose (glucose)
    - can be incorporated as monomers into disaccharides and polysaccharides
- **2.** Disaccharides: (double sugars)
    - two monosaccharides which combine by dehydration synthesis (glucose + fructose → sucrose + water)
    - ex: sucrose (glucose and fructose) cane sugar (table sugar)
    - ex: (glucose and galactose) found in milk
    - ex: (glucose and glucose) malt sugar (in brewing beer)
    - these molecules are too big to pass through the cell membrane → broken into mono-- → by hydrolysis (+ H_2O)
- 3. *Polysaccharides*: (many sugars)
    - macromolecules are polymers of a few hundred or thousand monosaccharides
    - are formed by linking in enzyme- mediated condensation
    - ideal for:
        - 1. Energy storage purpose
            - *starch (in plants)*
            - *glycogen (in animals)*—stored in liver and skeletal muscles

            (like di--, poly--, can be broken down into mono—through hydrolysis (+H_2O) when they are needed as in a low glucose level
        - 2. Structural support
            - cellulose (of plant cell walls)