The Human Body Systems

Chapters 17

I. **Integumentary System** – The Skin
   a. Main Function: Protection from the external Environment
   b. **Epidermis** – Top layer: cells undergo rapid cell division, entire epidermis replaced every 4 weeks
   c. **Dermis**-
      i. contains specialized epithelial cells to form hair and nails
      ii. Contains
         1. hair follicles
         2. sweat glands
         3. connective tissue
         4. nerve endings
         5. blood vessels
         6. **sebaceous glands**
      iii. Wrinkles develop here
   d. Skin color from **melanin**
   e. Regulates body temp by sweating

II. Skeletal System
   a. **206** bones in the body
   b. about ½ are in the hands and feet
   c. **Axial Skeleton**: Cranium (skull), vertebrae
   d. **Appendicular skeleton**: arms and legs, pectoral girdle and pelvic girdle
   e. Function
      i. Support
      ii. Anchor point for muscles
      iii. Protective cage for internal organs
   f. Skull
      i. Frontal Bone, Parietal, Occipital, Temporal, Nasal, Maxilla, Mandible
   g. Spine
      i. 7 Cervical: Atlas and Axis
      ii. 12 Thoracic
      iii. 5 Lumbar
      iv. **Sacrum** (fused vertebrae)
      v. **Coccyx** (4 fused)
      vi. Cartilaginous disks between vertebrae
   h. Structure of bone
      i. **Periosteum**- tough covering which supplies blood vessels, nutrients and oxygen to the bone
      ii. Shaft
      iii. **Compact bone**: dense strong bone
         1. **Haversian Canals**: network of tubes w/ vessels and nerves
         2. **Lamella**: Circular layers
      iv. **Spongy bone**: porous bone
         1. **Red Marrow**- found in the spongy bone makes red and white blood cells
         2. **Yellow marrow** – contains fat and nerve cells
      v. **Osteocytes**: cells that manufacture bone cells- embedded in compact and spongy layers. Deposits Calcium to make the bone
   i. Development of Bone

i. Long bones w/ **Epiphyseal Plates**: Growth Plates
ii. Babies born mainly w/ Cartilage which is replaced by bone as baby grows
iii. Cartilage in adults
    1. Cushions the body i.e. knee
    2. Flexibility i.e. the ribs
    3. Support i.e. nose and ears
iv. **Ligaments** connect bone to bone
v. **Tendons**: connect muscle to bone

j. **Joints**: Place where 2 bones come together
    i. **Immovable** joint: fixed, no movement, interlocking pieces of puzzle: skull
    ii. Movable
        1. **Ball and Socket**: Widest range of motion, Circular type movement
            a. Hip (femur and pelvis) & Shoulder
        2. **Hinge**: back and forth movement: elbow and knee
        3. **Pivot**: Allows side-to-side and up-and-down movement: Atlas/Axis
        4. **Gliding**: some bending and twisting: wrist and vertebrae

III. Muscular System

a. 3 types of muscle
    i. **Striated Muscle** – Voluntary – skeletal muscle
    ii. **Smooth Muscle** - Voluntary – muscles surrounding internal organs, arteries and the diaphragm
    iii. **Cardiac Muscle** - Heart Muscle

b. Actin and Myosin → Filaments→ Myofibrils → muscle fibers → Bundles→ Muscle

c. Nerve impulse causes muscle to contract but no pushing action

d. Skeletal Muscles usually found in **antagonistic pairs**: when one contracts, the other relaxes
    i. **Flexor**: (i.e. Biceps) causes limb to flex (bend)
    ii. **Extensors** (i.e. Triceps) causes limb to extend (Straighten)
    iii. **Origin**: tendon location where muscle starts (proximal end)
    iv. **Insertion**: tendon location on adjacent bone (Distal end)