Chapter 16 – Healthy Body Systems
Lecture Notes

A. How is the Body Organized? Cells → tissue → organs → organ systems
   a. **Cell**- the smallest unit of structure. (a building made of bricks)
      i. **Cell Theory** – the relationship between cells and living things
         1. All living things are composed of cells.
         2. Cells are the basic unit of structure and function in living things
         3. All cells are produced from other cells
      ii. **Hooke** identified and named "cells" by looking through a compound microscope at a thin slice of bark from a cork oak tree
      iii. **Leeuwenhoek** used a simple microscope to magnify pond water and see microscopic protozoans that he called "animalcules".
   b. **Tissue** – a group of similar cells that carry on the same function.
      i. The human body contains four basic types of tissue:
         1. **Muscle tissue**: tissue with the ability to contract. Examples: smooth muscle, cardiac muscle and striated muscle
         2. **Nerve tissue**: carries messages back and forth between the brain and all other parts of the body. Examples: brain, spinal cord and nerve cells.
         3. **Connective tissue**: provides support and structure to the body. Examples include bones, ligaments, tendons, cartilage, fat and blood.
         4. **Epithelial tissue**: covers the surfaces of your body (inside and out). Examples include the skin, stomach and intestinal lining.
   c. **Organs** – a structure made of different types of tissues that carry on a specific function generally the function is more complex than the function of any specific tissue:
      i. Heart: pumps blood thru the body
      ii. Lungs: gas exchange between the atmosphere and the circulating blood.
      iii. Brain: controls all aspects of the body
      iv. Femur: main thigh bone produces blood cells and supports the body
   d. **Organ Systems** – a group of different organs that work together to perform a major function
      i. There are 11 recognized human systems:
         1. **Circulatory system** – carries materials to and away from all body cells and includes the heart (duel pump), arteries, veins, capillaries and blood
         2. **Digestive system** – takes food and converts it into materials that can be used at the cellular level and includes the esophagus, stomach, small intestines, large intestines, etc.
         3. **Endocrine system** – controls many of the body functions by the release of hormones that affect the other body systems and include the adrenal glands, the thalamus, hypothalamus and thyroid glands
         4. **Excretory system** – takes waste products made at the cellular level and removes them from the blood. Examples include kidneys, ureter, and the bladder.
         5. **Immune system** – (some include this in the circulatory system) – include T cells, lymphocytes and antibodies.
         6. **Musculature system** – enables the body to move, moves food thru the digestive system, keeps the heart beating. Examples include biceps and triceps and the Gluteus maximus.

7. **<u>Nervous system</u>** – detects and interprets information the body receives from the outside environment and allows the body to react accordingly. Examples include the brain, spinal cord, and sensory organs
8. **<u>Reproductive system</u>** – allows for the continuation of life, produces sex cells that allow for creation of offspring. Controls male and female characteristics. Include testes, ovaries uterus etc.
9. **<u>Respiratory system</u>** – supplies oxygen to the body while removing carbon dioxide and include the lungs, trachea and bronchi.
10. **<u>Skeletal system</u>** – supports, gives shape and protects the body. Serves as attachment for the muscles and produces new blood cells in its marrow. Examples include the ribs, femur, humerous and phalanges
11. **<u>Integumentary system</u>** – the skin and its underlying materials protects the body, water regulation and maintains body temperature.

B. Keeping the body in balance
   a. **<u>Homeostasi</u>**s – the process that keeps the body's internal environment stable in spite of ever changing external environmental conditions
      i. Maintaining body temperature via sweating, hard breathing etc.
      ii. Stress disturbs homeostasis and the body reacts to return to "normal"
         1. "Fight or Flight Syndrome" – reaction of your body due to **adrenaline** that prepares your body to either fight off the stressor or to turn and run away from the source of stress.