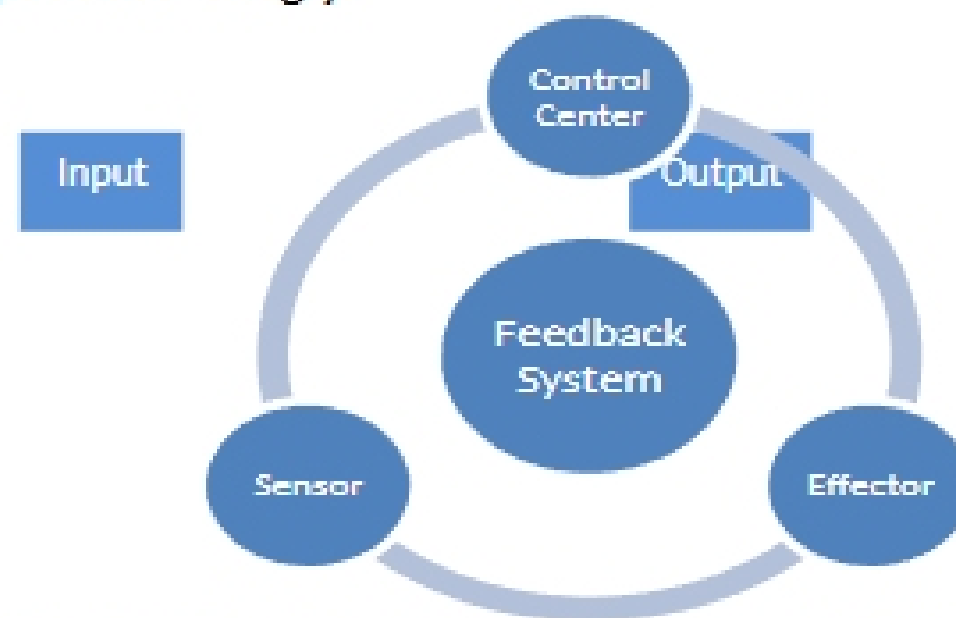


Anatomy and Physiology Lecture Notes

Fall Test 1- Chapters 1-3

- Anatomy- the study of the structure or shape of body parts and their relationship to each other
- Physiology- the study of the function (how the parts work)
 1. Levels of Structural Organization
- There is a hierarchy of structural complexity, beginning with the simplest, or chemical, level and culminating with the highest level, the whole organism
 1. Chemical level- atoms and their parts, and combinations of atoms called molecules
 2. Cellular level- the basic structural and functional units of life
 3. Tissue level- groups of similar cells, and their intercellular material, which work together toward a specific function. They also have a common embryological origin. Ex: blood, muscle, nerves, etc.
 4. Organ level- a structure composed of 2 or more tissue types, which work together to perform a function
 5. System level (Organ System)- an association of organs which cooperate to accomplish a purpose. There are 12 principal systems in humans.
 6. Organismal level- the sum total, a collection of structurally and functionally integrated systems
- Organ Systems:
 1. Integumentary- forms external body covering
 2. Skeletal- protects and supports body organs
 3. Muscular- allows manipulation of the environment
 4. Urinary- eliminates nitrogenous wastes from the body
 5. Endocrine- composed of glands that secrete hormones that regulate certain processes like sweat
 6. Nervous- fast-acting control system of the body
 7. Cardiovascular- composed of blood vessels that transport blood to and away from the body
 8. Lymphatic- picks up fluid leaked from blood vessels
 9. Respiratory- keeps blood constantly supplied with Oxygen
 10. Digestive- breaks down food into absorbable units

11. Male Reproductive- produces sperm and male sex hormones for the production of offspring
 12. Female Reproductive- produces eggs and female sex hormones for the production of offspring
- Homeostasis- the condition of maintaining the body's internal environment in a relatively constant state. Ex: maintain a steady temperature, blood pressure, glucose level, etc. Homeostasis is a dynamic equilibrium, which means it struggles to not be changed by outside stresses
 - Stress- anything that disturbs or unbalances the internal environment, so homeostasis is a ceaseless process of activities in response to stresses in an attempt to maintain equilibrium
 - Homeostatic Mechanisms- mechanisms in which are generally "self-regulating" and serve to maintain the homeostatic "steady state"
 - Feedback Systems- a conceptual way of viewing how homeostatic mechanisms operate (ex: thermostat). A control center monitors input and adjusts output accordingly.



- **Positive Feedback:** a change in one or more direction accelerates more change in the **same** directions
- **Negative Feedback:** a change in one direction feeds back and causes a change or adjustment in the **opposite** direction
- **Chemistry**
- Matter- anything which occupies space and has mass/weight. Matter can be gas, liquid, or solid.
- Energy- the capacity to do work, as in out matter into motion

- Element- a fundamental unique substance, which cannot be broken down into simpler substances (by chemical means)
- Atom- the building blocks for atoms and the smallest subdivision of an element, which displays the element's unique chemical and physical properties
- There are over 100 elements, but 99% of our body's mass is due to 6 elements:

▪ Oxygen	O	65%
▪ Carbon	C	18%
▪ Hydrogen	H	10%
▪ Nitrogen	N	3%
▪ Calcium	Ca	2%
▪ Phosphorous	P	1%
- Atoms were originally thought to be solid and indivisible. Now we understand that they are composed of smaller particles and a great deal of empty space.
- Atomic Structure:
 - Energy levels or orbitals containing electrons
 - Nucleus-the central core containing protons and neutrons
 - Proton (P⁺)- positive charged particle
 - Neutron (N⁰)- neutral particle (uncharged)
 - Electron (e⁻)- negative charged particle
- Electrons are in orbit.
- Nucleus- consists of P⁺ and N⁰, thus it's positive
- The number of electrons is equal to the number of protons, so an atom is neutral.
- The Atomic Number is the number of protons. (Ex: O=8, C=6, N=7)
- Protons and Neutrons are approximately equal in weight and mass, which is about 2,000 times more than electrons.
- Atomic Weight is also known as the Mass Number, which means it is the number of protons plus the number of neutrons.
- Nearly all elements have 2 or more atomic variants called isotopes.
- Isotopes have the same atomic number, the number of protons, but they vary in the number of neutrons and mass number.