

Review & Overview of Human Body Systems

Journal Notes

Part 1: The Basic Chemistry of Living Things

- ✿ Everything, living and non-living, in our world is made of **atoms**. There are over 100 different kinds of atoms that combine in many ways to make up every kind of matter. Air, water, rocks, plants, snakes and people are all made of many atoms.
- ✿ A substance or type of matter, made up of one type of atom is called an **element**. When two or more atoms join together, they form a **molecule**. Molecules make up **compounds**. Compounds found in living things are usually made of six different elements: carbon, hydrogen, nitrogen, oxygen, phosphorous, and sulfur.
- ✿ Molecules may join together to form even larger molecules called **macromolecules**.
- ✿ All living things are made of **cells**. Cells are partly composed of macromolecules.
- ✿ **Proteins, carbohydrates, lipids, nucleic acids, and ATP** are compounds that are found in all cells.



Part 2: Compounds in Living Things

PROTEINS

- ✿ Almost all of the life processes of a cell involve **proteins**. After water, proteins are the most common chemicals in cells. Proteins are large macromolecules that are made up of smaller molecules called **amino acids**.
- ✿ Living organisms break down the proteins in food to provide cells with amino acids. These amino acids are put together in new ways to form new proteins. Some proteins are made up of only a few amino acids, while others contain more than 10,000 amino acids.
- ✿ Proteins have many different functions. Some proteins form structures that are easy to see, like hair, fur, or the beaks of birds. Other proteins are at work at the cellular level. **Hemoglobin** is a protein in red blood cells that attaches to oxygen so that oxygen can be carried throughout the body. Some proteins help protect cells from foreign materials. And special proteins called **enzymes** cause different chemical reactions in a cell occur quickly. Cells use enzymes to make the chemical compounds they need and to break down compounds for energy.

CARBOHYDRATES

- ✿ **Carbohydrates** are a group of compounds made of sugars. There is more than one type of sugar. Cells use carbohydrates as a source of energy and to store energy. When an organism needs energy, its cells break down carbohydrates to release the energy stored in the carbohydrates. Breaking down carbohydrates to release energy is called **respiration**.

- ✿ There are two types of carbohydrates: simple carbohydrates and complex carbohydrates.
- ✿ **Simple carbohydrates** are made of one sugar molecule or a small number of sugar molecules linked together. The sugar in fruits and table sugar are examples of simple carbohydrates.
- ✿ When an organism has more sugar than it needs, the extra sugar may be stored for later use in the form of **complex carbohydrates**. Complex carbohydrates are made of hundreds or thousands of sugar molecules linked together.
- ✿ Plants make carbohydrates during **photosynthesis**. A potato plant makes sugar in its leaves during photosynthesis. It then stores its extra sugar as the starch in a potato. When you eat mashed potatoes or French fries, you are eating a potato plant's stored starch. Your body can then break down this complex carbohydrate to release the energy stored in it.

LIPIDS

- ✿ **Lipids** are fats and fatlike compounds. They are easily stored in the body and can serve as a source of energy.
- ✿ Lipids are compounds that cannot mix with water. Lipids have many important functions in the cell.
- ✿ Some lipids form the membranes of cells.

NULCLEIC ACIDS

- ✿ **Nucleic acids** are macromolecules made up of smaller molecules called **nucleotides**. A nucleic acid may contain thousands of nucleotides. Nucleic acids are sometimes called the blueprints of life because they contain all the information needed for the cell to make all the proteins.

🌿 **DNA** is a nucleic acid. A DNA molecule is the set of directions for how to make a protein. When a cell needs to make a certain protein, it gets information from DNA to control how amino acids are hooked together to make that protein.

ATP

- 🌿 **ATP** (adenosine triphosphate) is the fuel used for all cell activities that require energy.
- 🌿 When food molecules, such as carbohydrates and fats, are broken down, some of the released energy is transferred to ATP molecules. Just as crude oil must be converted to gasoline before it can be used to fuel a car, the energy in carbohydrates and lipids must be transferred to ATP before the stored energy can be used by the cells to fuel their life processes.



Part 3: How Living Things Are Organized

CELLS

- ✿ Every organism (living thing) is made of at least one cell. Many organisms live as a single cell, while others are made up of trillions of cells.
- ✿ A human body has about 200 different kinds of cells, and each type of cell is specialized to do a particular job.
- ✿ The way a cell looks depends on the job the cell does.

TISSUES

- ✿ A group of cells working together forms a **tissue**.
- ✿ The materials around and between the cells is also part of the tissue.
- ✿ The body contains four main types of tissue.
 - The job of the **epithelial tissue** is to cover and protect the underlying tissues.. **Epithelium** (tissue made from epithelial cells) is usually found on the surfaces of the body and organs, and the lining of body cavities, tubes, and ducts.
 - **Connective tissue** serves a "connecting" function. It supports, joins, protects, insulates, nourishes and cushions organs, and binds to other tissues. Its keeps organs from falling apart.
 - **Nervous tissue** is responsible for sensing "stimuli" and communicating electrical "signals" to and from different parts of the body. It is found in the brain, nerves, and sense organs.
 - **Muscle tissue** is made of cells that can contract. Muscle tissue is the most plentiful tissue in most animals.

ORGANS

- ✿ Two or more tissues that work together to perform a specific job, is called an **organ**.
- ✿ Examples of organs are the stomach, intestines, heart, lungs, and skin.
- ✿ Examples of plant organs are stems, roots and leaves.

SYSTEMS

- ✿ Organs that work together in groups to perform particular jobs are called **organ systems**.
- ✿ Each system has a specific job to do in the body. For example, your digestive system's job is to break down food into very small particles so it can be used by all of your body's cells.
- ✿ The body has several organ systems.. Each organ in the system has a job to do. A particular organ is able to do its job because of the different tissues within it.
- ✿ The organs in an organ system depend on each other. If any part of the system fails, the whole system is affected. And failure of one organ system can affect other organ systems. When all of the organ systems work together to maintain a stable internal environment it is called **homeostasis**.

Systems in the Human Body:

Digestive
Muscular
Nervous
Reproductive
Excretory

Skeletal
Circulatory
Respiratory
Endocrine
Lymphatic