NOTES 2.1

Chapter 2 - Cell Structure and Function
Lesson I - Cells and Life

Understanding Cells

The cells that make up all living things are very small. And though they are commonly referred to as the building blocks of life, early scientists did not have the tools to see cells until the invention of the microscope. After Hooke's discovery of cells, scientists made better microscopes. They looked for cells in places such as pond water and blood. The newer microscopes made it possible for scientists to see different structures inside of cells.

5 people 1st saw & described cells – (continued from NOTES 1.3)

1. **Matthias Schleiden**

- 1838, German scientist
- plants made of cells

2. **Theodor Schwann**

- 1839, German scientist
- animals made of cells

3. **Rudolf Virchow**

- 185S, German doctor
- cells come from cells

The Cell Theory

The observations of Hooke, Leeuwenhoek, Schleiden, Schwann, and Virchow led to the development of the **cell theory**.

Q: What is the cell theory?
A: a widely accepted explanation of the relationship between cells and living things

3 parts of the Cell Theory –

- All living things are made of one or more cells.
- Cells are the smallest unit of life.
- All cells are produced from other cells.

The Cell Theory...

- holds true for all living things
- can provide information about all life

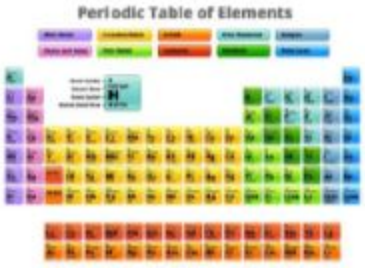
After the development of the cell theory, scientists raised more questions about cells. If all living things are made of cells, then what are cells made of?

The Main Ingredient - **WATER**

- 2/3(70%) of our bodies are made of it
- necessary for chemical reactions to take place
- helps cells retain their size, shape and temp

But what else??

Some background from 6th grade... elements, compounds and atoms. Oh my!



Q: What is an element?
A: any substance that cannot be broken down into simpler substances

Ex. carbon, hydrogen, oxygen, nitrogen, phosphorus and sulfur

Elements are made up of **atoms**

Q: What is an atom?
A: the smallest unit of an element

Atoms combine to form **elements** and **compounds**

Q: What is a compound?
A: 2 or more elements that are chemically combined

Ex. water = hydrogen + oxygen

Compounds are made up of **molecules**

Q: What is a molecule?
A: the smallest unit of most compounds

Ex. a molecule of water 2 hydrogen atoms + 1 oxygen atoms

Hence… H_2O

There are 2 types of compounds – **organic** and **inorganic**

Q: What is an organic compound?
A: a compound that contains carbon

Ex. CO_2 (carbon dioxide)

Q: What is an inorganic compound?
A: a compound that doesn't contain carbon

Ex. H_2O (water) or NaCl (salt)

Organic compounds are also known as **macromolecules**.

Q: What are macromolecules?
A: a substance that forms from joining many small molecules together

There are 4 types of macromolecules –

- Proteins
- Carbohydrates
- Lipids
- Nucleic acids

1. Proteins

- found in foods such as - meat, eggs, fish, nuts, and beans
- found in cells - cell membrane, other organelles
- used to produce muscles
- made of smaller structures - **amino acids** and **enzymes**

Q: What is an amino acid?
A: small units that are linked together chemically to form large protein molecules

There are 20 amino acids in our body. They work like the ABC's and can form a variety of different combinations to form different proteins necessary for our bodies.

Q: What is an enzyme?
A: a type of protein that speeds up a chemical reaction in a living thing

Ex. saliva contains amylase that breaks down nutrients in food

2. Carbohydrates

- starch – pastas and breads
- sugar - fruits
- found in cellulose in plants and in cell membranes

3. Lipids

- do not dissolve in water
- fats, oils, and waxes
- contain energy needed for cell processes
- cholesterol and vitamin A

Ex. a bear in winter during hibernation lives on lipids stored in its fat cells

4. Nucleic Acids

- contain the instructions that cells need to carry out all the functions of life
- 2 kinds **DNA-deoxyribonucleic acid**

RNA-ribonucleic acid

Q: What is DNA?
A: the genetic material in a cell

- carries information about an organism
- is passed from parent to offspring
- directs cell functions
- found in the chromatin in the nucleus

Q: What is RNA?
A: a nucleic acid that plays an important role in the production of proteins

- found in the cytoplasm and nucleus
- used to make proteins