

Chapter Eight: Cellular Structure and Function

Lesson 8.1: Life is Cellular

Cell: the basic units of all living things

- The smallest living unit of any organism

Robert Hooke:

- In 1665, he used any early microscope to look at dead cork cells.
- Called them “cells” because they resembled a monastery’s tiny rooms and it is still used today.

Anton van Leeuwenhoek

- He used a single-lens microscope to look at pond water.
- He concluded that these tiny living organisms were everywhere.

Many other scientists that observed other parts of the cell.

- Matthias Schleiden – all plants are made of cells
- Theodor Schwann – all animals are made of cells
- Rudolf Virchow – news cells can only come from existing cells

Cell Theory:

1. All living things are made up of cells.
2. Cells are the basic units of structure and function in living things.
3. New cells are produced from existing cells.

Microscopes: work by using beams of light or electrons to produce magnified images

1. Compound light microscopes – allows light to pass through a specimen and uses 2 lenses to form an image
 - a. This is the microscope you are most familiar with.
 - b. It uses 2 lenses to form an image.
 - i. Objective lens – located above the specimen and enlarges the image
 - ii. Ocular lens – located at the top and magnifies the image further
 - c. Only can produce clear images up to 1000 times magnification
 - i. Light scatters causing distortions
 - d. Most cell slides are dyed to easier imaging
2. Electron microscopes – uses beams of electrons focused by magnetic fields – offer a higher resolution than light microscopes – only view nonliving cells and tissues
 - a. Transmission electron microscopes
 - i. Flat and 2-dimensional images
 - b. Scanning electron microscopes
 - i. 3-dimensional images (best image known so far)

Cell membrane: thin, flexible barrier that surrounds all cells

- Regulates what enters and leaves the cells
- Called plasma membrane

Nucleus: in cells, the structure that contains the cell's genetic material in the form of DNA

- For atoms, this is the center of an atom which contains the protons and neutrons

Prokaryotes: unicellular organism that lacks a nucleus

- Do not enclose their genetic material within a nucleus
- Single-celled organisms like bacteria
- The first photosynthetic organism to appear on Earth
 - These organisms released oxygen into the air and changed the environment

Eukaryotes: organism whose cells contain a nucleus

- The nucleus separates the genetic material from the rest of the cell
- The cells are larger and more complex than prokaryotic cells
 - Contain dozens of structures and internal membranes that are highly specialized
- Multicellular organisms – humans are examples

