



# Objectives

- ✿ Describe the cell theory and the events that led to its development.
- ✿ Identify the basic parts of a cell.
- ✿ Differentiate between prokaryotes and eukaryotes.
- ✿ Compare and contrast the similarities and differences of different types of cells.
- ✿ List, in order, the hierarchy of cellular organization.



# Cells

- ✿ A **cell** is the smallest unit that can carry on all the process of life.
- ✿ The 7 characteristics of life are: (Bio. I)
  - ✿ Cellular Organization
  - ✿ Reproduction
  - ✿ Growth & Development
  - ✿ Change Over Time
  - ✿ Respond to Stimuli
  - ✿ Homeostasis
  - ✿ Metabolism



# The Cell Theory

- ✿ The fathers of the cell theory are Robert Hooke and Anton van Leeuwenhoek.
- ✿ The **cell theory** states that:
  - ✿ All living things are composed of one or more cells.
  - ✿ Cells are the basic units of structure and function in all living organisms.
  - ✿ Cells come only from the reproduction of existing cells.



# The Founding Fathers

- ✿ **Robert Hooke** used an early light microscope to view thin slices of cork and noticed “little boxes” that reminded him of cells in which monks lived.
- ✿ He started to look at stems, roots and ferns and found that all of these had the same “little boxes”.
- ✿ **Leeuwenhoek** was the first to fine tune a microscope and be able to see living cells in action.
- ✿ **OTHERS:** Schleiden (plants), Schwann (animals), Virchow (reproduction)

# The Basics of a Cell

- ✿ As you learned in Biology I, structure must compliment function (meaning the shape of something has something to do with what it does.)
- ✿ This same concept is true of cells.
- ✿ Cells vary greatly in **shape** because cells are capable of doing a wide range of things.





# The Basics of a Cell (Cont.)

- ✿ The **size** of a cell also plays a role in its function.
- ✿ A cell's size is limited by the relationship between the cell's outer surface area and its volume (**surface area-to-volume ratio.**)
- ✿ This is important because it limits how much “stuff” a cell can take in and put out.



# The Basics of a Cell

- ✿ Even though there is a wide variety of cell types, there are 3 basic features that all cells have:
  - ✿ **Plasma Membrane:** The cells outer membrane (also called the cell membrane.)
  - ✿ **Cytoplasm:** The area inside the cell that contains the parts of the cell (including the liquid medium.)
  - ✿ **Nucleus:** The “command and control” center of the cell.

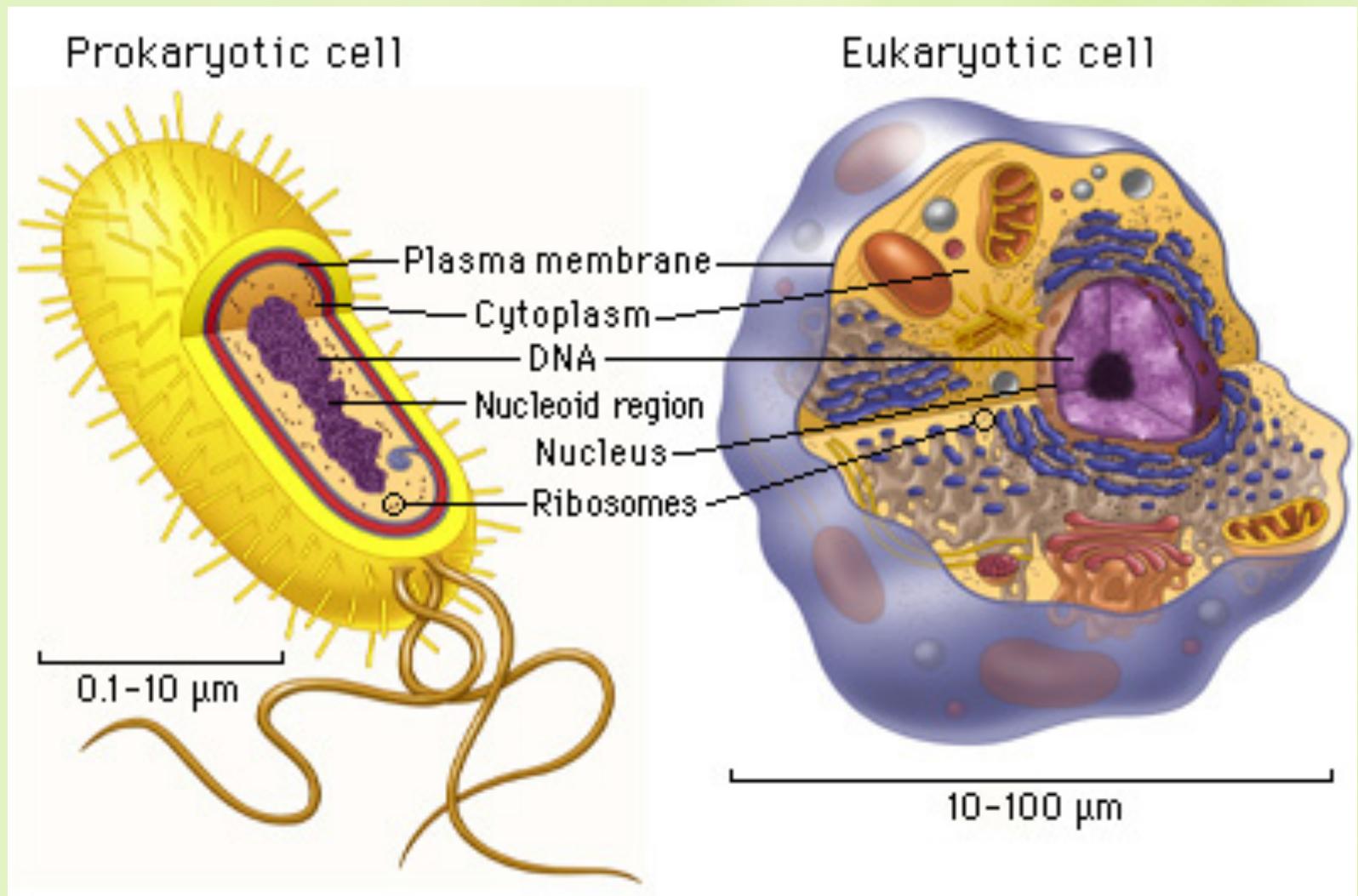


# Types of Cells

✿ There are 2 basic types of cells:

- ✿ **Prokaryotes:** These cells lack a membrane-bound nucleus and organelles (cell parts). They still have DNA. All prokaryotes are either in kingdom Bacteria or Archeabacteria (Monera).
- ✿ **Eukaryotes:** These cells have a distinct membrane-bound nucleus and other organelles that carry out cellular functions (all other kingdoms are eukaryotic.)

# Hey Baby...Nice Cell!





# Hierarchy of Cellular Organization

- ✿ As cells evolve they become more specialized and are able to work independently.
- ✿ Some cells work together with other cells of the same type to perform a function for a larger organism.
- ✿ This creates a **hierarchy of cellular organization.**



# Hierarchy of Cellular Organization (Cont.)

✿ In order from smallest to largest:

- ✿ Atom
- ✿ Molecule
- ✿ Organelle
- ✿ Cell (Living)
- ✿ Tissue: Group of similar cells with specific function.
- ✿ Organ: Group of similar tissue with specific purpose.
- ✿ Organ System: Group of organs with specific function.
- ✿ Organism



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