

BIOLOGICAL FRAMEWORKS FOR ENGINEERS

Session #4 [nm - m: Cells]

General Objectives:

- ✓ Overview of cells, types, and functions
- ✓ Discuss cell organelles and functions

Central Framework:

- ✓ The cell is the structural and functional unit of all living organisms

Interactive Activity:

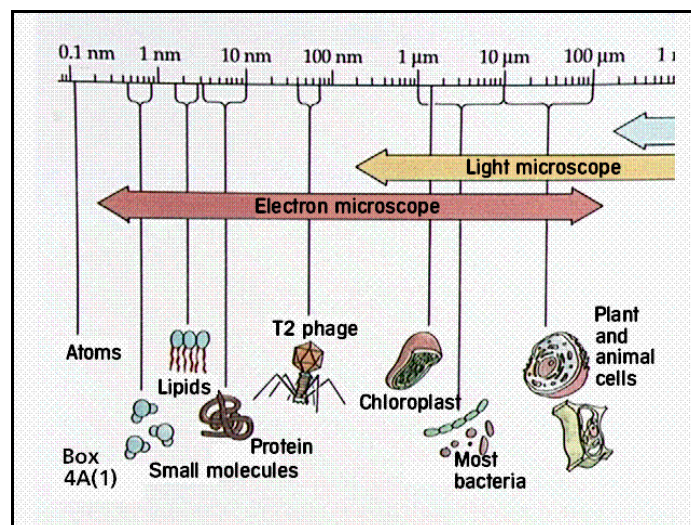
- ✓ Worksheet on biological and engineering parallels regarding the cell

Session Outline:

I. What are Cells?

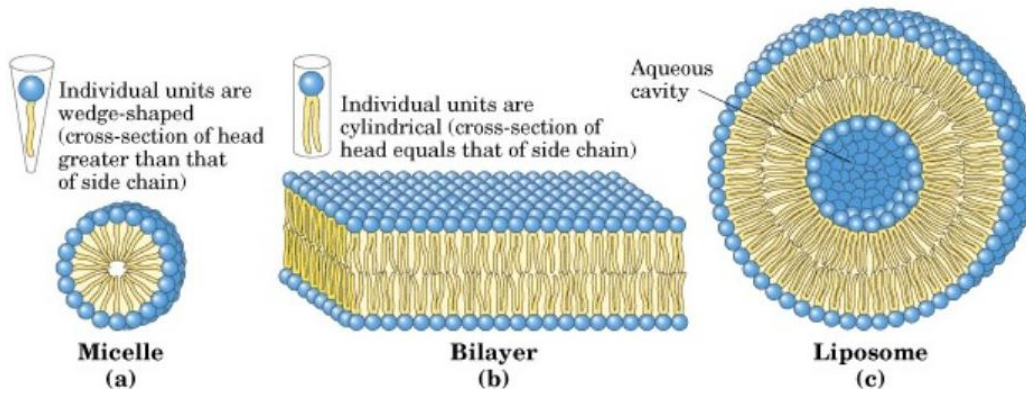
II. Cell Theory:

The cell theory, first developed in 1839 by Schleiden and Schwann, states that all organisms are composed of one or more cells; all cells come from preexisting cells; all vital functions of an organism occur within cells, and cells contain the hereditary information necessary for regulating cell functions and for transmitting information to the next generation of cells.



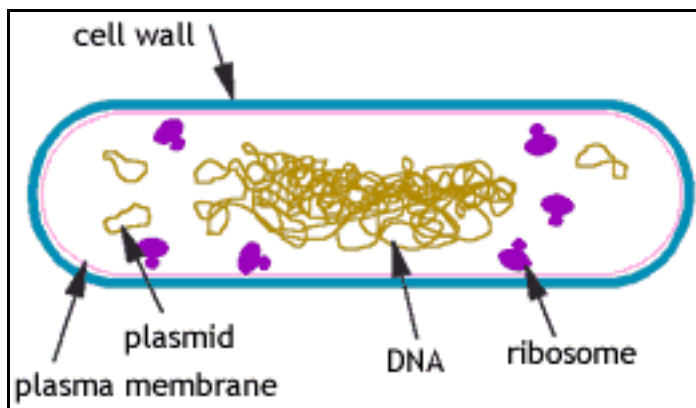
Source: www.mdx.ac.uk/www/lifesciences/alex/images/scale.gif

A. Lipid Bilayer



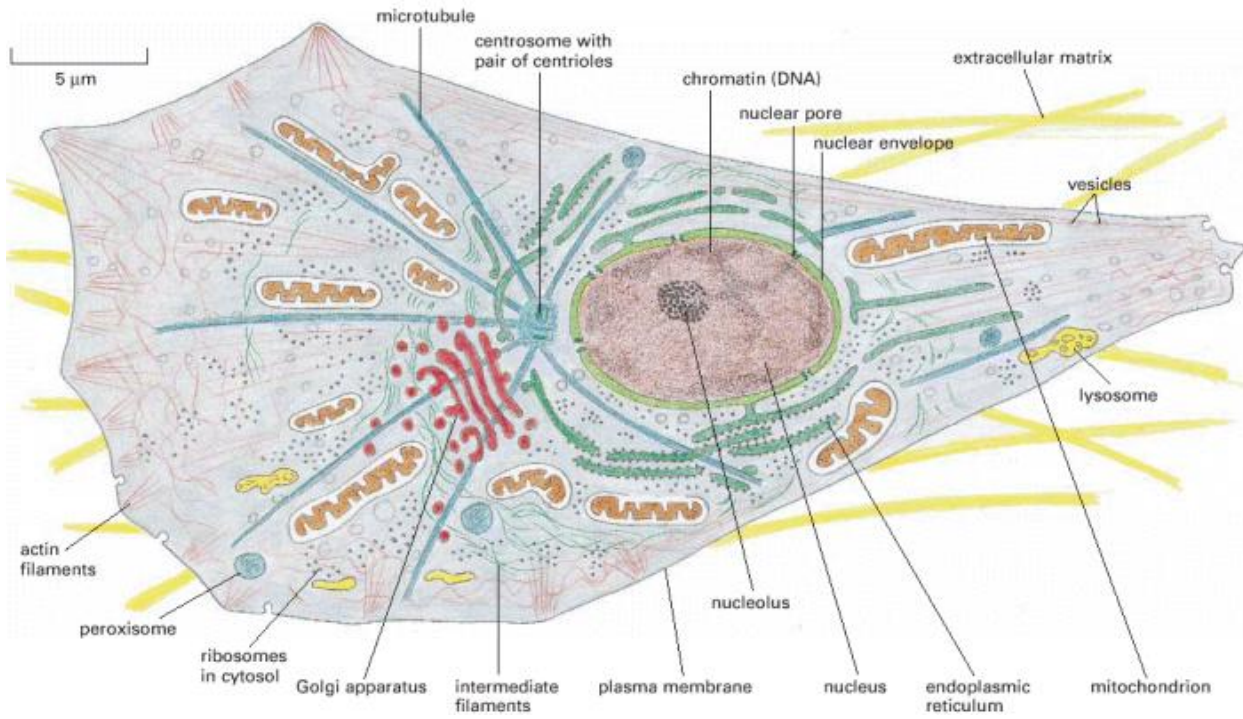
Source: courses.cm.utexas.edu/jrobertus/ch339k/overheads-2.htm

B. Prokaryotic cells



Source: www.microbeworld.org/img/aboutmicro/bacteria/bactdiag.gif

C. Eukaryotic cells



IN-CLASS EXERCISE ON CELLS

1. Which are larger, prokaryotic or eukaryotic cells?

2. What are the materials of cells? (check all that apply)

hard (metallic) _____ soft (soft plastic) _____ medium (hard plastic) _____

3. What are the equivalents in the cell of the following in a manufacturing plant:

- a. The building framework
- b. Doors
- c. Internal walls
- d. The machines that make products
- e. The central computer
- f. The central computer room (eukaryotic cells only)
- g. The combustion engine
- h. The solar cell (photosynthetic organisms)