

Chapter 3

Cells

3-1

Copyright © The McGraw-Hill Companies, Inc. Permission required for reproduction or display.

❖ Introduction:

- A. The human body consists of 75 trillion cells that vary in shape and size.
- B. Differences in cell shape make different functions possible.
- C. Within the cytoplasm are specialized **organelles** that perform specific functions for the cell.

3-2

Copyright © The McGraw-Hill Companies, Inc. Permission required for reproduction or display.

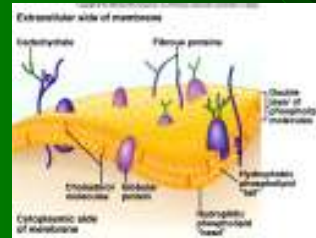
❖ A Composite Cell:



3-3

Copyright © The McGraw-Hill Companies, Inc. Permission required for reproduction or display.

1. **Cell Membrane:** regulates the movement of substances in and out of the cell



3-4

Copyright © The McGraw-Hill Companies, Inc. Permission required for reproduction or display.

2. **Cytoplasm:** consists of a clear liquid (cytosol) and provides an environment for organelles



3. **Nucleus:** stores genetic information and controls cellular activities

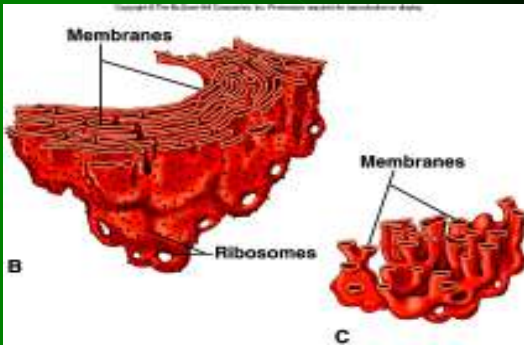
3-5

Copyright © The McGraw-Hill Companies, Inc. Permission required for reproduction or display.

4. **Endoplasmic reticulum (ER):** provides a transport system for substances via vesicles inside the cell.
 - i. Rough ER contains ribosomes and functions in protein synthesis.
 - ii. Smooth ER has no ribosomes and functions in lipid synthesis.
5. **Ribosomes:** involved in protein synthesis; found in cytoplasm and rough ER

3-6

Rough ER vs. Smooth ER



6. **Golgi apparatus:** packages, modifies, and distributes substances, such as proteins.



7. **Nucleolus:** place inside the nucleus where ribosomes are formed.



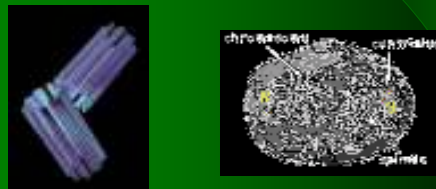
8. **Mitochondria:** the powerhouses of the cell and contain enzymes needed for aerobic respiration.



9. **Lysosomes:** the "garbage disposals" of the cell and contain digestive enzymes to break up old cell components and bacteria.



10. **Centrioles:** two hollow cylinders that function in the separation of chromosomes during cell division.



11. **Vacuole:** stores substances



12. **Cilia and flagella:** provide movement
⊖ short cilia are abundant on the free surfaces of certain epithelial cells
⊖ long flagellum can be found on sperm cells.

