

CELLS

Chapter 7

Cell Structure and Function

7.1 HISTORY OF CELL THEORY

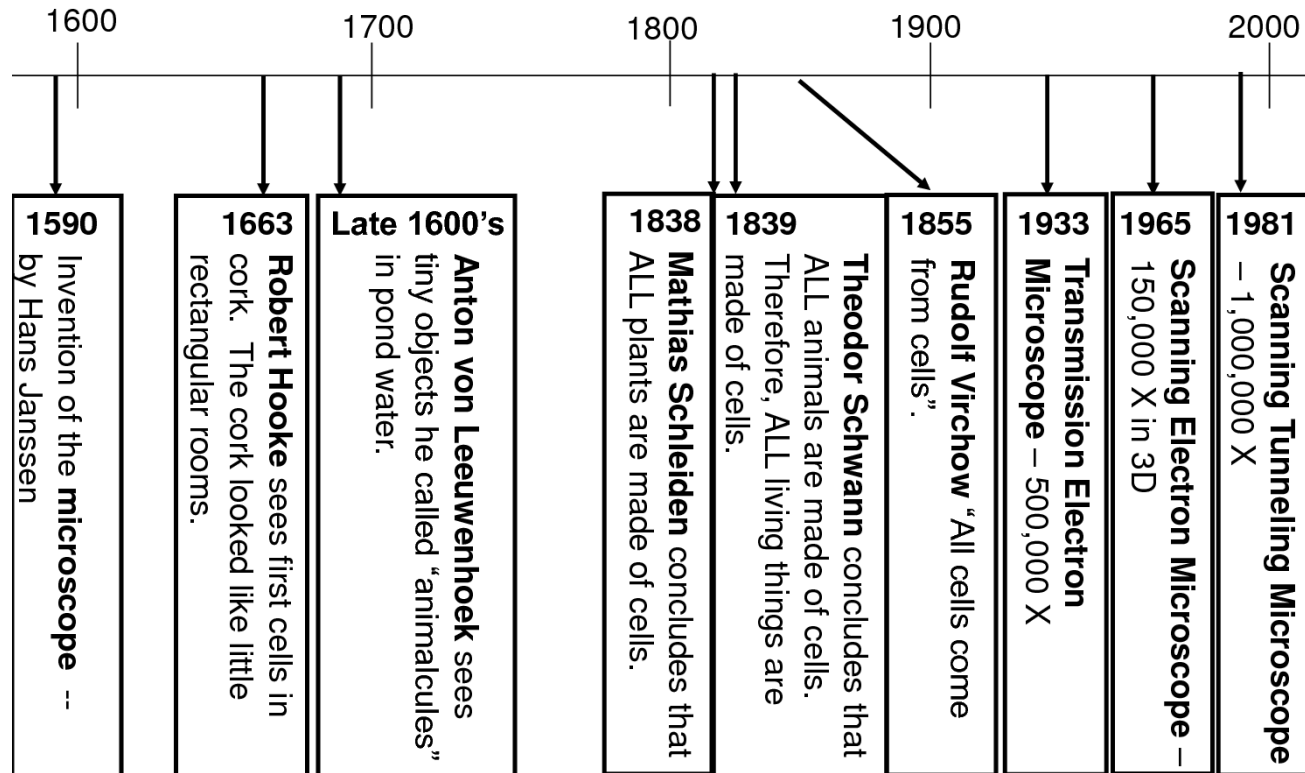
○ Cell Theory:

- All living things are made of cells
- Cells are the basic unit of structure and function of organisms
- All cell arise from other cells

7.1 HISTORY OF CELL THEORY

◉ Timeline

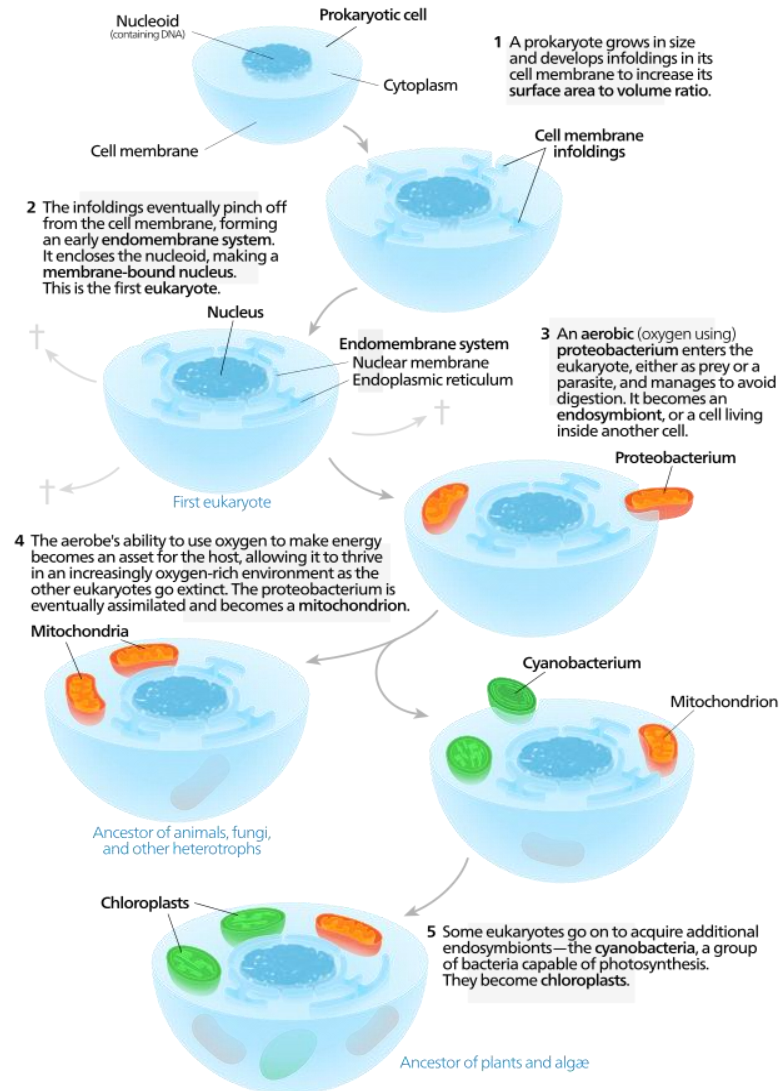
Cell Theory Timeline



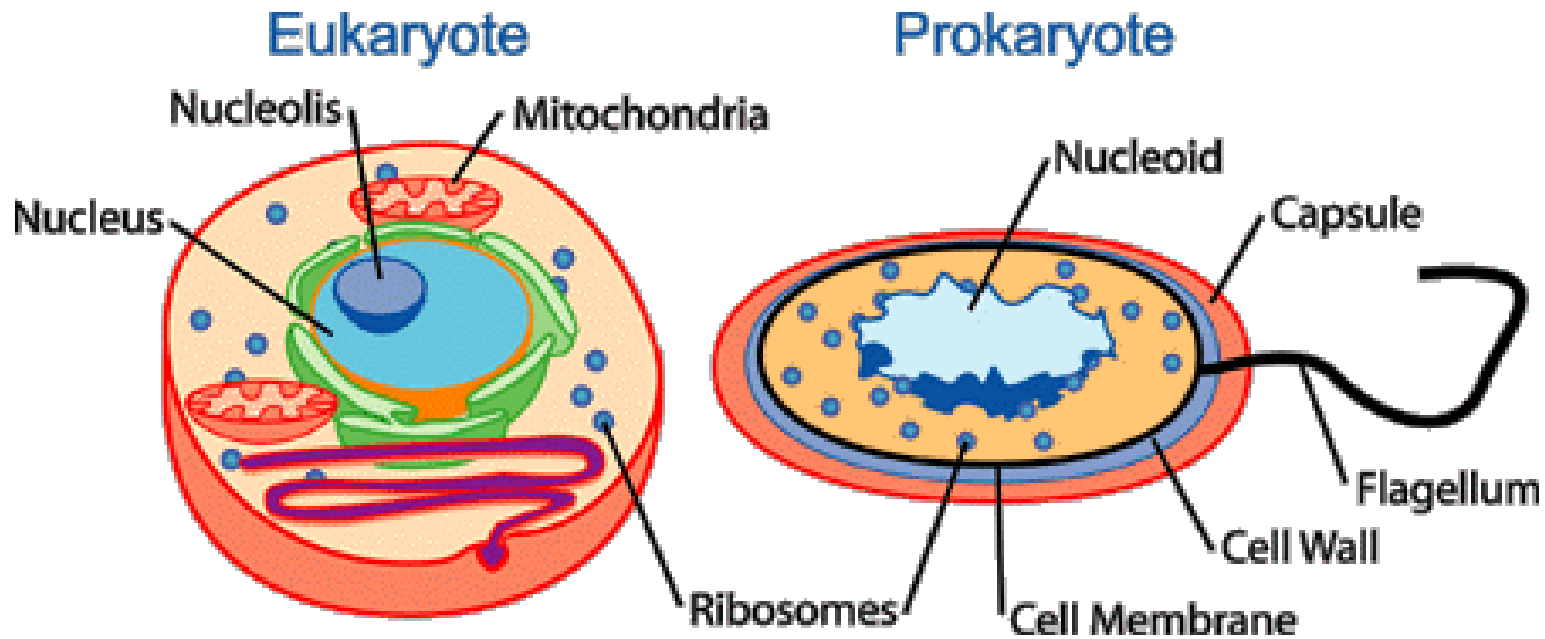
7.1 HISTORY OF CELL THEORY

Origin of some organelles

- Endosymbiosis
- Lynn Margulis



7.1 PROKARYOTIC AND EUKARYOTIC CELLS



7.2 CELL STRUCTURES

- Make a chart or Venn diagram to compare structures (organelles) of prokaryotes and eukaryotes and bacteria, plant and animal cells and function of organelles

Structures	Prokaryote	Eukaryote		Function of organelle
	Bacteria	Animal	Plant	
Nucleus				
Cytoplasm				
Mitochondria				

7.2 CELL STRUCTURES

4 CYTOSKELETON: supports organelles and cell shape and plays a role in cell motion:

Microtubule: tube of protein molecules present in cytoplasm, centrioles, cilia, and flagella

Intermediate filament: intertwined protein fibers that provide support and strength

Actin filament: twisted protein fibers that are responsible for cell movement

12 Centriole: complex assembly of microtubules that occurs in pairs

2 Cytoplasm: semifluid matrix that contains the nucleus and other organelles

2 Mitochondrion: organelle in which energy is extracted from food during oxidative metabolism

Secretory vesicle: vesicle fusing with the plasma membrane, releasing materials to be secreted from the cell

7 Lysosome: vesicle that breaks down macromolecules and digests worn out cell components

6 Golgi complex: collects, packages, and distributes molecules manufactured in the cell

6 Smooth endoplasmic reticulum: system of internal membranes that aids in the manufacture of carbohydrates and lipids

6 Rough endoplasmic reticulum: internal membranes studded with ribosomes that carry out protein synthesis

5 NUCLEUS: command center of cell

Nucleolus: site where ribosomes are produced

Nuclear envelope: double membrane between the nucleus and the cytoplasm

Nuclear pore: opening embedded with proteins that regulates passage into and out of the nucleus

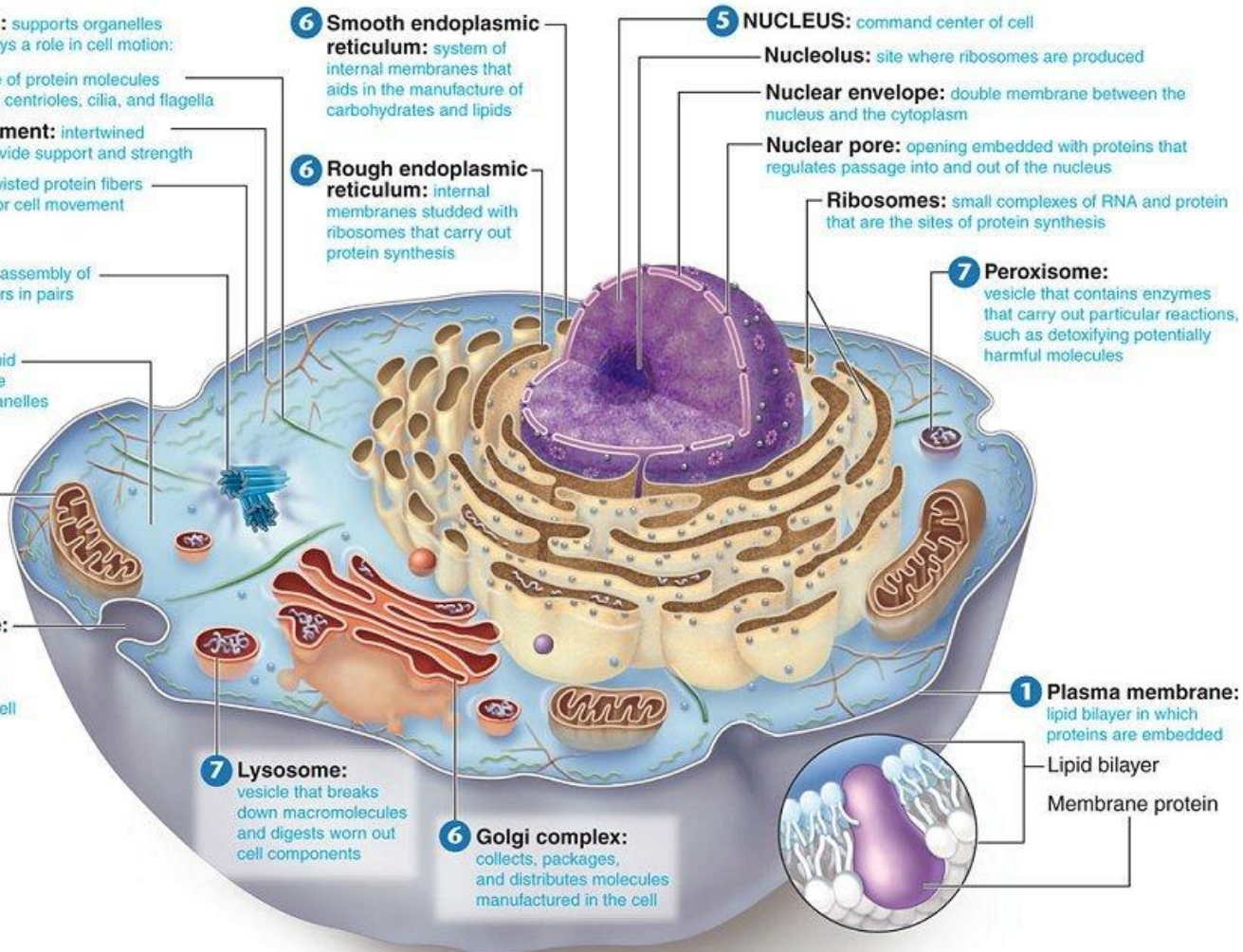
Ribosomes: small complexes of RNA and protein that are the sites of protein synthesis

7 Peroxisome: vesicle that contains enzymes that carry out particular reactions, such as detoxifying potentially harmful molecules

1 Plasma membrane: lipid bilayer in which proteins are embedded

Lipid bilayer

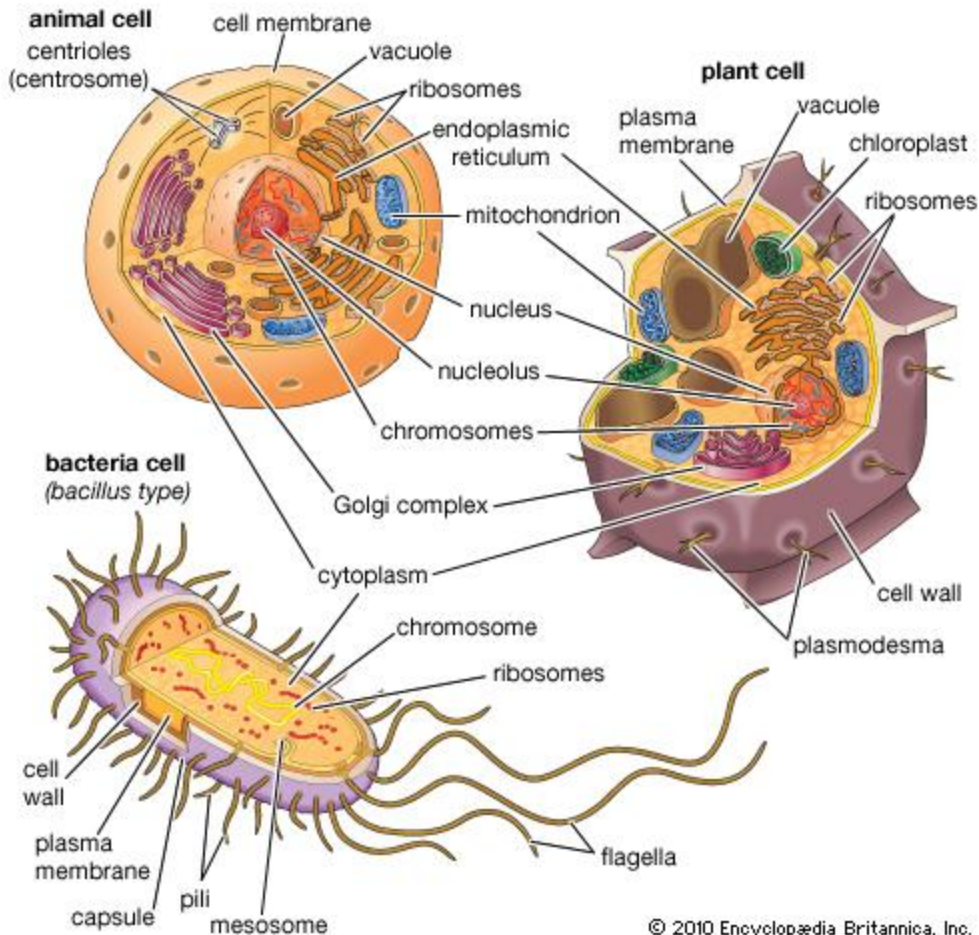
Membrane protein



7.2 CELL STRUCTURES

○ Plant, Animal and Bacteria Cells

Some typical cells



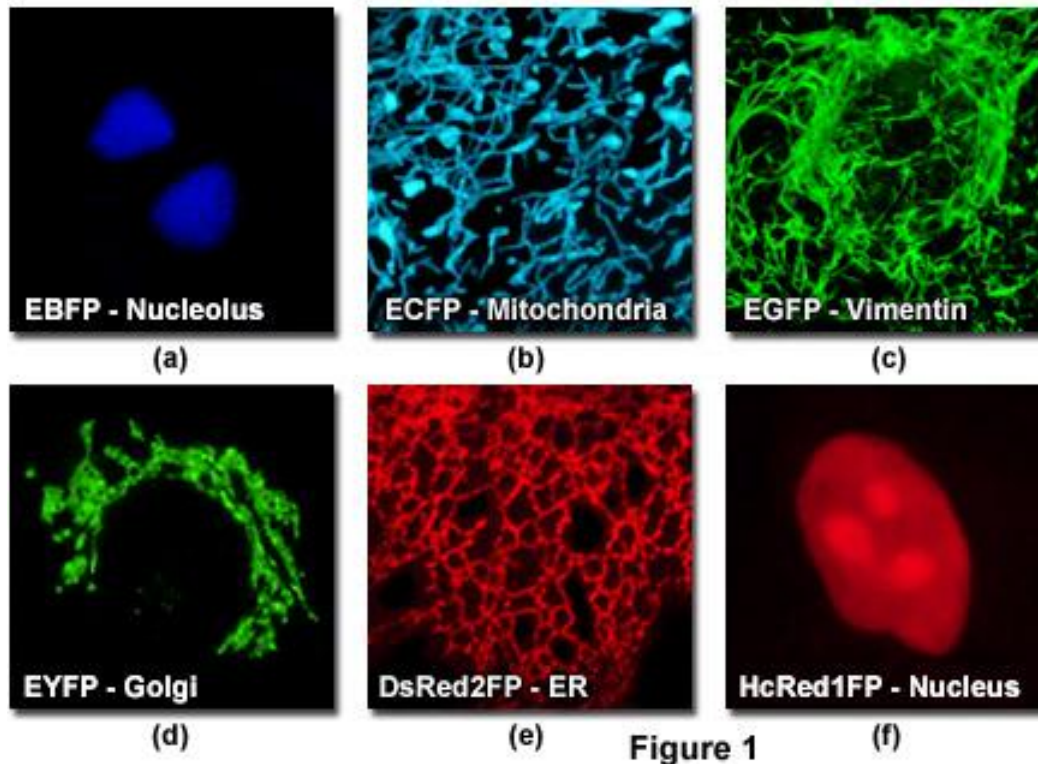
7.2 CELL STRUCTURES-FUNCTION

- ◉ <http://www.youtube.com/watch?v=5L9-HU-2j0A>

7.2 CELL STRUCTURES- FLUORESCENT MICROGRAPHS

- Use antibodies with fluorescent molecules attached to visualize specific proteins associated with specific structures in cells

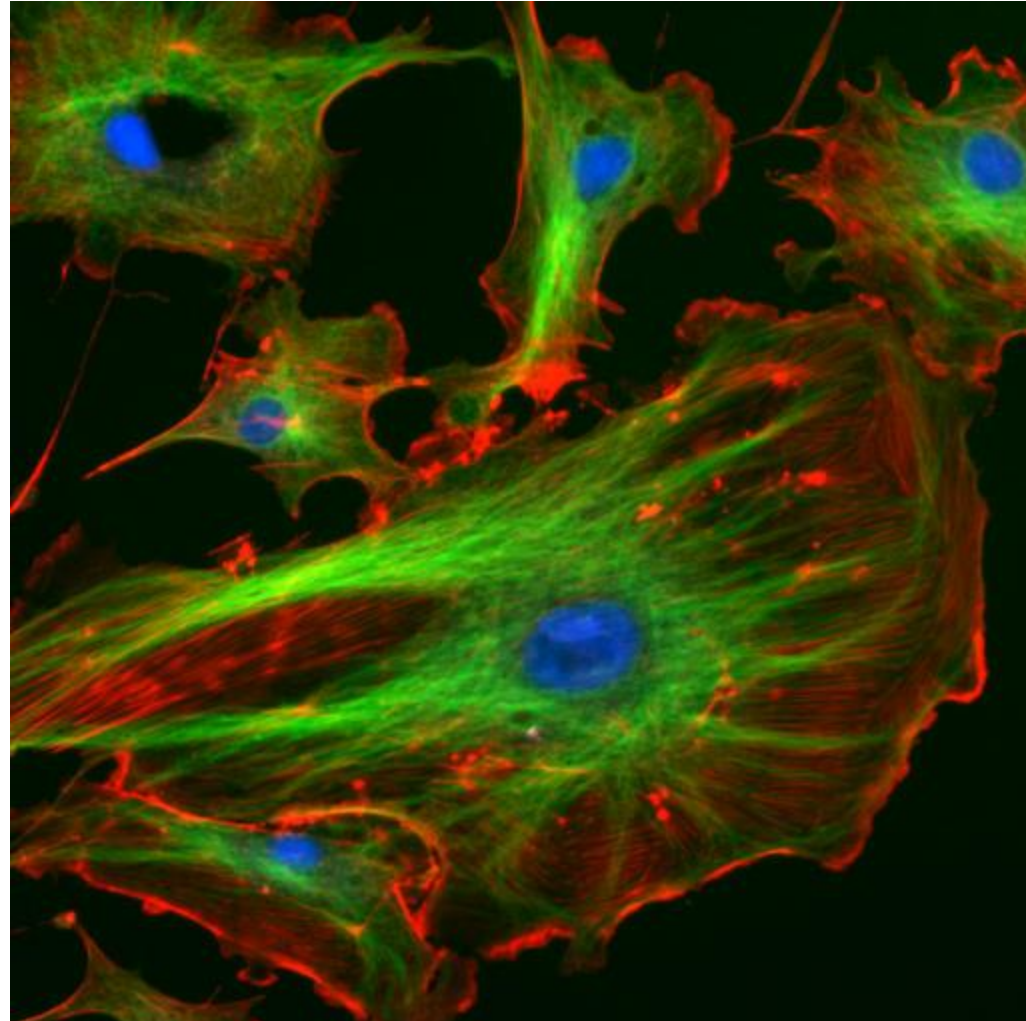
Digital Imaging of Localized Fluorescent Protein Chimeras



7.2 CELL STRUCTURES- FLUORESCENT MICROGRAPHS

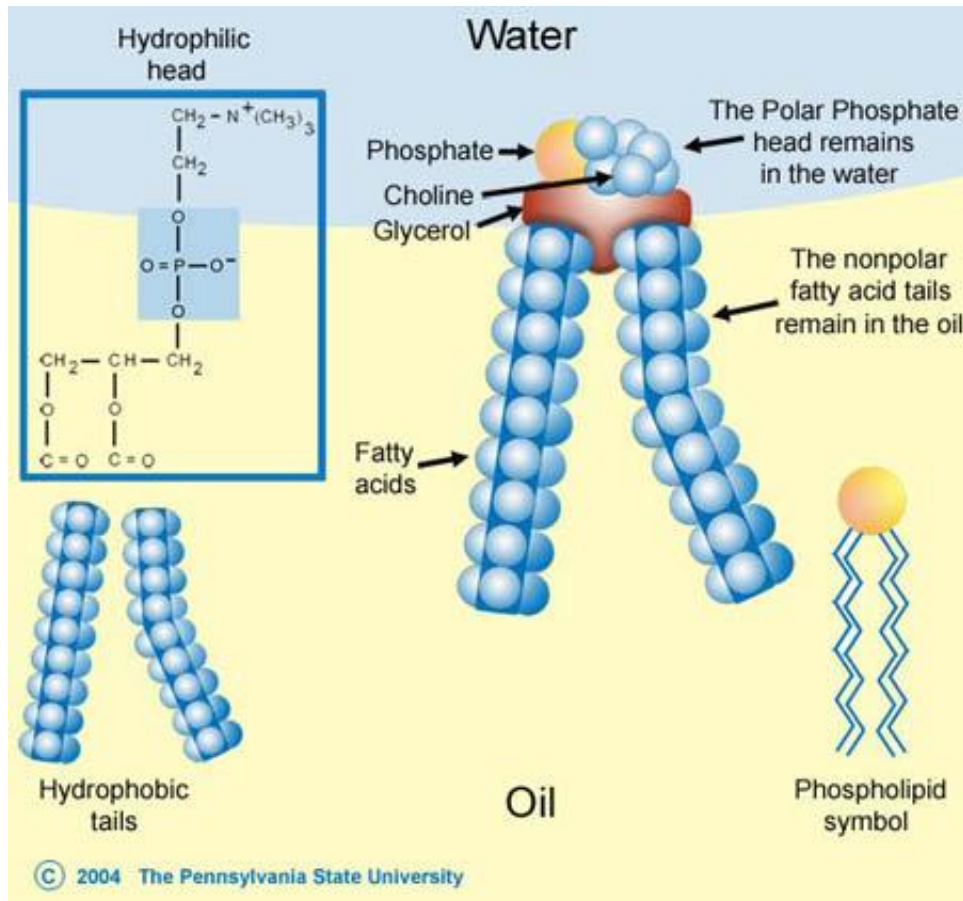
○ Cytoskeleton

Actin (red)
Microtubules (green)
Nucleus (blue)



7.3 MOVEMENT ACROSS MEMBRANES

○ Lipids, Proteins and Carbohydrates



7.3 MOVEMENT ACROSS MEMBRANES

Plasma Membrane Structural Components

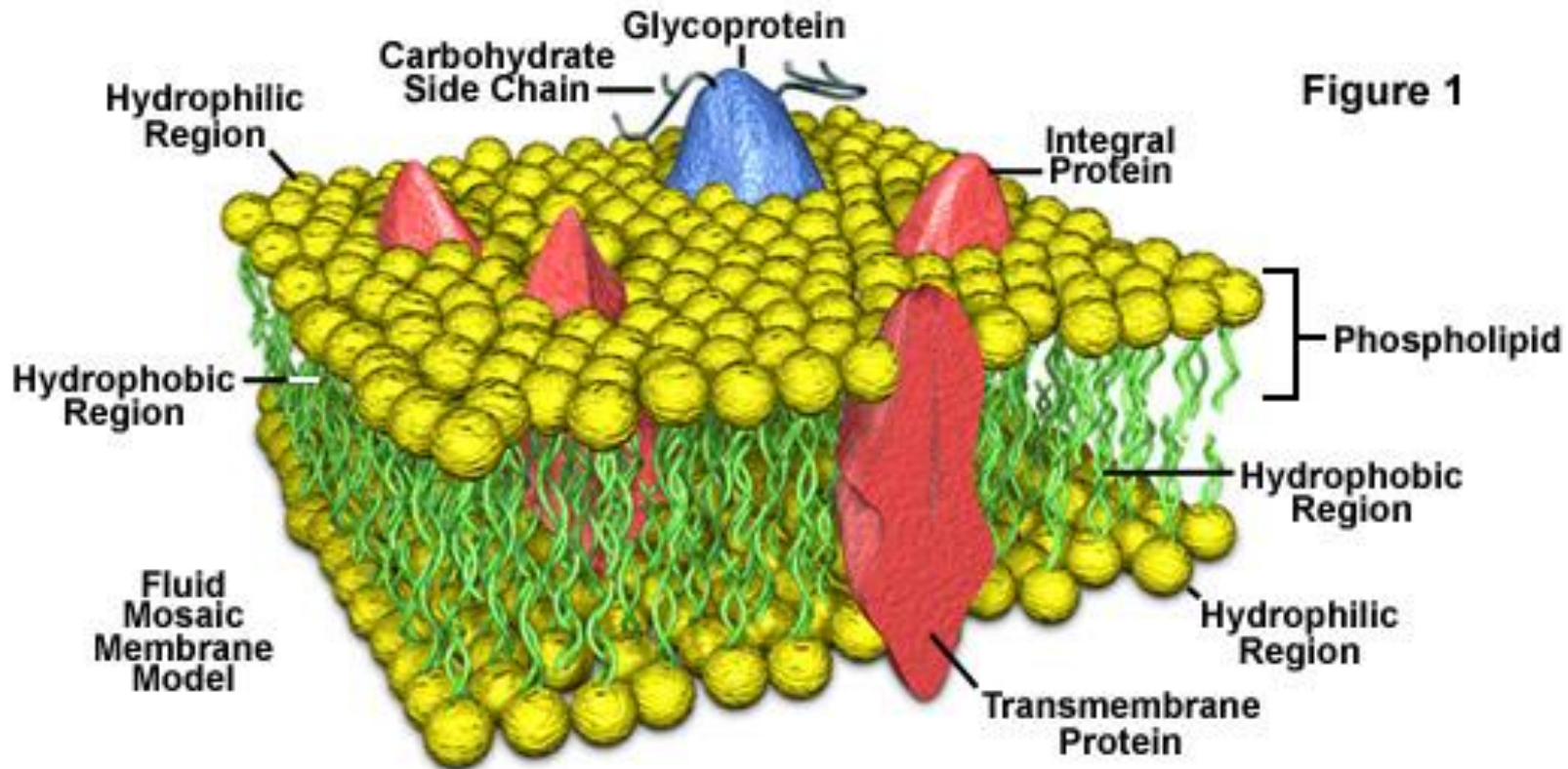
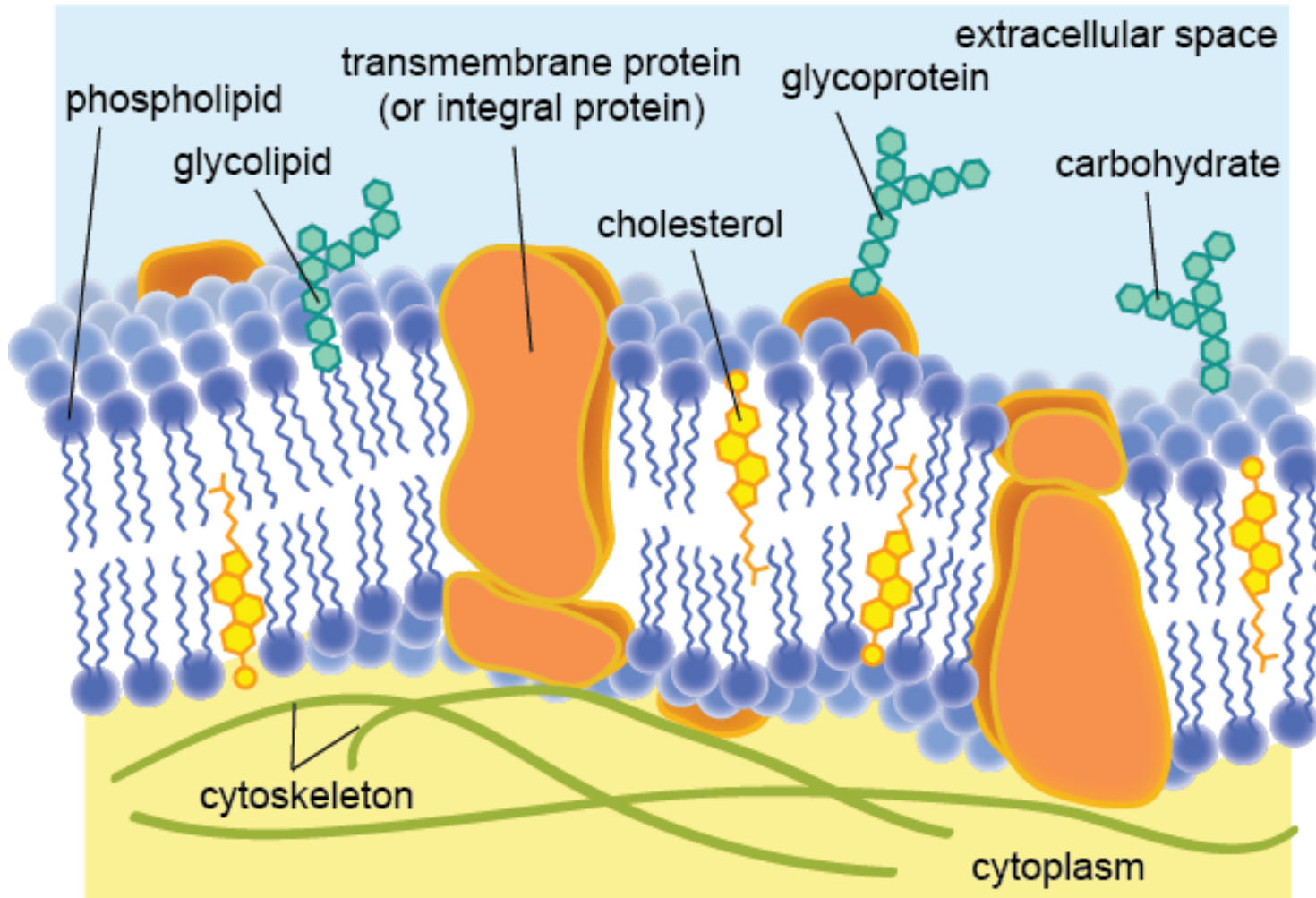


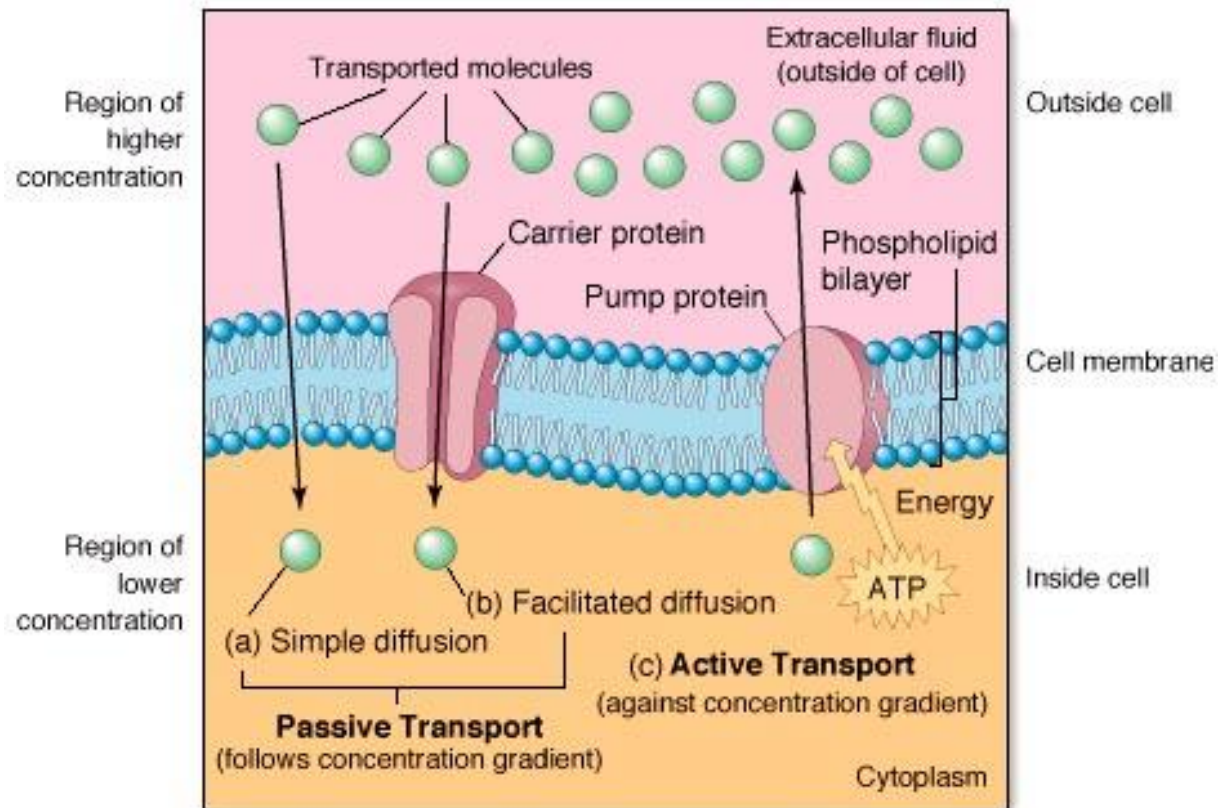
Figure 1

7.3 CELL MEMBRANES



7.3 MOVEMENT ACROSS MEMBRANES

- Diffusion and Active Transport-Movement of Substances across a semi-permeable membrane

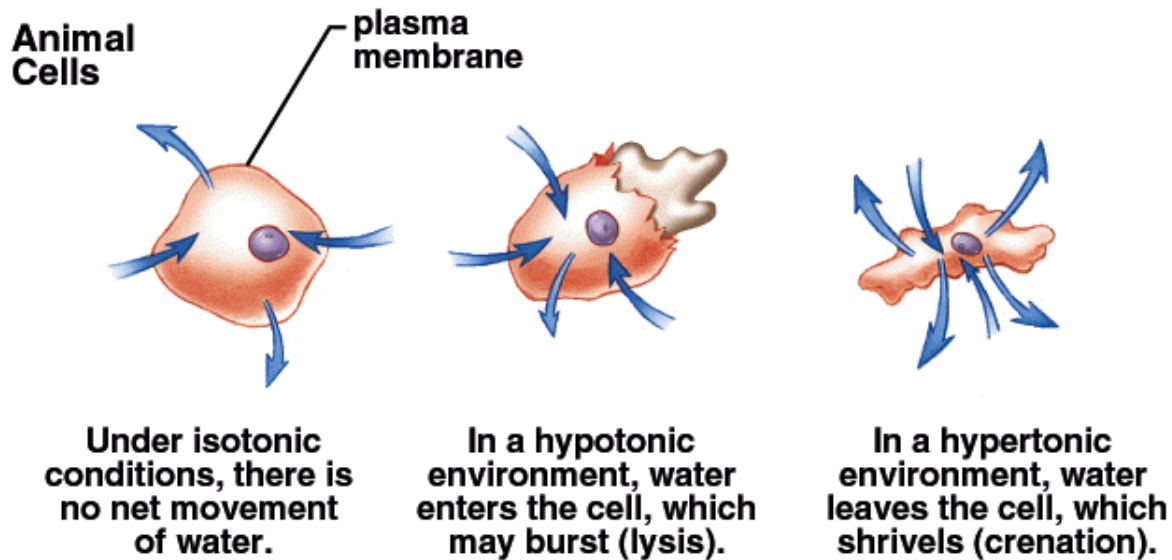


7.3 MOVEMENT ACROSS MEMBRANES

- Osmosis and Osmotic Pressure-Movement of water across a semi-permeable membrane




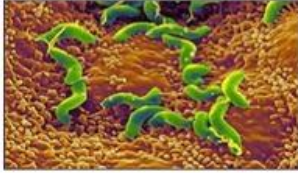

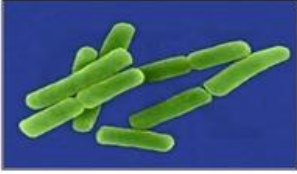


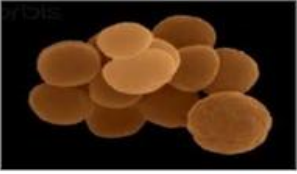


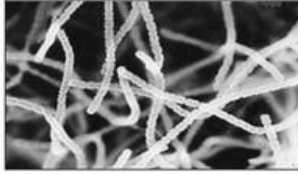
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Osmosis in animal cell



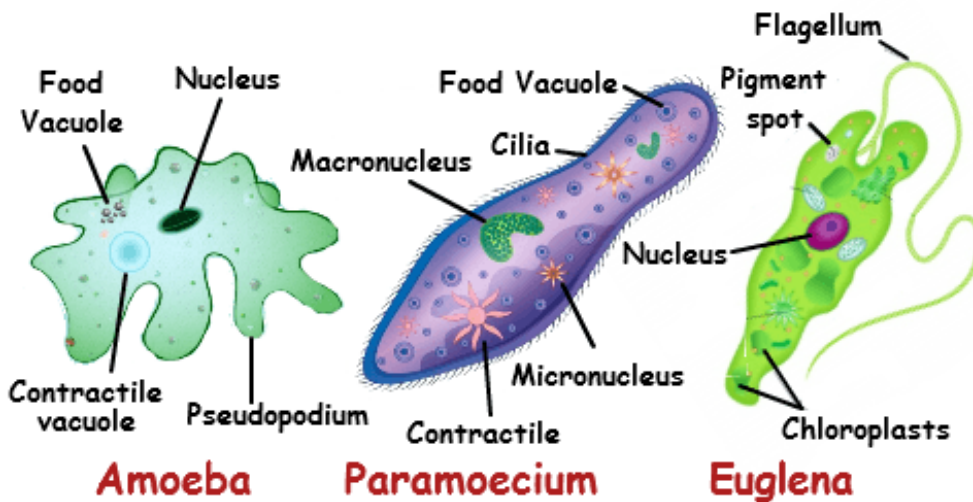
7.4 DIVERSITY OF CELLULAR LIFE

○ Prokaryotic Unicellular organisms-Bacteria

Circular (Coccus)	Rod-shaped (Bacillus)	Curved Forms	Other Shapes
 <p>Diplo- (in pairs)</p>	 <p>Coccobacilli (oval)</p>	 <p>Vibrio (curved rod)</p>	 <p>Helicobacter (helical)</p>
 <p>Strepto- (in chains)</p>	 <p>Streptobacilli</p>	 <p>Spirilla (coil)</p>	 <p>Corynebacterium (club)</p>
 <p>Staphylo- (in clusters)</p>	 <p>Mycobacteria</p>	 <p>Spirochete (spiral)</p>	 <p>Streptomyces (filaments)</p>

7.4 DIVERSITY OF CELLULAR LIFE

◉ Eukaryotic Unicellular Organisms-Fungi, Protists



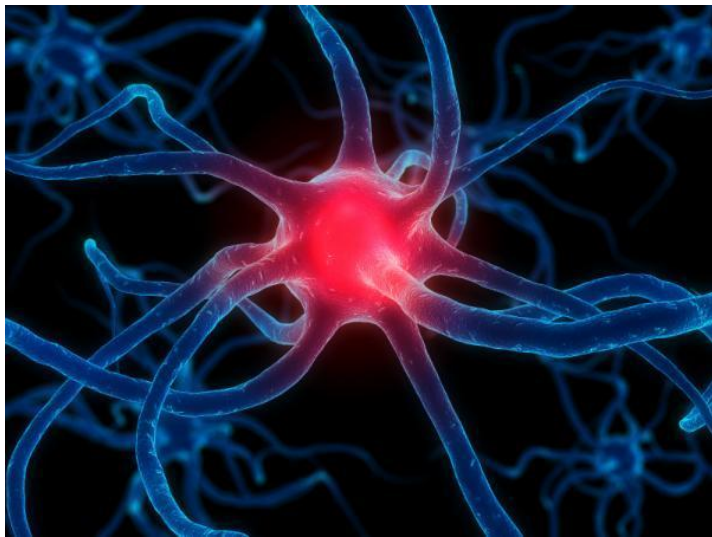
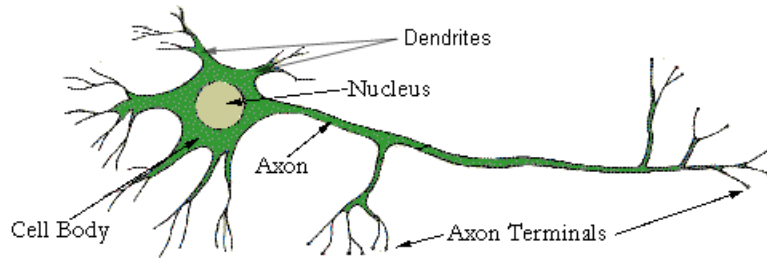
Protists

Yeast (fungus)



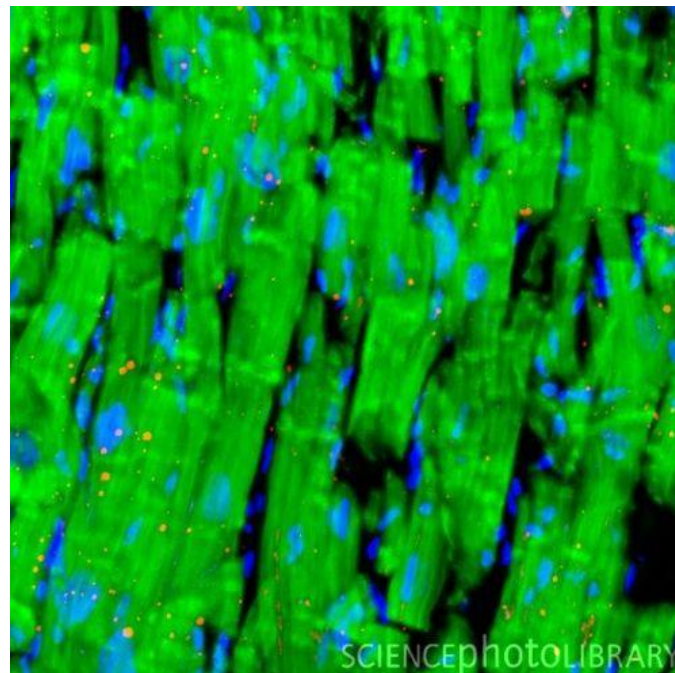
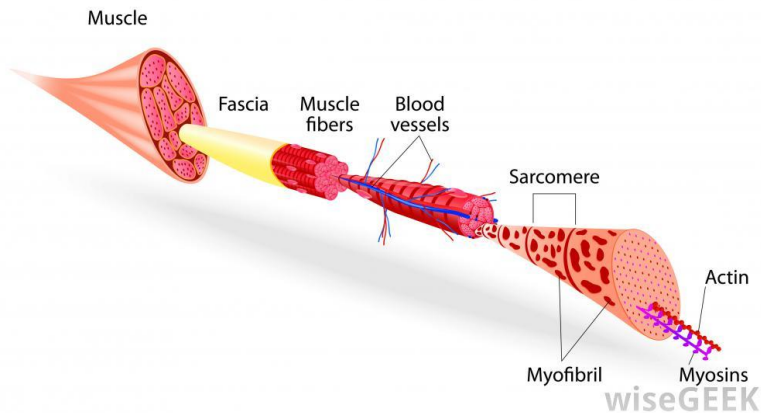
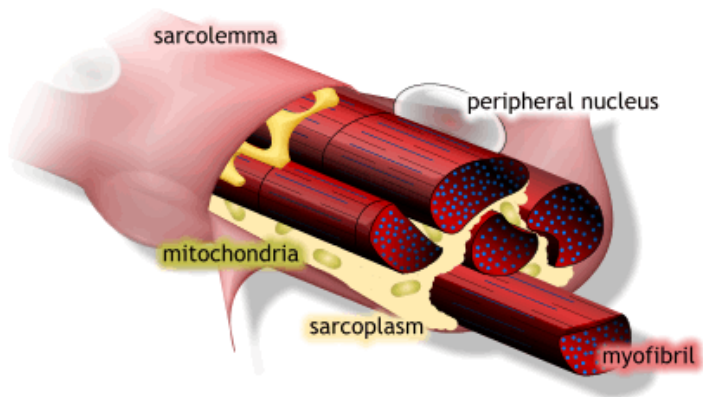
7.4 DIVERSITY OF CELLULAR LIFE

- Multicellular organisms- Cell specialization- different cells have different functions- Nerves



7.4 DIVERSITY OF CELLULAR LIFE

- Multicellular organisms- Cell specialization- different cells have different functions-Muscle



7.4 DIVERSITY OF CELLULAR LIFE

- Multicellular organisms- Cell specialization- different cells have different functions- Bone

