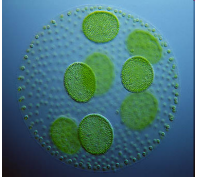


Eukaryote Form and Function

Lecture 6


Learning Outcomes

- Eukaryote cell structure
- Organelles and their functions
- Evolution of eukaryote cells



Eukaryotic Cell Walls

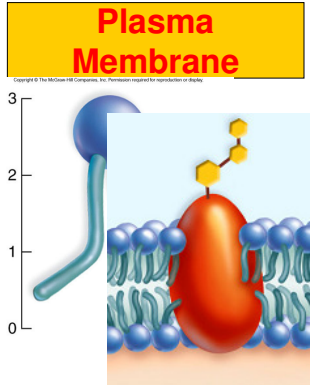
- Cellulose
 - Polysaccharide of Glucose
 - Green algae
 - plants
- Chitin
 - Polysaccharide of N-Acetyl Glucosamine (NAG)
 - Fungi
- No Cell Wall
 - Protozoa - pellicle protein layer
 - Animal cells - glycocalyx extra cellular matrix



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Plasma Membrane

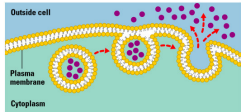
- Phospholipid bilayer and proteins
- Eukaryotic cells
 - Sterols
 - Resistance to lysis
 - Cholesterol - anima
 - Ergosterol - fungi
- Surface glycolipids and glycoproteins
 - Cell-cell attachment
 - Cell-cell recognition
- Endocytosis
 - Phagocytosis
 - pinocytosis



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Endocytosis and Exocytosis

- Exo
 - Transport of substances out
 - Proteins
 - Mucus
 - Enzymes
 - Antibodies
- Endo
 - Transport of substances in

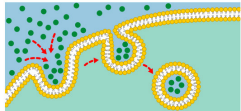


Outside cell

Plasma membrane

Cytoplasm

(a) Exocytosis

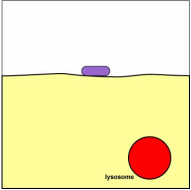
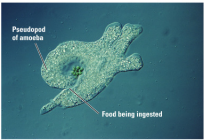


(b) Endocytosis

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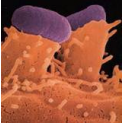

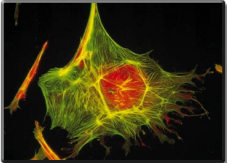
Phagocytosis

- Eating
 - Amoebas
- White blood cells
 - Neutrophils
 - Macrophages
- Membrane bound vacuole
 - phagosome
- Lysosome fusion to form phagolysosome



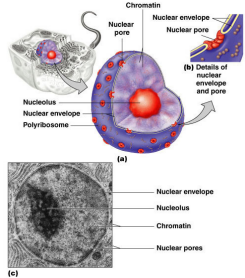
Cytoplasm

- Everything between plasma membrane and nucleus
- Cytosol
 - Only fluid
- Cytoskeleton
 - Internal structure
- Actin filaments
 - movement
- Microtubules
 - movement
- Organelles
 - 'little organs'
 - Structures with specialized metabolic functions



Nucleus

- Location of hereditary information
 - DNA
- Nuclear envelope
 - Nuclear pores
- Chromatin
 - Histones
 - Chromosomes
- Nucleolus
 - Ribosome manufacture



(a) Nuclear envelope, Nucleolus, Chromatin, Nuclear pores

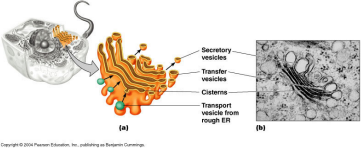
(b) Details of nuclear envelope and pore

(c)

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Golgi Apparatus

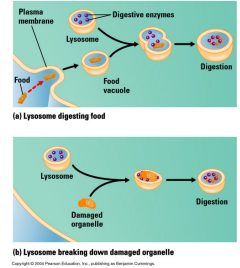
- Protein processing
 - 3-20 cisterns
- Transport vesicles
 - glycoproteins
 - glycolipids
 - lipoproteins
- Secretory vesicles
- Lysosomes



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Lysosomes

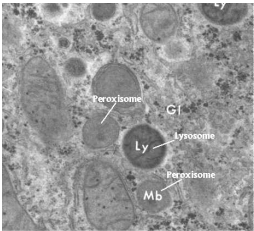
- Sacs of digestive enzymes
- Formed in Golgi Apparatus
- Digest
 - Old organelles
 - Molecules
 - Bacteria
- Granular white blood cells
 - Neutrophils



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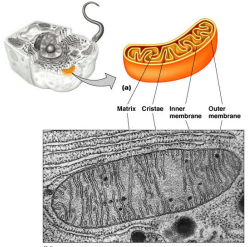
Peroxisomes

- Peroxisomes
- Oxidase enzyme
- oxidize fats, amino acids, toxins
 - create H₂O₂
- Catalase
 - → H₂O₂ → H₂O + O₂



Mitochondria

- Double membrane
- Cristae
 - Folded inner membrane
 - Studded with enzymes
- Matrix
 - Space within inner membrane
- Synthesis of ATP
- Prokaryotic Features
 - 70s ribosomes
 - MtDNA
 - Divide independently by binary fission
 - Can be affected by some antibiotics



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Secondary Endosymbiosis

- Eukaryotes engulfing Eukaryotes
- An algae engulfed by another protist
- Chloroplast surrounded by 3-4 membranes
- Many Protists evolved by secondary symbiosis
- Red Algae - Rhodophyta

