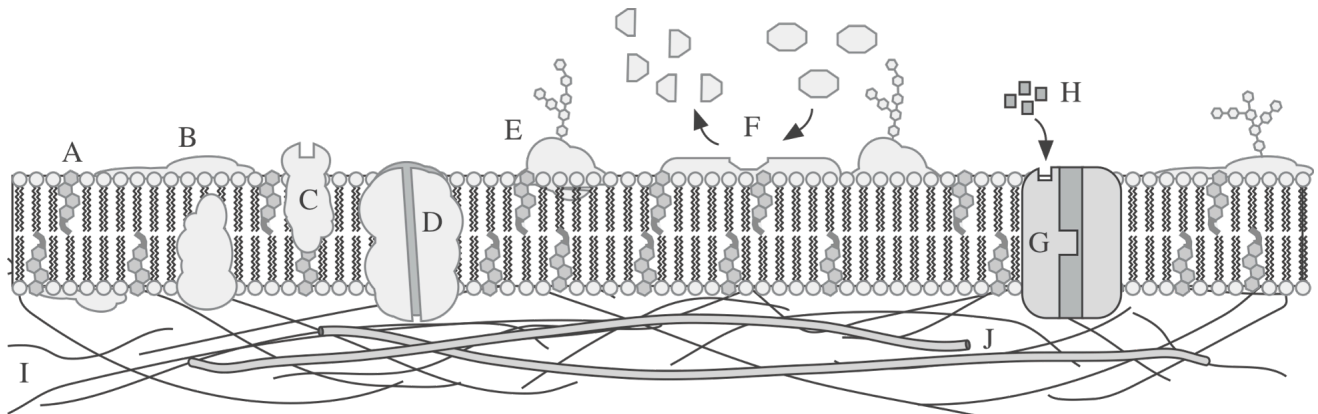


Introduction and Cell Organization

Nestler: Chapter 3

1. Cytology Defined
2. Eukaryotic Cell Review (Pages 78 - 87)
 - A. Cellular Organization
 - i. Cell Membrane (pp 79 - 80)

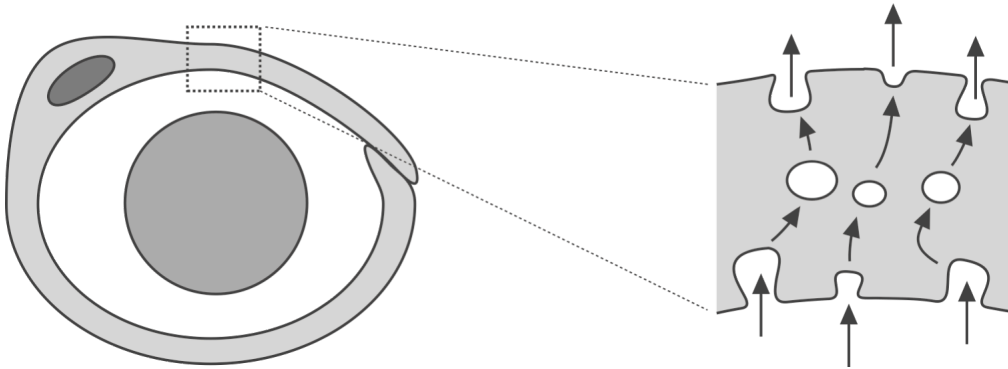
| | |
|----|--|
| A. | Cholesterol |
| B. | Peripheral Protein |
| C. | Receptor |
| D. | Transporter (Carrier Molecule) |
| E. | Glycoprotein (ie., Major Histocompatibility Complex) |
| F. | Enzyme |
| G. | Transporter with “Gate” |
| H. | Hormone |
| I. | Peripheral proteins of Cytoskeleton |
| J. | Microtubules |



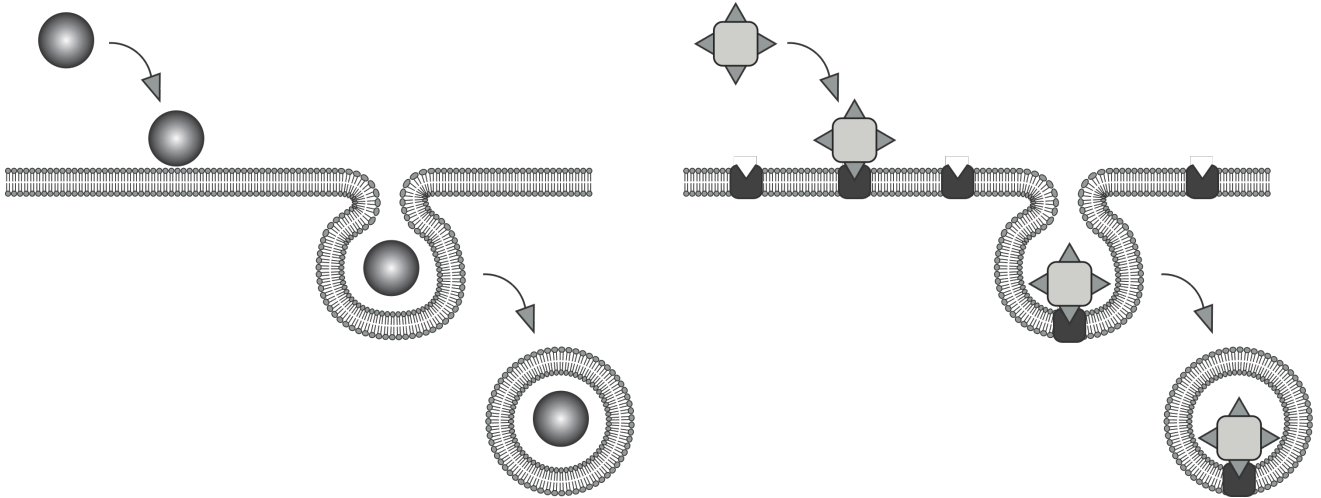
- a. Phospholipid Bilayer
 - Receptors (C) (Page 79)
 - Cholesterol (a sterol) (A) (Page 80)
 - Transporters / Channels /
Carrier Molecules (D) (Page 80 - 81)
 - Major Histocompatibility Complex (E) (Take good notes)

B. Endocytosis

i. Pinocytosis (Page 81)

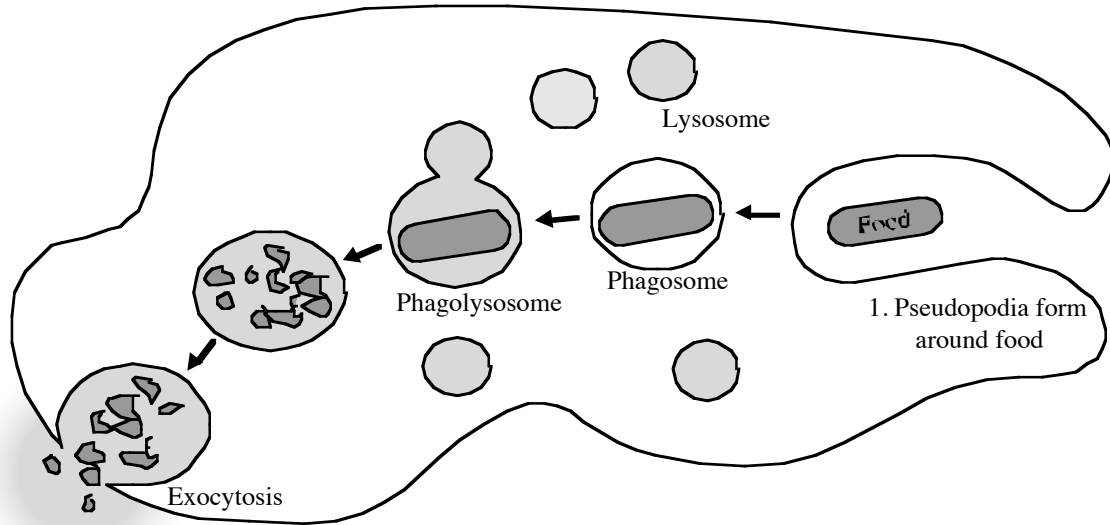


ii. Receptor Mediated Endocytosis (Page 82)



iii. Phagocytosis and Lysosomes (Page 81)

(SEE HANDOUT ON LEUKOCYTE ACTIVITY)



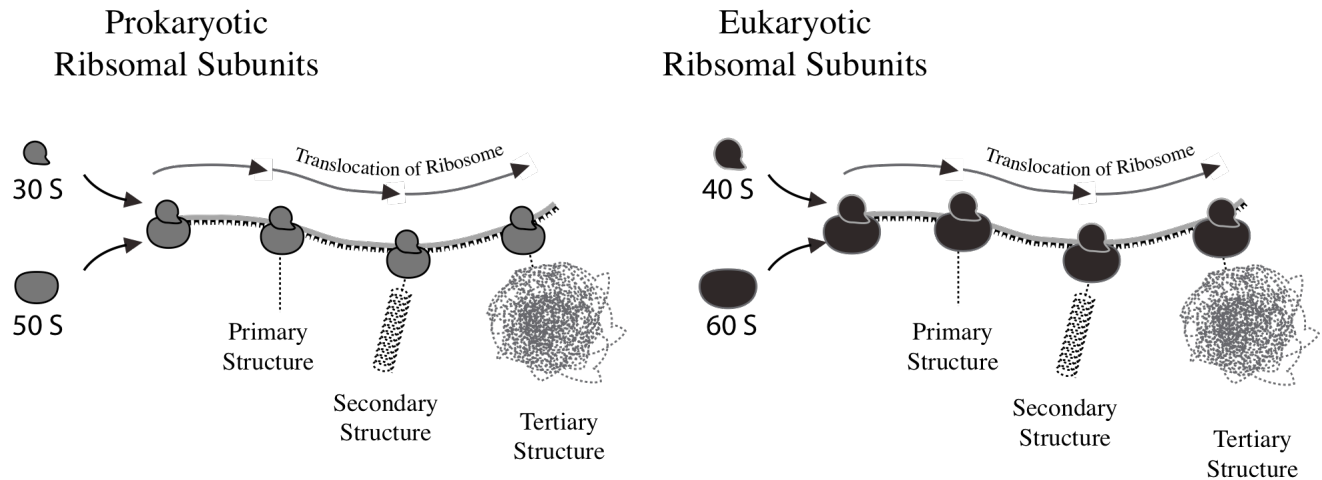
- Chemoattractants
- Positive & Negative Chemotaxis
- Pseudopods
- Phagosome
- Lysosome
- Pagolysosome
- Residual Body
- Exocytosis

C. Protein Synthesis (Pages 82, 86 - 87)

(See also HANDOUT on PROTEIN SYNTHESIS)

i. Ribosomes

a. 60S and 40S Ribosomal Subunits (Page 82)



b. Transcription and Translation (See handout)



c. Rough Endoplasmic Reticulum (Pages 86 - 87)

d. Transport Vesicles

e. Golgi Apparatus (Page 87)

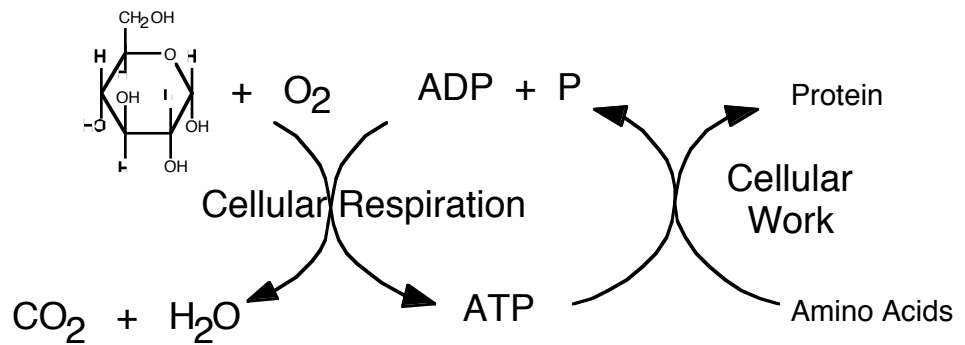
f. Vesicles (Page 87)

- Storage Vesicles (Page 87)
- Lysosomes (Page 87)
- Synaptic Vesicles ETC ETC ETC

- Excretion vs Secretion (page 82)

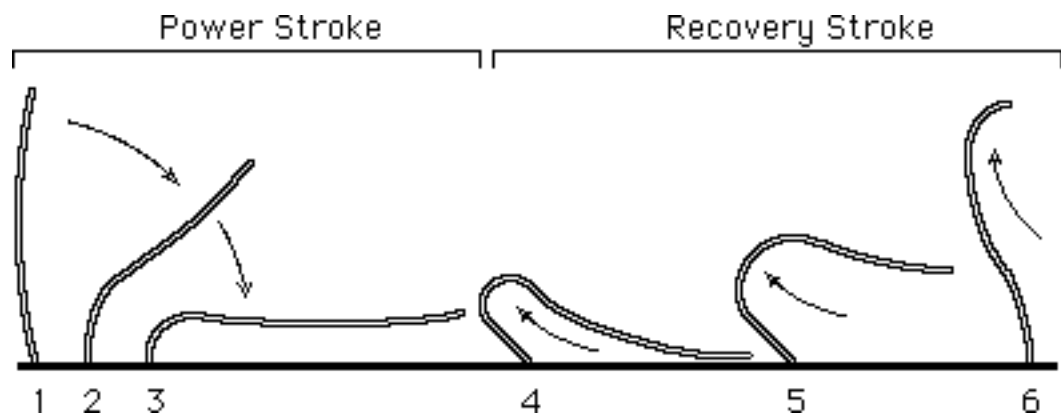
D. Mitochondria (Pages 84 - 85)

- Handout on Glycolysis and Cellular Respiration



E. Cilia (Page 83 - 84)

- i. Microtubules



- ii. Mucociliary Escalator and bacterial removal (Page 83)

- *Bordetella pertussis* (→ “whooping cough”)

3. Prokaryotic Cells (Pages 58 - 77)

A. Cell Membrane (Cytoplasmic Membrane) (Pages 59 - 60)

- i. Phospholipid Bilayer
- ii. Selective Permeability and Simple Diffusion (Pages 60 - 61)
 - a. Heat / Movement
 - b. Hypotonic Solution (See Figure 3.26, Page 61)
 - c. Hypertonic Solution
 - d. Isotonic Solution
- iii. Facilitated Diffusion (Page 62; Figure 3.28)
- iv. Osmosis (Page 61 - 62) See Handout on Osmosis
- v. Active Transport (Page 63)
 - a. ATP

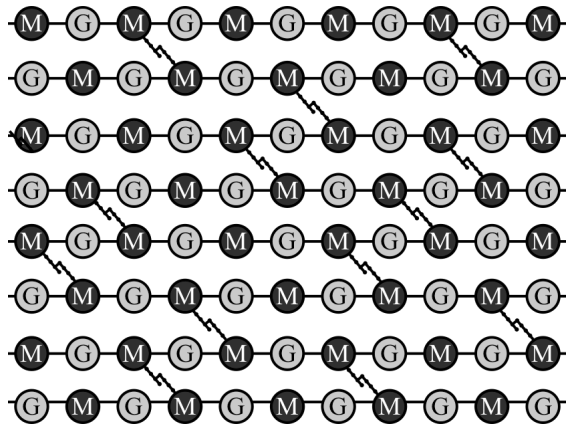
b. Proton (or Proto-) Motive Force (SEE HANDOUT)

B. Cell Wall (pp. 65 - 68)

i. Function

ii. Structure

a. Peptidoglycan



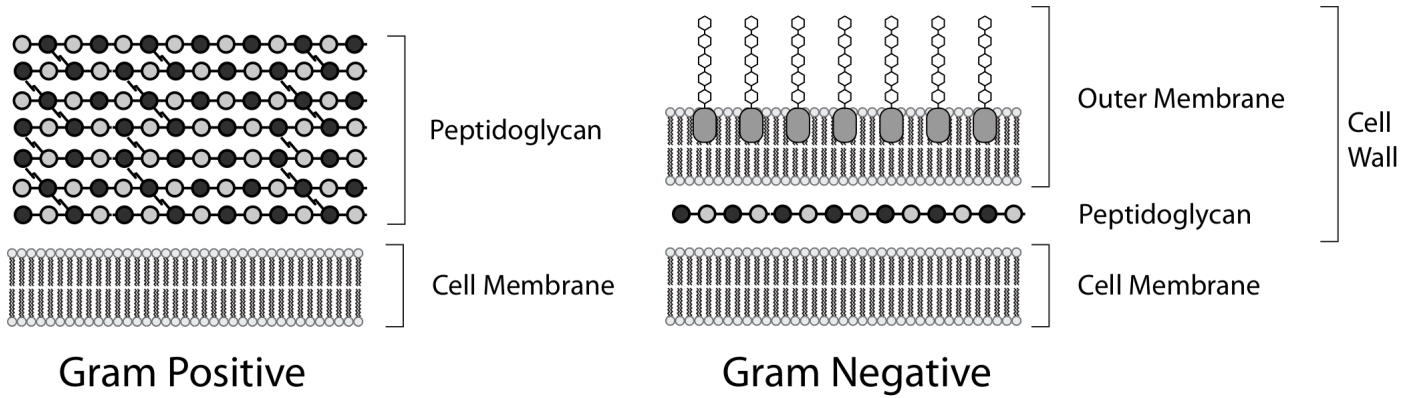
* N-acetylglucosamine (G)

* N-acetylmuramic acid (M)

* “Cross Bridges” (———)

iii. Gram Positive and Negative Bacteria

(Pages 65 - 67; See Figures 3.32 and 3.33)



iv. Gram Positive

a. Peptidoglycan

v. Gram Negative

a. Peptidoglycan

b. Outer Membrane

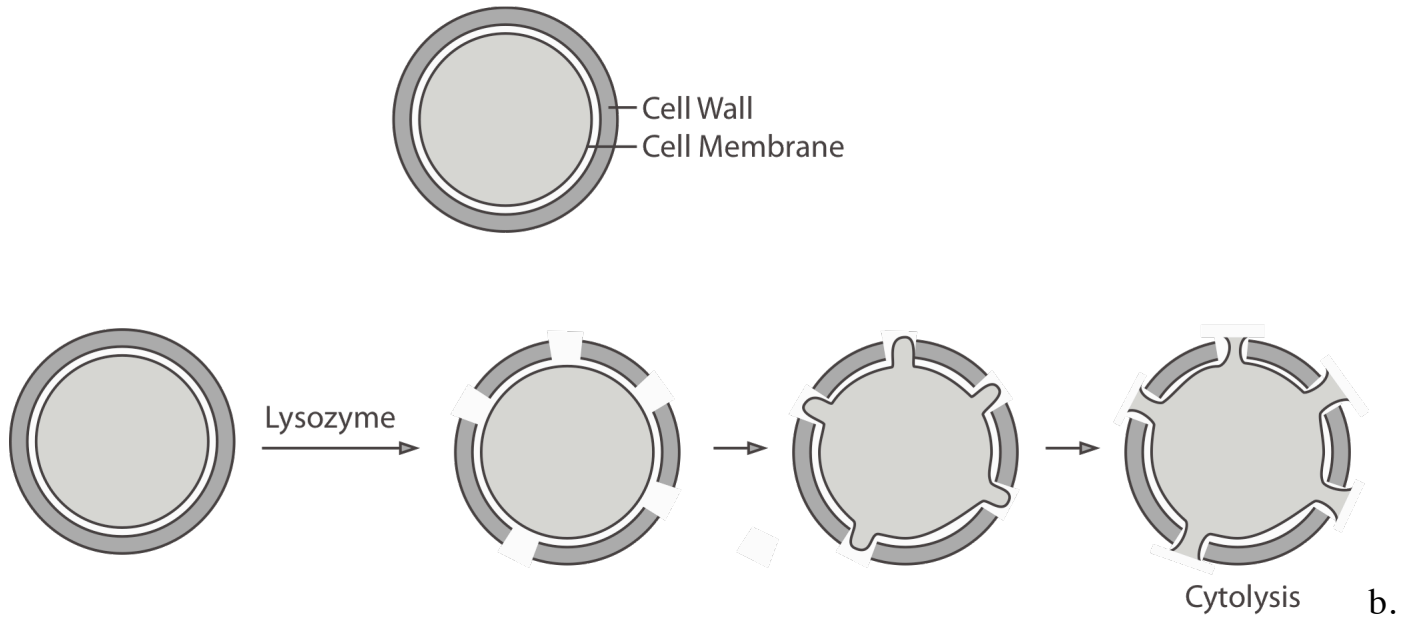
- Lipopolysaccharide

vi. Antimicrobial substances (Pages 69 - 70)

a. Penicillin

- Interferes with Transpeptidase

b. Lysozyme



vi. *Mycoplasma sp.* (Page 70)

a. Sterols

C. Capsule (Pages 70 - 72)

i Glycocalyx

ii Unorganized Glycocalyx (Slime Layer)

a. Example (Page 71)

- *Streptococcus pneumoniae* (→ *Pneumonia*)

iii Organized Glycocalyx (Rigid Layer - Capsule)





a. Example (Page 71)

- *Streptococcus mutans* (→ *Dental Caries*)

D. Flagella (Pages 72 - 73)

- i. Chemotaxis (Page 72)
 - a. Positive and Negative (Page 73)
 - b. “Tumble / Roll” (Page 73; Also see Page 74, Figure 3.39)

ii. Divisions

- a. Monotrichous 
- b. Amphitrichous 
- c. Lophotrichous 
- d. Peritrichous 
- e. Endoflagella
 - *Treponema pallidum*
 - *Borrelia burgdorferi*

iii. Antigenicity

- a. H antigen (Note: *E. coli* 0157:H7)

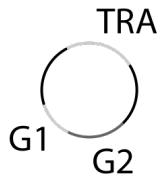
G. Chromosome (Pages 74 - 75)

H. Pili (Fimbriae) (Pages 73 - 75)

- a. Adhesion / colonization Factor
- b. Virulence Factor

- Example: *Neisseria gonorrhoeae*

I. Plasmids (Page 75)



- Conjugation (See INTRODUCTORY HARDOUTS)

J. Endospores (Pages 76 - 77)

- *See Introductory Handouts*

- Sporulation (Sporogenesis)

- Germination

- *Clostridium botulinum*

(→ Botulism)

- *Bacillus anthracis* (→ Anthrax)

K. Cell Inclusions (Inclusion Bodies) (

- Rabies

4. Morphology of Bacteria (Pages 57 - 58)

A. Coccus

Microbiology Student Outline – Introduction and Cell Organization

- i. Coccus
 - ii. Diplococci
 - a. *Neisseria gonorrhoea* (→ *Gonorrhoea*)
 - iii. Streptococci
 - a. *Streptococcus mutans* (→ *Dental Caries*)
 - iv. Staphylococci
 - a. *Staphylococcus aureus* (→ *Skin Infections*)

- B. Bacillus
 - i. Bacillus
 - a. *Bacillus anthracis* (→ *Anthrax*)
 - ii. Streptobacilli

- C. Spiral
 - i. Vibrios
 - a. *Vibrio cholerae* (→ *Cholera*)
 - ii. Spirochetes
 - a. Endoflagella
 - b. *Treponema pallidum* (→ *Syphilis*)
 - c. *Borrelia burgdorferi* (→ *Lyme Disease*)