

**BIO 226N - STUDY GUIDE
CELL STRUCTURE**

I. CELL SHAPE

A. Coccus - (cocci) - spheres

- Single coccus: *Micrococcus luteus*
 Diplococcus (two cocci): *Neisseria gonorrhoea*
Neisseria meningitidis
 Clusters of cocci: *Staphylococcus aureus*
 Streptococcus (chains): *Streptococcus pyogenes*

B. Bacillus (bacilli) - cylinders, rods

- Bacillus anthracis* - anthrax
Corynebacterium diphtheriae - diphtheria - pleomorphic rods

C. Spiral shape

1. Rigid -
 a. curved - (comma), *Vibrio cholerae* - cholera
 b. spirilla - *Rhodospirillum rubrum*
 2. Flexible - Spirochaetes: *Treponema pallidum* - syphilis
Borrelia burgdorferi - Lyme Disease

II. COMPARISON OF PROCARYOTES & EUKARYOTES

PROCARYOTES	EUKARYOTES	
NUCLEOID	TRUE NUCLEUS	CHROMOSOMES IN MEMBRANE
FISSION	MITOSIS	
SEX - PRIMITIVE	SEXUAL REPRODUCTION	
	MEIOSIS	EGGS/SPERM
NONE (MESOSOMES)	MITOCHONDRIA	ENERGY
CHROMATOPHORES	CHLOROPLASTS	PHOTOSYNTHESIS
CELLS WALLS - PEPTIDOGLYCAN	CELL WALL	ANIMAL- NONE
		PLANT - CELLULOSE
		FUNGI - CHITIN
RIBOSOMES SMALLER, 70S	RIBOSOMES	LARGER, 80S

III. CELL COMPONENTS

A. GLYCOCALYX/CAPSULE

Ex. *Streptococcus pneumoniae*

B. FLAGELLUM (Flagella):

- 10µm X 14nm
 MONOTRICHOUS - *Pseudomonas aeruginosa*
 AMPHITRICHOUS -
 PERITRICHOUS -
 LOPHOTRICHOUS -

TAXIS; CHEMOTAXIS; ATTRACTANT & REPELLANTS;

C. PILUS (pili): 1µm X 7nm

D. FIMBRIAE: *Neisseria gonorrhoeae*

E. CELL WALL - (CELL ENVELOPE); SHAPE, OSMOTIC PROTECTION

NAG: N-acetylglucosamine

NAM: N-acetyl muramic acid (sugar with hydroxyls and acid group)

NAG - NAM - disaccharide ; TETRAPEPTIDE SIDE-CHAIN; CROSSLINKING

AMINO ACIDS - PENTAGLYCINE

COMPARISON OF CELL WALLS OF GRAM POSITIVE AND GRAM NEGATIVE

GRAM POSITIVE
TEICHOIC ACID

GRAM NEGATIVE
LIPOPOLYSACCHARIDE OUTER
LIPOPROTEIN MEMBRANE
PHOSPHOLIPID
PEPTIDOGLYCAN (1-2 LAYERS)
PERIPLASMIC SPACE

PEPTIDOGLYCAN (MANY LAYERS)

F. CYTOPLASMIC MEMBRANE

PHOSPHOLIPID BILAYER & PROTEINS

FLUID MOSAIC MODEL

SELECTIVELY PERMEABLE BARRIER

G. CYTOPLASM - 80% H₂O, PRECURSORS, ENZYMES, RIBOSOMES

H. NUCLEOID - CHROMOSOME - DNA - GENES, GENETIC INFORMATION

5 X 10⁶ MONONUCLEOTIDE PAIRS

3 X 10⁹ MOL. WEIGHT

2000 - 4000 GENES, GENETIC INFORMATION

I. ENDOSPORES (SPORES)

SPORULATION - DORMANT, RESISTANT, SPORE COAT

GERMINATION - OUT GROWTH OF CELLS (VEGETATIVE GROWTH AND
CELL DIVISION)

Ex. *Clostridium botulinum*,

- TOXIN - BOTULISM

Cl. perfringens

- GAS GANGRENE

Cl. tetani

- TETANUS

Cl. novyi

- NON-PATHOGEN

Bacillus anthracis

- ANTHRAX

Bacillus subtilis

- NON-PATHOGEN