

**BIO 226N  
STUDY GUIDE  
NORMAL FLORA, INFECTIONS**

**I. NORMAL FLORA**

Symbiosis;

A. Skin - barrier - normal flora - diphtheroids - *Corynebacterium*  
opportunistic pathogens *S. aureus*; *S. epidermidis*; *Candida albicans*

B. EYE - Lysozyme

C. RESPIRATORY TRACT

Nose + Nasopharynx - *Neisseria* species (non pathogenic)

*Strep. pneumoniae*

*Strep. pyogenes*; *Hemophilus influenzae*; *Neisseria meningitidis*

(carriers-adenoids, tonsils) *Pneumocystis carinii* - Fungus; opportunistic

pathogen

D. DIGESTIVE TRACT: Mouth + Oropharynx ; normal flora: Spirochetes,  
Lactobacilli, Diphtheroids; opportunistic pathogens *Candida albicans*;  
*Streptococcus mutans* - pathogen

Stomach - pH < 2.0 - acidic

*Helicobacter pylori* - pathogen, ulcers

Intestine -

anaerobes & facultative anaerobes, coliforms,

*Streptococcus fecalis*, *Klebsiella*, *Proteus*,

*Enterobacter*, *E. coli* (pathogenic and  
non-pathogenic strains)

E. REPRODUCTIVE TRACT

*Lactobacillus*, *Candida*, *Trichomonas vaginalis*

F. UROGENITAL TRACT - opportunistic pathogens

*Candida albicans* - vaginitis

*Trichomonas vaginalis* - protozoan

**II. INFECTION**

A. DISEASE CLASSIFICATION - infectious, inherited, degenerative, neoplastic,  
nutritional deficiency, idiopathic

Pathology, Etiology, Virulence, Pathogenicity

B. RESERVOIR - source - animal body, food, water, soil, blood, human body

C. TRANSMISSION

1. Contact

a. Direct - person to person (example, sexual contact)

b. Indirect - contaminated object - Fomite (example, shared needle)

c. Droplets - sneezing, coughing

<1 meter travel (example, common cold)

2. Vehicles - food, water, airborne dust or droplet, nuclei, blood

Food - water

*Shigella* - Shigellosis

*Salmonella* - Salmonellosis

*Vibrio* - cholera

Hepatitis Virus A - infectious hepatitis

3. Airborne - dust, droplet nuclei -

travel more than 1 meter in the air

*Mycobacterium tuberculosis*

*Histoplasma capsulatum*

Measles, Chicken pox, Polio

Blood - Hepatitis B - serum hepatitis

3. Vectors - mechanical vector - flies

biological vector - example, Lyme disease

Deer tick, deer, mice, dogs, cats, people

*Borrelia burgdorferi*

- D. NOSOCOMIAL INFECTIONS (Hospital Acquired)
  - Surgical wound infections
  - Catheters (urinary tract infections)
  - Immunosuppressed patients
- E. SPREAD IN POPULATIONS
  - Endemic - always present - *Histoplasma capsulatum*
  - Epidemic - large number of cases in short time - cholera, typhus, influenza
  - Pandemic - world-wide epidemic AIDS
  - Sporadic - small number of isolated cases - Hanta virus
- F. SPREAD IN INDIVIDUAL
  - Primary - influenza
  - Secondary - *Staph. aureus* pneumoniae

### III. INVASIVE MECHANISMS

Pathogenicity, Virulence, *Candida* vs *Pasteurella tularensis*

- A. CAPSULES - *Strep pneumoniae*
- B. EXOTOXINS - diphtheria, botulism, gas gangrene  
cholera, tetanus, scarlet fever

*Corynebacterium diphtheria*

*Clostridium botulinum*

*Cl. perfringens*

*Vibrio cholerae*

*Cl. tetani*

*Strep pyogenes*

- C. ENDOTOXIN - cell walls of gram negative cells  
phospholipic, lipoprotein, lipopolysaccharides (lipid A)
- D. HEMOLYSINS - lyse RBC  
*Strep. pyogenes* B hemolytic
- E. LEUCOCIDINS - kills WBC (leucocytes)  
*Mycobacterium tuberculosis*, *Strep.*, *Staph.*
- F. HYALURONIDASE - dissolve cementing substance  
*Clostridium* - gas gangrene; *Streptococcus fasciatis*
- G. STREPTOKINASE - dissolve blood clots  
STAPHYLOKINASE
- H. COAGULASE - clots blood, protects microbes inside the clot  
*Staph. aureus*

### IV. KOCH'S POSTULATES

- A. Same organism present in every case of disease
- B. Organism must be isolated from diseased host and grown in pure culture
- C. Introducing pure culture into susceptible host causes same disease
- D. Organism must be isolated from the deliberately infected host and grown again in pure culture