


Veterinary Microbiology (Unit-1)

NORMAL, OPPORTUNISTIC AND SAPROPHYTIC BACTERIAL FLORA

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NORMAL BACTERIAL FLORA

- Organisms routinely residing on body's surfaces
 - **Normal flora-** Mixture of organisms regularly found at any anatomical site
 - Healthy animal- internal tissues free of microorganisms
 - Favourable environments for growth of microorganisms
 - Bacteria of the normal flora:
 - ❖ **Symbionts** – benefit both themselves and host
 - ❖ **Commensals** – no benefit to host
 - ❖ **Opportunists** – harm host, disease under certain circumstances
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- Skin, oral cavity, gastrointestinal tract, respiratory tract, genito-urinary tract
- Skin and digestive system- most diverse and complex bacterial flora
- Tissue tropism
- Composition vary


In the digestive tract:

- Densely populated
- **Oral cavity-** strict anaerobes and facultative anaerobic bacteria
- *Haemophilus* spp., *Bacteroides* spp., *Fusobacterium* spp., *Actinomyces* spp., *Actinobacillus* spp. etc.

STOMACH-

- Relatively few microorganisms
- Acid-tolerant species of *Lactobacilli* and *Streptococci*
- *Helicobacter pylori*- gastric pathogen, humans, pigs, cats and several other species

Small Intestine-

- Anterior part- acidic
 - Mainly Gram-positive sp.
 - Distal section- *Enterobacteriaceae* and *Bacteroides* spp., in addition to *Lactobacilli* and *Enterococci* sp.
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Large intestine-

- Enormous microbial population
- Anaerobic bacteria- *Bacteroides* spp., *Fusobacterium* spp., *Clostridium* spp.; Facultative anaerobes – *E. coli*, *Klebsiella* spp.

NORMAL FLORA OF SKIN:

- *Micrococci*, coagulase-negative *Staphylococci* etc., non-pathogenic, commensal

NORMAL FLORA OF RESPIRATORY SYSTEM

- Nasopharynx- large no. of bacterial sp. (*Staphylococci*, *Streptococci*, *Pasteurella* sp.)

- **NORMAL FLORA OF UROGENITAL TRACT**


Staphylococcus, *Streptococcus* and coliform group etc.



BENEFICIAL EFFECTS

- Assists in enzymatic breakdown of food
- Production of vitamins- niacin, B1, B2, B6, and B12, folic acid, biotin, and vitamin K
- Commensals & symbionts- prevent colonization
- Defence against pathogens- Antibodies, endotoxins, bacteriocin
- Development of certain tissues (lymphatic tissue), rumen

DISADVANTAGES

- Immunity lowered- pathogenic
 - Pathogens in different issue, e.g. normal flora of intestine- urinary tract infection (UTI)
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OPPORTUNISTIC BACTERIAL FLORA

- Free-living, or a part of the host's normal flora
- Adopt pathogenic role under certain circumstances (compromised immune system, other infection, tissue damage, etc)
- Normally harmless organisms
- *E. coli*, *Klebsiella* sp., *Pseudomonas* sp. etc.

Saprophytic bacteria:

- Live on dead or decaying organic matter
 - usually present in soil and water
- e.g. *Clostridium* sp., *Proteus* sp., *Pseudomonas* sp. etc.



TYPES OF INFECTION

- **Infection:**
- An organism enters the body, increases in number, and causes damage to the host
- All infections do not invariably result in the disease

- **Primary infection:** initial infection with an organism in a host

- **Reinfection:** subsequent infection with same organism in same host

- **Secondary infection:** infection with new organism in a host whose body resistance is already lowered by a pre-existing infectious disease



- **Cross-infection:** infection with new organism from another host or another external source in host already suffering from a disease
- **Nosocomial infection:** hospitals acquired infections
- **Iatrogenic infection:** physician induced infection as a result of therapy with drugs or investigation procedures
- **Subclinical infection:** nearly or completely asymptomatic
- **Latent infections:** organisms in a latent or hidden stage in host, subsequently multiply to produce clinical disease under certain circumstances.



SOURCES OF INFECTIONS:

- The person, animal, object or substance from which an infectious agent passes or is disseminated to the host

- **Endogenous sources:**

Normal bacterial flora, in certain situations pathogenic, infections at different sites

E. coli -normal flora of intestine- urinary tract infection

- **Exogenous sources:** from outside host's body

- **Animals:**

- ❖ Incubating a disease
- ❖ Overt disease
- ❖ Convalescent carrier
- ❖ Contact/subclinical carrier

- **In-animate source:** Soil, feces, through wound, contaminated feed, water, equipment

- **Insects:** Mosquitoes, ticks, mites, flies, fleas, lice



METHOD OF TRANSMISSION OF INFECTION

- **Contact:** By direct or indirect contact
- **Inoculation:** Inoculation of microorganisms directly into tissues of the host
Example: Tetanus, Rabies
- **Ingestion:** Ingestion of water and food contaminated with microorganisms
- **Inhalation:** Infections are transmitted by inhalation of droplet nuclei
- **Vectors:** Mosquitoes, flies, fleas, ticks, mite, lice

Routes/Portal of Entry:

- Respiratory tract
- Gastrointestinal tract
- Genital tract
- Skin/ Mucous membrane
- Transplacental
- Via umbilicus

