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Medical Bacteriology (460 MIC)

lecture 2

Normal Flora of Humans

The Normal Flora of Humans (Microbiota)

Definition: The nature mixture of population of microorganisms frequently found on or within body of healthy individuals.

The normal flora of humans consists of a few fungi, but bacteria are the most numerous and obvious microbial components of the normal flora.

In healthy human, there are many of bacteria are consistently associated with the body such as:

1) Body surfaces

2) Mucus membranes

(skin and mucous membranes, are always contact with environmental organisms and become colonized by various bacterial species).

3) Intestinal linings of humans

The internal tissues, e.g. blood, brain, muscle, etc., are normally free of microorganisms.

What are the Benefits of Normal Flora?

Normal flora may be influenced by various factors, including

Genetics, age, sex, stress, health condition, antibiotics, nutrition and diet of the individual

Normal Flora of Human

Normal Flora of the Skin

Such as *S. epidermidis* (non-pathogen on skin) , Corynebacteria.
Sometimes pathogenic *S. aureus* found on the hands. This because the face and hands are likely inoculated with the bacteria on the nasal membranes.

Normal Flora of the Conjunctiva (eyes)

Number of flora are usually small
***S. epidermidis* is predominant**
S. aureus, Haemophlus sp. and *Neisseria* sp. are occasionally found
Newborn may especially prone to bacterial attachment. *Chlamydia sp.* and *Neisseria sp.* might be present on vagina of an infected mother, silver nitrate or an antibiotic may be put into the newborn's eyes to avoid infection after passage through the birth canal.

Normal Flora of the Respiratory Tract

Upper Respiratory Tract

Large number of bacterial species are colonize it.
predominantly with *S. epidermidis,* Corynebacteria, and *S. aureus.*
The healthy sinuses are sterile.
The pharynx (throat) is normally colonized by streptococci and various gram-negative cocci.
The pathogens such as *Stre. pneumoniae, Strep. pyogenes, H. influenzae*
Nose always heavily colonized with coagulase negative staphylococci, Corynebacteriun and *S. aureus*

Lower respiratory tract (trachea, bronchi)

Virtually free of bacteria
The pathogens such as *H. influenzae* or *S. pneumoniae.*

Normal Flora of the Oral Cavity

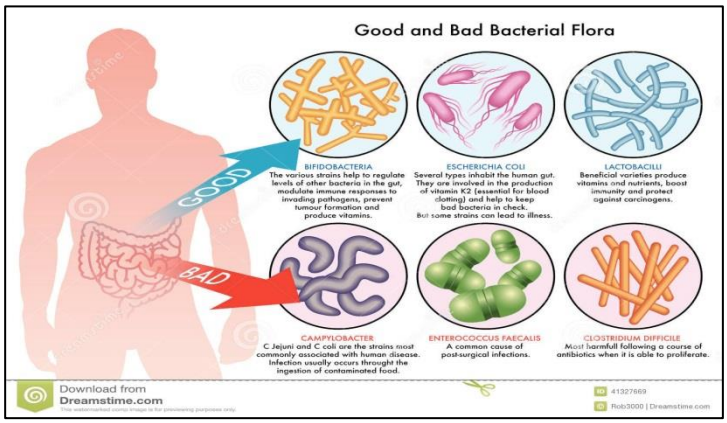
The mouth is a favorable habitat for variety of bacteria.
Oral bacteria include streptococci, lactobacilli, staphylococci and corynebacteria, with a **great number of anaerobes**, especially bacteroides.
Teeth colonized by *Strep. mutans* (can causes dental caries)
Oral flora contribute to host nutrition through the synthesis of vitamins, and they contribute to immunity by inducing low levels of antibodies that may cross react and antagonism with pathogens
Oral flora can also cause diseases, including abscesses.

Normal Flora of the Gastrointestinal Tract

Different in the composition by age, diet, and the use of antibiotics.
Stomach: because the high acidity of gastric; very few bacteria (mainly acid-tolerant lactobacilli).
***Helicobacter pylori* is a pathogen.**
The small intestine has a relatively sparse gram-positive flora, mainly of **Lactobacilli** and *Enterococcus faecalis.*

The flora of the large intestine (colon); highest, **E. coli**, anaerobic bacteria, is similar to that found in feces

Intestinal tract is sterile at birth.



Normal Flora of the Urogenital Tract

Urinary bladder, upper urinary tract; are normally sterile.
Some enteric bacteria (e.g. *E. coli, Proteus*) and Corynebacteria, which are probably contaminant urine from the skin.

Vagina: flora influenced by estrogen.
-Colonized after birth with Corynebacteria, Staphylococci, Streptococci, *E. coli.*
-Lactobacilli are dominate vaginal microbiota during reproductive years.
low pH of the vaginal epithelium prevents establishment by most bacteria as well as pathogenic yeast; *Candida albicans.*
This is a striking example of the protective effect of the normal bacterial flora for their human host.

Urethra of men normally sterile.

Review Questions

2. What are the benefits of normal flora? (4 points)

3. Give three examples of the body sites that associated with bacterial flora? Give two examples of the body sterile sites?

4. What are the factors that effect on the human normal flora?

5. What do you know about normal flora of eyes (Conjunctiva)- Normal flora of Gastrointestinal Tract?

6. Give two examples of oral bacterial flora?