Normal Flora

Lecture 5

Microbiology

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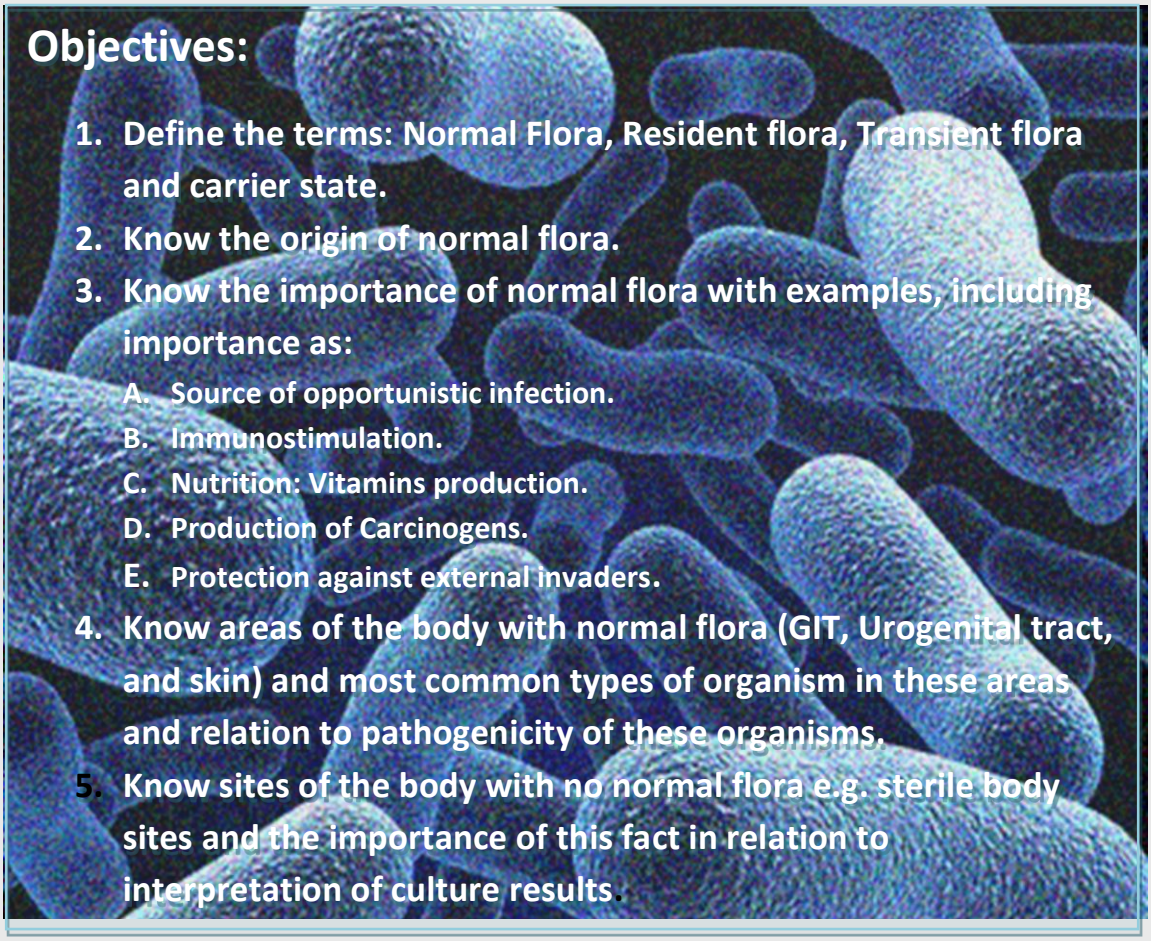
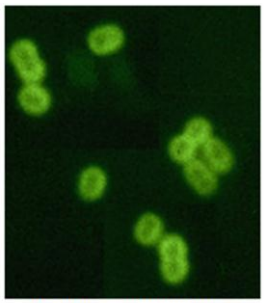


Definition

- **Normal flora are microorganisms that are frequently found in a particular site in normal healthy individual. "do not cause disease"**

Types of Normal Flora

1. **Commensals: natural relationship with host."متعايشه"**
2. **Residents : present for invariable period ."مقيمه"**
3. **Transients : establish itself briefly , excluded by host defense or competition from residents."موجوده في فتره قصيره"some of it are potentially pathogenic**
4. **Carrier state :potentially pathogenic , eg. Streptococcus pneumoniae, Neisseria meningetidis in throat of healthy individual**
5. **"the carrier doesn't have disease ,he transmit it to others"**



Streptococcus pneumoniae.

Origin of Normal Flora

- **Newborn sterile in utero the normal flora will appear After birth ,due to the exposed of flora of mother's genital tract, and organisms in the environment.**

Normal flora effects	
Beneficial effects	**Harmful effects**
1- **Immunostimulation (antibody development)** " partial protection stimulated by normal flora"	1- **May be a source of opportunistic infections.** "If there any issues in the immunity system will become pathogenic " **e.g. In patients with impaired defense mechanisms. E.g. *Staphylococcus epidermidis, E.coli*.**
2- **Exclusionary effect (vacuum effect) and protection from external invaders. "كائنها حرس حدود"**	2- **may cross react with normal tissue components ,eg, antibodies to another ABO group arise because of cross reaction between intestinal flora and the antigens of A &B blood substances.**

3- **Production of essential nutrients (vit. K & B by some normal intestinal flora eg. *E.coli*.)** (أمراض تأتي عندما تقل المناعه في الإنسان)	**3- Production of carcinogens: Some normal flora may modify chemicals in our diets into carcinogens through their enzymes. eg. artificial sweeteners may be enzymatically modified into bladder carcinogens.**

Distribution of normal flora

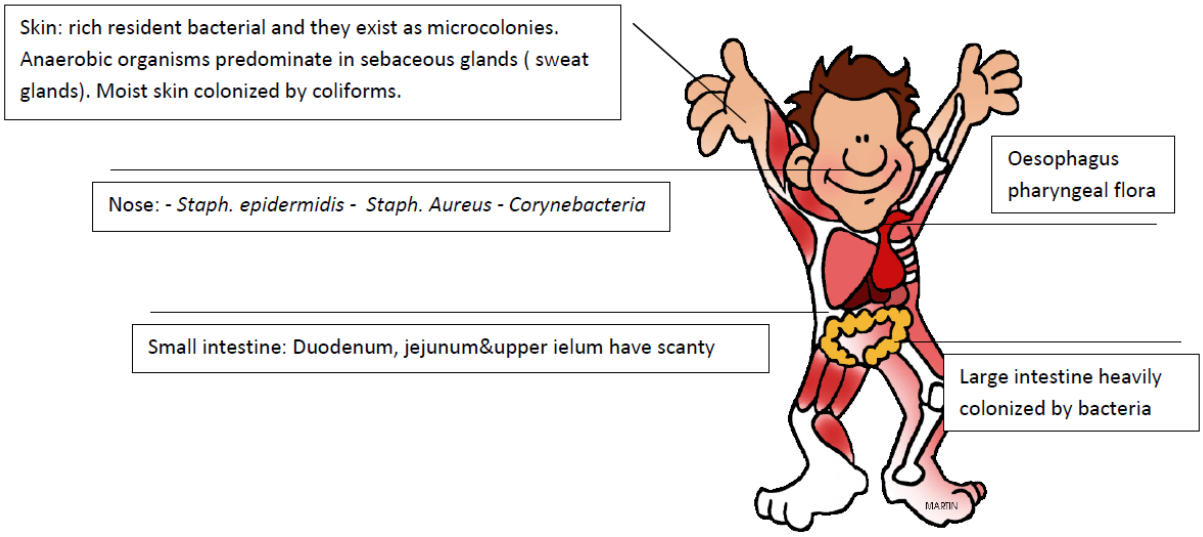
- **Internal organs (except alimentary tract"GIT") are sterile at health.**
  N.B Sterile: NO ORGANISMS

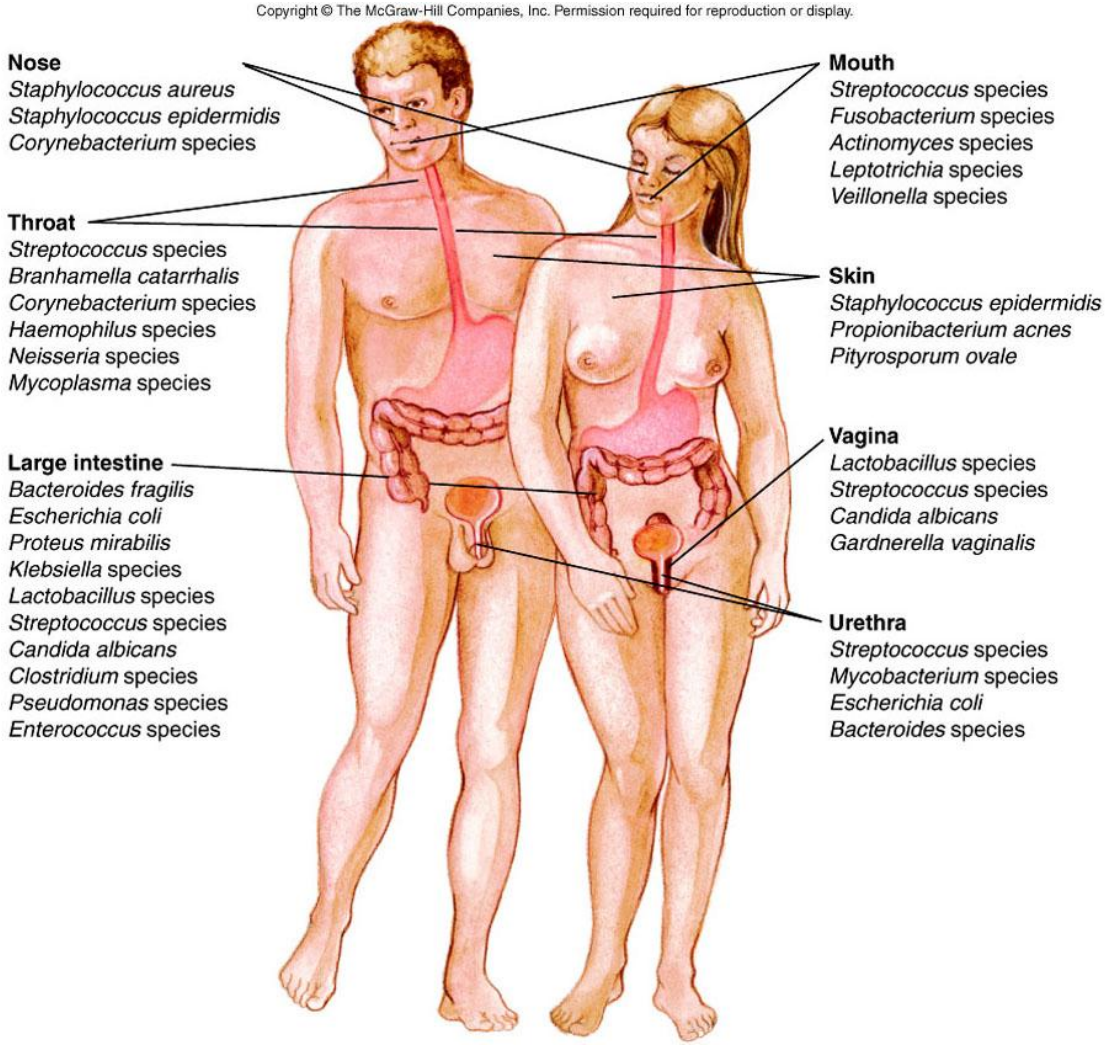
Sterility maintained by :

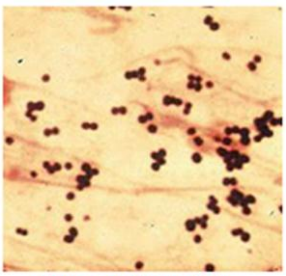
1- **local defense mechanisms e.g. WBC**
2- **chemical substances in serum & tissues eg. Complement , antibodies.**
3- **-phagocytic activity of PMN**

Areas of the body with normal flora

1. **Gastrointestinal tract : mouth & large colon**
2. **Urogenital tract : vagina &distal 1/3 of the urethra**
3. **Skin**



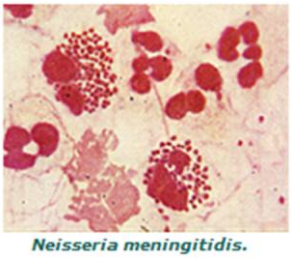



S. aureus. Gram stain.

Normal flora of:

1. respiratory tract
   - **A. Lower respiratory tract is sterile**
   - **B. Upper resp. tract colonizes by flora as in mouth &nasopharynx**
   - C. Nose: -
     - **Staphylococcus epidermidis**
     - **Staphylococcus aureus**
   - D. Oropharynx :
     - **Viridans streptococci**
     - **Commensal *Neisseriae***

     potential pathogens are :
     - ***Heamophilusinflenzea&Pneumcoccus***
     - **Less common found: *Streptococcus pyogenes , Neisseria meningitidis***


Neisseria meningitidis.

2. Gastrointestinal tract

A. Saliva contains 10^8 bacteria /ml
B. Gingival margin debris & dental plaque continually colonized by bacteria.
C. Oerophyagu"المريء"flora same as pharyngeal "البلعوم"flora.
D. Empty stomach sterile due to gastric acid."after eating will have some flora"
E. Duodenum, jejunum & upper ileum have (scanty=small amount) flora
F. Large intestine heavily colonized by bacteria.

3. Feces

A. 1/3 of feces wt. is bacteria , mainly dead,
B. Living bacteria ~ 10^{10}/gm
C. 99% anaerobes
D. Anaerobic environment maintained by aerobic bacteria utilizing free O2.
E. *Bacteroidesfragilis* group the dominant anaerobes.
F. Less common: *E.coli*isaerobic.

4. Genital tract

- Female genital tract heavily colonized , why ?because it's short
- 10^8/ml in normal vaginal secretion.
- In both sexes *Mycobacterium Smegmatis*(AFB) (acid fast bacilli)"تتحمل الاحماض" in secretions which contaminate urine-leads to confusion /misdiagnosis.

A. Male& Female distal urethra: *S.epidermidis*
B. Female Vulva :
- *S. epidermidis*,Corynebacteria, E.*coli*and other Coliforms &*Enterococcus faecalis*.

C. Vagina :

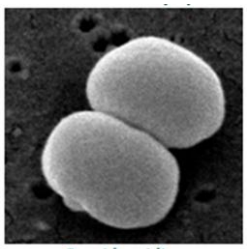
Lactobacilli (Doderlein's bacilli) (Maintain low phacidic)
Enterococcus faecalis
Yeasts.In small number

5. Skin

- Skin has rich resident bacterial flora($10^4/cm^2$).
- Exist as microcolonies. "مستعمرات صغيره"
- Anaerobic organisms predominate in areas with sebaceous glands"مناطق فيها غدد دهنيه".
- Moist skin ,often colonized by coliforms."من القولون"

Normal flora of skin:

1- *Propionibacterium acnes*
2- *S. epidermidis*
3- *S. aureus*(less common, potential pathogen)


S. epidermidis.

A. External auditory meatus"المنطقه الخارجيه من الاذن" flora:
- *S. epidermidis*
- *Corynebacter*ia
- AFB (Acid Fast Bacilli)occasionally found in wax.

B. CONJUNCTIVAL SAC FLORA :"الجفن"

- ***Corynebacteriumxerosis***
- ***S.epidermidis***

When we blink enzyme called lysozym that destroy bacteria will be secreted.

Summary of Common Normal Flora and existence in Various Body Sites

	Staph.epidermidis	Staph.aureus	Alpha hemolytic Streptococci	Diphtheroid and propionibacterium	Gram Negative	Enterococcus	Anaerobes	Lactobacillus
Skin	*			*				
Nose, axilla and groin		*						
Oral Cavity			*				*	
Gastrointestinal tract			*		*	*	*	
Female Genital								*
Male Genital	*			*				Same as skin

Useful link :-

http://textbookofbacteriology.net/normalflora.html

http://suite101.com/article/normal-flora-and-opportunistic-pathogens-a93484

http://www.ankawa.com/forum/index.php?topic=223528.0