NON SPORING ANAEROBES

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- NON SPORING ANAEROBE AS COMMENSAL
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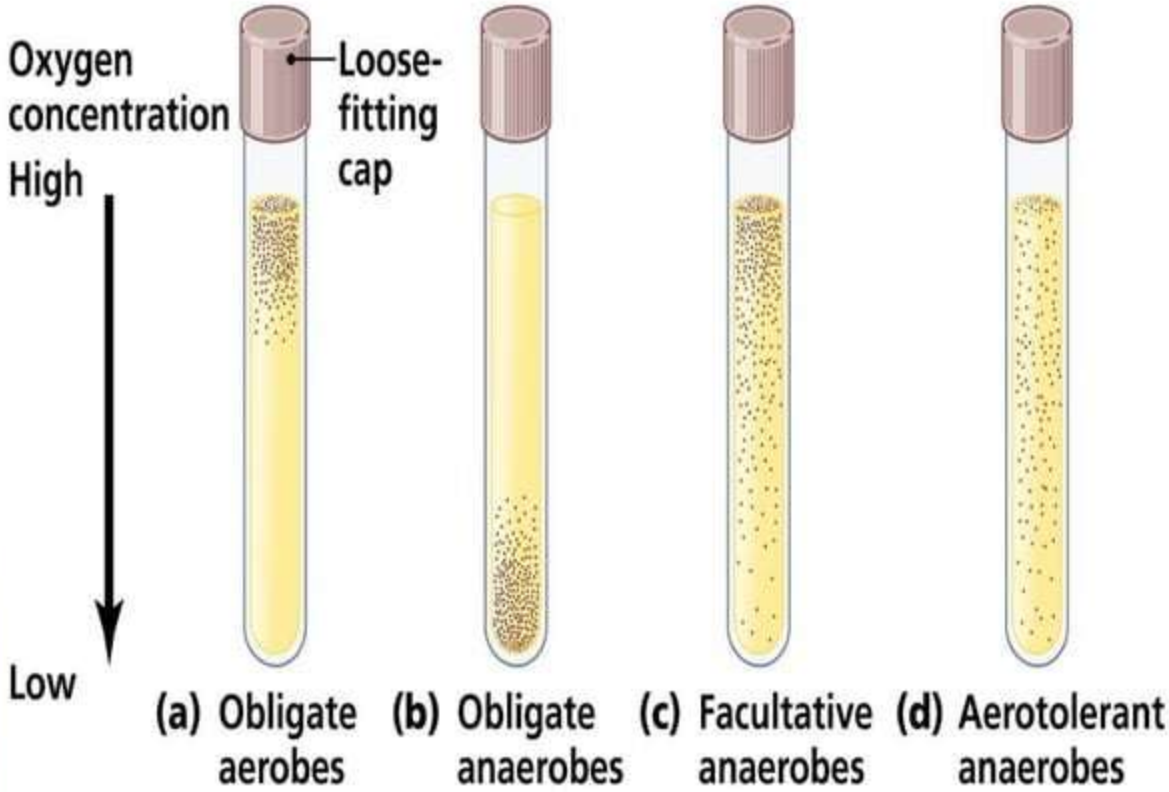
ANAEROBIC BACTERIA

There is no universally accepted definition of anaerobic bacteria-these require a reduced oxygen tension for growth and fail to grow on surface media when incubated in air or 5-10% CO_2.

- Obligate anaerobes
- Aerotolerant anaerobe
- Facultative anaerobes.
- Capnophilic bacteria
- Microaerophilic bacteria



Why anaerobes are killed by oxygen?

Why anaerobes are killed by oxygen

- Aerobic organisms use oxygen as terminal electron acceptor and generate toxic oxygen reduction products including H_2O_2,hydroxy radicals, singlet oxygen and superoxide anions, such reactive metabolites destroy the lipid components of cells and damage the DNA.
- However, aerobes and facultative anaerobes are protected from these reactive by-products due to certain enzymes like peroxidases and superoxide dismutases

CLASSIFICATIONOF NONSPORING ANAEROBES

Gram Positive Cocci:
PEPTOCOCCUS
PEPTOSTREPTOCOCCUS

GramPositiveBacilli:
BIFIDOBACTERIUM
PROPIONIBACTERIUM
MOBILUNCUS
ACTINOMYCES
LACTOBACILLUS
EUBACTERIUM

GramNegativeCocci:
VEILLONELLA

GramNegativeBacilli:
FUSOBACTERIUM
BACTERIODES
PREVOTELLA
PORPHYROMONAS
LEPTOTRICHIA

NON SPORINGANAEROBES AS NORMAL FLORA

- Most muco-cutaneous surfaces of humans harbor a rich flora of anaerobic bacteria which varies at different anatomic sites in terms of concentrations and microbialspecies.
  - Upper air ways
  - Saliva (approximately 10^8 /ml)
  - Gingival crevices (almost 10^{12} /ml)

NON SPORINGANAEROBES AS NORMAL FLORA

- Small intestine (10^4- 10^5/ml)
- Terminal ileum and colon (10^{11}/gm)

(Peptostreptococcus species, Bacteroides species, Fusobacterium species, Clostridia and a variety of non spore forming gram positive rods like Bifidobacterium, Eubacterium etc)

NON SPORINGANAEROBES AS NORMAL FLORA

- Female genital tract (10^5 -10^{11} /ml) shows shifts during various stages of the menstrual cycle that may be hormonally influenced. Thedominant anaerobesareLactobacillus(Doderlein's bacillus),Peptostreptococcus and Bacteroides species.
- Urethra in both sexes contains skin flora as well as Bacteroides and Fusobacterium species.

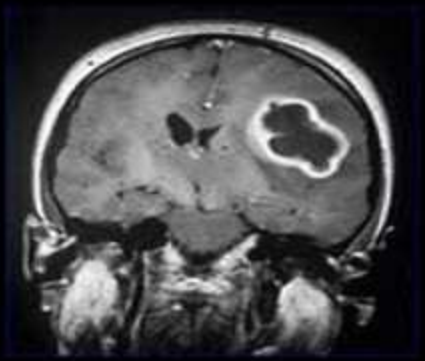
ROLE AS COMMENSAL

- Compete With Pathogens For Its Nutrition
- Modulate Host Innate Immune Response
- Produce Vit K& Bile Acids In Intestine
- lactobacillus maintains vaginal Ph
- Prevent IBS.

ANAEROBIC INFECTIONS
COMMENSAL AS PATHOGENS

- Anaerobic infections are usually endogenous that is they originate from the host's own flora when there is a breech in the muco cutaneous barrier resulting in the displacement of normal flora.
- Spillage of fecal contents into the peritoneum following appendicitis, penetrating trauma or cancer can lead to intra abdominal infections involving anaerobes

Anaerobic infections



CLINICAL DISEASES- Anaerobic Cocci

- PEPTOSTREPTOCOCCUS

  P.anaerobius responsible **for puerperal sepsis.**

  P.magnus causes abscesses- breast/ axillary

Infections of sebaceous cyst also can occur due to these organisms.

CLINICAL DISEASES- Anaerobic GI

- EUBACTERIUM

  Common cause **of Periodontitis**
- PROPIONIBACTERIUM

  Implicated in **Acne**
- LACTOBACILLUS

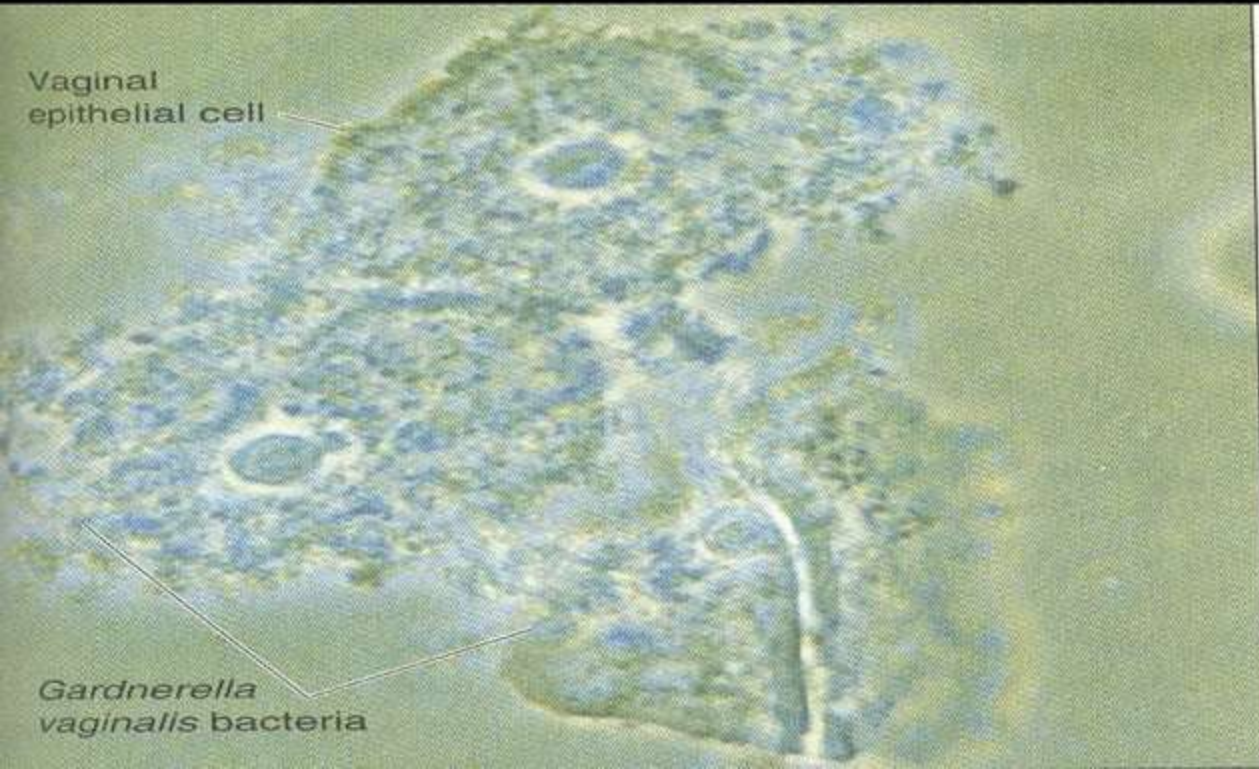
  L.catenaforme is associated with Broncho-pulmonary infections.
- MOBILUNCUS

  M.curtisii & M.mulieris isolated in Bacterial vaginosis

Bacterial vaginosis

- Polymicrobial infection characterised by rotten fish, vaginal discharge
- A direct wet mount may reveal many characteristic "clue cells"= desquamated epithelial cells with attached organisms
- Gram variable organisms seen on staining

CLUE CELLS



CLINICAL DISEASES- Anaerobic G


Bacteroides fragilis

- BACTEROIDES

  B.fragilis is the most common anaerobe isolated fro
  clinical diseases viz., peritonitis, meningitis, brain abscess etc.

- PORPHYROMONAS

  P.gingivalis- periodontal disease

  P.endodontalis- root canal infections

- LEPTOTRICHIA

  L.buccalis causes Vincent's angina along with fusob

CLINICAL DISEASES- ANAEROBIC GNB

- FUSOBACTERIUM

F.necrophorum- produces a wide range of exotoxins: causes Lemierre's Disease (necrosis of the lateral pharyngeal wall with septic jugular vein thrombosis)

- PREVOTELLA

P.melaninogenica- Wound infections, mastoiditis, abscesses.

-Produces a black colour pigment (hemin derivative) & gives red fluorescence when exposed to UV light

CLUES TO ANAEROBIC INFECTION

- Infection adjacent to surfaces that harbour anaerobes as normal flora.
- Infections characterized by abscess formation or tissue necrosis.
- Gas formation
- Grams stain of exudates showing poly microbial flora or organisms with morphologic features of anaerobes.
- Foul odor

Lab diagnosis of NonSporingAnaerobe

Specimen collection

- Liquid or tissue specimen

is preferred .

Swabs should be avoided (if used- must be transported in Stuart's media)

- Successful recovery requires rapid delivery to the laboratory in a transport medium that maintains a moist, anaerobic atmosphere.

ANAEROBIC MEDIA

- Non selective media having peptones, yeast extract, vitamin K, hemin, 5% sheep blood agar and reducing agent can be used for culturing anaerobes.

Variety of broth and solid media are commercially available for the isolation of anaerobic bacteria

- Anaerobic blood agar
- Kanamycin vancomycin laked blood agar
- Phenylethyl alcohol agar
- Columbia colistin nalidixic blood agar medium
- Thioglycollate broth
- Chopped meat broth (Robertson's Media)

Gaspak

Anaerobic incubation systems

A variety of systems are available for this purpose

- ►Anaerobic jars
- ►Disposable bags & Chambers
- ►Roll tube methods etc.

Treatment

- METRONIDAZOLE
- CARBAPENEMS
- AMPICILLIN /SULBACTAM


THANK YOU