Neisseria

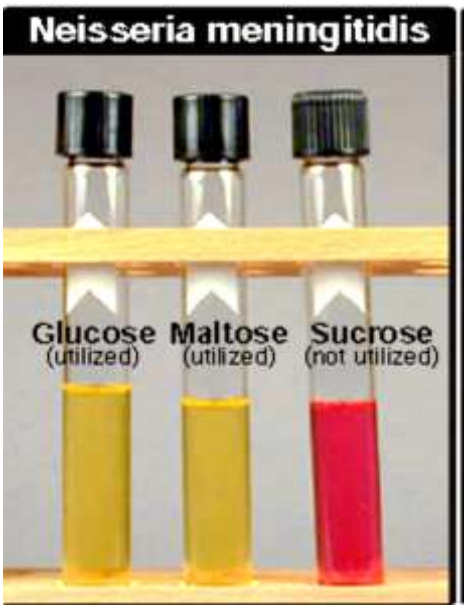
General characters:

The genus consists of **gram-negative,** aerobic cocci Two Neisseria species are pathogenic for humans ***Neisseria gonorrhoeae*** (commonly called gonococcus), the causal agent of gonorrhea and ***Neisseria meningitides***(commonly called meningococcus), and a frequent cause of meningitis. Gonococci and meningococcal are **non-motile diplococci, oxidase-positive**

Both bacteria are classified as **pyogenic** cocci because infections by these organisms characterized by the production of purulent (pus-like) material comprised largely of white blood cells.

Cultured on chocolate agar and **Thayer-Martin medium**.

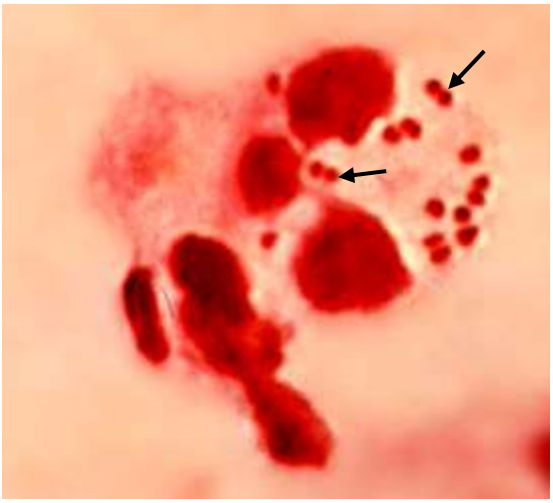
Biochemical tests: All Neisseria species are oxidase-positive to differentiate between species, sugar utilization tests are used
N. meningitidis utilizes both glucose and maltose while
N. gonorrhoeae uses only glucose.



Neisseria meningitides produces acid from oxidation of glucose and maltose, but not from sucrose. The acid turns pH indicator phenol red from red to yellow

N. gonorrhoeae:

N. gonorrhoeae is causative agent of Gonorrhea, is frequently observed within the poly morph nuclear Leukocytes(PMNL) of clinical samples from infected patients is usually transmitted during sexual contact or more rarely, during the passage of a baby through an infected birthcanal. It does not survive long outside the human body because it ishighly sensitive to dehydration .No vaccine is available for gonorrhea.



Presence of *Neisseria gonorrhoeae* Inpolymorph nuclear leukocytes in Urethral discharge

Antigenic Structure:

1. Pili: These hair-like surface appendages are enhance attachment of the organism to host epithelial and mucosal cell surfaces.

2. Lipooligosaccharide: Gonococcal Lipooligosaccharide (LOS) have Shorter, more highly branched, non-repeat O-antigenic side chains Than do lipopolysaccharides found in other gram-negative bacteria. The bactericidal antibodies in normal human serum are IgM molecules directed against LOS antigens.

3. Porin proteins: The gonococcus expresses a single porin type known as PorB. Different strains express either PorB1A or PorB1B however, the porin proteins are not subject to a high frequency phase or antigenic variation like other outer membrane antigens.

4. Opacity proteins: Opacity (Opa) proteins (formerly called PII proteins)are so named due to their tendency to impart an opaque quality to gonococcal colonies. The gonococcus has the capacity to express up to 11 different Opa proteins, Opa proteins are subject to phase variation, Different Opa proteins bind to distinct receptors on host cells.

N. meningitidis:is one of the most frequent causes of meningitis.

Like *N. gonorrhoeae*, *N. meningitidis* is a non-motile, gram-negative

Diplococcus, shaped like a kidney bean, which always appears in pairs .

Smear of purulent cerebrospinal fluid

Showing*Neisseria meningitidis*

It is also piliated and the pili allow attachment of the organism to the nasopharyngeal mucosa where it is harbored both in carriers and in those with meningococcal disease. When meningococcus is isolated from blood or spinal fluid, it is invariably encapsulated. The meningococcal polysaccharide capsule is antiphagocyticand, therefore, the most important virulence factor, the Antibodies to the capsule carbohydrate are bactericidal.

1.Serogroups: The polysaccharide capsule is antigenically diverse . which allows the identification of at least 13 capsular polysaccharide

2.Serotypes: A second classification system called serotyping

(serotypes 1, 2,...20) is also a serologic classification that is based on the properties of the outer membrane proteins.