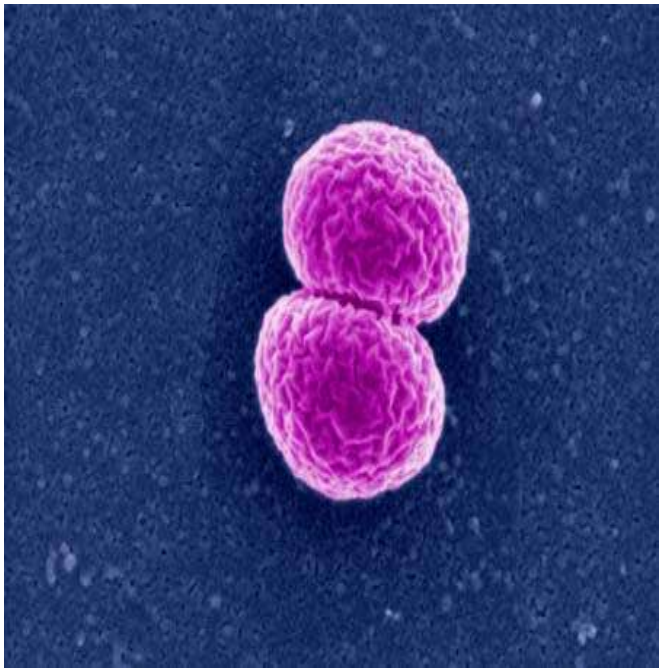
Gram Negative cocci

Neisseriae

The Neisseriae are gram negative cocci that usually arranged in pairs. *Neisseria gonorrhoea* (gonococci) and *Neisseria meningitidis (meningococci)* are pathogenic for human and typically are found inside polymprphnuclear cells. Some Neisseriae are normal inhabitants of human respiratory tract rarely causing disease and occur extracellularly.

Gonococci and meningococci are closely related with 70% DNA homology. Meningococci have polysaccharide capsule, whereas gonococci does not. Meningococci rarely have plasmids whereas most gonococci do. They can differentiate by usual clinical presentation of the disease, meningococci are typically found on respiratory tract and cause meningitis, while gonococci cause genital infection (Gonorrhoea).



Gram Negative cocci

Neisseriae

Morphology:

The typical Neisseria is a gram negative non-motile diplococci kidney shape (the flat or concave sides are adjacent).

Culture:

On special enrichment media e.g.Mullar-Hinton , Modified thayer - Martin or Heated blood agar (Chocolate agar). They produce convex glistening, non-pigmented, non-hemolytic colonies. They required 5% CO2 (Candle jar). The Neisseria gives **oxidase positive that differentiate them from streptococci.**

Neisseria gonorrhoea

They caused gonorrhoea, which is globally distributes. It is exclusively transmitted by sexual contact usually by men or women with asymptomatic infection. The infectivity rate after a single contact with infected partner is 20-30% for men and greater for women. N. gonorrhoea is antgenically heterogeneous and capable of changing its surface structure *in vivo* & *in vitro*. These bacteria can avoid host defense by several types of surface structures.

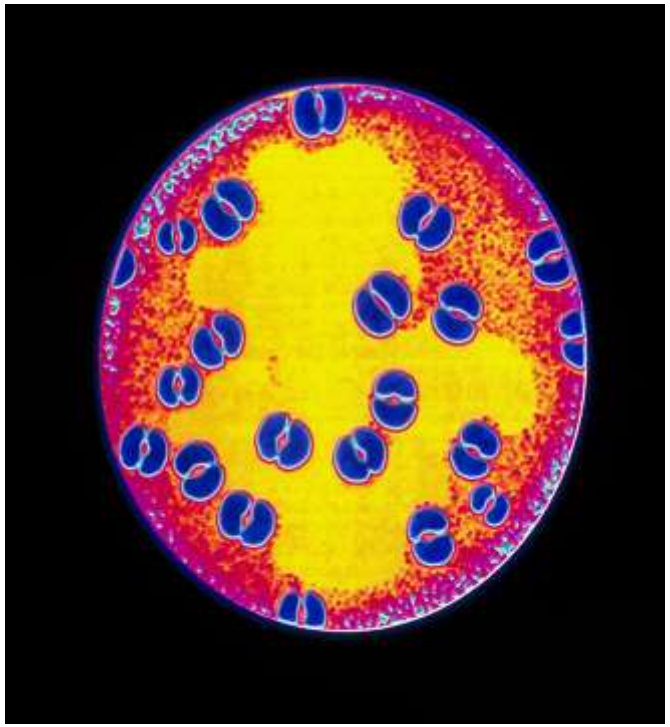
1.Pilli : hair-like projections extend from the surface. They enhance attachment to host cell and resist phagocytosis.

2.Por: they extend through the bacterial cell membrane in trimers forming pores through which nutrient are passed.

3.Opa: enhance adherence of gonococci within colonies and helps attachment of bacteria to the host cell.

4.Lipopolysaccharide capsule: Gonococci can express antigenically different types of LPS at the same time.

5.Reduction Modifiable protein (Rmp): it is associated with Por in the formation of pores in the cell surface.



Neisseria gonorrhea

Pathogenesis:

Gonococci attach the mucous membrane of the genitourinary tract, eye, rectum and throat producing acute suppuration that may lead to tissue invasion followed by chronic inflammation and fibrosis. In males usually causing urithritis with yellow creamy pus and painful urination. This process may extent to epididymis. In untreated cases, fibrosis occurs that may lead to urethral stricture. Urethral infection in man may be asymptomatic. In females the primary infection is in the endocervix and extends to urethra and vagina. Resulting in mucopurulent discharge that may extent to uterine tubes causing salpingitis, fibrosis & obliteration of tubes (**Infertility develop in 20% of women with salpingitis**). Chronic gonococcal cervicitis or proctitis is often asymptomatic. Gonocoocal bacteremia leads to skin papules, & it may also cause suppurative arthritis usually of knee, ankles & wrists. Gonococci can be cultured from blood and synovial fluid in 30% of patients with gonococcal urithritis.

Post-gonococcal urithritis (PGU): is common chronic sequelae of untreated or badly managed gonorrhoea, usually caused by different pathogens.

Penicillinas producing *N. gonorrhoea* (PPNG): are a totally penicillin resistant gonococci appeared in different parts of the world & highly prevalent among certain population (e.g. prostitutes).

Gonococcal ophthalmia neonatorum: An infection of the eye of newborn acquired during passage through infected birth canal. Untreated cases may lead to blindness. To prevent GON, instillation of 1% tetracycline ointment or 0.5% erythromycin ointment into the conjunctival sac of newly born is compulsory in certain developed countries. Silver nitrate is also effective & is the classical method, but t is irritant to conjunctiva.

Neisseria gonorrhea

Laboratory diagnosis:

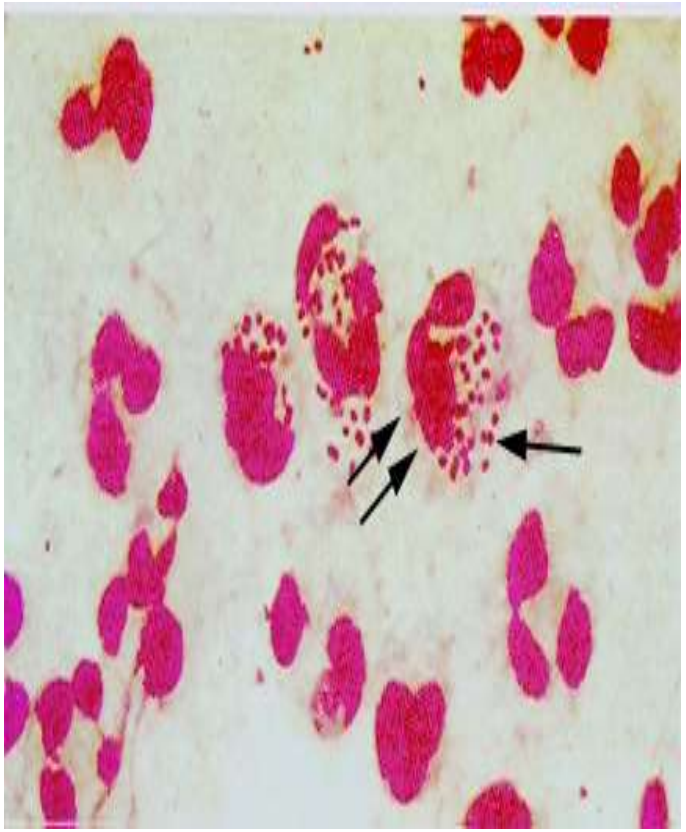
1.Specimens: Pus discharge from urethra, conjunctiva, synovial fluid, blood.

2.Smears :To detect intracellular (within pus cells) gram negative diplococci (Diagnostic). In men the sensitivity is 90% & specificity is 99%. In women (Endocervical exudate), the sensitivity is 50% & the specificity is 95%.

3. Culture: on special enrichment media (e.g. Modified Thayer-Martin agar, chocolate agar) under 5% CO_2.

4.Serology: Detection of specific antibodies against pili, outer membrane protein & LPS by ELISA.

Neisseria gonorrhea

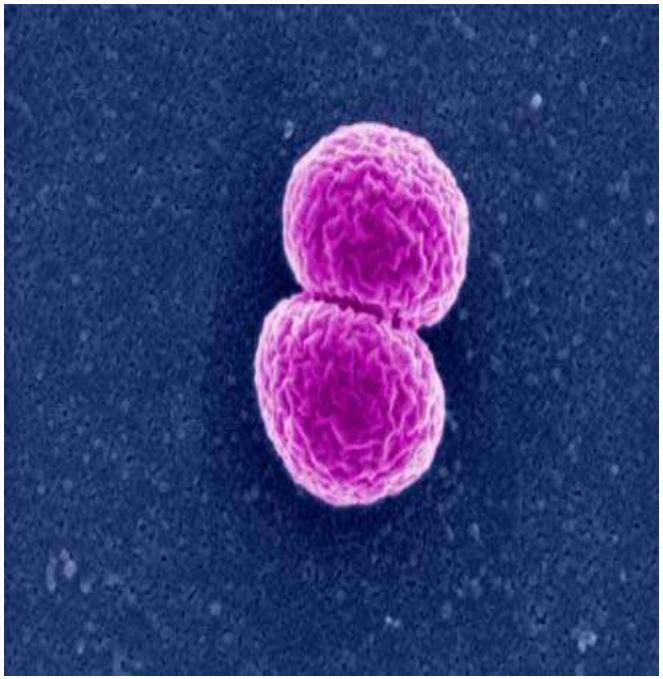


Neisseria meningitidis

The most important serogroups associated in disease in human are A, B, C, Y and W- 135. 5-30% of the normal population carry meningococci in nasopharynx.

Pathogenesis:

Human is the only natural host for meningococci. The nasopharynx is the portal of entry. The bacteria attached to the epithelial cells by pilli. Then reaching the bloodstream (Bacteremia). Meningitis is the most common complication of meningococcemia. Usually begins suddenly with intense heahache, vomiting & stiffness of the neck that may progress to coma.



Neisseria meningitidis

Laboratory diagnosis:

1.Specimens: blood (for culture), CSF(for culture ,smear & biochemical investigations). Nasopharyngeal swab for detection of carriers.

2. Smears: Intracellular G-diplococci (with flat adjacent sides).

3.Culture: on special enrichment media under 5% CO2 and further colony identification through carbohydrate fermentation & agglutination with specific antisera..

4. Serology: Latex agglutination test or hemagglutination test with specific antibodies to meningococcal polysaccharide.