Neisseria

**General characteristics:**

Gram – negative diplococci, kidney bean shape; they are oxidase positive and catalase positive.

Meningococcus and Gonococcus need 5-10% CO2 and humid atmosphere. Meningococcus and Gonococcus require chocolate agar to grow on.

*Neisseria gonorrhoeae* (G C)

**Diseases:**

Females: cervicitis, endometriosis, urethritis, STD, pharyngitis, and proctitis.


**Laboratory diagnosis**

**Discharge are collected:**

In the male: from the urethral discharge (morning drops), exudates or made from the centrifuged urinary deposit, conjunctiva swab.

In the female: from vagina to the cervix and fallopian tubes swab.

**Gram stain:**

A direct Gram stain is very useful for sterile body fluid. Gram stain is more sensitive in males compared to females due to the presence of normal flora in the female urogenital tract.

**Specimen choice and collection:**

The specimen choice and collection method depends on the testing technique used in a laboratory and the age, sex, and sexual orientation of
the patient. Specimens should be collected with Dacron or rayon swabs because calcium alginate may be toxic to gonococci. Fatty acids inhibit the growth of gonococci; therefore, cotton swabs that do not list acceptable manufacturer specifications should not be used. To minimize the inhibitory effects of unknown substances in the specimen, the swabs should be inoculated directly onto growth medium or placed in swab transport medium immediately after sampling. Rapid transport with in at least 6 hours post collection is essential. Amies or Stuart media are used as transportation media.

**Transport of specimens:**

Methods of transportation vary with the specimen and the type of test being done, but in all instances when commercially available transport systems are used, the instructions provided by the manufacturer should be followed.

Ideally, the specimens should be inoculated onto culture medium immediately after collection to preserve the viability of gonococci for isolation. If the inoculated media are being transported to a local laboratory, the plates should be held at room temperature for no more than 5 h in a CO2-enriched atmosphere using a candle jar or a commercial CO2-generating system. If long-distance shipping is required, the specimens should be inoculated onto media contained in a CO2-generating system, incubated for 18 h to 24 h and have visible growth on the plate before shipping.
CO2-generating systems such as JEMBEC and InTray GC (BioMed Diagnostics) preserve the viability of the organisms for longer periods of time than non-nutritive systems.

A direct smear for Gram staining may be performed as soon as the swab specimen is collected from the urethra, cervix, vagina or rectum. The swab should be rolled gently onto the slide to preserve cellular morphology and over an area less than 1 cm². Gram staining kits are commercially available. Under oil immersion, urethral smears from symptomatic males usually contain intracellular Gram-negative kidney-shaped diplococci in polymorphonuclear leukocytes, the presence of which is required for the presumptive diagnosis of gonorrhea. The presence of extracellular Gram-negative diplococci is an equivocal finding that must be confirmed by culture or nucleic acid test. The endocervical smears from females or rectal specimens are more difficult to interpret due to the presence of other Gram-negative coccobacilli, including *Moraxella osloensis*, *Moraxella phenylpyruvica*, *Kingella denitrificans* and *Acinetobacter* species.

The current preferred laboratory method for the diagnosis of *N. gonorrhoeae* infections is the isolation and identification of the agent. Media and cultural conditions for isolation: The primary specimens should be inoculated onto nonselective chocolate agar and selective agar containing antimicrobial agents that inhibit the growth of commensal bacteria and fungi. The antibacterial agents in modified Thayer-Martin, Martin Lewis and New York City medium are vancomycin, colistin, trimethoprim lactate and the antifungal agents nystatin and neomycin or amphotericin B. Some fastidious strains, such as the arginine-,
hypoxanthine- and uracil-requiring strains, are more susceptible to the concentrations of vancomycin or trimethoprim used in the selective media. Isolates that are inhibited by supplements in selective media should be grown on media with lower concentrations of antibiotic. Isolates that are atypical, such as vancomycin-susceptible strains, should be forwarded to reference laboratories to confirm their identification. Therefore, a quality assessment program that periodically compares isolation rates on selective and nonselective media is desirable.

**Carbohydrate fermentation:**

Gonococcus is glucose fermenter and positive for hydroxyproline aminopeptidase. Surface structures include the following:

A) Pili
B) 3 Types of protein (POR, OPA, RMP) which important for adhesion.

**Neisseria meningitides:**

The species have some of important virulence factors such as:

1- Antiphagocytic polysaccharide capsule.
2- Pilli (colonization and antiphagocytic factor).
3- Protease.

**Disease:**

Meningitis, waterhouse friderchsen syndrome (adrenal hemorrhage), Urethritis, Proctitis. Meningococcus is a common cause of meningitis in children (3 months to 1 year old) and among young adults.
**Laboratory diagnosis:**

Meningococcus can ferment glucose and maltose sugar and it is positive for Y-glutamyl aminopeptidase.

Other Neisseria sp.

Neisseria sicca, Neisseria subflava, N. flavescens, N. mucosa.

They are part of the normal respiratory flora.

*N. catarrhalis* (*Moraxella catarrhalis*)

**Disease:**

Bronchitis, pneumonia, sinusitis, conjunctivitis, meningitis, otitis media, female genital tract infection.

**Laboratory diagnosis:**

Catalase and oxidase: positive.

Negative for all carbohydrates: asaccharolytic.

Negative for all enzymes.