Neisseria gonorrhoeae, Neisseria meningitidis and Moraxella catarrhalis

I. General characteristics
gram-negative diplococci

- oxidase positive, thought of as aerobic (actually obligate respirers, do not ferment), catalase positive, nonmotile, optimal growth 35-37°C, inhabit mucous membranes

must distinguish these organisms from the 8 other normal microbiota Neisseria species

II. Neisseria gonorrhoeae

- often referred to as gonococcus or GC
- always considered pathogen
- complex growth requirements;

- growth requires increased CO₂
- may autolyse

Neisseria species differentiated by: patterns of acid detected from oxidation of carbohydrates, and other tests

Clinical Significance
causative agent of gonorrhea

- causes acute urethritis in males; infection of endocervix in females, 50% of infections in females are asymptomatic - untreated can cause infertility

- pharyngeal infections
- anorectal infections
- ocular infections
- PID (pelvic inflammatory disease)
- disseminated gonococcal disease

Specimen Handling and Collection –
Proper collection and transport are critical
Transport swab of (swab in non-nutrient buffer, can’t allow specimen to dry out) endocervix, urethra, rectum, pharynx, conjunctiva, blood, joint fluid, aspirates from skin lesions

Culture

Best method for maximal recovery of gonococci is to plate directly onto growth medium and incubate at 35°C in a CO₂ enriched environment. Specimens from sites with normal flora should be inoculated onto Thayer-Martin medium, also called VCN Medium.

exhibit several colony types

Gram stain and oxidase test:

Males:

Females:

Identification – Acid detected from carbohydrate oxidation; Cystine tryptic digest agar base (CTA) medium containing 1% carbohydrates and phenol red pH indicator

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In cases of sexual assault and child abuse it is extremely important to be able to correctly identify *N. gonorrhoeae*

gonococci are difficult to identify—sometimes they are so fastidious they don’t grow. Can use fluorescent antibody test

nucleic acid probe tests and nucleic acid amplification tests are available for *N. gonorrhoeae*

III. *Neisseria meningitidis*

often referred to as meningococcus or MC

may colonize nasopharynx as nonpathogens in a “carrier” state; some strains cause epidemic and acute meningitis

can grow on blood agar not on nutrient agar
growth enhanced by humidity and CO

**encapsulated**

autolyse

**Clinical Significance**

Carriers in the population (5-15%), spread person to person or by aerosols

Meningococcemia-characterized by small hemorrhagic skin lesions (petechiae) meningitis

virulence is related to capsular polysaccharide serogroup (13 serogroups)

from bloodstream may get meningococcal arthritis, osteomyelitis, and pericarditis

**Specimen Collection**

Collect cerebrospinal fluid (CSF) and blood, swab skin lesions and nasopharynx

**Culture**

Culture and incubation conditions are those described for the gonococcus.

Gram stain and oxidase test

Identification – acid detected from carbohydrate oxidation

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Also direct antigen test for capsular polysaccharides

**IV. Moraxella catarrhalis**

1-5% of adults carry this organism; children and older adults may have higher frequency

can grow on nutrient agar

must be distinguished from *Neisseria* species in the lab

**Clinical Significance**

Otitis media, sinusitis, bronchitis, pneumonia
Specimen Collection

Sputum and possibly sinus biopsy or middle ear sample

Culture

Culture and incubation conditions are similar to those described for the gonococcus

Gram stain and oxidase test

Identification – Acid detected from carbohydrate oxidation

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