

## Family: Neisseriaceae

**Phylum: Proteobacteria**

**Class: Betaproteobacteria**

**Order: Neisseriales**

**Family: Neisseriaceae**

□ **Genus I: *Neisseria***

□ **Genus II: *Kingella***

□ **Genus III: *Eikenella***

□ **Genus IV: *Simonsiella***

□ **Genus V: *Alysiella***

## *Neisseria*

### General Characteristics :

- 1- is a gram-negative, nonmotile diplococcus, Individual cocci are kidney-shaped; when the organisms occur in pairs, the flat or concave sides are adjacent.
- 2- *Neisseria gonorrhoeae* (gonococci) and *Neisseria meningitidis* (meningococci) are pathogenic for humans and typically are found associated with or inside polymorphonuclear cells.
- 3- Some neisseriae are normal inhabitants of the human respiratory tract, rarely if ever cause disease, Meningococci have polysaccharide capsules, whereas gonococci do not, and meningococci rarely have plasmids whereas most gonococci do.
- 4- The neisseriae produce **oxidase** and give positive oxidase reactions; the oxidase test is a key test for identifying them.

### **Culture and Growth Characteristics:**

In 48 hours on enriched media (eg, Mueller-Hinton, modified Thayer-Martin, "chocolate" agar), gonococci and meningococci form convex, glistening, elevated, mucoid colonies 1–5 mm in diameter. Colonies are transparent or opaque, nonpigmented, and nonhemolytic. The neisseriae grow best under aerobic conditions, but some will grow in an anaerobic environment. They have complex growth requirements. Most neisseriae ferment carbohydrates, producing acid but not gas, and their carbohydrate fermentation patterns are a means of distinguishing them. Meningococci and gonococci grow best on media containing complex organic substances such as heated blood, hemin, and animal proteins and in an atmosphere containing 5% CO<sub>2</sub> (e.g, candle jar). To avoid overgrowth by contaminants, the selective medium contains antimicrobial drugs (eg, vancomycin, colistin, amphotericin B, and trimethoprim). A modified Thayer-Martin medium with antibiotics (vancomycin, colistin, amphotericin) favors the growth of neisseriae, inhibits many other bacteria, and is used for nasopharyngeal cultures. The organisms are rapidly killed by drying, sunlight, moist heat, and many disinfectants. They produce autolytic enzymes that result in rapid swelling and lysis in vitro at 25 °C and at an alkaline pH. Gonococci ferment only glucose and differ antigenically from the other neisseriae. Gonococci usually produce smaller colonies than those of the other neisseriae.

### **Pathogenesis:**

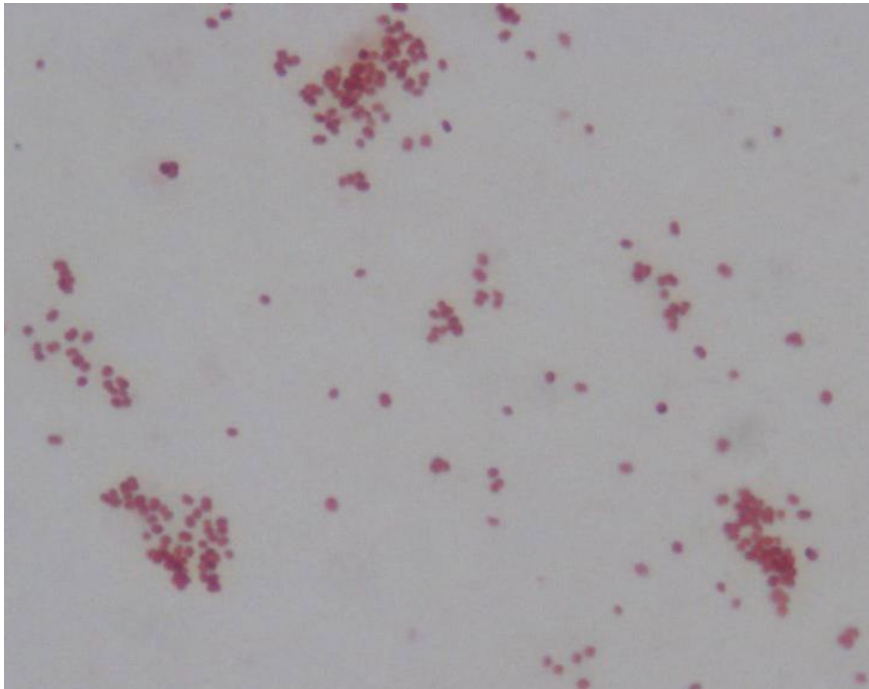
- *Neisseria meningitidis* (Meningococci) typically are found in the upper respiratory tract and cause meningitis,
- while *Neisseria gonorrhoeae* (gonococci) cause genital infections (gonorrhoeal disease, sexual transmitted disease)

**Specimens:** Pus and secretions are taken from the urethra, cervix, rectum, conjunctiva, throat, and spinal fluid for culture and smear. Blood culture is necessary in systemic illness.

### **Laboratory diagnostic tests:**

1. Gram stain (G-ve diplococci).
2. Enriched media (eg, Mueller-Hinton, modified Thayer-Martin, "chocolate" agar).
3. Oxidase test (+ve)
4. Carbohydrate fermentation.

**5. Nitrate reduction test.**



***Neisseria* gram-negative cocci**

Test	<i>Neisseria gonorrhoeae</i>	<i>Neisseria meningitidis</i>
Glucose	+	+
Maltose	-	+
Fructose	-	-
Lactose	-	-
Pigments	Greyish white	Greyish white
CO <sub>2</sub> requirement	Necessary	Necessary
Growth at 22°C	-	-
Growth at 35°C	+	+
NO <sub>3</sub> reduction	-	+