



Neisseria spp.

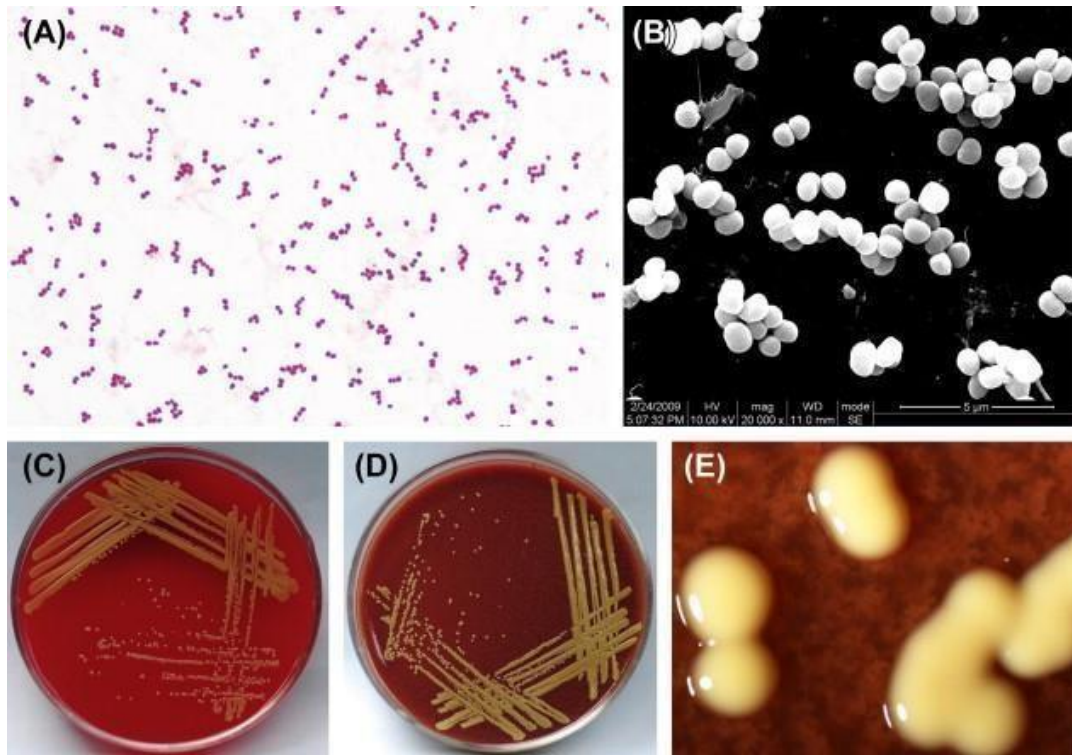
Neisseria gonorrhoeae and *Neisseria meningitidis* are both Gram Negative Bacteria. They are diplococci (“kidney” or “coffee-bean” shape), non-sporing, non-motile and oxidase positive.

Neisseria gonorrhoeae (*gonococci*) cause sexually transmitted infection gonorrhea.

Neisseria meningitidis (*meningococci*) causes meningitis. *N. meningitidis* occur intracellularly or extracellularly. *N. meningitidis* is a fastidious bacterium, dying within hours on inanimate surfaces

Diagnosis

- Species of *Neisseria* are positive for both catalase and oxidase.
- *N. gonorrhoeae* makes acid from only glucose.
- *N. meningitidis* produces acid from both glucose and maltose.
- **Polysaccharide capsule.** *N. meningitidis* has a polysaccharide capsule.
- *N. gonorrhoea* possesses no such capsule. Instead of having the usual lipopolysaccharide (LPS).
- Gram stain: Gram-negative coffee bean-shaped diplococci



Neisseria meningitidis A- gram stain. C- on blood agar D- on chocolate agar

Selected Biochemical Reactions for Identification of *N. gonorrhoeae* and *N. meningitidis* (Member of *Neisseria* spp. produce acid from carbohydrates by oxidation)

	Glu	Mal	Lac	Suc	Capsule
• <i>N. gonorrhoeae</i>	+	-	-	-	-
• <i>N. meningitidis</i>	+	+	-	-	+

Culturing

Because *N. meningitidis* grows well in a humid atmosphere, if an infection with *N. meningitidis* is suspected, laboratorians may choose to add a shallow pan of water to



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the bottom of the incubator or add a dampened paper towel to the candle jar. The moisture source should be changed regularly to prevent contamination with molds.

Inoculated culture media must be incubated at 35° - 37°c in 3% to 7% CO₂ or candle jar.

- **Chocolate blood agar (CBA)**, is a nonselective, enriched growth medium used for isolation of pathogenic bacteria. It is a blood agar plate, containing red blood cells that have been lysed by slowly heating to 80°C. Chocolate agar is used for growing fastidious respiratory bacteria, such as *Haemophilus influenzae* and *Neisseria meningitidis*.

- **Thayer-Martin agar** (or **Thayer-Martin medium**) is a Mueller-Hinton agar with 5% chocolate sheep blood and antibiotics

Vancomycin which is able to kill most Gram-positive organisms,

Colistin which is added to kill most Gram-negative organisms except *Neisseria*,

Nystatin which can kill most fungi, and

Trimethoprim which inhibits Gram-negative organisms, especially swarming *Proteus*).

It is used for culturing and primarily isolating pathogenic *Neisseria* bacteria, include both *Neisseria meningitidis* and *Neisseria gonorrhea* (**Selective media**)

N. meningitidis colonies are medium, smooth, round, moist, gray to white; encapsulated strains are mucoid.

- **Martin- Lewis medium, New York city medium** also used as a selective media



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Difference between *Neisseria gonorrhoeae* and *Neisseria meningitidis*

S.N.	Characteristics	<i>Neisseria gonorrhoeae</i>	<i>Neisseria meningitidis</i>
1	Referred as	Referred to as gonococcus.	Referred to as meningococcus.
2	Agents	<i>N. gonorrhoeae</i> is the agent of gonorrhea .	<i>N. meningitidis</i> is a major cause of cerebrospinal meningitis .
3	Colony Morphology	<i>N. gonorrhoeae</i> form smooth, round, moist, uniform grey/brown colonies with a greenish colour underneath on primary isolation medium.	<i>N. meningitidis</i> would form smooth, round, moist, uniform large grey/brown colonies with a glistening surface and entire edges.
4	Morphology	<i>N. gonorrhoea</i> is kidney shaped with apposing ends concave.	<i>N. meningitidis</i> is semicircular diplococcus with flat apposing ends.
5	Maltose Fermentation	No	Yes
6	Nitrite Reduction	<i>N. gonorrhoeae</i> doesn't reduce nitrites.	<i>N. meningitidis</i> can reduce nitrites in low concentrations.
7	Growth on Blood Agar	<i>N. gonorrhoeae</i> grow less well on blood agar than <i>N. meningitidis</i> .	<i>N. meningitidis</i> grow well on blood agar than <i>N. gonorrhoeae</i> .



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8	Capsule	No	Yes. The capsule is anti-phagocytic and is an important virulence factor.
9	Site of Infection	Primarily causing infection of the genital tract.	Colonizes the upper respiratory tract as a commensal and occasionally invades to cause systemic disease.
10	Pathogens	It is always considered a pathogen.	It is not always considered as pathogens.
11	Specimen Collection	Transport swab of endocervix, urethra, rectum, pharynx, conjunctiva, blood, joint fluid, aspirates from skin lesions.	Collect cerebrospinal fluid (CSF) and blood, swab skin lesions and nasopharynx.
12	Pathogenesis	<i>N. gonorrhoeae</i> can also cause conjunctivitis, pharyngitis, proctitis or urethritis, prostatitis, and orchitis.	Cause meningitis and other forms of meningococcal disease such as meningococemia, a life-threatening sepsis.