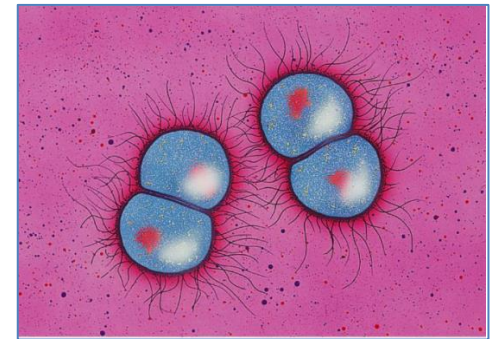


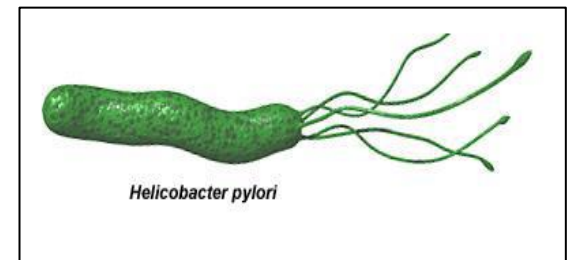
Medical Bacteriology- Lecture 12

Aerobic gram negative diplococci

Neisseria
Moraxella



Helicobacter



Neisseria

- **Gram-negative coccus**
- **diplococci (kidney or coffee bean shaped)**
- **Aerobic**
- **Oxidase positive**



Two important pathogenic *Neisseria*

- *N. gonorrhoeae* causes gonorrhea (high prevalence and low mortality)
- *N. meningitides* causes of meningitis (low prevalence & high mortality).
-
- **Fragile**
- Fastidious
- grow on **chocolate blood agar**
- selective medium is **Thayer Martin medium for primary isolation**
- **Pyogenic bacteria**
- **Occur intracellularly in the cytoplasmic of neutrophils**
- **Antigenic variation**

Comparison on features of *N .meningitides* & *N. gonorrhea*

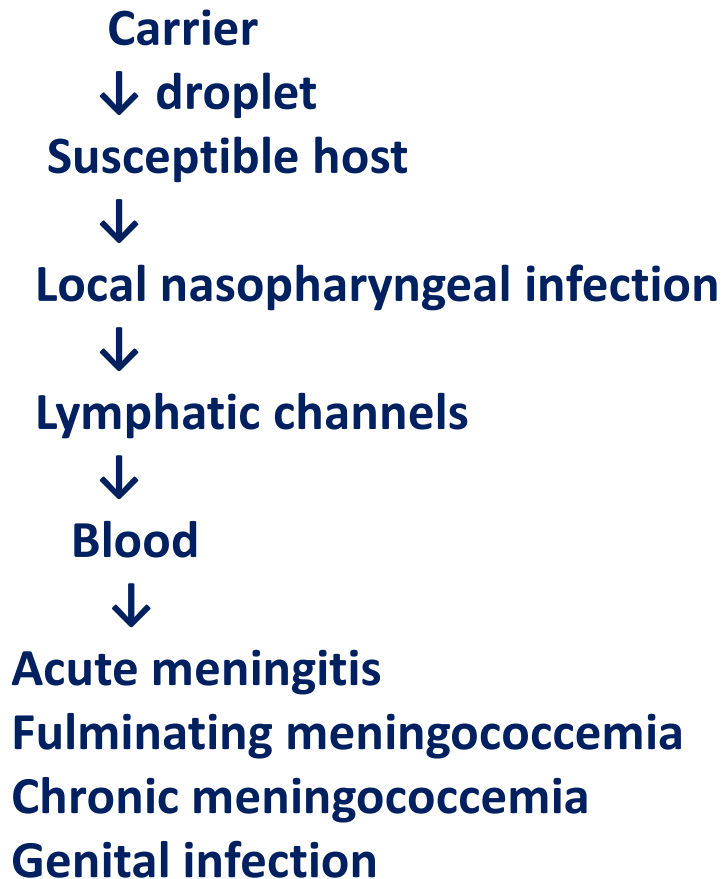
Feature	<i>N . meningitides</i>	<i>N. gonorrhea</i>
Site of infection	meninges	Urethra/cervix
Route of infection	inhalation air borne droplets	Sexual/ fetus
Disease	Meningococca/Meningococemia	Gonococcal (venereal)
Specimen of choice	Cerebrospinal fluid	Urethral/Cervical swab
Oxidase test	Positive	positive
Virulence factors	1- Capsule (major virulence factor) 2- Pili 3- endotoxin 4-leukocyte association factor 5- iron acquired system	1-leukocyte association factor 2-pili 3- endotoxin 4- iron acquired system
Normal flora	Part of normal flora Nasopharynx	Never part of normal flora Obligate parasite of human urogenital tract
Penicillinase producing	Sensitive to penicillin	Resistant to penicillin

N . meningitides

The meningococcus causes of meningitis (low prevalence & high mortality).

Meningitis: inflammation of the meninges of the brain or spinal cord.

Disease progression



Initial symptoms (fever, sore throat, headache, stiff neck, photophobia)

Metastatic lesions: Dissemination of meningococci may result in hemorrhage and necrosis in: lungs, Joints, Skin, central nervous system.

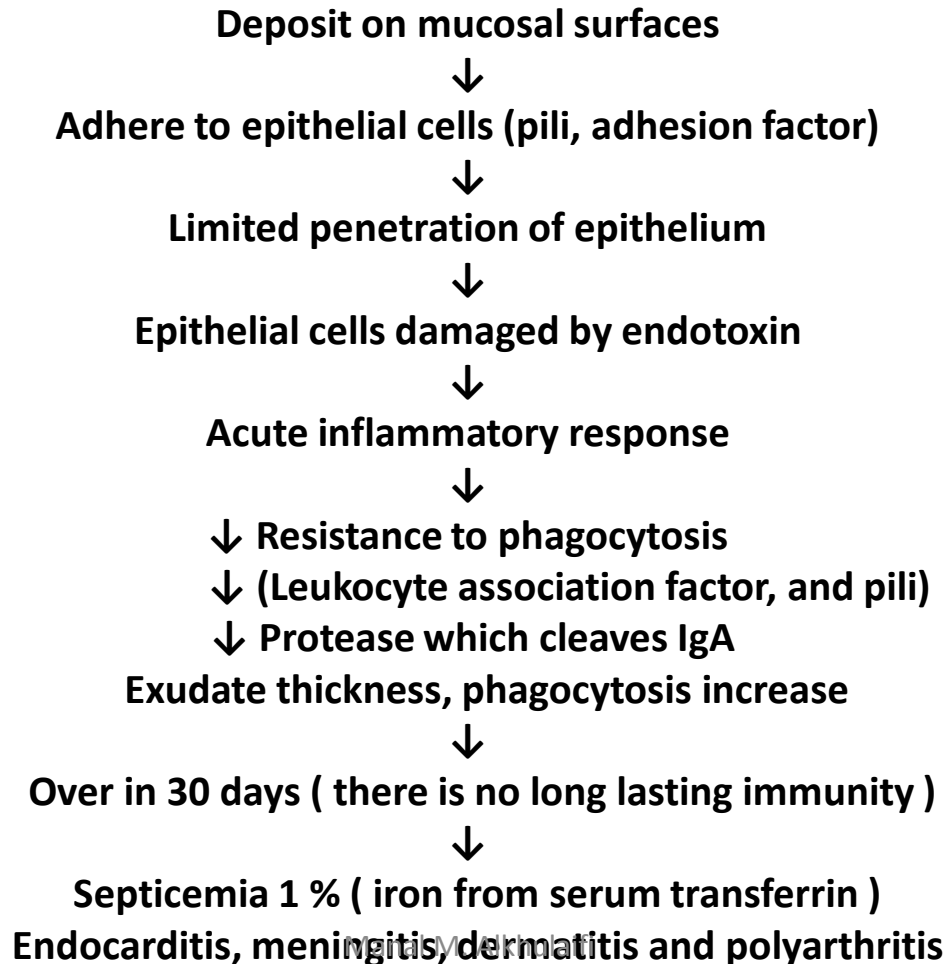
Treatment: Penicillin

prevention: Vaccination

N. gonorrhoeae

The gonococcus causes gonorrhea (high prevalence and low mortality)
microcapsule of sialylated LOS (in systemic infection)

Disease progression



Other species of *Neisseria*

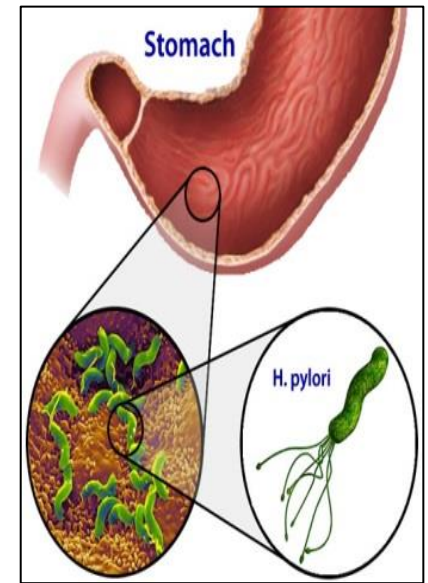
- *N. flavescens* rarely cause outbreak meningitis or septicemia.
- *N. mucosa* commonly normal flora in rhinopharynx.
- *N. subflava* normal flora of rhino/nasopharynx. Very rarely causes meningitis

Moraxella (Branhamella) catarrhalis

- **Gram negative diplococci (coffee beans)**
- **aerobic**
- **Fastidious**
- **fragile**
- **present in upper respiratory tract in healthy individuals**
- **Opportunistic in children and elderly adults**
- **causes otitis media, sinusitis, pneumonia, chronic bronchitis**
- **produce DNase**
- **Hockey puck” – colony remains intact when pushed across plate with loop**
- **Sensitive to many beta lactams antibiotics**

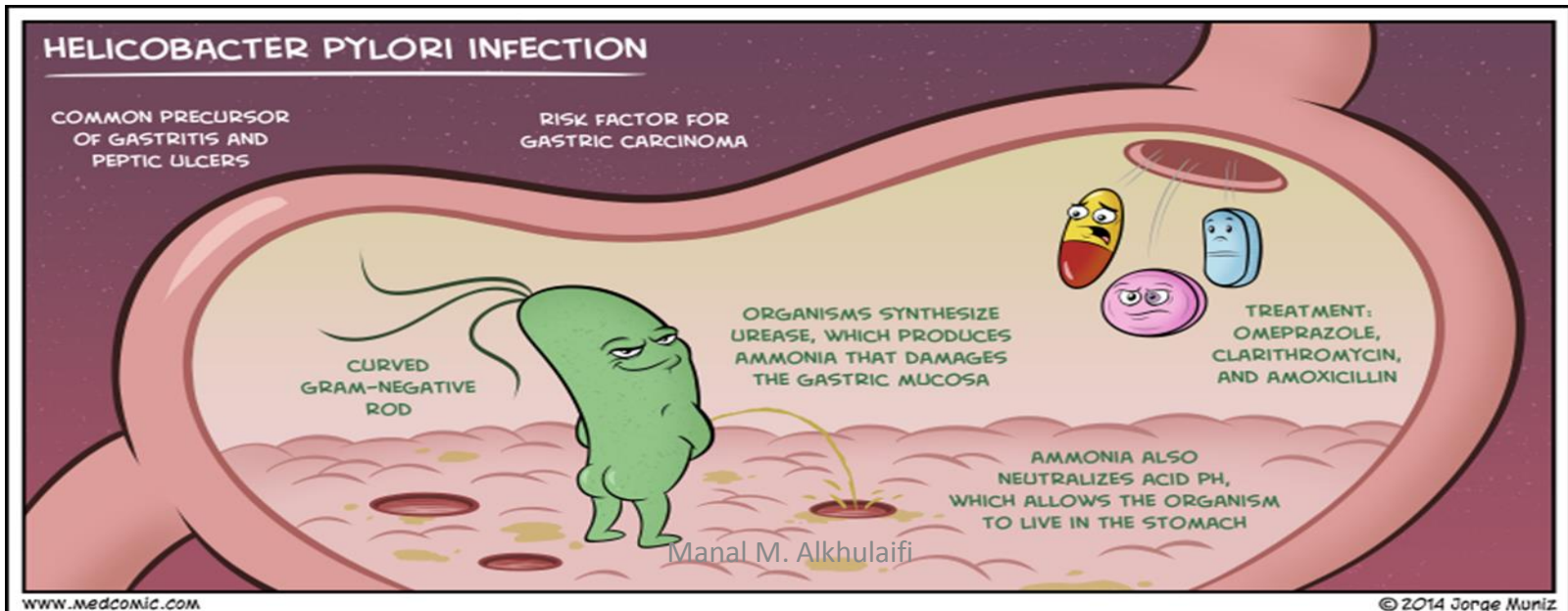
Helicobacter pylori

- **Spiral-shaped (curved) gram negative rods**
- highly motile with polar flagella
- **colonizes the stomach of hosts**
- **Route of entry:** Ingestion of contaminated food and drinks
- **Causes;** Peptic ulcer disease (gastric and duodenal ulcer)
- Gastric cancer
- **Symptoms;** abdominal pain with burning sensation, poor appetite, weight loss, vomiting, blood in stool.
- Grows on skirrow's media with vancomycin and polymycin.



H. pylori

- **Virulence factors**
- Urease (major virulence factor)
- *Urease produce ammonia that damage gastric mucosa, ammonia also neutralize acid pH; which allows the organism to live in stomach.*
- Flagella for adhesions
- Protease (*modifies gastric mucus and reduce the ability of acid through mucus*)
- toxins (*inhibit stomach acid production*)
- LPS (damage mucosal cells)



H. pylori

- **Biochemical reaction**

Urease positive (strong producer)

- **Special test:**

- urea breath test

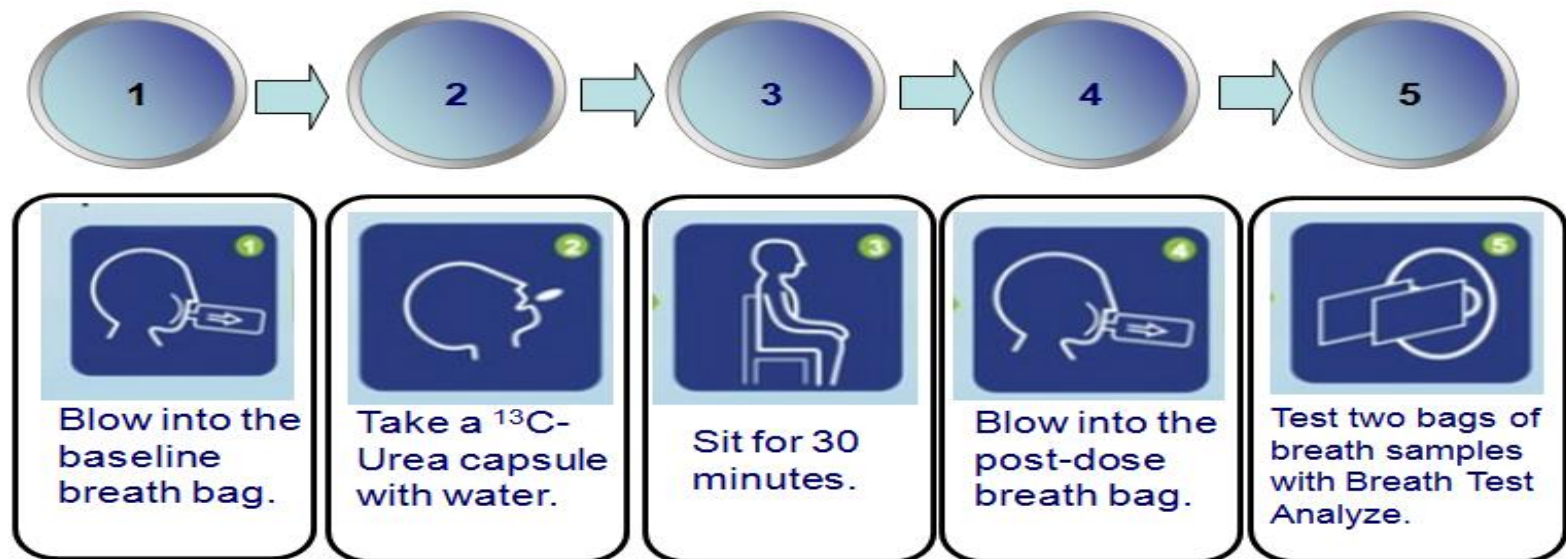
- **Serology:**

- Detection of antibodies in the serum specific for *H. pylori*
- Detection of *H. pylori* antigen in stool specimen

- **Biopsy urease test**

urea breath test

¹³C-Urea Breath Test Step:



H. pylori produce **urease**

Urease hydrolysis **ingested urea**, produce **ammonia and CO₂**

CO₂ diffuses in blood and exerted in the breath

Test utilizes by **patient takes (¹³C-urea)** to **label CO₂ gas**.

increased production of ¹³CO₂ is associated with *H. pylori* infection.