Medical Bacteriology- Lecture 13

Gram Negative Coccobacilli

Haemophilus

Bordetella

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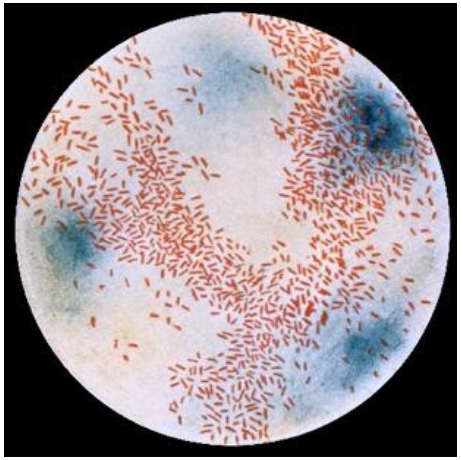
Haemophilus "loves heme"

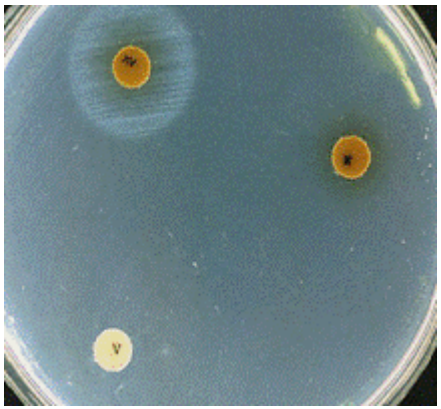


- **Small gram-negative coccobacilli**
- Present in upper respiratory tract as a normal flora
- Fastidious
- Requiring **growth factors present in blood** for isolation.
- **The growth factors are:**
- **X-factor (Heme)**
- **V-factor (NAD).**

- **Grown on chocolate blood agar under aerobic conditions or 5% CO2**

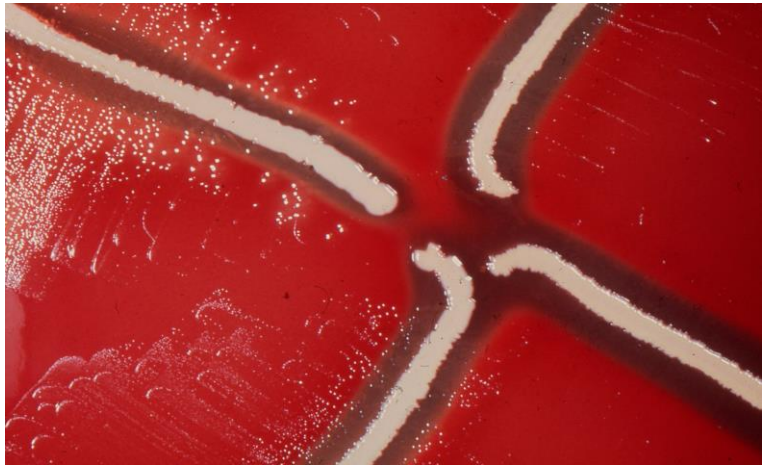
Identification of haemophilus depends upon the need for growth factors (X & V)

Require X and V	Require X	Require V
H. influenza	*H. parainfluenzae*	*H. ducreyi*



H. influenza

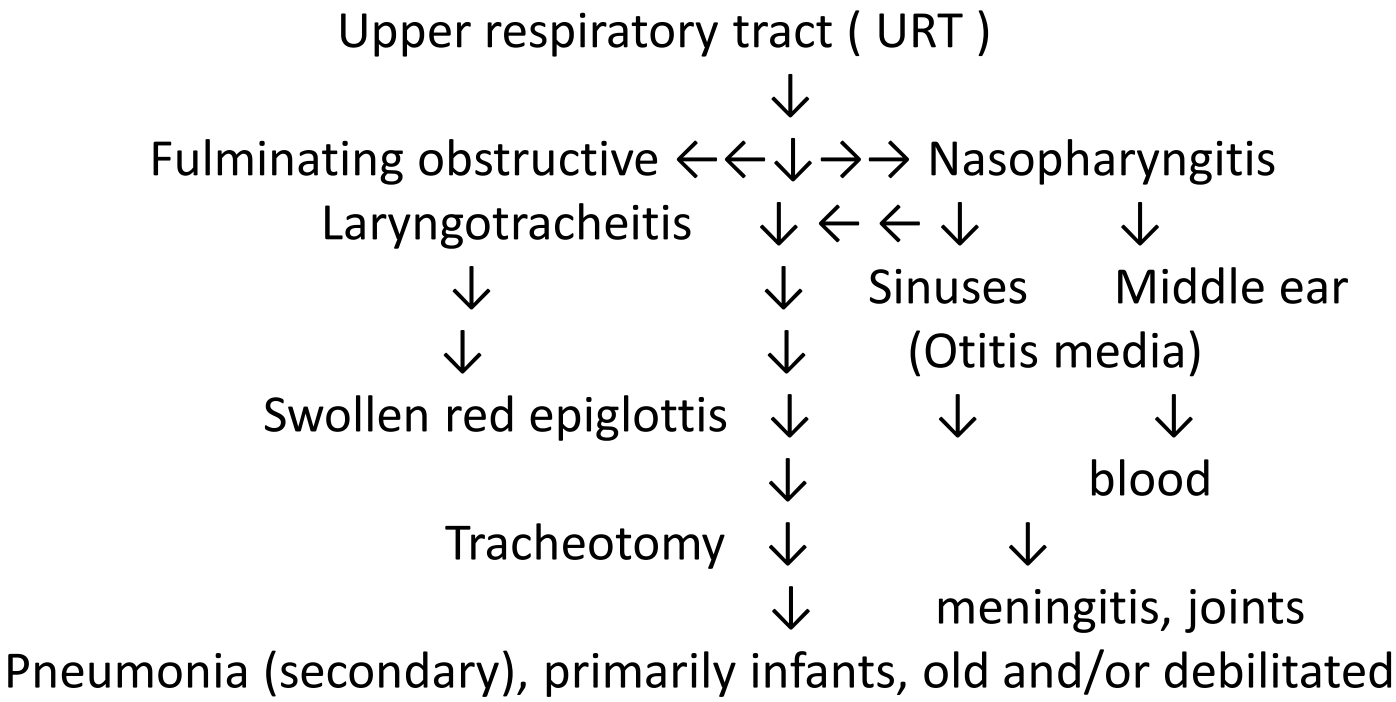
- **Extracellular pathogen**
- **It is an important secondary invader to the influenza virus**
- **causes ; Acute pyogenic meningitis- Acute epiglottis- Pneumonia- Otitis media.**
- **- *H. influenzae* most common cause of meningitides in children (5 moths to 5 yrs).**
- **mortality of untreated meningitides up to 90%**
- **Satellitium; *H. influenzae* cannot grow on blood**
- **Agar alone except around of *S. aureus***
- **susceptible to newer cephalosporin.**



- **Virulence determinants of *H. influenza* :**
  - **Polysaccharaide Ribitol capsule (most important virulence factor)**
  - **M-protein**
  - **IgA protease**
  - **Fimbriae**
  - **Endotoxins**

H. influenza

Disease progression



H. ducreyi

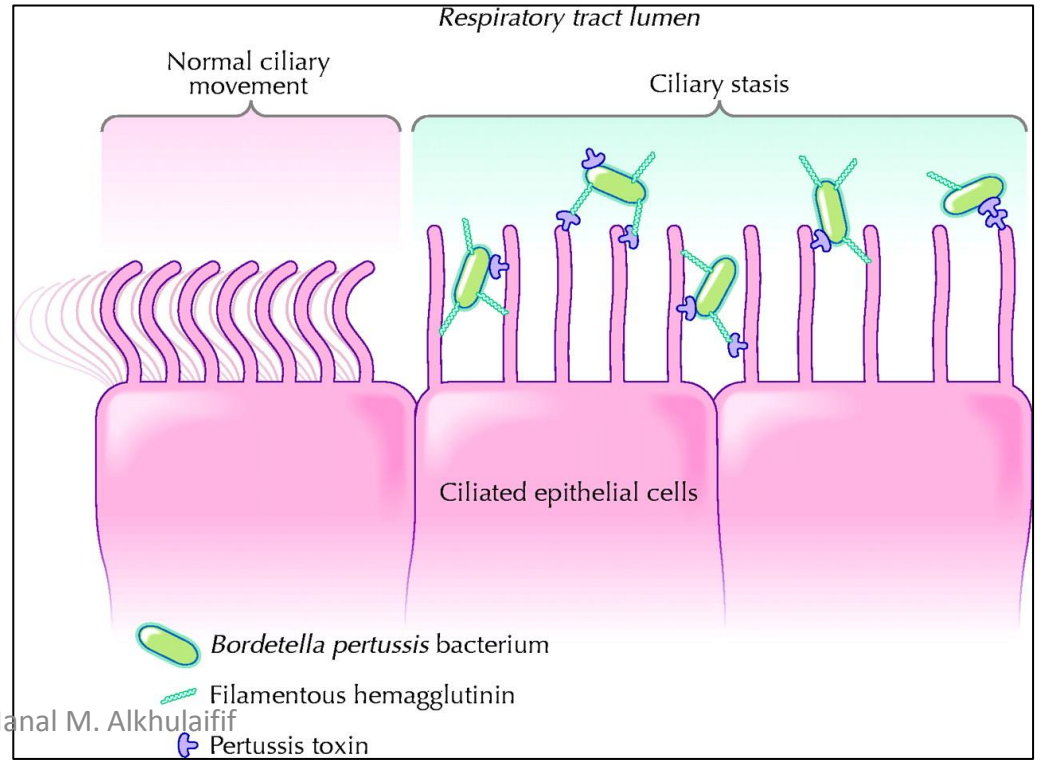
- **causes chancroid (soft chancre) (a sexually transmitted disease).**

H. aegypticus

- **causes contagious conjunctivitis**

Bordetella pertussis

- Causes Whooping cough (pertussis)
- Very small gram-negative coccobacillus that appears singly or in pairs
- Strictly aerobic
- Fastidious (blood agar and other additives)
- Colonizes the cilia of the respiratory epithelium
- Highly contagious
- Airborne disease, spread through respiratory system secretions.
- Prevention: DPT vaccines



Whooping cough (pertussis) stages

First stage (Catarrhal), colonization

- Non specific symptoms, low fever, mild cough
- "Adhesion mechanism; filamentous hemagglutinin and pertussis toxin
- Contagious.
- Antibiotics are useful

Second stage (Paroxysmal)

- Irritation, prolonged cough with inspiratory gasp (whoop).
- Mediated by varies toxins
- Antibiotics have no effect

Convalescent stage (Recovery stage)

diminished paroxysmal cough

secondary complications (pneumonia, encephalopathy)

Toxins Produced by *B. pertussis*

- **Invasive adenylate cyclase**: reduce phagocytic activity- helps the organism to initiate infection
- **Lethal toxin** : causes inflammation and local necrosis
- **Tracheal cytotoxin:** Inhibits DNA synthesis in cilia- causes fever.
- **Pertussis toxin**, **PTx:** colonization and toxic stages- causes cough
- **Unusual LPS endotoxin**
- **Neurotoxin**
- **Haemolysins**

- **Other virulence factors:**
- **Capsule**
- **Lymphocyte promoting factor**
- **Haemagglutinin factor**
- **Histamine sensitizing factor**