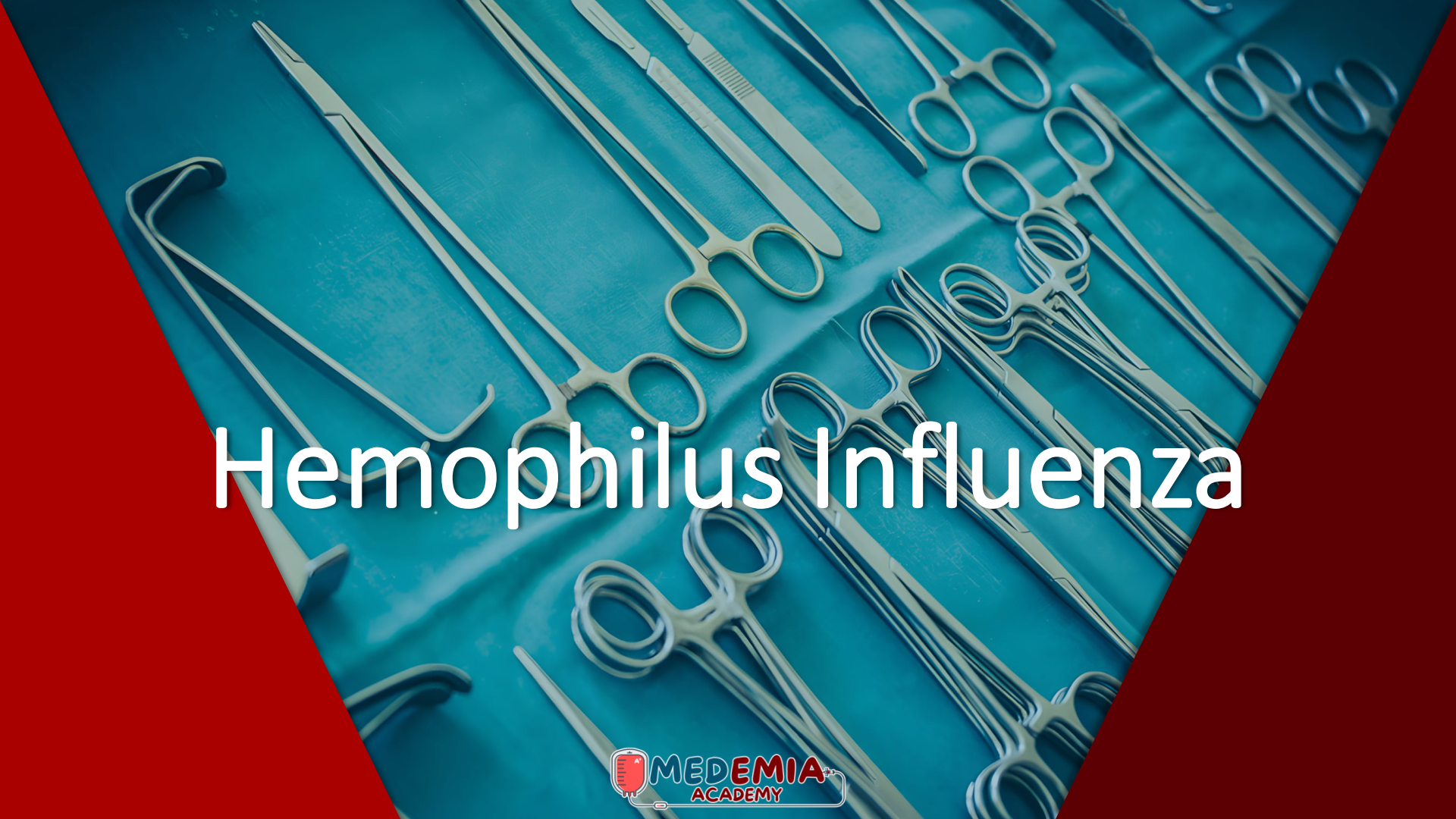


Hemophilus Influenza

MEDEMIA ACADEMY

Hemophilus Influenza

- A group of small gram-negative coccobacilli
  - requires certain growth factors present in blood for their growth
  - Haemophilus influenzae are exclusive human bacteria found on the mucous membrane of the upper respiratory tract in humans and can live on dry hard surfaces for up to 12 days
  - Most strains of H. influenzae are opportunistic pathogens
    - they usually live in their host without causing disease, but cause problems only when other factors (such as a viral infection, reduced immune function or chronically inflamed tissues, e.g. from allergies) create an opportunity

Hemophilus Influenza

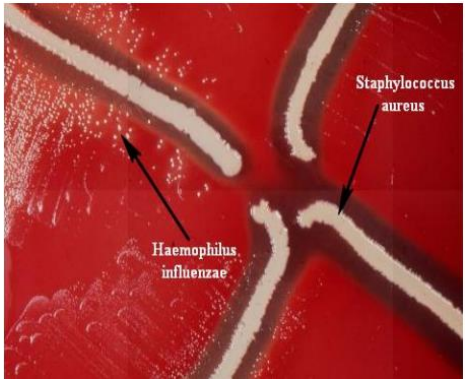
- gram-negative coccobacilli or short bacilli
- Generally aerobic but can grow also in anaerobic conditions
- Non-motile, Non-spore forming

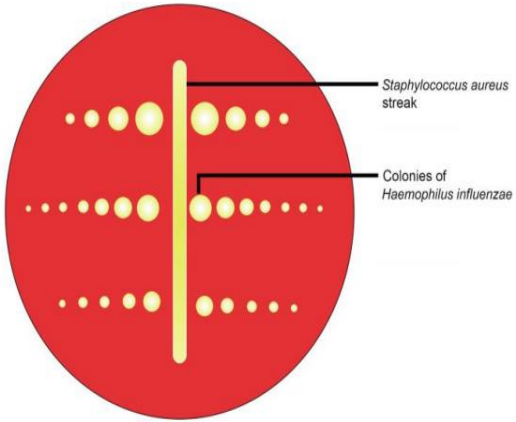
Culture and growth requirements

- Fastidious organism :
  - ❑Requires growth factors X (hemin) and V (NAD) for growth
    - Factor X : Found in Blood , It is required for the synthesis of iron containing enzymes cytochrome oxidase, peroxidase and catalase
    - Factor V : nicotinamide adenine dinucleotide (NAD) required in oxidation reduction processes in the growing bacterial cell.

The Satellitism test

- Blood agar medium provides only an X-factor, but for obtaining a V-factor, the erythrocytes present in the blood agar must be haemolyzed. H. influenzae can neither haemolyze the blood nor grow without the V-factor, so H. influenzae alone can't grow in a blood agar medium.
- Staphylococcus aureus is hemolytic, and its presence in the blood agar medium makes V-factor (NAD) available in the medium. Hence, H. influenzae can grow in the vicinity of S. aureus colonies in the blood agar medium. This phenomenon is called 'satelliting'.





Antigenic structure and virulence factors

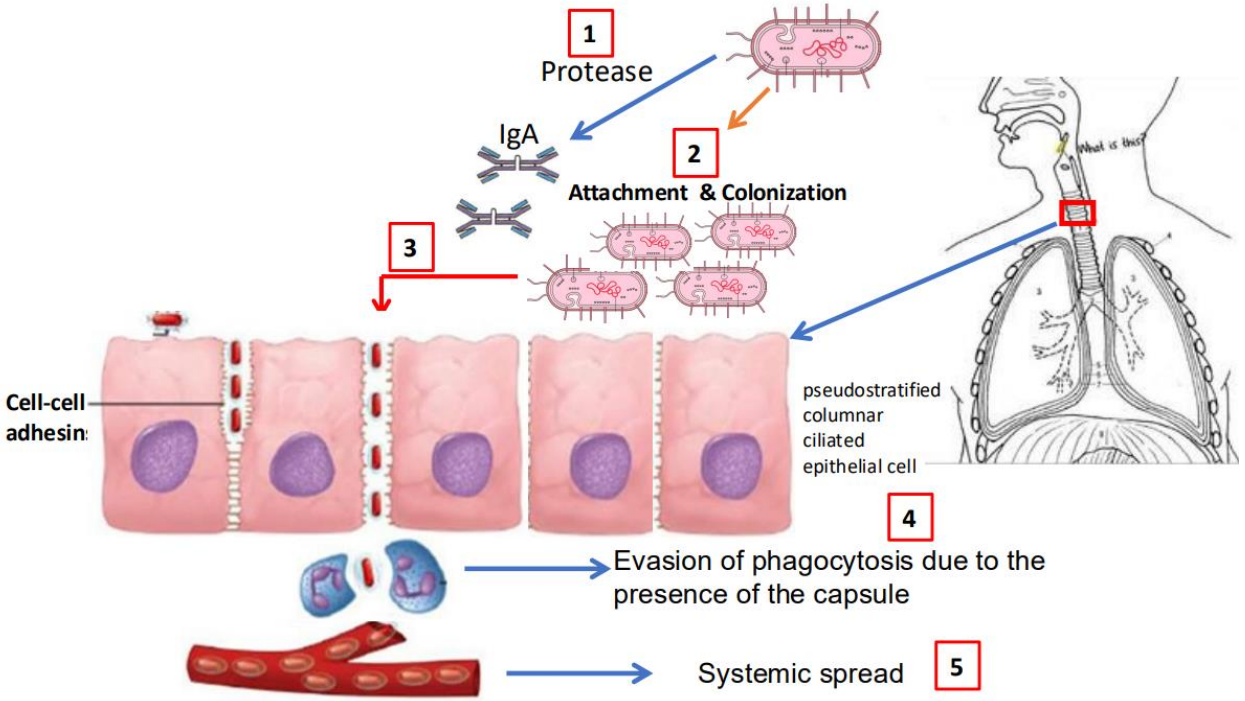
1. Polysaccharide capsule :
   - The Haemophilus influenzae is divided into :
     A. **Typable** (encapsulated): isolates have capsular polysaccharides1
     - Are divided into six serotypes, designated **a to f**, based on the capsular polysaccharide antigen called polyribitol phosphate (PRP).

     B. **Nontypable** (NTHi) (nonencapsulated): isolates lacking capsular polysaccharides and can cause noninvasive diseases
2. Endotoxins
3. Pilli
4. IgA proteases
5. Outer membrane proteins

Diseases caused by H.influenzae

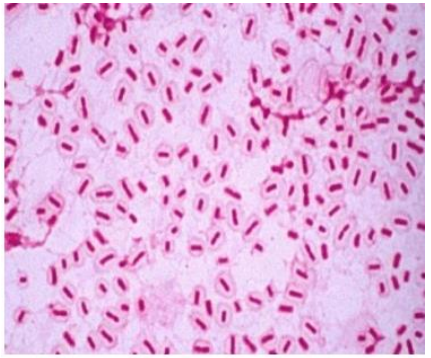
- Meningitis
- Pneumonia
- Bronchitis
- Otitis Media
- Epiglottitis
- Cellulitis
- Septic arthrits

Pathogenesis of Invasive disease



Laboratory Diagnosis

- **Specimen**: CSF, blood, sputum and pus
- **Smear**: Gram stained, immunofluorescence and capsule swelling reaction (Quellung reaction)
- **Culture**: Nutrient or Chocolate blood agar with factors x and V (IsoVitalex enriched chocolate agar). Addition of 10% CO_2 enhances the growth
- **Capsular polysaccharide antigen detection** by latex agglutination in CSF
- **PCR**



Prophylaxis

❖• Hib diseases can be prevented by administration of Hib conjugate vaccine (capsular polysaccharide conjugated to carrier protein) which may be one of the following :

- PRP-D: the conjugated protein is Diphtheria toxoid
- HbOC: the conjugated protein is Corynebacterium diphtheriae protein
- PRP-OMP: the conjugated protein is outer membrane protein of Niesseria meningitidis
- PRP-T: the conjugated protein is tetanus toxoid

The vaccine is given at 2,4,6 months and at 12-15 month

Treatment

- Untreated invasive infection: Mortality rate of 90%. Start empirically until you get sensitivity results
- Skilled medical and nursing care is also vital in the management of acute epiglottitis, where maintenance of a patent airway is crucial.
- Cephalosporines as cefotaxime or ceftriaxone

cases

❖**Case 1 :** A 2 years old child presented to the Emergency department with two days history of being unwell with Pyrexia ,Dysphagia, drooling of saliva, and Difficulty in speaking

❖**Case 2 :** A one-year-old infant brought to the emergency room suffering from seizures, projectile vomiting, high fever after 2 days of having cough and nasal congestion