

This is a group of small G negative pleomorphic bacteria that require enrichment media. *H. influenzae* type b is an important human pathogen. *H. ducreyi* is a sexually transmitted pathogen causing **chancroid** (soft chancre). Other members are among the normal flora of mucous membrane.

### ***H. influenzae***

*H. influenzae* is found on the mucous membrane of URT in human. It is an important cause of meningitis in children & RTIs in children & adults.

#### **Morphology & identification:**

In specimens from acute infection, the organism is short coccobacilli (usually in pairs or short chain). In culture the morphology depend on the age & type of medium. The organism in young culture (6-18 hrs) on enrichment media has a definite capsule. Capsular swelling test is used for typing of *H. influenzae* with specific antisera.

**Culture:** On brain-heart infusion agar with blood, small, round convex colonies develop in 24 hrs. Colonies on chocolate agar takes 36-48 hrs. The presence of X & V factors in the medium enhances the growth. *H. influenzae* is non-hemolytic. It grow much larger around colonies of staphylococci (**Satellite phenomenon**

## **Hemophilus group *H. influenzae***



## Antigenic structure:

Encapsulated *H. influenzae* contain capsular polysaccharide one of six types (a-f). Most *H. influenzae* in the normal flora of the URT are not encapsulated.

## Pathogenesis:

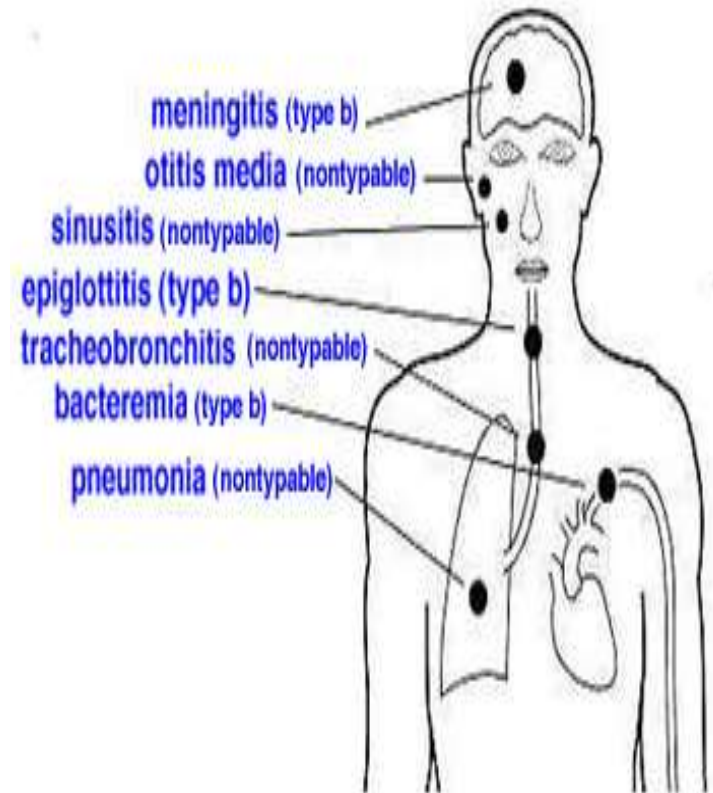
*H. influenzae* produce no toxin. The polyribose phosphate capsule of *H. influenzae* type b (Hib) is the major virulence factor. The capsular is antiphagocytic in the absence of specific anticapsular antibody.

The carrier rate in the URT for Hib is 2-4%. The carrier rate for nontypeable *H. influenzae* is 50-80%. Hib causes meningitis, pneumonia, & empyema, epiglottitis, cellulitis & septic arthritis. Nontypeable *H. influenzae* tend to cause chronic bronchitis, otitis media, sinusitis & conjunctivitis following immune suppression.

The blood of about 75% of children aged 3-5 years have anti-Hib antibodies, therefore, clinical infection in such age is less common.

## *H. influenzae*

### *Haemophilus influenzae* infections



## Clinical findings:

Hib enter through the RT. There may be a local extension involving the sinuses & middle ear. Hib & pneumococci are the most common etiological agents of bacterial otitis media & acute sinusitis. Hib may reach the bloodstream causing meningitis or less commonly septic arthritis. Hi is the most common cause of meningitis in children 5 months to 5 years of age.

## Laboratory diagnosis:

1. Specimens: Nasopharyngeal swabs, pus, sputum, CSF for smear & culture.
2. Direct identification: The organism may be directly identified in the clinical specimens by immunofluorescent materials mixed with anti-Hi antisera, or through capsular swelling test. Hi also can be directly detected in CSF by specific antisera.
3. Culture: On enrichment media containing X & V factors.

## Immunity:

Infants > 3 months may have serum antibodies transmitted from the mother, during this period HI infection is rare, but subsequently these Abs are lost. Children may often acquire Hi infections which are usually asymptomatic, but may be in the form of respiratory disease or meningitis. By age of 3-5 years many children have naturally acquired Abs.

## *H. influenzae*



Immunization of children with Hib conjugate vaccine induce the same Abs. The mortality rate in untreated Hi meningitis may be upto 90%. More than 25% of Hib produce **B-lactamase** (resistant to penicillin group of antibiotics). Furthermore high percentage of Hi have the ability to form **biofilms** in *vivo* & *in vitro*.

### **Epidemiology:**

Hib is transmitted from person to person by respiratory route. Children aged 2 months or older can be immunized by Hib conjugate vaccine. The widespread use of this vaccine has greatly reduced the incidence of Hib meningitis in children & also reduce the carrier rate for Hib.

### ***H. Duceyri***

It causes chancroid (soft chancre) which is a sexually transmitted disease. Chancroid consist of a ragged ulcer on the genitalia with marked swelling & tenderness. The regional LNs are enlarged & painful. The disease must be differentiated from syphilis, Herpes simplex virus type 2 infection & lymphogranuloma venereum.

## ***H. Duceyri***

Most Common Types of Severe *Haemophilus influenzae* Disease, 1999 - 2008

