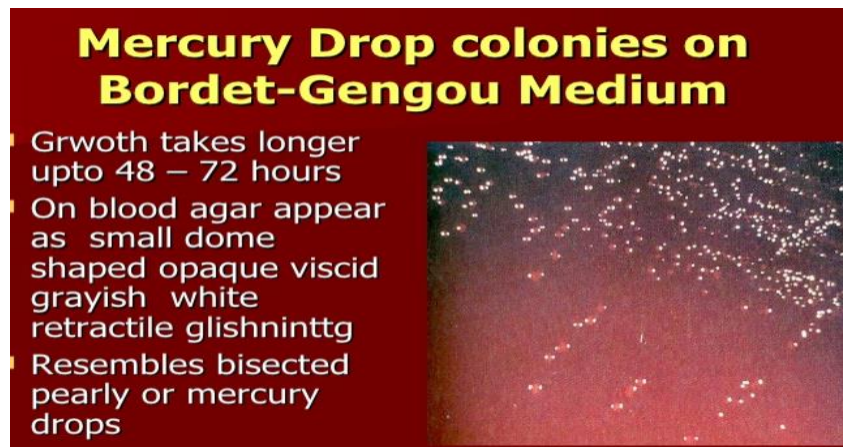


Bordetella pertussis

An infant born in a rural area is brought to the Emergency ward with severe bouts of coughing throughout the day. During the visit, the baby appears cyanotic and suffers an attack of many coughs on a single expiration followed by a deep inspiration. The coughs produce copious greenish phlegm. Further history reveals that the infant has not been vaccinated. The physician fears that erythromycin therapy will not be helpful at this stage of the illness. Following results were obtained culturing is sputum:



1. Name the disease and the organism causing it
2. Is this disease contagious? What is the mode of transmission of the disease?
3. What are the virulence factors?
4. What is the pathogenesis of the disease?
5. What are the three clinical stages of the disease?
6. The characteristic sound made by patients suffering from infection with this bacterium occurs during what phase of the infection?
7. Discuss the laboratory diagnosis.
8. What is the treatment and prevention of the disease?

Answers:

1. The disease is called pertussis or whooping cough, and it is caused by the bacterium *Bordetella pertussis*.

2. Yes, pertussis is highly contagious. It spreads from person to person through droplets produced during coughing or sneezing.
3. The virulence factors include pertussis toxin (PT), filamentous hemagglutinin (FHA), pertactin (PRN), and fimbriae (FIM). These contribute to bacterial adhesion, evasion of the host immune response, and damage to host tissues.
4. After inhalation, *B. pertussis* attaches to the cilia of the respiratory epithelial cells, produces toxins that paralyze the cilia, and cause inflammation of the respiratory tract. This results in coughing and other symptoms associated with the disease.
5. The three clinical stages are:
 - Catarrhal stage: initial stage characterized by mild cough, runny nose, and low fever.
 - Paroxysmal stage: severe, rapid bouts of coughing, followed by a deep high-pitched intake of breath that sounds like a "whoop."
 - Convalescent stage: recovery phase, the cough becomes less severe and less frequent.
6. The characteristic "whooping" sound occurs during the paroxysmal stage of the infection.
7. Laboratory diagnosis of pertussis is typically achieved through isolation and identification of *B. pertussis* from a nasopharyngeal specimen, or increasingly, through PCR testing. Serological testing can also be used, especially in later stages of the disease.
8. Treatment usually involves antibiotics like azithromycin, clarithromycin, or erythromycin to eradicate the bacteria and reduce the spread of the disease. However, antibiotics are most effective when given early in the course of the disease. Prevention of pertussis is primarily through vaccination, specifically the DTaP or Tdap vaccines (Diphtheria, Tetanus, and acellular Pertussis) given in multiple doses during infancy and childhood.