

Infectious diseases and the immune system

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Whooping Cough Whooping Cough Role of the Immune System and the pathogenesis of whooping cough

The immune system develops antibodies to the disease-causing bacteria after the vaccine is introduced into the body. The inactivated *Bordetella pertussis* bacteria react by diminishing chances for evolution of the disease. Pathogenesis includes the presence of three major virulence factors namely toxins, hemolysins, and adhesins. The pertussis toxin causes the disruption of the phagocytic activity in the respiratory system. Pertactin is the virulence factor that enhances the adhesion capabilities to tracheal epithelial cells. Filamentous hemagglutinin is also a factor responsible for the bacterium's adherence to the ciliated cells. Tracheal cytotoxin then leads to the paralysis of the ciliated cells. Finally, the adenylate cyclase initiates the infection and causes reduction of the phagocytic activity.

Non-specific immunity: It includes a nonantigen-specific method of immunization that ensures immediate maximal response by the body. The vaccine provides the antigen to initiate antibodies against the bacteria.

Specific immunity: The immunity includes a response that is antigen-dependent whereby the body produces antibodies against the specific bacteria.

2. Etiology (cause) of whooping cough (genus and species)

The *Bordetella pertussis*, a bacterium that grows at 35-37 degrees, is the determined cause of whooping cough. (Genus: *Bordetella*, species: *pertussis*)

3. Scientific name for whooping cough

The scientific name for whooping cough is *pertussis*

4. Pathogenesis Definition:

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It is the mode of way of a disease's development in an organism

5. Whooping cough Description by its signs and symptoms, diagnosis, and treatment

Symptoms include low fever, sneezing, slight cough, and later whooping. Diagnosis can be through physical and visual examination of the patient accompanied by a laboratory test to determine the bacteria. Treatment includes the use of antibiotics.

6. Cellular and acellular vaccination

Acellular vaccination includes one where there is the use of inactivated bacteria and one or less concentrated bacterial components. The Whole-cell vaccination is a mode of vaccination where the vaccines are administered with diphtheria and tetanus (DPT) and are more effective.

7. Pearl Kendrick (her link to whooping cough-personal and professional)

Pearl was a scientist from Wheaton, Illinois, who has suffered from whooping cough and recovered. The respiratory illness had surfaced in different continents leading to various deaths due to its way of transmission. After surviving from the killer disease, she engaged in research and other scientific activities to ensure that there was a cure to prevent more deaths. Other French scientists namely Jules Border and Octave Genguo motivated her work.

She used her experience on the disease's symptoms to understand how the bacteria reacted during the incubation period. Consequently, she teamed up with other scientist and begun working towards establishing an antibiotic for the disease. The antibiotics were attained through laboratory tests on the bacteria's trends.

8. Current statistics on whooping cough in the United States

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Less than one year: 120 cases per 100, 000

1-6 years: 20 cases per 100, 000

7-10 years: 60 incidences per 100, 000

11-19 years: 25 incidences per 100, 000

More than 20 years: 5 cases per 100, 000 Source (Cdc. gov, 2015)

9. Recommended vaccination schedules

Children should get five doses of DTaP, after which they one dose is administered at the ages of 2, 4, 6, and 15 through 18 months and 4 through 6 years (Cdc. gov, 2015).

10. Evaluation

Pros for following a vaccination schedule.

The process reduces the baby's chances of contracting the disease due to the pre-determined vaccination schedule. Additionally, it saves on costs because the prevention of a disease is substantially cheaper than its treatment.

Cons of following a vaccination schedule.

There are side effects in some children due to variations in health including allergic reactions. The vaccination may fail due to body compositions and mutation of different viruses and bacteria; hence, lead to fatal results while the parent is not aware of the changes.

Reference

Cdc. gov,. (2015). Vaccines: VPD-VAC/Pertussis/main page. Retrieved 10 June 2015, from <http://www.cdc.gov/vaccines/vpd-vac/pertussis/>