Abstract:

Bordetella pertussis is a strictly human pathogen colonizing the upper respiratory tract, causing a respiratory disease known as whooping cough or pertussis. The introduction of whole-cell vaccines and acellular vaccines, resulted in a significant reduction in the incidence of disease and reduce the fatalities associated with infection. However, epidemiological data show a significant increase in the incidence of the disease in recent decades. The increasing incidence is mainly attributed to the transition from the whole-cell vaccine to an acellular vaccine. Based on research from recent years has shown that acellular vaccines have many drawbacks, and it is therefore necessary to change the vaccination strategy. One possible solution to the situation is the development of a new generation of whole-cell vaccines with reduced reactogenicity.

The new whole-cell vaccine was prepared by a genetically modified *B. pertussis* strain. *B. pertussis* was modified using allelic exchange to develop strain encoding enzymatically inactive pertussis toxin, modified lipid A and lacking dermonecrotic toxin. This combination of genetic modifications in mice led to a decrease in reactogenicity test vaccine in vivo. In case of intranasal infection whole-cell vaccine containing genetically modified strain is providing the same protection as vaccine containing *B. pertussis* wild type strain. It was also observed effect of cyclodextrin on the toxicity of bacterial suspension. Removal of the cyclodextrin from the culture medium resulted in decreased reactogenicity to experimental whole cell vaccine.

Key words:

Bordetella pertussis, dermonecrotic toxin, lipid A, lipooligosaccharide, pertussis toxin, vaccination, whooping cough