



UNIVERSITY OF GEORGIA

Center for Vaccines And Immunology

Vaccine to Prevent Transmission and Colonization of *Bordetella* (Whooping Cough) in Humans and Animals

INVENTION: University of Georgia investigators have developed a vaccine to prevent transmission and colonization of *Bordetella* in humans and animals.

Despite an extensive vaccination regimen and continued high levels of vaccine coverage, the prevalence of pertussis infection has drastically increased throughout the industrial world in recent years, leading to epidemics in the United States and other countries. In fact, in 2015 the National Institute for Allergy and Infectious Diseases added *Bordetella pertussis* to the list of priority Emerging Infectious Diseases/Pathogens due to both increasing rates of whooping cough in adults and the significant increase in infant deaths. The cause of this re-emergence is not well understood. However, it is important to note that limiting disease in adolescents and adults will limit disease in infants for which the disease is more likely to be fatal. Current whooping cough vaccines are on the market and are generally regarded as moderately effective but not long-lasting. *Bordetella* is also an important pathogen for animals as it is the causative agent of kennel cough in dogs and can also infect cats and other pets allowing transmission from pets and farming animals to their owners.

APPLICATIONS:

- Preventative vaccine for Whooping Cough in humans
- Long-term vaccine for kennel cough in dogs, Atrophic Rhinitis in pigs, bronchopneumonia in cats and other respiratory diseases in several mammals
- Pan-vaccine for all *Bordetella* species.

ADVANTAGES:

- Generates a more robust immune response than current vaccine
- Provides sterilizing immunity that completely prevents infection, allowing the complete eradication of the organism within a population, a herd or a kennel
- Protects against diverse *Bordetella* spp.

STAGE OF DEVELOPMENT: pre-clinical animal studies ongoing

BACKGROUND: A whole cell pertussis vaccine was introduced in the mid-20th century to protect against whooping cough, but due to undesirable secondary effects, an acellular vaccine replaced in in the mid-1990's. It has been shown that the current acellular vaccine protects against symptoms of pertussis, but not colonization or transmission, creating a great need for a more efficient vaccine with long-lasting sterilizing immunity that prevents both colonization and transmission. There are vaccines available for veterinary settings that provide limited protection against *B. bronchiseptica*, and those vaccines include vaccines for dogs and pigs. However, none of those robustly protect and all require yearly boost. Importantly, all these vaccines fail to provide sterilizing immunity to confer herd immunity; at best they reduce symptoms, but all allow infections that can spread to others, allowing the pathogens to continue to circulate.

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