

Wake Forest University Health Sciences

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Featured Technology

Acellular animal vaccine for *Bordetella bronchiseptica* mediated respiratory infections

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Background:

The bacterium *Bordetella bronchiseptica* causes respiratory diseases in various animals, such as swine, dogs, cats, sheep, guinea pigs, rabbits, mice, and rats. In year 2000, respiratory disease due to *B. bronchiseptica* was the greatest cause of mortality in swine, and the annual economic impact of *B. bronchiseptica* mediated porcine respiratory disease in the U.S. alone is estimated to be at least \$57M. *B. bronchiseptica* is also capable of infecting immunocompromised humans, e.g. AIDS and cystic fibrosis patients.

Commercially available *B. bronchiseptica* vaccines include live, attenuated, heat-killed, or genetically modified bacteria, all of which are associated with problems such as persistence of vaccine strain in the host, retention of some of the virulence characteristics and poor induction of antibody response and protective immunity. In contrast, the acellular vaccine developed at Wake Forest University School of Medicine can efficiently elicit protective immune responses without the risk of subsequent infection by the vaccine strain and disease.

Invention:

Researchers at Wake Forest University School of Medicine have developed, manufactured and tested an acellular *B. bronchiseptica* vaccine comprised of the immunogenic BcfA (*Bordetella* colonization factor A) protein, **which with remarkable efficacy establishes protective immunity *in vivo* against *Bordetella* infections. Proof of concept has been established** in an *in vivo* mouse model, and both passive and active immunization have been shown to induce complete protection from bordetellosis, greatly decreased bacterial burden, high antibody titers and markedly reduced pulmonary injury.

Highlights:

- Vaccine does not contain whole-cell bacteria, which eliminates the risk of infection by vaccine strain in the host and subsequent disease or zoonosis.
- Vaccine is cost-effectively produced by using recombinant DNA techniques.
- Vaccine is highly potent and targets multiple animal species of *B. bronchiseptica* strains.
- BcfA protein can be incorporated into a multivalent vaccine, which gives prospects of obtaining greater efficacy and broader protection.

Additional Information:

Patent pending: PCT/US2008/012051

Sukumar N. et al. *Infection and Immunity*, 2009, 77(2), p 885-895

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