

# **Purified bacterial extract sprayed into lungs ramps up innate immune system**

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A purified extract prepared from a common microbe and delivered to the lungs of laboratory mice in a spray set off a healthy immune response and provided powerful protection against all four major classes of pathogens including those responsible for anthrax and bubonic plague, according to a presentation at the American Society for Cell Biology's 47th Annual Meeting.

In addition, when the researchers exposed another group of mice to an aerosol of live *Streptococcus pneumoniae*, the only animals that survived were the ones that had been pre-treated with the spray. A total of 83 percent of these mice survived. None of the untreated animals lived.

The researchers at the M.D. Anderson Cancer Center in Houston developed the spray from a purified extract of the common coccobacillus named *Haemophilus influenzae*, the cause of ear and sinus infections in human children.

Their "aerosolized lung innate immune stimulant," as the scientists have named the spray treatment, could benefit immune-compromised patients with cancer, HIV or other diseases as well as emergency workers and the general public facing uncommon threats like an aerosolized bioterror attack or a spreading respiratory epidemic.

According to Brenton Scott who with his postdoctoral advisor, Burton Dickey, developed the spray, the treatment works best if administered four to 24 hours before exposure. Nearly all mice survived when treated

before exposure to lethal doses of anthrax, influenza, and the dangerous mold, *Aspergillus*. But, the treatment also has some benefit when given after exposure. Effectiveness declines over time but seems to last up to five days after a single dose.

The researchers report that protection by stimulant is associated with rapid pathogen killing in the airways, does not depend on recruitment of other immune defense cells such as neutrophils, and correlates with increased levels of antimicrobial polypeptides in the lung lining fluid. The host response is localized to the airways, and safety studies indicate that the treatment causes minimal side effects, even with repeated doses.

Preclinical testing is being completed, and clinical trials are being designed.

In tests on mice, the stimulant was protective against all four major classes of pathogens (Gram-positive and Gram-negative bacteria, fungi, and viruses), including the Class A bioterror agents *Bacillus anthracis* (anthrax), *F. tularensis* (tularemia) and *Yersinia pestis* (bubonic plague).

Source: American Society for Cell Biology

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