

Chronicle

Brenton Scott, a researcher at the University of Texas M.D. Anderson Cancer Center, led the study into the effect of aerosolized bacteria on pathogens in the lungs.

KAREN WARREN: CHRONICLE



Dec. 4, 2007, 7:46AM

Lab finds fast way to boost immunity

M.D. Anderson says new aerosol may change how we fight diseases

By ERIC BERGER

Copyright 2007 Houston Chronicle

The tiny mice didn't realize that the gas they were inhaling would save their lives as they scampered around a plastic container in a Houston laboratory.

In a few hours, these experimental mice — along with others who hadn't had a turn in the container — would be exposed to pneumonia. All of the untreated mice would die. The ones exposed to the aerosol would survive.

Conducted by a team of scientists at The University of Texas M.D. Anderson Cancer Center, the experiments demonstrated a concept that could revolutionize the way public health planners approach outbreaks of infectious disease.

The aerosol, which contains a purified extract of a common bacterium, stimulates the lungs to vigorously reject pathogens.

Unlike vaccines, which must typically be given a week or more before exposure, the new aerosol is highly effective against a host of pathogens, including anthrax, influenza and even the plague, if given just a few hours before infection. The new drug even has some benefit if given after exposure.

"Our idea was: Why not strengthen the immune system in the body's lungs?" said Dr. Burton Dickey, chair of pulmonary medicine at M.D. Anderson and a leader of the research.

"We decided to try and kill all the pathogens in the lungs, the body's first line of defense, before they penetrate into the rest of the body," he said. "We've found that we can very dramatically ramp up the defenses of the lungs."

The scientists succeeded by seeking to boost a neglected aspect of the immune system.

The new aerosol targets the innate immune system, different from the adaptive immune system with which most people are familiar. Vaccines, which teach the body to build up antibodies, recognize and destroy invaders, target the adaptive immune system. Only higher vertebrates, such as birds and mammals, have this component of the immune system.

Novel approach

More common to all life is the innate immune system, which doesn't recognize specific invaders, but rather generally recognizes and reacts to all pathogens in a generic way.

The approach by M.D. Anderson scientists to the pathogens is novel in that it seeks to bolster the innate rather than the adaptive immune system. They presented their study results Monday at the annual meeting of the American Society of Cell Biology in Washington, D.C.

"The aerosol stimulates an innate immune system response in the lung lining that kills the invading pathogens virtually on contact," said Brenton Scott, a researcher in Dickey's lab who led the study.

In their experiments, the scientists let mice breathe the special, aerosolized bacteria for 20 minutes. Then, within four to 24 hours, the mice were exposed to various pathogens. After that time, 100 percent of mice exposed to Staph A survived, 90 percent exposed to influenza A survived, 60 percent exposed to the plague survived and 30 percent exposed to another potential bioterror agent, tularemia, survived.

Unlike a vaccine, the aerosol provides protection only for a few days.

Dr. David Corry, an assistant professor at Baylor College of Medicine who also has begun working on stimulating the innate immune system to ward off pathogens, said the field is full of potential.

"Until recently, no one has thought much about stimulating the innate immune system, partly because while it's quick on, it's also quick off," Corry said. "But this new research shows you can stimulate the innate immune system to be highly protective. This is an idea that has been untapped and an opportunity missed, so it's something that has great potential for development."

Several impediments have held up the development of drugs to boost the innate immune system, Corry said. Foremost, he said, is that targeting this part of the immune system rather than the adaptive immune system represents a radical departure from traditional vaccination. Change often comes slowly in science.

Secondly, he added, there are challenges with delivering aerosolized drugs to patients' lungs. It's not as easy as taking a pill or receiving a shot. It requires specialized facilities and trained people. Something as simple as an asthma inhaler wouldn't suffice.

Behind the idea

Still, the approach has considerable promise with biohazard concerns popping up around the world. Even brief protection from bioterror threats such as anthrax or natural threats such as avian influenza could prove invaluable to first responders and health care providers.

So why did cancer center researchers end up designing an aerosol that provides immunity against infectious agents?

Dickey admits he's heard the question before. Pneumonia is a significant cause of death in cancer patients, because chemotherapy kills off white blood cells and weakens the adaptive immune system.

The researchers, who have patented the technology in accordance with M.D. Anderson licensing policies, say their next step is to try the therapy in larger animals. If all goes well, they hope to begin human clinical trials in the first quarter of 2009.

They will target leukemia patients, whose immune systems are among the most compromised of all cancer patients.

eric.berger@chron.com

COMMENTS

Readers are solely responsible for the content of the comments they post here. Comments are subject to the site's [terms and conditions](#) of use and do not necessarily reflect the opinion or approval of the Houston Chronicle. Readers whose comments violate the terms of use may have their comments removed or all of their content blocked from viewing by other users without notification.

You must be logged in to leave a comment. [Login](#) | [Register](#)

Submit

Most recent comments



VoiceInTheCrowd wrote:

Someone's been practicing critical thinking outside the box! Fascinating!

12/4/2007 7:52 AM CST

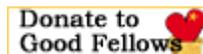
[Recommend \(3\)](#)

[Report abuse](#)



ADVERTISING: [Contests](#) | [Fraudulent Ads](#) | [Information & Rates](#) | [Place An Ad](#) | [Singles In Houst](#)
CHRONICLE: [Subscribe Now](#) | [Subscriber Services](#) | [Buy Photos & Page Prints 2005-Present](#) | [Historic Page Prints 1](#)
[Corrections](#) | [RSS Feeds](#)  [RSS](#)

SERVICES: [Privacy Policy](#) | [Terms & Conditions](#) | [Help](#) | [Registration](#) | [Report a Problem](#) | [Site M](#)



HEARST newspapers