

RESEARCH TO APPLICATION—\$2 million in UI research nets promising plague vaccine

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BIOMEDICAL RESEARCHERS at the University of Idaho are confident a new vaccine can effectively combat pneumonic plague, the deadly airborne form of the black plague. Their vaccine relies on a combination of a drug adjuvant—the binder or carrier that helps drugs enter the body—and proteins from the coat of the plague bacteria to prevent infection, say microbiologists Carolyn Hovde Bohach and Scott Minnich.

Their work and that of fellow UI microbiologist Greg Bohach received more than \$2 million since 2002 from the National Institutes of Health for biodefense and infectious disease research. Their research relied on sophisticated facilities available in the \$14 million Agricultural Biotechnology Laboratory completed in 2001 with \$6 million in state funding.

The plague vaccine would plug a gap. Although a vaccine effective against bubonic plague was used in the past, it was removed from use, in part because it offered no protection against the airborne form. The new vaccine is ready for further testing.

Plague in any form is terrifying. In 1994, a small outbreak of pneumonic plague in Surat, India, sent thousands fleeing. Hospitals were overwhelmed by fearful residents with cold- or flu-like symptoms. Minnich said the plague bacterium, *Yersinia pestis*, and other major disease organisms are so deadly because they trick the body's defenses long enough to multiply to lethal levels. The new vaccine, which can be sprayed into the nose, triggers the body's innate immune system immediately, mobilizing its presence in the lungs. The bacterial-coat proteins then trigger the production of specific immune defenses against the plague.

A similar strategy can be effective, Minnich believes, against flu, anthrax, and other disease organisms that use the same stealth strategy.

Potential military use: The effectiveness of triggering the body's overall immune response within hours to prevent infections was the most surprising and significant finding. "This rapid response could be important for the military," Hovde Bohach said. A fast-acting vaccine could protect troops responding to a bioweapon attack or natural disease outbreak.

More importantly, the vaccine may help protect civilian populations. The study also showed the vaccine's rapid effect can increase the effectiveness of antibiotics and rescue victims within the first few days of exposure.

Hovde Bohach and Minnich are working to develop another vaccine. It would keep cattle from carrying *E. coli* O157:H7 that threatens public health. That study is funded by the Idaho Beef Council.

Nanoscale products may improve safety, shelf life of fresh, therapeutic foods

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A FOOD SCIENCE professor with the UI College of Agricultural and Life Sciences uses unusual properties of the tiniest materials to extend the shelf life of ready-to-eat foods and inhibit foodborne pathogens, such as *E. coli* O157:H7, *Listeria monocytogenes*, and *Salmonella* contamination in the foods.

Sea Min, assistant professor in the Department of Food Science and Toxicology, works with food scientists and engineers to

develop biopolymer edible films and coatings from low-value food byproducts that enhance the shelf life and safety of fresh foods.

Reducing byproducts to nanoscale building blocks allows Min to produce films and coatings with properties that make them valuable for commercial use in wrapped or coated foods.

His research will create potential opportunities both for food preservation and therapeutic and nutritional products.

Frozen-meat cooking directions may lead to foodborne ills

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FAULTY DIRECTIONS on frozen ground-beef patty package labels and new packaging techniques could lead to foodborne illnesses, according to a University of Idaho School of Family and Consumer Sciences faculty member.

Sandra McCurdy, food safety specialist at the University of Idaho, said customers shouldn't use color alone to decide if meat is safe.

McCurdy said some company labels don't say how long to cook frozen-meat patties and others specify inadequate cooking times, such as "1.5 minutes on each side," or "cook until brown." Marler Clark, a law firm in Seattle, has noticed more people wanting to sue as a result of illnesses they contracted after eating previously frozen ground-beef patties.

"We did a test to see how long it actually takes to cook (frozen beef patties), and the average was somewhere around 4 minutes per side," McCurdy said. "Meat is safe after it reaches 160°F throughout."

Findings came from studies of Katrina Finley, a UI graduate who, during a student project, recorded instructions on 40 package labels from frozen meat products sold in the West.

DID YOU KNOW?

1,000 TO 3,000

NUMBER OF PLAGUE CASES WORLD-WIDE EVERY YEAR. AN AVERAGE OF 5 TO 15 CASES OCCUR EACH YEAR IN THE WESTERN UNITED STATES.

Source: Centers for Disease Control, www.bt.cdc.gov/agent/plague/faq.asp