

Public release date: 25-Mar-2007

Contact: Hilary Thomson

hilary.thomson@ubc.ca

604-822-2644

[University of British Columbia](#)

UBC researchers find new superbug weapon for near-empty antibiotics arsenal

New peptide boosts body's own immunity

Imagine the desperation of trying to fight lethal infections when antibiotics fail to work.

That scenario – commonly found with "hospital superbugs" – may well improve thanks to a discovery by a research team at the University of British Columbia, in collaboration with UBC spin-off company Inimex Pharmaceuticals, that has identified a peptide that can fight infection by boosting the body's own immune system.

"Antibiotics are now under threat because of the explosion in antibiotic-resistant bacteria. A third of all deaths on this planet are the result of infection so there is an urgent need to create new therapies," says Robert Hancock, principal investigator and Canada Research Chair in Pathogenomics and Antimicrobials. "The beauty of this peptide is that it acts on the host to trigger a protective response and doesn't act on bacteria directly. That means it's unlikely bacteria will become resistant to it."

The team found that a peptide, or chain of amino acids, they have dubbed innate defense regulator peptide (IDR-1), can increase innate immunity without triggering harmful inflammation, and offer protection both before and after infection is present.

The discovery, in animal models, will be published March 25 in the journal *Nature Biotechnology*.

Researchers tested the peptide's effectiveness against *Staphylococcus aureus* including MRSA; a superbug called vancomycin-resistant *Enterococcus* (VRE); and *Salmonella*. In Staph and VRE infections, although bacteria were not completely eradicated, IDR-1 significantly reduced bacteria counts and mortality, when given either 24-48 hours before or four hours after

infection began. In Salmonella, the peptide offered significant protection when administered prior to infection setting in.

Data showed that IDR-1 activates several signaling pathways to stimulate infection-clearing chemokines · a chemical mediator that mobilizes immune response.

In addition, the peptide did not produce harmful inflammation and toxicity often seen when the immune system is stimulated and, in fact, actually reduced the potentially harmful septic response. Sepsis, a consequence of a ravaging inflammatory response associated with infection, kills as many as 200,000 annually.

The innate immune response is the first line of defense against infection and comprises an interactive network of cellular and molecular systems that recognize and kill pathogens, as well as signaling pathways that trigger biological responses.

The researchers anticipate the therapy may be useful as a supplement to antibiotics in combating common hospital infections such as ventilator associated pneumonia, post-surgical infections, high dose chemotherapy and infections arising from insertion of catheters or other medical devices.

"We now have a powerful new tool that will allow us to stop infection before it starts · it's a new concept in treating infection," says Hancock.

The researchers estimate there are two million cases of antibiotic-resistant infection in hospitals that kill approximately 70,000 people annually in North America. Hospital-based methicillin-resistant Staphylococcus aureus (MRSA) alone causes an estimated 100,000 hard-to-treat infections annually and is now seen in community-based infections, such as boils and abscesses or life-threatening bloodstream infections.

"Salmonella causes 1.3 million infections and up to 100 deaths every year in the U.S. We're looking at a crisis in 10 years as most bugs will be resistant to most antibiotics. There's an urgent need to develop new tools," says Brett Finlay, a UBC microbiologist and an author on the paper. He and Hancock co-founded Inimex, which conducted many of the experiments required for the study.

Researchers expect it will be about 12-15 months before the discovery is introduced into human clinical trials.

###

Support for the research has been provided by the Canadian Institutes of Health Research (CIHR), Canada's major agency responsible for funding health research, and the Foundation for the National Institutes of Health through the Grand Challenges in Global Health Initiative, a U.S.-based project funded by the Bill & Melinda Gates Foundation, that has offered research grants totaling \$436.6 million to achieve scientific breakthroughs against lethal diseases in the world's poorest countries.

Additional support has been provided by Genome Canada and Genome BC. Genome Canada is the primary funding and information resource relating to genomics and proteomics research in Canada. It has established six genome centres across the country, including Genome BC.

Inimex Pharmaceuticals, Inc. is a privately held biopharmaceutical company focused on development and commercialization of Innate Defense Regulator products, novel first-in-class drugs that selectively trigger the body's innate defenses without causing inflammation.
