

**TATRC Highlighted Research News Article:  
Three Projects from Infectious Disease Portfolio**

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First Paragraph Note:

\* Used [http://www.afhsc.army.mil/msmr\\_pdfs/2009/v16\\_n04.pdf](http://www.afhsc.army.mil/msmr_pdfs/2009/v16_n04.pdf)  
pp. 11 and 18 for statistics.

**Combating an Enemy Threat:  
On the Forefront of Research to Protect Warfighters from Infectious Disease**

In 2008, U.S. military treatment facilities reported almost 200,000 cases of infectious and parasitic diseases; in fact, infectious diseases cause more casualties than enemy fire in tropical regions. New tools are more important than ever to combat evolving drug resistance and protect our warfighters from the spread of disease.

The U.S. Army Medical Research and Materiel Command's (USAMRMC) Telemedicine and Advanced Technology Research Center (TATRC) is collaborating with universities, research centers and industry worldwide to provide these tools.

TATRC manages 700 research projects on the forefront of military medicine through a unique partnership among government, academia and industry. Because the center plays more of a behind-the-scenes role connecting more highly visible research entities, the public is often unaware of its essential role in supporting military healthcare advances.

“TATRC excels in bringing people and projects together to get the latest knowledge and technology out to the Soldier in the field as quickly as possible,” says TATRC Infectious Disease Portfolio Manager John M. Carney. One way is through gathering researchers with military and civilian health experts from throughout the nation at regular sessions to review related projects.

A recent product line review highlighted several of the efforts in the Infectious Disease Portfolio, which includes approximately 40 projects. The portfolio is co-managed by the Military Infectious Diseases Research Program.

Says TATRC Director Col. Karl Friedl, “The portfolio is a rich tapestry of talented researchers and dedicated institutions who seek to protect warfighters’ health by advancing technology to prevent, detect and treat viral and bacterial infectious disease and parasitic disease.”

Three researchers who presented their work at the PLR share insights here into their novel approaches and the promising medical possibilities.

## Novel Antibacterial Technology for Wound Infections

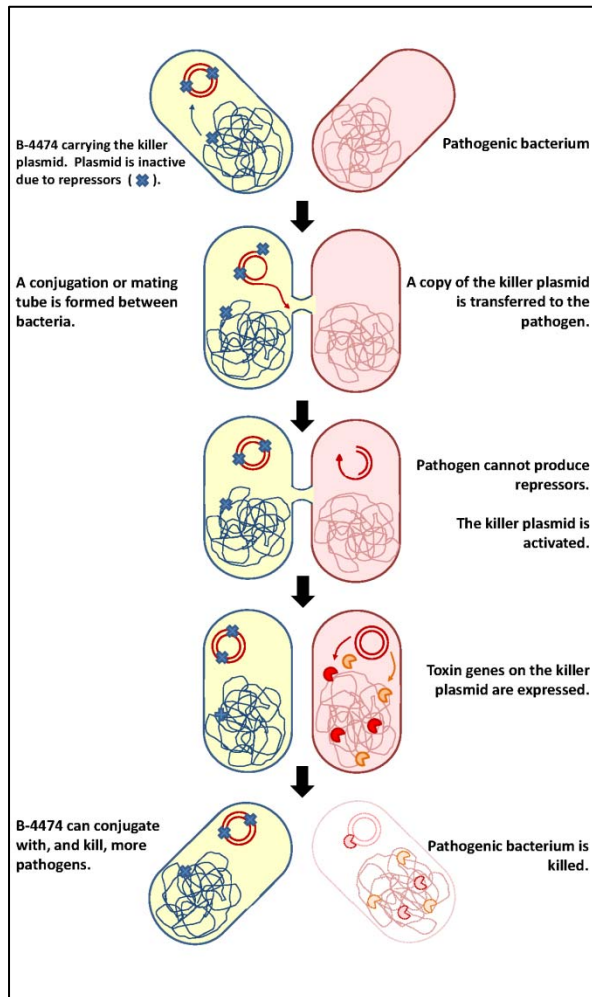
Dr. Steven Watt

ConjuGon, Inc.

Many battlefield-related wound infections today are extremely difficult to treat because bacterial pathogens are rapidly developing resistance to all currently used antibiotics, leading to extended hospitalization, increased risk of amputation and sometimes death. These pathogens are becoming a major problem in civilian hospitals as well.

ConjuGon, Inc., is developing a new technology to eliminate infections caused by antibiotic-resistant, Gram-negative bacteria. It works in a completely different way, such that drug resistance is no longer an issue.

ConjuGon's technology is based on conjugation, a natural process by which DNA is transferred from a donor bacterium to a recipient bacterium. ConjuGon uses conjugation to introduce genes into pathogens that, when expressed, will kill those pathogens with extremely high efficiency. The donor bacterium has been engineered to minimize human toxicity, to be unable to replicate in the environment or in the body, and to maintain and protect itself from the killer plasmid.



Says principal investigator Dr. Steven Watt, "The technology has proven safe and highly effective against multidrug-resistant bacteria in animal studies. With TATRC support, we are finalizing a marketable product and beginning the process of testing required for FDA approval so we can get this therapy out to the warfighter."

*ConjuGon's novel therapeutic kills many bacteria, including those that are resistant to conventional antibiotics. The technology was presented at a MIDRP Wound Conference and a TATRC Product Line Review in 2009.*

*Image courtesy of ConjuGon, Inc.*

## **Defense Against Viral Illness**

**Dr. Anne Radcliff and Dr. Vishwanath Lingappa  
CUBRC, Inc., and Prosetta Bioconformatics Corporation**

The military faces a pressing need for antiviral drugs to protect Soldiers from an array of viruses. Most drug development has focused on targeting a specific virus—which means there will be a lag between the emergence of a new strain and the production of a drug to fight it.

However, Dr. Vishwanath Lingappa's group at UC San Francisco discovered that viruses use the host animal's or person's proteins to assemble structures called capsids, which are needed for a virus to reproduce. TATRC is supporting researchers at CUBRC-Prosetta who are identifying host factors that will inhibit influenza virus capsid assembly. The work builds upon Lingappa's and Program Manager Dr. Anne Radcliff's other applications of this technology to public health threats such as HIV and highly lethal infectious diseases of importance in biodefense.

Radcliff says, "This line of discovery research shows great promise. Because the approach targets the host, not the virus, the normal mechanism by which viruses mutate to develop drug resistance is much less effective. Plus, the host is protected against multiple viruses because they won't have a basic protein needed to produce infectious virus particles. This could be the beginning of a whole new class of antiviral compounds."

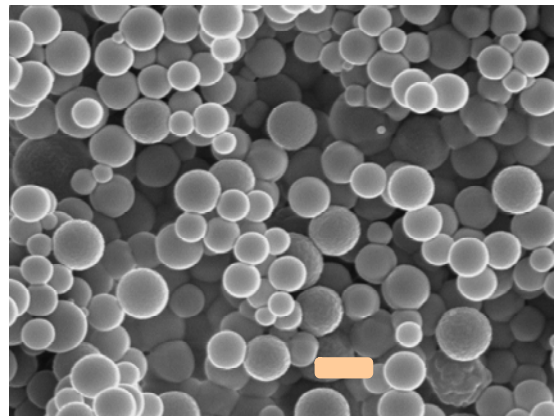
## **Microencapsulation and Vaccine Delivery**

**Dr. Allison Ficht  
Texas A&M University**

More effective, easily stored vaccines are a critical tool in the military's defense against possible viral warfare or terrorist attacks. Investigators at Texas A&M University are engaged in promising research in microencapsulation of vaccines (entrapping them within micro or nano particles) as a way to enhance their effectiveness. These encapsulated vaccines could have the capability to be shipped at room temperature and taken orally in a single dose.

Principal investigator Dr. Allison Ficht explains, "Microencapsulation allows for controlled release of the vaccine, which eliminates the need for booster vaccines and has been shown to greatly enhance the immune response. In addition, controlled release could potentially reduce the amount of antigen needed, protect the antigen for storage and target it to specific tissues. We are exploring particles that enable oral or intranasal delivery without side effects."

TATRC is supporting the group's efforts to develop prototype controlled release vaccines



and take them into animal testing, with the ultimate goal of improving the delivery of a number of vital vaccines.

***Investigators at Texas A&M University are working on a new, more effective vaccine delivery method. Shown are microcapsules produced through emulsion technology; they allow for controlled release of a vaccine.***

*Image courtesy of Texas A&M University*