



US DEPARTMENT OF DEFENSE

# BLAST INJURY RESEARCH PROGRAM COORDINATING OFFICE

## Protective Equipment

### Novel Dendrimers for Antimicrobial Textile Finish

Wound infection following blast-related injuries continues to be a significant source of morbidity and mortality in the modern era of military healthcare. Approximately a quarter of combat wounds become infected, having a significant impact on patient outcomes and healthcare costs. Therefore, there is a need to identify a light-weight, durable, antimicrobial finish for integration into textiles to control the transmission of pathogenic bacteria and minimize infection in military medical shelters and field hospitals. An important component in the overall strategy for improving soldier performance and developing Smart Textiles is that the antimicrobial finishes should not cause the degradation of other properties of the fabric (e.g., porosity or mechanical properties). Research supported by the Department of Defense (DoD) Small Business Innovation Research (SBIR) Program topic, “Antimicrobial Textiles,” will focus on developing and optimizing catalytic antimicrobial systems for direct integration into fabric for clothing, shelters, and wound dressings. As part of a previously completed Phase I SBIR project titled “Novel Dendrimers for Antimicrobial Textile Finish,” Physical Sciences, Inc. (PSI) successfully synthesized and chemically coupled a novel antimicrobial dendrimer to cotton fabric. In the follow-on Phase II, PSI will continue to develop this antimicrobial compound by improving protocols to scale up the synthesis of the dendrimer, creating a process to attach the dendrimer to multiple fabric types, and performing comprehensive characterization of the fabric properties to ensure both safety and durability of the compound. The resulting technology will be easily integrated into fabric weaving and manufacturing and it will be scalable to a high through-put process, allowing large volumes of fabrics to be treated. This technology will have both DoD and civilian applications, including the inclusion in antimicrobial textiles, anti-infective wound dressings, medical devices, and hospital textiles, bedding, and wipes. Following the completion of Phase II of this project, PSI will direct their focus towards developing a comprehensive program for commercialization of this product to transition it from the laboratory to use within the field or hospital setting.

