

Bioactive dressing surface has great potential for healing wounded soldiers, cops

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A soldier suffers a life threatening wound at a remote location, miles from any medical assistance. No one can help him stop the bleeding or prevent the wound from becoming infected. At the same time, he needs to find cover fast, which is difficult as he tends to his wound.

A new wound dressing surface developed by a University of Rhode Island textile chemist and the president of a Massachusetts biomedical firm could be the solution for that soldier, as well as police officers, firefighters, hikers, rock climbers and emergency medical personnel.

Martin Bide, URI professor of textiles, fashion merchandising and design, and Matthew Phaneuf, president of BioSurfaces, Ashland, Mass., have invented a wound dressing surface based on polyester that combines infection resistance with enhanced blood-clotting properties.

“We have this technology and we know it works, and we’re going to continue to refine it, but if there are companies, agencies or businesses interested in buying it, URI would be interested in talking about how that could be accomplished,” said Bide, a resident of South Kingstown.

According to Bide and Phaneuf, a polyester material with polyurethane is inlaid into the structure to provide the properties of elasticity. The base material is modified chemically so that it provides anchor for protein attachment. After that step, the broad-spectrum antibiotic Cipro is incorporated into the polyester using textile dyeing technology, followed by the biologically-active agent thrombin, a pivotal enzyme in the clotting process.

“The specific protein, thrombin, kicks off the body’s clotting mechanism, and while that is working, the antibiotic is moving into the wound to prevent infection,” Phaneuf said.

The product allows an injured person or emergency medical worker to apply the bioactive surface simply by pulling this bioactive bandage out of a package and applying it to the wound site. The wound dressing surface frees the soldier’s hands to deal with other life-and-death issues. Without the new dressing, the injured soldier or medics must apply direct pressure with their hands, apply clotting and anti-infection medications, and then attach a bandage. The new product developed by Bide and Phaneuf eliminates nearly all of these steps.

Bide has been collaborating with Phaneuf for the last 14 years. The partnership began when Phaneuf, who is also the assistant director of the Vascular Surgery Research Laboratory at Beth Israel Deaconess Medical Center in Boston, mentioned to his wife, Tina, an obstacle he was facing in working with artificial arteries. Tina recommended that he speak with her former professor, Martin Bide, for some assistance.

Phaneuf and Bide clicked and the two used textile dyeing processes to enhance the impact of antibiotics in fighting infection in artificial arteries.

That collaboration led to their most recent work with wound dressing surfaces. “In little bits and pieces over the past several years dating back to our original work, we have been working on infection prevention techniques,” Phaneuf said.

“We have now developed something that provides pressure to a wound and is bioactive,” Phaneuf said.

Other bioactive agents could be added to a dressing to address other

treatment issues, Bide said. “We have a multi-use textile with a multifaceted surface. We found a successful way to attach these chemical groups without degrading the polyester.”

Phaneuf said he and Bide have pushed forward because of each other’s strong interest in helping soldiers, firefighters, police officers and others in hazardous situations treat their wounds successfully.

Source: University of Rhode Island

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