



VCU develops 'WoundStat'

Independent study by Army found product for troops' blood loss to be highly effective

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An explosion rips down an Iraqi street, spraying debris through the legs, torsos or arms of military troops.

In such a potentially fatal situation, seconds count when it comes to stopping blood loss. Those seconds and wounds may be filled by a substance created at Virginia Commonwealth University called WoundStat.

Smack a handful of the sandy mineral into a hemorrhaging wound, apply pressure, and the material forms a seal to stop the rapid blood loss. WoundStat has stopped lethal hemorrhaging within two minutes when tested on anesthetized pigs, the Army's model for such studies.

Until recently, methods for stopping heavy bleeding during combat had not changed much since the Civil War. Medics apply gauze and pressure or use a tourniquet to cut blood flow to limbs, which can result in amputations if left tied for too long.

For about a decade, the Army has been researching more high-tech ways to treat hemorrhaging.

"We looked at Vietnam, Korea, World War II. Of all those killed in action . . . about one-third to 40 percent died of bleeding to death," said Ronald R. Blanck, a retired surgeon general of the Army.

And most wounds, he notes, are treatable.

Soldiers overseas now carry the HemCon bandage, made with a blood-clotting agent derived from shrimp shells. A product called QuikClot does to blood what its name implies.

Then there's WoundStat. If it is approved by the U.S. Food and Drug Administration, Bethesda, Md.-based TraumaCure Inc. plans to sell the product to military and commercial customers.

WoundStat was developed in VCU Medical Center's Reanimation Engineering Shock Center.

"Our interest is in all things that have to do with critical illness and injury -- how to save the most critically ill and injured person and return them back to productive lives," said Dr. Kevin Ward, an emergency physician and associate director at the shock center.

Part of that group, called Operation Purple Heart, focuses on treating combat casualties.

"We took a step back and examined what the strengths and weaknesses were with the current [blood-stopping] products that were out there to see if there was something we could improve upon," Ward said. Research began in December 2004.

Ward and two colleagues -- biochemist Robert Diegelmann and biomedical engineer Gary Bowlin -- developed a tan-colored concoction of minerals that looks like a cross between flour, sand and cat litter. After its use, WoundStat

can be peeled off the injury.

With the help of VCU's Office of Technology Transfer, the men were introduced to bioscience and entrepreneurial expert Jack McDonnell. Impressed by WoundStat's potential, McDonnell licensed the technology and established the company in May 2006. He is TraumaCure's chairman and executive vice president.

Chief Executive Officer Devinder S. Bawa and President and Chief Operating Officer Rhonda Friedman have expertise managing entrepreneurial and established health-care and technology firms.

"These three people have this combination of skills that are really required to make a company a success," said Ivelina Metcheva, director of VCU's tech transfer office, which works to spin out university research into products, services or businesses.

TraumaCure has landed "seven figures" worth of capital, McDonnell said, and it is seeking more. Money will be easier to find if talent is in place, Metcheva notes. "Venture capitalists bet on jockeys, not on horses."

McDonnell expects FDA approval before October, and then efforts go to selling to the military. The company also plans to market WoundStat to first responders such as emergency medical technicians, police and firefighters.

Blanck, the retired surgeon general and an outside director of TraumaCure, said current hemorrhage-stopping products -- specifically, HemCon and QuikClot -- have been a step in the right direction but that there is room for improvement.

"I'm not critical of them because I think they've been responsible for saving lives. Our goal is to save even more," he said. A spokeswoman for HemCon said its standard-issue bandages work best on large, high-blood flow wounds but are limited on smaller but serious injuries such as a gunshot. QuikClot clots blood but produces a reaction when used that creates excessive heat, and studies have found that it may damage organs and tissues.

An independent study by the Army's Institute of Surgical Research found WoundStat to be a highly effective wound dressing that does not produce a heat reaction. The report said the product's primary limitation is that it will stop blood flow on damaged vessels, acting as a granular tourniquet in areas where a traditional tourniquet cannot be tied, such as the groin. Such occlusion of the vessels could become a problem in a neck injury where blood must continue to flow.

The report also noted that more studies are needed to prove the product's efficacy and safety -- but Ward and his colleagues maintain it is harmless and lifesaving.

Should WoundStat hit the market, the VCU inventors will receive 40 percent of royalties on sales under terms of the university licensing agreements. The remaining 60 percent is disbursed across VCU.

"Not only is it great [business] potential, but look at what good it does in the world," McDonnell said. "It's fabulous."

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