CEO CFO

Remedium TECHNOLOGIES

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A Medical Device Start-Up Operating with the Vision of User-Directed Enhancement of Wound Care Products and Severe Hemorrhage, Remedium Technologies Provides Unique Solutions through their Platform Technology, HemogripTM

Healthcare
Medical Device

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Matthew Dowling
CEO

BIO: Matthew Dowling, **Ph.D.** is the **CEO and co-founder of RTI**. Matt completed his graduate work at the Fischell Department of Bioengineering at the University of Maryland in May 2010 and has since pursued RTI on a full-time basis. In 2005, he was awarded the Fischell Fellowship in Biomedical Engineering for his ideas for commercially viable drug delivery systems after graduating in chemical engineering at the University of Notre Dame. At UMD, he developed the platform Hemogrip™ technology which acts as the cornerstone of Remedium's R&D pipeline for hemostasis and wound healing products. Within a year of launching Remedium Technologies as a grad student, he raised the required R&D funding to bring Hemogrip™ through pre-clinical stages of safety and efficacy evaluations. Matt was the winner of the 2010 Dean's Doctoral Research Award from the Clark School of Engineering, **the highest honor for an Engineering Doctoral student**, for his work on chitosan-based self-assembled soft materials for use in drug delivery and wound treatment.

About Remedium Technologies Inc.
Remedium Technologies is a medical device start-up which operates with a vision of user-directed advancement in the standard of care for the control of severe hemorrhage. Severe hemorrhage is the leading cause of death on the battlefield, accounting for over half of all preventable deaths in combat. Within the civilian setting, traumatic injuries are the leading cause of death among patients under the age of 44. Currently available products or methods to stop these kinds of injuries are either inherently ineffective or very difficult for most users to implement effectively.

Interview conducted by:
Lynn Fosse, Senior Editor
CEOCFO Magazine

CEOCFO: Mr. Dowling, what is the vision for Remedium Technologies?
Mr. Dowling: Remedium operates with the vision of user-directed enhancement of wound care products.

CEOCFO: What are you currently working on? What are some goals you have for the future?
Mr. Dowling: We are developing a sprayable foam, which is contained a light-weight hand-held canister. It is able to stop a range of bleeds and most importantly, it addresses non-compressible hemorrhage, which is the leading cause of death due to hemorrhage. In fact, 85% of all deaths due to hemorrhage are due to non-compressible hemorrhage. A good example of this type of injury would be a shrapnel injury to the abdomen of a soldier in battle, where one would be dealing with a lot of messy, soft tissue bleeding that cannot be addressed with a traditional bandage or standard tourniquet technology.

CEOCFO: Would you tell us what is in the foam, as well as the development of the product and whether or not there any products like it already on the market?
Mr. Dowling: The material we use is chitosan, and many companies have used chitosan for various wound care and hemostatic technologies. Chitosan is extracted from crab, crustacean, and insect shells, and it is widely available in nature. It is low cost, and it is inherently anti-microbial, which is very useful for treating wounds. It is also very robust; you can take it out into the wild and it doesn't go bad on you. Nobody uses chitosan in a flowable or sprayable format because it is not effective without formulating it as a solid, compressible bandage, gauze or powder. However, we perform a proprietary modification of chitosan that allows it to be able to stop bleeds rapidly in these flowable and sprayable formats. Our sprayable foam is our focus technology right now.

CEOCFO: To your knowledge, has this been tried in the past?
Mr. Dowling: No, it has not.

CEOCFO: What made you realize it was feasible?

Mr. Dowling: I did my PhD at the University of Maryland in their department of bioengineering, and this is the technology I was working on in graduate school. The use of this technology and its ability to treat bleeds was somewhat unexpected. We were using that material for drug delivery applications, but through a set of simple experiments with cells and blood cells, we realized that it was useful as a hemostaticagent. From there, we made use of a plethora of university resources to spin out a company. The University of Maryland was particularly good for this in terms of their infrastructure in place to build startups from the University and to coach up those companies such that they grow into competitive, fundable positions. I have been working with the company full-time since finishing my PhD in 2010, and to date we have raised about $1.6 million in non-dilutive capital in order to develop this technology.

CEOCFO: Where are you currently in the process of development?
Mr. Dowling: We are getting very close to submitting our first FDA application for our bandage product, which predates the sprayable foam. There is a significant market for the bandage, while foam is more of a disruptive technology. Right now, we are navigating the FDA process for our bandage.

CEOCFO: Why will people want your bandage as opposed to some of the other ones on the market?
Mr. Dowling: In a number of published experiments, we have demonstrated that the bandage is able to stop very severe bleeds, which other leading bandages in the market cannot stop safely and effectively. This has a lot to do with the bandage's tissue adhesion capability; the cohesion of these bandages is also improved over competing bandages. When you resuscitate a patient and their blood pressure goes up, many of these bandages tend to fall off or break apart. This bandage will stay on and stay together. Note that there is the exact opposite adhesion problem with some other advanced wound care materials; when they do work in those instances, they can be extremely difficult to remove and in some cases impossible to remove. The result is that they can do significant damage to tissue and/or cause long term damage or scarring. Our bandage does not do have these problems, and we can completely remove the material based on tuning the adhesion properties to an optimum point.

CEOCFO: Will you be commercializing yourselves or will you be looking for a partnership?
Mr. Dowling: We are looking for partnerships in all areas, including licensing, manufacturing, and distribution. We have a couple of good manufacturing partners already in place, and we are talking to a few other prospective partner firms from the stand point of licensing and distribution. It often makes sense for seed-stage device and therapeutics companies to partner in order hit milestones. For us, partnerships are something that we actively pursue.

"We address multi-billion dollar need, and we provide unique solution to that need through our platform technology, Hemogrip™."
- Matthew Dowling

CEOCFO: Has the medical community paid attention to your company yet?
Mr. Dowling: Several people in the medical community have paid attention and we have many good advisors on our team that are well-known in the field of trauma medicine. The most notable of which is David King, who is a trauma surgeon at Harvard Medical/Massachusetts General Hospital. He is a hemostat researcher and he has done multiple tours of duty in Iraq and Afghanistan. He has also been a co-inventor on a couple of new technologies for which we have submitted patents. We are getting close to submitting a publication with him, and we have done multiple publications with some other well-known medical practitioners, such as John Hess (University of Maryland School of Medicine) and Grant Bochicchio (Washington University School of Medicine). While we have gotten some nice recognition, it will require getting the technology to clinical trials to access the attention of the greater medical community. We have not gotten to that stage yet, but that is something that is coming down the pike relatively quickly, particularly for the bandage.

CEOCFO: What have been some of the challenges on the business side?
Mr. Dowling: For a company like ours, which is a seed-stage medical device company, the two biggest challenges are (1) funding and (2) navigating the FDA process. Both have been extremely challenging for any new company, particularly over the last five to seven years. We have been fortunate enough to keep building and to keep the operation moving forward through non-dilutive means, despite getting a lot of early "no"s from various state and federal funding agencies. As we approach to some of these bigger product development and marketing milestones through grant funding, we will be able to more clearly calculate valuation numbers and also reduce risk for the investors that will come on board.

CEOCFO: Is there a shelf life to either the bandage or the spray?
Mr. Dowling: We have done shelf life testing, and we have met a key industrial metric of a two year lifetime. Note, that this lifetime can be further extended, but is often not required for most practical applications.

CEOCFO: What is the market potential for your product?
Mr. Dowling: The market for wound care management on a global scale is about 25 billion dollars, which is everything from products sold to services provided in that field. Within the United States, there is a one billion dollar market for hemostatic product sales, and that is growing at a rate of about eleven percent per year, so it is a very healthy market and it includes everything from hemostats for treatment of battlefield injuries or hemostats for treatments of surgical bleeds. Surgical bleeds are the bulk of that market, and we are going to be entering into two key areas, which are the trauma space as well as cardiac catheterization and interventional radiology space. Both of

these applications are considered external uses form an FDA standpoint, and that helps new technologies get through more quickly than something that would be left inside the body.

CEOCFO: Why should people be paying attention to Remedium, and what sets you apart as a company?

Mr. Dowling: We are developing an innovative and user-friendly solution to a very significant problem in non-compressible hemorrhage. The magnitude of this problem has been widely publicized, and there is an immediate market for that kind of technology. Beyond that, the use extends into many different kinds of wound treatment: not just bleeding control, but also treatment chronic wounds, and regenerative medicine applications. In terms of the market, it ultimately extends from very niche markets such as battlefield trauma all the way to over the counter applications, which will come later down the line after lots of efficacy and safety data has been generated in clinical trials. We address multi-billion dollar need, and we provide unique solution to that need through our platform technology, Hemogrip™. The solution is low cost and it will have a big impact by reducing health care costs at the point of care.

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