Soft ray looks to save lives by developing rapid, low-cost system for detection of bacteria in blood platelets

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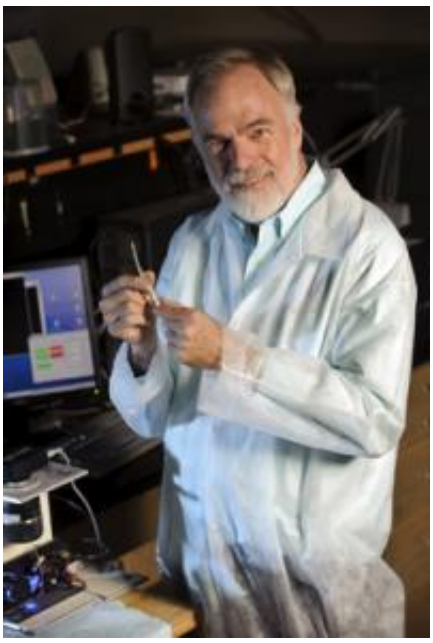

Paul E. Johnson, a UW professor of physics, works with technology he calls FountainFlow cytometry, which can be used to detect environmental or drinking water contamination, fungus in the blood and bacteria in blood platelets -- and more quickly than current detection methods.

Paul E. Johnson envisions the day when most citizens can have their blood platelets checked quickly for bacteria at a low cost. And he has created the technology that he believes can make a difference in eventually saving lives.

Johnson, a University of Wyoming professor of physics since 1981, is venturing from the classroom to the boardroom with his biotechnology company SoftRay Inc., where he has created a lab instrument that can be used in hospitals and health clinics to detect bacteria in blood platelets or fungus in blood much earlier than current methodologies allow. And he is receiving assistance and expertise from the Wyoming Technology Business Center to make it happen.

"The WTBC has helped me develop a business plan. I've received feedback from venture capitalists and developed presentations to give to venture capitalists," says Johnson, who is currently in the pre-venture stage of his business idea. "They've helped me connect with a lot of people in the business community."

The WTBC is a statewide business development program (under the UW Office of Research and Economic Development) that is developing a technology business incubator and an outreach program focused on early-stage, high-growth companies. The 30,000-square-foot facility, which opened in 2006, offers laboratory, office and shared-conference room space for client companies as well as a state-of-the-art data center.

Johnson has created a technology he calls FountainFlow cytometry, which is used for measuring microorganisms in food, water and human blood. The platform technology can be used to detect environmental or drinking water contamination, fungus in the blood and bacteria in blood platelets -- and more quickly than current detection methods, Johnson says.

Platelets are the cells in human blood which cause blood to coagulate upon exposure to air. Platelets are used for transfusions for hospital patients who have undergone trauma or bled out; or for people who are immune-compromised, meaning their bodies cannot naturally produce platelets on their own.

Johnson says his technology -- which he began working on approximately six years ago because he wanted to make a significant societal impact -- can detect fungal infection in blood within a few hours compared to the current methodology, such as culturing, which takes 1-3 days to diagnose a form of fungus. That can be the difference between life and death for a patient who has gone into septic shock. A person can die from septic shock within 1-24 hours while current diagnosis typically takes 48-72 hours, Johnson says.

"A person's survival rate depends critically on quick diagnosis and treatment," Johnson says. "With our current FountainFlow platform technology, we will be able to make a diagnosis within 1-2 hours. And the physician will be able to use the appropriate drug regimen to save the person's life."

In his technology, Johnson says a fluid, such as blood or water, is mixed with chemicals. It is then pumped through the hoses of the instrument. The fluid is illuminated, using light from an LED. A dye is added to the fluid, which allows Johnson to pinpoint the microorganisms he's specifically interested in detecting. When the microorganisms are illuminated with the ultra-bright LED light, the microorganisms glow. A camera, which is part of the instrument, captures video frames of that fluid flow. A computer can analyze those frames to count the number of glowing particles in the images. It then determines the number of particles per volume in the fluid flow. This process allows the physician to determine the level of infection.

"Camera technology and LED technology have both become cheaper and more powerful," Johnson says. "I've managed to ride both of those waves to develop an instrument that can conduct cell detection."

Johnson currently is conducting his research with Poudre Valley Hospital in Fort Collins and Bonfils Blood Center in Denver. Poudre Valley

Hospital is a 241-bed regional medical center which serves northern Colorado, southern Wyoming and western Nebraska. Bonfils operates six community donor centers; serves nearly 200 health care facilities in Colorado and beyond; and collects nearly 154,000 units of blood annually, according to its website.

While Johnson conducts his research at his laboratory in UW's Physical Sciences Building and at Bonfils -- with the aid of National Institutes of Health (NIH) grants -- he stressed that the WTBC and its facilities have been invaluable to his efforts.

"There is a lot of commercialization with something as complicated as this device. It requires meeting with (people in the) business and scientific fields," Johnson says. "I've been able to meet with people very good at dye development, and those that have to work with blood and blood platelets. I'm constantly getting feedback. They (WTBC) really care about the success of their clients."

He adds, "The great thing about the WTBC is we have a group of people intimately familiar with high-tech business development. It's really great to have someone identify problems. Before, I felt isolated. They (WTBC) have a lot of experience."

Johnson said he has lived and learned with a previous Laramie-based business venture, First Magnitude Corp., he started. First Magnitude marketed electronic, high-sensitive cameras used for research. While that company proved profitable, Johnson admitted to some business mistakes.

"We were attracting the high end of the market, but we didn't have the patents" for the technology, Johnson recalls. "If you don't have the patents, you get taken over rapidly by the big boys."

When he started SoftRay, Johnson shuttered First Magnitude Corp. And he vowed to learn from that experience.

While UW owns the patent on Johnson's technology, Johnson has an exclusive license on the patent, which means he owns the rights to market the technology.

Johnson says he is still mulling whether he would want to manufacture the technology himself or provide a license to a large corporation with production and manufacturing facilities already in place.

"I would like to be a Laramie-based company for the foreseeable future. The bio-detection industry is growing and is in excess of $30 billion annually," Johnson says. "I'd like to be a major player in the bio-detection industry."

In addition to the health care industry, Johnson sees other potential market applications -- including detection of contamination in food and water products -- for his technology.

"We're interested in licensing technology," he says. "If someone would want to use it for bottled water, that would be huge. The sky's the limit."

Provided by University of Wyoming