

## Medical miracles grow in Oregon tech companies

HEALING BANDAGES, STEM-CELL STORAGE AND OTHER ADVANCES WILL BE AVAILABLE SOON

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In the not-so-distant future:

Before a patient has called his doctor might already know that the patient's heart is racing or that his circulation is failing.

Soldiers' battlefield wounds might heal with the help of their own stem cells, which have been extracted, multiplied, frozen and stored, thanks to a new technology.

Those who have lost their voice to disease might get voice transplants – computerized speech that sounds like their own once did.

As Oregon grows its bioscience industry, the state's doctors, scientists, engineers and businesses are poised to contribute those advances and many more to the swiftly changing world of medicine.

About \$370 million of federal bioscience research dollars flow through the state's universities and private companies, and the life-sciences industry accounts for an estimated \$480 million in payroll annually in Oregon, said Bob Lanier, director of the Oregon Bioscience Association.

The inventors, manufacturers, regulatory specialists and marketers work in such small-scale operations as QuantRx Biomedical Corp., with six employees in its new research center near Portland International Airport, and in big companies, such as Biotronik of Germany, which employs 400 at its U.S. headquarters in Lake Oswego.

What medical devices and technologies are they dreaming up that clinicians and patients will see in the next few years? A sampling:

**Stem cells to speed healing:** Injured soldiers drive Dr. Kenton Gregory's work at Oregon Medical Laser Center at Providence St. Vincent Medical Center. There, Gregory and his colleagues rush to create the technology that will help soldiers help themselves.

He envisions a day when every U.S. soldier will supply a bone-marrow sample, drawn with a simple syringe. Bone marrow contains precious stem cells, now known to have nearly magical properties: They can help damaged nerves, muscles, blood vessels, bones and even organs repair themselves.

Adults lose stem cells as they age. So a soldier whose arm or leg gets blown to shreds by a roadside bomb, for instance, needs more stem cells than his or her body can provide. In Gregory's lab, scientists work to perfect technology that can amplify the handful of stem cells found in a bone-marrow sample into tens of millions of stem cells, then freeze and store those cells for the day when a wounded soldier might need them. The cells would then be injected into the injured patient, helping their damaged tissue regenerate.

The stem-cell work from his lab and others nationwide, Gregory said, "will revolutionize almost everything in medicine and surgery" within five to 10 years. The U.S. Department of Defense funds some of Gregory's research, but it appears bound to translate into treatments that, down the road, also will benefit civilians.

**Revolutionary bandages:** War wounds also inspired Gregory and his colleagues to change the way battlefield medics stanch bleeding. In 2001, the scientists discovered that chitosan, a molecule gleaned from shrimp shells, can help blood clot. Knowing that, they crafted bandages that not only stop severe bleeding in moments, but also fight off bacteria. The result: HemCon Medical Technologies Inc., a Tigard startup that has received widespread publicity since every soldier in Iraq and Afghanistan began carrying its bandages into battle.

Now, many emergency medical technicians and emergency rooms use the spongy bandages, and this fall, they'll go on sale to the public, marketed specifically at those who take blood-thinning medications or those who have tough-to-treat wounds, said John Morgan, HemCon's president and chief operating officer.

HemCon makes variations of its wound dressings for dental use. Late this year, the company will begin selling dressings designed to temporarily control bleeding during surgery, as well as implantable dressings that can be left inside a surgical patient. By 2008 at the latest, Morgan said, HemCon will add burn dressings to its product line.

**Round-the-clock diagnostics:** Later this year, Tiba Medical of Northwest Portland will launch its 24-hour ambulatory blood-pressure monitor, said Merat Bagha, president.

Patients will wear the cell-phone-sized monitor on the hip or arm for a full day. When they return the unit to their doctor, the physician can download 24 hours worth of data, tracking changes in blood pressure when a patient is working,



Ray Miracle, manager of QuantRx/LabFx, demonstrates line sprayer to make fertility strips

sleeping, drinking coffee, sitting in traffic, taking medication, enduring stressful encounters, listening to calming music -- however it is the patient typically spends time. Software accompanying the monitor will provide physicians with a report of how a patient's blood pressure fluctuates in their routine environment rather than in the white-coated environs of a medical office.

Tiba also expects a late 2007 release for its new Bluetooth wireless-equipped stethoscope. The device will allow doctors to transmit the sounds picked up during auscultation -- listening to the body's internal sounds -- to a remote listener or to a computer, a plus for telemedicine.

**Heart smarts:** Biotronik, the German company with U.S. headquarters in Lake Oswego, mixes medicine with wireless technology, too, as it expands on its lines of implantable cardiac pacemakers and defibrillators.

In February, it launched its Lumax cardiac resynchronization therapy device, designed for patients with congestive heart failure. The teardrop-shaped device, smaller than a deck of cards, notes variation in a patient's heart rate, activity level and other parameters. It automatically alerts the patient's doctor if, for instance, the patient's heart is beating too fast or if they've grown lethargic. The clinician can then intervene before a patient's condition requires emergency medical attention.

About every 18 months, said Mark Johnson, director of marketing, Biotronik hopes to embellish the system with new capabilities. Next year, it expects to add V-to-V timing, to help synchronize the heart's left and right ventricles, increasing the organ's efficiency.

**Restoring voice:** In the future, patients who have permanently lost their voices because of surgery or disease might find them again if scientists and engineers at the Center for Spoken Language Understanding at the Oregon Graduate Institute of Science and Technology achieve their goal: voice transplants.

Jan P.H. van Santen, the center's director, said he and his colleagues are developing and testing the core software technology that would allow them to take old recordings of a person's voice and create computerized speech that closely mimics what the person sounded like.

The company he formed to get the technology to market is called Biospeech Inc. Generally, van Santen said, the assisted-technology industry relies on extremely sophisticated software and specialized hardware. He and his team know the software they're developing will be sophisticated, but they want it to be easy to use on run-of-the-mill computers.

The voice-transplant technology, which could be ready for the marketplace within three years, van Santen said, has the potential to help millions of people with conditions ranging from severe autism to multiple sclerosis.

**Quick test results:** QuantRx Biomedical Corp. is in the process of getting Food and Drug Administration approval for rapid diagnostic tests for five illegal drugs or for legal drugs that people may abuse, such as morphine. QuantRx expects all of the tests to make it to the marketplace by the end of the year, Bill Fleming, chief scientific officer, said.

The company has the only one-step, positive-read technology in the marketplace, Fleming said. Its tests can use saliva or urine on strips of paperlike material imbedded with chemistries targeted at various drugs or infectious diseases. If those drugs or diseases are present, a clear line appears on the strip within about 10 minutes.

Pennsylvania-based QuantRx opened its 7,000-square-foot research and development operation in February in Northeast Portland; the products it manufactures sell under other companies' private labels.