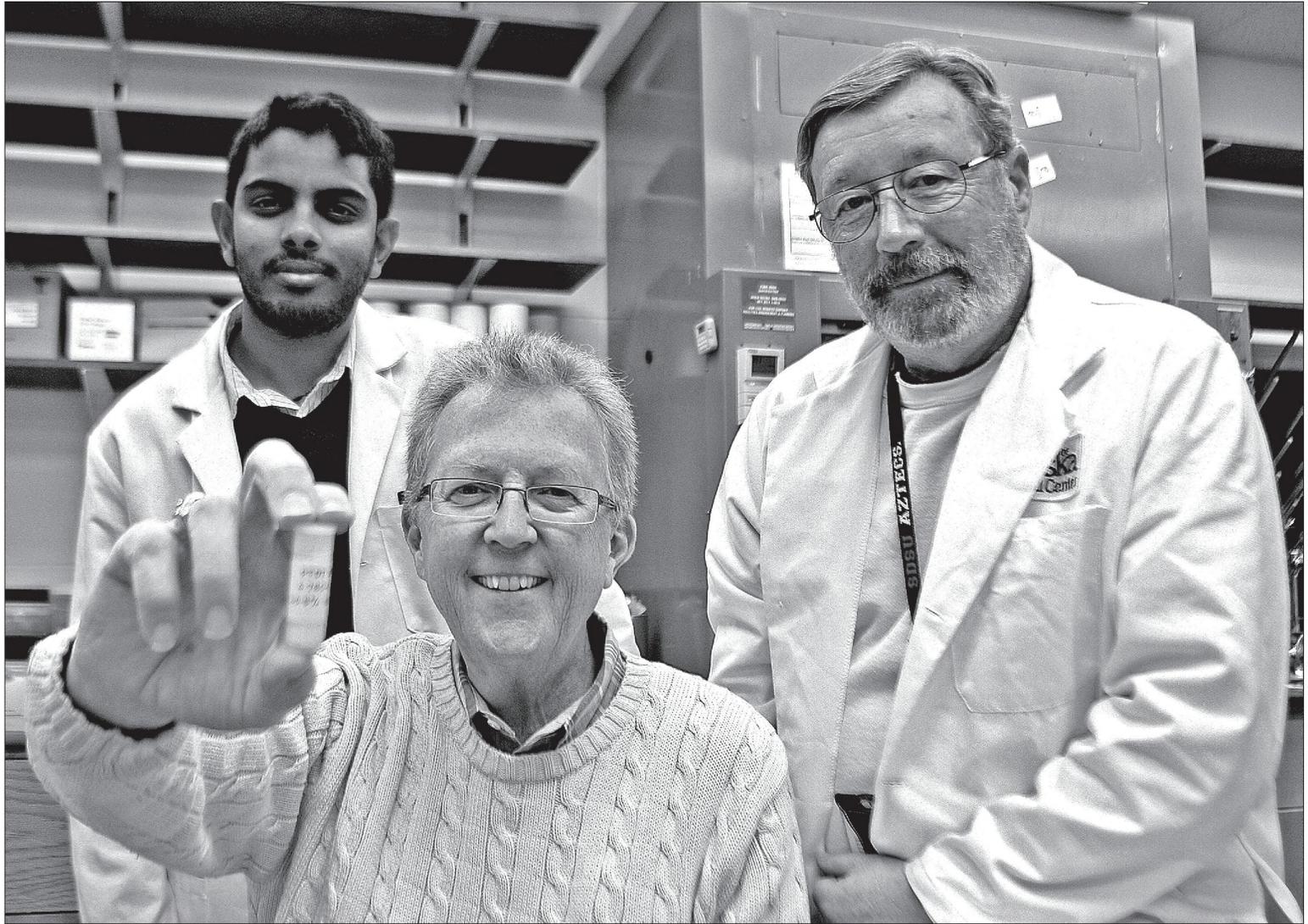




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Gary Madsen, center, ProTransit Nanotherapy president and CEO, has a vial of prototype product that could one day be incorporated into skin-care products such as sunscreen and cosmetics. The nanoparticles, formulated by scientists Bala Vamsi Karuturi, left, and Steve Curran, are vehicles that can deliver powerful antioxidants to the deepest layers of skin. There, they can help prevent skin cancer, wrinkles and blemishes.

# Life-changing discoveries begin in Omaha

UNeMed, an arm of UNMC, finds the best path to bring technologies and inventions to the market

By JUDY HORAN

WORLD-HERALD CORRESPONDENT

**A** blood test to predict coronary artery disease. A pill to cure malaria in just three days. Robotic surgery performed remotely from hundreds of miles away.

Behind these and other life-changing discoveries now being tested or approved is UNeMed, the technology licensing arm of the University of Nebraska Medical Center.

UNeMed identifies sources of a new idea or device, evaluates its potential and finds the best path to bring it to market, said Michael Dixon, president and CEO of UNeMed.

"Let's say a researcher has an idea. We'll go out and talk to companies and get them interested. They give us money to prove it works before licensing it from us," Dixon said. "We routinely see 75 to 90 inventions per year. A third to a half, we can't patent."

UNeMed signs 14 to 20 licenses per year with investors. It has secured patents in countries including China, Japan and Russia, and it recently opened an office in China.

The company works with researchers and scientists at the University of Nebraska at Omaha, the VA Medical Center and the UNMC College of Dentistry in Lincoln as well as at UNMC in Omaha.

Dixon warns not to expect immediate results.

"Even after discovery, we're three to five years away from moving into the clinic before being tested and from five to 10 years before it can be sold or marketed."

In addition to taking time, the process also involves plenty of money.

To file a U.S. patent costs \$10,000 to \$20,000. International patents cost \$50,000 to more than \$250,000. In health care, the road from discovery to approval by the U.S. Food and Drug Administration might take more than 10 years and cost \$2.6 billion, according to Tufts University.

Finding funding is part of the process. Some foundations and companies fund scientific research, but the bulk of funding comes through the federal government.

"Researchers benefit financially. But every researcher's goal is to make people's lives better. A way to have an impact is to have one of your ideas get approved and save millions of lives," Dixon said.

The Fred & Pamela Buffett Cancer Center, opening in 2017, has added five cancer researchers to its staff, he noted.

"We tell them we won't rest until their technologies are developed. If we look back historically, many of the advances that occurred in health started with humble beginnings in academia."

Some discoveries supported by UNeMed:

**MALARIA TREATMENT**

"UNeMed essentially donated the rights to a new malaria treatment to Medicines for Malaria Venture, a nonprofit backed by the Bill and Melinda Gates Foundation," Dixon said.

According to the World Health Organization, there were about 198 million cases of malaria in 2013 and an estimated 584,000 deaths.

The new treatment invented at UNMC has finished clinical trials and now cures malaria with three doses in just three days. The next-generation drug, which is now in phase 2 of its trials, could potentially cut the treatment to a single pill.

**DRUG DELIVERY TECHNOLOGY**

A startup company backed by UNeMed, ProTransit Nanotherapy is working with UNMC technology that will deliver antioxidant enzymes to the skin's deepest layers to prevent damage that leads to wrinkles, blemishes

and cancer. Major cosmetic firms are already interested in this.

"Our intent is to take it worldwide," said Gary Madsen, president and CEO. "There is no product on the market that delivers the antioxidant enzymes that we do."

Using the same technology, researchers have produced results from testing at the Cleveland Clinic in healing crushed spinal cords. They hope to replicate those results with more advanced tests after completion of the first round of fundraising.

ProTransit is located on the UNMC campus in Omaha.

"There's nothing like this. We still have to do FDA compliance and clinical trials," Madsen said.

**CORONARY ARTERY DISEASE**

UNMC researchers believe they have found a simple blood test that can tell who is susceptible to heart disease, not just the day before a fatal heart attack but years in advance.

**BIOMECHANICS TECHNOLOGY**

Technology from UNO biomechanics facilities includes a detection platform for chronic obstructive pulmonary disorder that can predict when the condition will soon get worse. Eventually a cellphone app might be developed to alert people to get help. Similar technology measures a person's subtle movements as they stand in place, which could be useful to measure cognitive health and, for example, to detect and analyze concussions.

**CANCER TREATMENT**

A compound tagged by a radioactive isotope that can be used to kill, see or track a tumor has FDA approval to move into clinical trials on prostate cancer patients.

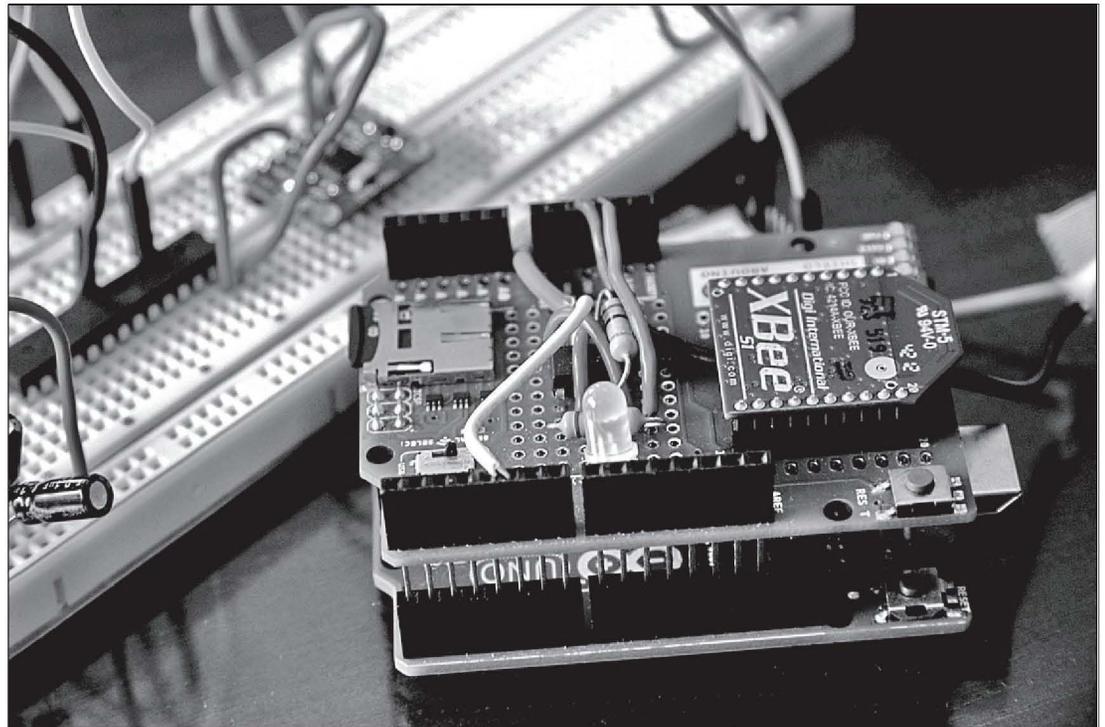
**KIDNEY DIALYSIS**

Dr. Marius Florescu, a UNMC inventor, improved the hemodialysis catheter, which has been licensed to a California-based company. He also designed the first known improvement to the AV Fistula in more than 40 years. His invention could make the surgically created connection of vein and artery (fistula) safer, more successful and more effective for people in need of kidney dialysis.

**REMOTE SURGERY**

A startup company, Virtual Incision hopes to advance robotic surgery so a surgeon can perform a procedure from hundreds of miles away. University of Nebraska-Lincoln is involved in the collaboration.

NASA is looking at Virtual Incision as a solution to space-bound astronauts who need emergency surgery and is testing the robots in a deep-sea submarine that simulates communication in space. The U.S. Department of Defense sees potential on the battlefield for surgery done remotely. The robots await FDA approval.



CHARLIE LITTON/UNEMED

**Biomechanics researchers at the University of Nebraska at Omaha are in the early stages of developing a working prototype for a device that could one day predict an imminent worsening of chronic obstructive pulmonary disease before any obvious symptoms are present.**



CHARLIE LITTON/UNEMED

**Michael Dixon, president and CEO of UNeMed, at the UNeMed shareholders meeting last year at TD Ameritrade Park in Omaha. The technology licensing arm of the University of Nebraska Medical Center was founded in 1991.**