

2014 **UNeMED**
ANNUAL REPORT **CORPORATION**





UNeMed improves healthcare by fostering innovation, advancing biomedical research and engaging entrepreneurs and industry to commercialize novel technologies.

402-559-2468
unemed@unmc.edu
<http://www.unemed.com>

Mail:
986099 Nebraska Medical Center
Omaha, Nebraska 68198-6099

Location:
4460 Farnam St., Ste. 3000
Omaha, Nebraska 68198-6099



Playing well with others

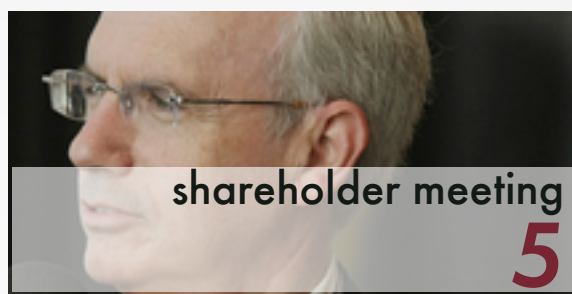
I am pleased to report that FY2014 was another successful year for UNeMed and the University of Nebraska Medical Center (UNMC).

Innovation on the UNMC campus is strong, as evidenced by the more than 18 percent increase in new invention disclosures generated this past year. In the past five years there have been more than 400 new inventions created at UNMC, and those ideas have generated 80 new partnerships, or licenses, with industry. That is 80 new drugs, diagnostics, devices or tools that are being developed with private resources. That is 80 new technologies moving to the market where they can have a positive impact for patients and our economy.

One of the major themes of this annual report is "collaboration." Biomedical research and technology development is a very long and complex endeavor. More than 80 percent of UNMC inventions contain more than one inventor. Teams, often with members from disparate backgrounds, come together to solve the world's most complex questions. However, collaboration doesn't end with invention. Technology development requires a myriad of new skill sets, including legal, regulatory, business and scientific expertise. While UNeMed employees have many of those skills, we are fortunate to have the ability to partner with so many outstanding scientists and business leaders as we help guide technology from the bench to the patient.

Michael Dixon

Michael Dixon, Ph.D.
President and CEO



shareholder meeting **5**

activities

testimony **2**

education **15**

web presence **16**

startups

spinal nanotherapy **9**

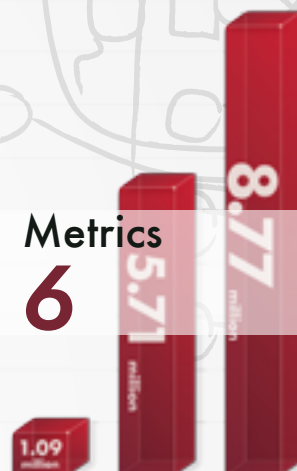
elegant instruments **14**



power of collaboration **10**

Metrics

6



innovation week

awards **4**

demo day **9**

technologies

compound treats, images cancer **17**

repair diabetes damage **17**

treat pancreatic cancer **18**

better laparoscopy **18**

aquablade **19**

answering chemo-resistance **19**

prevent, stop biofilms **20**

vaccine strategy for parkinson's **20**

Lawmakers look to UNeMed

UNeMed played prominent roles on state and national stages as lawmakers in Lincoln and D.C. sought advice on new legislation that would impact intellectual property law and the biotech and startup business sectors.

Nebraska Sen. Heath Mello called on UNeMed President and CEO Michael Dixon to testify before a committee about the merits of the Business Innovation Act. Less than a month later, U.S. Rep. Lee Terry asked Dixon to weigh in on a possible new measure intended to curb certain patent law abuses.

Seven prominent business leaders and entrepreneurs—some from as far as California and Texas—gathered for Nebraska's appropriation committee on Feb. 19, 2014. All testified in support of LB 1114, which would extend

the sunset of the Business Innovation Act to Dec. 1, 2021.

"I think this program is absolutely a leg up," Dixon told the committee, "or at least puts us on the same footing as other states with a similar program."

The bill was eventually fast-tracked through the Unicameral where it was unopposed, 44-0, in a March 27 vote. Gov. Dave Heineman signed it into law on April 2.

Less than a week after the governor signed the bill, Dixon appeared before the U.S. House Subcommittee on Commerce, Manufacturing and Trade, chaired by Rep. Lee Terry (R-Neb.).

Terry called the hearing to examine the issue of pat-

Continues below



King of the hill

At left, Nebraska Rep. Lee Terry (left) chats with UNeMed President and CEO Michael Dixon following the U.S. House Subcommittee on Commerce, Manufacturing and Trade in Washington D.C. in April. Terry, the committee chairman, called Dixon to testify about "patent trolls," and how new legislation might impact academic research. Below, is a screenshot from Dixon's testimony as broadcast by C-SPAN.

Continued from above

ent demand letters, a common practice abused by some patent assertion entities, or PAEs. Everyone who spoke during the hearing unanimously decried the deceptive practice, citing as the principle problems: General lack of clear details in demand letters, a lack of federal guidelines, and no clear definition of local or state jurisdictions.

Terry said he and the committee wanted to hear from expert witnesses as the committee contemplated a bill that would "itemize or prescribe what should be in a demand letter."

The result of the April 8 meeting is

the so-called "TROL Act"—the Targeting Rogue and Opaque Letters Act—which was forwarded to the full Committee on Energy on Commerce on July 10. If the bill survives committee, it will then be sent to the House floor for further debate.

"Reduce the ambiguity of demand letters," Dixon told the subcommittee, "and you'll reduce the power of patent trolls."

Sent by the thousands to small businesses, vague demand letters threaten legal action for patent infringement. The letters often do not refer to a spe-



cific patent or even how the business infringed a patent, which leads some businesses to pay for a license just to avoid the greater expense of lawyer fees.

—Charlie Litton, UNeMed

Utility

UNeMed can bring to any discussion a vast pool of training, experience and expertise. That amounts to more than 75 years of combined technology transfer experience, 17 advanced degrees—including seven doctorates—and expertise in a wide range of fields that includes life science, law, business and communications.

Collectively, UNeMed is a vital resource for the University of Nebraska Medical Center—one that partners with faculty, staff, and students to identify problems and develop solu-

tions that promote the general health and welfare of the state. Whether those solutions are new drug candidates, medical devices, or methods for treating diseases, all innovations are evaluated for their scientific and commercial potential.

UNMC employees first disclose their innovative solutions to UNeMed, which then works to identify and collaborate with non-university commercial partners to fully develop those innovations into market-ready products and solutions that improve public

health.

These technologies can be further developed through established companies, or used as the basis of a new company that leads to a robust startup community for the local economy. This development is supported through various university, state and federal funding programs, in addition to private investment and research sponsorship.

Throughout the process, UNeMed works to facilitate the exchange of information, rights, and assets to improve the health of all Nebraskans.

MISSION

UNeMed improves healthcare by fostering innovation, advancing biomedical research and engaging entrepreneurs and industry to commercialize novel technologies.

VALUES

- Innovative Vision
- Integrity and Stewardship
- Excellence
- Dedication

VISION

- World-class technology commercialization entity
- Best service to faculty
- Recognized by community as an entrepreneurial resource
- Help build a strong biomedical ecosystem in Nebraska



Kick-off

In 1991 the Board of Regents of the University of Nebraska saw that innovation and discovery needed help going beyond academic journals and into the hands of people who could benefit most.

In a move to protect and commercialize world-class intellectual property created at the University of Nebraska Medical Center, the Regents established UNeMed Corporation as the licensing arm for UNMC. As a for-profit corporation, UNeMed also administered other commercial and research contracts for UNMC. The job of evaluating and managing new inventions fell to the Intellectual Property Office.

UNeMed eventually absorbed the Intellectual Property Office in a 2007 restructuring. The restructuring folded UNeMed into UNMC's research division under the Vice Chancellor for Research, creating UNeMed as it exists today — a world-leading technology transfer office that springboards

Nebraska innovation from the research bench to patients' bedsides.

The mission today goes far beyond the modest beginnings 22 years ago.

UNeMed has since established itself as a national leader among technology transfer offices, reaching far above and beyond the traditional role of licensing technologies and filing patent applications.

UNeMed's progressive approach is infused with an entrepreneurial spirit that places the office at center stage as a major player in the startup, consulting, and conferencing communities.

Playing that role is made easier with a partner like UNMC, which has undergone a transformative period of growth that has firmly placed a large star over Omaha on the biomedical research map.

Gendelman, ViiV partnership highlights '13 Innovation Awards

Each year Innovation Week culminates with the Innovation Awards Ceremony and Reception.

Howard Gendelman, M.D., took top honors in 2013, receiving the Innovator of the Year award, and Keshore Bidasee, Ph.D., claimed the Most Promising New Invention to close out the seventh annual Innovation Awards. The Innovation Awards also honored all the UNMC technologies that were invented, patented or licensed during the previous year.

"We embrace, love, cherish the journey," Gendelman said. "It's like

climbing a mountain. The sport isn't getting to the top, the sport is in the climb."

Dr. Gendelman was honored for his work against neurodegenerative and infectious diseases. In 2013 UNeMed helped him build a research partnership with ViiV Healthcare—a pharmaceutical company that specializes in HIV treatments. ViiV was created in 2009 by the combined HIV portfolios of GlaxoSmithKline and Pfizer.

The research partnership will explore Dr. Gendelman's nanoformu-

lated antiretroviral therapy, called NanoART, which could reduce the current need of daily medications for HIV management to a single, monthly dose.

Also in 2013, Dr. Gendelman initiated a human proof of concept study to test one portion of his vaccine strategy for Parkinson's disease.

During his acceptance speech, Dr. Gendelman said both inventions are derived from an initial discovery he made soon after completing graduate school in 1979.

Continued on page 12



Innovator of Year

Howard Gendelman, M.D., greets the audience after accepting the Innovator of the Year award during UNeMed's 2013 Innovation Awards Ceremony in the Durham Research Center auditorium Thursday, Oct. 10. "There's going to be many hurdles," the UNMC researcher told the crowd. "It takes not smarts, but determination to get over those hurdles."

Bidasee's diabetes research is most promising new invention

Keshore Bidasee, Ph.D., was honored with the 2013 Innovation Awards' Most Promising New Invention for his work in diabetes. Dr. Bidasee, who joined UNMC in 2002, developed a potentially groundbreaking treatment for complications associated with diabetes.

He identified a viral construct that strategically overexpresses the enzyme Glyoxalase-1. The enzyme targets and degrades the suspected cause of diabetic complications—a naturally occurring chemical, methylglyoxal, which is created by damaged cells



Dr. Bidasee

when blood sugar levels are high.

With the help of the National Institutes of Health and the Gene Therapy Program at the University of Pennsylvania, Bidasee's team created a harmless virus that "infects"

methylglyoxal-producing cells with an enzyme called Glyoxalase-1. The enzyme eliminates methylglyoxal where

it causes problems, while leaving it free to perform its beneficial functions.

Early testing shows the treatment not only stops damage in the kidneys, eyes and heart, but also shows promise in halting cognitive decline—a major concern in elderly diabetics.

The gene transfer strategy even significantly reduces blood sugar levels.

Currently there are no FDA-approved treatments that target cardiovascular complications in diabetes while also helping manage blood sugar levels. But Glyoxalase-1 therapy aims to be the first.

UNeMed, UNMC share success at annual meeting

Researchers at the University of Nebraska Medical Center are among the most inventive in the country, according to information provided to an exclusive audience of administrators, faculty and staff during UNeMed Corporation's shareholder meeting on Aug. 5 at TD Ameritrade Park's Skybox Lounge.

The meeting featured brief remarks from UNMC Chancellor Jeffrey P. Gold, M.D., who outlined his support for commercialization efforts. He was followed by Michael Dixon, Ph.D., the President and CEO at UNeMed.

Dr. Dixon called UNMC researchers

an "inventive group," citing the most recent data from the Association of University Technology Managers, which shows UNMC's 7.48 inventions for every \$10 million spent was fifth in the nation.

"We are definitely on the national radar screen," said Dr. Gold, referring to a national poll that predictably showed people most often associated the University of Nebraska with football. The second thing they connected to Nebraska was healthcare, according to Dr. Gold.

Dr. Dixon also noted that 75 UNMC technologies are currently under li-

cense, with 39 helping improve lives as products on the market.

Improving the "human condition" is a key component of Dr. Gold's vision for UNMC research. He told an estimated crowd of 80 that research doesn't end after publishing a paper in an academic journal or when a grant expires.

"The research is done when a human life is changed," Gold said.

He added: "It's the people in this room that carry out the final step, that take it from the laboratory into the realm of reality, so it changes the lives

Continues below

Looking Forward

At right, UNMC Chancellor, Jeffrey P. Gold, M.D., addresses a gathering of select University officials administrators and researchers during UNeMed's Shareholder Meeting at TD Ameritrade Park in Omaha. Following his remarks, UNeMed CEO and President Michael Dixon shared several core metrics to highlight UNeMed successes over the previous fiscal year, including:

- 78 new inventions disclosed
- 315 material transfer agreements
- 93 confidential disclosure agreements
- 16 patents issued
- 14 licensing agreements

(More metrics and data on pages 6-8.)



Continued from above

of patients today and tomorrow and for generations and generations to come."

The UNMC Chancellor is the lone shareholder, serving as proxy for Nebraska's University Technology Development Corporation, which owns UNeMed.

Dr. Dixon reported \$1.17 million in total revenue during the previous fiscal year. He said it was comparable to Northwestern University before a successful licensing deal netted the Chicago-based Big Ten Conference member more than \$2.3 billion with the development of Lyrica, an anti-seizure medication.

"That's why we're going to keep taking at-bats," Dixon said. "Because it takes just one swing for a home run."

UNeMed has also focused on expanding its international footprint. In the last two years, UNeMed signed licensing agreements with companies in six different countries.

To lead the growing international efforts, Dr. Dixon announced the addition of D.J. Thayer, who joined UNMC and UNeMed in early July as the director of international and domestic affairs. Thayer, President of infoUSA Inc. for 10 years, will lead UNMC's international activities, particularly as it establishes operations in China. And new agreements in China are currently under negotiation, Dr. Dixon said.

He also highlighted recent fund-raising efforts for local startup companies

that were built on UNMC innovations. In the last three years, UNMC entrepreneurs have raised more than \$10 million in a burgeoning Omaha startup environment that CNN Money rated No. 3 in the country.

Dr. Gold concluded his remarks with the idea that research funding was not a gift, but a necessary investment for greater prosperity and health.

"It's an investment that will convert this intellectual property—and all of your hard work in your research labs—into the future cures and the ways we prevent disease in our country and in our community," he said.

U.S. patents issued to UNMC inventors in fiscal 2014

Patent No.	Patent Title	Issued	Inventor(s)
8,725,419	System and Method for Sequence Distance Measure for Phylogenetic Tree Construction	May 13, 2014	Khalid Sayood, Steven Hinrichs, Hasan Olu
8,722,616	Anti-HIV Peptides and Methods of Use Thereof	May 13, 2014	Guangshun Wang
8,679,096	Multifunctional Operational Component for Robotic Devices	March 25, 2014	Shane Farritor, Mark Rentschler, Amy Lehman
8,653,233	Compositions and Methods for Preventing or Treating Cancer	Feb. 18, 2014	Michael (Tony) Hollingsworth, Karl Kohlgraf, Thomas Caffrey
8,604,742	Robotic Devices With Arms and Related Methods	Dec. 10, 2013	Nathan Wood, Shane Farritor, Jason Dumpert, Mark Rentschler, Adnan Hadzialic, Stephen Platt, Dmitry Oleynikov
8,585,734	Ergonomic Handle and Articulating Laparoscopic Tool	Nov. 19, 2013	Susan Hallbeck, Dmitry Oleynikov, Kathryn Done, Tim Judkins, Allison DiMartino, Jonathan Morse, Lawton Verner
8,560,047	Method and Apparatus for Computer Aided Surgery	Oct. 15, 2013	Hani Haider, O. Andres Barrera
8,535,656	Amphiphilic Polymer-Protein Conjugates and Methods of Use Thereof	Sept. 17, 2013	Alexander Kabanov, Xiang Yi, Serguei Vinogradov, William Banks
8,507,437	Apoptosis-Modulating P53 Protein Therapy for Vascular Disorders and Nanoparticles Containing the Same	Aug. 13, 2013	Vinod Labhasetwar
8,491,890	Methods and Compositions for Inhibiting Diseases of the Central Nervous System	July 23, 2013	Howard Gendelman, R. Lee Mosley, Ashley Reynolds
8,486,909	Compositions and Methods for the Diagnosis and Treatment of Inflammatory Disorders and Fibrotic Diseases	July 16, 2013	Stephen Rennard, Tadashi Sato, Xiang-der Liu, Olaf Holz, Helgo Magnussen

U.S. Patent Applications (2010-2014)



Foreign Patent Applications (2010-2014)

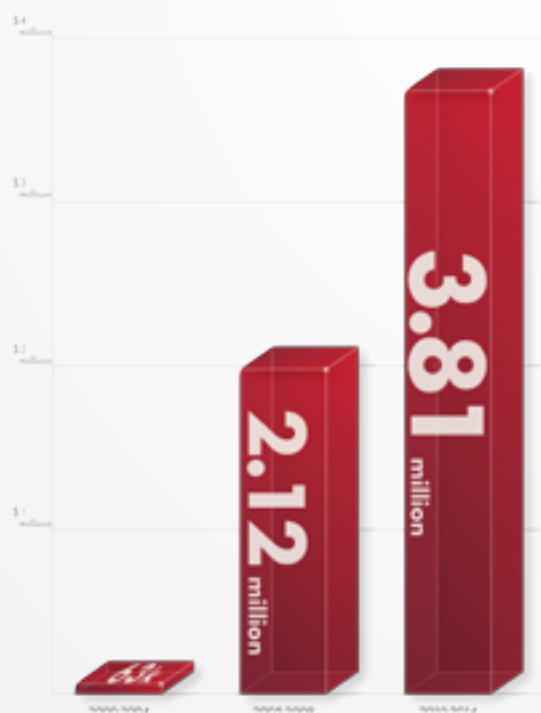


UNMC PATENTS

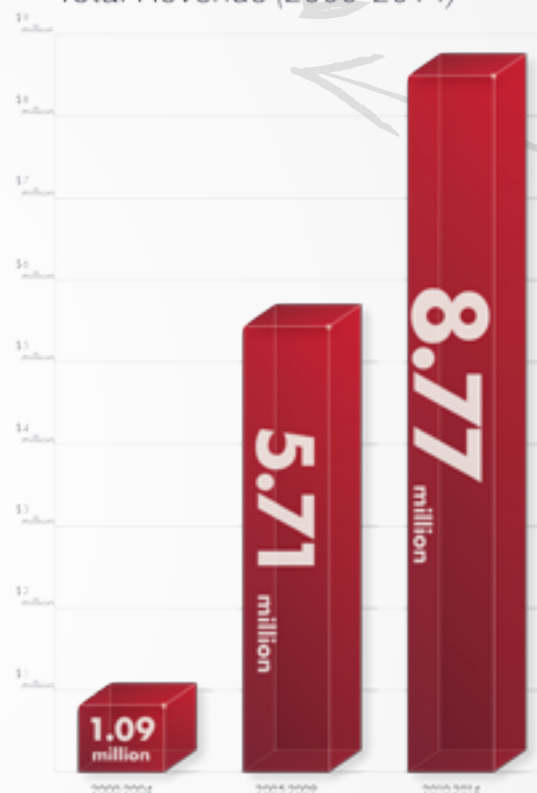
Inventor	U.S.	Foreign	Total
Patrick Iversen	17	27	44
Sam Sanderson	14	26	40
Thomas Porter	18	20	38
Larry Smith	7	22	29
Sudhir Paul	8	19	27
Donald Miller	4	18	22
Jonathan Vennerstrom	4	18	22
Michael (Tony) Hollingsworth	8	13	21
Thomas McDonald	8	10	18
Gennady Gololobov	2	14	16
Richard Tempero	3	13	16
Shane Farritor	12	3	15
Randy Fox	6	8	14
Robert LeVeen	6	8	14
Alexander Kabanov	9	5	14
Mark Rentschler	9	3	12
Dmitry Oleynikov	11	1	12
Stephen Platt	11	1	12
Howard Gendelman	3	8	11
William Beschorner	2	7	9
Geoffrey Thiele	3	5	8
Lynell Klassen	3	5	8
Michael Sorrell	3	5	8
Randall Brand	3	5	8
Jason Dumpert	7	1	8
Ravishankar Kalaga	2	5	7
Annika Weber	3	4	7
Surinder Batra	6	1	7
Adnan Hadzialic	7	0	7
200 with six or fewer total patents			

	UNMC Inventions (by department)	Inventions Submitted (2014)	5-year Total (2010-2014)	2013 Rank	+/-
1	COP-Pharmaceutical Sciences	10	54	3	+2
2	COM-Surgery	9	40	6	+4
3	COM-Internal Medicine	8	26	6	+3
4	COM-Pharmacology & Experimental Neuroscience	7	36	1	-3
5	Munroe-Meyer Institute	6	13	5	—
5	COM-Pathology & Microbiology	6	45	2	-3
7	COM-Emergency Medicine	4	13	11	+4
7	Eppley Institute	4	22	6	-1
7	College of Public Health	4	16	6	-1
10	College of Pharmacy	2	12	20	+10
10	COM-Radiology	2	6	14	+4
10	COM-Family Medicine	2	2	20	+10
10	COM-Biochemistry & Molecular Biology	2	15	6	-4
10	COM-Orthopedic Surgery	2	7	14	+4
10	College of Dentistry	2	13	3	-7
16	College of Nursing	1	6	11	-5
16	COM-Genetics Cell Biology & Anatomy	1	9	14	-2
16	COM-Radiation Oncology	1	4	20	+4
16	School of Allied Health Professions	1	12	20	+4
16	COM-Anesthesiology	1	11	14	-2
16	COM-Cellular & Integrative Physiology	1	13	11	-5

Distributions (2000-2014)

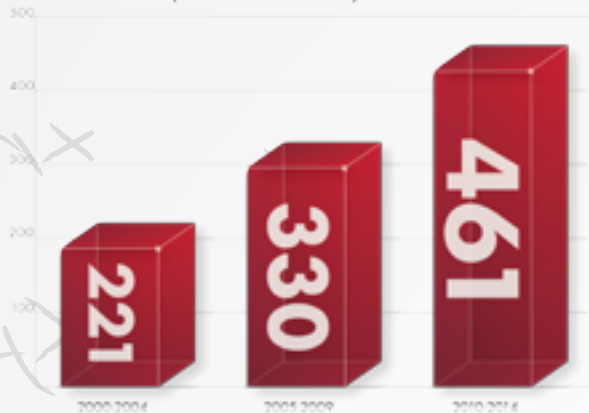


Total Revenue (2000-2014)



STATS

CDAs (2000-2014)



Licensing Agreements (2000-2014)

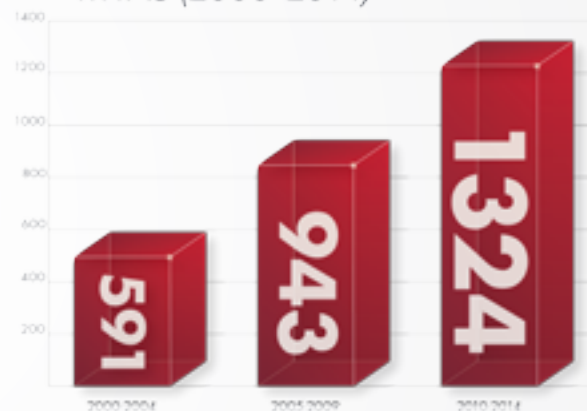


Evaluation

How UNeMed performed in key measures during fiscal 2014.

- 14 licensing agreements
- 16 patents issued
- 37 new inventors
- 39 licenses with products on the market
- 75 active licenses
- 78 new inventions disclosed
- 89 unique inventors
- 93 confidential disclosure agreements
- 100 patent applications
- 123 opportunities created
- 315 material transfer agreements
- \$334,589 total distributions
- \$1,172,805 total revenue

MTAs (2000-2014)



Patent Applications (2000-2014)



New Inventions (2000-2014)



Innovation Week adds startup demo day

Companies formed around recent technology developed at the University of Nebraska Medical Center demonstrated their innovations and discoveries during the inaugural UNMC Startup Company Demonstration Day on Monday, Oct. 7, 2013.

Inventions displayed spanned a wide array of biomedical development that ranged from surgical devices and nanoparticles to next generation antibiotics and innovative research tools.

Hosted by UNeMed Corporation, the event was part of Innovation Week, an annual showcase of UNMC's research discoveries and developments. Innovation Week also included a special seminar from GlaxoSmithKline chemist Brian Johns, Ph.D., who delivered a talk about the development and discovery of Tivicay® — a powerful new

HIV treatment that recently earned FDA approval. Innovation Week concluded at the Innovation Awards Ceremony and Reception (see page four).

Demo Day drew an estimated 120 people into the Durham Research Center's auditorium.

"It was great to see that the majority of the crowd was from the local community," UNeMed President and CEO Michael Dixon said after. "There was great representation from the local venture capital and biotech community."

Virtual Incision co-founder Shane Farritor — the University of Nebraska-Lincoln engineer who partners with UNMC researcher Dmitry Oleynikov — opened the slate of presentations with a demonstration on a surgical robot

Continues on page 14

Early-stage robots in space

Shane Farritor, Ph.D., inventor and co-founder of Nebraska biotech startup Virtual Incision, shows how a key component of his new surgical robot would work on a living patient. Farritor and his co-inventor, UNMC surgeon Dmitry Oleynikov, M.D., drew national attention in the summer of 2014 when NASA performed zero-gravity tests on the robots for their potential use in space.



PTNT moves toward testing new spinal injury treatment

Imagine a world where a crushed spinal cord is not a sentence to life in a wheelchair, but a temporary setback.

It sounds like something from a sci-fi novel, but an Omaha biotech startup could someday make it a reality.

ProTransit Nanotherapy, founded by former UNeMed entrepreneur in residence Gary Madsen, Ph.D., expanded its nanotechnology portfolio beyond fighting skin cancer to helping paraplegics regain their feet.

Both technologies are based on the core principle of halting damage caused by free radicals, which often lay at the root of many ailments, including



Dr. Madsen

skin cancer and spinal damage.

The spinal treatment is still in early development, but remarkable preclinical video footage shows lab rats making full recoveries from crushing spinal injuries.

ProTransit Nanotherapy will create prototypes of its nanotechnology at the University of Nebraska's Biologics Production Facility in Omaha. When completed, inventor and company co-founder Vinod

Labhasetwar, Ph.D.—along with other collaborators—will use the prototypes for additional testing on other animal species.

ProTransit Nanotherapy was built around a technology Dr. Labhasetwar developed while still at UNMC, a drug delivery system that can carry treatments to traditionally difficult-to-reach places, such as the deepest layers of skin or brain and spinal tissue.

The skin cancer-fighting product under development is expected to be an additive for existing skincare products, such as sunscreen or cosmetics.

—Tyler Mueller, UNeMed

The power of Collaboration

The power of collaboration shouldn't be underestimated.

Anyone can have a great idea, but real innovation lies at the intersection of crossing disciplines. When smart, specialized experts come together, there's little they can't do.

Collaboration leads research teams to discover new ideas and products, and fosters success that might not have been possible alone. Few of UNMC's 244 U.S. patents list single inventors, with a full 68 percent, or 165, naming two or more.

In the last 10 years alone, just 17 of 96—a whopping 18 percent—of UNMC patents are from a single inventor.

"Rarely does it take one scientist to solve a problem," said Jennifer Larsen, M.D., UNMC's Vice Chancellor for Research.

Collaboration brings together the unique perspective that comes from different skill sets and areas of expertise. Cancer biologist Surinder Batra, Ph.D., sees the world and its problems differently than computer experts like UNL's Nick Palermo, Ph.D.

But lock them in a room for a few hours, and they become powerful allies in the fight against pancreatic cancer.

Collaborations between talents like Drs. Batra and Palermo, don't often happen in a vacuum, and they are rarely by accident.

Dr. Batra had discovered a biomarker—pancreatic differentiation factor 2, or PD2 for short—which may hold the answer to successfully treating one of the world's deadliest cancers. Yet the discovery appeared destined for relative obscurity. Its potential as a powerful tool against pancreatic cancer might have never been known.

Learning exactly how to harness PD2's potential would have been too costly in both time and treasure.

The nudge toward collaboration came from UNeMed Senior Licensing Specialist Joe Runge, who found a way to eliminate both problems in one stroke. By pairing Dr. Batra with Dr. Palermo, and bringing in yet a third expert, Jonathan Vennerstrom, Ph.D., the PD2 project was able to compress years of research that would normally cost millions into just a few weeks at cost of \$250,000.

The PD2 project's modest funding was made possible through a proof-of-concept grant awarded by the University and the Nebraska Research Initiative, and even that might not have been possible without a collaborative approach. Collaborations are more likely to win grant awards, Dr. Larsen said.

By the end of June 2014, the team had used one of the most powerful supercomputers in all



of American academia—the Holland Computing Center at UNO's Peter Kiewit Institute—to zero in on a handful of promising drug candidates.

The realization of PD2's potential remains very much alive, sparking new interest from potential industrial partners.

UNeMed and its vast network of connections that extends beyond academia can help connect researchers to collaborators within the biotech industry. UNeMed works with scientists and industry to bridge academic research with commercial interests, UNeMed president and CEO Michael Dixon said.

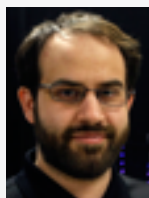
But researchers can build their own partnerships, independent of any matchmaking efforts from UNeMed. UNMC scientists can plumb the "Find an Expert" database (see sidebar), or get out to campus events to meet and mingle with colleagues.

The networking approach worked for Anna Brynskikh-Boyum, Ph.D.

Then a graduate student,



Dr. Batra



Dr. Palermo



Dr. Vennerstrom

To find an expert...

...go to a webpage database of more than 1,000 researchers and faculty throughout the University of Nebraska system, which includes information about areas of study and publications. Researchers can browse the database and find someone specific to their needs.

View the database at:
<http://www.experts.scival.com/nebraska/>



Dr. Anderson



Dr. Thiele



Duryee

Three for the heart

New blood test may show earliest signs of coronary artery disease



Brynskikh-Boyum needed advice on an idea she had. While attending UNeMed's 2012 Innovation Awards ceremony, she sought out Shane Farritor, Ph.D., a UNL engineer perhaps best known for his collaboration with UNMC surgeon Dmitry Oleynikov, M.D. Together, Farritor and Oleynikov, founded Virtual Incision while developing surgical robots that NASA is testing for use on astronauts while in orbit and beyond.

But Brynskikh-Boyum's problem was more terrestrial, so Farritor referred her to one of his graduate students, Tom Frederick.

Together, Frederick and Brynskikh-Boyum developed a new research tool, Versatool™, built a startup company, Elegant Instruments, and started selling products online all within one year. (See story on page 14.)

As University of Nebraska's interim president James Linder, M.D., told faculty and staff in an Aug. 11 email, "The more we work together, the more we can accomplish."

—Tyler Mueller, UNeMed

An interdisciplinary team of researchers at the University of Nebraska Medical Center believe they've made a potentially ground-breaking discovery. It's a simple test that effectively determines whether or not a patient is harboring the dangerous type of heart disease that kills one in four Americans every year. Even better, the test could tell an apparently healthy 40-year-old that they are in the earliest stages of the world's No. 1 killer.

Most people live with it, blissfully unaware. They only develop complications late in life, such as chronic chest pain or angina. But there are others who unexpectedly suffer a debilitating or fatal heart attack. It doesn't seem to matter if they're young, fit and trim or a world famous actor vacationing in Europe.

Coronary artery disease is the accumulation of plaque deposits inside the arteries that feed the heart. As plaque builds up, it restricts blood flow. For people who have the unstable and usually lethal form of the disease, a piece of that plaque can break off creating two potential problems.

While that debris is swept away in the blood stream, things like blood platelets and clotting factor start building up at the rupture site, creating a bottleneck that blocks blood flow. And the debris itself can get wedged further down the line where it could also dam off blood flow. Either way, the result is a sudden heart attack or stroke.

Unfortunately, that heart attack is too often the first indication that a patient has the lethal form of the disease. UNMC's new test could change that.

Geoff Thiele, Ph.D., a professor of internal medicine, and Michael Duryee, a research coordinator for the Division of Rheumatology and Immunology at UNMC's College of Medicine, made the initial discovery. While looking for clues to help understand inflammatory conditions such as arthritis and al-

coholic liver disease, they focused on a molecule that is a strong indicator of inflammation. Known as MAA or malondialdehyde-acetaldehyde, the molecule also appeared to indicate the presence of coronary artery disease.

"We thought it was cool scientifically, but we're not clinical guys," Duryee said. "We don't see this everyday."

Dr. Thiele and Duryee brought in cardiologist Dan Anderson,

Continued on Page 13

Accentuate the positive

Collaboration can be difficult to encourage. Personalities can clash. Disagreements ranging between the significant and the petty can kill any well-intentioned project.

But it's always worth the effort.

Even when a collaboration doesn't produce something like a product or cutting-edge research, there is still something to take away. Knowledge can be gained from every collaboration because "failure teaches more than success," Dr. Dixon said. It might be learning how to talk or work with another, or it might be as simple as learning what doesn't work.

The data gained from a failed collaboration could even be used for new research or lead to an entirely new product that solves a different problem, Dr. Larsen said.

Option attack: Startup keeper, industry pitch

Most inventions disclosed to UNeMed are at an extremely early stage of development, and industry partners typically require additional research data before entering into formal relationships. In such a circumstance, new corporate entities are often the most appropriate avenue for product development.

UNeMed works with entrepreneurs, investors and consultants to form new companies around disclosed technologies. UNeMed nurtures these companies — identifying early inves-

tors, grant opportunities and potential leaders — while often taking an equity stake in the business.

From fiscal 2010 to 2014, UNeMed helped build 14 new startup companies, nearly double the 16 startup companies formed in the previous 10 years.

UNeMed's recent success can be partly attributed to a more concentrated effort in the area, but Nebraska has also become a more fertile entrepreneurial environment in recent years. Government incentives,

local directives and several new mentoring and funding programs all helped cultivate the burgeoning startup scene in Omaha and surrounding areas.

In early July, CNN took notice of Omaha's growth as a startup community, rating it the third-best city to launch a startup.

UNeMed plays an active role in this ecosystem, participating in local entrepreneurial organizations such as Pipeline, Straight Shot and NMotion.



Yes, Omaha

Omaha's growth in the startup and entrepreneurial communities has captured the attention of national media. With the support of the University of Nebraska, UNeMed has long been actively engaged in both worlds, with it's advising and mentoring young biotech entrepreneurs or sponsoring and promoting major startup conferences like Big Omaha.

Awards *Continued from page 4*

Jonas Salk, the famed inventor of the Polio vaccine, was among those who reviewed Dr. Gendelman's discovery all those years ago. Dr. Gendelman told an estimated 200 that Salk was not impressed by the work.

Salk, one of the most celebrated American researchers of the last 60 years, advised Dr. Gendelman to choose a new path of study. Despite Salk's enormous reputation, Dr. Gendelman made an unlikely decision.

He chose to prove him wrong.

"There's going to be many hurdles," Dr. Gendelman said. "It takes not smarts, but determination to get over those hurdles."

Most Promising New Inventions

2013	Keshore Bidasee, Ph.D.	Targeted Glyoxalase-1 Gene Transfer to Prevent Cardiovascular and End-Organ Complications in Diabetes
2012	Gregory Oakley, Ph.D.	Small Molecule in Vivo Inhibitors of the N-Terminal Protein Interacting Domain of RPA1
2011	Babu Padanilam, Ph.D.	Novel Target for the Treatment of Renal Fibrosis
2010	Stephen Bonasera, M.D., Ph.D.	Noninvasive Monitoring of Functional Behaviors in Ambulatory Human Populations
2009	Paul Dunman, Ph.D.	Novel Antibiotic Compounds
2008	Guangshun (Gus) Wang, Ph.D.	Anti-HIV Peptides and Methods of Use Thereof
2008	Janina Baranowska-Kortylewicz, Ph.D.	Sex Hormone Binding Globulin: New Target for Cancer Therapy

Innovation Awards

2013	Howard Gendelman, M.D.	Innovator of the Year
2012	Tammy Kielian, Ph.D.	Emerging Inventor
2011	Jonathan Vennerstrom, Ph.D.	Lifetime Achievement
2010	Amarnath Natarajan, Ph.D.	Emerging Inventor
2009	Rodney Markin, M.D., Ph.D.	Lifetime Achievement
2008	Dong Wang, Ph.D.	Emerging Inventor
2007	Robert LeVeen, M.D.	Lifetime Achievement



Blood Test *Continued from page 11*

M.D., Ph.D., an assistant professor in the Division of Cardiology who is a rare blend of researcher and practicing physician. He has a frontline view of the battle against the world's most prolific killer, which annually takes more than an estimated 17 million people. Heart disease accounts for 600,000 American deaths every year.

"In the current realm of understanding disease, we know that inflammation is important in cardiovascular disease," Dr. Anderson said. "But we really don't understand a lot about why or how."

By current measures, Dr. Anderson said, about 30 percent of people with heart disease slip through the cracks. For those people, the first indication of trouble may be a killer heart attack in what he called "a failure of medicine."

"We should have seen and recognized this decades prior, and prevented it," he said. "People tend to feel okay and think they're okay. But they're not even seeing the tip of the iceberg."

But there are others with the disease who suffer few,

if any, ill-effects. Predicting which patients will develop the more deadly form of heart disease is little more than a guess.

Then Dr. Thiele and Duryee knocked on the door.

"I said, 'Oh, my God.' From a clinical diagnostic perspective, this becomes invaluable to help understand those different groups of patients," Dr. Anderson said.

Looking for clues

An interdisciplinary team of researchers at the University of Nebraska Medical Center in Omaha—Dan Anderson (left), Michael Duryee (right) and Geoff Thiele (pictured on page 11)—believe they found a way to determine who will develop potentially deadly heart disease with a simple blood test.



Over the course of two pilot studies, the team tested hundreds of volunteer patients' blood, and found a remarkable correlation.

"Right now, the data really is incredible," Dr. Thiele said.

It's no minor feat for pilot studies to generate significant results with such a small group of patients. Most other studies in cardiovascular research don't show significant results until thousands of patients are included in a study, Dr. Anderson said.

"We're seeing differences where we haven't been able to predict those differences before, and I think that's the value," he said.

The initial results have gained attention elsewhere.

The research team and UNMC's technology transfer office, UNeMed Corporation, are currently in prelimi-

nary discussions with several companies on how to translate the results into products that can better factor in a patient's risk of heart attack

Dr. Thiele said that any test developed from the discovery would be cheap and easy to implement with any clinical lab facility's existing equipment. It would be a simple blood test, not unlike tests that measure blood-sugar levels for diabetics.

The next rounds of testing will be critical to understand how accurate the test can be, particularly studies that follow individual patients over the course of five or 10 years, Duryee said.

If successful, researchers hope the

test could be used to definitively tell younger patients in their 40s, 30s or even their 20s whether or not they will develop potentially fatal heart disease. Perhaps even patients in their teens could get early warnings, and begin taking preventative measures.

"That's what we don't know, but that's our goal," Dr. Anderson said.

—Charlie Litton, UNeMed

Student inventors collaborate, join startup party

It almost sounds like the start of a bad joke: A Russian, a Nebraskan and an MIT scientist are sitting at a table...

But here the Russian saw a problem and thought of a way to fix it. The Nebraskan knew how to make the vision a reality, and the MIT scientist brought the two together in a cross-pollination of disciplines and university campuses.

Anna Brynskikh Boyum had been stewing on an idea for a few months, thinking, "I need an engineer's take on

this." She hoped to find that help at the 2012 Innovation Awards ceremony.

As a grad student at UNMC, Boyum spent a lot of her time in front of a cryostat machine, a tool that can shave frozen tissue samples, revealing a multitude of things, such as cancerous cells from a liver biopsy.

But the delicate slices tend to curl, wrinkle, melt or tear before a lab technician can get the sample onto a slide for microscopic analysis.

Technicians fight with these

frozen and nearly transparent samples with a set of tools they scrounge together, such as paint brushes and butter knives.

What if all these tools could be combined into something specifically designed for the task?

She saw Shane Farritor browsing the buffet line at the Innovation Awards reception and asked Farritor if it could be done.

Farritor passed Boyum's idea to one of his graduate stu-

dents, Tom Frederick, a doctoral candidate in mechanical and material engineering.

What began as a simple idea, is now Versatool™—An ergonomically designed handle with an integrated knife and interchangeable tips using a slick, magnetic coupling system.

The elegant design perhaps inspired the name of the startup company they formed together, Elegant Instruments.

"Without that face-to-face meeting, this might not have happened," Frederick said.



Operation Versatool™

Elegant Instruments and its Versatool™ are the products of a student collaboration that brought together engineering and biomedical lab work.

Startups (2000-2014)



Demo Day *Continued from page 9*

designed to improve surgeries that remove part of the large intestine.

Farritor said current techniques and tools are often performed through small incisions, or laparoscopically. But those tools can be counter-intuitive and difficult to use.

"I couldn't tie my shoes with laparoscopic tools," he said, "but I could with this."

The crowd also saw presentations from Motometrix, which can detect concussion's just by measuring the nearly imperceptible changes in a person's balance; Elegant Instruments, a startup built by two graduate students who devised a better tool for research lab technicians (see above); Prommune, a company built on Sam Sanderson's promising next generation antibacterial treatment; ProTransit Nanotherapy, which plans to deliver powerful anti-oxidant agents with nanoparticles (see page nine); Cardiosys, a data analysis platform with predictive capabilities; and Radux, a device company that makes products to protect physicians from radiation as they work on patients who are undergoing x-rays.

Bioscience E-ship course expands researcher skills

When it comes to selling research as a potential product, entrepreneurial skills and business acumen are required—abilities most researchers necessarily avoid in their relentless pursuit of scientific understanding.

A graduate-level course, administered by Dan Monaghan, Ph.D., in the fall of 2013, aimed to equip researchers with those entrepreneurial skills.

Formed through a joint partnership between UNeMed and the Center for Clinical and Translational Research, “Bioscience Entrepreneurship” included areas such as intellectual property law and product development.

UNMC students participated in research-driven discussions of entrepreneurship, case-driven exposure to intellectual property and corporate law and detail-driven examples of biotechnology product development over a 15-week semester. The class also used input from real

world entrepreneurs, lawyers and business professionals.

The class, consisting of five graduate students, was a melting pot of fields of study, experiences, and backgrounds. UNeMed’s Joe Runge, one of the lecturers of the course, said when they applied their knowledge and previous experiences to the business model, the group of students participated in thought-provoking discussions and came to interesting conclusions.

Lecturers of the class included current and former UNeMed employees, including Runge; UNeMed patent lawyer and Director of Intellectual Property, Jason Nickla, J.D.; and UNeMed entrepreneur-in-residence Gary Madsen, Ph.D.

Runge plans to improve with the class and add a larger focus on the research aspect of the course in the future.

Reaching beyond academia

UNeMed’s popular slate of activities during Innovation Week include an open house, educational seminar, the Innovation Awards (at right), and the first-ever UNMC Startup Demonstration Day. For more on Innovation Week and Demo Day, see pages four and nine.



UNeMed committed to educational mission

The mission of all academic research institutions, besides the pursuit of knowledge through research, is to educate students in scientific disciplines and the management of ideas, money and time so they may be successful in their future careers. Many of those careers will impact the public through economic growth and public health, so it falls to UNeMed to educate students in developing, marketing, and transferring novel technologies to the market.

Students are informed to contact UNeMed when initial discoveries are made; ensuring the University has the best chance of developing and successfully licensing a technology that leads to significant and sustained revenue.

To aid in the education of the campus community, UNeMed engages in different types of outreach projects; programs that teach either general or specific information and focusing on individuals who show an interest for a career in transferring technologies to the commercial sector. UNeMed’s postdoc and intern programs serve to educate individuals, while open seminars and UNeMed’s Innovation Week provides exposure and education to all campus personnel.

UNeMed seeks to create a community based on innovation at UNMC, where all faculty, staff, and students are both knowledgeable and aware of the possibilities of developing and transferring valuable technologies from UNMC to the private sector.

New design creates new opportunities

Over the past few months, UNeMed has been improving the usability and function of its website, ensuring that important information about UNMC technologies is easier to discover and more intellectually accessible to a wider audience.

The goal is a simple one: UNeMed wants to improve its ability to engage with people who want to know more about UNMC research, the technologies that emerge from that research, and learn how to enter into partnerships with us and our talented pool of researchers.

Website visitors may have already noticed an updated technology portal, designed with a mobile-friendly look and user-friendly navigation. The new design allows users to quickly find a technology by the disease it affects, examine its technical specifications, review any related multimedia, and read the most up-to-date news.

The goal was to improve and promote each technology individually in order to increase the number of visitors the site receives. We used targeted keywords to make sure we attracted the right people who seek what we offer. This mar-

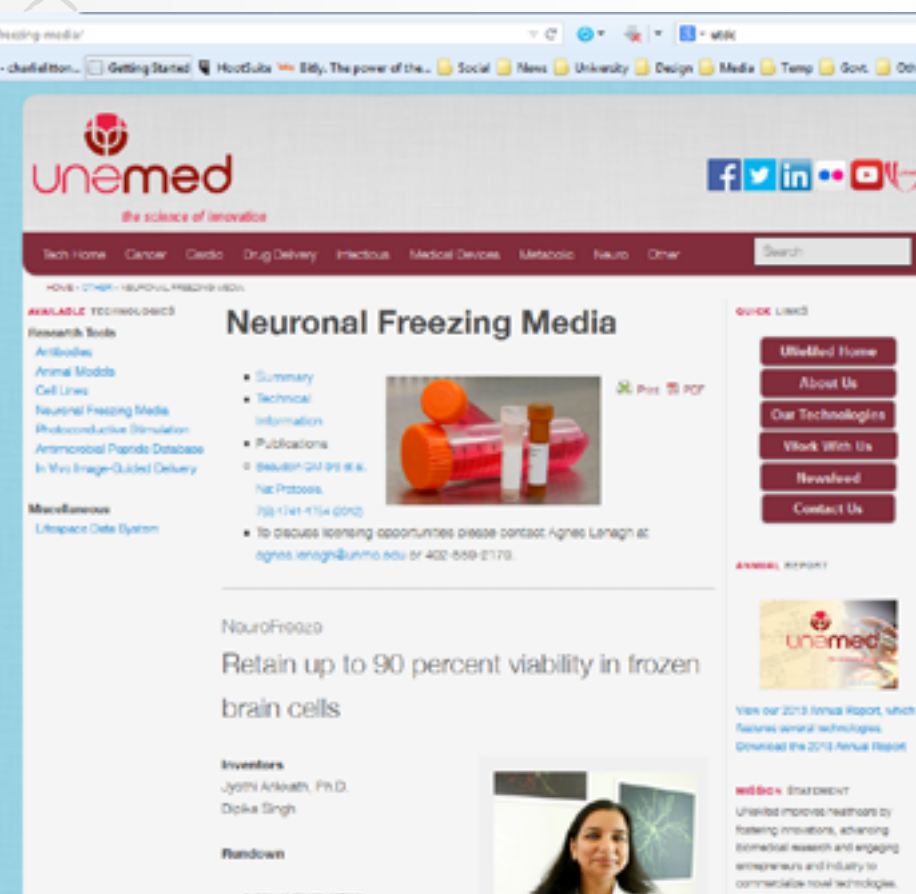
keting strategy has already proven successful, attracting several direct inquiries about technologies available for licensing.

To add to the user experience, visitors can move between three layers of complexity ranging from a short summary for non-specialists to the highly technical scientific literature. The short summaries allow anyone to understand the technology, what problem it addresses, and the solution it presents. The technology's technical specifications are also available for expert readers.

Rebuilding and restructuring the website is an ongoing process. As the value of digital increases in the tech transfer realm, UNeMed intends to remain an industry leader in seizing the new opportunities that an adaptable digital presence can provide.

Media Stats

- 94** number of times UNeMed or UNMC technologies appeared in the news during fiscal '14
- 48** number local and regional media
- 28** number of national and international media



UNeMed services

As a regional leader in technology transfer, UNeMed is establishing itself as more than a mere extension of the University of Nebraska Medical Center.

In addition to consulting services for smaller institutions, UNeMed also expends a fair amount of energy building and maintaining its reputation as a valuable resource within the intellectual property, small business and biotechnology communities.

UNeMed has executed agreements with external institutions, takes a leadership role in the local entrepreneur and startup community, offers educational seminars and is a visible member of the international biotechnology industry.

UNeMed's effectiveness in these services is largely due to the make-up of its talented staff and personnel. In addition to a staff of biomedical and intellectual property experts, UNeMed has also added the business and clinical perspective with a physician- and entrepreneur-in-residence.

Diabetes treatment: Most promising invention of 2014

New therapy halts, repairs organ damage

An exciting new development at the University of Nebraska Medical Center helps mitigate the disastrous effects of diabetes—particularly degenerative and destructive brain complications more often seen in the elderly.

UNeMed named the innovation its “Most Promising New Invention” of 2014 during its annual Innovation Awards ceremony. (See page four.)

Research on diabetic animals

shows that an enzyme, Glyoxalase-1, could be used to treat common diabetes complications such as blindness, heart disease, kidney failure, and erectile dysfunction.

Even more promising, the therapy also helps improve brain function and minimizes the amount of brain tissue affected by a stroke, all while significantly helping reduce blood sugar levels.

Glyoxalase-1 targets and degrades

the suspected cause of these complications—a naturally occurring chemical, methylglyoxal, which is created by damaged cells when blood sugar levels are high.

Currently there are no FDA-approved treatments that target brain complications in diabetes and also help manage blood sugar levels. But with a committed partnership, Glyoxalase-1 could be the first.

Diabetes Therapy

Inventor

■ Keshore Bidasee, Ph.D.

Rundown

- Prevent cognitive dysfunction
- Reduce cerebrovascular complications
- Minimize affected brain tissue following stroke
- Treats other diabetic complications
- Reduce brain complications
- Manage blood sugar
- Targets damaged cells



Cancer therapy

Diagnose, treat tumors with one compound

Two of the most prevalent forms of cancer are prostate cancer and breast cancer, accounting for more than 60,000 U.S. deaths each year. As a result they have become a major focus of both diagnostic and therapeutic development.

As with all diseases, the main goal is to develop more accurate forms of diagnosis and disease tracking along with safer and more effective therapies.

Researchers at UNMC have developed a way to accomplish both goals with one compound. The compound can be used to image a patient's can-

cer and treat it at the same time.

Compounds are tagged with a radioactive isotope that can be used to kill, see, or track a tumor.

The compounds specifically target a cellular protein called the androgen receptor, which is commonly found in a variety of cancers, including breast and prostate cancers.

These compounds have undergone extensive cellular and animal studies and an Investigation New Drug application has been filed with the FDA. UNMC plans to start a clinical trial in prostate cancer patients in the near future.

Radio-cancer compound

Inventors

- Janina Baranowska-Kortylewicz, Ph.D.
- Zbigniew P. Kortylewicz, Ph.D.

Rundown

- Novel compound
- Accurate diagnostic
- Track cancer growth
- Image and kill cancer cells
- Effective against prostate cancer
- Comprehensive, successful cellular and animal studies

Treatment resistance

Wage war against pancreatic cancer

There may finally be an answer to pancreatic cancer. Every year, roughly 45,000 people are diagnosed with pancreatic cancer, one of the most lethal forms of cancer. With current treatment options, almost 43,000 of them will die within five years of diagnosis.

The few treatments that exist are too soon rendered impotent as patients quickly develop resistance to the drugs.

But researchers at the University of Nebraska Medical Center may be able to increase the odds for those

who receive the grim news. Researchers at UNMC are working on a novel drug called "13-197" that has shown promise in mouse models.

"13-197" is still in preclinical development for pancreatic cancer, and may be useful in the treatment of other forms of cancer and other diseases such as diabetes.

UNMC is interested in partnering with a pharmaceutical company to further develop "13-197" and future analogs for clinical use.



UNMC Photo

Treatment resistant cancer

Inventors

- Amarnath Natarajan, Ph.D.
- Qian Chen, Ph.D.
- Vashti Bryant, Ph.D.
- Rajkumar Rajule

Rundown

- Novel drug
- Orally Available
- Potent inhibitor of cancer cell proliferation
- Effective in pancreatic cancer animal model
- Treat other forms of cancer
- Treat diabetes, other diseases

Better laparoscopy

Ergonomic, intuitive design for better surgeons, quicker procedures

As the world pushes to make minimally invasive surgery easier and safer, surgical procedures need smaller and smaller incisions.

Intuitool

Inventors

- Dmitry Oleynikov, M.D.
- M. Susan Hallbeck, Ph.D.

Rundown

- Intuitive interface
- Ergonomic design
- Shorter learning curve
- Shorter procedures
- Shorter patient recovery
- Better Patient Care

Engineers and surgeons at the University of Nebraska Medical Center found a way to meet those needs, while making those procedures safer for patients and easier for surgeons—a groundbreaking new surgical tool called "Intuitool."

Minimally invasive, or laparoscopic, surgery is difficult for any surgeon. During a procedure, a surgeon must hold the instrument, often at awkward angles, for hours at a time. The surgeon can't see the tools directly, instead relying on two-dimensional video displays. And everything must fit through an opening about the size of Abraham Lincoln's head on a U.S. penny.

Intuitool is the next generation of laparoscopic tools, with robust articulation and superior ergonomic design and feel. Its



rod-driven system conveys the maximum amount of power with minimal exertion. Multiple publications over eight years demonstrate how Intuitool is safer, easier, and quicker to learn.

UNeMed is seeking a partner to license a portfolio of international patent applications teaching multiple aspects of the Intuitool; or an entrepreneur eager to arm surgeons with better tools.

AquaBlade

Eliminate risks associated with open-heart surgeries

AquaBlade, a new medical device invented at the University of Nebraska Medical Center, could provide a less invasive treatment for cardiovascular disease and eliminate a significant amount of the inherent risks associated with open-heart surgeries.

AquaBlade is an innovative surgical instrument that uses a catheter to deliver a specialized cutting tool through a patient's artery where it uses a high-pressure water jet to repair life-threatening tears in artery walls. The device could also be used to deploy custom-length stents in blood vessels or even help remove previously deployed stents.

Arterial tears in the inner lining of an artery can lead to the formation of blood clots that obstruct blood flow and eventually lead to a heart attack or stroke. If left untreated, an arterial tear is fatal for 80 percent of patients.

Current treatments for arterial tears often require open-heart surgery, which carries a 25 percent risk of death and an extended recovery period.

AquaBlade eliminates most of those risks while also minimizing the time of recovery. It is currently at the conceptual stage, preparing a functional prototype for pre-clinical testing.

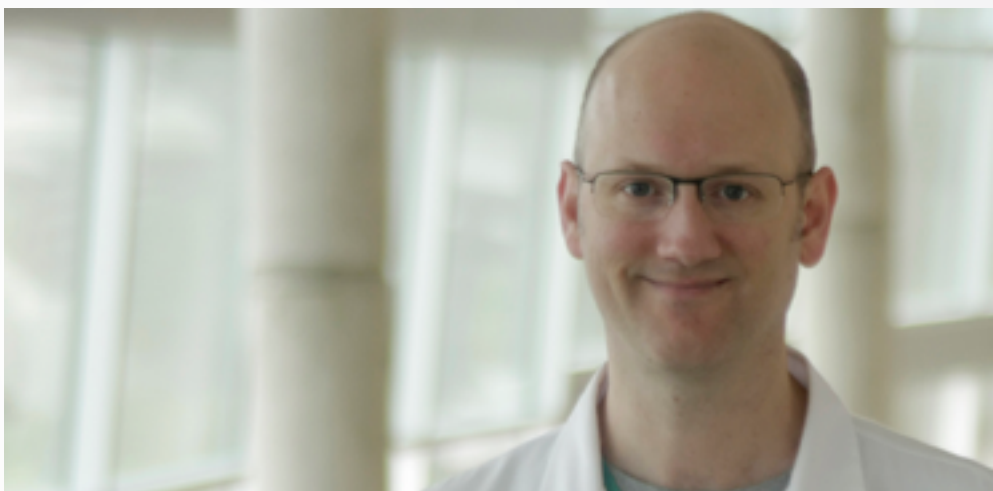
AquaBlade

Inventors

- Jason MacTaggart, M.D.
- Nicholas Phillips
- Alexey Kamenskiy, Ph.D.
- Amy Mantz

Rundown

- Novel surgical/medical device
- Treats aortic dissection
- Removes stents
- Deploys custom-fit stents
- Less invasive
- Faster patient recovery



Chemotherapy resistance

Get rid of cancer once and for all

Resisting chemotherapy treatment may no longer be an option for cancer cells.

Cancer cells don't always respond to chemotherapy and resistance is a major cause of treatment failure among cancer patients.

Researchers at the University of Nebraska Medical Center discovered a compound that renders cancer cells vulnerable to chemotherapy, allowing patients to fight resistant cancers.

There are different causes of resistance in cancer. Many chemotherapy drugs kill cancer cells by damaging their DNA. However, the cell's own proteins can repair that damage.

Certain proteins originally meant to

prevent cancer actually help its progression and increase its resistance to treatment. One such protein, Replication Protein A1, promotes the repair of damaged DNA in healthy cells, which might otherwise lead to cancer.

But once a cell becomes cancerous, the same mechanism also protects cancer cells from the lethal effects of DNA-damaging therapeutics, like chemotherapy.

UNMC researchers found a new compound that stops the repair mechanism in cancer cells by blocking Replication Protein A1. Early testing shows the new compound may be used alone or in combination with other cancer drugs to deliver a one-two punch to cancer cells.

This novel treatment could allow on-

cologists to gain the upper hand against chemotherapy-resistant cancers. Additional testing is ongoing, and researchers are looking for an industrial partner to help develop the compound for clinical trials.

Chemo compound

Inventors

- Gregory Oakley, Ph.D.
- Jason Glanzer, Ph.D.

Rundown

- Treat chemotherapy-resistant cancer cells
- Useful as chemosensitizing agent
- Complement and improve existing therapies
- For cancers resistant to DNA-damaging drugs

Parkinson's Disease

New vaccine strategy may signal beginning of end

A novel combination developed by researchers at the University of Nebraska Medical Center may be the final solution that could deliver a knockout blow to Parkinson's disease.

UNeMed's 2014 Innovator of the Year (page four), Howard Gendelman, M.D., and his team believe they are on the

verge of producing an effective vaccine to battle the debilitating disorder that affects more than 1 million Americans. Right now, the only treatment options for Parkinson's—the world's second-leading neurodegenerative disorder

behind Alzheimer's—are methods for reducing symptoms.

But if Dr. Gendelman's approach succeeds, the immune systems of vaccinated patients will be armed to fend off the disease and prevent its disastrous effects.

The vaccine turns an old foe into a potential ally.

Vaccination with a protein alone, alpha-synuclein, actually has the ability to make Parkinson's even worse. But when the protein is paired with an immune modulator, it promotes an immune response that protects brain cells from further damage.

Preclinical studies show a remarkable 91 percent survival rate of neurons in treated laboratory mice. In 2014, early stage clinical trial testing began on one of the vaccine's critical components. The early test will help determine if the immune system of a Parkinson's patient can be successfully modulated.



UNMC Photo

Parkinson's Vaccine

Inventors

- Howard Gendelman, M.D.
- R. Lee Mosley, Ph.D.
- Ashley Reynolds, M.D., Ph.D.

Rundown

- Novel therapeutic combination
- Treats underlying factors, not just symptoms
- Treats existing disease
- Prevents future disease
- Potentially useful for other neurodegenerative disorders

Biofilm Infections

Prevent, treat and destroy with the immune system

More than a million cases of hospital-acquired infections can be traced to biofilm, a slimy coating of microbes that can form on medical devices and implants.

Biofilm infections are notoriously difficult to treat without removing or replacing the infected medical device. Treatment is further hindered by the development of antibacterial resistant strains of microbes.

But researchers at the University of Nebraska Medical Center have discovered a new way to combat device-related infections. Rather than pursue traditional routes of treatment with antibiotics, Dr. Tammy Kielian has discovered a method to prevent, treat

and destroy biofilms that adhere to implanted medical devices.

Dr. Tammy Kielian has discovered that the inhibition of a certain population of cells known as myeloid-derived suppressor cells, enhances the ability of the body's immune system to attack and clear biofilms.

By targeting a patient's own cells, rather than using antibiotics, this approach may also help decrease the likelihood of developing antibiotic-resistant bacteria.



UNMC Photo

Biofilm Prevention

Inventor

- Tammy Kielian, Ph.D.

Rundown

- Minimizes biofilm infections
- Proof of concept in animal models

ROSTER

BOARD OF DIRECTORS



Steve Schreiner
Vice President & Director of Marketing and Licensing
Ph.D., Pathology and Microbiology, University of Nebraska Medical Center
M.A., Microbiology, University of Nebraska Omaha
Joined UNeMed: **2006**



Jason T. Nickla
Vice President & Director of Intellectual Property
J.D., Creighton University School of Law
LL.M., International Intellectual Property Law, Chicago-Kent College of Law
Joined UNeMed: **2009**



Joe Runge
Director of Business Development
M.S., Molecular Biology, University of Iowa
J.D., University of Iowa
Joined UNeMed: **2005**



Matthew Boehm
Senior Licensing Specialist
Ph.D., Cancer Biology, University of Nebraska Medical Center
Joined UNeMed: **2009**



Jack Mayfield
Contracts Manager
J.D., University of Tennessee
M.S., Education-Instructional Media, Kansas State University
Joined UNeMed: **2012**



Cori Harsh
Finance Manager
Joined UNeMed: **2009**



Valerie Gunderson
Office Manager
Joined UNeMed: **2007**



Mindy Ware
Patent Associate
Joined UNeMed: **2010**



Charlie Litton
Communications Specialist
M.A., Journalism, University of Nebraska-Lincoln
Joined UNeMed: **2013**



Qian Zhang
Licensing Associate
Ph.D., Cancer Biology, University of Nebraska Medical Center
Joined UNeMed: **2011**



Agnes Lenagh
Licensing Associate
Ph.D., Pharmacology and Experimental Science, University of Nebraska Medical Center
Joined UNeMed: **2012**



Caronda Moore
Licensing Associate
Ph.D., Medical Science, University of Nebraska Medical Center
Joined UNeMed: **2013**



Deepak Madhavan
Physician in Residence
M.D., University of Nebraska Medical Center
Joined UNeMed: **2013**



Anne Rivas
Office Associate
Joined UNeMed: **2013**



Jack A. Hartwigsen
Senior Licensing Consultant
Ph.D., Molecular Biology, Iowa St. Univ.
M.S., Molecular Biology, Iowa St. Univ.
M.B.A., Finance, University of Iowa
Joined UNeMed: **2006**



Michael Dixon
President & CEO
Ph.D., Pathology and Microbiology, University of Nebraska Medical Center
Joined UNeMed: **2003**



Don Leuenberger
Chair
Vice Chancellor for Business and Finance
University of Nebraska Medical Center



Tyler Martin, M.D.
Director
CEO
Adjuvance Technologies



Terry Opgenorth, Ph.D.
Director
Vice President
CSU Ventures, Colorado State University



Richard Spellman, Esq.
General Counsel for Healthcare
University of Nebraska Medical Center



Mike Pallesen
Secretary & General Counsel
Cline Williams, Wright, Johnson & Oldfather



402-559-2468
unemed@unmc.edu
<http://www.unemed.com>

Mail:
986099 Nebraska Medical Center
Omaha, Nebraska 68198-6099

Location:
4460 Farnam St., Ste. 3000
Omaha, Nebraska 68198-6099