



COLLEGE OF MEDICINE
AND LIFE SCIENCES

THE UNIVERSITY OF TOLEDO

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COLLEGE OF MEDICINE AND LIFE SCIENCES

spotlight

2017



COLLEGE OF MEDICINE
AND LIFE SCIENCES
UNIVERSITY OF TOLEDO

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Supporting our Community, Fulfilling our Mission



The Spotlight presented before you is a snapshot of the past year. I hope it provides great insight into the wonderful work going on each and every day at The University of Toledo College of Medicine and Life Sciences.

Inside, you will find a glimpse of how we are supporting our community and fulfilling our three mission pillars of education, research and clinical care.

Among the highlights of this past year was growing our partnership with ProMedica. This includes expanded research and learning opportunities for our faculty and students, as well as capital investments to improve the College of Medicine facilities. A learner space for students and residents opened at Toledo Hospital and we transitioned 32 additional residents and more than 300 medical students into Toledo Children's Hospital and Toledo Hospital.

The Academic Affiliation is making great strides toward its goal of cultivating a pipeline of exceptional medical talent. This also aligns with our new mission statement to improve health in the communities and region we serve. More than 75 percent of the new students are Ohio residents, and one-third is from northwest Ohio. Graduating students also are staying in our northwest Ohio community to pursue residencies at UT in record numbers. Of all of our accomplishments, the fact that UT students are choosing to stay in Toledo for residency will likely have the greatest impact on our medical community in the years to come.

Our students also made a difference in the community through programs like the Summer Community Health Project and CommunityCare Clinics. Our faculty and students also traveled the globe, sharing their knowledge and expertise in countries including Guatemala and Honduras.

Our surgical residency program was ranked 14th in the country by the Journal of Surgical Education when considering outcomes.

Philanthropy plays a vital role to ensure the continued advancement of medical science and our mission to improve the human condition. This report also highlights the story of the Medical Research Society, which awarded its second \$50,000 grant to a faculty member leading promising research. Importantly, these grants are helping our faculty be competitive for national grant awards and creating opportunities for their trainees.

Our donors also have helped to ensure the dream of a medical education is within reach for many of our new and continuing students by providing scholarship opportunities. Our students benefit significantly from this philanthropy with more than \$1.1 million in scholarships awarded last fall.

The University continues to lead in the area of research. Our faculty received more than \$13 million in research grants. Studies included Alzheimer's disease, atherosclerosis, diabetes, hypertension, the immune system, kidney disease, Lake Erie algal bloom toxins and PTSD.

As we look into 2017 and beyond, we'll continue to pursue several major initiatives, including the ProMedica Academic Affiliation, improving residency programs to attract and retain talented students, implementing a new curriculum for our incoming class of medical students, renovating our research labs on campus and improving the student experience.

In closing, I would like to thank the faculty, staff, students, alumni, donors, supporters and trustees who have contributed to the remarkable achievements and successes in this past year. I'm looking forward to even more success in the future.

A handwritten signature in black ink, appearing to read "C. J. Cooper".

Christopher J. Cooper, MD

Executive Vice President for Clinical Affairs

Dean of the College of Medicine and Life Sciences



Facts & Figures

History

In the 1960s, a critical shortage of doctors developed in the United States due to the limited number of medical schools that existed to train them. In response to this shortage, the Toledo State College of Medicine — later renamed Medical College of Ohio and, after that, Medical University of Ohio — was founded in 1964 as a freestanding, state-supported institution that eventually blossomed into an academic health sciences center.

One of 14 state universities in Ohio, The University of Toledo was established in 1872 and became a member of the state university system in 1967. UT and the Medical University of Ohio merged in July 2006 to form an institution with a comprehensive breadth of undergraduate, graduate and professional programs matched by just 27 universities across the nation, and with the third-largest public university operating budget in the state.

In July 2016, the University celebrated its 10-year anniversary of the merger.

“This merger was something that was kind of ahead of its time because in higher education, we’re talking about getting the best value for the resources that we spend on higher education,” said John Carey, chancellor of the Ohio Department of Higher Education.

In 2015, The University of Toledo College of Medicine and Life Sciences began a 50-year academic affiliation partnership with a local health system, ProMedica, to provide additional and expanded opportunities for the College. This includes expanded research and learning opportunities for faculty and students, as well as capital investment to improve university facilities.

The University’s Economic Impact

The University of Toledo’s impact to the region’s economy totals \$3.3 billion, according to a 2017 comprehensive study by UT economists.

That is equivalent to 9.7 percent of the region’s gross, metropolitan area product.

“As the second-largest employer in northwest Ohio with an enrollment of more than 20,000 students, we are proud to be one of Toledo’s anchor institutions contributing as a major force to the region’s growth and development,” UT President Sharon L. Gaber said. “The University of Toledo continues to work hard to strengthen the community.”

List of Academic and Clinical Departments

- Anesthesiology
- Cancer Biology
- Emergency Medicine
- Family Medicine
- Internal Medicine
- Medical Microbiology and Immunology
- Neurology
- Neurosciences
- Obstetrics and Gynecology
- Orthopaedic Surgery
- Pathology
- Pediatrics
- Physician Assistant Studies
- Physiology and Pharmacology
- Psychiatry
- Radiation Oncology
- Radiology
- Surgery
- Urology

FY16 Research Data for the College of Medicine and Life Sciences

FY16 TOTAL EXPENSES **18,534,597.75**

FEDERAL **13,854,395.12**

STATE **468,322.85**

OTHER **4,211,879.78**



61
of principal investigators



134
of active awards



96
of new awards for FY16



225
of grant proposals submitted and pending for FY16

RESEARCH SUPPORT

Mission

We improve health in the communities and region we serve by educating excellent clinicians and scientists, providing patient-centered and high-quality care, and producing nationally recognized research in focused areas.

The College of Medicine and Life Sciences revised its mission, vision and values in 2016 to reflect the evolving educational, clinical and research goals of the College.

The revised mission accompanies an updated vision for the college, meant to reflect the Academic Affiliation between the College of Medicine and Life Sciences and ProMedica and the ongoing effort to develop educational programs and sponsored research of national prominence.

Both statements reflect the College's core values of professionalism, service, diversity, collaboration and discovery.

"We want all College of Medicine and Life Sciences employees, faculty and learners to embrace and demonstrate our common values each day," said Dr. Christopher J. Cooper, executive vice president for clinical affairs and dean of the College of Medicine. "The revised mission and vision statements frame the organizational culture of the College and will influence our success in achieving our educational, clinical and research imperatives."

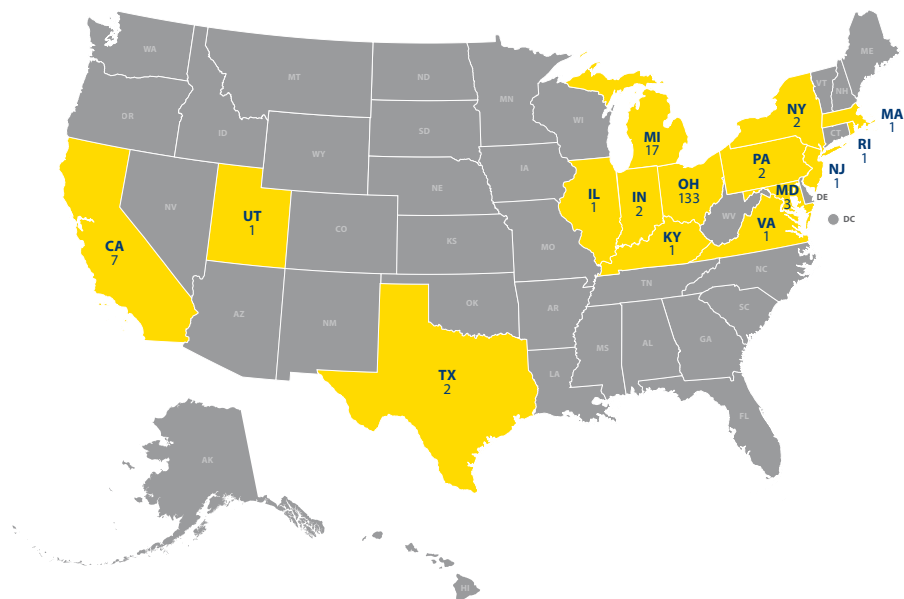
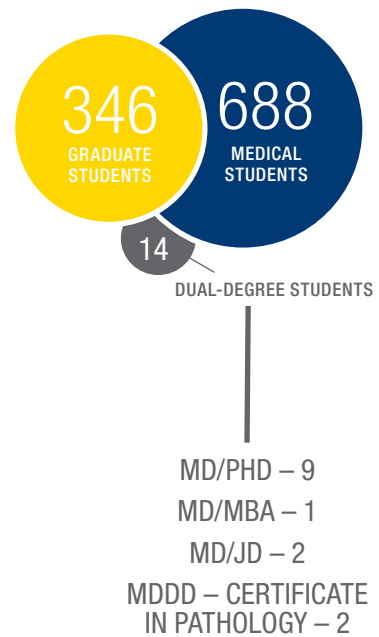
Students

The College enrolled 688 medical students and 346 graduate students during the spring 2017 semester, with 14 dual degrees.

Medical Students: Class Profile

The 175 medical students admitted to the College last fall represent 54 different universities or colleges, including 18 institutions in Ohio. More than 75 percent of the new students are Ohio residents, and one-third is from northwest Ohio. All students have earned bachelor's degrees, with 60 holding master's and two with PhD degrees. There are 95 men and 80 women.

The entering class of 2016 was filtered from 3,679 applications. The average, total GPA of this class is 3.64.



Match Results

It was an exciting day for 165 graduating medical students from The University of Toledo who packed Stranahan Theater to learn where they would complete their training.

“Match Day is a thrilling milestone for a medical student,” Dr. Christopher J. Cooper, dean of the College of Medicine and Life Sciences, said. “Our students matched throughout Ohio and the nation in a very competitive environment. Our faculty and staff are proud of this class for their years of hard work and dedication to become doctors. We are honored to help launch their careers.”

Of the 12 UT students who matched in northwest Ohio hospitals, nine continue to train in UT residency programs.

The students matched in 24 specialties, with 67, or 41 percent, in primary care fields. The top specialties for the graduating class were internal medicine, emergency medicine, family medicine and pediatrics.

Ohio was the most popular state with 52 students matching there, followed by Michigan with 18 and California with 14. Overall, students matched with programs in 31 states.

“I could’ve gone somewhere closer to home in New England, but my experience here made me want to stay,” Sophia Toraby said. “The specialty was a wonderful surprise. I had applied for both general surgery and ob/gyn. I let the national match math algorithm make the decision for me. This is a great fit.”

Not only were graduating medical students proud of their placements, faculty and staff were pleased with the spike in the number of budding doctors across the country who will join UT’s residency programs.

Diversity

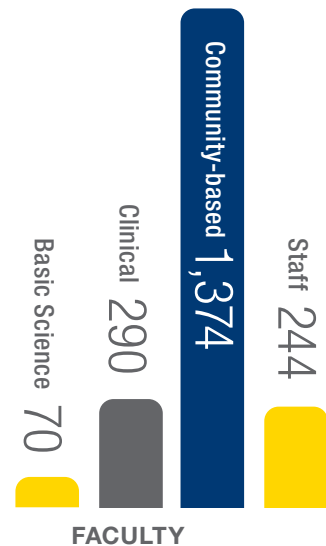
The College of Medicine and Life Sciences is a community of diverse, lifelong learners who embrace the value of diversity. The College seeks to create and sustain an environment in which all members remain aware of and strive to achieve their best potential when relating to patients, learners and colleagues from diverse racial, cultural and ethnic backgrounds.

The Office of Diversity is very active in the admissions process and sits on the College of Medicine Medical School Admissions Committee.

The University of Toledo’s chapter of the Student National Medical Association (SNMA) is an organization for medical students that focuses on the needs and concerns of current students who have historically been underrepresented in medicine and come from underserved communities. The members of this organization strive to ensure that medical education has emphasis on increasing future physicians who are culturally competent and sensitive to the needs of diverse populations.



UT resident Ebtisam Alumin, left, and medical student Tarshree Sawyer, center, are excited to see that Avneet Singh matched in internal medicine at the University of Vermont Medical Center. Sawyer is headed to the University of North Carolina Hospitals for pediatrics.





— EDUCATION —

The University of Toledo College of Medicine and Life Sciences is teaching and training future physicians and world-class researchers who will lead the way to a new model of health care. Facing an aging population and an increased need for health care providers, this work is even more relevant.

By fostering new partnerships for academic excellence and expanded opportunities for clinical training and residency placement, UT is on a long-term mission to recruit top-performing students, educate them to be the best doctors, advanced practitioners and research scientists, and retain them in northwest Ohio as they build their careers.

Academic Affiliation Expands Clinical Training Capacity

A learner space and conference center for students and residents opened at ProMedica Toledo Hospital and included a transition of 32 additional residents and more than 300 University of Toledo medical students. New administrative offices for the Academic Affiliation also opened in Jobst Tower on the campus of ProMedica Toledo and Toledo Children's Hospitals. Designed to enhance clinical integration and provide offices for key faculty and functions from the College of Medicine and Life Sciences, the 10,000-square-foot space includes 21 private offices, 24 workstations and five conference rooms.



Residents in pathology now pursue all of their clinical rotations in blood banking and transfusion medicine at ProMedica Toledo Hospital under the direction of Dr. Susan Shapiro. This has resulted in dramatic

improvements in resident scores on the annual Resident In-Service Examination in the area of blood banking and transfusion medicine.

Surgery Residency Ranked 14th in Nation

The University of Toledo's surgical residency program was ranked 14th in the nation when considering outcome-based measures.

Published in the *Journal of Surgical Education*, the research was compiled through publicly available data from all 218 eligible, general surgery residency programs. To generate an outcomes-based program ranking, surgery programs were evaluated according to an average percentile that was calculated using board pass rates and the prevalence of alumni publications.

The article stated that surgical residency programs should be valued for their outcome-based measures and that reputation alone doesn't

do justice for a residency's quality when comparing surgical residency programs across the country.

"This solidifies what we already know about UT's surgical residency," said Dr. Munier Nazzal, professor of vascular surgery and director of the vascular laboratory, former director of the General Surgery Residency Program. "We offer an excellent surgical residency program that results in our alumni contributing to articles, grants and clinical trials in the surgical field."

This information was compared against peer nominations generated through a 2014 national survey that asked 17,000 verified physicians to rate as many as five residency programs.

"The most important step was to improve the educational part of the residency training."

"Our residency has changed over the past few years," Nazzal said. "The most important step was to improve the educational part of the residency training. We shifted from 'service providers' to 'balanced education, research and service' with well-defined programs of research, teaching and education."



Simulation Center Focuses on Interdisciplinary Teamwork and Collaboration

The University of Toledo's Lloyd A. Jacobs Interprofessional Immersive Simulation Center continues to reflect today's reality of medicine. Using the center's state-of-the-art technology, UT students in differing specialties are learning the importance of interdisciplinary teamwork and collaboration.

The three-story, 65,000-square-foot facility is the first in the nation to incorporate three integrated simulation centers: a progressive anatomy and surgical skills center, an advanced clinical simulation center and a virtual immersive reality center.

“We wanted everyone to experience the high-intensity process, emotions and medical treatment of heroin overdose”

“Our graduates leave UT better equipped for their careers due to the amplified experience they receive from the Interprofessional Immersive Simulation Center,” said Dr. Christopher J. Cooper, executive vice president for clinical affairs and dean of the College of Medicine and Life Sciences. “They are more confident in their abilities, which leads to higher patient confidence and safety.”

Since its opening in 2014, the center has been the source of training for approximately 2,000 learners per month,

including those from the colleges of medicine and nursing, as well as paramedics from local fire and rescue departments and military units. The center's technology also can be applied in non-medical fields, including the arts, humanities, natural sciences and engineering.

In March 2016, The University of Toledo hosted a heroin overdose simulation to help fight Ohio's heroin epidemic.

In front of an audience, students training to be doctors, nurses and emergency responders were put to the test with a heroin overdose simulation.

The real-time emergency situation — from the staged apartment to the simulated hospital room — was broadcast to a crowd of recovering heroin addicts, Toledo police and fire chiefs, UT faculty and staff, and community partners to increase education about Ohio's heroin epidemic.

“We wanted everyone to experience the high-intensity process, emotions and medical treatment of heroin overdose starting inside a home,” Tia Hornish, UT clinical simulation and education research associate, said.

“By watching the situation unfold, we hope they feel a connection to what is happening to people of all ages and walks of life in our community. As health-care providers, we need to be able to understand that the heroin epidemic is not discriminating against anyone and provide resources to help addicts.”



In an effort to improve worldwide access to quality health care, physicians from The University of Toledo in August 2016 trained Iraqi surgeons in emergency medicine.

The doctors from Kafa, Iraq, studied at UT for a month to learn the procedures and interdepartmental cooperation required to develop emergency departments in their country.



Human Donation Program Celebrates Milestone

The only academic program in the country designed to prepare individuals to coordinate and oversee the organ and tissue donation and transplantation process graduated its 100th student in August 2016.

The University of Toledo's Master of Science in Biomedical Science Human Donation Science program prepares individuals to facilitate the organ donation process from beginning to end. They serve as liaisons between the donor's family, medical staff, organ procurement organizations and transplant centers.

"It's the best job in the world," said Rachel Baczewski, certified procurement transplant coordinator at Life Connection of Ohio and 2013

graduate of the program. "It's so rewarding to know that I'm providing comfort to families who have lost a loved one, and assisting in saving the lives of other patients. Each family gets a piece of my heart."

Coordinators must pull together a team of medical professionals, facilitate medical testing and ensure laws are followed while compassionately and diplomatically communicating with the donor's family.

"It's a tough job, and organ procurement organizations were seeing a high level of turnover among their coordinating staff," said Linda Miller, assistant professor of UT's Human Donation Science program. "We wanted to see better training

"It's the best job in the world."

programs and higher retention rates. We developed this program as a result."

Students enrolled in the Human Donation Science program each receive a multidisciplinary education covering all components of organ donation and complete course work in medical science, management, human resources and law. They also complete clinical training and two internships prior to graduation.



Medical Student Trades Baton for Stethoscope

University of Toledo third-year medical student Moriah Muscaro is one of the best baton twirlers in the nation.

Her perfect figure eights, spins and illusions are a result of 17 years of continual practice, constant competition and relentless repetition.

“Twirling is amazing for me, even if it is an incredible amount of hard work, because I love to perform for people,” the 24-year-old said. “I love performing for an audience and getting everyone to smile when they leave.”

Just a week after being named College Miss Majorette of America in July 2015, she traded her baton for a short, white coat.

“In many ways, my years of baton twirling and competing can be compared to my journey of getting into medical school,” Muscaro said. “What I learned from twirling is work ethic. I have had to balance school and twirling my whole life. When I had homework and competition, I had to turn down friends and social opportunities.”

That continues to be the reality of her life as a medical school student. The aspiring pediatrician is applying many of her baton lessons to real life.

“I love the feeling of my hard work paying off, but I know that even if I work hard, I won’t always succeed,” she said. “That is good to keep in mind as I go through medical school, because while I tend to excel in math and science, I am undertaking the most vigorous academic journey of my life.”

Today, she uses baton twirling as her stress reliever and has participated in the medical student talent show.

Students Run with the Dean

University of Toledo College of Medicine and Life Sciences students, along with some faculty and staff, participate in a monthly “run with the dean” event on campus.

The event is an opportunity for students to connect with Dr. Christopher J. Cooper, dean of the College of Medicine and Life Sciences and executive vice president for clinical affairs.

Participants, including the dean, run four to six miles around campus to parks in the surrounding area and back.

Depending on the time, the group enjoys breakfast, lunch or dinner afterward for discussion and further one-on-one time with the dean.

“We have a very talented group of students and faculty who are committed to the emotional and physical health of our college,” Cooper said. “It is really a great pleasure spending time with these young women and men, and having the opportunity to hear their stories directly from them.”



Students Benefit from Generous Support

A total of 119 scholarships worth \$1.1 million were awarded to University of Toledo College of Medicine and Life Sciences students last fall.

One of the recipients was graduated medical student Megan Mooney, who was the recipient of the UT and ProMedica Better Together Scholarship.

“Receiving this scholarship has helped me beyond words,” Mooney said. “Not only has it supported me financially and educationally, I feel like the sponsors of my scholarship

have become part of my personal support system. It has inspired me to think about how I can pay it forward and serve others in the future.”

The amount of financial support available to UT students is a testament of generous sponsors and alumni.

“Our students benefit tremendously from the generosity of our scholarship donors,” UT President Sharon L. Gaber said. “Their financial support means our students can continue their studies without

The amount of financial support available to UT students is a testament of generous sponsors and alumni.

bearing the full weight of their educational expenses, and can focus on becoming the next generation of physicians. We express our heartfelt gratitude for their continued support.”

Scholarship Created to Honor UT Resident



In 2016, University of Toledo surgical resident Dr. Cyrus Chan passed away one year shy of finishing his surgical residency at UT.

Chan’s transformation from life-saving doctor to terminal patient touched his fellow surgeons with the unpredictability of life.

Fellow residents Dr. Steve Stanek and Dr. Tahir Jamil created a way to ensure Chan’s legacy lives on.

While Chan was still alive, his friends and colleagues created an endowed scholarship for medical students and an endowed award for residents

that will be presented annually through The University of Toledo Foundation in Chan’s name. The money will be given to people with the same gifts as Chan.

The UT medical community rallied for Chen during his illness. Jamil called him a brilliant surgeon who helped heal many patients and teach medical students.

“He’s not only a compassionate doctor with his patients,” Jamil said at the time. “Cyrus has won several awards for teaching. Seeing such a close friend and such a good human being have such a terrible condition has hit home for all of us. We’re devastated.”

Dr. Thomas Schwann, then-interim department chair and S. Amjad Hussain Endowed Professor in Thoracic and Cardiovascular Surgery, had spoken of how honored and privileged he was to work with Cyrus.

“Cyrus is not a ‘Hollywood’ sort of a surgeon,” Schwann had said. “He is not loud and boisterous. He is quietly effective.”

Donations had poured in from around the world. At the time, Chan said he felt honored by the support.

“I cannot put into words how much I love them and all they have done for me,” he said. “It makes me feel special to know that everything I have done for the University and contributed to the residency program has left a mark.”

Chan passed away a few weeks later.

The money raised in Chan’s name was given to students and residents committed to surgery and to taking the time to educate others about the College of Medicine.

To support Chan’s enduring legacy, contributions can be made to the Dr. Cyrus Chan Endowed Scholarship Fund or the Dr. Cyrus Chan Teaching Award in Surgery at give2ut.utoledo.edu.

Donor Lives up to Daughter's Ideal



Tom Litzinger is the last person who would want any publicity for what he's doing for the College of Medicine and Life Sciences at The University of Toledo.

But he knows he can't help a future medical school student without drawing attention to his cause.

In memory of his late daughter, Litzinger donated his \$100,000 life

insurance policy to the College of Medicine to support the Amie Litzinger MD Class of 2013 Endowed Scholarship Fund. This is in addition to his \$25,000 pledge after Amie's death.

Amie died Jan. 1, 2013, from genetic heart disease just months prior to her scheduled graduation from medical school. She was awarded her diploma posthumously, the only student in the history of the College of Medicine to be so recognized.

"Amie loved the College of Medicine," Litzinger said. "Amie could not say enough kind words about her fellow classmates, staff, faculty, administration and friends.

"As a father, how can I not give back to the institution that provided so much for Amie? Amie loved her role at the UT College of Medicine. It truly is an incredible institution that deserves my commitment and dedication."

Litzinger, said education is expensive and he doesn't want someone to forgo medical school because of the cost.

"As a father, how can I not give back to the institution that provided so much for Amie?"

"I will continue to give so we can secure any potential medical school student the opportunity to attend medical school," he said. "Amie, unfortunately, will never become the caring physician that she desired to become. Her patients must have viable replacements to pick up where Amie left off."

For information about how to donate to Amie's Fund, contact Jennifer Schaefer at 419.383.5071 or jennifer.giesige2@utoledo.edu, or go to give2ut.utoledo.edu/litzinger.asp.

An Evolving Admissions Process

Beginning with the incoming class of 2017, The University of Toledo's College of Medicine and Life Sciences evolved its admissions process. Leaders within the College recognized the need for a fundamental reframing of medical school admissions, which began in earnest this year. Utilizing a more rigorous interview process called multiple mini interviews or MMIs, Admissions was able to streamline the interview process, seeing more applicants for the limited number of positions.

In addition, the Office of Medical School Admissions was structurally reorganized and placed into the Office of Student Affairs, operating under the direction of Dr. Yvette Perry, assistant dean for Admissions & Strategic Enrollment.

An emphasis on competency-based curriculum

Also beginning with the incoming class of 2017, the College of Medicine and Life Sciences is embarking on a major curriculum change with emphasis on competency-based curriculum with early clinical experience and seamless integration of foundational and clinical sciences.

KEY ASPECTS OF THE NEW CURRICULUM INCLUDE:

- Systems-based foundational sciences with clinical integration
- Greater emphasis on clinical reasoning and clinical skills in all four years
- Utilization of more innovative educational methods/approaches
- Focus on interprofessional education, patient safety and career development

Graduates Ready to Lead and Serve

After countless hours of studying, hundreds of cups of coffee, and more than a few restless nights, students graduating from The University of Toledo College of Medicine and Life Sciences waited in anticipation in the wings of the Stranahan Theater before receiving their diplomas.

“It is so rewarding to finally have the title of doctor,” said Dr. Harshal Waghulde, who received his PhD in biomedical sciences at the College’s 2016 commencement ceremony.



Waghulde

Waghulde was one of more than 170 students who received doctoral degrees.

Graduates and their guests listened as retired U.S. Air Force Maj. Gen. Susan Desjardins delivered a commencement address centered on the theme of public service. It was fitting, as leadership, determination, focus and community seem to be the common threads of this graduating class.

“Our class is unique. Sure, we challenged each other, but it’s not about vanity and competition,” explained Dr. Josh Merris, who received his doctorate of medicine. “We pushed each other and learned from each other in order to get better.

We respect each other and have built a community of support. It’s been a great experience.”

The path to commencement was rewarding, but challenging.

“Medical school was definitely a challenge. I missed family vacations and celebrations, and it was mentally draining,” said Dr. Rachael Sciplin, a doctor of medicine graduate. “My professors and family helped me realize that the sacrifices were temporary, and that I would come out of it better on the other side. I had to step out of my comfort zone, and each success helped me gain confidence.”

Waghulde is a first-generation college student from a small town in India, but he said the faculty and his colleagues made Toledo feel like home.

“There were many resources here for me to complete research and be on the front lines of cutting-edge science,” he said. “I am the first one in my family to go to college. I’m grateful for the opportunity to pursue a career in medicine.”

For Merris, balancing medical school and personal time with his wife and four young children was sometimes a challenge. He said his peers were supportive and respected his decision to go home after classes instead of joining them in the library or at social events.

“My classmates and instructors helped me find balance. They encouraged me to put family first and stay focused on the reasons I wanted to pursue medicine,” he said. “I credit my wife for my success. She kept

everything running. She was the glue that held it all together while I was studying. I can’t thank her enough.”

With degree in hand, the graduates are ready to make a difference in the world by giving back.

Sciplin hopes to work in an outpatient clinic in an urban or underserved area, perhaps returning home to the Toledo region after completing her residency at the University of South Florida Morsani College of Medicine in Tampa. Merris looks forward to making a difference in the lives of cancer patients. He will remain in Toledo for his first year of general residency before moving to Buffalo, N.Y., to begin in radiation oncology. Waghulde will continue his research during postdoctoral work at UT before returning to India.

“These and all of our graduates exemplify The University of Toledo’s

mission,” said Dr. Christopher J. Cooper, executive vice president for clinical affairs and dean of the College of



Sciplin

Medicine and Life Sciences. “They are ready to become leaders and agents of change.”

In all, 254 students received degrees: 169 earned doctor of medicine degrees, five received doctor of philosophy degrees, 65 received master’s degrees, and 15 received graduate certificates.

A close-up, blue-tinted photograph of a microscope's objective lenses and eyepiece, serving as the background for the page.

— RESEARCH —

For centuries, through the process of investigation and discovery, researchers have contributed to the advancement of society: Better health, longer lives, greater prosperity. The University of Toledo College of Medicine and Life Sciences continues to encourage scientific investigation among its faculty and learners by supporting promising new research and identifying new sources of seed funding. It's through this level of discovery that our researchers are helping to ease pain, build memories and safeguard the next generation of scientists.

In 2016, UT faculty received more than \$13 million in research grants. Studies included Alzheimer's disease, atherosclerosis, diabetes, hypertension, the immune system, kidney disease, Lake Erie algal bloom toxins and PTSD.

Researcher Receives \$3.38 Million Grant to Study PTSD

A University of Toledo researcher received a \$3.38 million award from the National Institute of Mental Health in October 2016 to study the brain for early signs of post-traumatic stress disorder (PTSD) after injury.

PTSD is increasingly recognized as a major mental health problem, with an estimated 8 million adults suffering from some form of the disorder as a result of a traumatic event.

The competitive award is the largest grant received by the University from the National Institute of Mental Health and was given to Dr. Xin Wang, associate professor of psychiatry, to use MRI imaging to study the early development of PTSD in trauma victims.

His study, titled “Study of Early Brain Alterations That Predict Development of Chronic PTSD,” received \$755,000 in 2016, and will total \$3.38 million over a period of four-and-a-half

years, pending oversight and review of annual congressionally approved NIH funding levels. The NIH study section that peer-reviewed Wang’s proposal ranked it in the top 4th percentile for “major research” among those competing for mental health research funding.

The research project will study trauma patients who agree to be monitored for a period of a year, during which time they will be evaluated using non-invasive, functional magnetic resonance imaging technology. This state-of-the-art diagnostic equipment is available only at UT Medical Center. Study participants will be recruited from UTMC’s emergency department, as well as emergency departments from the ProMedica and Mercy Health systems.

“This cutting-edge technology is a safe, non-invasive and non-radioactive way to examine the brain for mechanisms of PTSD development after acute trauma,” Wang said. “Patients will be tracked for one year to identify possible changes in the brain that



Wang

This state-of-the-art diagnostic equipment is available only at UT Medical Center.

differentiate the PTSD development and normal recovery free of stress symptoms. We hope to identify the early changes in the brain that occur in the days following a trauma that place a patient at high risk of developing the disorder.”

Wang first developed this acute PTSD study with civilian automobile accident victims in 2013 with support from an NIH pilot grant. His research at UT has drawn attention from national and international PTSD researchers.



Congresswoman Marcy Kaptur visited campus to celebrate the award. “This is a very significant development,” she said. “Dr. Wang’s research could identify and lead to new medical responses for those most likely to suffer from PTSD.”

Team Develops and Markets Blood Clot Device

Three University of Toledo faculty members have developed a surgical tool that has the potential to save lives.

Dr. Mohammad Elahinia, professor of mechanical engineering, Dr. Rajesh Gupta, assistant professor of medicine and an interventional cardiologist, and Dr. Christopher J. Cooper, professor of medicine and dean of the College of Medicine and Life Sciences, created the QuickFlow PE and say — if fully fine-tuned, tested and FDA-approved — the device would safely remove large

would be significantly faster than all other modes of treatment, including competitive catheters.”

The plan is for the device to extract blood clots without leaving behind smaller clots, and make the procedure to remove a pulmonary embolism — a blockage in a lung artery — safe and less expensive than current methods.

An estimated 100,000 Americans die of pulmonary embolism every year, and about 600,000 Americans suffer from this disease annually.

associate with the UT Office of Technology Transfer, said. “It has been a pleasure to work with Drs. Cooper, Gupta and Elahinia, as well as the various students involved in the development of this device over the last few years to assist with acquiring patent protection for the QuickFlow PE.”

The technology transfer team also helped with the launch of Thermomorph by acquiring funding through UT’s Rocket Innovations and the Ohio Third Frontier Commission, which invests in entrepreneurs moving new technology into the marketplace to create companies and jobs.

UT inventors and startup companies have received more than \$1.5 million from the Third Frontier Technology Validation and Start-Up Fund and matching funds to support the commercialization of research since January 2012. UT ranks third in the state for the number of these awards.



The QuickFlow PE would work similar to a heart catheterization. The idea is for vascular access to be gained through a vein in the groin. The catheter then would be threaded to the affected site, and the device —



blood clots in the lungs in emergency situations faster than current technology.

The device is a thin wire that blossoms into two tiny umbrellas.

Elahinia, Gupta and Cooper recently launched a startup company called Thermomorph to further build and commercialize the QuickFlow PE with the help of UT’s technology transfer team.

“Our research led us to this promising, simple and effective technology, which we believe could restore blood flow within 30 to 60 minutes of the patient’s arrival,” Elahinia said. “This

which opens like two tiny umbrellas attached by a flexible wire — would be deployed. Next, the clot would be captured by closing the circular covers together, then removed through the catheter.

UT signed an exclusive license agreement with Elahinia and Cooper, executive vice president for clinical affairs, to move the business-building process forward.

“It has been exciting to watch the technology evolve from a basic idea in the laboratory to the potentially life-saving device it has become today,” Mark Fox, patent technology

“It has been exciting to watch the technology evolve from a basic idea in the laboratory to the potentially life-saving device it has become today,”

Elahinia recently participated in the National Science Foundation Innovation Corps program to more precisely define the market need his device would meet.

Exploring the Connection between Kidney and Heart Diseases

Chronic kidney disease affects nearly 25 percent of the adult population in the United States. It is closely associated with cardiovascular disease and can lead to a patient requiring dialysis or kidney transplant.

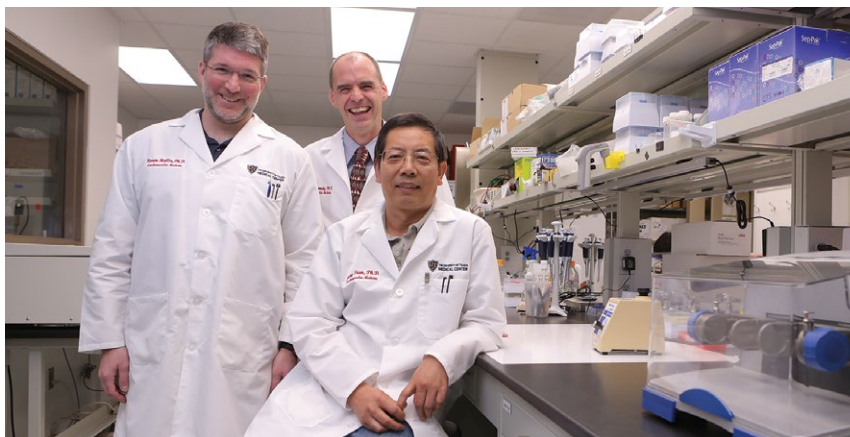
Researchers at The University of Toledo are exploring the connection between the kidney and heart in an effort to understand the molecular mechanisms, which can help develop new treatments to improve patient outcomes.

A recent study titled “Attenuation of Na/K-ATPase Mediated Oxidant Amplification With pNaKtide Ameliorates Experimental Uremic Cardiomyopathy” was published in *Scientific Reports* in October 2016.

UT researchers, in collaboration with Marshall University and New York Medical College, identified a peptide that could reduce kidney disease-related cardiac fibrosis in mice, which could potentially lead to the development of new treatment options for patients diagnosed with kidney disease.

“We know patients with kidney disease often develop cardiac fibrosis, which is a condition where their heart tissue becomes damaged and scarred,” said Dr. Jiang Tian, associate professor of medicine and lead co-author of the study. “Cardiac fibrosis was previously thought to be untreatable, but this new discovery shows promise for reversing or preventing the condition.”

The research builds on pioneering work by co-author Dr. Zijian Xie, director of the Marshall Institute



Dr. Steven Haller, left, Dr. David Kennedy, center, and Dr. Jiang Tian are examining the connection between the kidney and heart.

for Interdisciplinary Research, who discovered a new function of the Na/K-ATPase during his tenure at UT. Xie found that the Na/K-ATPase can mediate cell signaling, in addition to its role in regulating the potassium and sodium level in each cell of the body.

The research team subsequently learned that dysfunction of kidneys signals the body to produce steroids that bind to the Na/K-ATPase, but that a long term, “off-target” effect of this causes scarring to develop in the heart.

“We discovered that these sodium-potassium pumps don’t just move sodium and potassium around, but they are multitasking proteins that are involved in other functions, as well,” said Dr. David Kennedy, assistant professor of medicine and co-author of the study. “It’s like finding out your car is a spaceship and you didn’t even know it.”

When the team introduced a peptide called pNaKtide in a mouse model with kidney disease, the associated cardiac fibrosis was reduced.

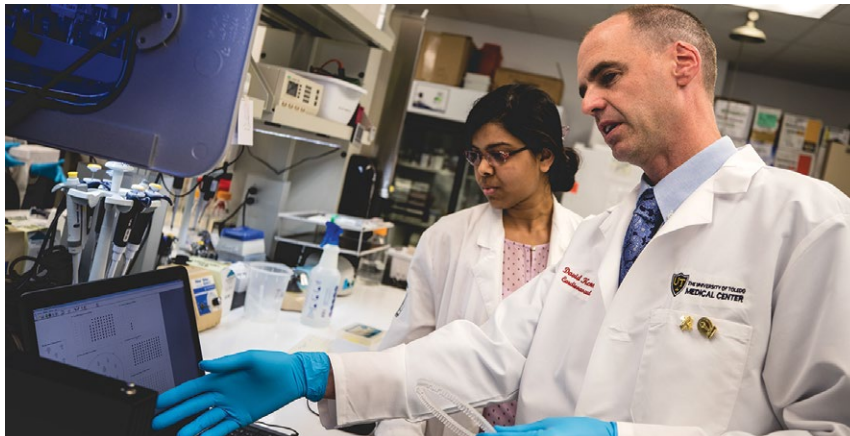
“We are excited about these findings and will further explore the possibility to use this peptide as a therapeutic treatment for cardiac fibrosis,” Tian said.

In a related UT study, Dr. Steven Haller, assistant professor of medicine, discovered use of the immunosuppressant drug Rapamycin also helps in reducing cardiac fibrosis in animal models with kidney disease.

“Given that we now know Na/K-ATPase signaling initiates events that lead to cardiac fibrosis, we can look at ways to interrupt this sequence,” Haller said. “Rapamycin inhibits an enzyme implicated in the progression of many different forms of kidney disease, and we now know it also regulates a pro-fibrotic steroid, which binds the Na/K-ATPase and causes fibrosis.”

The study, “Rapamycin Attenuates Cardiac Fibrosis in Experimental Uremic Cardiomyopathy by Reducing Marinobufagenin Levels and Inhibiting Downstream Pro-Fibrotic Signaling,” was published in the *Journal of the American Heart Association*.

Research Team Focuses on the Effects of Lake Erie Algal Bloom Toxins



Dr. David Kennedy leads a research team focusing on the health effects of Lake Erie algal bloom toxins.

A research team in The University of Toledo College of Medicine and Life Sciences is taking an in-depth look at Lake Erie algal bloom toxins and the impact they can have on the liver.

“No one knows what safe limits are for a large segment of the public,” said Dr. David Kennedy, assistant professor in the Division of Cardiovascular Medicine. “Previous studies only focused on healthy animals.”

During the heart of the summer algal bloom season, researchers use mice as a model to study the impact of microcystin exposure on patients who have the most common and often undiagnosed form of liver disease that is tightly linked to obesity.

“Microcystin is a toxin that specifically targets the liver, a vital organ that needs to be healthy in order to process the food you eat,” Kennedy said. “And non-alcoholic fatty liver disease is the most prevalent type of liver disease nationally — particularly in northwest Ohio. Whether diagnosed or undiagnosed, a third of northwest Ohioans have this disease that is silent at first, but predisposes you to big

problems down the road, such as the liver becoming scarred and inflamed.”

According to the National Institutes of Health, obesity is a major risk factor for the development of non-alcoholic fatty liver disease, which causes the organ to swell with fat. Unchecked, the disease can lead to liver failure and the need for a transplant.

“There is a large population of people who may be susceptible to the effects of microcystin exposure, whether it’s swallowed while swimming at the beach or through the tap should toxic

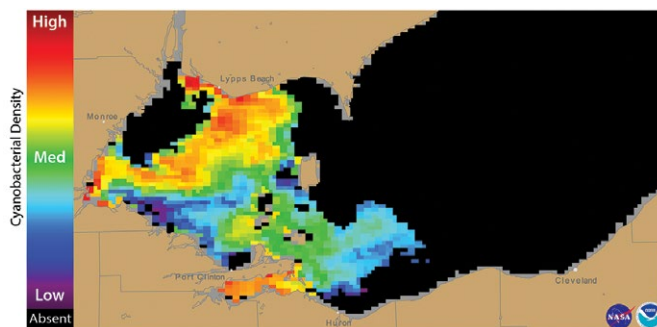
algae once again contaminate the public water supply,” said Dr. Steven Haller, assistant professor in UT’s Division of Cardiovascular Medicine and co-leader of the project that began in the spring. “The Toledo water crisis inspired us to re-evaluate what levels we’re calling safe.”

In the summer of 2014, the city of Toledo issued a “Do Not Drink” advisory for a half-million water customers due to the level of microcystin detected in the drinking water.

The state of Ohio awarded UT researchers a \$45,000 grant, which is matched by the University, for the project to discover if a pre-existing liver disease makes a person more susceptible to damage from the toxin released by algal blooms.

The goal is to help inform local, state and international health organizations as they create guidelines for safe limits of exposure.

UT is among eight Ohio universities to receive a total of \$1.9 million from the Ohio Department of Higher Education’s Harmful Algal Bloom Research Initiative.



Cyanobacterial Index from NASA MODIS-Terra data, collected September 24, 2017.

The Harmful Algal Bloom Research Initiative, jointly managed by UT and Ohio State University, is funding 13 collaborative research projects to provide solutions for the harmful algal blooms that affect Lake Erie, Grand Lake St. Mary’s, Buckeye Lake and other fresh-water bodies in and around Ohio.

Testing a New Drug to Treat Diabetes and Increase Bone Mass

In collaboration with chemists from the Scripps Research Institute, University of Toledo researchers have discovered a compound that normalizes glucose levels while increasing the mass and quality of bone.

“Our data demonstrate the regulation of bone mass and energy metabolism share similar mechanisms,” said Dr. Beata Lecka-Czernik, professor in UT’s departments of Orthopaedic Surgery and Physiology and Pharmacology, and a member of the faculty in the Center for Diabetes and Endocrine Research. “This suggests a new pharmacologic agent could be developed to treat both diabetes and metabolic bone diseases.”

Targeting PPAR γ , the protein in the body that regulates energy use and bone cell differentiation and function, Dr. Patrick Griffin and researchers from the Scripps Research Institute developed a series of new insulin sensitizers.

“Our multidisciplinary chemical biology team at Scripps Florida had spent many years developing precise structure activity relationships around many chemical scaffolds that alter the shape and behavior of PPAR γ ,” Griffin said. “These efforts were then combined with the bone biology expertise of Dr. Lecka-Czernik to explore whether we have compounds that maintain excellent insulin sensitization efficacy, but are positive on bone health.”

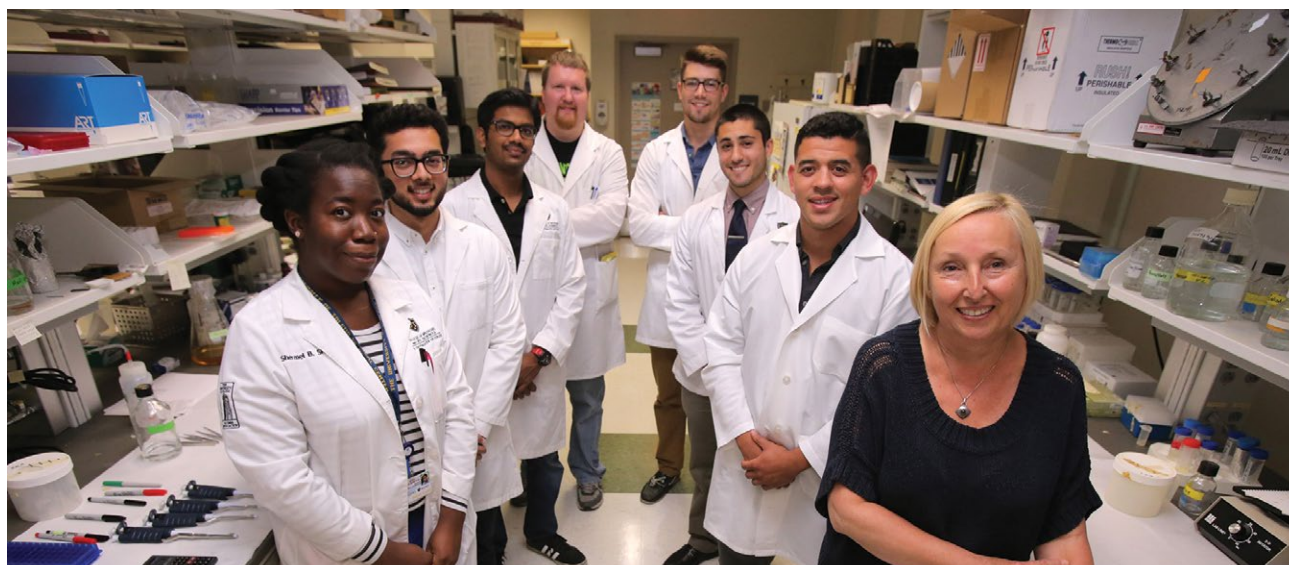
Lecka-Czernik and her team at UT then tested these compounds for bone safety.

“During the course of our experiments, we discovered that a compound called SR10171 normalizes glucose levels in Type 2 diabetes, prevents associated weight gain and increases the mass and quality of bone,” she said. “Remarkably, this experimental drug also maintains its positive effect on bone in non-diabetic conditions and acts as an insulin sensitizer only on demand when normal glucose and insulin becomes imbalanced.”

SR10171 supports bone formation by directly regulating bone cells that work together to break down, build and protect bone.

The results also suggest the bone remodeling properties of this compound could be used to treat osteoporosis, Lecka-Czernik said.

The team’s findings, “PPARG Post-Translational Modifications Regulate Bone Formation and Bone Resorption,” was published in the August 2016 issue of EBioMedicine. This team science was funded in part by a collaborative grant from the National Institute of Diabetes and Digestive and Kidney Diseases.



Dr. Beata Lecka-Czernik, right, posed for a photo with her team, from left, Shermel Sherman, Faiz Tausif, Amit Chougule, Lance Stechschulte, Matthew Mazur, Zachary Rotter and Ali Elatawy.

Looking at the Cause of Lyme Disease

A University of Toledo microbiologist has received nearly \$2 million in federal research funds to study *Borrelia burgdorferi*, the causative agent of Lyme disease, and develop new therapies for treating patients affected by the condition.

The National Institute of Health's National Institute of Allergy and Infectious Diseases awarded Dr. Mark Wooten, professor of medical microbiology and immunology, \$1,948,415 over five years to identify the mechanisms that allow *B. burgdorferi* to evade immune clearance in skin and other host tissues.

"Traditionally, it has been difficult to study this bacterium, since it can only survive within animals and not in artificial cultures," Wooten said. "Our group has been able to develop advanced microscopy models that allow us to directly observe the bacteria within the skin of living

mice over extended periods of time without harming the animal. We will use these methods to continuously monitor how the infection develops, which we believe will identify the key mechanisms that allow the bacteria to evade the host's immune response."

Data gathered from the study could be used to provide new targets for Lyme disease therapies.

Lyme disease is the No. 1 vector-borne disease in the United States. Incidence increases every year during the summer tick season.

Wooten said people getting bitten by an infected tick is a growing problem in the Midwest and Northeast because humans are increasingly living in close proximity to animals, such as deer, that carry the bacteria.

"Not only are the numbers in the New England states continuing to rise," he said, "but the bacteria now can be

found throughout much of Ohio."

More than 300,000 cases are believed to occur each year; however, it is estimated that only 10 percent to 20 percent of Lyme disease cases are actually reported.

Lyme disease is the No. 1 vector-borne disease in the United States.

"Our latest findings indicate that the bacteria can literally outrun our immune cells within the host," Wooten said. "We figured they would get in the skin and go hide from our immune response. Actually, we are finding that they don't hide. They continue to move for months or years, and our immune system isn't clearing them. Why is that? That is what we hope to unravel."

Lab Renamed to Honor Benefactor



The generosity of Dr. William Bauer and his wife, Catherine, has allowed UT to expand its nationally recognized research of the human brain.

The William R. Bauer, MD, PhD MRI Human Brain Imaging

Laboratory is in the Block Health Science Building. Bauer recently donated \$100,000 to the Department of Neurosciences in the UT College of Medicine and Life Sciences to support the research of Dr. Xin Wang, associate professor of psychiatry.

Bauer is a volunteer clinical professor of neurosciences at UT.

"Dr. Bauer is a successful neurologist who has made

substantial contributions to help educate medical students and support research here since the 1980s," Wang said. "With his support, we have been growing brain MRI research at UT from scratch to a nationally recognized MRI research center. Dr. Bauer's new donation will help us purchase new computers for imaging data processing and devices for advanced behavioral tests. The funding also will support talented researchers to analyze the MRI images."



Seeking Answers for Hypertension

How is high blood pressure inherited?

A University of Toledo researcher is seeking the answer.

Thanks to a three-year, \$231,000 grant from the American Heart Association, Dr. Sivarajan Kumarasamy, assistant professor in the Department of Physiology and Pharmacology and a member of UT's Center for Hypertension and Personalized Medicine, launched a new lab to continue research in identifying genetic biomarkers for hypertension and renal failure.

Hypertension, or high blood pressure, is a leading cause of death and disability in the U.S. and worldwide. As many as one in three people are hypertensive, resulting in increased risk for heart attack, stroke and kidney failure. While it can be treated with medication, much remains to be learned about why some individuals are more likely to develop high blood pressure and kidney disease.

“Some lifestyle behaviors, such as salt intake, smoking and physical inactivity, put individuals at an increased risk

of developing hypertension, but high blood pressure can also run in the family,” Kumarasamy said. “If your parents or other close, blood relatives have had high blood pressure, you are more likely to develop it, too.”

His study explores the role a specific gene called Regulated Endocrine Specific Protein 18 (Resp18) plays in the development of hypertension and kidney failure. The function of this molecule is unknown, but by using a cutting-edge, genetically engineered, rat-mutant model of this gene, Kumarasamy has discovered a novel link between Resp18 and hypertension.

This new funding allows him to further examine the molecular mechanism connecting this gene to blood pressure regulation and kidney disease.

“Preliminary results are promising that we can identify a biomarker,” he said. “I am grateful for the excellent opportunity provided by my mentor, Dr. Bina Joe, to study a piece of this genetic puzzle and begin my research career.”



Kumarasamy

The results of Kumarasamy's study could be used to diagnose or predict hypertension or kidney defects. Long-term results of his research also could have implications for diabetes and other medical conditions related to renal failure and hypertension.

As many as one in three people are hypertensive, resulting in increased risk for heart attack, stroke and kidney failure.

Researcher Receives Grant from Medical Research Society to Continue Alzheimer's Disease Study

A University of Toledo researcher is taking a closer look at how a common food additive could reverse brain cell damage caused by Alzheimer's disease.

Midi-GAGR is a byproduct of low acyl gellan gum, a commonly used gelling agent in foods such as icing and pudding that has been shown in lab testing to reverse the effects of Alzheimer's disease in mice.

Dr. Joshua Park, UT assistant professor of neurosciences, has received a \$50,000 grant through the UT Medical Research Society to continue his study and seek a pharmaceutical company to assist in further testing.

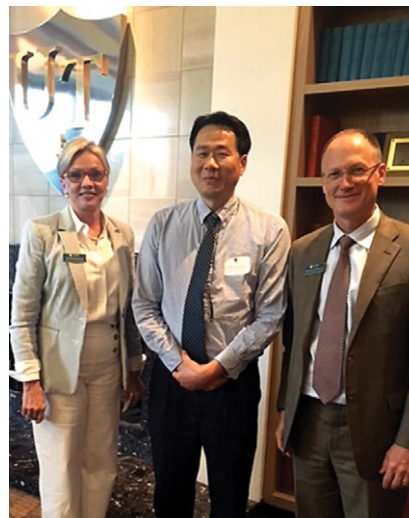
Alzheimer's disease is a degenerative condition affecting the intracellular network of brain cells, causing neurofibrillary tangles to form inside the cells, which inhibits their function

and leads to their death. This damage results in memory and cognition loss.

Midi-GAGR reverses damage to the cell network and reduces the level of proteins that generate the neurofibrillary tangles, which allows the brain to begin repairing the building blocks and signalers, improving memory and cognition.

"In animal lab tests, we have seen improvement in both behavior and in the physical structures of the brain," Park said. "There is still much more testing to do before we will be approved for human trials, but it should move fairly quickly, as low acyl gellan gum has already been approved for human consumption by the FDA."

The Midi-GAGR treatment is administered through a nasal spray, which is significant because many people with Alzheimer's lose the ability to swallow as the disease



Dr. Joshua Park, center, posed for a photo with Marianne Ballas and Dr. Christopher Cooper, executive vice president for clinical affairs and dean of the College of Medicine and Life Sciences, after receiving a \$50,000 grant through the UT Medical Research Society.

progresses. It also metabolizes slowly, which means it would be administered only once daily.

"We also have found the medication actually crosses into the brain to treat cells directly," he said.

About the Society

The University of Toledo Medical Research Society was created by the philanthropic leadership of northwest Ohio. The purpose of the society is to create a permanent, endowed source of highly leveraged seed funding for biomedical research projects developed at the College of Medicine and Life Sciences.

The society was started by Marianne Ballas, a member

of the UT College of Medicine Advisory Council, chair of Women & Philanthropy at UT, and owner of Ballas Buick GMC in Toledo.

In addition to advancing new treatments for chronic diseases and conditions, the seed money provided by the Medical Research Society helps researchers advance their projects. Once they are able to prove the ingenuity

of their investigations and support it with substantive data, the research is more likely to attract grant funding from other sources, enabling investigators to more fully develop the research.

The society meets throughout the year to discuss ongoing University research and review the rising projects eligible for funding.

Alzheimer's Disease Study (cont.)

"This is important because most medications are processed in the circulatory system and never actually make it to the brain."

This is the second award given by the Medical Research Society since its founding in 2014. The society consists of 20 community and medical leaders with a collective interest in supporting UT's junior faculty research.

"Everyone in the room felt a personal connection to Dr. Park's research because we all know someone who has been touched by Alzheimer's disease," said Marianne Ballas, owner

of Ballas Buick GMC and a founder of the UT Medical Research Society.

"We were impressed by his tenacity, and we are confident Dr. Park and his unique research will make a difference for patients and their families."

"Receiving this grant is a great honor," Park said. "But even more importantly, the support from the research society and to the Toledo community is motivating. It encourages me to work even harder to find answers for Alzheimer's patients and their families."

Park hopes to see a medication on the market within the next 10 to 15 years.

"My parents are getting older, and many of their friends are starting to see memory loss and early stages of Alzheimer's," he said. "It is my hope that this research will lead to treatments that will be available to patients in my parents' lifetime."

UT's Office of Technology Transfer has filed a patent for the technology, which will provide intellectual property protection and allow Park to share his research with drug companies that could sponsor additional research.

Studying the Leading Cause of Death in America

Atherosclerosis is the main cause of coronary heart disease, the leading cause of death in western societies, and costs the U.S. more than \$200 billion in medical expenses and lost wages each year.

A University of Toledo researcher has received a \$378,750 grant from the National Heart, Lung and Blood Institute to study a new way to treat this devastating condition.

"You hear the commercials all the time for drugs that help control cholesterol and blood pressure," said Dr. Guillermo Vazquez, associate professor in the Department of Physiology and Pharmacology and associate director of UT's Center for Hypertension and Personalized Medicine. "These medications help manage two of the major risk factors for atherosclerosis progression and can reduce the risk of heart attack and stroke, but it is our goal to find new, complementary strategies that could also help reduce the plaque



Vazquez

burden in coronary heart disease."

Vazquez said the body has natural ways of clearing arteries

of this buildup, but cells called macrophages that take part in this process can become overwhelmed as the plaque grows thicker.

"Specialized cells called macrophages should carry lipids out of the plaque, but they can get stuck, which then contributes to the buildup and further reduces blood supply to the heart," Vazquez said.

Vazquez and his team have discovered that a protein named TRPC3, which is present in these macrophages, could be controlled to help reduce the size of the plaque

inside the arteries. They say that removing or turning off the TRPC3 protein may allow the macrophages to leave the arteries, reducing plaque buildup.

"We have developed mouse models of atherosclerosis in which we can test our hypothesis that interrupting TRPC3 functions may lead to increased mobility of the macrophage cells," Vazquez said. "This concept shows promise for the development of complementary pharmaceuticals that could eventually be used in conjunction with traditional cholesterol-lowering drugs to accelerate the reduction in plaque burden."

Also known as hardening of the arteries, atherosclerosis is an inflammatory condition in which plaque builds up inside arteries and restricts blood flow, which can lead to reduced flow of blood through coronary arteries, heart attack and stroke.



— CLINICAL CARE —

Sharing expert knowledge with students and fostering discovery and development of new treatments for chronic health conditions are key aspects of medical education. But why do we do it? For our patients. Our physicians, researchers and learners keep our patients at the heart of every lecture, every lab and every clinical experience to deliver on our mission of improving health in the communities and region we serve. Expert, patient-centered care is the product of their ongoing research and learning, and they are sharing this with patients from across the country and around the globe.



CommunityCare Clinic

The CommunityCare Clinic (CCC) is an interdisciplinary, student-run organization established to deliver quality health care to the underserved populations in the Toledo community.

The primary goal is to improve health in Toledo, while affording its volunteers the opportunity to discover societal issues, practice principles of public health

(i.e. health promotion) in an interdisciplinary fashion, and to affect a positive change in the greater Toledo Area.

The CCC prides itself as being one of the few student-run organizations at The University of Toledo to provide medical students with “hands-on” clinical experience. As a result, it aims to enrich the educational experience for volunteers both inside and outside of the clinic.

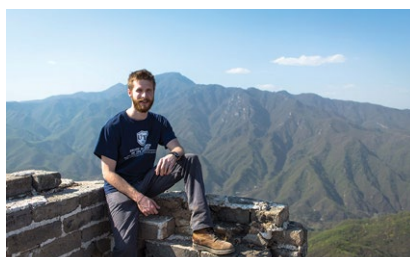
Students Around the Globe

Faculty and students travel the globe, sharing their knowledge and expertise in places including Guatemala and Honduras. UT students also make regular mission trips to Central America as part of the UT chapter of Global Medical Brigades, the largest student-led, undergraduate, medical mission organization in the world.

The College of Medicine and Life Sciences Global Health student clerkship program offers a broad array of clerkship opportunities across the globe that foster growth of medical knowledge through

direct patient-care experiences in other countries. Students have the opportunity to become active members of medical teams and see patients from around the world with a wide spectrum of common and rare diseases.

Global Health locations range from China, to Ethiopia, to Zambia.



32-year-old Woman Receives Heart Pump Implant at UTM

“Thank God I got here when I did,” 32-year-old Stacy Rollins of Napoleon, Ohio, said during a recent checkup at the Heart and Vascular Center at The University of Toledo Medical Center.

A month earlier, UT cardiothoracic surgeon Dr. Mark Bonnell saved her life by implanting a battery-powered blood pump inside her chest to take over for her failing heart.

“I was in pretty good shape, but I had been under a lot of stress,” Rollins said. “I started to feel terrible. I couldn’t breathe at night. I couldn’t go up the stairs. I was coughing. I thought it was pneumonia.”

Turned out her heart was barely pumping. The cough wasn’t a cold. The fatigue and breathlessness were symptoms of heart failure, which can rapidly become fatal.

In Rollins’ case, she had familial idiopathic cardiomyopathy — a weakening of the heart muscle inherited with unknown cause.

Her only chance of survival was a Left Ventricular Assist Device, commonly known as an LVAD. It is a mechanical device that helps pump blood to the rest of the body.

An LVAD can serve as a bridge to a heart transplant or, in rare cases, as therapy for a patient as her heart heals. The longest a patient has lived with an LVAD is eight years and counting.

“Nationally, about 1 percent or less of these LVADs are taken out for recovery,” Bonnell said. “Here at UTM, we have actually taken out almost 10 percent of them.”

UT Health cardiologist Dr. Samer Khouri said heart disease risk factors include a poor diet, lack of exercise and stress.

“This is what you call low-intensity stress that is continuous, unfortunately,” Khouri said. “The cause can also be genetic.”

Her only chance of survival was a Left Ventricular Assist Device, commonly known as an LVAD.

Khouri said women, especially younger women, more often ignore or mistake symptoms of heart failure.

“This is an age where many have children,” Khouri said. “They are so busy. They don’t have time for themselves.”

With more women dying from heart disease than breast cancer and lung cancer combined, Rollins wants others to know she is alive and healthy today because she responded to the subtle symptoms of heart failure and asked for help.

“I am grateful for my doctors and my life,” Rollins said.



Stacy Rollins talked with UT Health cardiothoracic surgeon Dr. Mark Bonnell during a recent checkup.

Pioneering Heart Exam Given to Gorilla



Amy Lather, an ultrasound technician at UT Medical Center, conducted an ultrasound on Kwisha, the gorilla at the Toledo Zoo, as Dr. Qaiser Shafiq, a cardiology fellow in the University training program, center, watched. Photo courtesy of Toledo Zoo.

The largest of all primates at the Toledo Zoo turned out to be the perfect patient, only hairier.

“Working with a gorilla was a scary and exciting experience,” said Dr. Samer Khouri, cardiologist, professor of Medicine and associate chief of the Division of Cardiovascular Medicine.

“We were in a controlled environment, but Kwisha is a 470-pound, muscular creature. He is so powerful that his hand has the ability to crush all the bones in my hand with one squeeze.”

Several cardiologists, anesthesiologist Dr. Andrew Casabianca, and ultrasound technician Amy Lather from The University of Toledo Medical Center volunteered their human health-care expertise for the 27-year-old male western lowland gorilla.

“Heart disease is a global problem facing great apes,” Dr. Kirsten Thomas, Toledo Zoo associate veterinarian, said. “The UTMC team was brought in to provide a new and unique measurement of cardiac health in great apes.”

“We take pride in the high-quality care we provide our animals here at the Toledo Zoo,” Jeff Sailer, Toledo Zoo executive director, said. “This collaboration with UTMC offered an additional level of imaging and cardiac expertise, helping us to provide the best possible care for Kwisha.”

Under the oversight of zoo veterinarians, the UT team conducted a comprehensive heart exam while Kwisha was under anesthesia. The specialists gave the gorilla a clean bill of health with no immediate issues that need to be addressed.

“A gorilla’s heart is almost the same as a human heart — only bigger,” Khouri said. “We followed the same principles, but this checkup was anything but routine. What’s amazing to me is how similar gorillas are to us physically.”

The silverback gorilla’s screening included an echocardiogram and a strain test, which is believed to have been the first strain analysis ever done on an ape.

“It’s a more sensitive and more accurate test,” Khouri said. “The process takes a detailed look at the contraction of heart muscle. We can detect problems in the heart before it’s apparent in a regular echo.”

“To the best of our knowledge, the strain test has not previously been performed in great apes, and is a novel approach to measuring cardiac function in these animals,” Thomas said. “The collective efforts of the UTMC cardiac team and Toledo Zoo veterinary staff has provided us the opportunity to be on the cutting edge of great ape research.”

Khouri plans to publish the new data soon and hopes to expand the work to include more apes to advance knowledge about heart function.

A gorilla’s heart is almost the same as a human heart — only bigger.

“This is an important first step for research to compare a gorilla to human heart contraction and function,” Khouri said. “Doing this special analysis makes us proud. Taking care of this kind of animal shows that every life on the planet deserves respect, and highlights how similar we are to all creatures on Earth.”

UT Doctors Push for Multiple Arterial Coronary Bypass Grafting as a Life-saving Treatment



Schwann

Cardiovascular disease, including atherosclerotic coronary artery disease, remains a significant public health challenge and is the No. 1 killer in the developed world.

Coronary artery bypass surgery and stenting are the two principal treatment options for coronary artery disease.

Dr. Thomas A. Schwann, S. Amjad Hussain Endowed Professor in Thoracic and Cardiovascular Surgery, in collaboration with investigators from Mount Sinai Medical Center in New York City and the American University of Beirut, published a paper in the *Journal of the American College of Cardiology* on the effectiveness of each of these treatment options in a study involving more than 8,000 patients.

The investigators determined that coronary artery bypass surgery using multiple arteries, as opposed to the standard coronary artery bypass surgery, in which only one artery and additional vein grafts are used, is the best treatment for patients with the most complex coronary artery disease. Using multiple arteries in coronary surgery resulted in a statistically significant increase in patient survival compared to stents that release medication.

The paper concluded that multi-arterial coronary artery bypass surgery is the optimal treatment for the most complex patients and “should be enthusiastically adopted by practicing cardiac surgeons and members of a multidisciplinary heart team as they strive to implement best evidence-based therapy.”

University of Toledo cardiac surgeons are on the forefront of multi-arterial coronary artery bypass surgery, and have published extensively with the same consistent message: compared to traditional surgery, multi-arterial surgery

saves lives. With the current publication, they have further extended the value of multi-arterial coronary surgery, showing improved outcomes compared to coronary stents.

“Traditional, single-arterial coronary artery bypass surgery is the ‘Chevy’ of cardiac surgery, while multi-arterial coronary artery bypass surgery is the ‘Porsche’ of cardiac surgery,” Schwann said. “By using multi-arterial coronary artery bypass surgery, we extend patients’ lives for up to 15 years post-operatively.”

Despite this compelling data, Schwann said only 10 percent of all coronary artery disease patients in the U.S. receive more than one arterial graft during their operations, while 70 to 80 percent of UTMC patients receive multi-arterial coronary artery bypass surgery.

“Cardiac surgeons and cardiologists work collaboratively at UTMC as part of an integrated heart team to choose the best treatment option for our patients,” Schwann said.



“We are working with our professional societies to influence our colleagues nationally to adopt a similar strategy. One artery is good, but using two or more is clearly a superior treatment strategy.”

Schwann said future investigations are needed to delve deeper into patients who benefit most from multi-arterial coronary artery bypass graft.

“In conjunction with the Society of Thoracic Surgeons, we are trying to secure grant funding to study this issue on a nationwide basis to fundamentally change the surgical treatment of coronary artery disease,” Schwann said.



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