

UNIVERSITY
OF CINCINNATI
**COLLEGE OF
MEDICINE**

**RESEARCH
ANNUAL
REPORT
2019**



The **UNIVERSITY OF CINCINNATI** is classified as an **R1: Doctoral University - Very high research activity institution**.

The **COLLEGE OF MEDICINE OFFICE OF RESEARCH** has made a commitment to:

- **Creating impactful and sustainable biomedical research programs.**
- **Developing passionate and innovative research teams.**
- **Becoming a destination for clinical trials.**
- **Harnessing “big data” to be not just evidence-based, but also evidence-gathering.**

Three institutes—operated jointly with UC Health and focused on cancer, neurosciences and cardiovascular disease—with a center for metabolic health serve as the foundation for these commitments.

FROM THE OFFICE OF THE DEAN



Andrew T. Filak Jr., MD
Senior Vice President for
Health Affairs and Dean



Melanie T. Cushion, PhD
Senior Associate Dean
for Research



Brett M. Kissela, MD, MS
Senior Associate Dean
for Clinical Research

THROUGHOUT fiscal year (FY) 2019 the University of Cincinnati College of Medicine celebrated 200 years of rich achievements in research, education, and clinical practice. This bicentennial year gave our college an opportunity to reflect on our history. As the first medical school in Ohio established by Daniel Drake, MD, we have been fortunate that our college faculty and graduates have consistently risen to the challenge of innovating, discovering and improving medicine through research. Our research mission has been a critical component of the college since those early days and continues to provide groundbreaking discoveries in a myriad of diverse areas of medicine from cancer to cardiology to stroke and infectious diseases.

The FY 2019 Research Annual Report of the UC College of Medicine tracks our latest research progress, highlights our outstanding researchers, and recognizes the successes of our research faculty during this past year. The accomplishments of our faculty reflect our commitment to the career success of our investigators,

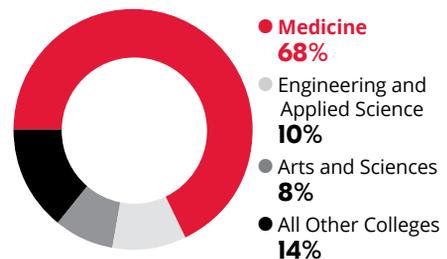
investments in the renewal of our research commitment, and the deployment of new knowledge, therapies, and devices that improve the lives of patients locally and globally.

FY 2019 was an extraordinary year for research at the College of Medicine.

Our researchers brought in **more awards** (233 total awards) and total award grant dollars (with the exception of FY 2016) than in years past. The total **new grant dollars rose** from \$95 million in FY 2018 to \$143 million in FY 2019, contributing significantly to the research mission of the University.

FY 2019 RESEARCH AND CLINICAL TRIAL AWARDS

Percentage of Revenue by College





In fact, our college brought in 68% of the total research dollars the university received last year. Additionally, our **percentage of funded applications increased** from 23% to 35% which by far exceeds the NIH average success rate (20%). As we applaud our College of Medicine annualized grant holdings of \$105 million we embrace our five year goal of increasing grant holdings to \$125 million.

Our **clinical faculty** are sought for their expertise in clinical trials. Not only are we working with top pharmaceutical sponsors to help bring new and novel drugs/devices to market, many of our clinical trialists are leading several large federally funded trial networks. This year over twenty clinical trialists brought in a revenue of \$100,000 or more. On average, our clinical trials revenue has increased 10% each year since FY 2013. In FY 2019, our clinical trialists brought in revenue of \$14.5 million which is an impressive \$2.4 million increase from last fiscal year.

Recognizing the vital role that **core facilities and shared equipment** play in the success of our researchers, we initiated core enhancement opportunities beginning in FY 2016. These funds allow core directors to validate and offer new innovative services to our faculty to keep them competitive. Additional investments in FY 2019 have included new image analysis systems to support microscopy core users and the integration of advanced

instrumentation and qualified personnel to begin to build a core footprint in the critical area of Metabolomics. Finally, our Proteomics laboratory was awarded a high-end instrumentation grant from the NIH (\$815,798) at the end of the FY to continue to build on the success they have had in supporting investigators with protein characterization and comparative protein profiling studies. The system is expected to be installed and validated in time to begin supporting research projects in January 2020.

Training and education of graduate students represents a critical part of our research and discovery mission as we cultivate the next generation of research scientists who will provide the vital biomedical breakthroughs of the 21st century. Our master's and certificate programs continue to grow in size and popularity, and additional opportunities for skill and knowledge enhancement have been afforded with the introduction of a new track in the Clinical & Translational Research MS program for clinical research professionals, as well as a brand-new Certificate in Telehealth. Our PhD programs continue their record of notable successes in both scholarship and national recognition for individual students. For the third year running, a College of Medicine doctoral student was recognized with the Presidential Medal of Graduate Student Excellence,

while another was recognized for current excellence and exceptional future promise with the awarding of a prestigious 6-year National Cancer Institute Predoctoral to Postdoctoral Transition Award. Meanwhile many of our students have continued to garner numerous national level fellowships from the National Institutes of Health, National Science Foundation, American Heart Association and several others. All this recognition represents a strong testament to the sustained quality and promise of the students recruited to our doctoral programs. We continue to emphasize student recruitment from underrepresented or disadvantaged backgrounds, and this year four of these students were elected to the Yale Ciencia Academy, a national program funded by the NIH offering sustained exposure to professional development, personal growth and career-focused opportunities.

IN THIS NEXT YEAR, our goals are to exceed the 2019 funding levels; provide new training opportunities for our research trainees under the direction of the Associate Dean for Graduate Education, Iain Cartwright, PhD and the Director of Medical Student Research Initiatives, Jason Blackard, PhD; continue to invigorate our research core infrastructure under the guidance of the Associate Dean for Research Core Facilities, Kenneth Greis, PhD; and sustain our upward trajectory

in basic research and clinical sciences under the respective leadership of the Senior Associate Dean for Research, Melanie Cushion, PhD, and Senior Associate Dean for Clinical Research, Brett Kissela, MD. An aspirational goal of increasing our grant holdings by \$25 million over the next 5 years was suggested by the University. Attaining this goal will initiate many changes, including new faculty hires to enhance our discovery sciences and facilitate translation of these discoveries to improve health and clinical care; foster scientific curiosity and investigation for students in our new undergraduate program; and create an environment of advanced clinical care that surpasses any in the region. •



COLLEGE OF MEDICINE
FY 2019

TOTAL NEW GRANT DOLLARS * **\$143 million**

AVERAGE FUNDING SUBMISSION SUCCESS RATE † **35%**

CLINICAL TRIAL REVENUE **\$14.5 million**

CLINICAL TRIALS PATIENT ENROLLMENT **2,657**

EXTERNAL GRADUATE STUDENT FELLOWSHIP AWARDS **37**

U.S. PATENT FILINGS * **61**

** Increased from FY 2018*

† Exceeded the national average



FROM THE OFFICE OF THE DEAN	/ 3
RESEARCH FINDINGS	/ 8
WHAT'S NEXT	/ 36
RESEARCH HONORS	/ 50
STUDENT HIGHLIGHTS	/ 58
RESEARCH GRANTS	/ 66
COLLEGE OF MEDICINE PROFILE	/ 117

**College of Medicine
OFFICE OF RESEARCH**

Melanie T. Cushion, PhD
Senior Associate Dean for Research

Brett M. Kissela, MD, MS
Senior Associate Dean
for Clinical Research

Ken D. Greis, PhD
Associate Dean for
Research Core Facilities

Iain Cartwright, PhD
Associate Dean for
Graduate Education

Jack Kues, PhD
Associate Dean Continuous
Professional Development

Jason Blackard, PhD
Director of Medical
Student Research Initiatives

Jen Veevers, PhD
Scientific Writer

Brieanne Sheehan
Program Director



**RESEARCH
FINDINGS**

Study Shows Technique to Be Effective in Identifying Smallest Lung Cancers



Sandra Starnes, MD

RESEARCHERS at the UC College of Medicine have found that radiotracer localization is a simple and effective technique to identify and remove small lung nodules in patients undergoing surgery.

These results, reported in the *Journal of Thoracic and Cardiovascular Surgery*, provide evidence that this technique may be the best way to locate and remove suspicious spots that are detected on a CT scan, leading to better outcomes for patients.

Radiotracer localization involves a radioactive material being injected in or near a lung nodule—the equivalent of a polyp or suspicious spot in the lung—and a radioprobe is used to pinpoint the location during surgery.

“Multiple localization, or mapping, techniques can help identify small or nonsolid pulmonary nodules during surgery,” says Sandra Starnes, MD, John B. Flege Jr. Chair and professor in the Division of Thoracic Surgery, Department of Surgery, co-director of the Lung Cancer Center at the UC Cancer Institute and principal investigator on this study. “Radiotracer localization has been our preferred method since 2009, but we wanted to see if it was the most effective method. It has been used by a few centers in Europe and infrequently in North America, despite several advantages. Improved understanding of the application and potential technical pitfalls could facilitate greater application of this technique.

Researchers in this study identified all

RESEARCH FINDINGS

patients undergoing preoperative radiotracer localization using a database. Medical records were retrospectively reviewed for patient demographic characteristics, nodule characteristics, procedure details, pathologic data and outcomes.

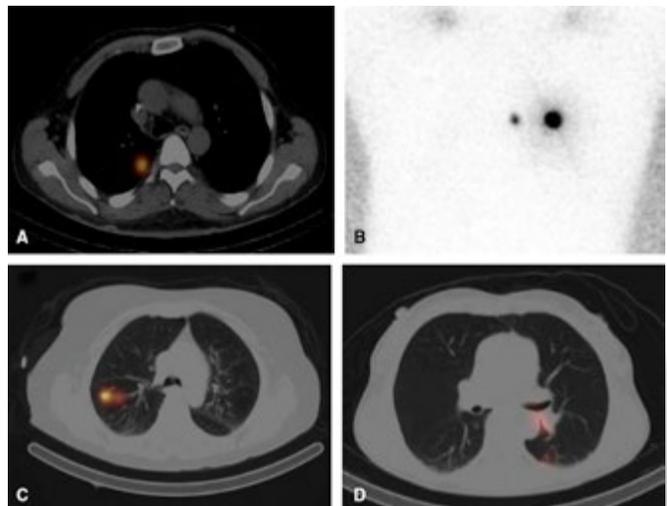
“Seventy-seven patients underwent localization of 79 pulmonary nodules,” Dr. Starnes says. “Radiotracer localization had an overall success rate of 95 percent; however, two patients required a second localization procedure on the same day. Most failures occurred in nodules that were less than 5mm from the pleural surface—the membranes around the lungs.”

Dr. Starnes adds that the majority (86 percent) of lesions were cancerous and that the average length of stay for patients in the hospital was two days.

“Radiotracer localization helps in enabling thoroscopic wedge resections (limited removal of a portion of the lung) and avoiding more invasive and unnecessary lobectomy, removal of the lobes of the lungs, or thorotomy, creating a surgical incision into the chest wall,” she says. “This technique overcomes some of the disadvantages of other techniques and is simple to implement, requiring no additional expertise on the part of the thoracic surgeon or interventional radiologist.”

She adds that it takes constant communication, collaboration and review of results with multidisciplinary members of the team, like interventional radiologists, to implement and improve this technique. Ross Ristagno, MD, associate professor in the Department of Radiology at UC and section chief of Interventional Radiology for UC Health, is a co-investigator on this study.

“Localization techniques for small pulmonary nodules will likely become more prevalent with the increase use of CT screening for lung cancer,” Dr. Starnes says, noting the small sample size of the study and adding that more studies will need to be done to support these findings. “Radiotracer localization has many advantages over other techniques and can be performed with high success and low risk to the patient.” •



Patterns seen on postradiotracer injection scintigraphy. A, Single focus of uptake seen on single-photon emission computed tomography. B, Dominant focus with a smaller secondary focus seen on planar scintigraphy. C, Single dominant focus with an adjacent tail. D, Airway penetration seen on single-photon emission computed tomography.

UC Researchers Advance our Knowledge of Treating Liver Disease

A GENE MUTATION that is believed to have safeguarded some people in 14th century Europe from the bubonic plague today may be protecting HIV patients co-infected with hepatitis C from potentially fatal liver scarring, says a University of Cincinnati (UC) College of Medicine physician-scientist.

Kenneth Sherman, MD, PhD, director of the UC Division of Digestive Diseases, led a team of scientists looking at how the CCR5-delta 32 gene mutation could protect HIV patients. The study's results are available online in the journal *Clinical Infectious Diseases*.

Dr. Sherman says he and a team of researchers from UC, the University of Maryland and the North Carolina-based Research Triangle Institute studied the blood samples of two cohorts of patients—one included individuals enrolled in the Multicenter Hemophilia Cohort Study, which included hemophilia patients who in the 1980s received untreated blood products contaminated with HIV and hepatitis C virus.

"If they did not succumb to complications of HIV early on, many of them went on to have rapidly progressive liver disease that we now know occurs in the setting of



Kenneth Sherman, MD, PhD



RESEARCH FINDINGS

untreated hepatitis C and HIV infection,” says Dr. Sherman, also Gould Professor of Medicine and a UC Health physician. “This is a group that has a rapid progression of liver fibrosis. The question we asked, ‘Is there is a subset of people who carry the gene that leads to a defect in CCR5, which is a receptor for some key elements of the immune system that modulate inflammation?’

“We identified within that cohort a group of patients for which there were serial samples collected over a period of four years on average and we classified those using biomarkers of fibrosis progression and whether or not they carry the mutation in CCR5 called the CCR5-Delta 32 mutation,” says Dr. Sherman.

Previous studies have suggested that the CCR5-delta mutation was enriched in people of European descent and then passed down by the survivors of the Black Death which swept Europe in the 14th century killing up to a third of its population. It confers a survival advantage to those infected with HIV because HIV uses the CCR5 receptor to enter immune cells, explains Dr. Sherman.

“Our belief was that this gene mutation would confer an advantage to individuals who have it in terms of their lowered risk of

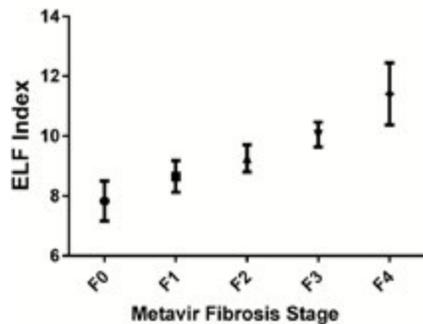
developing progressive liver fibrosis,” says Dr. Sherman. “We matched patients with and without the gene mutation and used measures of hepatic fibrosis that involved the use of a biomarker panel called the ELF Index (enhanced liver fibrosis).

“It turned out that the patients who had the mutation appeared to have less fibrosis progression by the measure that we used than those who did not have the mutation,” says Dr. Sherman. “That was evidence that the presence of a CCR5 mutation was possibly altering the rates of fibrosis progression in patients infected with hepatitis C and HIV.”

A second cohort of patients in the study included HIV patients who had no known liver disease and were enrolled in a clinical trial testing a new experimental drug called Cenicriviroc. It has the ability to block CCR5, a protein that is the main chemokine receptor on the body’s T-cells, and is used by HIV to enter and kill those defenders of the body.

Cenicriviroc could also block a second receptor known as CCR2. Patients in this trial were given the drug to see its effectiveness in battling HIV. Samples from the trial were utilized to determine the ELF Index. Patients with HIV who received a higher dose of Cenicriviroc showed a decrease in liver fibrosis (scarring) markers over a one-year period, explains Dr. Sherman. Liver scarring can cause life-threatening liver failure.

He says this is important to know because in HIV patients many processes—not just viral processes—can lead to liver scarring. “If CCR5 and/or CCR2 lead to a decrease in fibrosis regardless of the source of it, we can prevent the consequences of liver injury,” says Dr. Sherman.



Enhanced liver fibrosis (ELF) index validation. Highly significant analysis of variance (ANOVA) of ELF index between human immunodeficiency virus/hepatitis C virus coinfecting patients (stratified by metavir fibrosis stage F0-F4) ($r = 0.8018$, $P < .0001$).

RESEARCH FINDINGS

“Medications that people take for HIV treatment sometimes cause fatty liver, and other forms of liver injury,” says Dr. Sherman. “Following infection with HIV, the gut bacteria leak into the circulation, a process known as bacterial translocation. One of the liver’s jobs is to clean bacterial toxins before they get to the rest of the body. Unfortunately, the liver itself is sometimes injured following exposure to bacterial breakdown products, causing injury and scarring.

“We don’t have agents that protect the liver from non-specific injury at this time. If CCR5 and CCR2 are central to the pathways that lead to liver scarring then perhaps that injury can be modulated through CCR5 and CCR2 blockade,” says Dr. Sherman. “It is possible that someday all patients with

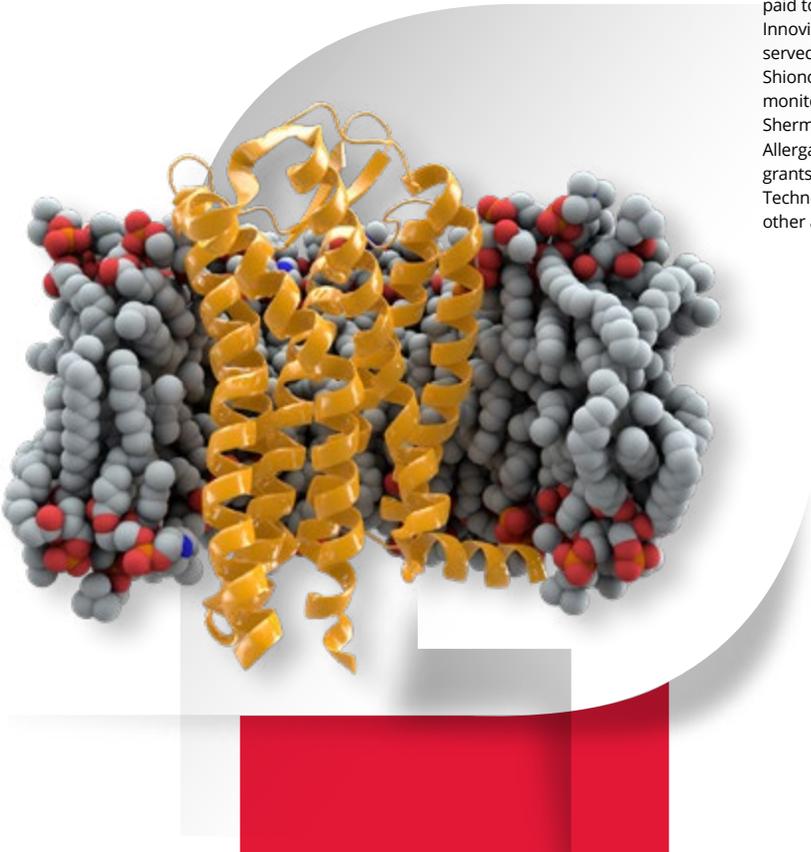
HIV may be treated with a blocking agent as part of their HIV drug cocktail designed to protect the liver and regain and maintain liver health.” •

Other UC researchers participating in the study include: Enass Abdel-Hameed, MD, PhD, research associate in the Division of Digestive Diseases; Susan Rouster, principal research assistant in the Division of Digestive Diseases; Mohamed Tarek Shata, MD, PhD, associate professor in the Division of Digestive Diseases; Jason Blackard, PhD, associate professor in the Division of Digestive Diseases; Parham Safaie, MD, clinical instructor in the Department of Internal Medicine; and Paul Horn, PhD, professor in the Division of Pediatrics.

Shyam Kottillil, MD, PhD, professor at the University of Maryland School of Medicine, is also a co-author of the study along with Barbara Kroner, PhD, and Liliana Preiss, who are both researchers at RTI International in Research Triangle Park, NC.

This work was supported by the National Institute of Allergy and Infectious Diseases of the National Institutes of Health under award number R01 AI065256-06-A1.

Dr. Sherman has received grants and contracts paid to the institution from AbbVie, BMS, Gilead, Innovio, Intercept, MedImmune and Merck. He has served on the advisory boards for Abbott Labs, Gilead, Shionogi, Merck and MedImmune and on data safety monitoring board for MedPace and Watermark. Dr. Sherman also received support from Tobira (now Allergan). Kottillil reports grants from Gilead Sciences, grants from Merck and funding from American Gene Technology, during the conduct of the study. The other authors have no conflicts to report.



Study Details Effect of Radiation Exposure on Hormone Deficiencies

A RESEARCHER at the College of Medicine, who is the first author on a study from Massachusetts General Hospital, has detailed the effect of radiation exposure on the development of hormone deficiency in pediatric and young adult patients treated for brain tumors.



Ralph Vatner, MD, PhD

These results, published in the Aug. 17, 2018 online edition of the *Journal of Clinical Oncology*, provide evidence that further supports minimizing the dose of radiotherapy to the hypothalamus and pituitary gland and will help predict the risk of hormonal complications for those being treated with radiotherapy for brain tumors.

The hypothalamus is a region of the forebrain that coordinates the activity of the pituitary gland, and together, they regulate many of the hormones in the body that control growth, metabolism, adrenal function and gonadal function.

There isn't much data defining the dose response of radiation therapy to the hypothalamus and pituitary gland in pediatric and young adult patients with brain tumors," says Ralph Vatner, MD, PhD, assistant professor in the Department of Radiation Oncology and lead author on this study. "We examined the correlation between radiation therapy dosage to these brain structures and development of endocrine dysfunction in this population."

Dr. Vatner says dosimetric data—measurement, calculation and assessment of the ionizing radiation dose absorbed by the human body—and clinical information was collected from 222 children and young adults (younger than 26 years old) with brain tumors treated with proton radiotherapy on three prospective studies (2003 to 2016) coordinated by Massachusetts General Hospital.

RESEARCH FINDINGS

Proton radiotherapy is a form of radiation treatment used for certain types of cancers and lymphomas. A major advantage over traditional forms of radiotherapy is its ability to deliver radiation to a tumor with remarkable precision, sparing healthy tissues. The Cincinnati Children's Hospital Medical Center/UC Health Proton Therapy Center is the only facility of its kind locally and only one of about 28 in the country.

Deficiencies of various hormones, including growth hormone, thyroid hormone, adrenocorticotrophic hormone and gonadotropins, were determined using serum collected from patients along with their clinical symptoms, and radiation dose was calculated using the treatment plans for these patients. Statistical models were developed using these data to estimate the effect of radiation dose and age on the development of hormone deficiency.

"Radiotherapy for brain tumors is known to cause hormone deficiency in some patients, and children are especially sensitive to this potential side effect. We were able to analyze data from 189 pediatric and young adult patients treated with proton therapy at [Massachusetts General], with an average follow-up of 4.4 years (between 0.1 to 13.3 years)—the largest study of its kind and the first with patients receiving proton therapy for a variety of brain tumors," Dr. Vatner says. "Among these patients, the rate of any hormone deficiency at four years was 48.8 percent, but this was strongly associated with the dose of radiation and the age at time of treatment."

"This provides strong support for the benefits of advanced radiation technologies such as proton therapy for the treatment

of brain tumors, especially in younger patients," he continues. "These data will help physicians predict the risk of deficiencies in growth hormone, thyroid hormone, adrenal corticosteroids and sex steroids in their patients receiving radiotherapy for brain tumors on the basis of patient age and radiation dose to the hypothalamus and pituitary gland. Moving forward, physicians can use these models to help navigate their treatment planning and identify patients who will most benefit from advanced technologies like proton therapy that can treat tumors while better sparing healthy normal tissues." •

This project was supported by the federal share of program income earned by Massachusetts General Hospital on a National Institutes of Health Grant C06 (CA059267).

Vatner receives honoraria and research funding from Varian Medical Systems, a radiation oncology treatment and software maker.



These results will help predict the risk of hormonal complications for those being treated with radiotherapy for brain tumors.

Data Shows Ritual for Orthodox Jewish Men May Offer Cardiovascular Benefits

A PILOT STUDY led by researchers at the College of Medicine suggests Jewish men who practice wearing tefillin, which involves the tight wrapping of an arm with leather banding as part of daily prayer, may receive cardiovascular health benefits.

The researchers propose that benefits may occur through remote ischemic preconditioning that results in protection during heart attacks. The results are available online in the *American Journal of Physiology-Heart and Circulatory Physiology*.

Jack Rubinstein, MD, associate professor in the Division of Cardiovascular Health and Disease, and a UC Health cardiologist, says he enrolled 20 Jewish men living in Greater Cincinnati—nine who wear tefillin daily and 11 non-users of tefillin—in the study. His team of researchers recorded baseline information on all participants during the

early morning and then additional data after wearing tefillin for 30 minutes.

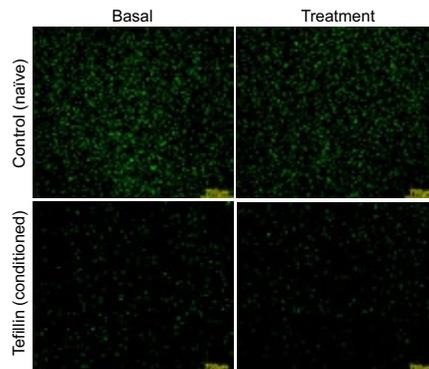
They measured the participants' vital signs, drew blood for analysis of circulating cytokines and monocyte function and also measured blood flow in the arm not wrapped with tefillin.

The men participating in the study were between the ages of 18 and 40 and all in good health.

"Tefillin is used for morning prayers for Jewish men over the age of 13 on an almost daily basis," says Dr. Rubinstein. "It is placed on the non-dominant arm around the bicep and the forearm in a pretty tight manner. It is never worn in a fashion as to preclude the blood flow. This is worn for about 30 minutes continuously. Prayers are sitting and standing so often you have to retighten the strap around your arm."

The usage of tefillin, also called phylacteries, dates back to scriptural commandments in the books of Deuteronomy and Exodus urging the faithful followers to comply with religious law and to "bind them as a sign upon your arm." Dr. Rubinstein says the binding of the arm and the discomfort users often report may serve as a form preconditioning and offer a substantial degree of protection against acute ischemic reperfusion injury (a section of the heart is deprived of oxygen and then damaged when re-oxygenated) that occurs as a result of a heart attack.

"One of the ways that protection occurs is through pain," says Dr. Rubinstein, also a



Chronic tefillin application reduces leukocyte adhesion and adhesion proteins.

RESEARCH FINDINGS

member of the UC Heart, Lung and Vascular Institute. “Feeling pain is actually a preconditioning stimulus.

“We found people who wear tefillin in either the short or long term, recorded a measureable positive effect on their blood flow. That has been associated with better outcomes in heart disease,” says Dr. Rubinstein.

Blood flow was higher for men who wore tefillin daily and improved in all participants after wearing it just once as part of the study, explained Dr. Rubinstein. Men who wore tefillin daily also had fewer circulating cytokines—signaling molecules that can cause inflammation and negatively impact the heart—compared to non-users, suggesting that near daily use elicits an effect similar to that observed with other methods of eliciting remote ischemic preconditioning-like effect.



Jack Rubinstein, MD

For years researchers have studied preconditioning by inducing small heart attacks in animal models and found that they protected the animal from larger, more serious heart attacks in the future. This same preconditioning could be used by partially occluding blood flow in one part of the body and thus serving as a protective element in another part of the body to lessen the injury, says Dr. Rubinstein.

“The problem with translating this to people is we don’t know when someone will have the heart attack,” says Dr. Rubinstein. “It is almost impossible to precondition someone unless they are willing to do something daily to themselves. Tefillin use may in fact offer protection as it’s worn on an almost daily basis.”

Dr. Rubinstein says there are studies out of Israel that have found Orthodox men have a lower risk of dying of heart disease compared to non-Orthodox men. This protection is not found in Orthodox women who usually don’t wear tefillin. •

Other researchers participating in the study include Phillip Owens, PhD, and Michael Tranter, PhD, both assistant professors in the UC Division of Cardiovascular Health and Disease, along with Nathan Robbins, Keith Saum, Shannon Jones, Akiva Kirschner, Jessica Woo, Connie McCoy, and Samuel Slone.

Marc Rothenberg, MD, PhD, Director of Allergy and Immunology Division at Cincinnati Children’s and professor of pediatrics at UC, along with Elaine Urbina, MD, Director of preventive cardiology at Cincinnati Children’s and a UC professor of pediatrics, were co-authors of the study.

The study received internal funding from the University of Cincinnati.

Dr. Rothenberg is a consultant for Pulm One, Spoon Guru, ClostraBio, Celgene, Shire, Astra Zeneca, GlaxoSmithKline, Allakos, Adare, Regeneron and Novartis. He has an equity interest in the first four listed and Immune Pharmaceuticals, and royalties from reslizumab (Teva Pharmaceuticals) and UpToDate.

Dr. Rothenberg is an inventor of patents, owned by Cincinnati Children’s.

New Drug Regimens Improve Kidney Transplant Outcomes

The reduced side effects and long-term cardiovascular risk reduction are major potential advantages of these regimens for the future.

PRELIMINARY RESULTS from a \$5.2 million clinical trial led by College of Medicine researchers show that the immunosuppressive drug belatacept can help safely and effectively treat kidney transplant patients without the negative long-term side effects of traditional immunosuppressive regimens.

The UC-led Belatacept Early Steroid Withdrawal Trial (BEST) represents a significant step forward in the science of how not only to save lives through kidney transplantation, but also how to prolong the lives and improve the quality of life for those patients for decades after surgery.

“In the BEST trial, we tried to achieve something that hadn’t been done in transplantation: to eliminate the use of corticosteroids very early after surgery and at the same time avoid the toxicities associated with the cornerstone immunosuppressive medications that had been used for four decades,” said principal investigator E. Steve Woodle, MD, William A. Altemeier Professor in Research Surgery at the College of Medicine and director of Solid Organ Transplantation for UC Health.

“We wanted to reduce the side effects and toxicities of these medications and make it easier for patients to tolerate their anti-rejection drugs, while achieving rejection rates that are reasonable,” Dr. Woodle said.

The study’s two-year findings were presented by BEST investigators in several

scientific sessions of the annual American Transplant Congress, held June 1–5, 2019, in Boston.

Additional findings related to the study were presented by study authors, including Rita Alloway, PharmD, research professor of nephrology at the UC College of Medicine and director of Transplant Clinical Research at UC Health. The two belatacept-based regimens evaluated in the study did not employ long-term use of prednisone (a corticosteroid) or tacrolimus (a calcineurin inhibitor).

“The primary problem that has prevented elimination of corticosteroids and calcineurin inhibitors to date has been excessive rejection rates,” Dr. Alloway said. “The BEST Trial demonstrates that rejection risk with the new belatacept-based regimens was increased somewhat, and the reduced side effects and long-term cardiovascular risk reduction are major potential advantages of these regimens for the future.”

For the 16,000 people who receive a kidney transplant in the U.S. each year, the standard of care involves a post-surgery regimen including corticosteroid and calcineurin inhibitor (CNI) immunosuppressants.

In 2011, the U.S. Food and Drug Administration approved the use of belatacept to prevent rejection in kidney transplant patients. Belatacept is a modified version of the drug abatacept, which is used to treat rheumatoid arthritis.

The BEST study is the first large,

RESEARCH FINDINGS



E. Steve Woodle, MD, and Rita Alloway, PharmD

multicenter trial to remove both corticosteroids and CNIs from a patient's drug regimen after kidney transplantation. Both drugs place patients at an increased risk of cardiovascular disease, high blood pressure, high cholesterol and diabetes. CNIs have also shown toxicity to transplanted kidneys.

UC Medical Center was the coordinating center for the trial, and many of the patients were treated there.

Beginning in September 2012, the BEST Trial enrolled more than 300 adult kidney transplant patients at eight transplant centers across the U.S. In the randomized trial, the patients received one of two belatacept-based immunosuppressive regimens, or the typical corticosteroid-based immunosuppressive regimen as a control.

After two years, the data shows that patients in the belatacept-based groups showed slightly higher rates of rejection, but lower rates of GI toxicity, neurotoxicity, electrolyte imbalance and other adverse effects associated with steroid-based regimens.

"This CNI- and steroid-free [immunosuppressive] protocol is a promising step forward in minimizing toxicities and improving renal allograft function," the study authors wrote. "Longer-term observations will need to be continued."

One unique feature of the BEST Trial was the involvement of patient-reported outcomes collected via patient surveys—uncommon in a clinical trial but critical to the success of the study, Dr. Alloway said. Those findings were shared for the first time at the American Transplant Congress meeting.

"The patients tell you how much better they feel and function with this new drug combination than they do with the standard combination," Dr. Alloway said. "And so we're able to show what specific side effects are reported in less than 5%, less than 10%, less than 15% of patients—and how that's different than what you see in the standard of care." •

The study was funded by Bristol Myers Squibb (BMS), the manufacturer of belatacept. Woodle and other investigators report no financial interest in BMS. Dr. Woodle has previously received consulting compensation from BMS and Genzyme, the manufacturer of Thymoglobulin.

HCV-Infected Donor Kidneys Could Reduce Transplant Patient Dialysis Time

TRANSPLANTING HEPATITIS C (HCV)-infected dialysis patients with organs from HCV-positive donors and then treating the infection after transplantation is more effective, costs less and will shorten wait times for donated organs, according to an analysis conducted by physician-researchers at the College of Medicine.

The findings are available online in the *Annals of Internal Medicine*. The lead author is Mark Eckman, MD, Posey Professor and

director of the College of Medicine Division of General Internal Medicine.

The model predicts that transplantation with an HCV-infected kidney followed by HCV treatment was more effective and less costly than treating HCV before transplantation, largely because of the longer wait times for HCV-uninfected kidneys, explains Dr. Eckman. A typical 57.8 year-old patient receiving hemodialysis would gain an average of six months of additional quality adjusted life years at a lifetime cost savings of \$41,591, says Dr. Eckman.

A patient receiving a non-infected kidney waits on average more than two years for that organ, while the wait for an HCV-infected kidney is about eight months, says Dr. Eckman. Also, 15 percent of patients undergoing dialysis for end-stage renal disease are infected with HCV.

“There is a high excess mortality risk for patients receiving hemodialysis and it is associated with a decreased quality of life for some patients,” says Dr. Eckman. “If you can spend less time on dialysis, you will be better off. The annual cost of hemodialysis is more than \$90,000.”

In the United States, an estimated 110,000 patients start dialysis each year. Of the approximately 500,000 patients who received dialysis for end stage renal disease in 2016, only 3.8 percent or 19,060 received kidney transplants, says Dr. Eckman.

The computerized decision analytic model pulled data from a variety of sources



Mark Eckman, MD

RESEARCH FINDINGS

including the United States Renal Data System, medical literature and clinical trials. The model looks at several factors such as sex, age, the degree of liver damage from chronic HCV infection, and treatment costs.

“While people are waiting for a kidney, there is a risk of dying on hemodialysis, with a mortality rate of approximately 7.5 percent per year,” says Dr. Eckman. “If you wait a shorter time to get a kidney transplant by accepting an HCV-infected kidney, you can avoid a year-and-a-half or more of time on a waiting list.

“Once you have a transplant, the annual mortality rate is roughly 2 percent per year instead of about 7.5 percent per year. The shorter the period of time waiting for a kidney on dialysis, the better your outcomes will be.”

Dr. Eckman says the computer model is needed because there are no large clinical trials yet that have addressed this question.

“This isn’t something we would have asked or thought about even a year ago,” says Dr. Eckman. “Now, we have very effective HCV treatments that we didn’t have two or three years ago. Some of these new medications can be used in patients on dialysis. The new drugs have much fewer side effects, and the treatment course is a lot shorter. The treatment of HCV has advanced dramatically.”

Several clinical trials have shown HCV cure rates as high as 98 percent with the new drugs, says Dr. Eckman.

“Secondly, a year ago we didn’t have drugs to treat HCV that could be used in patients with end stage renal disease,” says Dr. Eckman. “While treatment of HCV is very expensive, this cost balances out in our analysis as patients in both strategies are

getting treated for HCV.”

There are tradeoffs between the two strategies. Patients who get a non-infected HCV kidney have a lower risk of dying from liver disease because HCV is treated earlier, before kidney transplantation, says Eckman. But HCV-infected patients who receive an HCV-infected kidney are able to get off of dialysis sooner and have a lower risk of dying from end stage kidney disease.

“It is better to wait less time for a kidney by getting an HCV-infected kidney followed by treatment after transplantation,” says Dr. Eckman. He adds that the supply of HCV-infected kidneys has increased due to the unfortunate deaths of otherwise generally healthy young individuals who suffer opioid overdoses.

“What we hope is that this study will have some impact on policy,” says Dr. Eckman. •

Other authors contributing to the study are E. Steve Woodle, MD, director of solid organ transplantation for UC Health and William A. Altemeier Professor of Research Surgery in UC College of Medicine; Charuhas Thakar, MD, professor and director of the UC Division of Nephrology Kidney CARE Program; Flavio Paterno, MD, assistant professor in the UC Division of Transplantation; and Kenneth Sherman, MD, PhD, Gould Professor of Medicine and director of the UC Division of Digestive Diseases.

The study was funded by a grant from Merck Sharp & Dohme Corp. It also received support by the National Center for Advancing Translational Sciences (NIH – UL1TR000077-05). Merck Sharp & Dohme was given the opportunity to review the manuscript for intellectual property considerations.

Dr. Sherman has grants/contracts (institutional funding) from AbbVie, Bristol-Myers Squibb, Gilead, Inovio, Intercept, MedImmune, and Merck, and serves on advisory boards for Abbott Laboratories, Gilead, MedImmune, Merck, and Shionogi. He also serves on safety monitoring boards for Watermark and MedPace. Dr. Thakar is a consultant to Merck and NxStage. He has investigator-initiated funding from Bioporto and Otsuka. Drs. Eckman and Woodle have no conflicts of interest with the current study other than grant support from Merck through the Merck Investigator Studies Program.

The shorter the period of time waiting for a kidney on dialysis, the better the outcomes will be.

UC-Led Study Examines Safety, Efficacy of tPA Therapy in Mild Stroke Cases

WHILE THE GOLD STANDARD for stroke care is the use of IV tissue plasminogen activator (tPA, or product name Alteplase) to dissolve clots and mechanical thrombectomy to remove clots in severe to moderate strokes, researchers and clinicians have found it more difficult to align on a standard of treatment for mild strokes.

A national study looking at IV treatment of mild stroke, led by researchers at the College of Medicine, was published in the July 10, 2018 edition of the *Journal of the American Medical Association*.

Based on epidemiological data from the well-known Greater Cincinnati Stroke Study, about one-third of strokes are classified as mild stroke. Pooja Khatri, MD, professor of neurology at UC, and lead author on the study, wanted to determine if treatment with Alteplase showed benefit when extended to mild stroke.

Results of the study showed that use of tPA for mild stroke may not be as beneficial to the patient as was hypothesized.

“Mild stroke is the most commonly cited reason for deciding to not start tPA among patients who arrive to a hospital within the treatment window. But we also knew that after 90 day follow-ups, up to 30 percent of these patients would suffer from some kind of functional disability,” says Dr. Khatri, who is also director of acute stroke care for UC Health.

“In this study, we wanted to evaluate the efficacy and safety of using tPA to treat patients of ischemic stroke only presenting with minor deficits, judged as not clearly disabling,” says Dr. Khatri. “In Greater Cincinnati, I think our approach has been more conservative; we weren’t always treating with alteplase (tPA), while some centers have been treating them very aggressively. Previous trials excluded these patients, so



Pooja Khatri, MD

RESEARCH FINDINGS

individual clinicians and stroke teams had to make their own clinical judgments about treatment.” Dr. Khatri engaged with leaders at stroke centers across the country to better understand the treatment approaches for mild stroke.

The study used the National Institutes of Health Stroke Scale (NIHSS), which assesses stroke severity based on identifiers like the patient’s level of consciousness, facial droop and motor skills. A mild stroke is classified from 0 to 5, along with no clearly disabling deficits at time of presentation.

However, the trial ended early due to slower-than-expected enrollment. Outcomes for 313 patients were tracked and reported in this study, which does give researchers some evidence to consider when encountering mild stroke.

“Among the patients with minor, not clearly-disabling acute ischemic stroke, what we found is treatment with alteplase (compared with aspirin) did not increase the likelihood of a favorable functional outcome after 90 days. Yet, we saw the expected rate of symptomatic brain bleeding associated with the treatment,” Dr. Khatri says.

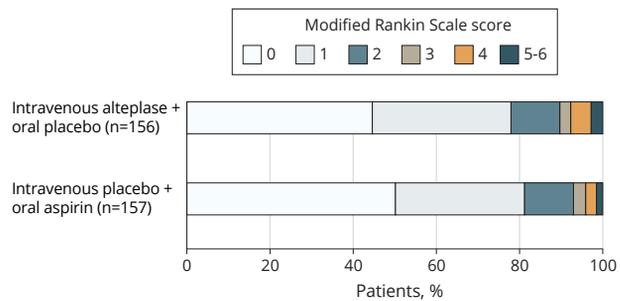
She adds that the research team had hoped tPA would be beneficial in patients with a very mild neurological deficit.

Based on the data, it appears unlikely that the benefits of tPA extend to patients with mild stroke who do not present clearly disabling deficits.

“While the early termination does lead to uncertainty in the results, based on the data, it appears unlikely that the benefits of tPA extends to patients with mild stroke who do not present clearly disabling deficits,” says Dr. Khatri, adding that this data provides additional information to physicians who treat stroke, and at some centers will be “practice-changing.”•

The study was funded by Genentech, makers of Alteplase. Dr. Khatri cites no conflict of interest.

Modified Rankin Scale Score Distributions at 90 Days by Treatment Group



Risk Of Adverse Outcomes Increases with Pregnancy in Kidney Transplant Recipients

PREGNANCY IN kidney transplant recipients is associated with adverse outcomes, according to research from the College of Medicine. The study, published online in the Jan. 23, 2019 edition of *BMC Nephrology*, finds that pregnancy in kidney transplant recipients is associated with higher risk of adverse maternal and fetal outcomes.

“Given that pregnancy in kidney transplant recipients can be challenging due to risks associated with immunosuppression and kidney allograft dysfunction, our study focused on pregnancy outcomes in women of child-bearing age who are kidney

transplant recipients,” says Silvi Shah, MD, assistant professor, Division of Nephrology, Kidney CARE Program at the College of Medicine, and lead author of the study.

The study showed significant higher rates of cesarean section (62.6 percent), preeclampsia (21.5 percent) and ectopic pregnancy (2.4 percent) in kidney transplant recipients as compared to the U.S. general population.

Dr. Shah and her team analyzed 87 studies that included 6,712 pregnancies in 4,174 kidney transplant recipients. A quantitative meta-analysis was performed,



RESEARCH FINDINGS

and the pooled incidence of various maternal and fetal pregnancy outcomes was calculated.

“Reproductive function in women with end stage kidney disease generally improves after kidney transplant,” says Dr. Shah. “What our study findings tell us is that pregnancy in kidney transplant recipients is associated with higher risk of adverse maternal outcomes. We have to consider these associated risks when we counsel women of child-bearing age with kidney transplant who are contemplating pregnancy.”

In regard to the fetal outcomes, the study showed higher rates of preterm births, still births (5.1 percent), and neonatal mortality (3.8 percent) in kidney transplant recipients as compared with national data in general population. The mean gestational age for newborns was 34.9 weeks (U.S. mean, 38.7 weeks) and the mean birth weight was 2,470 grams, or just less than five and a half pounds (U.S. mean, 3,389 grams or just less than seven and a half pounds).

“It’s very important when a woman who has a kidney transplant gets pregnant, she is followed by a multi-disciplinary team, including a gynecologist, a nephrologist and a neonatologist working together through the pregnancy,” says Dr. Shah. •

The study was supported by the UC College of Medicine Health Sciences Library Grant. The other co-authors of the study include Tiffany Grant, PhD, and Emily Kean from UC’s Donald C. Harrison Health Sciences Library; Prasoona Verma, MD, from Cincinnati Children’s; Renganathan Lalgudi Venkatesan, Ayank Gupta and Maitrik Sanghavi from Lindner College of Business; Richard Johansen from UC Libraries; Anu Gupta, MD, from Buffalo Medical Group; and Taranpreet Kaur, MD, from the Division of Nephrology, Kidney CARE Program and Jeffrey Welge, PhD, Department of Psychiatry and Behavioral Neuroscience, both in the UC College of Medicine.



Silvi Shah, MD

The study found that, compared to the U.S. general population, women of child-bearing age who are kidney transplant recipients have higher rates of:

- cesarean section
- preeclampsia
- ectopic pregnancy
- preterm births
- still births
- neonatal mortality



New UC Study May Help Guide Treatment Of Pediatric Anxiety

RESEARCHERS FROM THE COLLEGE of Medicine examined common medications prescribed for children and adolescents with anxiety disorders, to determine the most effective and best-tolerated. This study revealed that the selective serotonin reuptake inhibitors (SSRIs) performed best overall compared to other types of medications.

The results, available online in the *Journal of Clinical Psychiatry*, include the largest amount of data to date for analyses of pediatric anxiety disorder treatments. The study examined more than a dozen

medications from 22 randomized controlled trials.

“Clinicians have limited data to help them select among evidence-based medication treatments for their patients with anxiety. This meta-analysis provides guidance in terms of medication-specific differences in efficacy and tolerability among medications that are commonly used to treat pediatric patients with anxiety disorders,” says Jeffrey Strawn, MD, associate professor in the Department of Psychiatry and Behavioral Neuroscience at the College of Medicine and lead author on the study.



Jeffrey Strawn, MD

RESEARCH FINDINGS

According to the American Academy of Pediatrics (AAP), anxiety disorders are the most common type of mental health disorder in children. Anxiety affects approximately 8 percent of all children and adolescents. Symptoms of anxiety can include having recurring fears, aversions to social situations or being unable to control worries and can manifest as serious medical conditions: trouble sleeping, difficulty concentrating, even heart and digestive problems.

“Our study synthesizes evidence from multiple individual trials to guide clinicians and patients in deciding which medication to use when treating children and adolescents with anxiety disorders,” said Eric Dobson, MD, a psychiatry resident at the Medical University of South Carolina in Charleston, who conducted the study while a medical student at UC.

The authors identified trials published between 1971 and 2018, comparing 13 commonly used medications with placebo or with other medications—including antidepressants—for the acute treatment of anxiety disorders in children and adolescents. A total of 2,623 patients (average age: 11½ years) had been randomly assigned to receive a medication or receive placebo, and the patients had generalized, separation or social anxiety disorders that was of at least moderate severity.

The researchers looked at the number of patients who responded to treatment as well as the proportion of patients who discontinued the study as a result of adverse events. In anxious youth, treatment response was more effective with SSRIs than with serotonin-norepinephrine reuptake inhibitors (SNRIs). SNRIs prolong the activity of the neurotransmitters serotonin and

norepinephrine, while SSRIs act predominantly to prolong the effects of serotonin. In terms of discontinuation and tolerability, SSRIs were the most tolerable class of medication, while tricyclic antidepressants were the least tolerable. Tricyclic antidepressants increase levels of norepinephrine and serotonin, and block the action of the neurotransmitter acetylcholine, which may give rise to some of their side effects.

“This comprehensive evaluation comparing efficacy and tolerability of treatments in pediatric anxiety disorders suggests that SSRIs are superior to SNRIs and all other classes of medications,” says Dr. Dobson.

“These findings confirm the recommendations from the American Academy of Child and Adolescent Psychiatry that SSRIs be considered as the first-line medication treatment for anxiety in youth,” adds Dr. Strawn. •

This research was supported by the National Institute of Mental Health (MH106037–Strawn). Strawn has received research support from the National Institutes of Health (NIH) as well as Edgemont, Forest, Shire, Lundbeck and Neuronetics. He has received material support from and provided consultation to Myriad.

All authors cite no conflicts of interest.

These findings confirm the recommendations from the American Academy of Child and Adolescent Psychiatry that selective serotonin reuptake inhibitors be considered as the first-line medication treatment for anxiety in youth.

UC Studies Link Between Air Pollution And Childhood Anxiety

EXPOSURE TO AIR POLLUTION is a well-established global health problem associated with complications for people with asthma and respiratory disease, as well as heart conditions and an increased risk of stroke, and according to the World Health Organization, is responsible for millions of deaths annually. Emerging evidence now suggests that air pollution may also impact the metabolic and neurological development of children.



Kelly Brunst, PhD

A new study from researchers at the College of Medicine and Cincinnati Children's Hospital Medical Center looks at the correlation between exposure to traffic-related air pollution (TRAP) and childhood anxiety, by looking at the altered neurochemistry in pre-adolescents.

"Recent evidence suggests the central nervous system is particularly vulnerable to air pollution, suggesting a role in the etiology of mental disorders, like anxiety or depression," says Kelly Brunst, PhD, assistant professor in the Department of Environmental Health at the College of Medicine, and lead author on the study.

"This is the first study to use neuroimaging to evaluate TRAP exposure, metabolite dysregulation in the brain and generalized anxiety symptoms among otherwise healthy children," Dr. Brunst says.

The study was published by the journal *Environmental Research* and is available online.

The researchers evaluated imaging of 145 children at an average age of 12 years,

looking specifically at the levels of myo-inositol found in the brain through magnetic resonance spectroscopy. Myo-inositol is a naturally-occurring metabolite mainly found in specialized brain cells known as glial cells, that assists with maintaining cell volume and fluid balance in the brain, and serves as a regulator for hormones and insulin in the body. Increases in myo-inositol levels correlate with an increased population of glial cells, which often occurs in states of inflammation.

They found that, among those exposed to higher levels of recent TRAP, there were significant increases of myo-inositol in the brain, compared to those with lower TRAP exposure. They also observed increases in myo-inositol to be associated with more generalized anxiety symptoms. "These findings suggest that the neurotoxic effect of high TRAP exposure on generalized anxiety

Among those exposed to higher levels of recent traffic-related air pollution, there were significant increases of myo-inositol in the brain. This can speak to a bigger impact on population health.

RESEARCH FINDINGS

is partially (12%) due to increases in myo-inositol,” says Dr. Brunst.

Dr. Brunst noted however, that the observed increase in reported generalized anxiety symptoms in this cohort of typically developing children was relatively small and are not likely to result in a clinical diagnosis of an anxiety disorder. “However, I think it can speak to a bigger impact on population health ... that increased exposure to air pollution can trigger the brain’s inflammatory response, as evident by the increases we saw in myo-inositol,” says Dr. Brunst. “This may indicate that certain populations are at an increased risk for poor anxiety outcomes.” •

Co-authors on the study include Patrick Ryan, PhD, associate professor; and Mekibib Altaye, PhD, research professor, both with dual appointments in the departments of pediatrics and environmental health at the College of Medicine, and with Cincinnati Children’s; Grace LeMasters, PhD, emeritus professor, Department of Environmental Health, UC College of Medicine; Kimberly Yolton, PhD, director of Research Section, General and Community Pediatrics at Cincinnati Children’s, and a professor of pediatrics in the College of Medicine; Kim Cecil, PhD, research professor of radiology, pediatrics and environmental health with UC and Cincinnati Children’s; and Thomas Maloney and Travis Beckwith, PhD, with the Department of Radiology at Cincinnati Children’s.

Funding for this project was provided by the National Institutes of Environmental Health Sciences (P30 ES006096, R00 ES024116, R01 ES019890, R01 ES11170, and R01 ES027224) and the National Center for Advancing Translational Sciences (NCATS, UL1 TR001425).

The authors cite no conflicts of interest.



Quantitative Systems Pharmacology Model Developed for Pneumocystis Drug Treatments

A TEAM OF researchers in the College of Medicine has developed a quantitative systems pharmacology (QSP) approach—which uses computational models to predict interactions between a drug and its impact on the body’s biological systems and disease agents—to develop new treatments for *Pneumocystis pneumonia*, a lethal infection in immunosuppressed patients.

The research is available online in the journal *BMC Systems Biology*.

QSP models promise to aid in the development of novel therapies by integrating pharmacokinetic (PK) and

pharmacodynamics (PD) data and knowledge on biological systems to predict the effects of new treatment regimens,” explains Tongli Zhang, PhD, an assistant professor in the Department of Pharmacology and Systems Physiology, and the study’s corresponding author.

Richard Ballweg, a PhD candidate, in the Department of Pharmacology and Systems Physiology, is first author on the study.

Pneumocystis pneumonia (PCP) is a cause of morbidity in HIV-positive patients and in other patients undergoing therapy that suppresses the body’s immune system. Even with the introduction of highly active anti-retroviral therapy, PCP still causes death in about 15 percent of all HIV-infected patients.

Researchers constructed and independently validated PK modules that describe the distribution and decay of four drugs: three from the antifungal echinocandin family—*anidulafungin*, *casprofungin* and *micafungin*—and a fourth drug, *trimethoprim-sulfamethoxazole*, with available pharmacokinetic data collected in animal models, says Melanie Cushion, PhD, senior associate dean for research in the College of Medicine and a study co-author.

“Characterized by simple structure and well-constrained parameters, these PK modules could serve as a convenient tool to summarize and predict pharmacokinetic profiles,” says Dr. Cushion, also professor in the Division of Infectious Diseases.



Melanie Cushion, PhD, and Tongli Zhang, PhD

RESEARCH FINDINGS

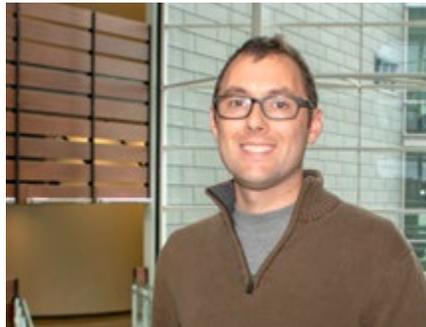
Researchers used currently accepted hypotheses on the life cycle stages of Pneumocystis to also construct a PD module to describe the proliferation, replication modes, slow decay in absence of drugs, and enhanced death in response to drugs by the pathogen Pneumocystis, explains Dr. Cushion. After integrating the PK module and PD module, the QSP model was further constrained with observed levels of asexual and trophic forms of Pneumocystis following treatments with multiple drugs.

The temporal dynamics of the QSP model were validated with corresponding data, says Dr. Cushion.

“Pneumocystis pneumonia has two very different life cycle stages,” explains Dr. Cushion. “With the drugs that we modeled which are the echinocandins, they target only one form—the asexual—and they disappear pretty quickly, but what is interesting is the other form, the trophic forms, remain in the lungs. They decrease a bit but maintain stable numbers while under treatment with the echinocandins.

“If you take the drug away the asexual return and increase in number and the trophic forms begin to replicate,” Dr. Cushion continues. “What we are trying to do is understand how we could use those concepts for a new type of therapeutic approach.”

“What is relevant here is our model can be adapted to other infectious agents,” says Dr. Cushion. “Now that we understand the life cycle of Pneumocystis, we can model the impact of new drugs that are coming out for Pneumocystis treatment as well as for other fungal infections. One of the problems with Pneumocystis pneumonia is there are few drugs with which to treat it. The gold standard is trimethoprim-sulfamethoxazole



Richard Ballweg

(TMP-SMX), but this combination exerts many side effects. Fifty percent of AIDS patients cannot tolerate TMP-SMX treatment and must be switched to lesser effective therapies.

“That’s why it is important to understand what these drugs do to the individual life cycle stages of Pneumocystis. The residual organisms that remain behind after treatment can repopulate and cause pneumonia after the drug is stopped, suggesting the quiescence may be a survival mechanism. These fungi have been around for a very long time and they collaborate with the host that they inhabit for survival. They prefer to maintain a balance without killing their hosts, but once the host upsets this balance with a compromised immune system, the fungi take advantage and proliferate.”

Dr. Cushion says the QSP model is a transdisciplinary effort that brings two very diverse disciplines together to create something new. •

Others participating in the study include Guan-Sheng Liu, PhD, a former postdoctoral fellow, Alan Ashbaugh, Yin Zhang, and Joseph Facciolo.

The study was funded by institutional support from the University of Cincinnati and funding from the U.S. Department of Veterans Affairs.

Researcher Explores Family Planning Needs In South Africa's Free State

GLOBALLY, South African adolescent girls have some of the highest rates of both unintended pregnancies and sexually transmitted infections, including HIV. Such outcomes can result in numerous adverse health or socioeconomic consequences including elevated risk of maternal and infant mortality, decreased educational attainment and exacerbation of poverty, among others.

In 2016, Jennifer Brown, PhD, an associate professor in the Department of Psychiatry and Behavioral Neuroscience at the College of Medicine, was the recipient of a Grand Challenges Explorations grant, an initiative of the Bill & Melinda Gates Foundation. This grant helped Dr. Brown pursue an innovative global health and development research project to assist with the family planning needs of these adolescent girls.

“There is a lack of research examining the broader cultural influences on the family planning needs of this population,” says Dr. Brown. “The primary aim of the study was to better understand the culturally relevant factors associated with the contraceptive and HIV prevention practices of South African adolescent girls between the ages of 14 and 17, who are at increased risk for unintended pregnancies and sexually transmitted infections using a methodology called Cultural Consensus Modeling.”

Their work is focused in the Sesotho-speaking region of Bloemfontein in the Free State province in central South Africa, about four hours from the metropolitan area of Johannesburg. While there's been a lot of work around HIV prevention health education, says Dr. Brown, it has typically been



The primary aim was to better understand the culturally relevant factors associated with the contraceptive and HIV prevention practices of South African adolescent girls between the ages of 14 and 17, using a methodology called Cultural Consensus Modeling.

RESEARCH FINDINGS



Jennifer Brown, PhD

focused in major metropolitan regions and in the coastal cities.

“A lot of young women (there) in their early teens may start to become sexually active, so we think that is the really critical time to start talking about both pregnancy prevention and HIV along with the prevention of other sexually transmitted infections.”

The research team engaged well-known peer leaders from the community, partnered with the Ministry of Health and other community-based groups to develop the questions and methods for the study.

“We took the tack of going in completely naive, asking the young women to tell us, ‘What do you think other young women are doing?’, the idea being that it’s a lot easier to talk about someone else, rather than yourself,” says Dr. Brown.

Among their findings was that abstinence was reported as a prominent prevention method, and only a minority of participants reported a history of sexual activity, reinforcing that their targeted age range of 14-17 may be optimal for interventions to prevent unintended pregnancies and sexually-transmitted infections, like HIV.

One of the groups they met with during the study was loveLife, an organization with a presence across all of South Africa aimed at educating young people about their health and encouraging them to give back to their communities. Brown says that working with loveLife was a powerful collaboration and that she and her colleague were even featured on a radio show run by loveLife teen volunteers.

“I think because South Africa has such a high prevalence of HIV, disproportionately affecting black South Africans, there is a greater openness with the topics of sexual health,” she says. “It’s not without challenges, but our community partners were very supportive of the work and want to see it continue and expand.” Dr. Brown says the project turned out to be a highly successful collaboration. “In 18 months, we expanded our partnership with the University of the Free State and local community-based organizations, hired research staff on the ground in South Africa, implemented the study, recruited 450 teenagers with parental consent to participate and established strong community buy in,” she adds.

Ahead, Dr. Brown hopes to work with their new partners to modify the current sexual health curriculum in South African schools to have a joint focus on pregnancy and STI/HIV prevention through greater emphasis on a youth-led approach. •

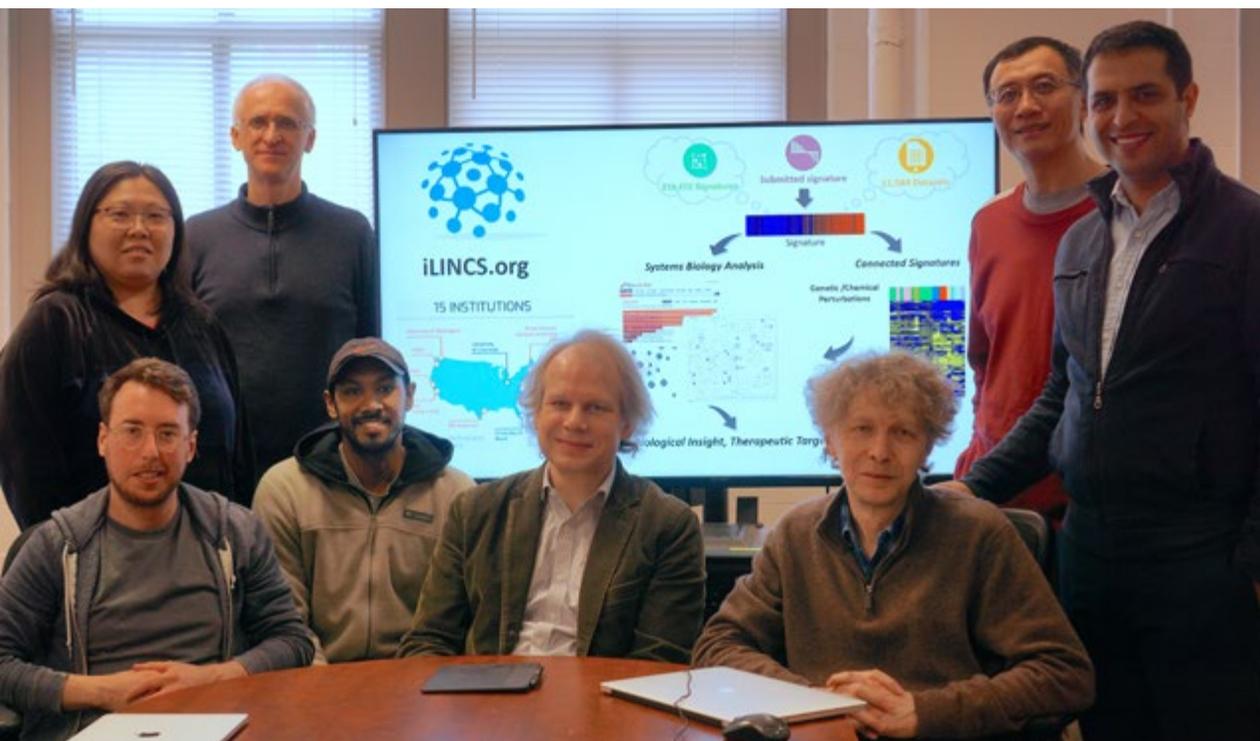
Web Portal Integrates Big Data to Drive Therapeutic Discoveries

A WEB-BASED PLATFORM called iLINC is connecting big data to help researchers learn how diseases work and identify effective treatments. The portal, a one-stop resource for accessible analytics tools, gives researchers unprecedented access to cellular disease and drug data from around the world.

Led by a team within the College of Medicine's Division of Biostatistics and Bioinformatics and Department of Environmental Health, the project is funded

by the National Institutes of Health's Library of Integrated Network-Based Cellular Signatures (LINCS) Program. LINCS is a public database of omics signatures, indications of how cells respond to various genetic and environmental stressors.

Every day, investigators are generating new omics signatures—and they can only reveal new biological insights if they are shared with the greater research community. The iLINC portal connects these datasets with biologist-friendly tools for



Mario Medvedovic, PhD, back row, second from left; and Jarek Meller, PhD, front row, right; with members of the iLINC team.

RESEARCH FINDINGS

analyzing the data, helping researchers gain a more detailed understanding of cell pathways.

"It's a brave new world where analytical tools work together," says Jarek Meller, PhD, associate professor in the Department of Environmental Health. "iLINCS collects a lot of information and helps researchers find a way to integrate and present their findings in a manner that enables new discoveries."

With iLINCS, researchers can also compare gene expression changes in diseases and drugs to identify potential treatments. If there is a negative correlation between drug perturbations and disease gene expression profiles, the drug could possibly reverse disease processes.

"iLINCS provides access to more than 200,000 omics signatures of various diseases," says Mario Medvedovic, PhD, director of the Division of Biostatistics and Bioinformatics and leader of the research team. "Now we can compare these with drug signatures to learn more about what is happening with the diseases. iLINCS does this in a user-friendly way—you can execute sophisticated analytical tasks with a single click."

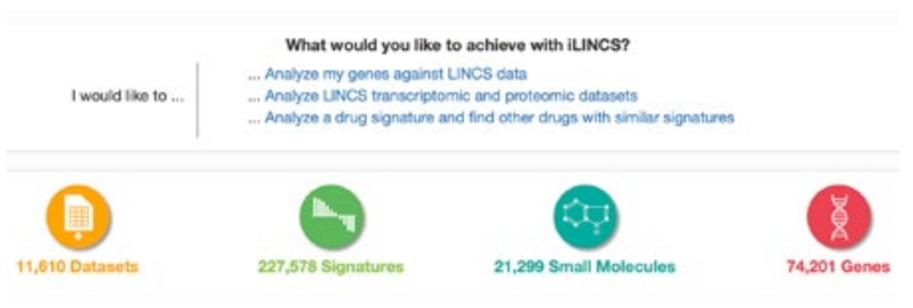
What makes iLINCS so user-friendly? You don't need any computer programming skills to analyze the data. Without technical

roadblocks, omics datasets and analysis tools are accessible to more researchers than ever before.

The portal has already facilitated research on therapies for schizophrenia and breast cancer, and has even found a place in UC classrooms. Students taking Introduction to Functional Genomics and Data Science for Biomedical Research courses are learning from data and gaining new insights with the help of iLINCS.

"We hope to see researchers become increasingly familiar with iLINCS," says Dr. Medvedovic. "We plan to keep adding data and signatures to create many more use cases. What we could do in terms of complex analyses, the sky is the limit." •

Omics datasets and analysis tools are accessible to more researchers than ever before.





WHAT'S NEXT

HIGHLIGHTS OF
RECENT FUNDING

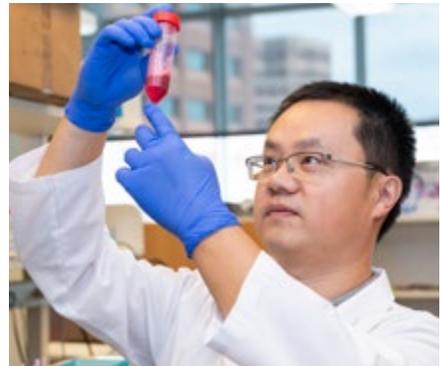
NATIONAL INSTITUTE OF NEUROLOGICAL DISORDERS AND STROKE R01

Regulation of Lipid Catabolism by Autophagy in Neural Stem Cell of Tuberous Sclerosis Complex

This study will examine the molecular and metabolic mechanisms of autophagy in regulating signaling pathways for high mTORC1 activity, using Tsc1-deficient neural stem cells.

Chenran Wang, PhD, assistant professor in the Department of Cancer Biology, has received a \$1.7 million grant from the National Institute of Neurological Disorders and Stroke to study the molecular pathways that cause a rare genetic, tumor-forming condition to develop.

“Tuberous sclerosis complex (TSC) is a genetic disorder that causes tumors to form in many different organs, primarily in the brain, eyes, heart, kidney, skin and lungs; it affects as many as 50,000 people in the U.S. TSC can also affect the brain by causing seizures, autism and intelligence instability in newborns and adults. The mutations of genes known as Tsc1 or Tsc2 lead to the loss of their tumor suppressing functions which control the activity of mTORC1, a protein complex, and its abnormal function in the formation of TSC,” says Dr. Wang. mTORC1 is an established “master regulator” of cells and stimulates the activity of cell growth but negatively regulates autophagy. “Our recent findings revealed a higher autophagy activity in Tsc1-deficient cells under energy stress conditions, leading to the production of a novel double knockout animal model, where TSC1 and FIP200, an essential autophagy protein, were deleted in the neural stem cells (NSC). Using this unique model, we revealed the essential functions of autophagy to sustain high mTORC1 activity and in abnormal development of Tsc1-deficient NSC. These pilot findings lead us to believe



Chenran Wang, PhD

that autophagy plays a major role in the ability of NSC to maintain high mTORC1 activity and provides a metabolic target for TSC patients.”

In this study, Dr. Wang will examine the molecular and metabolic mechanisms of autophagy in regulating signaling pathways for high mTORC1 activity, using Tsc1-deficient NSC. “We will also use our newly developed FIP200 knock in model to further clarify the mechanisms in Tsc1-deficient animals. We will also adopt pharmacological methods to target autophagy and its mediated metabolism to treat defects in Tsc1-deficient NSC,” he explains. “This will help us expand our knowledge of pathogenesis in TSC-deficient NSC, identify signaling pathways and metabolic alterations by hyperactivating mTORC1 and develop new therapeutic concepts for continued investigation in the treatment of TSC patients.” •

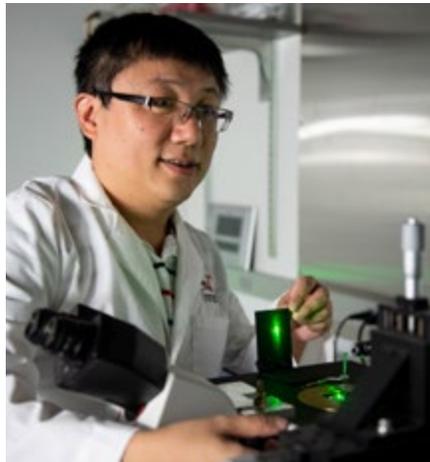
NATIONAL INSTITUTE OF GENERAL MEDICAL SCIENCES

SNARE-mediated Membrane Fusion Involved in Autophagosome Biogenesis

The role of SNARE-controlled membrane fusion in the formation of the autophagosome and its ability to begin working will be examined, as an understanding of such molecular mechanisms could offer a basis for therapeutic advances for a process implicated in human disease.

Jiajie Diao, PhD, assistant professor in the Department of Cancer Biology, secured a \$1.8 million grant to study the mechanisms of autophagic membrane fusion.

“Autophagy, in which a cell basically eats itself, is a crucial pathway by which cellular waste is recycled. Autophagic dysfunction has been associated with cellular quality control, responses to stress, development, lifespan and a range of infectious and other diseases in humans, including cancer, neurodegenerative diseases and diabetes,” says Dr. Diao.



Jiajie Diao, PhD

Membrane fusion—a fundamental process in life where two separate lipid membranes merge into a single continuous bilayer—is a critical process involved in the formation of an autophagic membrane, otherwise known as autophagosome biogenesis. “However, the exact molecular mechanism of autophagic membrane fusion remains unclear,” says Dr. Diao. “Since membrane fusion activity could act as a switch to regulate the autophagy in human diseases, dissecting the fusion machinery is essential to understanding the exact roles of autophagy in specific disease contexts and could provide the opportunity to develop new therapeutic strategies.”

“Based on our preliminary findings, we think that the modification of autophagic SNAREs (proteins) are important for controlling membrane fusion involved in autophagosome biogenesis, while this process is regulated by other proteins including nuclear receptor binding factor 2 and Atg9. Additionally, an attempt to find new fusogens, proteins that facilitate the fusion of cell to cell membranes, and reconstruct the early autophagosome biogenesis is an important expansion, essential for future drug development.” •

AMERICAN CANCER SOCIETY

Oral Rinse Methylation for Follow-up Surveillance of Oral/Pharyngeal Cancer

A methylation panel on a oral rinse sample will be evaluated for its potential in early detection of oral and pharyngeal cancer recurrence.

Researchers at the College of Medicine are investigating whether certain molecular markers that can be collected from simple mouthwash samples can help in identifying throat and mouth cancers.

Scott Langevin, PhD, assistant professor in the Department of Environmental Health and a member of both the Cincinnati Cancer Center and UC Cancer Institute, was recently awarded \$782,000 from the American Cancer Society to continue his research which will hopefully assist in use of a certain oral rinse to catch recurrence of these types of cancers in their earliest stages.

"In 2017, mouth and throat cancer, otherwise known as oral and pharyngeal cancer, accounted for an estimated 49,670 new cancer diagnoses and 9,700 cancer-related deaths in the U.S., and the outcomes for patients with this cancer is relatively poor. About half of these patients will have cancer recurrence within two years of treatment," Dr. Langevin says. "Earlier detection of recurrent tumors is associated with better clinical outcomes, so there is a clear need for new tests that can help facilitate early detection."

Researchers in Dr. Langevin's lab previously identified a biomarker panel made up of 22 regions of DNA; based on the amount of a certain molecule attached to these regions—a process called DNA methylation—scientists could identify the presence of mouth and throat cancer with a high level of accuracy by oral rinse samples.

"With this project, we hope to evaluate the potential of this oral rinse methylation panel as a clinical tool for early detection of cancer recurrence following diagnosis and treatment," he says.

Dr. Langevin adds that his team will take a deep look into methylation within the tumors themselves to enhance understanding of the prevalence and extent of these alterations in mouth and throat cancers.

"Facilitated by my clinical co-investigators, Dr. Trisha Wise-Draper and Dr. Alice Tang, we will identify and recruit a cohort of patients who have been diagnosed with mouth and throat cancers and will regularly collect oral rinse samples, roughly every three months for two-years, following their initial diagnosis and treatment," he says. "Our team will catalog the methylation patterns across the 22 regions that make up our biomarker panel and document how they impact gene expression by applying DNA and RNA sequencing techniques on matched tumor and normal tissue from mouth and throat cancer patients."

"This has clear clinical relevance and could serve as a beneficial tool for early detection and subsequent early intervention of these very serious cancers, potentially improving outcomes for patients," Dr. Langevin says. •



Scott Langevin, PhD

NATIONAL INSTITUTE ON DRUG ABUSE

Omics Analysis of HIV During Synthetic Opioid Exposure

Researchers will undertake a series of studies evaluating the impact of synthetic opioids on HIV latency/reactivation, viral diversity, transcription factor expression and cell signaling pathways.

Jason Blackard, PhD, associate professor in the College of Medicine's Division of Digestive Diseases, has secured a three year, \$1.7 million National Institute of Drug Abuse grant to conduct an omics analysis of synthetic opioids and HIV.

"We have a very poor understanding of how HIV impacts opioids or how opioids impact HIV," says Dr. Blackard, whose translational research laboratory studies virus-virus and virus-host interactions. This project will include ex vivo experiments using blood samples exposed to HIV and/or synthetic opioids in the laboratory as well as an observational study in humans. As part of the observational study, Dr. Blackard will work with clinicians to enroll patients who come to UC Medical Center's emergency room as a result of drug overdose. When patients presenting with opioid-related overdose are seen by an emergency physician, blood is drawn to determine what substance is present in their bodies. Many of these individuals may already know their HIV status, while others may require additional testing for HIV. The observational study focuses on individuals with HIV.

"In my lab we grow HIV, Hepatitis C, Hepatitis B and we take something we grow in a petri dish and add it to the blood sample that we took from a patient," says Dr. Blackard. "We do the same measure of replication; how well does HIV grow in the presence of an opioid?"



Jason Blackard, PhD

"There are a whole bunch of markers of HIV disease we can measure," explains Dr. Blackard. "We know that people with opioid use disorders relapse quite frequently. We know that people who are relapsing may not adhere to their HIV medications.

"So, we have to take this relatively holistic approach, saying what we probably need is new or additional medications to treat opioid use disorder in the context of HIV because these two things are synergetic, but they are helping each other along in a bad way."

"Maybe we need to look at what specific combinations of drugs work best for reducing HIV replication for people that are injecting versus those that don't," says Dr. Blackard. "Even though we talk about how we treat the HIV, which we do reasonably well, we do a poor job of also treating the substance abuse." •

NATIONAL INSTITUTE OF GENERAL MEDICAL SCIENCES R01

Role of Acid Sphingomyelinase in the Modulation of Coagulation After Traumatic Brain Injury

This work seeks insights into coagulation regulation by elucidating the mechanisms by which acid sphingomyelinase activity alters platelet function and microparticle formation following traumatic brain injury, in order to reduce the detrimental effect of clot formation.



Michael Goodman, MD

A \$1.5 million, five-year grant from the National Institute of General Medical Sciences will allow a College of Medicine research team to study the microparticles that cause ongoing changes in the blood clotting mechanism following traumatic brain injury (TBI), in the hopes of developing therapies to better prevent and treat post-injury blood clots.

In victims of TBI, parts of platelets can break off to form microparticles that are associated with an increased risk of blood clotting. Using blood samples from animal models, the study will examine the connection between sphingolipids, a lipid found in cell membranes, and these microparticles.

Researchers hope to determine the role sphingolipids play in the formation of microparticles and the development of blood clots, and whether they can be targeted with existing or new anticoagulants.

"My hope is that this results in a multimodal approach to stop bleeding and prevent blood clots that happen in traumatic brain injury patients, and by extension other patients," says principal investigator Michael Goodman, MD, assistant professor in the Department of Surgery at College of Medicine and a UC Health physician. "We want to zero in on when an injury causes a transition from bleeding to clotting to figure out how to prevent these clots during recovery."

Dr. Goodman's interest in TBI began with research he conducted for the U.S. Air Force, including how flight after injury affects patient outcomes. That evolved into a broader interest in blood clotting, particularly why TBI causes a special kind of platelet dysfunction that results in a higher risk for developing blood clots, including pulmonary emboli and deep vein thromboses.

Dr. Goodman is one of fewer than 20 trauma surgeons in the U.S. to currently hold R01 funding. The award also makes UC Medical Center one of just four Level 1 Trauma Centers in the nation to have two trauma surgeon-directed R01 studies underway simultaneously: a research team led by Timothy Pritts, MD, PhD, professor of surgery at UC College of Medicine and a UC Health physician, is examining the role of red blood cell microparticles in lung inflammation after hemorrhage under a five-year R01 grant. •

DEPARTMENT OF VETERANS AFFAIRS (VA) CAREER DEVELOPMENT AWARD

Overcoming Resistance to Radiotherapy

Researchers aim to identify mechanisms of adaptive resistance to radiation therapy, determining whether combining ionizing radiation with a glutaminase inhibitor depresses cell proliferation in culture.

A five-year, \$1.4 million U.S. Department of Veterans Affairs (VA) Career Development Award will help principal investigator Vinita Takiar, MD, PhD, assistant professor of radiation oncology at the College of Medicine and a UC Health radiation oncologist, examine radiation resistance in head and neck cancer and ways to target molecular pathways to make this form of treatment more effective.

“Head and neck cancer is the sixth most common cancer worldwide and is diagnosed twice as frequently in veterans. Unlike other sites of the body, where cancers can be removed surgically, the head and neck is a difficult area in which to operate, and there is not as much that can be removed before there is functional

impairment for the patient,” she says.

“Radiation is a good option in certain cases, and there are clear benefits to radiating the tissue to prevent disease recurrence, even after surgery. However, even after high doses of radiation, the tumor can reappear within the treated area. We want to understand how this happens and then target those pathways to make radiation more effective.”

Dr. Takiar, also a member of the UC Cancer Institute, says the study will use Reverse Phase Protein Arrays (RPPA). The use of RPPA to identify new therapies to be used in combination with radiation has not been investigated previously.

“We will start by looking at the combination of radiation therapy with a glutaminase inhibitor, known as CB-839, to see if it makes cancer cells in culture more likely to die from radiation,” Dr. Takiar says.

By blocking glutaminase, a derivative of glutamine (an amino acid used in the biosynthesis of proteins), the energy producing machinery of cells becomes impaired, making it harder for cells that are damaged by radiation to repair themselves and continue to survive.

Dr. Takiar and her team will also work to identify other new head and neck cancer cellular pathways that are altered by radiation therapy using samples taken from patients, treating them with radiation and then looking at their molecular changes.●



Vinita Takiar, MD, PhD

CLINICAL TRIAL HOOKIPA BIOTECH

To Test an Investigational Vaccine to Prevent Cytomegalovirus (CMV) In Kidney Transplant Patients

The study is designed to learn more about the safety and effectiveness of the HB-101 vaccine at preventing the CMV infection in people who are CMV-negative who receive kidney transplants from living donors who are CMV-positive.

The University of Cincinnati and its affiliated health system, UC Health, will serve as one of several international locations to test the safety and effectiveness of the investigational vaccine HB-101 at preventing the cytomegalovirus (CMV) infection in people who are CMV-negative who receive kidney transplants from living donors who are CMV-positive. The vaccine is developed by Hookipa Biotech, who is funding the clinical research activities.

CMV is a infection present in over half of the population between 6 and 49 years of age in both the United States and Europe. Once someone has CMV, they have it for life. CMV is typically contracted through bodily fluid or through organ transplants.

"UC was chosen to be part of this study because of our expertise in transplant clinical care and research," says Rita Alloway, PharmD, research professor in the Division of Nephrology at the College of Medicine and director of transplant clinical research for UC Health. "UC, the first to enroll patients in this study, remains the lead enroller."

The study will enroll 150 transplant patients at as many as 40 sites over approximately 18 months. Prior to the kidney transplant, two to three doses of the study drug will be given about 28 days apart. After transplant, the participants will be managed by CMV prophylactic therapy following UC standard guidelines. The study will evaluate



Rita Alloway, PharmD

the patients receiving HB-101 compared to patients receiving placebo.

"This study is conducted in the living donor population because the transplant is a scheduled surgery, allowing for vaccination prior to the procedure," says Dr. Alloway. "Therefore, when we administer either the vaccine or the placebo prior to transplant, then monitor the patients for the next 12 months for CMV infection, we can determine if there is a benefit from the vaccine or not."

CMV is a disease with significant morbidity and potential mortality following kidney transplants, Dr. Alloway says. "Having a vaccine that developed protective antibodies prior to transplant and prevented CMV disease would have the benefit of reducing medications as prophylaxis post-transplant." •

NATIONAL INSTITUTE OF NEUROLOGICAL DISEASES R01

APRISE (Assessing Population-based Radiological brain health in Stroke Epidemiology)

Researchers will study the use of neuroimaging to identify risk factors of stroke recurrence, which is approximately 25 percent of all stroke cases in the U.S.

Researchers at the College of Medicine have received a \$3.2 million grant from the National Institute of Neurological Diseases to study the use of neuroimaging to pinpoint the risk factors of stroke recurrence.

Achala Vagal, MD, associate professor and vice chair of research in the Department of Radiology, is the principal investigator (PI) on the study, along with co-PIs Pooja Khatri, MD, professor of neurology and director of the UC Stroke Team, and Brett Kissela, MD, Albert Barnes Voorheis Professor and Chair of the Department of Neurology and Rehabilitation Medicine and senior associate dean for clinical research.

Recurring stroke makes up about 25 percent of all stroke cases—nearly 800,000 annually—in the U.S. alone. Someone who has suffered a stroke has an increased risk of a recurring stroke for up to five years after the initial event.

“Compared to our understanding of the risk factors of an initial stroke, we have limited understanding of the factors surrounding recurrent strokes,” says Dr. Vagal.

Titled APRISE (Assessing Population-based Radiological brain health in Stroke Epidemiology), the study will leverage the extensive infrastructure of the Greater Cincinnati Northern Kentucky Stroke Study, the first large, population-based metropolitan study of trends in stroke incidence rates and outcome within a biracial population. The region's population is similar to that of



Achala Vagal, MD

the United States in terms of age, economic status and racial makeup so for understanding stroke, it also serves as a generalized model for the country. Over the past 22 years, the study has produced numerous major findings, particularly with regard to racial disparities in stroke.

Dr. Vagal and neuroimaging researchers will assess imaging for signs of small vessel disease in the brain; this can be in the form of previous injury, microbleeds, white matter disease (wearing away of tissue) or brain atrophy, among other observations.

“The development of a clinical prediction tool, incorporating our full range of modern imaging techniques, will enhance our ability to identify patients at a higher risk for recurrent strokes,” says Dr. Vagal. •

FONDATION LEDUCQ

Cure PhosphoLambaN Induced Cardiomyopathy (CURE-PLaN)

This project will investigate the role the gene phospholamban plays in the genetic heart disorder arrhythmogenic cardiomyopathy.

A University of Cincinnati researcher will lead an American network of researchers in a \$6 million international project that will investigate the role phospholamban (PLN) plays in the genetic heart disorder arrhythmogenic cardiomyopathy (ACM). The pathogenesis of ACM is largely unknown and the diagnosis remains challenging, but it is a leading cause of sudden cardiac death in young individuals, often related to exercise and adrenergic stimulation.

The five-year project, titled Cure PhosphoLambaN-induced Cardiomyopathy (Cure-PLaN), is funded by the Paris-based Fondation Leducq, which supports international efforts to research cardiovascular and neurovascular diseases.

Evangelia Kranias, PhD, professor in the Department of Pharmacology and Systems Physiology and Hanna Chair of Cardiology at the College of Medicine, will serve as the U.S. coordinator while Pieter Doevendans, MD, PhD, of the Netherlands Heart Institute will coordinate the European network. Institutions include Stanford University and the Icahn School of Medicine at Mount Sinai, along with the Netherlands Heart Institute in Utrecht, the Biomedical Research Foundation of the Academy of Athens in Greece and University Medical Center in Goettingen, Germany. Each of the six institutions involved will share equally in the grant.

Dr. Kranias provided the first evidence that phospholamban plays an important role in regulating the heart's ability to



Evangelia Kranias, PhD

contract and pump blood, identifying the mutation of phospholamban—PLN R14del—in 2006 in Greece. Dr. Kranias says that recent evidence suggests that this mutation plays a central role in mediating ACM and its progression. “During this project, the research team will try to understand what goes wrong in the hearts of some human carriers with the phospholamban mutation causing them to develop heart disease while others do not,” says Dr. Kranias.

The team will use a shared platform of patient data coupled with lab experiments and animal models. These will include patient-specific induced pluripotent stem cell derived cardiomyocytes, human engineered cardiac tissues and animal models.

“I have worked all my life on phospholamban and have really defined the function of this gene in the heart,” says Dr. Kranias. “Now I am able to see my work moving from bench to bedside where we can apply all the knowledge from four decades of research to develop therapy for these patients.” •

NATIONAL HEART, LUNG AND BLOOD INSTITUTE

The Role of Sex in the Life Cycle and Transmission of Pneumocystis

The importance of the sexual cycle for survival of Pneumocystis will be investigated using the anidulafungin treatment and prophylactic models, addressing specifically: is sexual replication required for completion of the life cycle of Pneumocystis; and at what point in the Pneumocystis life cycle can the infection be transmitted.

Melanie Cushion, PhD, senior associate dean for research in the College of Medicine and professor in the Division of Infectious Diseases, has secured a \$1.9 million four-year grant from the National Heart, Lung and Blood Institute (1R01HL146266-01) to test whether anti-fungal agents known as echinocandins could be part of a therapy to block the formation of asci, a life cycle stage which results from sexual replication in the fungus that causes pneumocystis pneumonia.

“We have found in mouse models that without the formation of asci, the infection cannot be transmitted to uninfected mice,” says Dr. Cushion. “It provides strong evidence that these asci are the agents of the infection—a concept suspected, but heretofore not proven. Our analysis has shown that these echinocandin-treated fungi were trying to proceed with sexual replication but could not due to a lack of beta-glucan, an integral cell wall component in asci.”

Dr. Cushion says the echinocandins don't attack non-beta glucan producing life cycles in pneumocystis pneumonia, which can remain in the lungs despite treatment of up to three weeks.

“In a clinic setting, the echinocandin should not be given as a monotherapy as cessation of therapy allows the asci to return,” says Dr. Cushion. “Three weeks of



Melanie Cushion, PhD

treatment with echinocandins is the standard regimen, but what if we take it out to three months? If the fungi that remain after extended treatment with an echinocandin disappear, this would provide the evidence that sexual replication is obligatory for pneumocystis,” says Dr. Cushion.

Dr. Cushion is working with co-investigator Alexey Porollo, PhD, associate professor in the UC Department of Pediatrics and researcher at Cincinnati Children's.

“Pneumocystis species live a parasitic life style and are not cultivable outside their mammalian hosts,” says Dr. Porollo. “This severely limits studies of these fungi at the molecular level and hinders design of new drugs against this pathogen. However, it makes it more interesting to study such an organism as many areas of its biology still lie in an uncharted territory.” •

NATIONAL INSTITUTE ON DRUG ABUSE

Optimizing HEALing in Ohio Communities (OHIO)

The University of Cincinnati will be part of a \$65.9 million grant to Ohio research universities to implement and evaluate intervention strategies to significantly reduce opioid overdose deaths in the next three years.

The University of Cincinnati (UC) will be part of a \$65.9 million grant to Ohio research universities as part of an effort funded by the National Institute on Drug Abuse (NIDA), part of the National Institutes of Health (NIH) to drastically reduce the number of opioid overdose deaths in the next three years.

In April 2019, Health and Human Services Secretary Alex Azar announced the launch of the HEALing Communities Study to help reverse the nation's opioid crisis. "This ambitious study will test an integrated community-based approach to address the opioid crisis, with a goal to decrease opioid overdose deaths by 40 percent in select communities over three years," said Secretary Azar.

The NIH launched the HEAL initiative (Helping to End Addiction Long-term) in June 2018, a bold, trans-agency effort to speed scientific solutions to stem the national opioid crisis. The study is being carried out in partnership with the Substance Abuse and Mental Health Services Administration, which provides support for many of the local prevention, treatment and recovery support services to be studied.

As announced, Ohio will be among four states (with Kentucky, Massachusetts and New York) to receive federal funds to implement and evaluate intervention approaches. The award constitutes a partnership between UC, Ohio State University, RecoveryOhio and Case Western Reserve



Theresa Winhusen, PhD

University as well as additional universities and community organizations in 19 counties across Ohio. UC will receive \$15.1 million over four years.

Theresa Winhusen, PhD, professor of psychiatry and behavioral neuroscience in the UC College of Medicine, director of the Addiction Sciences Division and principal investigator of the Ohio Valley Node in the NIDA Clinical Trials Network, will serve as a co-principal investigator for the state of Ohio with Rebecca Jackson, MD, director of the Ohio State University's Center for Clinical and Translational Science, along with Alisha Nelson of RecoveryOhio, an initiative created by Gov. Mike DeWine. UC, Ohio State and Case Western will coordinate the research study in collaboration with the 19 counties.

WHAT'S NEXT

The HEALing Communities Study will determine how to address the opioid epidemic through prevention, treatment and recovery. To assess the effectiveness of different interventions, the study will compare results between communities, and in order to make these comparisons, participating communities will be randomly assigned using a scientific algorithm to start these interventions either in December 2019 (Wave 1) or December 2021 (Wave 2). Throughout the project, all participating communities will continue to get all the other treatment and prevention resources and services that they would otherwise receive.

"The HEALing Communities Study is critically important for its potential to address the opioid epidemic, including reducing opioid overdose deaths, through the use of interventions that, if found to be successful, can be readily disseminated to other parts of the country," says Dr. Winhusen.

UC faculty members Jennifer Brown, PhD, associate professor of clinical psychiatry in the addiction sciences division, and Michael Lyons, MD, associate professor of emergency medicine, will lead the state-wide effort of intervention implementation across the selected counties.

The project will include counties in Ohio which have been hardest hit by opioid deaths and overdoses, which are counties both urban and rural. The 19 counties are: Allen, Ashtabula, Athens, Brown, Cuyahoga, Darke, Franklin, Guernsey, Greene, Hamilton, Huron, Jefferson, Lucas, Morrow, Ross, Scioto, Stark, Williams and Wyandot.

In 2017, 4,293 Ohioans died from opioid-related overdoses, according to the Centers for Disease Control and Prevention. With that toll, Ohio experienced 39.2

opioid-related overdose deaths per 100,000 people, a rate that is second only to West Virginia.

"To receive this award for Ohio is crucial to tackling some of these frightening statistics of the opioid crisis. For Ohio, obviously and unfortunately the need is a big factor," says Dr. Lyons. "We hope we can provide communities with an understanding of the evidence based treatments, and then implement them in an impactful way."

Additional faculty investigators from UC include: Jason McMullan, MD, associate professor of emergency medicine; Brett Harnett, and Tzu-Yu "Danny" Wu, PhD, both assistant professors of biomedical informatics; and Edward Latessa, PhD, professor of criminal justice, and Myrinda Smith, senior research associate, from the School of Criminal Justice and the UC Corrections Institute in the UC College of Education, Criminal Justice, and Human Services. •



Michael Lyons, MD, and Jennifer Brown, PhD

NATIONAL INSTITUTE OF ALLERGY AND INFECTIOUS DISEASES

Microbiome and E. coli O157:H7 Infection of Human Gut Tissue

Researchers will examine various aspects of infection by Shiga toxin producing E. coli using a induced human intestinal organoid model.

Alison Weiss, PhD, professor in the Department of Molecular Genetics, Biochemistry and Microbiology in College of Medicine, has been awarded a four-year \$1.6 million grant from the National Institute of Allergy and Infectious Diseases to study Shiga toxin producing *Escherichia coli* O157:H7.

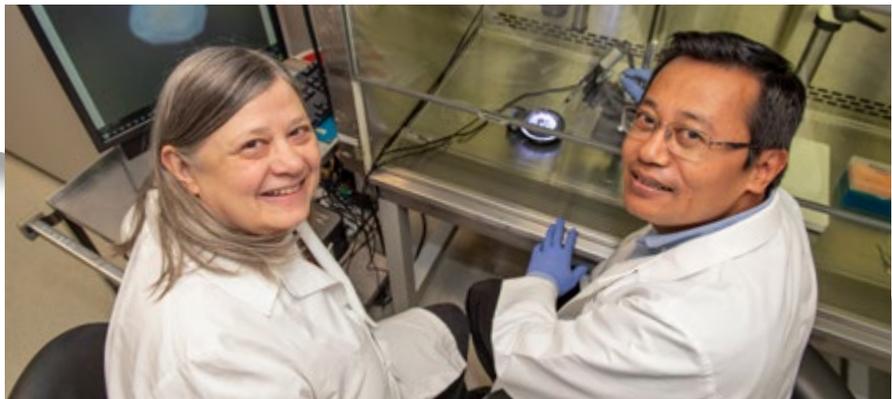
Shiga toxin producing E. coli (STEC), including O157:H7, are an important cause of diarrheal disease, causing about 265,000 illnesses in the United States annually. About 10 percent of cases progress to hemolytic uremic syndrome, a condition resulting in damaged red blood cells clogging the kidneys and the most common cause of acute kidney failure in children. There is currently no treatment for STEC.

The infection was first identified in hamburger meat, but it is carried asymptotically by many creatures. "What is interesting is in the cattle that carry the disease,

the organisms just live right at their anal junction," says Dr. Weiss. "It doesn't bother the cattle systematically so we can't identify them as sick and then they inoculate all of their fecal matter when they defecate."

Researchers have used embryonic stem cells to create induced human intestinal organoids (iHIOs), which the Weiss lab has shown to be sensitive to E. coli and Shiga toxin. Dr. Weiss and Suman Pradhan, PhD, research associate in the Weiss Laboratory, explained their findings in a 2017 article "Intestinal Organoids Model Human Response to Infection by Commensal and Shiga Toxin Producing *Escherichia coli*" published in *PLoS One*.

Now her lab will use these these iHIOs to further study of factors influencing infection and disease progression by STEC. "It's a human specific disease and it has been impossible to understand until we can study these human tissue models," says Dr. Weiss. •



Alison Weiss, PhD, and Suman Pradhan, PhD



RESEARCH HONORS

College of Medicine Team Science Award

The Team Science Award recognizes a team of College of Medicine faculty members who have successfully created and sustained a multidisciplinary research team that significantly contributes to the mission of the College.



Collaborative for Research on Acute Neurological Injuries (CRANI)

Nominated by:

Brett Kissela, MD, Department of Neurology
and Rehabilitation Medicine

CRANI is led by co-founders Brandon Foreman, MD, Department of Neurology and Rehabilitation Medicine; Jed Hartings, PhD, Department of Neurosurgery; and Laura Ngwenya, MD, PhD, Department of Neurosurgery. The vision of CRANI is to establish the University of Cincinnati and affiliates as world-class leaders in translational research on acute neurologic injury (ANI), recognized for a unique approach to collaboration across a spectrum of related diseases and across clinical and basic sciences. The mission of the group is to establish a community and curriculum for collaboration and sharing of resources and expertise on the study of ANI across the University of Cincinnati and affiliate institutions by creating a virtual department and academic home that breaches traditional boundaries of departments and institutions, disease categories and clinical vs. laboratory investigations. CRANI's team science approach leverages resources and expertise in ANI for increased research productivity, funding and reputation in discovering mechanisms of ANI and developing improved methods for diagnosis and treatment.

College of Medicine Research Rising Star Award

The Research Rising Star Award recognizes someone who demonstrates an outstanding commitment to health-related research.

A Research Rising Star is in the top tier of career benchmarks among peers and demonstrates excellence in a variety of measures. These measures include not only a strong record of high impact publications, extramural funding, and recognition as an expert in their research area as evidenced by invited presentations at national or international meetings or venues, and recognition by and service with sponsors or professional societies. Excellence may also be seen in additional attributes that set the recipient above his or her peer group.



Jiajie Diao, PhD

Jiajie Diao, PhD

Assistant Professor, Department of
Cancer Biology

Since joining the Department of Cancer Biology, Dr. Diao has made tremendous achievements in his research programs. He quickly established a productive research group including postdocs, graduate students and other visiting researchers. One of the most impressive achievements in Dr. Diao's scholarly activities is his publication of very high-quality papers in top-notch scientific journals as a senior author or a coauthor. He has published 60 articles during his career, 24 of those since joining the University of Cincinnati three years ago. Six other papers are submitted or under revisions currently.

Dr. Diao has been extremely active in pursuing extramural funding to support his expanding research activities. He has been awarded a NIH R35 grant as the sole principal investigator, and grants from the Michael J. Fox Foundation for Parkinson's Research and Dr. David Millhorn Innovation Award together with Kim Seroogy, PhD, of the Department of Neurology and

Rehabilitation Medicine. Dr. Diao also has filed one provisional patent application from UC last year, consistent with his high research productivity and innovation. In 2017 he was recognized with the Young Scientist Prize in Biological Physics from the International Union of Pure and Applied Physics, a prestigious award for junior biophysicists. Additionally, he has actively contributed to the teaching and service missions of the Department of Cancer Biology and across campus at UC. Besides his assigned teaching for "Data Critique" in the Cancer Biology graduate program (served as course director in Spring 2019) and Molecular and Cellular Biology graduate course at the College of Medicine, Dr. Diao volunteered for multiple guest lectures in the UC Department of Chemistry. Dr. Diao's service contributions include serving on his department's seminar committee, retreat planning committee and graduate program committee (particular efforts in admissions), faculty search committee for the UC Physics Department and a reviewer for a large number of journals and a number of granting agencies.

College of Medicine Research Rising Star Award



Brandon Foreman, MD

Brandon Foreman, MD, FACNS

Assistant Professor, Department of Neurology and Rehabilitation Medicine

Dr. Foreman serves as associate director for neurocritical care research within the Division of Neurocritical Care. He was trained in both clinical neurophysiology and neurocritical care at Columbia University Irving Medical Center in New York, and joined the UC Gardner Neuroscience Institute in 2014. At UC, Dr. Foreman has received important training in DC-EEG, a new technology to record slow EEG potentials, including spreading depolarizations (SDs) of the brain, through the mentorship of Jed Hartings, PhD, professor of neurology and rehabilitation medicine and an international expert in the recording and analysis of this phenomenon. Alongside Dr. Hartings and Neurotrauma Director Laura Ngwenya, MD, PhD, assistant professor of neurosurgery, Dr. Foreman co-founded the unique Collaborative for Research on Acute Brain Injuries (CRANI) that holds weekly meetings to foster emerging and multidisciplinary translational research.

Dr. Foreman is the principal investigator for the Critical Care EEG Monitoring Research Consortium, and leads the ICU Working Group for the Transforming Research and Clinical Knowledge in Traumatic Brain Injury (TRACK-TBI) study under the mentorship of Opeolu Adeoye, MD, associate professor of emergency medicine. He also serves as site PI for the NIH-funded Epilepsy Bioinformatics grant (EpiBioS4Rx) and the New-onset Refractory Status Epilepticus (NORSE) registry, co-

investigator for the Department of Defense-funded Spreading Depolarizations II (SDII) study and co-investigator for the Air Force Research Laboratory's Cerebral Ultrasound for Trauma study to assess noninvasive biomarkers of elevated intracranial pressure.

Dr. Foreman also worked on the largest series of new-onset refractory status epilepticus and a practice survey across neurocritical care units regarding the management of patients with refractory status epilepticus, and he recently published UC's experience performing intracranial multimodality neuromonitoring in patients with severe TBI. Dr. Foreman was awarded a K23 grant ("Impact of Intracranial Pressure on Cortical Functioning and Cognitive Outcome after Traumatic Brain Injury"). He has published 23 articles in peer-reviewed journals and was first or senior author on nine of these. These publications are in the top tier of medical journals. Additionally, he has authored three case reports, eight book chapters, six reviews, and 11 abstracts.

College of Medicine Research Service Award

The Research Service Award recognizes faculty who have committed their time and expertise to improving the quality and rigor of College of Medicine research. Award recipients have demonstrated their exceptional service to the College of Medicine.



Timothy Pritts, MD, PhD

Timothy Pritts, MD, PhD

Department of Surgery

Nominator: Jeffrey J. Sussman, MD

Timothy Pritts, MD, PhD, is a general and trauma surgeon whose research is focused on improving care for injured and critically ill patients through optimizing resuscitation strategies and mitigating potential harm from the red blood cell storage lesion. During the course of his career, he has mentored more than 30 medical students, surgical residents and postdoctoral fellows. Many of these have gone on to successful research careers and prestigious academic positions, including three surgeon-scientists within the UC Department of Surgery who have obtained National Institutes of Health (NIH) funding: Michael Goodman, MD, Amy Makley, MD, and Vanessa Nomellini, MD, PhD. Dr. Pritts mentored Drs. Goodman and Makley when they were general surgery residents spending two years in the laboratory as research fellows (2008-2010) and again after they joined our faculty in 2013. Dr. Goodman, under Dr. Pritts' tutelage, has now obtained his own R01 and Department of Defense (DoD) funding as principal investigator. This group has now become one of the best-funded trauma research groups in the country and is one of only a few groups with more than two NIH-funded trauma surgeons.

Dr. Pritts has been very active in College of Medicine research activities. In the Department of Surgery, he served for three

years and four years, respectively, on the executive committees of two NIH-sponsored T32 training grants. He has served since 2015 on the college's Acute Care Research Council and since 2017 as co-director, as well as serving on the Investigator Council for the UC Office of Clinical Research. He also has served as faculty in the Systems Biology and Physiology PhD programs.

As chief of the Section of General Surgery, Dr. Pritts maintains a focus on clinical care, research, teaching and mentoring. His initial K08 award from the NIH was followed by an R01 award which was recently renewed. He also currently serves as principal investigator on two U.S. Air Force grants and co-investigator on several other NIH and military research projects. Dr. Pritts serves as a grant reviewer for the NIH, DoD and several surgical societies. His research has resulted in significant clinical and basic science advances related to the care and resuscitation of trauma patients. With his team, he has published more than 150 peer-reviewed publications, chapters and reviews. Many of these are co-authored by surgical residents serving as research fellows in his laboratory. An active member of multiple surgical societies, Dr. Pritts has served on the executive councils of the Association for Academic Surgery, the Society of University Surgeons, the Central Surgical Association and the Ohio Chapter of the American College of Surgeons. Dr. Pritts and his team have given more 200 presentations and invited talks nationally and internationally.

College of Medicine Clinical Trialist of the Year

The Clinical Trialist of the Year Award recognizes the investigator with the greatest revenue from industry-funded clinical trials during the fiscal year.



Trisha Wise-Draper, MD, PhD

Trisha Wise-Draper MD, PhD

Department of Internal Medicine,
Division of Hematology Oncology

Dr. Wise-Draper's clinical trial program largely focuses on novel immunotherapy combinations for head and neck cancer and other solid tumors. In addition, as part of the experimental therapeutics program, she works with industry to execute first-in-

man studies and newly developed targeted agents. Examples of novel agents include a spherical nucleic acid configuration of Toll-like receptor 9 agonist nucleotide to activate Th-1 responses, a STAT-3 anti-sense molecule to dampen a negative regulator of immune cells and a novel antibody binding ErbB3 to overcome cetuximab resistance.

College of Medicine Research Professional Award

The Research Professional Award recognizes staff who serve our research mission in a way that vastly transforms productivity and drives the research enterprise.

They do so by contributing to publications and grant proposals; acquiring and managing clinical trials; designing and executing experiments; recruiting, educating, and protecting clinical research participants; analyzing data; maintaining regulatory compliance; engaging the community in the research enterprise; and mentoring future researchers. We are grateful for their time and expertise they commit to improving the quality and rigor of laboratory and clinical research.



Tonya LaSorella-Dorst, RN

Tonya LaSorella-Dorst, RN

Department of Surgery, Division of Transplantation

Nominated by: Shimul Shah, MD, E. Steve Woodle MD, Rita Alloway, PharmD, and Simon Tremblay, PharmD, PhD

Tonya LaSorella-Dorst, RN, is a senior research professional at the University of Cincinnati College of Medicine. Tonya is a registered nurse with a certification in clinical research from the Association of Clinical Research Professionals. She has devoted her 20-year career to clinical research, with experience in transplant, infectious disease, cancer and pharmacokinetics. Since joining Dr. Alloway's team in 2010, she has spearheaded the team's research efforts in transplant immunosuppression in kidney and liver transplant recipients with a focus on improving post-transplant outcomes by reducing the common side effects associated with lifelong immunosuppression. Some of the most rigorous and revolutionary studies the team has conducted focus on the pharmacokinetics of immunosuppressive agents. Pharmacokinetic studies require extreme organizational skills for successful completion. Tonya has partici-

pated in pharmacokinetic studies in over 100 patients at UC. In addition, Tonya leads the team which provides around the clock coverage enrolling transplant recipients in groundbreaking studies.

Elizabeth Serafin, MS

Department of Anesthesiology

Nominated by: Mark Baccei, PhD, Jun-Ming Zhang, MD, Temugin Berta, PhD, and Marcia Espinola, DVM

Liz Serafin, MS, is a principal research assistant in Dr. Baccei's lab at the University of Cincinnati College of Medicine's Pain Research Center. Liz earned her BS in microbiology and immunology from the University of California, Irvine and her MS in molecular genetics from the University of Cincinnati. Since joining Dr. Baccei's lab in 2012, she has studied the maturation of pain-related spinal cord circuits under normal and pathological conditions. Her current work investigates the transcriptional profile of spinal cord neurons that make up nociceptive networks, using population-level and single-cell RNA seq-



Elizabeth Serafin, MS

based gene expression analyses to identify novel molecular markers and targets for age-dependent pain intervention strategies. In addition to her work in Dr. Baccei's lab, Liz has also served as a voting member of the UC Institutional Biosafety Committee since 2015.

RESEARCH PROFESSIONAL AWARD FINALISTS:

Angela Molloy, RN, BSN

Department of Neurology and Rehabilitation Medicine

Nominated by: Daniel Woo, MD, Aram Zabeti, MD, Andrew Duker, MD, and Tracey Glauser, MD

Angela Molloy, RN, a clinical trials project manager at the University of Cincinnati, is the overall study coordinator for the NeuroNEXT/CinciNEXT Program. Angela has personally overseen the start-up and management of all NeuroNEXT trials at CinciNEXT since December 2013. Her career has spanned numerous subspecialties within neurology, including multiple pharmaceutical and National Institutes of Health-funded trials in movement disorders, multiple sclerosis, neuromuscular disease, stroke and brain tumor. She also has experience in managing staff and programs by continually mentoring and educating her co-workers. She is a member of the International Association of Clinical Research Nurses and a certified clinical research professional through the Society of Clinical Research Associates. Angela is involved in multiple institutional coun-

cils, has completed the Cincinnati Children's Hospital Medical Center Leadership Foundation Program and the Leadership Development Research Training Program through the Center for Clinical and Translational Science and Training Community Leaders Institute.



Angela Molloy, RN, BSN

Benjamin Packard, BS

Department of Pharmacology and Systems Physiology

Nominated by: James Herman, PhD, Yvonne Ulrich-Lai, PhD, and Eric Wohleb, PhD

Benjamin Packard, BS, received a bachelor's degree in biology from Mount Vernon Nazarene College in 1998. He has been employed in the lab of Dr. Herman since 2003. He started as a research assistant, running Western blots, sectioning brains and managing the transgenic mouse colony, and was later promoted to research associate and lab manager. Presently, he runs experiments for the lab (primarily RIAs for stress hormones), manages the day-to-day research of the Herman Lab at UC and the Cincinnati Veterans Affairs Medical Center, and coordinates shared resources used by all of the stress research labs at the UC Reading Campus.



Benjamin Packard, BS



STUDENT HIGHLIGHTS

Highlights in Graduate Education at the College of Medicine 2018-2019

The College of Medicine is heavily invested in the training of students for advanced degrees in biomedical research, our goal being to contribute at the highest level to the future biomedical science workforce. Following are a few highlights of the national and international recognitions that members of our student body regularly receive.



Courtney Giannini

UC Presidential Medal Of Graduate Student Excellence

Courtney Giannini, a fifth year student in the College of Medicine's Medical Scientist Training program which offers a joint MD/PhD, received a 2019 UC Presidential Medal Of Graduate Student Excellence, for scholarship, leadership, character and service. A Cincinnati native, Giannini finished two years of medical school before taking a leave of absence to tackle three years of graduate study in the Division of Epidemiology. In her dissertation work, she is examining sunscreen products for the level of oxybenzone and relating oxybenzone exposure to the age at several pubertal milestones. This is the third year running that the medal recipient was a College of Medicine student.

NCI F99/K00

Madeline Niederkorn, a fifth-year graduate student in the College of Medicine, is the recipient of a National Cancer Institute (NCI), Predoctoral to Postdoctoral Fellow

STUDENT HIGHLIGHTS

Transition Award of \$75,910 for the project “Regulators of Ubiquitin Signaling in Malignant Hematopoiesis.” The F99/ K00 grant support is given to encourage and retain outstanding graduate students



Madeline Niederkorn

recognized by their institutions for their high potential and strong interest in pursuing careers as independent cancer researchers. Only 24-30 awards are made nationally per year. Niederkorn is looking to identify novel and rational therapeutic targets that have less toxic side effects than chemotherapy for patients with myelodysplastic syndromes and acute myeloid leukemia.

Four Yale Ciencia Academy for Career Development Fellows

Four UC College of Medicine graduate students—Marissa Smail, Camille Sullivan, Chrystelle Vilfranc and Paige Balencia Greenwood—have been named fellows with the Yale Ciencia Academy for Career Development. The academy has accepted 40 young researchers from across the United States. The Academy’s focus is to



Yale Ciencia Academy Career Development Fellows (left to right): Camille Sullivan, Paige Balencia Greenwood, Marissa Smail, Chrystelle Vilfranc

STUDENT HIGHLIGHTS

increase the number of scientists from underrepresented or underserved communities.

Paige Balencia Greenwood is a third-year PhD candidate in the Neuroscience Graduate Program in the College of Medicine. She is studying the role of socioeconomic status (SES) on brain structure and function in relation to reading acquisition in typical and atypical readers. Greenwood recently published a first author paper in the journal *Brain and Cognition* on the association between maternal reading ability and the functional connectivity of regions within the brain related to language and executive functions in four-year-old girls. Her long term goal is to use her research to contribute to bridging the gap in academic disparities in low income neighborhoods.

Marissa Smail is a second-year PhD student in the Neuroscience Graduate Program in the College of Medicine, and the first in her family to attend college. Her current research investigates the molecular mechanisms underlying depression-like behaviors in a novel rodent model of loss, utilizing integrated bioinformatics analyses of RNAseq, proteomics, and kinomics data from multiple emotional regulatory brain

regions. Her long-term goal is to improve therapies for poorly understood neuropsychiatric disorders.

Camille Sullivan is a fifth-year MD/PhD student in the College of Medicine pursuing graduate work in the Department of Cancer Biology. Her focus is on the mechanistic roles of the Ron receptor tyrosine kinase in the prostate tumor microenvironment with a focus on the antitumor immune response. She plans to pursue orthopaedic surgery with the long-term career goal of becoming a surgeon-scientist.

Chrystelle Vilfranc is a fifth-year PhD candidate in the Cancer and Cell Biology program in the College of Medicine. Her dissertation research involves elucidating the role of efficient DNA damage and response signaling in the protection against chronic liver disease including hepatocellular carcinoma, the most common form of primary liver cancer. Her long-term goals include increasing health education and scientific outreach opportunities in communities of color. She currently serves as the digital curator for VanguardSTEM, a virtual community for women and non-binary persons of color in the fields of science, technology, engineering and medicine.

COLLEGE OF MEDICINE GRADUATE STUDENTS CURRENTLY HOLD:

- 1 F99/K00
- 18 F30/F31
- 7 Ryan Fellowships
- 4 American Heart Association Fellowships
- 1 American Epilepsy Foundation Fellowship
- 1 ASM Fellowship
- 1 Cancer Free Kids Fellowship

NIH F31 Diversity Predoctoral Fellowship

Camille Sullivan, a fifth-year MD/PhD student pursuing graduate work in the Department of Cancer Biology, was recently awarded the highly competitive F31 Diversity Predoctoral Fellowship from the National Cancer Institute to support her thesis research.



Camille Sullivan

STUDENT HIGHLIGHTS

Election to Neuroscience Scholars Program

Jennifer Patritti Cram (Neuroscience Graduate Program) was elected to the Neuroscience Scholars Program, an extensive two-year training program sponsored by the Society for Neuroscience for underrepresented neuroscience graduate students and postdoctoral fellows. NSP offers live events and webinars, a library of educational resources, and an online community for career connections and scientific and professional development guidance.



Jennifer Patritti Cram

NIH F31 NRSA Predoctoral Fellowship; Epilepsy Foundation Fellowship

Christin Godale (Neuroscience Graduate Program) was awarded an American Epilepsy Foundation Fellowship. She was also awarded a highly selective F31 National Research Service Award (NRSA) Predoctoral Fellowship from the NIH. For the past two years, she has served as the graduate student representative to the UC Board of Trustees.



Christin Godale

Three Minute Thesis (3MT) competition

In UC's Three Minute Thesis (3MT) competition, **Demi Fischesser**, a student in the Molecular Genetics, Biochemistry and Microbiology Graduate Program took first place and **Kaitlin Hart**, a student in the Molecular, Cellular and Biochemical Pharmacology Program took second place. This is the second year running for the College of Medicine to receive first place in the event.



Demi Fischesser



Kaitlin Hart

Medical Sciences Undergraduate Program

The Medical Sciences Undergraduate Program first offered a minor to undergraduates in 2012 before admitting students in 2014 for a major in medical sciences, permitting students the opportunity to earn a bachelor's degree from the College of Medicine. Today, the UC College of Medicine is one of the only medical schools in the country to offer this unique baccalaureate degree, which focuses on 'hands-on' experiential learning, in which research plays a key component.

"What we do is we provide them a chance to experience a mini-career in medicine and related healthcare disciplines within the medical school," says Anil Menon, PhD, director of the program and professor of molecular genetics in the College. Medical sciences majors take the same foundational courses as many students preparing for medical school but in their junior and senior years, get more of the advanced sciences, all taught by faculty who also teach the graduate and medical students. Each medical sciences major has several mentors including either an MD/clinician or PhD/researcher along with a medical student and resident. They spend time in laboratories in the college or Cincinnati Children's Hospital Medical Center, engage in service-learning projects, and shadow physicians at UC, Children's or other health systems in Cincinnati.

"When they make a decision after four years whether to go into medical school, it is a decision based on evidence and experience," Dr. Menon says. Some choose to go on to medical school, some choose PhD doctoral programs and some choose graduate school in public health. Students are also ready for careers in allied health sciences, dentistry or in medical laboratories.

Of the first five students who graduated with a medical sciences major, three are now in medical school at the College, one is in optometry school while another is pursuing graduate studies at UC.

This year's entering class of 90 students brings an average incoming SAT of 1453 with a 3.91 high school grade point average.

Following are four students from the Medical Sciences major highlighting some of research work in which they participated.

STUDENT HIGHLIGHTS



Scott Emmert

"I joined the laboratory of Dr. Francesco Mangano and Dr. June Goto at Cincinnati Children's Hospital Medical Center. They had shown a mutation in the *Ccdc39* gene was responsible for the hydrocephalus phenotype in the progressive hydrocephaly (*prh*) mouse model. Using CRISPR/Cas9 I successfully introduced this mutation into rat embryos to generate a rat model of hydrocephalus with *Ccdc39* gene mutation. Following this, I successfully demonstrated that CRISPR/Cas9-based disruption of the rat *L1cam* gene could generate a knockout (KO) model of X-linked hydrocephalus (XLH). Capitalizing on the large size of our model organism, we employed a T2-weighted MRI and diffusion tensor imaging study to characterize this model. By detailed volumetric analysis, I discovered that *L1cam* KO rats demonstrate abnormal enlargement of the fourth and lateral ventricles consistent with the XLH phenotypes in humans and mice."

Andrea Ori

"I started working in the laboratory of Andrew Herr, PhD, in the Immunobiology department at Cincinnati Children's, in my freshman year. As a researcher in the lab, I investigated the structure and function of Small Basic Protein (Sbp) in *Staphylococcus* biofilm formation. Biofilms are multi-cellular aggregates that adhere to surfaces, most commonly, indwelling medical devices, and lead to hospital acquired infections. Sbp is a scaffold protein that interacts with the cell wall anchored Accumulation-associated protein, Aap, to form these biofilms. With the lab's expertise in recombinant Aap, we sought to evaluate potential interactions with Sbp and investigate conditions that promote biofilm formation. These specialized colonies of bacteria are highly resistant to antibiotics and immune responses so understanding biofilm formation is critical for the development of novel therapeutics."



STUDENT HIGHLIGHTS

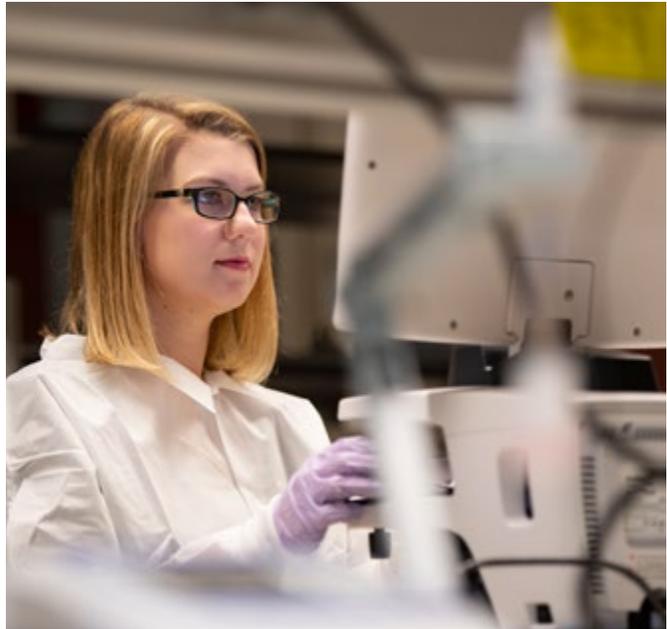


Nihar Rama

"As a student in Dr. Tanya Kalin's lab in Cincinnati Children's Hospital's Division of Pulmonary Biology, I investigate mechanisms of lung cancer pathogenesis, including transcriptional signaling networks which promote tumorigenesis and aspects of the tumor microenvironment. I also assess potential treatments for this deadly family of diseases which act on the signaling or microenvironmental factors implicated in tumor development or metastasis. Clinically, several subtypes of lung cancer remain difficult to treat, and these patients often have low qualities of life and probabilities of survival. Our translational research aims to build on an increasing understanding of lung cancer biology to identify and probe new treatments which are both more effective and safer for patients."

Chloe Elleman

"I worked with Drs. Shari Wade and Megan Narad in the Head Injury Research Center at Cincinnati Children's. While there, I had the opportunity to be involved in a variety of studies evaluating the efficacy of psychosocial intervention programs for patients with traumatic or other acquired brain injuries. Some of the primary projects that I worked on included assessing animal assisted therapy during physical and occupational therapy visits in the inpatient rehabilitation program as well as a study of family functioning and educational outcomes for brain tumor survivors. These experiences sparked my interest in education and the process of adaptation following traumatic events and contributed to my decision to study education in the post-conflict environment of Belfast with my subsequent Fulbright award."





RESEARCH GRANTS

Research Grants FY 2019

Hassane Amlal, PhD



Associate Professor,
Department of Internal
Medicine, Division
of Nephrology and
Hypertension

“Mechanism(s) of Adenine-induced Fluid Loss in the Kidney”

- Dialysis Clinic, Inc. Award
- Grant runs from Oct. 1, 2018 to Sept. 20, 2020
- \$238,764 in total costs

This research will examine the effects of adenine on renal salt and water transport in a time-course and dose response study using Sprague Dawley rats and determine the signaling pathways mediating the downregulation of salt and water channels by adenine. These studies will be the first to dissect the potential cellular and molecular mechanisms responsible for the development of kidney disease in rodent models of adenine-induced renal failure, extensively used by many investigators and laboratories.

George Babcock, PhD



Professor Emeritus,
Department of Surgery

“Antimicrobial Block Copolypeptides (A-Blocks): Innovative Therapeutics and Prophylactics for Wound Infection”

- Amicrobe, Inc. Award
- Grant runs from July 1, 2018 to Sept. 30, 2018
- \$100,000 in total costs

This research will test the ability of selected AB-100L hydrogels and AB-100RL solutions to decrease microbial burdens, as well as to prevent and treat invasive infection in wounds that involve deep tissues (especially muscle damage).

Mark Baccei, PhD



Professor, Department
of Anesthesiology

“Synaptic Function within Mature Central Pain Networks after Neonatal Injury”

- National Institute of Neurological Disorders and Stroke R01
- Grant runs from April 1, 2019 to Jan. 31, 2024
- \$1,814,127 in total costs

The outcome of these studies will be the first insight into how early tissue damage alters the functional organization of inhibitory microcircuits in the developing spinal nociceptive network and thereby diminishes their ability to suppress pain sensation. This research is significant because it will identify the specific inhibitory synaptic pathways within the spinal DH that must be restored in order to prevent the exaggerated susceptibility to chronic pain following neonatal tissue damage.

CO-INVESTIGATORS:

Steve Davidson, PhD, Department of Anesthesiology,
Jie Li, PhD, Department of Anesthesiology

RESEARCH GRANTS FY 2019 (continued)

Jonathan Bernstein, MD



Professor, Department of Internal Medicine, Division of Immunology, Allergy and Rheumatology

“Health Effects of CREON2000 in Asthmatic Children”

- National Institute of Allergy and Infectious Diseases Sub Award
- Grant runs from Aug. 1, 2018 to July 31, 2019
- \$190,568 in total costs

The objective of this study is to determine whether asthmatic children with mild to moderate allergic persistent asthma living in homes with a centrally installed CREON2000 will have improved asthma control as measured by the Asthma Control Questionnaire. A major limitation of asthma management has been the inability to achieve effective environmental control measures in the home and workplace. In the initial SBIR phase I study, researchers were able to demonstrate that UV irradiation as an environmental control intervention was effective at reducing asthma symptoms and improving airway hyperresponsiveness as measured by peak flow variability. This trial is of significant clinical importance to the management of asthma patients as it is testing whether centrally ducted UV irradiation units can be effective as a single environmental control intervention in achieving asthma control in children with allergic asthma.

Temugin Berta, PhD



Assistant Professor, Department of Anesthesiology

“Purification and Characterization of Mature Murine and Human Satellite Glial Cells”

- National Institute of Neurological Disorders and Stroke R21
- Grant runs from Sept. 1, 2018 to Aug. 31, 2020
- \$440,753 in total costs

Given the prevalence of chronic pain and the partial efficacy of current drugs, which exclusively target neuronal mechanisms, new strategies to manipulate satellite glial cells (SGCs) in pain processing hold considerable promise. The expected outcomes of this research will have a positive impact on public health by revealing for the first time the unique genetic signatures and functions of murine and human SGCs that can be used by future studies for the development of new tools that allow cell type-specific genetic manipulations (e.g., cell ablation, gene silencing and optogenetic manipulations) and for the progress of new disease-modifying therapeutic approaches in order to suppress chronic pain.

CO-INVESTIGATOR:

Steve Davidson, PhD, Department of Anesthesiology

RESEARCH GRANTS

RESEARCH GRANTS FY 2019 *(continued)*

Temugin Berta, PhD



Assistant Professor,
Department of
Anesthesiology

“Targeting Sensory Ganglia and Glial Signaling for the Treatment of Acute and Chronic Pain”

- National Institute of Neurological Disorders and Stroke R01
- Grant runs from July 1, 2019 to May 31, 2024
- \$2,006,250 in total costs

The objective of this research is to study and validate the tissue inhibitor of metalloproteinase 3 (TIMP3) signaling in SGCs as a novel therapeutic target for acute and chronic pain. TIMP3 has unique plethoric functions in inhibiting matrix metalloproteinases, the tumor necrosis factor- α -converting enzyme, and the vascular endothelial growth factor receptor 2. Because these enzymes and receptor have all been implicated in some extent in inflammation and pain, researchers hypothesize that the expression of the tissue inhibitor of metalloproteinase 3 (TIMP3) in SGCs is critical for the neuroimmune homeostasis in sensory ganglia, as well as for the development of pain. Researchers propose to use multiple gain- and loss-of-function approaches in combination with a battery of behavioral, electrophysiological and biochemical analyses to validate TIMP3 signaling for the treatment of acute and chronic pain.

CO-INVESTIGATORS:

Judith Strong, PhD, Department of Anesthesiology
Wen-Rui Xie, PhD, Department of Anesthesiology
Jun-Ming Zhang, PhD, Department of Anesthesiology

Jason Blackard, PhD



Associate Professor,
Department of Internal
Medicine, Division of
Digestive Diseases

“Omics Analysis of HIV During Synthetic Opioid Exposure”

- National Institute on Drug Abuse R61
- Grant runs from March 1, 2019 to Dec. 31, 2021
- \$1,793,218 in total costs

Important knowledge regarding how synthetic opioids influence HIV latency and reactivation is absent from the available literature. To fill this critical gap and institute a major shift forward in the understanding of the opioid epidemic, researchers will conduct a series of complementary in vivo studies to directly evaluate the impact of synthetic opioids on markers of HIV latency/reactivation, viral diversity, transcription factor expression, microRNA expression and cell signaling pathways.

CO-INVESTIGATORS:

Jennifer Brown, PhD, Department of Psychiatry and Behavioral Neuroscience
Michael Lyons, MD, Department of Emergency Medicine
Mario Medvedovic, PhD, Department of Environmental Health
Kenneth Sherman, MD, PhD, Department of Internal Medicine, Division of Digestive Diseases

RESEARCH GRANTS

RESEARCH GRANTS FY 2019 *(continued)*

Michael Borchers, PhD



Associate Professor,
Department of Internal
Medicine, Division of
Pulmonary, Critical Care
and Sleep Medicine

“Natural Killer Cell Functions in Lymphangiomyomatosis”

- National Heart, Lung and Blood Institute R01
- Grant runs from Jan. 1, 2019 to Dec. 31, 2022
- \$1,588,190 in total costs

The goal of this research is to define the phenotype, function and role of NK cells and NKG2D in Lymphangiomyomatosis (LAM) using both LAM patient samples and animal models. Researchers will define the functional significance of unique NK cell populations in LAM; define the mechanism of VEGFD-amplified NK cell activation; define the function of NK cells and Nkg2d in the initiation and progression of LAM; and define the efficacy and benefits of therapeutic inhibition of circulating soluble Nkg2d ligands.

CO-INVESTIGATOR:

Kenneth Greis, PhD, Department of Cancer Biology

Joseph Broderick, MD



Professor, Department
of Neurology and
Rehabilitation Medicine;
Director of the
University of Cincinnati
Gardner Neuroscience
Institute; and Director of
the National Institutes of
Health StrokeNet

“NIH StrokeNet National Clinical Coordinating Center”

- National Institute of Neurological Disorders and Stroke U01
- Grant runs from Aug. 1, 2018 to July 31, 2023
- \$12,080,732 in total costs

The National Institute of Neurological Disorders and Stroke at the National Institutes of Health has funded and developed the NIH StrokeNet to conduct small and large clinical trials and research studies to advance acute stroke treatment, stroke prevention and recovery and rehabilitation following a stroke. The NIH StrokeNet National Coordinating Center, located at the University of Cincinnati, manages 29 regional centers which involves more than 400 U.S. hospitals. The network is designed to serve as the infrastructure and pipeline for exciting new potential treatments for patients with stroke and those at risk for stroke. Currently, seven large stroke trials are ongoing or just starting within NIH StrokeNet. In addition, the NIH StrokeNet provides an educational platform for stroke research fellows and clinical trial coordinators that is coordinated by the National Coordinating Center at UC.

CO-INVESTIGATORS:

Khatri Pooja, MD, Department of Neurology and Rehabilitation Medicine

Dawn Kleindorfer, MD, Department of Neurology and Rehabilitation
Medicine

RESEARCH GRANTS FY 2019 *(continued)***Joseph Broderick, MD**

Professor, Department of Neurology and Rehabilitation Medicine; Director of the University of Cincinnati Gardner Neuroscience Institute; and Director of the National Institutes of Health StrokeNet

“Sleep for Stroke Management and Recovery Trial (Sleep SMART)”

- National Institute of Neurological Disorders and Stroke Sub Award
- Grant runs from May 1, 2018 to April 30, 2022
- \$29,773,159 in total costs

This is a phase 3, open label, blinded endpoint assessment, multi-center, randomized, controlled trial to determine whether treatment of sleep-disordered breathing (SDB) with PAP after acute ischemic stroke or high-risk transient ischemic attack (TIA) reduces recurrent stroke, myocardial infarction and all-cause mortality six months after the event, and treatment of SDB shortly after acute ischemic stroke improves stroke outcomes at three months. This trial provides StrokeNet with opportunities to use its network more fully and ultimately will provide results that can easily be translated into community settings across the U.S. This study represents a rare opportunity to test a safe, inexpensive treatment that could impact both stroke recovery and prevention in the majority of stroke patients.

“TRANScranial Direct Current Stimulation for Post-stroke Motor Recovery (TRANSPORT 2)”

- National Institute of Neurological Disorders and Stroke Sub Award
- Grant runs from Aug. 15, 2018 to July 31, 2022
- \$2,835,202 in total costs

The National Coordinating Center for StrokeNet at the University of Cincinnati will coordinate The TRANSPORT2 (TRANScranial direct current stimulation current for Post-stroke Motor Recovery Study). Wayne Feng, MD, at Duke University School of Medicine, and Gottfried Schlaug, MD, PhD, at Harvard Medical School, are the study principal investigators. This phase 2 study trial will test an overall hypothesis that a combination of bihemispheric transcranial direct stimulation (tDCS) at 2 mA or 4 mA, along with modified Constraint Induced Movement Therapy” (mCIMT), will lead to a greater sustained motor improvement on day 15 (two days) after the start of the intervention as compared to sham stimulation. Sustained benefits will be assessed at day 45 (± five days) and day 105 (± 10 days) after the start of the intervention. This multicenter, sham-controlled, three-arm study will randomize 129 subjects in a 1:1:1 allocation ratio per arm (sham, 2 mA, or 4 mA tDCS) and treat subjects with the assigned dose of tDCS for 30 minutes and mCIMT for two hours for 10 sessions over a two-week period. The University of Cincinnati will be one of the treatment sites for the trial (Oluwole Awosika, MD, is the site principal investigator).

RESEARCH GRANTS FY 2019 *(continued)*

Joseph Broderick, MD



Professor, Department of Neurology and Rehabilitation Medicine; Director of the University of Cincinnati Gardner Neuroscience Institute; and Director of the National Institutes of Health StokeNet

“Perinatal Arterial Stroke: A Multi-site RCT of Intensive Infant Rehabilitation (I-ACQUIRE)”

- National Institute of Neurological Disorders and Stroke Sub Award
- Grant runs from Feb. 1, 2019 to Jan. 31, 2024
- \$5,056,527 in total costs

The I-ACQUIRE Trial is the nation’s first multicenter pediatric stroke recovery trial and the University of Cincinnati will be the National Coordinating Center for the trial. Researchers and clinicians from 12 sites across the U.S., including at Cincinnati Children’s Hospital Medical Center, will evaluate an innovative therapeutic approach to help 8-month-old to 24-month-old infants who experienced strokes. This Phase 3 clinical trial will examine the effectiveness of a pediatric therapy over four weeks that includes modified constraint therapy (casting the good arm) to increase upper extremity skills, gross motor development and cognition in 240 children nationwide. The intensive rehabilitation protocol is based on more than two decades of pediatric rehabilitation research led by Sharon Landesman Ramey, PhD, and Stephanie DeLuca, PhD, the co-directors of Fralin Biomedical Research Institute Neuromotor Research Clinic. Ramey, a professor and Distinguished Research Scholar, and Warren Lo, MD, a pediatric neurologist at Nationwide Children’s Hospital and clinical professor of pediatrics and neurology at Ohio State University College of Medicine, are the lead principal investigators.

Jennifer Brown, PhD



Associate Professor, Department of Psychiatry and Behavioral Neuroscience

“ASPIRE: Accelerating Substance Use and Psychiatric Screening Among Individuals at-risk or HIV-infected and Facilitated Referral via the Emergency Department”

- Substance Abuse and Mental Health Services Administration Award
- Grant runs from Sept. 30, 2018 to Sept. 29, 2029
- \$467,716 in total costs

This research will significantly impact the ability to screen and provide an intensive, sustained linkage-to-care intervention to address the needs of predominantly minority populations with substance use and co-occurring mental health disorders who are at high risk for HIV or HIV positive in the Cincinnati region.

CO-INVESTIGATOR:

Michael Lyons, MD, Department of Emergency Medicine

Jose Cancelas-Perez, MD, PhD



Professor, Department of Pediatrics and Director, Hoxworth Blood Center

“In Vitro Clinical Evaluation for the Transition of Baxter PL-146 to Renolit 326 and Baxter PL-2209 to Renolit 3720 Plastics for the Blood-Pack Unit”

- Fenwal Award
- Grant runs from Jan. 1, 2019 to Dec. 31, 2019
- \$285,014 in total costs

This study intends to determine whether a new generation of bio-compatible plastics with decreased leaching result in nondecrement in red cell, platelet or plasma components upon long-term preservation in the clinical setting.

RESEARCH GRANTS FY 2019 *(continued)*

Robert Cohen, MD



Professor, Department of Internal Medicine, Division of Endocrinology, Diabetes and Metabolism

“Glycemia Reduction Approaches in Diabetes: A Comparative Effectiveness Study (GRADE)”

- National Institute of Diabetes and Digestive and Kidney Disease Sub Award
- Grant runs from Aug. 1, 2018 to July 31, 2019
- \$437,733 in total costs

GRADE is a randomized clinical trial of participants diagnosed with type 2 diabetes within the past 10 years who are already on metformin. Participants will be randomly assigned to one of four commonly used glucose-lowering drugs (glimepiride, sitagliptin, liraglutide and basal insulin glargine), plus metformin, and will be followed for up to seven years. The goal of the GRADE study is to determine which combination of two diabetes medications is best for achieving good glycemic control, has the fewest side effects and is the most beneficial for overall health in long-term treatment for people with type 2 diabetes.

Melanie T. Cushion, PhD



Professor, Department of Internal Medicine, Division of Infectious Diseases

“The Role of Sex in the Life Cycle of Pneumocystis”

- VA Merit Award
- Grant runs from Oct. 1, 2018 to Sept. 30, 2022
- \$650,000 in total costs

Researchers posit that ascii, and thus sexual replication, is required to facilitate progression through the life cycle of the fungal pathogens, *Pneumocystis*, leading to a productive infection. Researchers contend that ascii are required for transmission of *Pneumocystis* infection. In this study, researchers will explore two critical, but unanswered questions that will lead to a deeper knowledge of the life cycle of *Pneumocystis*, and also suggest potential vulnerabilities for targeted treatment concomitant with anidulafungin therapy: (1) Is sexual replication required for completion of the life cycle of *Pneumocystis*? (2) Can sexual replication rebound after cessation of prolonged anidulafungin treatment?

“The Role Sex in the Life Cycle and Transmission of Pneumocystis”

- National Heart, Lung and Blood Institute R01
- Grant runs from Feb. 1, 2019 to Jan. 31, 2023
- \$1,980,916 in total costs

Few drugs are available to treat the pneumonia caused by *Pneumocystis*, PCP. Using a novel echinocandin treated model of PCP, researchers have determined that the sexual cycle may be necessary for its survival, offering a potential therapeutic target. Using this model researchers will ascertain whether these fungi truly require the sexual cycle to replicate and transmit the infection and in doing so will further define their life cycle.

RESEARCH GRANTS FY 2019 *(continued)*

William Sean Davidson, PhD



Professor, Department of Pathology and Laboratory Medicine

“Multidisciplinary Approaches to HDL Structure, Assembly and Functional Heterogeneity”

- National Heart, Lung and Blood Institute Sub Award
- Grant runs from Sept. 15, 2018 to June 30, 2019
- \$249,078 in total costs

This research is relevant to public health because an increased understanding of the function of high density lipoproteins (HDL) will help guide the development of therapeutic strategies designed to raise plasma HDL for protection against cardiovascular disease, the No. 1 killer in the U.S. Thus, the proposed research is relevant to the part of National Institute of Health’s mission that pertains to developing fundamental knowledge for understanding the causes, prevention and eventually a cure for human diseases.

Deeptankar DeMazumder, MD, PhD



Assistant Professor, Department of Internal Medicine, Division of Cardiovascular Health and Disease

“Critical Health Assessment and Outcomes Study/ Score (CHAOS) for Improved Personalized Prediction of Impending Adverse Events Before Clinical Presentation”

- National Heart, Lung and Blood Institute Sub Award
- Grant runs from Aug. 1, 2018 to July 31, 2019
- \$249,080 in total costs

The primary goal of CHAOS is to identify “hidden” subclinical critical illness in individuals before clinical presentation (e.g., sudden cardiac death). This would provide the necessary lead time for health care providers to assess reversible or preventive causes and to deliver more planned, appropriate, efficient, effective and best practice-driven therapies. This would also reduce duration of hospitalization, complications and health care costs. Further, CHAOS-based risk stratification can lead to safer hospital discharge, fewer repeat hospitalizations and more appropriate selection of recipients for advanced life-saving therapies that otherwise are costly, limited in availability and have high risk of procedural complications.

Jiajie Diao, PhD



Assistant Professor, Department of Cancer Biology

“SNARE-mediated Membrane Fusion Involved in Autophagosome Biogenesis”

- National Institute of General Medical Sciences R35
- Grant runs from Aug. 1, 2018 to July 31, 2023
- \$1,828,791 in total costs

Researchers hypothesize that the morphology and modification status of autophagic SNAREs are important for mediating membrane fusion involved in autophagosome biogenesis, while this process is regulated by accessory proteins including nuclear receptor binding factor 2 and Atg9. Further systematical studies on the role of SNARE-mediated membrane fusion in autophagosome maturation and initiation are critical to elucidate detailed molecular mechanisms, which could offer therapeutic advances. Moreover, an attempt to find new fusogens and reconstitute the early autophagosome biogenesis is an important expansion, which is also essential for future drug development.

RESEARCH GRANTS

RESEARCH GRANTS FY 2019 (continued)

Jiajie Diao, PhD



Assistant Professor,
Department of Cancer
Biology

“Chaperones of Alpha-synuclein for Membrane Fusion Involved in Synaptic Transmission”

- **Michael J. Fox Foundation for Parkinson's Research Award**
- **Grant runs from March 1, 2019 to Oct. 31, 2020**
- **\$150,000 in total costs**

This research aims to elucidate the molecular mechanism for lyso-phospholipids (lysoPLs) and vesicle-associated membrane protein 2 (VAMP2) regulated alpha-synuclein early transient oligomerization in solution and membrane association. The second aim of this research is to determine the roles of lysoPLs on alpha-synuclein's function in soluble N-ethylmaleimide-sensitive factor attachment protein receptor (SNARE) mediated membrane fusion. The researcher's technically advanced single-vesicle assays are ideal tools to reveal the physiological function and assess the influence of various alpha-synuclein species on synaptic transmission. Moreover, the involvement of phospholipids and proteins related to synaptic transmission in alpha-synuclein oligomerization or aggregation will be further elucidated.

CO-INVESTIGATOR:

Kim Seroogy, PhD, Department of Neurology and Rehabilitation Medicine

James Driscoll, MD, PhD



Assistant Professor,
Department of Surgery

“Targeting Human Plasma Cells to Overcome Humoral Responses in Transplantation”

- **National Institute of Allergy and Infectious Diseases R56**
- **Grant runs from Aug. 3, 2018 to July 31, 2019**
- **\$433,081 in total costs**

Transplantation is the preferred treatment for many end-stage organ diseases, but pre-formed HLA antibodies delay or preclude transplantation in many patients while putting others at high risk for rejection. Researchers will use biochemical and genomic studies to define the antibody-producing plasma cells in transplant candidates and identify novel targets that can be pharmacologically inhibited to facilitate kidney transplantation in refractory patients. The results will inform therapeutic decisions and are broadly applicable to all forms of alloantibody-mediated organ rejection as well as autoantibody-mediated diseases such as systemic lupus erythematosus, rheumatoid arthritis and myasthenia gravis.

RESEARCH GRANTS

RESEARCH GRANTS FY 2019 (continued)

James Driscoll, MD, PhD



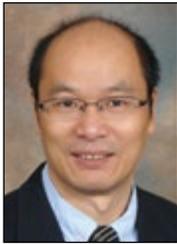
Assistant Professor,
Department of Surgery

“Targeting Human Plasma Cells to Overcome Humoral Responses in Transplantation”

- National Institute of Allergy and Infectious Diseases R01
- Grant runs from Dec. 17, 2018 to Nov. 30, 2023
- \$2,330,941 in total costs

Transplantation is a cure for many end-stage organ diseases, but the immunosuppression required to prevent graft rejection carries with it several side effects that can impact patient health. Researchers will use biochemical and genomic studies to define the antibody-producing plasma cells in transplant candidates and identify novel targets that can pharmacologically inhibited to facilitate kidney transplantation in refractory patients. The results will inform therapeutic decisions and are broadly applicable to all forms of alloantibody-mediated organ rejection as well as autoantibody-mediated diseases.

Guo-Chang Fan, PhD



Professor, Department
of Pharmacology &
Systems Physiology

“Roles of Sectm1a in Macrophages and Cardiac Function During Sepsis”

- National Institutes of Health R01
- Grant runs from April 1, 2019 to March 31, 2023
- \$1,194,629 in total costs

This study aims to define the exact role of Sectm1a in macrophages during polymicrobial sepsis, using a macrophage-specific Sectm1a-overexpressing mouse model, identify the mechanism by which Sectm1a-elicited anti-sepsis is dependent on GTR, using a GTR-knockout mouse model; and investigate the therapeutic potential using recombinant Sectm1a protein to treat sepsis. This research is expected to identify Sectm1a as a potent and novel regulator of host immunity and a major protector against sepsis. If verified, the findings from this research should provide new therapeutic options for boosting macrophage function in the clearance of bacteria during sepsis and, hopefully, to minimize sepsis-induced death.

CO-INVESTIGATOR:

Charles Caldwell, PhD, Department of Surgery

Carl Fichtenbaum, MD



Professor, Department
of Internal Medicine,
Division of Infectious
Diseases

“ACTG Core Funds”

- National Institute of Allergy and Infectious Diseases Sub Award
- Grant runs from Dec. 1, 2018 to Nov. 30, 2019
- \$1,023,470 in total costs

The major goals of this project are to design, conduct and analyze clinical trials to treat HIV disease and to treat/prevent its associated complications.

RESEARCH GRANTS

RESEARCH GRANTS FY 2019 *(continued)*

Carl Fichtenbaum, MD



Professor, Department of Internal Medicine, Division of Infectious Diseases

“Leadership and Operations Center, AIDS Clinical Trials Group”

- National Institute of Allergy and Infectious Diseases Sub Award
- Grant runs from Dec. 1, 2018 to Nov. 30, 2019
- \$325,903 in total costs

The goal of this research is to serve as a clinical research site at the University of Cincinnati for the AIDS Clinical Trials Group Network (ACTG) studies. Researchers will continue to follow participants already enrolled in ACTG studies and enroll new participants. Their goal is to enroll eight gap period participants (September-November 2018) and 23 new participants during the next grant year (2018-2019).

Michael Goodman, MD



Associate Professor, Department of Surgery

“REBOA at Altitude: Efficacy and Effects”

- Air Force Research Laboratory Award
- Grant runs from July 17, 2018 to Sept. 28, 2021
- \$777,000 in total costs

This research will test REBOA catheter performance at altitude and extremes of temperatures. In addition, researchers will evaluate the effects of reperfusion following the use of REBOA at altitude in a poly-trauma model.

CO-INVESTIGATORS:

Amy Makley, MD, Department of Surgery
Timothy Pritts, MD, PhD, Department of Surgery

“Do Intravenous Gas Bubbles Formed From Blood Products Infused in the Aeromedical Evacuation Environment Influence Outcomes in Traumatic Brain Injuries (TBI)”

- Air Force Research Laboratory Award
- Grant runs from Aug. 2, 2018 to Oct. 25, 2019
- \$622,996 in total costs

The primary aim of this research is to investigate whether infusions of blood products in combination with hypobaric exposures common to aeromedical evacuation patient transport leads to the development of intravascular bubbles, and whether those bubbles result in significantly different outcomes in a traumatic brain injury model. A secondary aim of this study is to quantitatively identify bubble formation using intravascular ultrasonography and further to determine whether intravascular bubbles formed may be correlated to increased inflammatory processes as determined by serum biomarkers for inflammation and by fluorescent tissue labels specific for platelet aggregates.

CO-INVESTIGATORS:

Achala Vagal, MD, Department of Radiology

RESEARCH GRANTS FY 2019 *(continued)*

Kenneth Greis, PhD

Professor, Department of Cancer Biology



“Cesium Irradiator Replacement Program”

- Department of Energy Sub Award
- Grant runs from June 22, 2018 to April 30, 2020
- \$203,000 in total costs

Instrumentation that can allow for irradiation of cells and animals is essential for research studies targeted at understanding cellular function (or dysfunction during diseases) and for developing treatment plans that use radiation. The University of Cincinnati has relied on the use of cesium irradiation systems for these studies for the past 30 years. Modern research protocols call for a more controlled irradiation to deliver focused doses of radiation, typically in the form of X-rays. Through the Cesium Irradiator Replacement Program (CIRP) sponsored by the U.S. Department of Energy and administered through the Pacific Northwest National Laboratory (PNNL), UC has been awarded funding to support the purchase of an Xstrahl brand Xenx X-ray irradiation system to replace the aging cesium systems. Personnel from the PNNL also will decommission and remove the cesium systems from the university. The Xenx system will provide a more controlled irradiation system that will advance research in a variety of areas, including DNA damage repair, cancer and the therapeutic use of radiation.

Michael Lamba, PhD

Professor, Department of Radiation Oncology



Jun-Lin Guan, PhD



Francis Brunning
Endowed Chair;
Professor and Chair,
Department of Cancer
Biology

“Autophagy and mTORC1 Signaling in Lymphatic Malformation and Lymphangiosarcoma”

- National Heart, Lung and Blood Institute R01
- Grant runs from Sept. 1, 2018 to July 31, 2022
- \$1,645,488 in total costs

Researchers’ knowledge about the mechanisms underlying the development of LM and progression to LAS is very limited, and LAS remains as a deadly disease with no effective treatment. The characterization of key signaling pathways such as mTORC1 signaling and cellular processes like autophagy, as well as cross-talk between them and lipid catabolism in the vascular tumor cells will significantly advance our fundamental knowledge about LM and LAS and contribute to novel therapies for the disease.

Kevin Haworth, PhD



Assistant Professor,
Department of Internal
Medicine, Division of
Cardiovascular Health
and Disease

“Ultrasound-mediated Controlled Hypoxic Reperfusion for Inhibition of Reperfusion Injury”

- National Heart, Lung and Blood Institute R01
- Grant runs from July 1, 2019 to April 30, 2024
- \$3,651,316 in total costs

The objective of this research is to refine the novel, catheter-based intracoronary delivery of ultrasound activated microdroplets to control reoxygenation. Therapeutic benefit will be assessed using ex vivo rat and in vivo porcine models of myocardial ischemia-reperfusion. The central hypothesis is that controlled hypoxic reperfusion, using ultrasound-mediated oxygen scavenging, will reduce reperfusion injury and increase tissue viability post ischemia.

RESEARCH GRANTS FY 2019 *(continued)*

Christy Holland, PhD



Professor, Department of Internal Medicine, Division of Cardiovascular Health and Disease

“Chronic Thrombus Ablation with Histotripsy and Thrombolytics”

- National Heart, Lung and Blood Institute Sub Award
- Grant runs from Dec. 15, 2017 to Nov. 30, 2022
- \$1,057,183 in total costs

The long-term objective of this research is to develop an image-guided strategy to treat chronic deep vein thrombosis using a combination of histotripsy, a type of high amplitude, pulsed therapeutic ultrasound and catheter-directed thrombolytics. The overall hypothesis is that the mechanical action of histotripsy-induced bubble clouds enhances intravenous thrombolysis.

Michael Holliday, MD



Associate Professor, Department of Family and Community Medicine

“University of Cincinnati Cardiovascular Disease Collaborative”

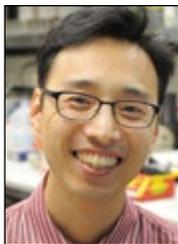
- Centers for Medicare and Medicaid Services Sub Award
- Grant runs from July 3, 2018 to June 30, 2019
- \$179,640 in total costs

Michael Holliday, MD, is principal investigator for the University of Cincinnati team collaborating with Case Western Reserve University on an Ohio Medicaid Technical Assistance and Policy Program (MEDTAPP)-funded project to distill and aggregate best practices for care in cardiovascular disease (CVD). Case Western Reserve University is serving as the lead institution for the project, which also partners Wright State University, Ohio State University and Ohio University, to assist in preparing Medicaid providers to address the social determinants of health and improve health outcomes for our most vulnerable populations, specifically those diagnosed with hypertension and other CVDs. The project hopes to create a repository through web presence to share best practice resources. Project deliverables include implementing education and resources for standardizing CVD care in primary care practices. Teleconferencing also will play a role in dissemination, using existing models such as Project ECHO.

CO-INVESTIGATOR:

Barbara Tobias, MD, Department of Family and Community Medicine

Christian Hong, PhD



Associate Professor, Department of Pharmacology and Systems Physiology

“Roles of Circadian Rhythms in Gastrointestinal Systems”

- National Institute of Diabetes and Digestive and Kidney Disease R01
- Grant runs from Sept. 15, 2018 to May 31, 2023
- \$1,471,256 in total costs

Circadian rhythms and cell cycle are critical determinants of gastrointestinal epithelial homeostasis. This research will uncover fundamental molecular mechanisms that link circadian rhythms and cell cycle in the small intestine, and the consequences of this coupling in the context of intestinal stem cell regeneration, epithelial barrier function and innate immune response. These findings will help design precision disease therapies with identified potential targets and temporal regimens to restore circadian clock-dependent adult stem cell regeneration and proliferation.

RESEARCH GRANTS

RESEARCH GRANTS FY 2019 (continued)

Kristin Hudock, MD, MSTR



Assistant Professor,
Department of Internal
Medicine, Division of
Pulmonary, Critical Care
and Sleep Medicine

“CLOVERS: Crystalloid Liberal or Vasopressors Early Resuscitation in Sepsis”

- National Heart, Lung and Blood Institute Sub Award
- Grant runs from Nov. 1, 2017 to April 30, 2021
- \$179,707 in total costs

CLOVERS is a national, National Institutes of Health-funded clinical trial, which compares two methods of increasing blood pressure in patients with dangerously low blood pressure due to a suspected infection. One method is to first provide intravenous fluids to the patient and then use drugs such as adrenalin (called vasopressors); the other method is to use the drugs first and then use fluids. The purpose of this research is to determine the impact of a restrictive fluids strategy as compared to a liberal fluid strategy on 90-day in-hospital mortality in patients with sepsis-induced hypotension. This trial will enroll up to 2,230 subjects from PETAL network hospitals, with an estimated 75 subjects enrolled at UC during the next three years.

David Hui, PhD



Professor, Department
of Pathology and
Laboratory Medicine

“ApoE Receptor-2 in Vascular Disease Progression and Regression”

- National Heart, Lung and Blood Institute R01
- Grant runs from April 1, 2019 to March 31, 2023
- \$2,808,771 in total costs

This research will offer novel mechanisms depicting how the cell surface receptor apoER2 modulates intracellular events associated with cell division and motility to impact cardiovascular disease. The information may also be leveraged to design personalized therapeutic strategy to combat cardiovascular disease in a large number of individuals with Lrp8 gene polymorphism and mutation.

CO-INVESTIGATOR:

Anja Jaeschke, PhD, Department of Pathology and Laboratory Medicine

Jay Johannigman, MD



Professor, Department
of Surgery

“Free O₂ Autonomous Oxygen System (U.S. Trial)”

- Air Force Research Laboratory Award
- Grant runs from July 17, 2018 to Sept. 28, 2021
- \$1,227,000 in total costs

The scope of this research is to evaluate the clinical value of the FreeO₂ system in the prehospital setting among chronic obstructive pulmonary disease and trauma patients.

CO-INVESTIGATORS:

Thomas Blakeman MSc, Department of Surgery

Richard Branson, MSc, RRT, Department of Surgery

Dina Gooma, Department of Surgery

Jason McMullan, MD, Department of Emergency Medicine

RESEARCH GRANTS

RESEARCH GRANTS FY 2019 *(continued)*

Winston Kao, PhD



Ben and Louise Tate Professorship of Ophthalmology and Professor, Department of Ophthalmology

“Cell Therapy and Gene Editing for Cystinosis”

- Cystinosis Research Foundation Award
- Grant runs from Feb. 1, 2019 to Jan. 31, 2020
- \$179,834 in total costs

This research aims to determine the efficacy of UMSC and gene editing for treating corneal symptoms of cystinosis using our two novel mouse models.

CO-INVESTIGATORS:

Hassane Amlal, PhD, Department of Internal Medicine, Division Nephrology and Hypertension
Fei Dong, PhD, Department of Ophthalmology

Pamposh Kaul, MD



Professor, Department of Internal Medicine, Division of Infectious Diseases

“HIV Training for Professionals and Consumers-UC”

- Ohio Department of Health
- Grant runs from Oct. 19, 2018 to June 30, 2020
- \$553,153 in total costs

The Midwest Training + Education Center (MATEC) at the University of Cincinnati’s Infectious Diseases Division provides HIV/AIDS education to Ohio physicians and other health care professionals. With this award from the Ohio Department of Health, MATEC will expand its work to provide education for Ohio consumers of HIV medical services. The overall intent is to ensure consistency of medical care for Ohio people living with HIV.

Pooja Khatri, MD



Professor, Department of Neurology and Rehabilitation Medicine

“Early Feasibility Clinical Study of the VitalFlow Stimulator, an Emergency Treatment for Ischemic Stroke”

- National Institute of Neurological Disorders and Stroke Sub Award
- Grant runs from April 1, 2018 to May 31, 2020
- \$168,239 in total costs

“Cincinnati Regional Coordinating Center for NINDS Stroke Trial Network”

- National Institute of Neurological Disorders and Stroke U24
- Grant runs from Aug. 15, 2018 to July 31, 2023
- \$1,557,453 in total costs

Stroke is a public health priority as a leading cause of death and disability worldwide. Multicenter clinical trials are needed to test new discoveries that may reduce this burden in the treatment, prevention and recovery arenas. The Cincinnati Regional Coordinating Center proposes continued partnership with the NIH StrokeNET to improve clinical trial efficiency, success and quality, thereby advancing stroke care.

RESEARCH GRANTS FY 2019 *(continued)*

Gurjit Khurana-Hershey, MD, PhD



Professor, Department of Internal Medicine, Division of Immunology, Allergy and Rheumatology; Director, Medical Scientist Training Program

“Medical Scientist Training Program”

- National Institute of General Medical Sciences T32
- Grant runs from July 1, 2018 to June 30, 2023
- \$1,917,120 in total costs

This grant supports the Medical Scientist Training Program (MSTP) at the University of Cincinnati College of Medicine (UC CoM). The dual-degree program was established in 1985 and has been continuously funded by the National Institutes of Health for more than 15 years. It enrolls nine new students each year and currently includes 55 students. The central goal of the UC CoM MSTP is to train physician-scientists who will be leaders in their respective fields in academic medicine.

Evangelia Kranias, PhD



Hanna Chair of Cardiology and Professor, Department of Pharmacology and Systems Physiology

“Cure PhosphoLambaN induced Cardiomyopathy (CURE-PLaN)”

- Foundation Leducq Sub Award
- Grant runs from Jan. 1, 2019 to Dec. 31, 2023
- \$977,460 in total costs

The long-term objective of this collaborative study is to develop novel treatments for PLN mutation carriers prone to or suffering from heart failure, and to expand the utility of these therapeutic strategies to the overall population of heart failure patients.

Scott Langevin, PhD



Associate Professor, Department of Environmental Health

“Oral Rinse Methylation for Follow-up Surveillance of Oral/Pharyngeal Cancer”

- American Cancer Society National Chapter Award
- Grant runs from Jan. 1, 2019 to Dec. 31, 2022
- \$782,000 in total costs

The specific aims of this study are to identify and recruit a cohort of patients diagnosed with incident primary oral and pharyngeal cancer and regularly collect oral rinse samples (~ every three months) for two years following initial diagnosis and treatment; catalog the methylation patterns across the 22 regions that make up the biomarker panel and how they impact gene expression by applying state-of-the-art DNA and RNA sequencing techniques on matched tumor and normal tissue from oral and pharyngeal cancer patients; and assess the potential utility of the oral rinse methylation panel as a tool for early detection of recurrent cancer during the first two years of post-treatment patient follow-up. This research has clear cancer relevance, as the overarching goal of this study is to determine the clinical utility of this novel biomarker panel as a tool for early detection of recurrent and new primary oral and pharyngeal cancers, in an effort at improving clinical outcomes for patients.

RESEARCH GRANTS FY 2019 (continued)

Chia-Ying Lin, PhD

Mary S. and Joseph S. Stern Jr. Endowed Chair in Musculoskeletal Research and Professor, Department of Orthopaedic Surgery

“A Novel Smart Patch for the Fetoscopic Procedure to Repair Spina Bifida”

- National Institute of Neurological Disorders and Stroke R01
- Grant runs from April 1, 2019 to March 31, 2024
- \$2,244,064 in total costs

The goal of this study is to assess how the features of the newly designed patch can contribute to the protection of affected spinal cord that in turn alleviates complications associated with myelomeningocele (MMC) defect. Using a sheep MMC model researchers have developed and will assess the efficacies of the new PLA/PCL patch in reducing the procedure time of fetoscopic coverage on MMC, providing adequate barrier to stop CSF leak and protect the exposed spinal cord to mitigate the damage, and guiding and enhancing wound closure of MMC without tethering the spinal cord. If successful, the designed new patch will help advance fetoscopic approaches to become the most reliable procedure for the prenatal management of the MMC defect. This will greatly improve the outcome of the fetoscopic MMC repair, and facilitate the paradigm shifting for the surgical care of MMC.

Agnes Luo, PhD

Associate Professor, Department of Molecular Genetics, Biochemistry and Microbiology

“Genetic and Drug Modulation of Sonic Hedgehog Pathway in Brain Ischemia”

- National Institute of Neurological Disorders and Stroke R01
- Grant runs from Aug. 1, 2018 to July 31, 2020
- \$700,092 in total costs

Researchers hypothesize that the Sonic Hedgehog (shh) signaling pathway is involved in the regulation of neuroregeneration after stroke and that modulating the shh signaling pathway will lead to better functional outcome in stroke recovery. Researchers will test this hypothesis in a combined pharmacological and genetic approach in an animal model of stroke (middle cerebral artery occlusion MCAo).

“Modulating a Critical Inhibitory Proteoglycan Receptor to Promote Functional Recovery After Stroke”

- National Institute of Neurological Disorders and Stroke R01
- Grant runs from April 15, 2019 to Feb. 28, 2023
- \$1,416,679 in total costs

Researchers hypothesize that the CSPG signaling pathway is involved in the regulation of neuroregeneration and axonal sprouting after stroke and that modulating the CSPG signaling pathway will lead to better functional outcome in stroke recovery. Researchers will test this hypothesis in both young and aged mice in the proximal transient middle cerebral artery occlusion (MCAo) animal model. In specific aim 1 and 2, researchers will investigate the role of the CSPGs signaling pathway in functional recovery in young or aged stroke animals. In specific aim 3, researchers will examine the mechanisms of neurorepair in stroke animals by combination of genetic and pharmacological modulation with inducible cell type specific RPTP α knockout or ISP peptide treatment.

RESEARCH GRANTS

RESEARCH GRANTS FY 2019 *(continued)*

Amy Makley, MD



Associate Professor and Director, Department of Surgery, Section of Trauma and Critical Care

“Effect of Stored Blood on Sphingosine-1-phosphate Mediated Vascular Barrier Integrity”

- National Institute of General Medical Sciences K08
- Grant runs from Sept. 1, 2018 to Aug. 31, 2022
- \$793,605 in total costs

Trauma remains the leading cause of death in young adults in both the U.S. and worldwide. Hemorrhage accounts for the majority of potentially preventable mortality after trauma, and current treatment includes the transfusion of stored blood products. This research will investigate the interplay between the transfusion of stored blood and the development of lung injury following hemorrhage, ultimately targeting preventable mortality following traumatic injury.

Francis McCormack, MD



Gordon and Helen Hughes Taylor Chair of Internal Medicine, Professor and Director, Department of Internal Medicine, Division of Pulmonary, Critical Care and Sleep Medicine

“A Population-based Cohort Study to Monitor Safety and Effectiveness of Sirolimus in Patients with Sporadic Lymphangioliomyomatosis”

- Pfizer, Inc. Award
- Grant runs from May 1, 2019 to May 1, 2021
- \$250,000 in total costs

This is a descriptive study designed by Pfizer to present additional long-term safety and effectiveness data on patients with sporadic Lymphangioliomyomatosis (S-LAM) treated with sirolimus beyond the MILES trial and published literature. This study will be conducted by utilizing an ongoing observational study from the U.S. called the Multicenter International Durability and Safety of Sirolimus in LAM Trial (MIDAS) to evaluate safety and effectiveness of sirolimus in S-LAM patients when used under conditions of routine clinical care.

Mario Medvedovic, PhD



Professor, Department of Environmental Health

“Data Coordination and Integration Center for LINCS-BD2K”

- National Institute of Allergy and Infectious Diseases Sub Award
- Grant runs from July 1, 2019 to June 30, 2020
- \$551,515 in total costs

RESEARCH GRANTS FY 2019 *(continued)*

Ardythe Morrow, PhD



Professor Emerita,
Department of
Environmental Health

“Enhanced Surveillance for New Vaccine Preventable Diseases”

- Centers for Disease Control and Prevention Sub Award
- Grant runs from March 1, 2018 to Aug. 31, 2020
- \$224,031 in total costs

Dr. Morrow serves as the project leader/principal investigator and is responsible for the design, data management and analysis of a unique birth cohort named the Pediatric Respiratory and Enteric Virus Acquisition and Immunogenesis Longitudinal (PREVAIL) study. The purpose of the study is to define the natural history of infection and immune response to major pediatric pathogens in order to provide data useful for guiding vaccine development. PREVAIL enrolled 245 mother-infant pairs in pregnancy and is continuing follow-up until at least 2 years of age.

“The Impact of Human Milk Oligosaccharide 2'-Fucosyllactose on Growth, Feeding Progression and Neurodevelopment in Preterm Infants”

- Abbott Laboratories Sub Award
- Grant runs from Feb. 1, 2018 to July 31, 2019
- \$105,328 in total costs

This is a novel trial of the human milk molecule 2'-FL, being tested as a dietary supplement in preterm infants. The trial is being conducted at Nationwide Children's Hospital in Columbus, Ohio; all sample analysis is being performed at the University of Cincinnati. The Morrow lab will be conducting analysis of the infant microbiome and genetics.

“Friesland Campina Project ToMorrow”

- Friesland Campina Nederland BV
- Grant runs from Feb. 1, 2019 to Jan. 31, 2022
- \$501,648 in total costs

This research involves the development and validation of a method to more effectively study microbial metabolism in the context of clinical studies. The method involves anaerobic fermentation of fecal samples and metabolomic analysis of the fermentate. This study would also validate this novel combination of methodologies for use in future clinical studies on other milk oligosaccharides and other prebiotics.

RESEARCH GRANTS FY 2019 *(continued)*

Erik Nelson, MD



Associate Professor,
Department of
Psychiatry and
Behavioral Neuroscience

“Switching Versus Augmentation in Treatment Resistant Depression”

- **Patient-Centered Outcomes Research Institute Sub Award**
- **Grant runs from Feb. 1, 2018 to Oct. 31, 2018**
- **\$721,280 in total costs**

This is a multi-site, randomized, open-label, effectiveness trial comparing three treatment arms for major depressive disorder patients with treatment-resistant depression who are currently on ongoing, stable and adequate antidepressant therapy (ADT). Adequate ADT is defined as a therapeutically sufficient dose for a sufficient treatment period, which would be expected to be effective according to the Massachusetts General Hospital Antidepressant Treatment Response Questionnaire. Patients will be randomized in a 1:1:1 fashion to one of three treatment arms: aripiprazole augmentation, rTMS augmentation and switching to venlafaxine XR.

Laura Ngwenya, MD, PhD



Assistant Professor,
Department of
Neurosurgery

“Spreading Depolarizations and Brain Dysfunction Following Traumatic Brain Injury”

- **National Institute of Neurological Disorders and Stroke K08**
- **Grant runs from April 15, 2019 to Jan. 31, 2024**
- **\$1,009,070 in total costs**

This study will determine the impact of spreading depolarizations (SD) on traumatic brain injury (TBI)-induced pathology, providing critical guidance for targeted therapeutic intervention. The hypothesis is that the occurrence of spreading depolarizations after TBI exacerbates brain pathology and is especially disruptive of hippocampal function. This research aims to investigate whether TBI+SDs causes greater injury pathology and aberrant neurogenesis, determine whether SDs lead to deficits in hippocampal dependent behaviors and epilepsy, and will conduct single-cell RNA sequencing on hippocampal dentate gyrus cells to identify cell-type specific molecular disturbances to guide future studies.

Vanessa Nomellini, MD



Assistant Professor,
Department of Surgery

“Mechanisms of Altered Neutrophil Trafficking in the Persistent Inflammation, Immunosuppression, Catabolism Syndrome (PICS)”

- **National Institute of General Medical Sciences K08**
- **Grant runs from Sept. 20, 2018 to Aug. 31, 2023**
- **\$991,621 in total costs**

This research aims to investigate the mechanisms of neutrophil dysfunction that occurs during the immunosuppressed phase after sepsis, commonly referred to as the Persistent Inflammation, Immunosuppression and Catabolism Syndrome (PICS). This state is associated with ongoing signs of systemic inflammation, but with increased susceptibility to infection due to T cell depletion and immune cell dysfunction. The experimental design utilizes a murine model of PICS, which was first established in Dr. Nomellini’s lab, to elucidate the mechanisms of aberrant neutrophil migration during PICS using in vivo and in vitro techniques.

RESEARCH GRANTS FY 2019 *(continued)*

Andrew Norman, PhD



Professor, Department of Pharmacology and Systems Physiology

“First-in-Human Study of a Humanized Anti-cocaine Monoclonal Antibody”

- National Institutes of Health U01
- Grant runs from July 1, 2019 to April 30, 2022
- \$4,770,702 in total costs

Despite decades of pre-clinical research and clinical trials there are no approved pharmacological treatments for cocaine use disorder. Immunotherapy with cocaine vaccines has provided some evidence of clinical efficacy but only in patients with serum anti-cocaine antibody concentrations greater than approximately 42 µg/mL. The goal of this proposal is to initiate and complete a Phase 1a, first-in-human clinical trial of our recombinant humanized anti-cocaine monoclonal antibody (mAb), pre-clinical designation, h2E2, in healthy volunteers. The major aim of the research is to assess the safety and tolerability of h2E2 using a series of ascending doses that will produce serum concentrations between the minimally effective concentrations reported in the vaccine study and up to 40-fold higher. This will provide the means to address the issue of whether high concentrations of anti-cocaine antibodies will be effective at preventing relapse in cocaine users.

CO-INVESTIGATORS:

Terence Kirley, PhD, Department of Pharmacology and Systems Physiology

Erik Nelson, MD, Department of Pharmacology and Systems Physiology

William Ridgway, MD, Department of Internal Medicine

Rose Webster, Department of Pharmacology and Systems Physiology

Jeffrey Welge, PhD, Department of Psychiatry and Behavioral Neuroscience

Hanna Nicole Wetzel, Department of Pharmacology and Systems Physiology

Joseph Palascak, MD



Professor, Department of Internal Medicine, Division of Hematology Oncology

“2018-2019 Cascade”

- Hemophilia Foundation of Michigan Sub Award
- Grant runs from June 1, 2018 to May 31, 2019
- \$151,817 in total costs

The University of Cincinnati Adult Hemophilia Treatment Center (AHTC), founded in 1975, located at the University of Cincinnati College of Medicine, provides comprehensive care to persons with inherited bleeding disorders. The center currently serves 160 active patients from seven counties in Ohio, five in Kentucky and two from Indiana. Examples of services provided by the center include diagnosis, evaluation, treatment and education, collaboration with Cincinnati Children’s Hospital Medical Center Treatment Center, participation and enrollment of patients in the American Thrombosis and Hemostasis Network (ATHN) and network with community-based agencies to provide supportive services.

RESEARCH GRANTS

RESEARCH GRANTS FY 2019 *(continued)*

Joseph Palascak, MD



Professor, Department of Internal Medicine, Division of Hematology Oncology

"2019-2020 Cascade"

- Hemophilia Foundation of Michigan Award
- Grant runs from June 1, 2019 to May 31, 2020
- \$147,150 in total costs

The University of Cincinnati Adult Hemophilia Treatment Center (AHTC), founded in 1975, located at the University of Cincinnati College of Medicine, provides comprehensive care to persons with inherited bleeding disorders. The center currently serves 160 active patients from seven counties in Ohio, five in Kentucky and two from Indiana. Examples of services provided by the center include diagnosis, evaluation, treatment and education, collaboration with Cincinnati Children's Hospital Medical Center Treatment Center, participation and enrollment of patients in the American Thrombosis and Hemostasis Network (ATHN) and network with community-based agencies to provide supportive services.

Shailendra Patel, MD, PhD



Albert W. Vontz, Jr. Professorship of Diabetes, Professor and Director, Department of Internal Medicine, Division of Endocrinology, Diabetes and Metabolism

"The Role of Abcg4 in Alzheimer's Disease"

- National Institute on Aging R03
- Grant runs from April 1, 2019 to Jan. 31, 2021
- \$320,875 in total costs

Researchers hypothesize that the ATP-binding cassette homodimer G4 (Abcg4) is a bona fide exporter of Amyloid β -peptide at the blood-brain barrier and may play a role on the pathogenesis of Alzheimer's disease. This research will test whether this first step can be verified in a mouse model of ATP-binding cassette homodimer G4 (Abcg4) knockout, using a validated Alzheimer's disease mouse model. Additionally, desmosterol, an endogenous sterol from the cholesterol biosynthesis pathway, was a modulator of Amyloid β (A β) secretion in vitro and this effect was dependent upon Abcg4 function. This research can lead to the linkage of the cholesterol pathways to the Alzheimer's disease pathways and may lead to greater insight into the pathophysiology of Alzheimer's disease.

Susan Pinney, PhD, FACE



Professor, Department Environmental Health

"Longitudinal Study of Endocrine Disrupting Chemical Exposure and the Early Hormonal Milieu of Girls Around the Time of Thelarche"

- National Institute of Environmental Health Sciences R01
- Grant runs from Aug. 15, 2018 to June 30, 2021
- \$860,586 in total costs

This research is highly innovative because of its unique design: girls have been evaluated longitudinally from ages 6-7 years, with serum hormone measurements during time points around thelarche, and measurements of environmental biomarkers prior to puberty. Using existing prospectively collected pubertal maturation and environmental biomarker data, and recently acquired measurements of

RESEARCH GRANTS

RESEARCH GRANTS FY 2019 *(continued)*

Susan Pinney, PhD, FACE



Professor, Department
Environmental Health

serum hormones in banked serum samples timed to maturation events, in a group of girls followed since ages 6 and 7, we will directly address the gaps noted in the 2013 IBCERCC report “Breast Cancer and the Environment: Prioritizing Prevention.” The impact of this research will provide information that will lead to the identification of mechanisms of endocrine disrupting chemicals and targetable pathways, resulting in strategies to minimize disruption in the timing of pubertal events in girls and future risk of adverse health outcomes in adult women.

“Fernald Community Cohort: Research Resource for Environmental Epidemiology”

- National Institute of Environmental Health Sciences R24
- Grant runs from Sept. 30, 2018 to June 30, 2023
- \$2,003,325 in total costs

Researchers will maintain the cohort by updating health status information, enrolling 800 “next generation” cohort members and collecting their data and biospecimens, maintaining the biorepository with periodic quality assurance assessments, and increasing communication with cohort members and with community physicians regarding research activities and findings. Researchers also will enrich the cohort through obtaining new health outcome and exposure data; converting our codes for medical terms, diagnoses and medications to standard ontologies; developing new biomedical informatics tools; and by exploring the feasibility of using banked samples in new technologies (ccfDNA for DNA methylation biomarkers; exosomal miRNA for expression molecular markers).

Timothy Pritts, MD, PhD



Professor and Chief,
Department of Surgery,
Section of General
Surgery

“REVIVE: Reducing Exsanguination Via In-Vivo Expandable Foam”

- Department of the Army Sub Award
- Grant runs from Sept. 1, 2018 to Aug. 31, 2020
- \$452,309 in total costs

The objective of this research is to demonstrate safety, effectiveness and benefit-risk profile of ResQFoam for the in-hospital treatment of emergent, exsanguinating, intraabdominal hemorrhage resulting in Class III or IV hemorrhagic shock due to trauma.

CO-INVESTIGATORS:

Andrew Friedrich, MD, Department of Anesthesiology
Michael Goodman, MD, Department of Surgery
Jason McMullan, MD, Department of Internal Medicine

RESEARCH GRANTS

RESEARCH GRANTS FY 2019 *(continued)*

Timothy Pritts, MD, PhD



Professor and Chief,
Department of Surgery,
Section of General
Surgery

“Red Blood Cell Microparticles and Lung Inflammation After Hemorrhage and Resuscitation”

- National Institutes of Health R01
- Grant runs from Feb. 1, 2014 to March 31, 2023
- \$1,412,125 in total costs

Hemorrhage is a major cause of death in injured patients. Treatment to improve survival from hemorrhage include transfusion of stored packed red blood cells, which may cause harm to patients who survive. This research will increase our understanding of the underlying mechanisms of resulting endothelial cell activation and potentially allow mitigation of harm from the use of stored packed red blood cells in resuscitation from hemorrhage.

CO-INVESTIGATORS:

Charles Caldwell, PhD, Department of Surgery
Erich Gulbins, MD, PhD, Department of Surgery
Alex Lentsch, PhD, Department of Surgery

Michael Privitera, MD



Professor and
Director, Department
of Neurology and
Rehabilitation Medicine,
Epilepsy Division

“Project ECHO”

- Centers for Disease Control and Prevention Sub Award
- Grant runs from June 1, 2018 to May 31, 2019
- \$100,000 in total costs

The UC Pain ECHO was launched in 2015 with grant funding and the leadership team of staff and faculty from the UC Department of Family and Community Medicine and UC James L. Winkle College of Pharmacy. This ECHO program will empower primary care providers who already have skills in culturally appropriate communication to address issues in their patients with epilepsy.

Sakthivel Sadayappan, PhD, MBA



Professor, Department
of Internal
Medicine, Division of
Cardiovascular Health
and Disease

“Myoarchitectural Basis of Heart Failure”

- National Heart, Lung and Blood Institute Sub Award
- Grant runs from Sept. 24, 2018 to Aug. 31, 2019
- \$160,127 in total costs

This research will study the mechanism by which impaired phosphorylation of MYBPC3 affects structural stability of the cardiac sarcomere, and thereby modulates sarcomere morphology, transmural fiber helicity and ventricular wall mechanics.

“Hypertrophic Cardiomyopathy in Populations of South Asian Descendants”

- MyoKardia, Inc. Research Agreement
- Grant runs from April 19, 2019 to April 30, 2020
- \$250,000 in total costs

The objectives of this research proposal are to define the molecular consequences of the D389V variant on myosin binding and cardiac contractility in vitro and to determine the pathophysiological aspects of D389V using an in vivo model. The central hypothesis of this re-

RESEARCH GRANTS

RESEARCH GRANTS FY 2019 *(continued)*

Sakthivel Sadayappan, PhD, MBA



Professor, Department of Internal Medicine, Division of Cardiovascular Health and Disease

search is that the D389V variant disrupts binding of cMyBP-C to myosin resulting in increased contractility eventually leading to hypertrophic cardiomyopathy (HCM). Through the novel use of a knock-in mouse model, researchers will, for the first time, be in a position to unravel the molecular mechanism(s) of aberrant hypercontraction in carriers of the D389V variant, leading to HCM, as well as develop a diagnostic tool with which to identify early-onset of HCM and heart failure in D389V carriers worldwide

“Molecular Mechanisms of Cardiac Arrhythmias in Patients with Compound Mutations”

- American Heart Association - National Chapter Award
- Grant runs from July 1, 2019 to June 30, 2022
- \$300,000 in total costs

This research seeks to determine the mechanisms of arrhythmias and sudden cardiac death in hypertrophy, using model systems that are based on patients carrying double genetic variant: a Ser96Ala variant in the HGNC gene (HRCS96A), which is found to be 48% (het) and ~16% (homo) worldwide, and a polymorphic MYBPC3 (Del Int32) variant that is exclusively present in 6% of South Asian descendants with an estimated 100 million carriers worldwide.

CO-INVESTIGATOR:

Evangelia Kranias, PhD, Department of Pharmacology and Systems Physiology

Renu Sah, PhD



Associate Professor, Department of Pharmacology and Systems Physiology

“Neuroinflammation, Asthma and PTSD”

- National Institute of Mental Health R21
- Grant runs from Feb. 1, 2019 to Dec. 31, 2020
- \$455,469 in total costs

Researchers will investigate how neuroimmune mediators associated with severe asthma drive posttraumatic behavior and physiology. In a unique mouse model of severe asthma in which Th17 cell and IL17A play a central role, researchers observed significant deficits in fear extinction as well as altered neuronal plasticity in fear regulatory prefrontal and amygdala areas. Using novel transgenic mice, this study will explore how severe asthma-associated inflammatory mediators (Th17 cells/IL-17A) may worsen PTSD-relevant physiology following traumatic stress. Elucidation of a direct link between IL-17A and PTSD would have broadly applicable implications for understanding PTSD risk and pathophysiology, as well as, identify alternative therapeutic strategies.

RESEARCH GRANTS

RESEARCH GRANTS FY 2019 *(continued)*

Jeffrey Schlaudecker, MD



Kautz Family Endowed
Chair of Geriatric
Medical Education and
Associate Professor,
Department of Family
and Community
Medicine

“Transformational Fellowship Training for Community Primary Care Champions”

- Health Resources and Services Administration Sub Award
- Grant runs from Sept. 1, 2018 to Aug. 31, 2023
- \$1,478,879 in total costs

The purpose of this program is to strengthen primary care and the workforce by establishing fellowship programs to train community-based practicing primary care physician and/or physician assistant champions to lead health care transformation and enhance teaching in community-based settings.

CO-INVESTIGATORS:

Sandra Regan, PhD, Department of Family and Community Medicine
Megan Rich, MD, Department of Family and Community Medicine
Christopher White, MD, Department of Family and Community Medicine

Wen-Hai Shao, PhD



Assistant Professor,
Department of Internal
Medicine, Division of
Immunology, Allergy
and Rheumatology

“Axl Receptor Tyrosine Kinase, a Potential Therapeutic Target in Glomerulonephritis”

- National Institute of Diabetes and Digestive and Kidney Disease R01
- Grant runs from April 1, 2019 to March 31, 2022
- \$709,889 in total costs

Glomerulonephritis (GN) is a pathologic lesion in several autoantibody and immune complex disorders. This research should increase understanding of the role of Axl receptor tyrosine kinase in GN pathogenesis. The preliminary data demonstrates that Axl contributes to anti-glomerular base membrane antibody (Ab)-induced disease by promoting glomerular mesangial cell survival and proliferation. This research aims to identify the mechanisms that regulate Axl expression in the inflamed kidney, identify the signaling mechanisms by which Axl promotes GN and determine the ability of R428 to suppress the development of GN and treat established GN.

Vinita Takiar, MD, PhD



Associate Professor,
Department of Radiation
Oncology

“Translational Research Career Development: Overcoming Resistance to Radiotherapy”

- VA Merit Award
- Grant runs from Oct. 1, 2018 to Sept. 30, 2022
- \$1,344,154 in total costs

The goals of this project are to identify and target mechanisms of adaptive resistance to radiation therapy. Researchers will determine whether the combination of ionizing radiation with a glutaminase inhibitor results in decreased proliferation and aerobic respiration in 2D and 3D culture. Researchers also will validate the efficacy of glutaminase inhibition in combination with RT, using preclinical heterotopic cell line and patient-derived xenograft animal models.

RESEARCH GRANTS FY 2019 *(continued)*

Thomas Thompson, PhD



Professor, Department of Molecular Genetics, Biochemistry and Microbiology

“Structural Insight into the Signaling and Regulation of GDF8 and GDF11”

- National Institute of General Medical Sciences R01
- Grant runs from Sept. 20, 2018 to Aug. 31, 2022
- \$1,457,658 in total costs

This research aims to involve resolving the molecular details of GDF8 and GDF11 with its cognate receptors, characterizing the latent state of GDF8 and GDF11 and deciphering how they are activated from latency and determining the structural mechanism of the extracellular antagonist GASP and determining how antagonism is specific for GDF8 and GDF11. Collectively, these aims will provide a deeper understanding of the mechanism that regulate GDF8 and GDF11 signaling, which can ultimately be used to facilitate or augment current therapeutic efforts to modulate ligand signaling.

Michael Tranter, PhD



Assistant Professor, Department of Internal Medicine, Division of Cardiovascular Health and Disease

“A Novel Role for HuR in UCP1-independent Thermogenesis and Energy Expenditure”

- American Heart Association - National Chapter Award
- Grant runs from July 1, 2019 to June 30, 2022
- \$300,000 in total costs

The long-term goal of this research is to elucidate the HuR-dependent molecular mechanisms driving energy expenditure in adipocytes. The researcher’s central hypothesis is that HuR-mediated lipolysis facilitates thermogenic energy expenditure in brown and beige adipocytes in a UCP1-independent manner.

“RNA Aptamer Homing Beacons to Reduce Obesity”

- American Heart Association - National Chapter Award
- Grant runs from July 1, 2019 to June 30, 2021
- \$200,000 in total costs

The goal of this research is to create a synthetic RNA aptamer-based homing beacon to increase uncoupling protein 1 (UCP1) expression by promoting interaction of the UCP1 mRNA transcript with the RNA binding protein Human antigen R (HuR) that is known to promote stabilization and expression of target genes. The expected outcome and clinical impact of increased UCP1 expression would be increased energy expenditure and improved cardiometabolic health.

RESEARCH GRANTS

RESEARCH GRANTS FY 2019 *(continued)*

Patrick Tso, PhD



Mary M. Emery
Endowed Chair
of Pathology and
Professor, Department
of Pathology and
Laboratory Medicine

“Role of the GI Lymphatic System in Hormonal Signaling and Nutrient Metabolism”

- National Institute of Diabetes and Digestive and Kidney Disease R01
- Grant runs from Sept. 20, 2018 to May 31, 2023
- \$2,992,537 in total costs

This research addresses the overall hypothesis that the transport and signaling of hormones and related factors within the GI lymphatic system is necessary for normal functioning of the GI tract and for overall metabolic health.

CO-INVESTIGATORS:

Min Liu, PhD, Department of Pathology and Laboratory Medicine

Yvonne Ulrich-Lai, PhD, Department of Pharmacology and Systems Physiology

“Evaluation of Delivery Vehicle Effects Upon Tissue Accretion of Key Lipid Soluble Nutrients”

- Abbott Laboratories Award
- Grant runs from Dec. 1, 2018 to Nov. 30, 2019
- \$211,372 in total costs

Researchers found a major impact of mixtures of monoglyceride, diglyceride and phospholipid (MDGPL) on the formation and secretion of chylomicrons. A fascinating question is whether MDGPL has any influence on the accretion of key lipid soluble nutrients in neonatal brain. Chylomicrons from donor animals will be labeled using radio-labeled lipid soluble nutrients. Chylomicron metabolism will be studied in neonatal rats. The nutrients that will be studied will include vitamin E, DHA, linolenic acid, arachidonic acid and linoleic acid.

Yvonne Ulrich-Lai, PhD



Associate Professor,
Department of
Pharmacology and
Systems Physiology

“Stress, Comfort Food, and Obesity”

- National Institute of Diabetes and Digestive and Kidney Disease R56
- Grant runs from Sept. 15, 2018 to Aug. 31, 2019
- \$240,125 in total costs

This research uses a novel “snacking” paradigm to determine the neural mechanism by which comfort feeding gives stress relief in normal weight individuals. It also identifies the extent that this stress relief is impaired during diet-induced obesity (DIO). This has critical implications for metabolic health, as it suggests a vicious cycle whereby obese individuals continually increase their consumption of palatable foods to maintain effective stress relief in the face of escalating DIO.

RESEARCH GRANTS FY 2019 *(continued)*

Achala Vagal, MD



Professor and Vice
Chair, Department of
Radiology

“Assessing Population-based Radiological Brain Health in Stroke Epidemiology (APRISE) Study”

- National Institute of Neurological Disorders and Stroke R01
- Grant runs from Sept. 30, 2018 to July 31, 2023
- \$3,123,474 in total costs

The objective of this research is to build on the Greater Cincinnati/Northern Kentucky Stroke Study infrastructure to radiologically characterize the full stroke/transient ischemic attack (TIA) population of Greater Cincinnati/Northern Kentucky from 2015 and create the first modern, largely MRI-based characterization of brain health in a contemporary stroke/TIA population. The specific aim is to create a prediction model of cerebrovascular disease recurrence (ischemic or hemorrhagic stroke) incorporating imaging parameters in a biracial, large-scale ischemic stroke/TIA population using state-of-the-art modeling approaches.

CO-INVESTIGATORS:

Rebecca Cornelius, MD, Department of Radiology

Mary Gaskill-Shipley, MD, Department of Radiology

Pooja Khatri, MD, Department of Neurology and Rehabilitation Medicine

Brett Kissela, MD, Department of Neurology and Rehabilitation Medicine

Thomas Tomsick, MD, Department of Radiology

Lily Wang, MBBS, Department of Radiology

“Human Centered Design: Optimizing Patient Experience through Design Thinking”

- American College of Radiology Innovation Grant
- Grant runs from June 1, 2019 to May 31, 2020
- \$100,000 in total costs

This research addresses the challenges of patients and families in the imaging workflow with the creativity, intuition and systemic reasoning of design thinking and creates the ideal outpatient journey that ultimately benefits the patient. Using a co-creative process involving all stakeholders and placing empathy in the center stage, researchers will understand the user, challenge assumptions, expand the range of possible solutions and offer engaging and interactive experiences for patients, families and care teams.

RESEARCH GRANTS

RESEARCH GRANTS FY 2019 (continued)

Susan Waltz, PhD

Professor, Department of Cancer Biology



Carolyn Price, PhD

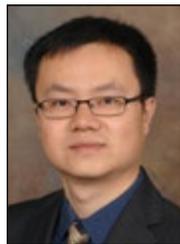
Professor, Department of Cancer Biology

“Pathways to Cancer Therapeutics”

- National Cancer Institute T32
- Grant runs from Sept. 1, 2018 to Aug. 31, 2023
- \$2,503,163 in total costs

The purpose of the Pathways to Cancer Therapeutics Training Program is to equip predoctoral and postdoctoral scientists with skill sets that will allow for their careers and science to cross-over into clinical translation. Trainees will gain an understanding of how research in cancer biology can be utilized to identify new and more effective cancer therapeutic strategies and the challenges associated with translating therapeutics into the clinic.

Chenran Wang, PhD



Assistant Professor,
Department of Cancer
Biology

“Regulation of Lipid Catabolism by Autophagy in Neural Stem Cell of Tuberous Sclerosis Complex”

- National Institute of Neurological Disorders and Stroke R01
- Grants runs from July 15, 2018 to June 30, 2023
- \$1,754,376 in total costs

Tuberous sclerosis complex (TSC) is a multi-system developmental disorder with prominent malformations and benign tumors in postnatal brain. This research aims to determine the molecular and metabolic mechanisms of lipophagy for hyperactivated mTORC1 signaling in TSC-deficient neural stem cell. This research has strong clinical relevance for developing novel targeted therapies to treat TSC patients and other hyperactivated mTORC1 associated diseases.

Yi-Gang Wang, MD, PhD



Professor, Department
of Pathology and
Laboratory Medicine

“IGF-2R is a New Therapeutic Target for Cardiac Ischemia-reperfusion Injury”

- National Institute of Allergy and Infectious Diseases R01
- Grant runs from April 1, 2019 to March 31, 2023
- \$1,649,658 in total costs

The objective of this research is to determine the pathological role of insulin-like growth factor 2 receptor (IGF2R) in myocardial ischemia-reperfusion injury. The molecular mechanisms underlying IGF2R trafficking and mediating cell death pathway will be revealed in these studies. This research also provides proof-of-concept for clinical applications of an IGF2R antagonist as a novel cardioprotective agent.

CO-INVESTIGATORS:

Guochang Fan, PhD, Department of Pharmacology and Systems Physiology

Jack Rubinstein, MD, Department of Internal Medicine, Division of Cardiovascular Health and Disease

Sakthivel Sadayappan, PhD, MBA, Department of Internal Medicine, Division of Cardiovascular Health and Disease

Meifeng Xu, MD, PhD, Department of Pathology and Laboratory Medicine

RESEARCH GRANTS

RESEARCH GRANTS FY 2019 *(continued)*

Alison Weiss, PhD



Professor, Department of Molecular Genetics, Biochemistry and Microbiology

“Microbiome and E. coli O157:H7 Infection of Human Gut Tissue”

- National Institute of Allergy and Infectious Diseases R01
- Grant runs from Aug. 15, 2018 to July 31, 2022
- \$1,603,854 in total costs

Shiga toxin producing E. coli O157:H7 are a leading cause of food-borne illnesses, and the most common cause of acute kidney failure in children. Currently there is no treatment for this potentially fatal disease; furthermore, administration of antibiotics to patients has been associated with increased disease severity. Animals, such as mice, are not sensitive to infection; researchers have developed human “mini-guts” to model infection, which will increase our understanding of human disease and allow us to evaluate potential therapeutics.

Theresa Winhusen, PhD



Professor and Director, Department of Psychiatry and Behavioral Neuroscience, Division of Addiction Sciences

“Optimizing HEALing in Ohio Communities (OHIO)”

- National Institute on Drug Abuse Sub Award
- Grant runs from April 17, 2019 to March 31, 2023
- \$2,958,861 in total costs

Upon completion of the study, researchers will have rigorous and reproducible evidence grounded in the contextual characteristics of the selected communities of an exportable and scalable model of service assessment, community-engaged decision-making and implementation of a data driven multipronged approach to reduce OUD that can be implemented across urban and rural communities in America.

Eric Wohleb, PhD



Assistant Professor, Department of Pharmacology and Systems Physiology

“Microglial Brain-derived Neurotrophic Factor (BDNF) in Stress and Antidepressant Response”

- National Institute of Mental Health R21
- Grant runs from July 1, 2019 to May 31, 2021
- \$200,625 in total costs

This study will use mice with microglia-specific BDNF depletion (Cx3cr1CreER:Bdnfl/fl) to test two specific aims: to determine if deficient microglial BDNF confers stress susceptibility via increased synapse loss and depressive-like behaviors following stress; and to examine the role of microglial BDNF in neurobiological responses and behavioral effects of rapid-acting antidepressants ketamine or scopolamine. This research is the first to study the role of microglial BDNF in neurobiological adaptations underlying both stress-induced depressive-like behaviors and antidepressant treatment. Researchers expect to identify a novel neurotrophic role for microglia, which may guide treatment strategies for major depressive disorder and other neurological conditions.

RESEARCH GRANTS

RESEARCH GRANTS FY 2019 *(continued)*

Ying Xia, PhD



Professor, Department of Environmental Health

“Gene-environment Interactions in Epithelial Morphogenesis”

- National Institute of Child Health and Human Development R01
- Grant runs from April 9, 2019 to March 31, 2024
- \$2,320,694 in total costs

Structural birth defects have a great impact on public health; results from this research will advance our understanding of their etiology and mechanisms. They will also provide crucial insights into the mechanisms through which GxE interactions disrupt biological pathways to cause defects. The experimental model is novel and can be applied to studies of a wide range of GxE interactions underlying complex diseases.

Aram Zabeti, MD



Waddell Chair in Multiple Sclerosis and Associate Professor, Department of Neurology and Rehabilitation Medicine

“DELIVER-MS”

- Patient-Centered Outcomes Research Institute Sub Award
- Grant runs from Feb. 1, 2018 to Jan. 31, 2023
- \$278,505 in total costs

Multiple Sclerosis is a long-term health problem affecting more than 2.5 million people worldwide. It is a leading cause of disability among young adults in North America. DELIVER-MS is funded by PCORI to answer an important question about benefits and risks of starting treatment with an escalation (old) approach versus an early highly effective treatment (new) approach for patients with relapsing-remitting multiple sclerosis.

Clinical Trials Revenue FY 2019

Caleb Adler, MD



Professor, Department of Psychiatry and Behavioral Neuroscience

Dr. Adler's clinical trial work has focused on the treatment of mood and other psychiatric disorders, including bipolar disorder, schizophrenia and ADHD. In addition to sponsored clinical trials, he recently completed a dual-site investigator-initiated study of bipolar depression and has contributed to the dissemination of research findings for other bipolar medications.

FY 2019 REVENUE: \$343,190

Rita Alloway, PharmD



Research Professor, Department of Internal Medicine, Division of Nephrology and Hypertension

The Transplant Clinical Research Program conducts industry-funded clinical trials in transplant recipients and candidates to identify novel immunosuppressants with improved efficacy and safety. In addition, several trials are ongoing which address unmet needs related to infectious complications post-transplant and reperfusion injury. The program is currently running five investigator-sponsored trials and eight industry sponsored trials. The BEST study is a multicenter, 315 patient study with an investigational new drug (IND) application which evaluates the safety and efficacy of simultaneous steroid withdrawal and calcineurin-free immunosuppression. The one-year results have shown that simultaneous steroid withdrawal with belatacept results in acceptable post-transplant outcomes without worsening nephrotoxicity, neurotoxicity or post-transplant diabetes. These clinical trials also include mechanistic and translational studies of peripheral blood and renal biopsy tissue utilizing state-of-the-art flow cytometry, single-cell genomics, intracellular protein biochemistry and ex vivo approaches to advance our understanding of the key elements of rejection and post-transplant diabetes. This team maintains a renal biopsy biobank from which samples have been utilized to obtain federal funding for innovative mechanistic studies which translate to novel therapies. Cytomegalovirus infection remains a difficult to treat post-transplant complication. They are evaluating a new CMV vaccine and an alternative CMV antiviral which may minimize this post-transplant complication.

FY 2019 REVENUE: \$216,284

CLINICAL TRIALS REVENUE

CLINICAL TRIALS REVENUE FY 2019 *(continued)*

Lesley Mussio Arnold, MD



Professor, Department of Psychiatry and Behavioral Neuroscience; Director, Women's Health Research Program

Dr. Arnold is the director of the Women's Health Research Program (WHRP) in the Department of Psychiatry and Behavioral Neuroscience and focuses on research studies of health problems that are of particular concern to women and are at the medicine-psychiatry interface. The WHRP is a leading research center in the study of chronic pain disorders, including fibromyalgia, migraine, chronic low back pain, osteoarthritis pain and neuropathy. She has over 25 years experience leading medication trials in chronic pain, designing clinical trial protocols and developing patient-reported outcome measures. As part of the effort to discover new non-opioid medical treatments for chronic pain and improve the assessment of pain for clinical trials, Dr. Arnold is conducting functional neuroimaging studies of chronic pain mechanisms.

FY 2019 REVENUE: \$453,008

Robert Baughman, MD



Professor, Department of Internal Medicine

Dr. Baughman runs the sarcoidosis clinic at the University of Cincinnati. The clinic registry includes over 2,200 patients and sees nearly 1,000 patients a year. Along with his longtime collaborator, Elyse Lower, MD, he has developed several novel treatments for sarcoidosis, including methotrexate, thalidomide, leflunomide, infliximab, rituximab and repository corticotrophin. This group has led several double-blind placebo-controlled trials in sarcoidosis. Current studies include treatments for pulmonary, ocular and cutaneous sarcoidosis. He also is studying sarcoidosis-associated fibrosis, pulmonary hypertension and fatigue.

FY 2019 REVENUE: \$121,168

Melissa DelBello, MD, MS



Dr. Stanley and Mickey Kaplan Endowed Chair in Psychiatry; Professor and Chair, Department of Psychiatry and Behavioral Neuroscience

Dr. DelBello investigates risk and resilience factors associated with the development of mood disorder in children and adolescents. Additionally, their group examines novel short- and long-term intervention and prevention strategies for youth with and at risk for mood disorders and attention deficit hyperactivity disorder by combining outcome studies, clinical trials and neuroimaging research.

FY 2019 REVENUE: \$582,357

CLINICAL TRIALS REVENUE

CLINICAL TRIALS REVENUE FY 2019 *(continued)*

Andrew Duker, MD



James J. and Joan A. Gardner Family Center for Parkinson's Disease and Movement Disorders Endowed Chair; and Associate Professor, Department of Neurology and Rehabilitation Medicine

Dr. Duker is a fellowship-trained neurologist who has a keen interest in improving our understanding of and treatments for movement disorders, including Parkinson's disease, Huntington's disease and others. As a primary investigator in numerous multicenter clinical trials run by the team at the Gardner Center for Parkinson's Disease and Movement Disorders at the University of Cincinnati Gardner Neuroscience Institute, he is working to bring cutting edge therapies to patients of the Greater Cincinnati area and beyond. He is a member of the Huntington Study Group and Parkinson Study Group.

FY 2019 REVENUE: \$259,717

Jean Elwing, MD, FCCP



Professor, Department of Internal Medicine, Division of Pulmonary, Critical Care and Sleep Medicine

Dr. Elwing is the principal investigator for several clinical trials in the Division of Pulmonary, Critical Care and Sleep Medicine, evaluating existing and novel therapies for pulmonary arterial hypertension (PAH). Currently, there are multiple ongoing phase II and III clinical trials or registries available to PAH patients, with the main focus of examining therapeutics and treatment regimens in hopes to determine the optimal strategies. The Pulmonary Hypertension Program follows a large cohort of patients affected by PAH. All patients seen in clinic are evaluated for possible participation in clinical trials or registries; the goal is to offer every patient an opportunity to participate in clinical research. Many patients actively participate in clinical trials at some point in their care. The Pulmonary Hypertension Program actively collaborates with Cincinnati Children's Hospital Medical Center and several other divisions at the University of Cincinnati on various research projects. The pulmonary research unit consists of five staff members and two clinical investigators who are focused on pulmonary hypertension. Funding sources include NIH and industry contracts. The program also participates in investigator-initiated projects and often collaborates with trainees who are interested in clinical research.

FY 2019 REVENUE: \$203,438

Alberto Espay, MD, MSc



James J. and Joan A. Gardner Family Center for Parkinson's Disease Research Endowed Chair; Professor, Department of Neurology and Rehabilitation Medicine

The James J. and Joan A. Gardner Center for Parkinson's Disease and Movement Disorders is involved in therapeutic trials of compounds to lessen symptom burden and in Parkinson's and Huntington's diseases as well as in laying the foundations for future disease-modifying interventions in molecularly defined subtypes of neurodegenerative disorders.

FY 2019 REVENUE: \$234,222

CLINICAL TRIALS REVENUE

CLINICAL TRIALS REVENUE FY 2019 *(continued)*

Gregory Fermann, MD



Professor and Vice
Chairman, Department
of Emergency Medicine

Dr. Fermann is the founder and director of the Clinical Trials Center (CTC) in the Department of Emergency Medicine. The CTC is responsible for supporting the screening and recruitment of subjects for industry-, foundation- and NIH-sponsored drug, device and diagnostic clinical trials. The trials focus on novel applications and new platforms of established cardiovascular diagnostics used in risk stratification of patients with emergent conditions.

Dr. Fermann is the chief investigator of the multicenter clinical trial MAGNET ACS-US that evaluates a portable magnetocardiographic device called VitalScan for the diagnosis of acute coronary syndrome in emergency department patients with chest pain and dyspnea. He is the PI of pivotal trials such as ANNEXA-4, the study of the reversal agent for direct acting oral anticoagulants. He is on the national steering committee of several multicenter trials, such as QUANTUM-AF (improving the under treatment of patients with AF), SOAR registry (evaluating the impact of DOAC-related hemorrhage) and GUIDED HF (PCORI sponsored trial of intensified treatment and follow up in patients discharged from the emergency department with AHF). He is co-investigator with Ayodele Adeoye, MD, Jay Johannigman, MD, and Jason McMullan, MD, on the NIH/NHLBI/NINDS-sponsored award Strategies to Innovate EmERgENcy Care Clinical Trials Network (SI-REN) Hub. Dr. Fermann has had continuous funding through the CTC since it was founded in 2009 and won the inaugural “Clinical Trialist of the Year” award in 2016.

FY 2019 REVENUE: \$686,678

Carl Fichtenbaum, MD



Professor, Department
of Internal Medicine,
Division of Infectious
Diseases

Dr. Fichtenbaum has been involved in the conduct of clinical research and clinical trials research for the past 25 years. He is currently the principal investigator on 14 industry-sponsored clinical trials focusing on HIV infection, HIV-associated dyslipidemia and influenza. He is a co-investigator on two other sponsored trials of central venous catheter bacterial infections and resistant bacterial infections. The goal of these studies is to provide the Cincinnati community with access to cutting edge therapies that prevent and treat infectious diseases and their associated complications.

FY 2019 REVENUE: \$252,587

CLINICAL TRIALS REVENUE FY 2019 *(continued)*

Lawrence Goldstick, MD



Associate Professor,
Department of
Neurology and
Rehabilitation Medicine

Over the course of the last several years, Dr. Goldstick and his team have been actively involved in mainly pharmacological clinical trials and NIH trials to a more limited extent. Dr. Goldstick and his team's main involvement has been with multiple sclerosis trials but have also been involved with Alzheimer's trials and NIH headache trials. Dr. Goldstick has been involved in 20 to 25 multiple sclerosis trials, 10 to 12 Alzheimer's trials and headache trials. Recent trials involve new treatments for relapses, comparator studies of monomethyl fumarate and dimethyl fumarate, initial treatment with ocrelizumab as initial therapy and recent onset of multiple sclerosis, and utilization of remyelinating agents in combination with immunomodulating therapies in the treatment of multiple sclerosis. Other studies have involved utilization of S1 P receptor agonists in the treatment of secondary progressive MS and treatment with a new S1 P therapy Ozanimod in the treatment of MS. Dr. Goldstick and his team are currently involved in studies utilizing extended interval dosing of natalizumab looking at efficacy measures and decrease in incidence of PML in JC positive patients. Current MS studies also include a phase 1 study evaluating subcutaneous ocrelizumab versus intravenous ocrelizumab in the treatment of relapsing remitting MS, evaluation of BTK inhibitors and oral B cell therapies in the treatment of MS. The research team is involved also in evaluating standard MS therapies versus escalation high potency therapies in the treatment of MS. Further studies have included studies of monoclonal antibodies directed at amyloid in Alzheimer's disease, beta secretase inhibitors in Alzheimer's disease and utilization of Tau therapies in Alzheimer's disease. Further studies include an NIH PCORI study looking at different treatment algorithms in medication overuse syndromes.

FY 2019 REVENUE: \$786,368

Michael Goodman, MD



Associate Professor,
Department of Surgery

Dr. Goodman's clinical research interests focus on the identifying factors that can improve the care and outcomes of the critically ill or injured surgical patient. These studies include the assessment of opioid-sparing pain control methods for rib fractures and the investigation of novel strategies to improve pulmonary mechanics in patients after traumatic brain injury or reduce unnecessary oxygen utilization after recent trauma.

FY 2019 REVENUE: \$132,241

CLINICAL TRIALS REVENUE

CLINICAL TRIALS REVENUE FY 2019 *(continued)*

Suresh Kamath, MD



Professor, Department of Internal Medicine, Division of Nephrology and Hypertension

Dr. Kamath's clinical trial program deals with newer pharmacotherapeutic agents and devices that improve the care of patients with chronic kidney disease and those receiving dialysis treatments for sustaining their life. He works with the industry sponsors and as well in collaboration with his colleagues in basic science departments and clinical translational research at the University of Cincinnati. Recent focus has been on drugs that are undergoing safety and efficacy in management of anemia of renal disease and novel therapeutic agents that are different in mechanism of action than widely available traditional therapies thereby reducing the side effects, improving quality of life and hopefully improving patient outcomes.

FY 2019 REVENUE: \$245,010

Natalie Kreitzer, MD



Assistant Professor, Department of Emergency Medicine

Dr. Kreitzer's clinical trial work has focused on the diagnosis of concussion in the emergency department. She has worked closely with the Jan Medical team to determine if the BrainPulse, a non-invasive neuromonitoring device, is able to recognize differences between patients who are concussed and non-concussed. Her industry-funded study is a non-blinded study to design an algorithm for the device for use as an aid in the diagnosis of concussion.

FY 2019 REVENUE: \$100,563

Hani Kushlaf, MD



Associate Professor, Department of Neurology and Rehabilitation Medicine

Dr. Kushlaf's clinical trial focus is on novel therapies for rare neuromuscular disorders. Through the UC Muscular Dystrophy Association Care Center, Dr. Kushlaf participates in several clinical trials in late-onset Pompe disease and myasthenia gravis. The trials in late-onset Pompe disease test newer generations of enzyme replacement therapy while the trials in myasthenia gravis test different immunologic mechanisms such as complement inhibition and FcRn receptor antibodies, or potassium channel blockade as potential therapies.

FY 2019 REVENUE: \$192,896

CLINICAL TRIALS REVENUE FY 2019 *(continued)*

Michael Lyons, MD, MPH



Associate Professor,
Department of
Emergency Medicine;
Director, Early
Intervention Program

Dr. Michael Lyons' clinical trial work has focused on implementation of HIV and hepatitis C screening and linkage to care by the Early Intervention Program in the emergency department (ED) of UC Medical Center. EDs are primarily focused on acute care and do not conventionally endorse a prevention mission. The Early Intervention Program was created in 1998 to expand the ED's focus to include public health and prevention services. Recent goals include building infrastructure to more fully integrate HIV/HCV screening into usual practice, bolstering linkage to care support for newly and previously diagnosed patients and using the electronic health record to target patients who have not been linked or have fallen out of care.

FY 2019 REVENUE: \$418,793

John Morris, MD



Professor, Department
of Internal Medicine,
Division of Hematology
and Oncology; Co-
Director, Comprehensive
Lung Cancer Center;
Associate Director, UCCI
Translational Research;
Director, Experimental
Therapeutics

Dr. Morris' efforts focus on early stage clinical trials of new anticancer agents. He directs the Experimental Therapeutics/Phase I Cancer Drug Program for the Division of Hematology Oncology. Phase I trials are the early stage testing of new drugs or drug combinations in patients with advanced cancer. The goal of these trials is to determine a drug's safety, its side effects, the maximum tolerated dose of a new, often untested drug in patients, and its activity against the patient's cancer. In recent years, there have been numerous advances in the treatment of cancer that have greatly impacted on patients' lives. The early phase testing of some of these drugs were carried out in a novel program at UC. Some of our studies have been first-in-human testing or a new agent as exemplified by the BQX-350 trial. BQX-350 is a drug developed at UC by Xiaoyang Qi, PhD, that combines saponin C, a natural glycoside that activates cell death pathways and DOPS, a lipid that forms nanovesicles with the saponin C that targets saponin to tumor cells and blood vessels that feed tumors. The BQX-350 trial, sponsored by Bexion Pharmaceuticals and carried out at UC and three other cancer centers nationally, successfully completed patient safety testing in under a year and is now being expanded. Crucial to this was the rapid recruitment of patient volunteers at UC. Other early phase clinical trials carried out in the UC Experimental Therapeutics/Phase I Cancer Drug Program include testing of an oral form of 5-azacytidine for the treatment of myelodysplasia and acute leukemias, a dual mTOR inhibitor, BEZ235 in combination with everolimus, another mTOR inhibitor for treatment of refractory solid tumors, novel immuno-oncology drugs and vaccines that stimulate the immune system to attack cancers, and novel targeted agents, among others. Dr. Morris directs the only formal Experimental Therapeutics/Phase I Program in the region offering new, novel and state-of-the-art experimental drugs to Tristate residents. His personal research interests are in development of cancer vaccines and an immunostimulatory cytokine, interleukin-15 for the treatment of cancer.

FY 2019 REVENUE: \$1,072,817

CLINICAL TRIALS REVENUE

CLINICAL TRIALS REVENUE FY 2019 *(continued)*

Erik Nelson MD



Associate Professor,
Department of
Psychiatry and
Behavioral Neuroscience

Dr. Nelson is director for the Depression Research Program within the Department of Psychiatry and Behavioral Neuroscience and is dedicated to furthering an understanding of depressive disorders, including studies of new treatments for depression and the biological underpinnings of these disorders. Dr. Nelson's specific interests include trials investigating new psychopharmacological treatments for depression, studies of abnormalities of the stress response in depression and identifying biomarkers of subtypes of depression using neuroimaging techniques and measures of the stress response system.

FY 2019 REVENUE: \$100,313

Richard Ryan, MD



Professor, Department
of Emergency Medicine

Dr. Ryan oversees the Creavo MAGNET-ACS trial, which is a prospective multi-center observation study to validate the diagnostic accuracy of a transportable magnetocardiograph (MCG) device for acute coronary syndrome (ACS). The MCG device non-invasively measures and displays an image of the magnetic signal produced by the electrical activity of the heart including activity distorted by necrosis/ischemia in the cardiac tissue. The MCG is being developed for the rapid triage of patients presenting to the Emergency Department with acute ACS-like symptoms. The MCG may aid the rule-out of ACS at an earlier stage in the diagnostic pathway for patients with acute chest pain and may help prevent inappropriate discharge of patients with a missed myocardial infarction. The potential rule-out improvement utilizing three pre-test probability ACS scores versus the MCG algorithm will be assessed, as well as the prognostic accuracy for all-cause mortality and major adverse cardiac events at one week and three months post-ED presentation.

FY 2019 REVENUE: \$168,439

Kenneth Sherman, MD, PhD



Robert and Helen Gould
Endowed Professorship
in Internal Medicine
and Professor, Division
Director, Department
of Internal Medicine,
Division of Digestive
Diseases

The Hepatitis Research Group and its clinical study arm is focused on a variety of research trials related to the treatment of hepatitis C, hepatitis B, NAFLD/NASH and PSC, as well as modulation of hepatic fibrosis. As major enrollers in a national PCORI trial of hepatitis C treatments, we continue to follow subjects for long-term outcomes. The group is evaluating multiple target agents in fatty liver disease, and we are involved in studies related to the opioid epidemic and in ways to improve access to transplanted organs (livers and kidneys).

FY 2019 REVENUE: \$215,955

CLINICAL TRIALS REVENUE

CLINICAL TRIALS REVENUE FY 2019 *(continued)*

Dylan Steen, MD, MS



Assistant Professor,
Department of Internal
Medicine, Division of
Cardiovascular Health
and Disease

Dr. Steen serves as part of the leadership of a health research partnership between the University of Cincinnati, Cincinnati Children's Hospital Medical Center and the Kroger Company. Their first trial, "SuperWIN," is testing novel, dietary interventions delivered by Kroger dietitians within Kroger supermarkets. In the future, additional trials and observational studies will be performed under the partnership. He also works with pharmaceutical manufacturing companies on new drug development, risk prediction models and real-world analyses of treatment practice.

FY 2019 REVENUE: \$210,179

Michael Thomas, MD



Professor, Department
of Obstetrics and
Gynecology; Director,
Division of Reproductive
Endocrinology and
Infertility

Dr. Thomas' clinical research has focused on the development of new and innovate contraceptive devices. Dr. Thomas has been involved with contraceptive clinical trials at the University of Cincinnati College of Medicine since 1988. He became one of the first principal investigators in the National Institutes of Health's Contraceptive Clinical Trials Network (CCTN) when it was first awarded in 1995. Since that time, he has continued to competitively renew this contract. Over the years, the CCTN has studied intrauterine devices, emergency contraceptives, vaginal rings, patches and various pill formulations. In addition, Dr. Thomas has worked on clinical trials in the area of menopause, polycystic ovary syndrome, endometriosis and amenorrhea. He and his staff are currently collaborating with the Department of Environmental Health on the effect of environmental toxins on sperm, oocyte and embryo development.

FY 2019 REVENUE: \$328,097

Trisha Wise-Draper, MD, PhD



Associate Professor,
Department of Internal
Medicine, Division
of Hematology and
Oncology; Medical
Director, UCCI Clinical
Trials Office

Dr. Wise-Draper's clinical trial program largely focuses on novel immunotherapy combinations for head and neck cancer and other solid tumors. In addition, as part of the Experimental Therapeutics/Phase I Cancer Drug Program, she works with industry to execute first-in-man studies and newly developed targeted agents. Examples of novel agents include a spherical nucleic acid configuration of Toll-like receptor 9 agonist nucleotide to activate Th-1 responses, a STAT-3 antisense molecule to dampen a negative regulator of immune cells and a novel antibody binding ErbB3 to overcome cetuximab resistance.

FY 2019 REVENUE: \$1,141,876

CLINICAL TRIALS REVENUE FY 2019 *(continued)*

Steve Woodle, MD



William A. Altemeier
Professorship in
Research Surgery
and Professor,
Department of Surgery;
Director, Solid Organ
Transplantation;
Director, Israel Penn
Center for Transplant
Oncology

Dr. Woodle's research projects are part of the transplant clinical trials team, a collaborative effort with Rita Alloway, PharmD, Adele Rike, PharmD, and Simon Tremblay, PharmD, PhD. The transplant clinical research team is currently conducting clinical trials under five FDA INDs, in addition to several NIH-funded translational transplant projects in collaboration with the Cincinnati Children's Hospital Medical Center Division of Immunobiology investigators led by David Hildeman, PhD. The Belatacept Early Steroid Withdrawal Trial (BEST) is perhaps this year's most notable industry-funded, investigator-initiated accomplishment for the transplant clinical research team. The BEST trial was a multicenter, randomized, controlled trial of 315 de novo kidney transplant recipients testing two calcineurin inhibitor and corticosteroid-free regimens (belatacept-based) to a control arm including a calcineurin inhibitor (CNI) (tacrolimus) with a two-year follow-up that was completed in December 2018 and is in press in the American Journal of Transplantation. The BEST trial is a landmark achievement in transplantation as it is the first multicenter trial to achieve simultaneous CNI and steroid-free immunosuppression without excessive rejection risk. The transplant clinical and translational research teams also have cutting edge research efforts in antihumoral therapies that target plasma cells and in applying single cell genomics analyses to redefine acute rejection in transplantation.

FY 2019 REVENUE: \$428,259

Aram Zabeti, MD



Waddell Chair in Multiple
Sclerosis and Associate
Professor, Division
Director for Multiple
Sclerosis, Department
of Neurology and
Rehabilitation Medicine

Dr. Zabeti is a principal investigator of the CHORDS clinical trial, which is an open label study to evaluate the effectiveness and safety of ocrelizumab in patients with relapsing remitting multiple sclerosis who have had a suboptimal response to an adequate course of disease modifying treatment. He is also principal investigator on the ocrelizumab study, the latest FDA-approved therapy for multiple sclerosis and the first and only medication approved for both the relapsing remitting form as well as the primary progressive form of MS. Other studies include CONSONANCE, a phase 3b study about ocrelizumab but focusing on the progressive form of MS rather than replacing form (CHORDS study), and EXCHANGE, another phase 3b study looking into the safety and tolerability of the newly approved drug Siponimod (Mayzent®) switching from other MS therapies.

Dr. Zabeti and his team are on track to be first site in the U.S. for a study to evaluate the efficacy and safety of ravulizumab in adult patients with neuromyelitis optica spectrum disorder (NMOSD). This study is sponsored by Alexion Pharmaceuticals, Inc.

FY 2019 REVENUE: \$161,918

RESEARCH GRANTS

Other Faculty Grants FY 2019

INVESTIGATOR	DEPARTMENT	TITLE	SPONSOR
Bassam Abu Jawdeh, MD	Department of Internal Medicine, Division of Nephrology and Hypertension	Pathway Exploration and Analysis in Renal Lupus (PEARL) – Phase 2	National Institute of Arthritis, Musculoskeletal and Skin Disease
Bassam Abu Jawdeh, MD	Department of Internal Medicine, Division of Nephrology and Hypertension	APOL1 Studies in Kidney Transplantation Consortium Clinical Centers (ASK-CCC)	National Institute of Diabetes and Digestive and Kidney Disease
Opeolu Adeoye, MD	Department of Emergency Medicine	The MOST Consent Study: Patient-Driven Consent for a Multi-Center Adaptive Trial Adaptive Trial in Acute Schemic Stroke	The Greenwall Foundation
Senu Apewokin, MD	Department of Internal Medicine, Division of Infectious Diseases	HOPE in Action: A Clinical Trial of HIV-to-HIV Deceased Donor Kidney Transplantation	National Institute of Allergy and Infectious Diseases
George Babcock, PhD	Department of Surgery	Efficacy Study of a Test Compound in a Murine Infection Model	Rem Brands, Inc.
Kinsey Barhorst	Department of Neurosurgery	The Effects of Cortical Spreading Depolarizations on the Hippocampus	Neurosurgery Research and Education Foundation
Robert Baughman, MD	Department of Internal Medicine	Validation of a Sarcoidosis Diagnostic Score (SDS)	Foundation for Sarcoidosis Research
Robert Baughman, MD	Department of Internal Medicine	Foundation for Sarcoidosis Research Additional Network Funding	Foundation for Sarcoidosis Research
Jason Blackard, PhD	Department of Internal Medicine, Division of Digestive Diseases	Introduction to Molecular Phylogenetics and Virus Evolution	American Society for Microbiology
Jason Blackard, PhD	Department of Internal Medicine, Division of Digestive Diseases	Memorandum of Understanding-Instituto Nacional de Saude of Mozambique	Instituto Nacional de Saúde (INS) of Mozambique
Thomas Blom	Department of Psychiatry and Behavioral Neuroscience	Intergovernmental Personnel Act Agreement for Thomas Blom	Department of the Army Research, Development and Engineering Command
Kelly Jo Brunst, PhD	Department of Environmental and Public Health Sciences	Sequencing in the Classroom Curriculum Pilot Project	National Human Genome Research Institute
Katherine Burns, PhD	Department of Environmental and Public Health Sciences	The Environmental Contaminant di-(2-ethylhexyl)phthalate (DEHP) Induces Endometriosis	Endometriosis Foundation of America
Adam Cole	Department of Internal Medicine, Division of Pulmonary, Critical Care and Sleep Medicine	Impact of Menstrual Cycle Related Variation in Lung Function on Disease Progression in LAM	Lymphangioleiomyomatosis (LAM) Foundation
Melanie T. Cushion, PhD	Department of Internal Medicine, Division of Infectious Diseases	In Vitro Assessments of Antimicrobial Activity	National Institute of Allergy and Infectious Diseases
Xenia Davis	Department Pathology and Laboratory Medicine	The Role of Apolipoprotein A-V in Chylomicron Metabolism	National Institute of Diabetes and Digestive and Kidney Disease

RESEARCH GRANTS

OTHER FACULTY GRANTS FY 2019 *(continued)*

INVESTIGATOR	DEPARTMENT	TITLE	SPONSOR
Philip Diller, MD, PhD	Dean's Office	Area Health Education Centers Point of Service Maintenance and Enhancement	Health Resources and Services Administration
Sharron DiMario	Area Health Education Center	Clermont County Safe Communities Grant	Department of Transportation
Elizabeth Dragan, MD	Department of Neurology and Rehabilitation Medicine	TRaditional versus Early Aggressive Therapy for Multiple Sclerosis (TREAT-MS) Trial	Patient-Centered Outcomes Research Institute
Alberto Espay, MD	Department of Neurology and Rehabilitation	Non-Motor Fluctuation Scale: Clinimetric Study	Sunovion Pharmaceuticals Inc.
Maria Espinola, PsyD	Department of Psychiatry and Behavioral Neuroscience	Human Trafficking Project	Ohio Department of Mental Health and Addiction Services
Jacob Feldman	Department of Internal Medicine, Division of Cardiovascular Health and Disease	N'-terminal Truncated cMyBP-C Myocytes Influence on Length Dependent Activation	National Heart, Lung and Blood Institute
Gregory Fermann, MD	Department of Emergency Medicine	Longitudinal Assessment of Post-traumatic Syndromes	National Institute of Mental Health
Gregory Fermann, MD	Department of Emergency Medicine	Longitudinal Assessment of Post-traumatic Syndromes	National Institute of Mental Health
Carl Fichtenbaum, MD	Department of Internal Medicine, Division of Infectious Diseases	ACTG Executive Committee	National Institute of Allergy and Infectious Diseases
Carl Fichtenbaum, MD	Department of Internal Medicine, Division of Infectious Diseases	Leadership and Operations Center (LOC), AIDS Clinical Trials Group (ACTG) [UM1AI068636] Vice Co-Chair on A5332	National Institute of Allergy and Infectious Diseases
Carl Fichtenbaum, MD	Department of Internal Medicine, Division of Infectious Diseases	Leadership and Operations Center (LOC), AIDS Clinical Trials Group (ACTG) [UM1AI068636]	National Institute of Allergy and Infectious Diseases
Fred Finkelman, MD	Department of Internal Medicine, Division of Immunology, Allergy and Rheumatology	Regulation of Gene Expression in the Anaphylactic Pathway	National Institute of Allergy and Infectious Diseases
Fred Finkelman, MD	Department of Internal Medicine, Division of Immunology, Allergy and Rheumatology	Food Allergy and Goblet Cell Antigen Passages	National Institute of Allergy and Infectious Diseases
Brandon Foreman, MD	Department of Neurology and Rehabilitation Medicine	SCH:INT:Collaborative Research: Data-driven Stratification and Prognosis for Traumatic Brain Injury	National Science Foundation
Brandon Foreman, MD	Department of Neurology and Rehabilitation Medicine	New-Onset Refractory Status Epilepticus (NORSE)	Yale University
Caroline Freiermuth, MD	Department of Emergency Medicine	A Comparison of Individualized vs. Weight Based Protocols to Treat Vaso-occlusive Episodes in Sickle Cell Disease (COMPARE VOE)	National Heart, Lung and Blood Institute
Ryan Gobble, MD	Department of Surgery	Doxycycline-coated Silicone Implants Decrease Incidence of Bacterial Infection	Plastic Surgery Foundation
Lisa Green	Department of Pharmacology and Systems Physiology	Understanding Cardiovascular Disease Mechanisms	National Heart, Lung and Blood Institute

RESEARCH GRANTS

OTHER FACULTY GRANTS FY 2019 *(continued)*

INVESTIGATOR	DEPARTMENT	TITLE	SPONSOR
Jun-lin Guan, PhD	Department of Cancer Biology	Role of FIP200 in RIG-I-mediated innate immunity	National Institute of Allergy and Infectious Diseases
Nishant Gupta, MD	Department of Internal Medicine, Division of Pulmonary, Critical Care and Sleep Medicine	Clinical Efficacy of Antimicrobial Therapy Strategy Using Pragmatic Design in Idiopathic Pulmonary Fibrosis (CleanUP-IPF) trial	National Heart, Lung and Blood Institute
Nishant Gupta, MD	Department of Internal Medicine, Division of Pulmonary, Critical Care and Sleep Medicine	IL-31 Regulation of Immunopathology in Pulmonary Fibrosis	National Institute on Aging
Nishant Gupta, MD	Department of Internal Medicine, Division of Pulmonary, Critical Care and Sleep Medicine	Validating Quantitative Magnetic Resonance Imaging Biomarkers of Idiopathic Pulmonary Fibrosis	National Heart, Lung and Blood Institute
Nishant Gupta, MD	Department of Internal Medicine, Division of Pulmonary, Critical Care and Sleep Medicine	Study of Co-trimoxazole and Proton Pump Inhibition Using Pragmatic Design in Idiopathic Pulmonary Fibrosis – CleanUP-IPF	Joan & Sanford I. Weill Medical College of Cornell University
Nishant Gupta, MD	Department of Internal Medicine, Division of Pulmonary, Critical Care and Sleep Medicine	Improving Intensive Care Patient Safety Through EHR-based Algorithms	National Library of Medicine
James Heubi, MD	Center for Clinical and Translational Science and Training	Short-Term Institutional Research Training Grant	National Institute of Diabetes and Digestive and Kidney Disease
Russell Hoffman, DNP	Department of Internal Medicine, Division of Cardiovascular Health and Disease	Validate QOLVAD: Validation of the Quality of Life with a Left Ventricular Assist Device (QOLVAD) Questionnaire	Minneapolis Heart Institute Foundation
Loryn Holokai	Department of Molecular Genetics, Biochemistry and Microbiology	Molecular Mechanisms of Premalignancy in Response to Helicobacter pylori Infection	National Institute of Diabetes and Digestive and Kidney Disease
Shouxiong Huang, PhD	Department of Environmental and Public Health Sciences	Purification and Identification of Mycobacterial Metabolites to Activate Mucosal-associated Invariant T cells	American Lung Association
Brian Hunt	Department of Cancer Biology	Targeting Glycolytic Metabolism in RON-driven Breast Cancer	National Cancer Institute
Maria Indihar, MD	Department of Internal Medicine, Division of Pulmonary, Critical Care and Sleep Medicine	Improving Research Participation at UC Adult Center	Cystic Fibrosis Foundation
Newsha Jahanpanah	Department of Internal Medicine, Division of Cardiovascular Health and Disease	Acoustical Society - Newsha Jahanpanah (student for Dr. Haworth)	Acoustical Society of America
Tianlun Jiang	Department of Internal Medicine, Division of Infectious Diseases	Antifungal Immunity Controlled by Commensal Intestinal Bacteria	National Institute of Diabetes and Digestive and Kidney Disease
Winston Kao, PhD	Department of Ophthalmology	Gene and Cell Therapy of Ocular Surface Diseases	Ohio Lions Eye Research Foundation

RESEARCH GRANTS

OTHER FACULTY GRANTS FY 2019 (continued)

INVESTIGATOR	DEPARTMENT	TITLE	SPONSOR
Winston Kao, PhD	Department of Ophthalmology	"On-demand" Long-Term Drug Delivery for Age-Related Macular Degeneration Treatment	Ohio Lions Eye Research Foundation
Winston Kao, PhD	Department of Ophthalmology	CRISPR Gene Editing for Lysosomal Storage Diseases: Mucopolysaccharidosis VII (MPS VII)	The Cincinnati Eye Institute Foundation
Winston Kao, PhD	Department of Ophthalmology	Effect of Extracellular Matrix Components on Umbilical Cord derived Mesenchymal Stem Cells (UMSCs)	Ohio Lions Eye Research Foundation
Elizabeth Kelly, MD	Department of Obstetrics and Gynecology	Cradle Cincinnati	Health Resources and Services Administration
Todd Kelley, MD	Department of Orthopaedic Surgery	Assessing Effects of EMR on Physician Well-Being using Smartphone Sensing	Orthopaedic Research and Education Foundation
Pooja Khatri, MD	Department of Neurology and Rehabilitation Medicine	Early Feasibility Clinical Study of the VitalFlow Stimulator, an Emergency Treatment for Ischemic Stroke	National Institute of Neurological Disorders and Stroke
Pooja Khatri, MD	Department of Neurology and Rehabilitation Medicine	Early Feasibility Clinical Study of the VitalFlow Stimulator, an Emergency Treatment for Ischemic Stroke	National Institute of Neurological Disorders and Stroke
Chih-Wei Ko, PhD	Department Pathology and Laboratory Medicine	Apolipoprotein A-IV is Important in the Modulation of Obesity and Glucose Tolerance in 129/Svj Mice	American Heart Association - National Chapter
Evangelia Kranias, PhD	Department of Pharmacology and Systems Physiology	Characterization of the Humanized Mouse Model with R14del-Phospholamban	Netherlands Heart Institute
Robert Krikorian, PhD	Department of Psychiatry and Behavioral Neuroscience	Biosignatures of Blueberry Metabolites are Associated with Neurological and Metabolic Benefits	U.S. Highbush Blueberry Council
Bryan Krueger	Department of Neurosurgery	Cadaveric Feasibility Study for Endoscopic Endonasal Occipitocervical Fusion	AOSpine North America
Michael Lamba, PhD	Department of Radiation Oncology	Varian	Varian, Inc.
Agnes Luo, PhD	Department of Molecular Genetics, Biochemistry and Microbiology	Inhibition of Drp1 Using a Selective Drp1 Peptide Inhibitor for Treatment of Alpha-synuclein-associated Parkinson's Disease	Local Initiative for Excellence (L.I.F.E.)
Agnes Luo, PhD	Department of Molecular Genetics, Biochemistry and Microbiology	Repositioning Gliptins for Parkinson's Disease Treatment	National Institute of Neurological Disorders and Stroke
Michael Lyons, MD	Department of Emergency Medicine	The Determine Effective Testing in Emergency Departments and Care Coordination on Treatment Outcomes (DETECT) for HCV Trial	National Institute on Drug Abuse
Rajat Madan, MD, PhD	Department of Internal Medicine, Division of Infectious Diseases	Impact of Obesity-associated Microbiome and Bile Acid Metabolites in Regulating Clostridium Difficile Lifecycle	Cincinnati Children's Hospital Medical Center
Christopher Marett, MD	Department of Psychiatry and Behavioral Neuroscience	ODMHAS Educational Grant to UC Forensic Psychiatry Fellowship	Ohio Department of Mental Health and Addiction Services

RESEARCH GRANTS

OTHER FACULTY GRANTS FY 2019 *(continued)*

INVESTIGATOR	DEPARTMENT	TITLE	SPONSOR
Francis McCormack, MD	Department of Internal Medicine, Division of Pulmonary, Critical Care and Sleep Medicine	Single Cell RNA Sequencing in LAM	Lymphangioliomyomatosis (LAM) Foundation
Francis McCormack, MD	Department of Internal Medicine, Division of Pulmonary, Critical Care and Sleep Medicine	Prevention of Preterm Birth Using the Collectin Surfactant Protein A (SP-A)	National Institute of Child Health and Human Development
Jason McMullan, MD	Department of Emergency Medicine	Paramedic Attitudes to Obtaining Informed Consent for Prehospital Research Trials	Emergency Medicine Foundation
Jason McMullan, MD	Department of Emergency Medicine	ESETT Pharmacokinetic-Pharmacodynamic (ESETT-PK) Study	National Institute of Neurological Disorders and Stroke
Katherine McMurray, PhD	Department of Pharmacology and Systems Physiology	Mechanisms of Panic and PTSD Vulnerability	National Institute of Mental Health
Mario Medvedovic, PhD	Department of Environmental and Public Health Sciences	Building Toxlcogenomics Database for Occupational Health Risk Assessment of Engineered Nanomaterials	Centers for Disease Control and Prevention
Teresa Meier, MD	Department of Radiation Oncology	Pragmatic Randomized Trial of Proton vs. Photon Therapy for Patients with Non-Metastatic Breast Cancer Receiving Comprehensive Nodal Radiation: A Radiotherapy Comparative Effectiveness (RADCOMP) Trial	Patient-Centered Outcomes Research Institute
Katelyn Melgar	Department of Internal Medicine, Division of Infectious Diseases	Novel Mechanisms and Therapeutic Strategies of Refractory Leukemia F31	National Cancer Institute
Jaroslav Meller, PhD	Department of Environmental and Public Health Sciences	Genetic Basis of Virus Induced Biliary Atresia	National Institute of Diabetes and Digestive and Kidney Disease
Keila Miles	Department of Psychiatry and Behavioral Neuroscience	The Impact of Ketosis on Creatine Transporter Deficiency	National Institute of Child Health and Human Development
William Miller, PhD	Department of Molecular Genetics, Biochemistry and Microbiology	Gene Regulation as a Foundation for Autoimmune Disease Prevention	National Institute of Allergy and Infectious Diseases
Rachel Moloney, PhD	Department of Pharmacology and Systems Physiology	Understanding the Role of the IL-BST Neurocircuit in Contextual Fear; a New Insight into Glucocorticoid Signaling	Brain & Behavior Research Foundation
Marshall Montrose, PhD	Department of Pharmacology and Systems Physiology	Personalized Cystic Fibrosis Therapy and Research Center	National Institute of Diabetes and Digestive and Kidney Disease
Ardythe Morrow, PhD	Department of Environmental and Public Health Sciences	Dosing and Pilot Efficacy of 2'-fucosyllactose in Inflammatory Bowel Disease	National Institute of Child Health and Human Development
Robert Neel, MD	Department of Neurology and Rehabilitation Medicine	A Population-Based Ohio ALS Repository and a Case-Control Study of ALS Risk Factors in Ohio	Centers for Disease Control and Prevention
Madeline Rae Niederkorn	Department of Cancer Biology	Regulators of Ubiquitin Signaling in Malignant Hematopoiesis	National Cancer Institute

RESEARCH GRANTS

OTHER FACULTY GRANTS FY 2019 *(continued)*

INVESTIGATOR	DEPARTMENT	TITLE	SPONSOR
Christine O'Dea, MD	Department of Family and Community Medicine	Engaging Language Professionals for Patient-Centered Outcomes Research with Latino Communities	Patient-Centered Outcomes Research Institute
Phillip Owens, PhD	Department of Internal Medicine, Division of Cardiovascular Health and Disease	Determine the Mechanism by Which Rivaroxaban Reduces Atherosclerosis in LDLR ^{-/-} Mice	Bayer AG
Joseph Palascak, MD	Department of Internal Medicine, Division of Hematology Oncology	2018-2019 Maternal and Child Health Bureau (MCHB) Contract	Maternal and Child Health Bureau
Joseph Palascak, MD	Department of Internal Medicine, Division of Hematology Oncology	A Natural History Cohort Study of the Safety, Effectiveness, and Practice of Treatment for People with Hemophilia (ATHN 7)	Genentech, Inc.
Joseph Palascak, MD	Department of Internal Medicine, Division of Hematology Oncology	CDC18-19-HTC434	Centers for Disease Control and Prevention
Joseph Palascak, MD	Department of Internal Medicine, Division of Hematology Oncology	Hepatitis C Virus (HCV) Outcomes After Treatment with DAA in Patients with Bleeding Disorders (ATHN 5: HCV Outcomes Study)	Hemophilia of Georgia
Sameer Patel, MD	Department of Surgery	Kv1.3 in Pancreas Cancer	Central Surgical Association Foundation
Shailendra Patel, PhD	Department of Internal Medicine, Division of Endocrinology, Diabetes and Metabolism	Role of Cholesterol Biosynthesis in Development	National Institute of Child Health and Human Development
Xiaoyang Qi, PhD	Department of Internal Medicine, Division of Hematology Oncology	Preclinical Studies of BXQ-350 Therapy for DIPG	Bexion Pharmaceuticals
John Reichard, PhD	Department of Environmental and Public Health Sciences	Intergovernmental Personnel Act Agreement for John Reichard	Centers for Disease Control and Prevention
Carol Rice, PhD	Department of Environmental and Public Health Sciences	Multi Union, National Ebola and Infectious Disease Awareness Training and Trainee Development	National Institute of Environmental Health Sciences
Carol Rice, PhD	Department of Environmental and Public Health Sciences	Hazardous Materials Worker Health and Safety Training (U45) (HDPTP)	National Institute of Environmental Health Sciences
Carol Rice, PhD	Department of Environmental and Public Health Sciences	Worker Health and Safety Training Cooperative Agreement DOE	National Institute of Environmental Health Sciences
Carol Rice, PhD	Department of Environmental and Public Health Sciences	Hazardous Materials Worker Health and Safety Training (U45) (HWWT)	National Institute of Environmental Health Sciences
Hannah Russell	Department of Internal Medicine, Division of Cardiovascular Health and Disease	Fibrin(ogen) in Abdominal Aortic Aneurysm Pathogenesis	National Heart, Lung and Blood Institute
Sakthivel Sadayappan, PhD	Department of Internal Medicine, Division of Cardiovascular Health and Disease	Amgen - Master Visiting Post Doctoral Scientist Program	Amgen, Inc

RESEARCH GRANTS

OTHER FACULTY GRANTS FY 2019 *(continued)*

INVESTIGATOR	DEPARTMENT	TITLE	SPONSOR
Sakthivel Sadayappan, PhD	Department of Internal Medicine, Division of Cardiovascular Health and Disease	American Heart Association - Summer Undergraduate Research Fellowship (AHA-SURF)	American Heart Association - National Chapter
Henry Claude Sagi, MD	Department of Orthopaedic Surgery	Assessing Coagulopathy in Trauma Patients with Pelvic and Acetabular Fractures	Foundation for Orthopedic Trauma
Atsuo Sasaki, PhD	Department of Internal Medicine, Division of Hematology & Oncology	Targeting the Metabolic Vulnerability of GTP-metabolism in IDH Mutated Glioma	Ohio Cancer Research Associates
Atsuo Sasaki, PhD	Department of Internal Medicine, Division of Hematology & Oncology	Sasaki B* Cured	B*Cured
Jo El Schultz, PhD	Department of Pharmacology and Systems Physiology	ASPET SURF Institutional Training Program 2019 - 2021	American Society for Pharmacology and Experimental Therapeutics
Kim Seroogy, PhD	Department of Neurology and Rehabilitation Medicine	GBA1 Defects Cause a C5a-C5aR1-induced Neurodegeneration in Parkinson's Disease	Michael J. Fox Foundation for Parkinson's Research
Silvi Shah, MD	Department of Internal Medicine, Division of Nephrology and Hypertension	DCI Reserve Funds	Dialysis Clinic, Inc.
Kenneth Sherman, MD, PhD	Department of Internal Medicine, Division of Digestive Diseases	Immune Correlates of Long-term Success with DAA Therapy in HCV/HIV Infected People Who Inject Drugs	National Institute on Drug Abuse
Kenneth Sherman, MD, PhD	Department of Internal Medicine, Division of Digestive Diseases	ACTG Protocol Chair Salary Support - Leadership and Operations Center (LOC), AIDS Clinical Trials Group (ACTG)	National Institute of Allergy and Infectious Diseases
Kenneth Sherman, MD, PhD	Department of Internal Medicine, Division of Digestive Diseases	A Randomized, Placebo-controlled Pilot Study of Sulfasalazine for the Treatment of Primary Sclerosing Cholangitis (SHIP)	Brigham and Women's Hospital, Inc.
Alan George Smulian, MD	Department of Internal Medicine, Division of Infectious Diseases	SAATELLITE - A Phase 2 Randomized, Double-blind, Placebo-controlled, Single-dose, Dose-ranging Study of the Efficacy and Safety of MED14893, a Human Monoclonal Antibody Against Staphylococcus aureus A	National Institute of Allergy and Infectious Diseases
Kavitha Subramanian, PhD	Department of Internal Medicine, Division of Infectious Diseases	Metallothionein 3 Shapes the Polarization and Metabolism of M2 Macrophages	American Heart Association - National Chapter
Camille Sullivan	Department of Cancer Biology	Macrophage Ron Signaling Regulates the Antitumor Immune Response in Prostate Cancer	National Cancer Institute
Charuhas Thakar, MD	Department of Internal Medicine, Division of Nephrology and Hypertension	Symposium and ASN Alumni Event	Dialysis Clinic, Inc.
Thomas Thompson, PhD	Department of Molecular Genetics, Biochemistry and Microbiology	A Pipeline to Screen and Validate MISR2 Agonists as Contraceptives that Inhibit Primordial Follicles	Bill & Melinda Gates Foundation

RESEARCH GRANTS

OTHER FACULTY GRANTS FY 2019 *(continued)*

INVESTIGATOR	DEPARTMENT	TITLE	SPONSOR
Jared Travers	Department of Internal Medicine, Division of Infectious Diseases	Role of Nuclear IL-33 in Mucosal Inflammation	National Institute of Diabetes and Digestive and Kidney Disease
Latia Tucker	Department of Pharmacology and Systems Physiology	Understanding Cardiovascular Disease Mechanisms - Billing agreement for Latia Tucker	National Heart, Lung and Blood Institute
Chenran Wang, PhD	Department of Cancer Biology	Administrative Supplement to Metabolic Alterations in Age-associated Dendritic Cell Function	National Institute on Aging
Alison Weiss, PhD	Department of Molecular Genetics, Biochemistry and Microbiology	Epigenomic Control of Antimicrobial Immunity in the Intestine	National Institute of Diabetes and Digestive and Kidney Disease
Steve Woodle, MD	Department of Surgery	Single Cell Analysis of Transplant Rejection	National Institute of Allergy and Infectious Diseases
Danny Wu, PhD	Department of Biomedical Informatics	Developing and Evaluating a Machine-Learning Algorithm to Detect Pediatric Weight Entry Errors	Association for the Advancement of Medical Instrumentation
Jane Yu, PhD	Department of Internal Medicine, Division of Pulmonary, Critical Care and Sleep Medicine	Single-Cell-RNA Sequencing for Identifying Differential Responses to Sirolimus Therapy in LAM	Lymphangioleiomyomatosis (LAM) Foundation
Jane Yu, PhD	Department of Internal Medicine, Division of Pulmonary, Critical Care and Sleep Medicine	Quantification of Plasma Levels of Sphingolipids and Ceramides in Patients with TSC	Tuberous Sclerosis Alliance
Yong Yuan, PhD	Department of Ophthalmology	New Understanding from Mouse Lines with Features of Pseudoexfoliation Syndrome	The Glaucoma Foundation

The background features a complex, abstract design of overlapping, swirling bands. The left side is dominated by light gray and white tones, while the right side transitions into a vibrant, deep red. The overall effect is dynamic and modern, with a sense of movement and depth.

COLLEGE PROFILE



FACULTY

Tenure/Tenure Track	361
Clinical Track	1,275
Research Track	181
Field Service Track	45
Educator Track	30
Volunteer/Adjunct/Visiting	446

ALL FUNDS OPERATING REVENUE* FY 2018 (IN MILLIONS)

Clinical Practice	\$652.7
Federal/Non-Federal Research	\$322.4
Hospitals	\$520.0
State Appropriations	\$44.6
Gift and Endowment Income	\$28.5
Other Income	\$214.9
Tuition	\$39.3

TOTAL OPERATING REVENUE **\$1,822.5**

* From LCME 1-A

COLLEGE OF MEDICINE FACILITIES

Buildings	16
Research Space (net square feet)	420,951
Total Space (gross square feet)	2.31 million

DEVELOPMENT

Total Dollars Raised (fund year 2019)	\$27,494,550
College of Medicine Endowments (market value as of 6/30/2019)	\$505,002,846





RECENT RESEARCH BREAKTHROUGHS

- Identifying two genes that convey a risk of heart failure 10 times greater than that faced by people who do not carry the gene and that by far the greater risk was in African-Americans.
- Demonstrating for the first time that a response to a drug can be predicted from an individual's own DNA using genomic markers called haplotypes.
- Identifying a viral protein—VP16—as the molecular key that prompts herpes simplex virus to exit latency and cause recurrent disease.
- Determining that the drug sirolimus could stabilize lung function in people with Lymphangioleiomyomatosis, a rare, life-threatening lung disease mostly affecting women.
- Identifying a genetic variant in a calcium-binding protein—histidine-rich calcium binding protein—that can be linked to heart rhythm dysfunction.
- Determining that the circulation of cholesterol is regulated in the brain by the hunger-signaling hormone ghrelin, pointing to a new potential target for the pharmacologic control of cholesterol levels.
- Discovering SapC-DOPS, the combination of a lysosomal protein saposin C (SapC) and a phospholipid known as dioleoylphosphatidylserine (DOPS), that assembled into tiny cavities, or nanovesicles, can target and kill many forms of cancer cells.



COLLEGE OF MEDICINE LEADERSHIP

Andrew T. Filak Jr., MD

Senior Vice President for Health Affairs and Dean

Melanie T. Cushion, PhD

Senior Associate Dean for Research

Philip M. Diller, MD, PhD

Senior Associate Dean for Educational Affairs

Brett M. Kissela, MD

Senior Associate Dean for Clinical Research

Alex B. Lentsch, PhD

Senior Associate Dean for Faculty Affairs and Development

Lori A. Mackey

Senior Associate Dean for Operations and Finance
Chief Financial Officer

Myles L. Pensak, MD

Senior Associate Dean for Clinical Programs

Notice of Nondiscrimination

The University of Cincinnati does not discriminate on the basis of disability, race, color, religion, national origin, ancestry, medical condition, genetic information, marital status, sex, age, sexual orientation, veteran status or gender identity and expression in its programs and activities.

The university does not tolerate discrimination, harassment or retaliation on these bases and takes steps to ensure that students, employees and third parties are not subject to a hostile environment in university programs or activities.

The university responds promptly and effectively to allegations of discrimination, harassment and retaliation. It promptly conducts investigations and takes appropriate action, including disciplinary action, against individuals found to have violated its policies, as well as provides appropriate remedies to complainants and the campus community. The university takes immediate action to end a hostile environment if one has been created, prevent its recurrence, and remedy the effects of any hostile environment on affected members of the campus community.

UC is committed to the ideal of universal Web accessibility and strives to provide an accessible Web presence that enables all university community members and visitors full access to information provided on its websites. Every effort has been made to make these websites as accessible as possible in accordance with the applicable guidelines.

The following person has been designated to handle inquiries regarding discrimination, harassment, or retaliation based on disability, race, color, religion, national origin, ancestry, medical condition, genetic information, marital status, age and veteran status:

Tamie Grunow
Senior Associate Vice President & Chief Human Resources Officer
Section 504, ADA, Age Act Coordinator
340 University Hall, 51 Goodman Drive
Cincinnati, OH 45221-0039
513-556-6381; grunowtl@ucmail.uc.edu

The following person has been designated to handle inquiries regarding discrimination, harassment or retaliation based on sex, sexual orientation, gender and gender identity or expression:

Karla Phillips
Interim Title IX Coordinator
3115 Edwards 1, 45 Corry Blvd.
Cincinnati, OH 45221
513-556-3349; karla.phillips@uc.edu



University of Cincinnati College of Medicine

3230 Eden Avenue

PO Box 670555

Cincinnati, OH 45267-0555

med.uc.edu



250 mL

KIMAX®
KIMBLE

APPROXIMATE VOLUMES

250 mL

NO. 26550
STOPPER NO. 8