Midwestern University

Tomorrow's Healthcare Team

Research: Impacting and Expanding Knowledge

2022

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Message from the President

Dear Faculty and Friends of Midwestern University,

In 2015, Midwestern University launched its One Health philosophy with clear objectives to better integrate our commitment to interprofessional education, which we accomplish by engaging our research, faculty, staff, and students in cross-program collaborations that focus on improving the patient care experience, using interdisciplinary health care teams to address an individual's needs.

Today, evidence of this important initiative can be witnessed in the classrooms, the laboratories, and in many community outreach programs that are shared with students across the campuses. Evidence of our philosophy can be seen in the evolution of the Core Facilities that have encouraged and enabled faculty to jointly share in the many research activities taking place today. As highlighted in this report, the Core Facility expansion on the Downers Grove campus, as an example, has doubled over the past four years and in fiscal year 2022, the Facility was used 2100 times with 130 different researchers.

Research is an important component in our One Health philosophy. We want to recruit and educate students who have a deep commitment to life-long learning and scientific inquiry. What better way to stimulate this commitment than to work with a faculty member who seeks grants, looks for innovative ways to involve students in exploring new concepts, and ideas to improve the health and well-being of their future patients. Fortunately, many of these faculty are here at Midwestern University.

I congratulate all the faculty honored in this year's Annual Research Report. Their work and commitment are a testament to the valued presence of One Health at Midwestern University.

Sincerely,

Kathleen H. Goeppinger, Ph.D.

Kathleen H. Goeppinger, Ph.D.
President and Chief Executive Officer, Midwestern University

Dear MWU Community,

Thank you for taking the time to learn about the expanding breadth of research accomplishments by some of our outstanding faculty at Midwestern University. These research booklets highlight faculty research projects that have been funded at greater than $400,000 and include all research which secured $100,000 or more of extramural funds. In the few years that we've been doing these booklets, you may have noted that our funded grants exceeding $400,000 have doubled from seven in 2020 to 14 in 2022.

While it's difficult to pinpoint what propelled this recent increase in larger grants, I think there are several factors that may have contributed. First and foremost, I strongly believe that the ingenuity of faculty who strive to be life-long learners is a major driving factor. To complement the strong hiring practices of our Colleges, we've tried to surround our faculty with the appropriate resources to accomplish basic, translational, and clinical research. In December of 2019, MWU engaged Hanover Research® to assist faculty as consultants in reviewing extramural grants when desired by our faculty. Our latest round of survey responses demonstrates that 87% of faculty rated Hanover® project feedback as either highly satisfied or satisfied with the support they received.

Another area of enhanced support in recent years has been the establishment of Core Facilities on each campus. Recognizing that some researchers have common needs for highly specialized pieces of equipment, MWU has invested $2.73 million in such equipment across both campuses, in addition to having a full-time dedicated staff member on each campus. Be sure to check out our page dedicated to our Downers Grove Core Facility in this booklet.

Other areas of research enhancement over the years have been to ensure a consistent flow of intramural funding, where we typically offer approximately a half million dollars in competitive funds, enhance our Animal Resources department across both campuses, and offer statistical support through a bioclinical statistician. Not only can this latter resource help ensure that appropriate statistical methods are applied, but they can also assist with expertise in performing advanced statistical methods and graphing results for more complex projects.

As always, my sincere thanks go out to all those working in the research labs to directly support scholarly activity, in addition to those in our research support departments who directly and indirectly provide support through our Core Facilities, Clinical Research Services, Animal Resources, and our Office of Research and Sponsored Programs. Finally, thank you to all the faculty, staff and student researchers who demonstrate unwavering commitment to elevating the standard of research excellence we all strive to attain at Midwestern University.

Sincerely,

James M. Woods, Ph.D.
Assistant Vice President of Research

Research: Impacting and Expanding Knowledge

Midwestern University
Tomorrow's Healthcare Team

Midwestern University's Commitment to Research

MWU

$34.2 Million

Commitment to Research Activities*

in Fiscal Year 2022

$2.1 Million

in Extramural Funding Expenditures

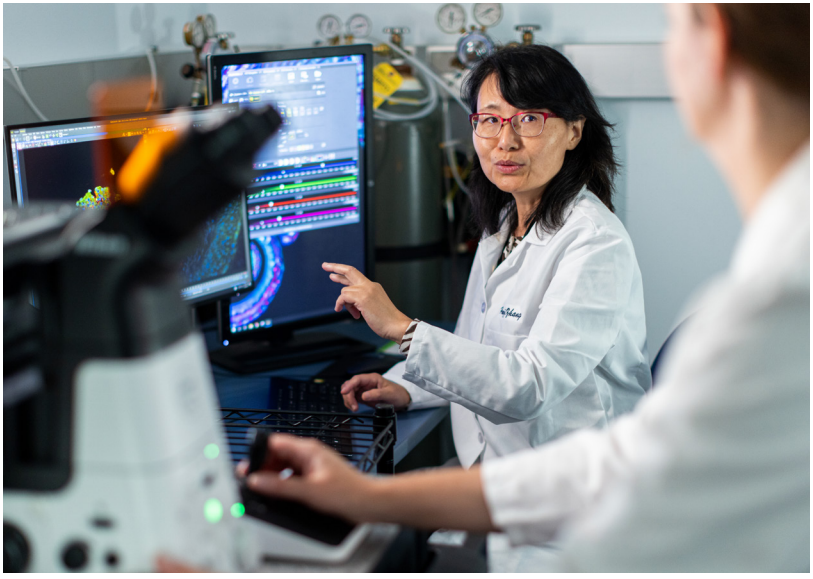
in Fiscal Year 2022

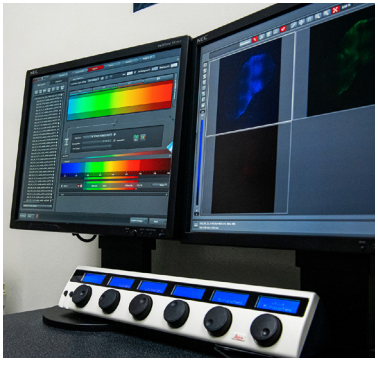
113 Student Research Fellowships

funded at $497,000

in Fiscal Year 2022

**Includes direct and indirect costs. For 2022, this equates to 7.6% of the University budget.*





Principal Investigators and Projects Awarded Grants Exceeding $400,000:

Dr. N. Jim Rhodes
College of Pharmacy

■ **Title:** Systems-based pharmacologic modelling to elucidate beta-lactam clinical pharmacodynamics and define optimal dosing regimens in severe pneumonia[Δ]

Dr. Chad VanDenBerg
Clinical Research Services

■ **Title:** Multiplexed In-solution Serological Tests for SARS-CoV-2, Human Coronaviruses and Other Respiratory Pathogens[†]

Dr. Carrie Veilleux
College of Graduate Studies

■ **Title:** Grasping our evolutionary origins: Unraveling the anatomical and molecular adaptations of primate touch[*]

Dr. Kristina Martinez-Guryn
College of Graduate Studies

■ **Title:** The role of the gut mycobiota in regulating host lipid absorption and obesity[Δ]

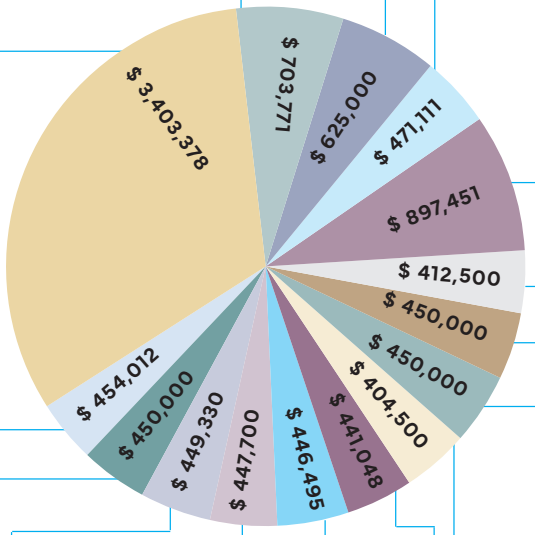
Dr. Marc Scheetz
College of Pharmacy

■ **Title:** Assessment of MODS and Personalized Exposures of Antibiotics[Δ]

■ **Title:** Quantifying Renal Injury Among the Most Commonly Used Antibiotic Combinations[Δ]

Dr. Brina Lopez
College of Veterinary Medicine

■ **Title**: Host-Pathogen Interaction During Cryptosporidiosis - A Model for Disease Pathogenesis and Discovery of Effective Therapeutics[§]



Dr. Minsub Shim
College of Graduate Studies

■ **Title:** Cyclooxygenase-2 Signaling in Cell Senescence and its Role in Chemotherapy-Induced Long-term Adverse Sequelae[Δ]

Dr. Chongwoo Kim
College of Graduate Studies

■ **Title:** Molecular Basis of the Selective Assembly of Functionally Distinct PRC1[Δ]

Dr. Weidang Li
College of Veterinary Medicine

■ **Title:** Mechanism(s) of CD8 T Cell-mediated Chlamydia-induced Reproductive Pathology[Δ]

Dr. Renier Velez-Cruz
College of Graduate Studies

■ **Title:** The role of SWI/SNF chromatin remodelers in homologous recombination and genome stability[*]

Dr. Ann Revill
College of Graduate Studies

■ **Title:** Cholinergic Modulation of XII Motoneurons and XII Premotoneurons[Δ]

Dr. John Vandenbrooks
College of Graduate Studies

■ **Title:** Elucidating the Role of Rhipicephalus sanguineus (the Brown Dog Tick) as a Vector for Rocky Mountain Spotted Fever (RMSF) Transmission in Arizona[#]

Dr. Mitra Esfandiarei
College of Graduate Studies

■ **Title:** Targeting Endothelial Dysfunction in a Genetic Mouse Model of Aortic Aneurysm: Implications for Prevention and Therapy[Δ]

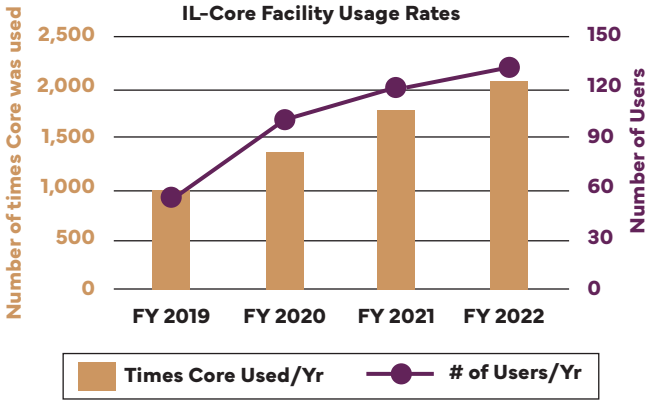
Dr. Tobias Riede
College of Graduate Studies

■ **Title:** The Influence of Vocal Loading Upon the Healing of Experimental Vocal Fold Injury[Δ]

Funding sources: *[Δ]National Institute of Health Awards; [§]USDA National Institute of Food and Agriculture; [#]Arizona Biomedical Research Center; [†]Leidos/ASU/NIH; *National Science Foundation*

Midwestern University Grants Funded from $100,000 – $400,000

Investigator/s	College(s)	Title	Total	Agency
Baab, K.	**CGS**	Testing Adaptive Hypotheses of Plio-Pleistocene Hominin Craniofacial Evolution	**$330,021**	National Science Foundation
Jadavji, N.	**CGS**	Identification of Developmental Factors Involved in Ischemic Stroke Outcomes in Adulthood and Old Age	**$152,735**	American Heart Association
O'Neill, M.	**CGS**	Collaborative Research: The Effects of Musculoskeletal Design on Bipedal Walking and Running Performance in Humans, Chimpanzees and Early Hominins	**$239,935**	National Science Foundation
Rhodes, N. J.	**CPDG**	Development and validation of CRRT-specific beta-lactam population pharmacokinetic models to guide treatment for patients with hospital-acquired pneumonia	**$399,991**	Food and Drug Administration
Riede, T.	**CGS**	Collaborative Research: Evolution of Long-distance Communication in Vocal Rodents	**$193,774**	National Science Foundation
Riede, T.	**CGS**	The Role of Vocal Ligament in Fundamental Frequency and Adduction Control	**$192,212**	NIH-R01 Subcontract from the University of Utah
Townsend, K.E.B.	**CGS**	Collaborative Research: After the Bridgerian Crash - An Integrated Analysis of Mammalian Paleocommunities and Paleoecologies During the Middle Eocene	**$239,596**	National Science Foundation
Elbayoumi, T. and Yao, M.	**COP**	Atrial Fibrillation Strategically Focused Research Network: Atrial Substrate in Atrial Fibrillation and AF-associated Brain Disease	**$126,979**	American Heart Association Subcontract from Northwestern University
Vasudevan, B.	**AZCOPT**	A Multi-center, Double-masked, Randomized, Placebo-controlled, Phase 3 Study of the Safety and Efficacy of Atropine 0.1% and 0.01% Ophthalmic Solutions Administered with a Microdose Dispenser for the Reduction of Pediatric Myopia Progression (The CHAPERONE Study)	**$313,000**	Eyenovia
Vasudevan, B.	**AZCOPT**	Effect of LipiFlow on Ocular Surface Disease Management with Cataract Surgery	**$273,000**	Johnson & Johnson Surgical Services
Rice, S.	**CCO**	A Multi-center, Double-masked, Randomized, Placebo-controlled, Phase 3 Study of the Safety and Efficacy of Atropine 0.1% and 0.01% Ophthalmic Solutions Administered with a Microdose Dispenser for the Reduction of Pediatric Myopia Progression (The CHAPERONE Study)	**$313,000**	Eyenovia



IL-Core Facility Expands to Serve More Midwestern Researchers

The Midwestern University IL-Core Facility houses state-of-the-art instrumentation that is available to any Midwestern student, staff, or faculty researcher. This laboratory space is located in Science Hall and features more than 30 pieces of equipment that our researchers have used to conduct a wide range of impactful scientific experiments. In addition to serving Midwestern students, the facility also hosts nearby elementary and high school students for well-received STEM (Science, Technology, Engineering, Math) educational outreach events throughout the year.

Since opening in January 2018, the day-to-day activities of the IL-Core Facility have been overseen by Ellen Kohlmeir, Ph.D., Core Facility Manager. In this role, Dr. Kohlmeir maintains the equipment and provides personalized, expert training with any instrument for all faculty, staff, and students. As the IL-Core Facility has grown and evolved from initially having only six instruments, Dr. Kohlmeir's role has also greatly expanded and evolved, which led to her promotion to the position of Core Facility Manager in 2022. Thanks in large part to her efforts, the usage rates of the IL-Core Facility have more than doubled over the past four years. In fiscal year 2022, the IL-Core Facility was used nearly 2,100 times by over 130 different researchers – with half of those researchers being Midwestern University students.

For more information about the IL-Core Facility, visitt:
https://www.midwestern.edu/research/core-research-facility-downers-grove

BioClinical Statistics consulting is an important service offered by the Office of Research and Sponsored Programs (ORSP). This collaborative research unit provides comprehensive statistical support to Midwestern University researchers. Its mission is to enhance statistical knowledge and the critical biostatistical methodological and analytic needs of any research project at the University. Researchers benefit from statistical consulting and data management that is available from the beginning of a research project through manuscript preparation.

Charlotte Bolch, Ph.D., is the Manager of BioClinical Statistics and an assistant adjunct professor in the Master of Public Health Program at Midwestern University.

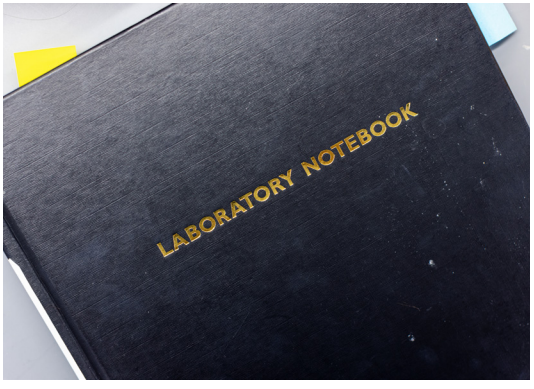
Midwestern University Researchers Benefit from BioClinical Statistics

Charlotte Bolch, Ph.D., is the Manager of BioClinical Statistics and an assistant adjunct professor in the Master of Public Health Program at Midwestern University. In her role, Dr. Bolch provides guidance about research design and methods for proposed research projects as well as sample size calculations and assistance with the statistical analysis methods sections of grant, Institutional Review Board (IRB), and Institutional Animal Care and Use Committee (IACUC) applications. She is also available to lead or advise the statistical analysis and interpretation of study data, along with providing writing assistance for the methods/results sections of manuscripts for publication.

Dr. Bolch completed her doctoral degree in Statistics Education at the University of Florida and a Master of Science degree in Biostatistics at the University of Minnesota. She has been at Midwestern University for nearly three years and has worked with faculty and students from all the MWU Colleges. "During her time at the University, Dr. Bolch has contributed significantly to the statistical analysis and writing of 16 accepted peer-

reviewed manuscripts led by MWU researchers," states Jim Woods, Ph.D., Assistant Vice President of Research.

In addition, Dr. Bolch has seven years of experience in biostatistical consulting in multiple areas of clinical research, with expertise in longitudinal data analysis, survival analysis, structural equation modeling for clinical data, and survey research. "I enjoy working with researchers of all levels of statistical knowledge to assist them in the analysis and interpretation of their data to appropriately answer their research questions and objectives," Dr. Bolch says.



Pinpointing Optimal Antibiotic Dosing Strategies for Better Patient Outcomes

N. Jim Rhodes, Pharm.D., Associate Professor, Pharmacy Practice, Midwestern University College of Pharmacy, Downers Grove

"An increasing body of evidence demonstrates that individual (i.e., patient-specific) antibiotic concentrations are highly different in critically ill patients– even when doses are adjusted for altered renal function."

Project: Systems-based pharmacologic modelling to elucidate beta-lactam clinical pharmacodynamics and define optimal dosing regimens in severe pneumonia

Principal Investigator: N. Jim Rhodes, Pharm.D., Associate Professor, Pharmacy Practice, Midwestern University College of Pharmacy, Downers Grove

Grant: $3,403,378 (NIH R01, total for MWU $1,955,823)

Dates: 7/11/2022 to 6/30/2027

Project Summary:

Hospital-acquired pneumonia (HAP) is a leading cause of death from nosocomial infections, which are infections acquired during the process of receiving healthcare that were not present at the time of admission. Critically ill patients who develop HAP disproportionally experience treatment failure and death compared to non-critically ill patients. Mortality in HAP typically ranges from 10-30% in these patients, with treatment failure rates approaching 50% in recent trials. Excess mortality and treatment failure in HAP may be the result of patient-specific factors, such as dynamic renal function leading to low blood levels of antibiotics. Likewise, pneumonia causing pathogens that are antibiotic resistant are less susceptible to currently available antibiotics, meaning that current dosing strategies for this population are less likely to succeed.

When beta-lactam pharmacokinetic-pharmacodynamic (PK/PD) target antibiotic exposures are not achieved, the risk of infection-related mortality increases. Unfortunately, inadequate beta-lactam PK/PD is a common problem for patients in the intensive care unit. An additional barrier to optimizing drug dosing is a lack of knowledge surrounding how much of an antibiotic dose is delivered to the lung for each patient being treated. These data are often extrapolated from healthy volunteers and available data are not sufficient to create individual dosing models.

N. Jim Rhodes, Pharm.D., Associate Professor of Pharmacy Practice at Midwestern University and an Infectious Diseases Pharmacist, hypothesizes that when beta-lactam concentrations fall below critical levels within the lung, the risk of antibiotic resistance, treatment failure, and death increase in pneumonia patients. "An increasing body of evidence demonstrates that individual (i.e., patient-specific) antibiotic concentrations are highly different in critically ill patients – even when doses are adjusted for altered renal function," Dr. Rhodes says. "The implication of these findings is that new dosing models that account for differences in pulmonary drug delivery are needed to optimize therapy for HAP patients who are most at high risk of treatment failure. Our long-term goal is to develop precision dosing strategies that overcome the variability in antibiotic exposures caused by severe illness."

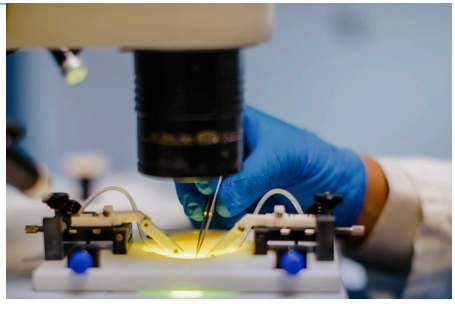
The project focuses on the interface between achievable antibiotic concentrations in blood with those that are observed within the lungs of patients with severe pneumonia. The project is aligned with another NIH-funded study: Successful Clinical Response In Pneumonia Therapy (SCRIPT) which is currently being conducted at Northwestern University (U19-AI135964), and is being led by Dr. Richard G. Wunderink.

Dr. Rhodes' team includes experts in drug assay development, including Dr. Marc Scheetz, Professor, Pharmacy Practice, Midwestern University, as well as experts in microbiology and comparative genomics. "As the principal investigator, I am pleased to be working with a multidisciplinary team of field leaders including the Midwestern University Pharmacometrics Center of Excellence, Northwestern University, and the Children's Hospital of Los Angeles," Dr. Rhodes states. The research team recently published findings from patients treated with the antibiotic meropenem who were enrolled in SCRIPT demonstrating that variability in drug exposures is highly prevalent. The rationale for the proposed research is that optimized dosing models will lead to improved treatment outcomes for HAP patients.

Kristina Martinez-Guryn, Ph.D., R.D., Associate Professor, Biomedical Sciences, Midwestern University College of Graduate Studies, Downers Grove

Unlocking the Mycobiome Connection to Obesity

"As emerging evidence suggests that diet-gut microbe interactions have the potential to promote disease, we developed the central hypothesis that the gut mycobiota contributes to lipid absorptive and digestive capacity in the small intestine."



Project: The role of the gut mycobiota in regulating host lipid absorption and obesity

Principal Investigator: Kristina Martinez-Guryn, Ph.D., R.D., Associate Professor, Biomedical Sciences, Midwestern University College of Graduate Studies, Downers Grove

Grant: $471,111 (NIH R21 NIDDK, total for MWU $285,029)

Dates: 5/1/2022 to 4/30/2025

Project Summary:

Obesity and associated metabolic disorders persist as major public health crises with obesity affecting more than 40% of the U.S. population. A leading cause of obesity and diabetes is the consumption of a Western-style diet rich in saturated fat and simple sugars. Recent research shows that high fat (HF)-high sugar diets alter the microbial composition of the distal gastrointestinal tract. The intestinal tract is comprised of functionally distinct regions. Likewise, the microbiome demonstrates longitudinal variation along the gut that is integral to regional intestinal function. How diet impacts the regional gut microbiome and influences on host physiological processes is poorly understood.

Kristina Martinez-Guryn, Ph.D., R.D., Associate Professor, Biomedical Sciences, College of Graduate Studies, Downers Grove, has shown that HF diets have a strong impact on the small bowel microbiota, specifically in the section of the small intestine known as the jejunum, the major site of macronutrient digestion and absorption. Moreover, microbes collected from the jejunum of HF-fed mice increased lipid absorption in adult germ-free mice compared to microbes collected from low fat-fed mice. However, in this study, focus was placed only on the bacterial taxa as opposed to the fungal taxa. A critical gap exists in the literature regarding the role of fungi in regulating the absorptive capacity of the gut in response to HF diets. Thus, the long-term goal of Dr. Martinez-Guryn's research is to elucidate the mechanisms by which candidate fungi such as Candida albicans regulate fat absorption, transport, and adiposity.

Candida albicans take on different morphological forms including yeast (non-virulent) or hyphae (virulent). The objective of Dr. Martinez-Guryn's research is to determine the impact of Candida albicans, in yeast or hyphae form, on lipid digestive and absorptive capacity of the small intestine and obesity development. Her lab plans to examine the localization of Candida along the length of the gut. Preliminary studies demonstrate that Candida albicans in yeast and hyphae form trigger the upregulation of genes involved in fat absorption. Weekly supplementation of heat-killed C. albicans also increased body weight gain in mice fed a HF diet and induced fatty acid translocase (Cd36) expression in the jejunum.

"As emerging evidence suggests that diet-gut microbe interactions have the potential to promote disease, we developed the central hypothesis that the gut mycobiota contributes to lipid absorptive and digestive capacity in the small intestine," says Dr. Martinez-Guryn. The major goals of her work are to examine the localization and morphology of C. albicans and impact on host lipid uptake and also to determine the host molecular mechanisms involved in C. albicans-mediated lipid absorption. "We have only reached the precipice of understanding how bacteria regulate nutrient digestion and absorption and even less is known regarding the role of intestinal fungi," she adds. "Our proposed research is innovative and significant because it will better define the small intestinal mycobiota, regional localization of C. albicans, and better define the mechanisms of host-microbe interactions that regulate absorption contributing to the development of obesity."

Brina Lopez D.V.M., Ph. D., DACVIM, Assistant Professor, Midwestern University College of Veterinary Medicine

The Link Between the Immune System and Cryptosporidiosis

"Despite substantial economic losses to the farm animal industry and the public, effective preventative and therapeutic interventions against cryptosporidiosis for susceptible populations are lacking."

Project: Host-Pathogen Interaction During Cryptosporidiosis – A Model for Disease Pathogenesis and Discovery of Effective Therapeutics

Principal Investigator: Brina Lopez D.V.M., Ph. D., DACVIM, Assistant Professor, Midwestern University College of Veterinary Medicine

Co-investigators: Brent Credille, D.V.M., Ph. D., DACVIM, Associate Professor, University of Georgia College of Veterinary Medicine; Clemence Chako, B.V.Sc., M.P.H., Ph.D., MRCVS, DACVIM, Director, Large Animal Clinic, and Associate Professor, Midwestern University College of Veterinary Medicine; Sylvia Ferguson, D.V.M., Ph. D., DACVP, Assistant Professor Midwestern University College of Veterinary Medicine; Jan Mead, Ph.D., Professor, Emory University; Michael Riggs, D.V.M., Ph. D., DACVP, Professor, University of Arizona

Grant: $454,012 (USDA NIFA)

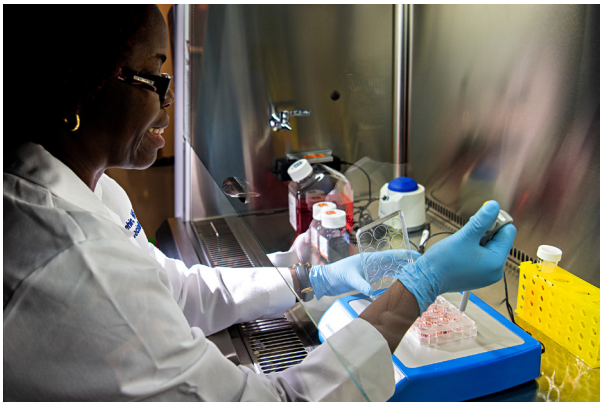
Dates: 7/01/2021 to 6/30/2024

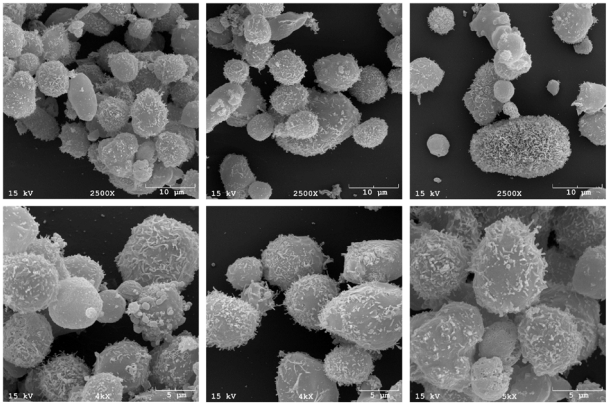
Project Summary:

Cryptosporidium is a parasitic infection that causes the diarrheal disease known as cryptosporidiosis. This disease poses a global public health threat characterized by life-threatening diarrhea in neonates, but severe clinical disease in mature animals and people is uncommon. Despite substantial economic losses to the farm animal industry and the public, effective preventative and therapeutic interventions for susceptible populations are lacking. This is partly due to gaps in understanding of the differential immune dynamics governing resistance to infection in adults but susceptibility in younger populations coupled with limitations associated with traditional models used to study this disease.

Innate immunity is the first line of defense against Cryptosporidium and is critical in determining the severity of infection. Essential components of the initial immune response to the parasite include the cells lining the GI tract, specialized immune cells called dendritic cells, and soluble mediators within the tissues. The importance of GI tract cells and dendritic cells in immunity against cryptosporidiosis has been demonstrated independently. Still, immune responses in vivo occur under cooperative interactions between these two components and the soluble mediators in tissues in a process called crosstalk. Studies detailing these interactions and how they develop as a function of age during cryptosporidiosis have not been described.

"The proposed study will bridge this existing gap in knowledge using a robust age-specific culture system comprised of GI cells, dendritic cells, and soluble mediators that mirrors in vivo infection in cattle. The results from this study will elucidate the general limitations and mechanisms of immune regulation in calves following Cryptosporidium exposure and will offer opportunities for broadly enhancing the protection of calves from infection in general through immune modulation with an expected translation benefit to human medicine," said Dr. Lopez.





Cryptosporidiosis, a global "One Health" threat, that has the ability to cause neonatal mortality and economic losses

A Fortress of Knowledge in the Battle Against COVID-19

Chad VanDenBerg, Pharm.D., M.S., BCPP, Director, Clinical Research Services

"The rapidity with which COVID-19 propagated itself through the world exposed gaps in global infrastructure that indisputably highlighted the need for collaboration within the scientific community to assess the virus' effects on the immune system."

Project: Multiplexed In-solution Serological Tests for SARS-CoV-2, Human Coronaviruses, and Other Respiratory Pathogens

Site Principal Investigator: Chad VanDenBerg, Pharm.D., M.S., BCPP, Director, Clinical Research Services

Principal Investigator: Joshua Labear, M.D, Ph.D., Professor, and Executive Director, ASU Biodesign Institute, School of Molecular Science

Grant: $703,771 Leidos/NIH - National Cancer Institute

Dates: 10/1/20 to 09/30/2025

Project Summary:

The SARS-CoV-2 (COVID-19) pandemic is one of the defining moments of this generation – a global healthcare crisis that graphically illustrated the speed and reach of a widespread viral contagion, affecting all areas of human life from individual and group health to the very social fabric of the world's nations.

The rapidity with which COVID-19 propagated itself through the world exposed gaps in global infrastructure that indisputably highlighted the need for collaboration within the scientific community to assess the virus' effects on the immune system. Domestically, a consortium of healthcare industry partners headed by the National Cancer Institute (NCI) and the National Institute of Allergy and Infectious Disease (NIAID) created the Serological Sciences Network for SARS-CoV-2 – otherwise known as SeroNet. The SeroNet initiative coordinates research that explores the serological, humoral, and cellular immune responses to SARS-CoV-2, as well as the COVID-19 vaccine, through a four-pronged portfolio of assets – Capacity Building Centers (CBC), the Serological Sciences Center of Excellence, Serological Research Projects, and the Frederick National Laboratory for Cancer Research (FNLCR).

Dr. VanDenBerg's research efforts at Midwestern University are being conducted in coordination and partnership with the CBC established at Arizona State University. The main focus is a five-year longitudinal serosurveillance study that will create and stock a databank and biobank of information and biological specimens from four cohorts – individuals who are or have been immunocompromised, and who have received or are planning to receive a COVID-19 vaccine regimen; a control group of persons planning to receive or already having received the COVID-19 vaccine; individuals who have been infected with SARS-CoV-2; and individuals who have received the initial vaccine series and who are planning or have already received a COVID-19 booster.

"Midwestern University, as one of three local partner organizations with the ASU CBC, will be responsible for recruitment, enrollment, biospecimen collection, and data collection," said Dr. VanDenBerg. "The biospecimens and health data that will be stored in the biobanks and databanks at ASU and the FNLCR will be used for current and future research into the immune response for the COVID-19 vaccine, as well as immunological research studies of SARS-CoV-2 infections."

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Midwestern University Illinois Colleges

555 31st Street | Downers Grove, Illinois 60515

Chicago College of Osteopathic Medicine

College of Pharmacy, Downers Grove

College of Dental Medicine - Illinois

Chicago College of Optometry

College of Health Sciences

- Physician Assistant | Physical Therapy
- Occupational Therapy | Clinical Psychology
- Speech-Language Pathology
- Graduate Nursing Programs

College of Graduate Studies

- Biomedical Sciences | Public Health
- Precision Medicine

Midwestern University Arizona Colleges

19555 North 59th Avenue | Glendale, Arizona 85308

Arizona College of Osteopathic Medicine

College of Pharmacy, Glendale

College of Dental Medicine - Arizona

Arizona College of Optometry

Arizona College of Podiatric Medicine

College of Veterinary Medicine

College of Health Sciences

- Physician Assistant | Physical Therapy
- Occupational Therapy | Nurse Anesthesia Programs
- Cardiovascular Science | Clinical Psychology
- Speech-Language Pathology | Graduate Nursing Programs

College of Graduate Studies

- Biomedical Sciences | Public Health
- Precision Medicine