Dobrowsky and Blagg earn Innovation Awards

Professor of Pharmacology and Toxicology Rick Dobrowsky, and Lester and Betty Mitscher Professor of Medicinal Chemistry Brian Blagg are co-recipients of KU Innovation and Collaboration’s 2015 James Baxendale Innovation Award. It honors those whose research has resulted in significant advances and commercial opportunities for the university. The award presentation was made October 7 at the Bioscience & Technology Business Center during the BioKansas BioBreak networking reception that followed the half-day “A Celebration of Innovation: A Startup Showcase.”

Dobrowsky and Blagg were cited for research that led to a major licensing agreement last year with Reata Pharmaceuticals of Irving, TX for a portfolio of drug technologies. The two are exploring the potential use of “novologues” for treating a complication of diabetes – diabetic peripheral neuropathy – that affects 60 to 70 percent of patients with diabetes. Novologues also show promise in treating cancer and neurodegenerative diseases. Reata is working with Blagg and Dobrowsky on a strategy for collaboration with KU. The company expects to fund new research at KU while it develops the existing technologies it has now licensed.

NOTE FROM THE CHAIR

Nancy Muma
Professor, Chair
Department of Pharmacology and Toxicology

The Department and graduate program have had another terrific year. Last year we matriculated six Ph.D. students and three students into our new M.S. program; this year, three Ph.D. students and three M.S. students matriculated. Four students graduated with a Ph.D. this year and each of them moved on to excellent post-doctoral fellowship positions. Stephen Fowler and Elias Michaelis retired this year and joined the ranks of our active emeritus professors!

This is just a brief summary of some of the activities in the Department; you can find more details in the rest of the newsletter. I hope you enjoy hearing about the Department and invite you to contribute an update about yourself for our next newsletter. Please contact us about visiting the Department this year. We would love to have you give a scientific seminar or a “Beyond the Lab” talk about scientific careers outside of academics.

Ph.D. Graduates

We have had several Ph.D. students graduate last year. Mengxi Sun graduated from the Pharmacology and Toxicology program last fall with Jeff Staudinger as an advisory. Rick Dobrowsky had two Ph.D. students from his laboratory graduate in the spring, Jiacheng (Vicki) Ma in the Pharmacology and Toxicology program and Michael Urban, in the Neuroscience program. Zhen (Jane) Mi completed her Ph.D. last summer in the Pharmacology and Toxicology program under Nancy Muma’s mentorship. These graduates are all currently engaged in post-doctoral fellowships. Congratulations to all!
MASTER’S OF SCIENCE PROGRAM OFF TO A STRONG START

We’ve had a great start to our new Master’s of Science in Pharmacology and Toxicology program. Last year, we recruited our first class of M.S. students. We recruited three excellent students who are each well on their way toward completion of their degrees. This fall, three new students began the program. This is a two-year M.S. program which includes didactic courses, training and experience in oral and written scientific communication skills and hands-on research in the laboratory. Students will write and defend a research-based master’s thesis before completing the program. This is a successful new program that we intend to continue, and we plan to explore the possibility of an online M.S. program as well.

Faculty Grants, Awards & Honors

Marco Bortolato
Deciphering gene-environment interactions in pathological reactive aggression
R01 MH104603-01
National Institute of Health (PI: M. Bortolato)
09/05/14-07/31/19 $2,391,472
Psychosocial stress as a vulnerability factor for problem gambling
KU-Strategic Initiative Grant (PI: M. Bortolato)
July 2015-June 2018 $300,000

Alex Moise
Standing member of the American Heart Association Grant Review Panel, Lipids Basic Sciences 1

Jackob Moskovitz
Testing new immunization against Alzheimer’s disease
K-INBRE Core Facility Grant (PI: J. Moskovitz)
University of Kansas
09/08/15-04/30/16 $5,000
Oxidation of ceruloplasmin as a novel biomarker for Alzheimer’s disease
KU-ADC Pilot Project (PI: J. Moskovitz)
KU Medical School Alzheimer’s Disease Research Center
04/01/16-03/31/17 $23,500
Effect of methionine substitution and oxidation on the structure-function of COMT
KU-COBRE-PSF Pilot Project (PI: J. Moskovitz)
KU School of Pharmacy
07/01/15-06/30/16 $10,000

Nancy Muma
HTS to identify small molecules to disrupt abnormal huntingtin interactions in HD
R01 NS088059 (Co-Pls: N.A. Muma, A. Roy)
National Institutes of Health/NINDS
04/01/2015-03/31/2019 $1,990,085

Jeff Staudinger
Novel Strategies to Suppress Inflammation and Tumor Progression
Nuclear Receptors in Liver Health and Disease CoBRE KUMC
04/01/2015-03/31/2016 $50,000
“SUMOylation of Bag3 in Hepatocytes and Hepatoma Cell Lines”
2015 J.R. and Inez Jay Award
07/01/2015-06/30/2016, $20,000

Shi Du Yan
Role of cyclophilin D in Aβ- and oxidative stress-induced synaptic injury
R37 AG037319 (Yan, P. I)
National Institutes of Health/NIA
07/01/2015-07/31/2020 $1,537,500
Mitochondrial degrading enzyme, synaptic mitochondrial function in AD mouse model
R01 AG044793 (Yan, P.I)
National Institutes of Health/NIA
08/14-05/31/2019 $1,900,000
RAGE and mitochondrial degeneration in diabetes
R01 NS089116 (Yan, P.I)
National Institutes of Health/NINDS
08/01-05/31/2019 $1,469,859

Liqin Zhao
ERβa regulation of brain bioenergetics during perimenopause
KUMC IRHRM Research Fund (Zhao, PI)
10/01/2014-06/06/2015 $10,000
Human APOE isoforms-mediated differential regulation of brain mitoproteome
NIHGM K-INBRE Research Fund (Zhao, PI)
09/01/2015-04/30/2016 $5,000
Bioenergetic mechanisms of APOE2-mediated neuroprotection
KU General Research Fund (Zhao, PI)
05/01/2015-04/30/2017 $8,000
Pharmacology & Toxicology Scientific Seminar Series

Michael Garcia, Ph.D.
Associate Professor of Biological Sciences
University of Missouri-Columbia
“Myelination of Peripheral Axons: It Takes a Village to Raise a Nerve.”

Nina Isoherranen, Ph.D.
Associate Professor
Department of Pharmaceutics
University of Washington
“Vitamin A and Retinoic Acid Homeostasis in Health & Disease; Role of ALDH1A & CYP26 Enzymes in Tissue Specific Retinoid Signaling”

Caroline Blanchard Ph.D.
Research Professor
The Pacific Biosciences Center,
University of Hawaii
“Functional Approaches to Translation of Biobehavioral Systems”

BEYOND THE LAB

Our Beyond the Lab program provides students postdocs and other research professionals in the Department and the school an opportunity to expand their knowledge of career opportunities and advancement. We hosted four guest speakers this year. We were fortunate to have two alumni from the Department. Dr. Kristin Lichti-Kaiser and Dr. Xunshan Ding returned to campus to share their experiences with us. Patrea Pabst spoke with us about scientific patents and scientific advisor positions at patent law firms.

Dr. Ginther, an expert on science policy and advisor to the National Institutes of Health, the National Academies of Science, and the Sloan Foundation on the diversity and future of the scientific workforce, visited our Department in November. Graduate students and post-doctoral fellows have greatly appreciated the programs. We would like to invite our alumni to consider returning to campus as part of the Beyond the Lab program in the future. Please contact either Nancy Muma, Department chair, or Liqin Zhao, director of the Beyond the Lab program.

Kristin Lichti-Kaiser, Ph.D
Product Safety Scientist, Syngenta
“Risk Assessment in GMO Trait Development”

Patrea L. Pabst, J.D.
Partner, Pabst Patent Group, LLP, Atlanta, GA
“Intellectual Property - What Is It, and Why It’s Important”

Donna Ginther, Ph.D
Professor of Economics & Director of Center for Science Technology & Economic Policy
Institute for Policy & Social Research
University of Kansas
“The Postdoc Rat Race”

Xunshan Ding, Ph.D
Scientist III
NGM Biopharmaceuticals, Inc.
“A Junior Scientists’s Perspective Regarding a Biotech Start-up”

KU SOP NO.2 in NIH Funding

The KU School of Pharmacy ranks second in the nation in research funding from the National Institutes of Health according to the American Association of Colleges of Pharmacy. KU SOP has been ranked in the top six in NIH funding since 1995 and in the top five since 2001. Congratulations to all of the School of Pharmacy investigators who have contributed this success!
Mac McGuire

After completing my training in Rick Dobrowsky’s lab in 2010, I accepted a post-doctoral fellowship with the National Institute of Allergy and Infectious Disease (NIAID) in Hamilton, Montana. My work at the NIAID focused on the trafficking of the prion protein, the cause of a group of diseases known as the transmissible spongiform encephalopathies (Creutzfeldt-Jakob disease, mad cow, chronic wasting disease, etc). My work used a specialized cell culture platform that allowed us to co-culture primary neurons and astrocytes in such a way that the neurons could extend axons through channels and interact with the astrocytes while keeping the cell bodies separate. Using this co-culture platform and confocal microscopy, we visualized the uptake and anterograde and retrograde transport of fluorescently tagged prion protein for the first time.

Once my time at the NIAID was up, I was given the opportunity to work as a medical writer for PRA Health Sciences in Lenexa, Kansas. While at PRA, I worked on the development of clinical study protocols and clinical study reports for Phase 1 clinical trials. After two years with PRA, I moved Cardinal Health Regulatory Sciences in Overland Park, Kansas where I have been a medical writer manager for a year. In addition to managing new medical writers, I am responsible for developing clinical summary sections for regulatory applications, clinical study protocols, clinical study reports, and various other documents.

Stepping away from the bench was a difficult decision, but one that I am glad I made. I find medical writing to be very interesting, and it allows me to learn a great deal about many different diseases and the treatments being developed for those diseases. My experience at KU and the skills I gained in Rick’s lab have been invaluable to my success as a medical writer. The ability to think critically about and analyze large amounts of data has been particularly important.

Life outside of work is focused on trying to keep up with my soon to be three-year-old son, James. My wife Angie and I also welcomed our second son, Thomas, on August 27th.

Liang Zhang

My experience as an undergraduate motivated me to pursue a graduate degree in the field of pharmacology and drug discovery. I am grateful to have studied under Dr. Rick Dobrowsky, who not only trained me extensively in drug discovery and drug mechanisms but also prepared me for my postdoctoral position with solid scientific and technical skills. After graduation in 2012, I joined Dr. Eugenia Trushina’s lab as a postdoctoral research fellow at the Mayo Clinic in Rochester, Minnesota. My work at the Mayo Clinic focused on early mitochondrial dysfunction in Alzheimer’s disease and novel drug therapy. During this time, I was awarded a Young Investigator Scholarship from the Alzheimer’s Drug Discovery Foundation. My latest study on small molecule therapy has shown that mild inhibition of mitochondrial complex I, together with a reduction of amyloid beta, averts cognitive decline in three animal models of familial AD. This work represents a promising and novel therapeutic strategy for Alzheimer’s disease and was recently published on EBioMedicine (2015).

I have now completed my postdoc training and began a new position as research technologist in Mayo Clinic in September 2015. I am working with a pediatric neurosurgeon to develop a novel drug therapy against pediatric brain tumors and a type of brain tumor “paint” that will help the surgeon to visualize tumors during surgery. I am extremely excited about my new journey in the field of drug discovery.

Student Research Award

Emily Carlson earned a Graduate Student Research Competition Presentation Award. Pictured, Provost Jeff Vitter presents Emily with a certificate and check.
When I was searching for an undergraduate major at KU, a pharmacy student suggested that I talk with Professor Ray Hopponen. He told me about various health care and research careers that could be pursued with a pharmacy degree, and I was soon enrolled in the pharmacy curriculum.

I knew from the beginning that I wanted to do graduate work, and I eventually settled on pharmacology because of my interest in biology and chemistry. After finishing pharmacy school, I was accepted into the graduate program at Baylor College of Medicine and began work with autonomic-cardiovascular pharmacologist Hugh Stanton. Stanton suggested a project concerning salivary gland hypertrophy, and I employed a number of novel autonomic receptor agonists and antagonists in demonstrating that beta-1 adrenoceptors mediated the glandular enlargement. I would have continued to study the signal transduction mechanisms involved in cardiac and salivary gland hypertrophy for my doctoral degree, but Stanton decided to return to the pharmaceutical industry when I completed my master’s.

One of the lessons I learned at Baylor was that research can be fun and interesting when the hypothesis is sound and methodology is available to test it. Moreover, I was pleased to publish our findings in JPET.

After finishing my degree at Baylor, I decided to return to KU and enter the new Ph.D. program in Pharm-Tox under Duane Wenzel. Wenzel had obtained a grant to study the effects of carbon monoxide (CO) on isolated, beating rat heart cells. Unlike my conceptually and logistically straight-forward master’s degree project, the research on carbon monoxide proved more difficult and challenging. The biological basis for a direct effect of CO on beating heart cells was uncertain, and the methodology to study this effect was not readily available. I eventually fabricated a rocker culture device to sit in the incubator in order to expose the heart cells to CO. Even with this method, very high CO concentrations had no discernible effect on the heart muscle cells. In fact, their contractile activity was improved and prolonged in tissue culture by CO exposure! We soon realized that this remarkable effect was due to a toxic effect of CO on the ever-present vascular endothelial cells, which were an unavoidable contaminant of heart cell culture preparation. By eliminating the growth and replication of the endothelial “weeds”, CO enabled the non-dividing cardiac muscle cells to flourish and continue to beat in culture for several weeks.

The lessons I learned from my doctoral degree program were 1) patience and perseverance, and 2) don’t overlook or minimize the unexpected “side effects” of a treatment protocol that might prove more interesting than the expected effect.

Because post-doctoral research training was considered optional when I finished my degree program, I decided to interview for pharmacy school faculty positions. I had three offers, and accepted a position at South Dakota State University where Ray Hopponen, the man who launched my pharmacy and pharmacology career, was then Dean. Unfortunately, cutbacks in state funding forced discontinuation of the pharmacology master’s degree program soon after I joined the faculty. Hence, teaching and administration became the main focus of my career at SDSU, and later at Oklahoma State University, College of Osteopathic Medicine. At OSU, I helped develop a new three-year, year-round medical school curriculum, and I learned the value of collaborating with other faculty in order to conduct research with limited funding and time. The main lesson I learned at OSU was that research can be more productive and interesting when you share your expertise with other investigators. I hope these insights will be useful to graduate students and young investigators.
New summer exchange program a great success

The Department started a summer exchange program with the School of Pharmacy at the Sun Yat-Sen University in China. The program provides an opportunity for select senior students from Sun Yat-Sen with outstanding academic records to experience research at KU and aims to attract outstanding students for future enrollment in KU graduate programs.

Four students took part in the inaugural program from July 7 - August 15. They arrived in the company of one of their professors, Dr. Ling Huang, Ph.D. The students engaged in research activities in four different laboratories within the Department. The students also enjoyed their living experience in Lawrence. They had great time at a cookout at Dr. Jeff Staudinger’s farm and loved taking pictures with the Jayhawk. The students described their KU experience as “unforgettable,” adding that “the limited time is the only flaw to this program”.

The program was a success from the Department perspective as well. There were outstanding prospective graduate students in the group of Sun Yat-Sen undergraduates and the faculty unanimously support continuing the program next summer.

Students earn recognition

Sarah Woody received a $5,000 Summer Research Fellowship from the Office of Graduate Studies for stipend support.
She was also awarded a KU Graduate Scholarly Presentation Travel Award of $500 and the Society for Neuroscience Trainee Professional Development Award for $1,000 in 2015.

Congratulations Sarah!

Cori Jones was awarded the Star Trainee Award from the Kansas IDeA Network of Biomedical Research Excellence (K-INBRE). The K-INBRE Star Trainee program provided $5,500 for salary support and her mentor, Marco Bortolato received $1,500 for related research expenses.

Thank you for your support

Thank you for your interest in supporting the Department of Pharmacology & Toxicology.

Private support allows the Department to provide resources for students, establish research seminars, and continue the excellence you have come to expect from our Department. Your support, regardless of size, can make a profound impact. Even small amounts given over time can accumulate to create substantial resources for the Department. For a lasting impact on the Department, major gifts can establish endowed funds that can be named for you or for someone else and provide financial support in perpetuity. Visit our website http://www.pharmtox.ku.edu/ or contact our development director, Sophie Lamb at slamb@kuendowment.org or at 785-832-7476 to make a donation.
Highlighted Faculty Publications 2014-2015


