Dear MSU Pharmacology & Toxicology Alumni, Faculty, Staff, Students, and Friends,

In the year and a half since our 50th anniversary celebration, our department continues to expand in both numbers and scope. I am excited by the dynamism and cooperation among our faculty, students, and staff.

New faculty (4 tenure-track faculty members and 9 fixed-term or joint faculty) have brought new research areas and have strengthened old ones while existing faculty remain very active and successful in research.

Two exciting new research areas are Cancer Prevention and Drug Discovery/Chemical Biology. The MSU administration continues to support our Drug Discovery program and core facilities. Pilot grants support faculty and students across campus to initiate and advance the development of new drug leads. MSU faculty have also been heavily involved in a new Center for Research on Ingredient Safety (CRIS) which was spearheaded by Dr. Norb Kaminski. Two of our joint recruits are CRIS faculty members.

Our education programs remain vibrant – the creative presentations in the 2017 Ph.D. student speed data event are clear proof. Dr. Anne Dorrance has been named Associate Chair for Education and we successfully renewed our NIH-supported T32 Integrative Pharmacological Sciences Training Program (IPSTP). The MSU-BEST program (PI: Dr. Stephanie Watts) is giving our trainees and those across MSU important skills and information on career possibilities. With new faculty, postdoctoral trainee numbers are increasing as well.

A new Undergraduate Minor in Pharmacology and Toxicology launched last year is attracting many young students to our disciplines. We thank Dr. Peter Cobbett and other faculty for their outstanding efforts in getting that program going. Our MS programs also are strong with Dr. Jane Maddox taking over leadership from Dr. Bill Jackson. Curricular changes in CHM and CVM are also exciting but bring challenges as they move away from traditional lecture-based formats.

Major changes at MSU are reshaping the South Campus area around Life Sciences with new buildings and biomedical research activities. The new McLaren Hospital plans near campus should enhance clinical research and education. We have also consolidated and updated our department office with new staff and a major facelift of the environment.

So, MSU Pharmacology and Toxicology in 2017 is a truly exciting place for outstanding research and teaching. We look forward to hearing from you and welcome your continued support of our programs.

Go Green!

Dr. Richard Neubig
The Cerebrovascular Research team is working to prevent dementia development and aneurysm rupture. Hypertension and obesity are two of the leading risk factors for dementia development. All forms of dementia are exacerbated by reductions in blood flow to the brain; our hypertensive and obese models also exhibit impaired cerebral perfusion that is linked to impaired cerebral artery endothelium-dependent dilation. The mechanisms responsible for the impaired dilation have not been identified; if we can correct this impairment, we may be able to improve cerebral blood flow and slow, or prevent the development of dementia.

An aneurysm is an outpouching of the blood vessel wall; 1 in 50 people have cerebral aneurysms that may go undetected for years. Aneurysms are generally only detrimental when they rupture. In the US, a brain aneurysm ruptures every 18 minutes and about half of these patients die. We are in the process of developing a novel, physiologically relevant, rodent model of cerebral aneurysm formation. We will use this model to identify biomarkers for aneurysm formation and to elucidate the genetic changes that occur in cerebral arteries as aneurysms develop. By doing this, we may be able to identify patients at risk for cerebral aneurysm formation and develop medical treatments to prevent aneurysm growth and rupture in at-risk individuals.

The Liby lab studies the role of inflammation and the immune system in cancer. We are developing new drugs to prevent or treat breast, lung and pancreatic cancer. Our focus is translational research, and one of the drugs we developed is being tested in advanced clinical trials in humans.

In the Bernard lab, we study the mechanisms that underlie the onset of carcinogenesis, so we can find new targets for prevention. We have discovered that intra-abdominal (visceral) fat can promote carcinogenesis in vitro and in animal models of high-fat diet-induced obesity by releasing fibroblast growth factor-2 (FGF2) and activating FGFR1. We aim to identify specific mechanisms of obesity-promoted cancer with a focus on visceral fat inflammation. We are now exploring the translational relevance of FGF2 as a biomarker of adiposity-associated cancer risk. Additionally, we have interests in screening to identify new compounds that target our pathways for chemoprevention and identifying modifiable risk factors as a biomarkers of adiposity-associated cancer that are amenable to prevention and early intervention measures. Attractive compounds for chemoprevention include natural products. Historically, natural product extracts were the source of medications. Purified natural products have advantages in terms of standardization of dose and avoidance of side effects of other products in the mixtures. We currently have collaborations and are seeking new collaborations to develop chemopreventive agents from purified natural products. The active compounds identified have the potential to lead to new scientific discoveries by revealing new mechanisms and pathways of carcinogenesis as well as providing potential commercial licensing and spin-off opportunities for chemopreventive agents.
As cannabis use for medical purposes is becoming increasingly prevalent in the HIV-infected population of the United States and Canada, a major focus of our laboratory’s research is to understand how cannabis use modulates the immune system of HIV patients. Our particular emphasis involves health complications that remain pervasive despite effective antiretroviral therapy. Specifically, this includes a decline in cognitive function termed, HIV-associated neurocognitive disorder, which impacts up to 50% of HIV-infected individuals. The underlying cause of this cognitive decline is believed to be due, at least in part, to chronic low-level inflammation in the brain, perpetuated by systemic immune activation. Specific immune cell processes in circulating blood and brain tissue contribute to this neuroinflammation, including a specific population of immune cells termed “inflammatory” monocytes (CD14+CD16+). These monocytes can transport HIV across the blood–brain barrier and also produce inflammatory proteins. In a recent study, we showed that cannabis use by HIV patients in the Mid-Michigan area is linked with a decrease in number and function of these circulating “inflammatory” monocytes. Furthermore, experiments using blood cells from HIV patients demonstrated that Δ9-tetrahydrocannabinol (THC), the primary psychoactive constituent in cannabis, decreased the generation of this inflammatory immune cell population while also decreasing monocyte release of a specific inflammatory protein. These findings suggest that cannabis use by HIV infected individuals suppresses specific immune processes implicated in chronic neuroinflammation during HIV pathogenesis.

One such process is the transition of resting “normal” monocytes into the pathologic “inflammatory” monocytes. Previous research showed that “inflammatory” monocytes have characteristics consistent with stimulation by a potent anti-viral protein termed interferon-α (IFNα). The primary source of IFNα is the plasmacytoid dendritic cell (pDC), which secretes upwards of 1000-fold more IFNα than any other immune cell type. As cannabinoids have been shown to reduce the amount of secreted inflammatory proteins, we investigated if THC could affect the production of IFNα by pDC from HIV patients that do not use cannabis. In this study, we showed that THC reduced the production of IFNα by pDC and that pDC from HIV patients were more sensitive to the suppressive effects of THC than pDC from healthy donors. We also found one putative reason for the higher sensitivity to THC in HIV patients, an elevated expression of the receptors that bind THC on immune cells from HIV patients compared to immune cells from healthy donors. Collectively, results from our studies suggest that cannabinoids in some HIV patients may reduce IFNα production by pDC and the subsequent stimulation of monocytes, which participate in neuroinflammation. Moreover, the findings discussed above suggest that cannabinoid-based therapeutics may be useful for the treatment of HIV-associated neuroinflammation.

Drug Discovery & Receptors

Drug Discovery/Chemical Biology – This group in the department has continued to grow. Tom Dexheimer, Research Specialist, joined us as manager of our Assay Development and high-throughput screening lab in 2014. He also coordinates our weekly Drug Discovery seminar series. In 2016, Edmund Ellsworth, from Zoetis Pharmaceuticals in Kalamazoo, became a fixed-term Professor and director of our Chemical Biology and Medicinal Chemistry Core lab. Just this year, Sing Lee, a new Assistant Professor, who received his Ph.D. in Chemistry at MSU in 2010, returned to Spartan Country after his postdoc. His research on chemical biology is on oxy-lipid signaling mechanisms. The drug discovery programs have received significant support from MSU. New Molecular Discovery pilot grants (MDG grants) supported by the Vice President for Research provide funds to faculty across campus to access our Drug Discovery Cores. Also, a group of our faculty (Neubig, Bernard, Ellsworth, and Dexheimer) are investigators on a MSU Foundation-supported Strategic Partnership Grant (SPG) entitled “Plant-inspired chemical diversity” which aims to find new antimicrobial and anticancer agents.
New Faculty Hires

1. Adam Lauver, Ph.D.
2. Kin Sing Stephen Lee, Ph.D.
3. Masamitsu Kanada, Ph.D.
4. Carolina Restini, Ph.D., Pharm.D.
5. Edmund Ellsworth, Ph.D.
6. Sudin Bhattacharya, Ph.D.
7. Stacie Demel, D.O., Ph.D.
8. Courtney Carignan, Ph.D.

Department Promotions & Appointments

Cheryl Rockwell, Ph.D.
Dr. Rockwell was promoted from Assistant Professor to Associate Professor, with tenure.

Anne Dorrance, Ph.D.
Dr. Dorrance was appointed to Associate Chair for the Department.

Erika Lisabeth, Ph.D.
Dr. Lisabeth was promoted from Senior Research Associate to Assistant Professor, fixed-term.

Faculty Awards

Stephanie Watts, Ph.D.
The Research Exemplar Project 2017: In Recognition of Professionalism and Integrity in Research

Greg Fink, Ph.D.
2017 Irvine Page & Alva Bradley Lifetime Achievement Awardee
2017 Council on Hypertension Distinguished Achievement Awardee

Karen Liby, Ph.D.
2017 College of Osteopathic Medicine Early Promise of Research Excellence Awardee

Susan Barman, Ph.D.
2016 Association of Chairs of Departments of Physiology Distinguished Service Awardee
Faculty Grants

The Faculty in Pharmacology & Toxicology have been very successful in procuring grants for their research. Here are new grants awarded in 2017:

• Cerebral parenchymal arteriole dysfunction and cognitive decline in a life-long high fat feeding model (A. Dorrance, W. Jackson) NIH R01 HL137694 $530,663/yr

• Identifying the receptors of environmentally sensitive epoxy-eicosanoids with AMS (S. Lee) NIH R00 ES024806 $249,000/yr

• Michigan State University PREP: Increasing underrepresented minority representation in biomedical sciences (W. Atchison) NIH R25 GM116761 $245,124/yr

• Studies of BET Inhibitor INCB054329 in KC and KPC Mouse Models of Pancreatic Cancer (K. Liby) Incyte Corporation $126,000/yr

• MSU Foundation Strategic Partnership Grant Novel Plant-inspired anti-microbial and anti-cancer agents (J. Bernard, E. Ellsworth, R. Neubig) $138,478/yr

Faculty Profile: Dr. Jay Goodman

What made you want to join our Department?

While studying as a post-doc at the University of Wisconsin (McArdle Laboratory for Cancer Research), Dr. Thomas Tephly (my Ph.D. mentor, University of Michigan Pharmacology Department) was at a scientific meeting where he bumped into Dr. Jerry Hook who had recently joined Michigan State’s new Pharmacology Department and Jerry told him there were open positions for faculty members. Tom informed me of this and wrote a letter of recommendation on my behalf to Dr. Theodore Brody, Chair of the Department who came from U of M’s Pharmacology Department. Familiarity with Ted from my U of M graduate school days made the decision to accept the offer to be an assistant professor at MSU rather easy. This was in 1971. I had intended to be in the Department for 5 years and then move on, but here I am a Spartan 46 terrific years later!

What made you want to be a scientist?

Starting as a child, I was always very curious. I enjoyed taking apart clocks and examining how things worked.

If you weren’t a scientist, what would you be doing today?

I would be a Scuba Diver. I’ve been a diver for many years and I love doing it.

What is something most people wouldn’t know about you?

I enjoy listening to Country Western Music. My wife and I often travel to Nashville, TN to cruise the honkey-tonk bars along Broadway.

Jay Goodman, Ph.D.
Theodore M. Brody was the founding chair of Michigan State University’s Pharmacology & Toxicology Department (originally the Department of Physiology and Pharmacology).

**Theodore M. Brody Award**

2017

Graeme Milligan, Ph.D.

2016  
Lori Isom, Ph.D.

2015  
Jeff Conn, Ph.D.

2014  
William Catterall, Ph.D.

2013  
Palmer Taylor, Ph.D.

2012  
Lynn Wecker, Ph.D.

2011  
Paul F Hollenberg, Ph.D.

2010  
Raymond J Dingledine, Ph.D.

2009  
Joey V Barnett, Ph.D.

2008  
Kenneth P Minnerman, Ph.D.

- Professor
- Gardiner Chair Of Biochemistry (institute of Molecular Cell and Systems Biology)
- Dean of Research (MVLS College Senior Management)
- University of Glasgow

**Kenneth E. Moore Distinguished Alumnus Award**

Kenneth E. Moore was one of the original six faculty members of Pharmacology at Michigan State University. Dr. Moore would later become a department chair with Pharmacology & Toxicology and we honor his contributions with the Distinguished Alumnus Award.

2017

Leon Bruner, Ph.D.

2016  
Kurt J. Varner, Ph.D.

2015  
Aimen Farraj, Ph.D.

2014  
John Goudreau, Ph.D.

2013  
Jesus Olivero-Verbel, Ph.D.

2012  
Clinton D. Kilts, Ph.D.

2011  
Nancy L. Kanagy, Ph.D.

2010  
Patricia E. Ganey, Ph.D.

2009  
Joshua R. Berlin, Ph.D.

2008  
Timothy Shafer, Ph.D.

2007  
Annette Fleckenstein, Ph.D

2006  
Gary Gudelsky, Ph.D.

2005  
Robert B. McCall, Ph.D.

2004  
Sandra J. Hewett, Ph.D.

2003  
William M. Kluwe, Ph.D.

2002  
David D. Ku, Ph.D.

2001  
James S. Bus, Ph.D.

2000  
Elaine M. Faustman, Ph.D.

- Executive Vice President, Science & Regulatory Affairs
- Chief Science Officer, Grocery Manufactures Association.
Alumni News & Updates:

ERIKA BOERMAN, PH.D.

Dr. Boerman completed our Ph.D. Program in 2010. She recently accepted an Assistant Professor position at the University of Missouri, Department of Medical Pharmacology & Physiology. Start date is December 1st, 2017.

JOSHUA R. EDWARDS, PH.D.

Dr. Edwards completed our Ph.D. program in 2004. He was promoted in July to full professor at Midwestern University, Department of Pharmacology. Dr. Edwards also received an award from NIH for an R15 (AREA) grant proposal entitled “Mechanisms of Cadmium-Induced Dysglycemia”.

Have News to Share? Send us an email!: phm@msu.edu

We can’t possibly capture everyone, but we want to do better! Share your news with us, get connected. We are working hard to improve our alumni relations, join the effort with us! If you have no news of your own to share, let us know about another alumni!

Our Funding Goals...

GRADUATE STUDENT FELLOWSHIPS
$50,000 annually, $1M endowed with naming opportunity

These fellowships will allow MSU Pharmacology & Toxicology to recruit truly exceptional students. The honor of the fellowship, enhanced stipend support, and the freedom to join the lab of their choice (regardless of funding) will make our department competitive for top students in the recruiting pool. This also helps us support and retain top faculty.

NAMED CHAIR OR PROFESSORSHIP
$1-5M endowed

Faculty are the foundation of our Department. Recruiting and retaining top faculty is critical to our mission to perform cutting edge research and train the next generation of pharmacologists and toxicologists. By honoring and giving ongoing support for the program of a new recruit or a rising-star already in our midst, we will maintain and enhance our excellence. Competition for successful faculty continues to increase as more institutions look to capture the same outstanding scholars. You can help us ensure a strong future for the Department by supporting a Named Chair or Professorship in Pharmacology & Toxicology at MSU.

STRATEGIC IMPACT FUND
$50k-250k endowed

Following Drs. Ted Brody, Ken Moore, and JR Haywood, it has been my privilege to serve as chair of the MSU Department of Pharmacology & Toxicology. We have instituted new programs (stipend supplements for students successfully competing for extramural funding and support for new postdoctoral fellows recruited to faculty labs) as well as maintaining others (cost-sharing and upgrades for our outstanding core facilities). These programs enhance the environment for faculty and students, building camaraderie and collaboration. A steady source of support from your gift will help us keep MSU Pharmacology & Toxicology a great place to educate top students and do outstanding science.

Our Giving Link: https://www.givingto.msu.edu/gift/?sid=2149
Feel free to contact me (RNeubig@msu.edu or at 517 353-7145) for other giving opportunities.
IPSTP Integrative Pharmacology Sciences Training Program

What is it?
The IPSTP is an NIH T32-supported interdisciplinary training program, available to Ph.D. students in 7 Ph.D. programs: Pharmacology & Toxicology, Biochemistry & Molecular Biology, Chemistry, Chemical Engineering and Material Science, Microbiology and Molecular Genetics, Neuroscience, and Physiology. Students will focus on studying two unique areas of research; in vivo pharmacology approaches and drug discovery. The program prepares graduate students for a successful research career as a pharmacological science professional.

Why?
The mission of the program is to prepare students to be leaders in the field of pharmacological sciences. Cooperation and scientific interaction among 45 training faculty and the students in the 7 participating Ph.D. programs deepens understanding and encourages collaborative work. Training provides students a much broader perspective on pharmacology that better prepares them to lead multi-disciplinary research teams in the pharmacological sciences.

Innovative features and activities unique to the program include:
- Student led journal club
- 2 week long boot camps that focus on techniques
- Professional development courses
- Fellowship writing workshop & mock study section
- Exposure to non-academic careers & regional networking opportunities

Masters Programs:
Master of Science in Pharmacology & Toxicology
A 31-credit program that provides advanced scientific knowledge in pharmacology and toxicology and is designed for individuals who are seeking additional academic qualifications that will facilitate advancement in their places of employment or enhance their competitiveness for admission to professional degree programs.

Master of Science in Integrative Pharmacology
This program is more specifically designed for those individuals actively employed in the pharmaceutical industry. In addition to advanced coursework in pharmacology, courses to enhance professional skills are required. Students are also required to complete a capstone research project and submit an associated paper.

All courses in both degree programs are offered online to provide maximal opportunity to students regardless of their geographic location, work schedules, or family responsibilities.

Current Students:
- Kevin Baker
- Kevin Chen
- Shelby DeChow
- Robert Freeborn
- Evert Njomen
- Patricia Perez-Bonilla
- Anna Stoll
- Di Zhang

Our online MS programs have been growing since they began in 2008. The programs originated with a Professional Science Master’s degree in Integrative Pharmacology and have since transformed and developed into our current MS in Pharmacology and Toxicology and MS in Integrative Pharmacology. These MS programs serve professional scientists working in industry, academic, and government laboratories, as well as students who desire to increase their scientific knowledge in preparation for medical professional schools. Almost 500 students have enrolled in the online programs since we began, and approximately 200 students are currently enrolled. Many of our graduates have gained promotions, secured new positions, or achieved entry to professional schools after completing their MS degrees. As of summer semester 2017, a total of 188 students have graduated from the online programs and proudly call themselves MSU Pharmacology and Toxicology alumni.

At a glance...
- Established in 2008
- # of graduates since 2008: 188
- Average time to graduation: 3 Yr

Jane Maddox, D.V.M. Ph.D.
Director, Online Master’s in Pharmacology & Toxicology Program
Recent Ph.D. Graduates

Kibrom Alula (Galligan Lab)
Kevin Baker (Luyendyk Lab)
Vanessa Benham (Bernard Lab)
Janice Diaz-Otero (Dorrance Lab)
Huijie Jade Feng (Neubig Lab)
David Ferland (Watts Lab)
Robert Freeborn (Rockwell Lab)

Joseph Henriquez (Kaminski Lab)
Yajing Ji (Neubig Lab)
Luca Kaiser (Rockwell Lab)
Ramya Kalyanakumar (Watts Lab)
Qianqian Ma (Jin Lab)
Alberto Perez-Medina (Galligan Lab)
Hoa Thi Nhu Phan (Neubig Lab)
Lindsay Riech (Liby Lab)
Erika Sarno (Robison Lab)
Bridget Seitz (Watts Lab)

Current Ph.D. Students

Kibrom Alula (Galligan Lab)
Kevin Baker (Luyendyk Lab)
Vanessa Benham (Bernard Lab)
Janice Diaz-Otero (Dorrance Lab)
Huijie Jade Feng (Neubig Lab)
David Ferland (Watts Lab)
Robert Freeborn (Rockwell Lab)

Michael R. Strug, D.O., Ph.D.
Isola Brown, Ph.D.
Nadia Ayala-Lopez, Ph.D.
Nadine El-Ayache, Ph.D.
Juliette Brown, Ph.D.
Sophia Kaska, Ph.D.
Natalia Kovalova, Ph.D.
Nusrat Matin, Ph.D.

Nikita Ramesh Joshi, Ph.D.
Theresa Lansdell, Ph.D.
Brittany Winner, Ph.D.

Robert Freeborn (Rockwell Lab)

Vincent Shaw (Neubig Lab)
Michelle Steidemann (LaPres Lab)
Anna Stoll (Sortwell Lab)
Jenna Strickland (Copple Lab)
Jasiel Strubbe (Bazil Lab)
Alexandra Turley (Rockwell Lab)
Elizabeth Williams (Robison Lab)
Di Zhang (Liby Lab)
Awards

Our students have been highly successful in winning several competitive awards. Here are just a few examples:

Joseph Henriquez
2017 Department of Pharmacology and Toxicology Best Student Publication award.

Janice Diaz-Otero
Caroline tum Suden/Frances A. Hellebrant Professional Opportunity Award from the American Physiological Society.

Huijie Jade Feng
American Epilepsy Society predoctoral fellowship.

Kibrom Alula
The American Physiological Society Minority Travel Fellowship Award.

Isola Brown
The American Physiological Society Minority Travel Fellowship Award.

Maleeha Ahmad
The Council on Hypertension Trainee Advocacy Committee & the International Society of Hypertension New Investigator Committee Onsite Trainee Poster Award.
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