ISSUE
01

UVA Pharmacology Yearly

JUNE
2022

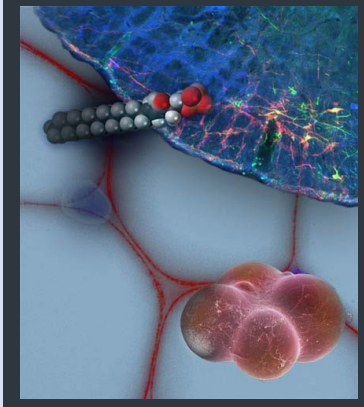
this issue

Message from the Chair:

Welcome to the inaugural Annual Newsletter for the Department of Pharmacology at the University of Virginia. If this is not our first ever departmental newsletter, it is at least the first in a very long time -- and we are pleased to begin using this forum to share with you some of the exciting developments and inevitable changes within the department.

In this issue, we highlight new research and publications from the department. We include a "Featured Faculty" piece from Dr. Beenhakker that describes his new experimental model for understanding the mechanistic basis for a key diagnostic test for absence epilepsy in children – and perhaps also for the seizures themselves. We also point out the many notable successes of our students – papers, graduation, awards, fellowships, etc. – achieved at different stages of their training. Finally, we recognize the faculty comings-and-goings, with various job changes, retirements and new recruitments all influencing the current make-up of the department. We hope that the pictures and stories reprised here will provide a sense of our recent achievements, as we have cautiously ventured out from the pandemic to celebrate at least some of these events together throughout the year.

I hope this newsletter will leave you feeling, as I do, that the "State of the Department" remains strong – and that this reflects the commitment and efforts of outstanding faculty, trainees and staff dedicated to excellence in research, education, and service to our communities. –Douglas A. Bayliss



PHARMACOLOGY
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Recent Events:

PHARM DAY- Friday, May 06, 2022

After two long years of social distancing and masking it was about time for a department get-together to celebrate the perseverance through the challenges that COVID- 19 pandemic brought to our work environments, as well as the impact in made on our personal lives. The Pharmacology Committee on Parties (Drs. Mark Beenhakker and Michelle Bland) hosted Pharm Day on Friday, May 06, 2022 from 11-4pm at Camp Albemarle. Despite the challenges that a day of clouds and scattered rain showers brought to the event, participants were able to enjoy lots of great food, tug-of-war, potato sack and egg-, laugther, good times and great fellowship. It turned out to be an amazing event that many enjoyed and many memories where made.

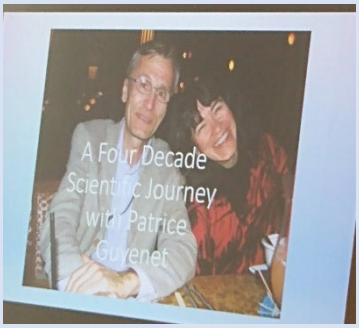
2021 Pharmacology Retreat, Retirement Symposium & Dinner in Honor of Drs. Patrice Guyenet & Ruth Stornetta- Thursday, October 14, 2021

The Pharmacology department hosts an Annual Research Retreat each year that includes a wonderful day of fellowship and collaboration, a variety of fun activities that include scientific poster contests, games, and presentations of a variety of research interest/efforts of our graduate students and faculty.

An exciting part of the day was the presentation of various awards and announcement of the contest winners. The 2021 award winners included:

- Ted W. Rall Award (outstanding paper) – Philip Seegren (Desai Lab)
- Best Predoctoral Presentation – Elizabeth Gonye (Bayliss Lab)
- Best Predoctoral Poster- Mitchell Granade (Harris lab)
- Best Postdoctoral Poster- George Souza (Abbott Lab)

Everyone did such an amazing job which made it difficult to decide the winners of these various awards. The Pharmacology Department is proud of all of the talented, hardworking, dedicated, and scientifically passionate students and faculty! It was evident that a lot of work went into each presentation and they were well-received by all.



There was a very special part of this year's Pharm Retreat dedicated to two of our very dear and long-time faculty members, Drs. Patrice Guyenet and Ruth Stornetta.

A Retirement Symposium was held in honor of their many years of service to UVA Pharmacology and their many contributions to research, mentorship and teaching. Several outside speakers participated in this honor, including:

- Clifford Saper, Harvard Medical School: "Brain Circuitry for Arousal from Sleep Apnea"
- Scott Baraban, UCSF: "Epilepsy Research in Translation"
- Ruth Stornetta, University of Virginia: "A Four Decade Scientific Journey with Patrice Guyenet
- Dan Mulkey, University of Connecticut: "Disordered Breathing in a Mouse Model of Pitt Hopkins Syndrome"

The Retirement Symposium was followed by a Retirement Dinner at Darden. What a joyous occasion…

Featured Faculty

Mark Beenhakker, PhD, Associate Professor of Pharmacology

Epilepsy is complex. For most forms of the disease, a concerted system of multiple gene mutations, together with environmental factors, converge to produce a brain that generates uncontrollable seizures. Compounding this complexity is the fact that 99% of the time, the epileptic brain operates normally. The seizure abruptly attacks the brain like a violent electrical storm. And then it quickly vanishes, leaving few clues of when the next storm will form. Given its complexities, how does one study epilepsy?

My lab aims to identify the cellular and molecular events that trigger seizures. We believe that focusing on such triggering events will lead to fundamental insights into the disorder, thereby paving the way forward to new, broadly applicable treatments. We have recently directed our efforts towards resolving how hyperventilation triggers seizures in a common pediatric form of epilepsy. Indeed, the use of hyperventilation to unequivocally and quickly diagnose patients with *absence epilepsy* is now commonplace, and largely obviates the need for protracted EEG recording procedures to capture spontaneous seizures. And yet, we know virtually nothing regarding the underlying mechanisms. Using a combination of EEG recordings, plethysmography and optogenetics, we have now shown that hyperventilation provokes a burst of seizures within two minutes of hyperventilation in both mouse and rat models of absence epilepsy – a striking confirmation of the face validity of this preclinical model. By using these models, we have also shown that blood alkalization that accompanies hyperventilation (i.e., respiratory alkalosis) is the primary, seizure-triggering stimulus. These results, recently published in *eLife*, prompted us to identify a population of pH-sensitive neurons responsible for transducing alkalosis into absence seizures. With our recently awarded R01 grant from the NIH, we will use these hyperventilation-evoked seizure models to elucidate shared molecules, cells, and circuits in these multifactorial epilepsies that may present novel therapeutic opportunities.

Faculty News

The last few years have been eventful for our faculty, even as the pandemic has made it difficult to recognize and celebrate all their accomplishments. Here, we highlight some of the changes that have occurred from early 2020 until now.

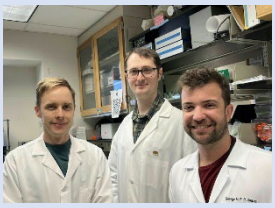
Sadly for us, but happily for them, three of our faculty have chosen to move into Emeritus status: Drs. Patrice Guyenet and John Lazo, at the beginning of 2020; and Dr. Paula Barrett in Mar-2022. We are excited for them as they enter this new phase of their lives, and are grateful that all three continue to participate in departmental activities. We also note that Paula is retaining a part-time position to complete work on her NIH grants. In addition, Dr. Michael Scott has decided to take on a new challenge in serving as Director of Toxicology for Charles River Laboratories; this new position takes Michael, his wife and kids across the pond to Edinburgh, Scotland where he will be reunited with his extended family, including his children's grandparents. We wish him well in this new endeavour (spelling according to the Queen.) Dr. Iullia Vitko also moved on from her longtime association with the Perez-Reyes laboratory, transitioning from basic to applied research as a Clinical Research Coordinator in Pediatrics.

Along with these departures, we also have some additions. Specifically, Dr. Stephen Abbott joined the faculty as an Assistant Professor in Mar-2022; Steve will continue to develop his independent NIH-funded research on central autonomic and respiratory control while maintaining his many fruitful collaborations in the department, school and across grounds. From the same national search, we are also pleased that Dr. Edward Nieh has chosen to join our faculty as an Assistant Professor. Edward has delayed his start to May-2023 to advantage the timing of his K99/R00 award. Once here, Edward will establish a program to understand internal state-dependent hypothalamic network dynamics associated with food and drug rewards. We look forward to having Edward with us very soon.

Last, but not least, some other advancements. We congratulate Dr. Michelle Bland on her promotion to Associate Professor; and Dr. Bimal Desai on the award of tenure – these promotions are official on July 1, 2022. Also advancing since 2020: Dr. Elizabeth Sharlow was promoted to Professor of Research on July 1, 2020; Drs. Nick Guagliardo, Anuradha Illendula, Yugesh Kharel, and Yingtang Shi all became Assistant Professors of Research in 2021.

As the department continues to evolve – and we extend our best wishes to those leaving and warm welcomes to those joining – we also continue to be defined by our collegiality and pursuit of rigorous excellence in all our missions.

Faculty Research Highlights



Stephen Abbott's lab in the Department of Pharmacology recently published an article in *Cell Reports* describing cells in the brain that protect the body against blood loss. Check out the associated UVA press release here (https://newsroom.uvahealth.com/2022/03/28/uva-discovers-bodys-natural-alarm-to-battle-blood-loss/). Way to Go, Abbott Lab! Congratulations to the whole team!

Elizabeth R. Sharlow, Professor of Research in Pharmacology highlights the Fiske Drug Discovery Laboratory where impactful pharmacological research occurs every day. At UVA, graduate and undergraduate students are learning to become the next "drug hunters" to advance therapeutic treatments. Visit UVA Engagement to learn more.

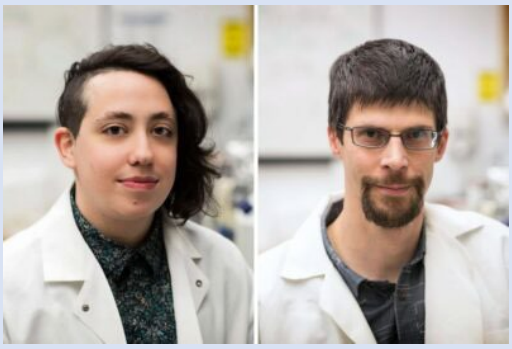
KeViRx is an early stage drug discovery company spun out of the **UVA Department of Pharmacology by Elizabeth Sharlow and John Lazo** and located in Charlottesville. Recently, KeViRx, Inc was selected to join BLUE KNIGHT™, a joint initiative between Johnson & Johnson Innovation – JLabs and the Biomedical Advanced Research and Development Authority (BARDA), a component of the US Department of Health and Human Services.

BLUE KNIGHT™ is a collaborative program designed to anticipate and respond to global health security threats. It provides a scientific and technological ecosystem for innovative, early stage startup companies to develop technologies that are strategically aligned with global health interests. KeViRx was selected for this program based on its technology platform and small molecule, KVX-053, which displays efficacy in preclinical models of ovarian cancer, acute myeloid leukemia and acute lung injury. As a BLUE KNIGHT™ company, KeViRx will benefit from dedicated mentorship and support from BARDA, in addition to JLabs' extensive global network of innovators for critical insights centering on KVX-053 development.

"KeViRx is honored to be selected to be a BLUE KNIGHT™ company and we are excited to be working with the BLUE KNIGHT™ program. We are optimistic that the program will help advance our KVX-053 platform for global health applications in the present and the future," said Dr. John S. Lazo, who serves as KeViRx's Chief Scientific Officer.

About KeViRx, Inc.

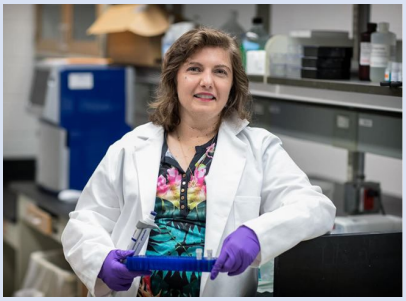
KeViRx, Inc. was founded in 2016 in Charlottesville, VA and is a privately-held biotechnology company focusing on small molecule-based drug discovery. KVX-053, has efficacy in multiple disease models including cancer and acute lung injury. For further information, please visit www.KeViRx.com.



Dr. Dorian Rosen (Pharmacology PhD, 2019), while working in the **Alban Gaultier lab**, showed that a common SSRI antidepressant, fluvoxamine, can also engage the sigma-1 receptor to dampen cytokine-mediate inflammatory responses, likely by effects on ER stress pathways. Based in part on these findings, and recognizing that excess cytokine production may be involved in the progression of COVID-19, researchers at Washington University initiated a small clinical trial that yielded early encouraging results. Now, as reported in the Lancet and highlighted in the New York Times, fluvoxamine was found to improve outcomes in high-risk patients with COVID-19 in a large randomized, placebo-controlled trial out of Brazil. Notably, the Rosen/Gaultier mechanism was cited as a possible mechanism for the salutary effects of this inexpensive, re-purposed drug ($4 per 10-day course). Congratulations to Alban and Dorian for their important contributions to the conceptual and practical insights that culminated in this result – this is not necessarily *why* we do our science, but it is surely satisfying when it works out this way.

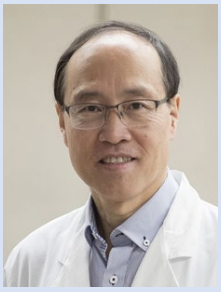
The Pharmacology department recognizes **Mark Kester, PhD**, UVA Professor of Biomedical Engineering, Pharmacology and Molecular Physiology and Biophysics, for making headlines for his excellent work with nanotechnology and the nanoSTAR Institute at UVA, where he is the director. Kester and the institute have placed second-year students in nanotechnology labs that match their academic interests via a Summer Undergraduate Research program; now,they have stepped the program up a notch by curating the nanoSTAR Summer Program for Entrepreneurial Nanoscale Engineering. With the help of Bernie Carlson, director of UVA's engineering business programs, and backed by a $100,000 grant from the Jefferson Trust, the program afforded nine students to receive the opportunity to develop their own intellectual property while learning the entrepreneurial skills to eventually bring it to the market. Third-year physics and psychology major, Ziyuan Wang was one of the nine to benefit from the program. Please visit UVA Today for the full story.

Maybe you missed the paper this year detailing the work of a **UVA SOM collaboration between the Department of Pharmacology and Nephrology**. Dr. Shinji Tanaka from the Okusa lab (Nephrology) and the Guyenet lab (Pharm) combined to map the signaling pathways that contribute to the beneficial effects of vagus nerve stimulation in a model of kidney injury. Check out the paper, published in PNAS: https://www.pnas.org/content/118/12/e2021758118



There was exciting new research from **Irina Bochkis's Lab**, where the team outlined an entirely new paradigm to explain the activation of Type II hormone receptors found inside cell nuclei. These receptors play important roles in our body's use of cholesterol and glucose, among other critical processes. Bochkis and her team detailed a complex cascade of events that is required to activate these hormone receptors. These findings were published in *Molecular Metabolism:*

Jessica Kain, Xiaolong Wei, Nihal A. Reddy, Andrew J. Price, Claire Woods and Irina M. Bochkis (2021).Pioneer factor Foxa2 enables ligand-dependent activation of type II nuclear receptors FXR and LXRα, Molecular Metabolism. This story made headlines in UVAToday and NBC29News

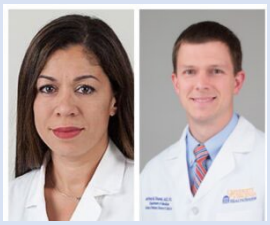


Zhen Yan, PhD (Professor of Cardiovascular Medicine and Pharmacology and joint appointee in Pharmacology) and his team published research findings in the Journal of Applied Physiology this year suggesting that exercise during pregnancy might have long-lasting benefits for a child's health. In studying lab mice, they found that maternal exercise during pregnancy prevented the transmission of metabolic diseases from an obese parent to the child. Of note, this exciting and convincing new research recently caught the attention of New York Times! You can read the full story by visiting https://www.nytimes.com/2021/04/28/well/move/pregnancy-exercise-diet.html.

Kudos to **Dr. Carl Creutz, Professor of Pharmacology**, who received the 2021 Robert J. Kadner Award for Outstanding Graduate Teaching.

This award is presented in honor of Dr. Robert J Kadner, an internationally recognized microbiologist whose research on microbial physiology spanned four decades. Dr. Kadner was highly revered by medical and graduate students for his mentorship and teaching at the UVA School of Medicine, where he remained dedicated to education and research up until his death in 2005. Throughout his career, Dr. Kadner was recognized for his strong advocacy of teaching, particularly in the basic sciences, as well as for his mentorship of medical students, graduate students, postdoctoral trainees, and junior faculty.

The Kadner Award recognizes School of Medicine faculty members engaged in basic science or clinical laboratory research who show a strong commitment to teaching in both the classroom and laboratory setting. Dr. Creutz exemplifies Dr. Kadner's legacy though outstanding instruction in graduate and medical classrooms as well as through his teaching and mentorship to trainees ranging from undergraduate students to senior professional research staff in the Pharmacology Department. The department is very grateful for his commitment to excellence in teaching and research!



Congratulations to **Alexandra Kadl, MD/PhD (**Professor of Medicine and joint appointee in Pharmacology) and **Jeff Sturek MD/PhD (**Assistant Professor of Medicine and Pharmacology Student Alumni, Class of 2010) for receiving the 2021 Team Science Award. The Team Science Award recognizes excellence in SOM faculty team research efforts. Nominated teams must have made significant research contributions with notable scientific and/or clinical impact. Drs. Kadl & Sturek demonstrated this extraordinary excellence as part of the COVID Care Team in the UVA Medical Center.

Way to go, Drs. Kadl & Sturek!

Graduate Student News

Scott Yeudall (Pharmacology Graduate Student and MSTP Student in Norbert Leitinger's Lab) is a recipient of the Ruth L. Kirschstein Individual Predoctoral NRSA for MD/PhD Students from the National Heart, Lung, and Blood Institute (NHLBI).

The Kirschstein-NRSA program enables promising predoctoral students, such as Scott, who has the potential to develop into a productive, independent research scientist, to obtain mentored research training while conducting dissertation research.

Scott's NRSA will help him explore "Macrophage and Monocyte Metabolic Adaptation in Hemolysis and Sickle Cell Disease."

Project Description: Hemolysis contributes to problems in a variety of diseases including Sickle Cell Disease, sepsis, malaria, and drug toxicity, when ruptured red blood cells release heme into the circulation, causing vascular inflammation, oxidative damage, and end-organ injury, which leads to significant morbidity for patients with these disorders. Macrophages and monocytes are immune cells that are responsible for clearing heme to prevent damage, but the mechanisms by which they are able to survive the stress of this process remain unclear. Scott proposes to examine how these cells adapt their metabolism to carry out these important functions, and to test whether manipulating cell metabolism can improve heme clearance and reduce heme-induced inflammation and tissue damage in settings of pharmacological hemolysis and exacerbated SCD. Way to go, Scott!

Elizabeth Gonye (Pharmacology Grad Student in Dr. Douglas Bayliss's Lab), was one of the BIMS students to receivea Wagner Fellowship. Thanks to the incredible generosity of Dr. Robert Wagner and his wife Mary Wagner, this award provides fellowships to graduate students in the School of Medicine. Dr. Wagner served as Professor and Chair of Microbiology from 1967-1994 and contributed in so many ways to the School of Medicine, UVA, and the scientific community at large. These fellowships are a lasting tribute to his dedication to student training, his encouragement of young scientists, and his love of UVA. Students are selected from a highly competitive pool of students based on their outstanding performance in graduate school. The Wagner Fellowship comes with a one-time $1K stipend supplement and up to $1K in support for professional development. Way to go, Liz!

The children are definitely our future, and with this in mind, **Merci Best** (Pharmacology Graduate Student in the George Bloom Lab, Biology) knows how important it is to keep kids interested and engaged in science! She is so passionate about it that she started a company that aims to do just that! Check out her story, recently spotted in the news, where she shares her motivation and drive to make a difference in the lives of kids! Way to go, Merci!!! You can find the full story at NBC29 News.

Congratulations to **Philip Seegren** for winning the Ted W. Rall Award for the best paper published by a Pharmacology Student in 2021. Phil received this award for his first-authored manuscript, "Mitochondrial Ca2+ signaling is an electrometabolic switch to fuel phagosome killing," published in *Cell Reports*. Philip is a trainee in the Bimal Desai Lab and describes the published work and findings below:

Defense against microbial infections requires substantial allocation of metabolic resources. Over the last decade, it has become abundantly clear that immune cells radically reprogram their metabolism to meet the bioenergetic demands of microbial killing. However, in the backdrop of this high-activity area lay the enduring and perplexing mystery in immunometabolic reprogramming: HOW do the immune cells change cellular metabolism so rapidly? In this manuscript, we reported the novel and arresting finding that in response to a fungal pathogen, *Candida albicans*, macrophages use a fast two-phase Ca^{2+}-relay to rapidly switch the mitochondrial metabolism into an overdrive. Upon detection and engulfment of the pathogen, macrophages rapidly elevate cytosolic Ca^{2+} and concurrently activate the Mitochondrial Ca^{2+} Uniporter (MCU) to obtain a

rapid influx of Ca^{2+} into the electrically charged mitochondria. This study identifies the MCU as a critical component of cell-intrinsic antimicrobial responses

The award was presented at the Annual Pharmacology Scientific Research Retreat. Way to go, Philip, for this well-deserved award!

Mitchell Granade (Harris Lab), is the recipient of the **2022 Outstanding Pharmacology Graduate Student and Robert Haynes Award!** For this honor, Mitch received $500, a certificate, and an engraved Jefferson Cup, all of which were presented at the **GBS Symposium on Thursday, May 26, 2022**. Mitch is recognized by the Pharmacology Graduate Committee for the scientific merit of his doctoral research, his scientific productivity, his academic performance, and his outstanding leadership skills. He successfully presented his dissertation defense seminar titled, "Adenosine Regulation of Adipose Tissue Lipid Metabolism" on Thursday, May 05, 2022.

As a recipient of the 2022 Outstanding Pharmacology Graduate Student Award, Mitch was also the department's nominee for the Michael J. Peach Outstanding Graduate Student Award and Jill E. Hungerford Prize in Biomedical Sciences. These prestigious awards recognize the accomplishments of our most talented and creative senior students across the School of Medicine. We are excited to announce that, in addition to being the 2022 Outstanding Pharmacology Graduate Student, Mitch received the **Jill E. Hungerford Award** at this year's GBS Symposium! The Pharmacology department is very proud of all of Mitch's accomplishments! Way to go, Mitch!

Katie Pavelec (Graduate Student in the Leitinger Lab), was **first place winner** for her poster, presented in **the GPS Symposium Poster Competition** held on **Thursday, May 26, 2022**. Great job, Katie, on presenting a compelling research story with a poster that was very well-received by all. Way to go, Katie! Pharm is very proud of you!

Congratulations to Dr. Katie Salvati (Beenhakker Lab), the recipient of the 2022 *Neuroscience Graduate Program Outstanding Student Award*! Katie's PhD work largely focused on resolving cellular and molecular events that trigger seizures. In one project, Katie used her experimental expertise to crack a nearly 100-year old question: How does hyperventilation trigger seizures in nearly 100% of patients with absence epilepsy? To tackle this question, Katie independently developed a new rat model of hyperventilation-triggered seizures that she then used to resolve basic, seizure-generating mechanisms. In doing so, Katie discovered that higher-order thalamic nuclei localized near the brain's midline are activated during hyperventilation-provoked respiratory alkalosis. In addition to publishing this work in eLife, Katie published two additional first author studies as well as three first author reviews/commentaries. Katie recently started a postdoctoral researcher position at the University of California, San Francisco, where she aims to use imaging tools to resolve large-scale seizure dynamics in the zebrafish. Thanks for making UVA Neuroscience and Pharmacology so proud!

2021 Pharmacology Graduates

Matteo Ottolini, Ph.D., December 2021 (Sonkusare Lab)
Dissertation Defense: "Endothelial TRPV4 channel signaling in blood pressure regulation"

Adam Borne, Ph.D., June 2021 (Hsu Lab)
Dissertation Defense: “Computational and Chemical Proteomic Strategies for Deconvoluting Inhibitor and Drug Mode of Action”

Adishesh K. Narahari, Ph.D., May 2021 (Bayliss Lab)
Dissertation Defense: ATP and Large Signaling Metabolites Flux Through Caspase-activated Pannexin 1 Channels

Brittany A. Martinez, Ph.D., May 2021 (Bland Lab)
Dissertation Defense: Innate immune Signaling In Drosophila Melanogaster Shifts Lipid Metabolism To Support Immune Function

Welcome to our New 2022 First Year Students

Please meet and help us welcome….

David Leace

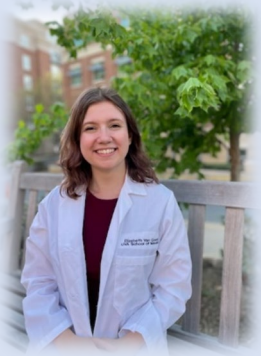
Pharmacology Degree Trainee

Ken Hsu's Lab

Madison (Maddie) Failor

Pharmacology Degree Trainee

Edward Perez-Reye's Lab



Elizabeth (Lizzie) Van Gorder

Pharmacology Degree Trainee

Michelle Bland's Lab

Daniel Lank

Pharmacology Degree Trainee

Thurl Harris's Lab

2021-22 Pharmacology Publications

Shi Y, Stornetta DS, Reklow RJ, Sahu A, Wabara Y, Nguyen A, Li K, Zhang Y, **Perez-Reyes E**, Ross RA, Lowell BB, **Stornetta RL**, Funk GD, **Guyenet PG**, **Bayliss DA**. A brainstem peptide system activated at birth protects postnatal breathing. Nature. 2021 Jan;589(7842):426-430. doi: 10.1038/s41586-020-2991-4. Epub 2020 Dec 2. PMID: 33268898; PMCID: PMC7855323.

Narahari AK, Kreutzberger AJ, Gaete PS, Chiu YH, Leonhardt SA, Medina CB, Jin X, Oleniacz PW, Kiessling V, **Barrett PQ**, Ravichandran KS, Yeager M, Contreras JE, Tamm LK, **Bayliss DA**. ATP and large signaling metabolites flux through caspase-activated Pannexin 1 channels. Elife. 2021 Jan 7;10:e64787. doi: 10.7554/eLife.64787. PMID: 33410749; PMCID: PMC7806264.

Huang T, Hosseinibarkooie S, Borne AL, Granade ME, Brulet JW, **Harris TE**, Ferris HA, Hsu KL. Chemoproteomic profiling of kinases in live cells using electrophilic sulfonyl triazole probes. Chem Sci. 2021 Jan 21;12(9):3295-3307. doi: 10.1039/d0sc06623k. PMID: 34164099; PMCID: PMC8179411.

Li H, Sibley CD, Kharel Y, Huang T, Brown AM, Wonilowicz LG, Bevan DR, **Lynch KR**, Santos WL. Lipophilic tail modifications of 2-(hydroxymethyl)pyrrolidine scaffold reveal dual sphingosine kinase 1 and 2 inhibitors. Bioorg Med Chem. 2021 Jan 15;30:115941. doi: 10.1016/j.bmc.2020.115941. Epub 2020 Dec 13. PMID: 33385956; PMCID: PMC8862572.

Vastagh C, Farkas I, **Scott MM**, Liposits Z. Networking of glucagon-like peptide-1 axons with GnRH neurons in the basal forebrain of male mice revealed by 3DISCO-based immunocytochemistry and optogenetics. Brain Struct Funct. 2021 Jan;226(1):105-120. doi: 10.1007/s00429-020-02167-7. Epub 2020 Nov 9. PMID: 33169188; PMCID: PMC7817561.

Guyenet PG, **Stornetta RL**. Rostral ventrolateral medulla, retropontine region and autonomic regulations. Auton Neurosci. 2022 Jan;237:102922. doi: 10.1016/j.autneu.2021.102922. Epub 2021 Nov 19. PMID: 34814098.

Barrett PQ, **Guagliardo NA**, **Bayliss DA**. Ion Channel Function and Electrical Excitability in the Zona Glomerulosa: A Network Perspective on Aldosterone Regulation. Annu Rev Physiol. 2021 Feb 10;83:451-475. doi: 10.1146/annurev- physiol-030220-113038. Epub 2020 Nov 11. PMID: 33176563; PMCID: PMC7903429.

Publications Continued..

Li K, **Abbott SBG**, **Shi Y**, Eggan P, Gonye EC, **Bayliss DA**. TRPM4 mediates a subthreshold membrane potential oscillation in respiratory chemoreceptor neurons that drives pacemaker firing and breathing. Cell Rep. 2021 Feb 2;34(5):108714. doi: 10.1016/j.celrep.2021.108714. PMID: 33535052; PMCID: PMC7888550.

Senthivinayagam S, Serbulea V, Upchurch CM, Polanowska-Grabowska R, Mendu SK, Sahu S, Jayaguru P, Aylor KW, Chordia MD, Steinberg L, Oberholtzer N, Uchiyama S, Inada N, Lorenz UM, **Harris TE**, Keller SR, Meher AK, Kadl A, **Desai BN**, Kundu BK, **Leitinger N**. Adaptive thermogenesis in brown adipose tissue involves activation of pannexin-1 channels. Mol Metab. 2021 Feb;44:101130. doi:10.1016/j.molmet.2020.101130. Epub 2020 Nov 25. PMID: 33248294; PMCID: PMC7779784.

Congdon M, Fritzemeier RG, Kharel Y, Brown AM, Serbulea V, Bevan DR, **Lynch KR**, Santos WL. Probing the substitution pattern of indole-based scaffold reveals potent and selective sphingosine kinase 2 inhibitors. Eur J Med Chem. 2021 Feb 15;212:113121. doi: 10.1016/j.ejmech.2020.113121. Epub 2020 Dec 29. PMID: 33445156; PMCID: PMC8224985.

Rocha IRC, **Perez-Reyes E**, Chacur M. Effect of photobiomodulation on mitochondrial dynamics in peripheral nervous system in streptozotocin-induced type 1 diabetes in rats. Photochem Photobiol Sci. 2021 Feb;20(2):293-301. doi: 10.1007/s43630-021-00018-w. Epub 2021 Feb 18. PMID: 33721255.

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Upcoming Department Events

- **Fall 2022 Pharmacology Seminar Schedule Dates on Thursdays @4PM in PINN 1-17:**
  - **September 08**
  - **September 22**
  - **October 06**
  - **October 27**
  - **November 10**
  - **December 01**
  - **2022 Annual Pharmacology Research Retreat in Fall – Date forthcoming….**

Save-the-Dates

- **Friday, October 21, 2022- Joseph Larner MeMemorial Lecture in Pharmacology, Guest Speaker- Marcia Haigis, Professor of Cell Biology, Harvard Medical School**
- **Friday, December 09, 2022- Pharmacology Holiday Party@ UVA Alumni Hall**