

# Pharmacology News

Volume 12, Issue 2  
Spring 2023

TULANE UNIVERSITY SCHOOL OF MEDICINE DEPARTMENT OF PHARMACOLOGY

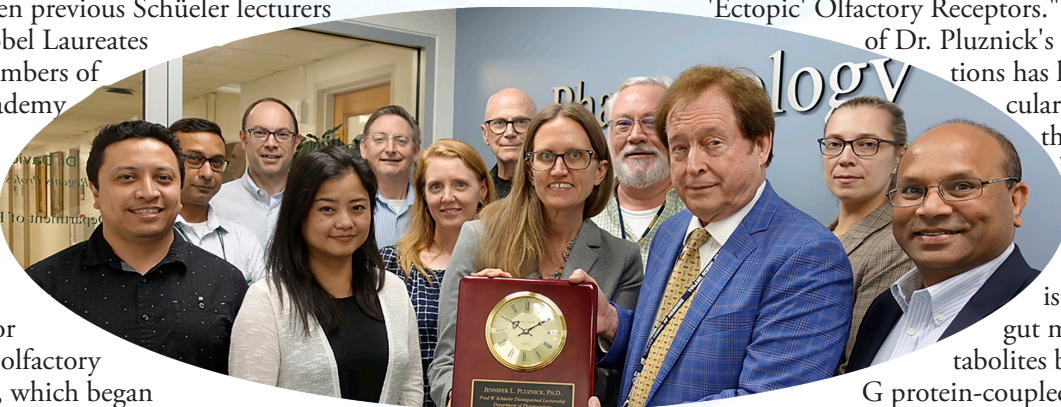
## Message from the Chair: Dr. David Busija

The Department of Pharmacology continues to prosper and make major advances in research findings, extramural funding, professional service activities, and education. There have been several recent noteworthy achievements to highlight. **First**, we had a major presence at the American Physiological Society (APS) Summit 2023 in Long Beach, California (April 20-23), with our faculty chairing and co-chairing sessions (*Drs. Katakam and Chandra*) and presenting invited slide (*Drs. Katakam, Chandra, Rutkai, Lindsey*) and poster presentations (*Drs. Chandra and Leite*). Our impact was particularly significant since this is the first APS “stand alone” meeting since dissolution of the yearly, multi-association Experimental Biology meeting. **Second**, *Dr. Ricardo Mostany* has been appointed to the NIH Sensory-Motor Neuroscience Study Section (SMN) as well as named the Director of the Neuroscience Ph.D. Program in the Tulane Brain Institute. This appointment recognizes his prominence in his field of study and past contributions as an ad hoc grant reviewer. His group made a strong showing at the Tulane Research, Innovation, and Creativity Summit in March. Our faculty have also been elected or appointed to many positions within Tulane University or external professional organizations. **Third**, *Dr. Jorge Casterena-Gonzalez*, who joined our department only three years ago, has received an R01 grant from NIH (see below). **Fourth**, under the direction of *Dr. Craig Clarkson*, our educational programs have continued to prosper. In a survey of the last graduating class (May 2022), over 90% of the medical students ranked the level of Pharmacology instruction as either good or excellent, compared with the national average of 83% from 16,583 respondents. The Owl Club representing the medical students also acknowledged Dr. Clarkson for his efforts (T2 Lecturers—highest average review scores). In addition, our Masters in Pharmacology students received a solid foundation in our discipline to enhance their acceptance to medical school and other advanced programs, with an 87% acceptance rate.

## Forty-Eighth Annual Schüeler Distinguished Lecture in Pharmacology Dr. Jennifer L Pluznick

The faculty and staff of the department of Pharmacology were honored to host *Dr. Jennifer Pluznick* (shown third from left with members of the Pharmacology faculty) for this year's Schüeler Lecture. The lecture was established in 1971 and fourteen previous Schüeler lecturers have become Nobel Laureates and most are members of the National Academy of Sciences. Dr. Pluznick, an Associate Professor of Physiology at Johns Hopkins School of Medicine, is known for her work on the olfactory signaling system, which began

in 2009 with publication of her seminal paper, "Functional expression of the olfactory signaling system in the kidney," published in the *Proceedings of the National Academy of Sciences, USA*. The topic of her talk was "Unexpected Roles for 'Ectopic' Olfactory Receptors." The outgrowth of Dr. Pluznick's renal investigations has led to cardiovascular function and the gut microbiota studies as well: discovering that host blood pressure is influenced by gut microbial metabolites binding to host G protein-coupled receptors.



## Dr. Jorge Castorena-Gonzalez receives NIH-NHLBI R01: Trpv4 regulation of lymphatic vascular function: Implications in metabolic syndrome, \$2,425,729

*We are investigating the pathophysiological mechanisms leading to lymphatic system dysfunction in metabolic syndrome and will assess the therapeutic potential of targeting Trpv4 channels and PAI-1 to improve lymphatic function.* The lymphatic system plays critical roles in fluid homeostasis, lipid and protein transport, lipid metabolism, and the transport of immune cells, pathogens, antigens, and pro-inflammatory molecules, as well as the dissemination of cancer metastases. Clinical studies have shown connections between obesity and lymphatic dysfunction, in that morbidly obese patients have 200-times greater odds of developing severe and potentially life-threatening cases of lymphedema. *Currently, there are no pharmacological therapies or cures for lymphedema, and patients suffering from lymphatic diseases continue to grow worldwide.* In animal models, we and others have identified aspects of lymphatic dysfunction associated with obesity and metabolic syndrome, including contractile and valve deficiencies and hyperpermeability, and that the extent of dysfunction correlates with degree of obesity, hypercho-

*Dr. Jorge Castorena-Gonzalez continued from Page 1*

lesterolemia, and local inflammation. The obesity—lymphatic dysfunction connection is a disease-promoting feedback loop, as lymphatic dysfunction worsens obesity. *We will test whether pharmacological improvement of lymphatic function has significant potential to ameliorate metabolic syndrome and the associated risk for cardiovascular disease.* Dysregulated activity of transient receptor potential vanilloid 4 (Trpv4) channels has been implicated with various inflammatory diseases; however, the regulatory role of Trpv4 channels in lymphatic vascular function is largely unexplored. We show that Trpv4 channel overactivity in the lymphatic wall is detrimental to vessel contractility/pumping, as well as to valve and barrier function. Trpv4 channels have also been implicated in regulatory mechanisms of tissue fibrosis via upregulation of the Plasminogen Activator Inhibitor-1 (PAI-1), which has been long-established as a biomarker for various diseases including atherosclerosis, thrombosis, cancer, Alzheimer's disease, obesity, and diabetes among others. We recently found that PAI-1 is significantly increased in the lymphatic vasculature of diet-induced obese mice, and global deficiency of PAI-1 significantly protects against obesity and metabolic dysfunction; but the underlying mechanisms and the lymphatic-specific contribution remain unknown. *We anticipate that our studies will provide fundamental insights about Trpv4 channels in the regulation of lymphatic vascular function and dysfunction and establish the potential of repurposing pharmacological PAI-1 inhibitors (currently under clinical trials) for lymphatic dysfunction treatment in inflammatory diseases, including obesity and metabolic syndrome.*

## Faculty News

### Dr. David Busija

- **Grant Submissions:** NIH/NIA, March 2023
- **Journal Reviewer:** *American Journal of Physiology*
- **Professional Service:** (1) American Physiological Society (APS) Finance Committee; (2) member of the Editorial Board: *American Journal of Physiology-CV and Heart Physiology*, (3) Elected as Secretary Treasurer of the APS Cardiovascular Section

### Dr. Stephen Braun

- **Invitation to a meeting:** Group Task Force Meeting, Paris, France, December 10-12, 2022
- **Grant Reviewer:** 2023 Emory Primate Research Center, Pilot Grant Reviewer
- **Journal Reviewer:** *iScience*, *Frontiers in Immunology*

### Dr. Jorge Castorena-Gonzalez

- **Grant Award:** "Trpv4 regulation of lymphatic vascular function: Implications in metabolic syndrome," NIH-NHLBI R01 HL168568, \$2,425,729, 03/20/2023-02/29/2028 (5-year award)
- **Invited Speaker:** (1) "Mechanisms of Impaired Lymph Transport in Obesity-Induced Lymphedema," Tulane University SOM, Cell and Molecular Biology Seminar Series, 1/2023; (2) "Lymphatic system function and dysfunction: How does obesity contribute to impaired lymph transport?" Tufts Medical Center, Molecular Medicine Seminar Series, 3/2023; (3) "Obesity and Lymphatic Dysfunction: Structural and Molecular Modifications," President's Symposium: Micro-Lymphatics as Mediators of Tissue Homeostasis, American Physiology Society Summit 2023 (APS Summit 2023), Long Beach, CA, 4/2023

- **Grant Reviewer:** Ad Hoc Grant Reviewer, National Institutes of Health (NIH), Study section: Integrative Vascular Physiology and Pathology (IVPP), 2/2023
- **Professional Service:** (1) Council Member and Membership Committee Member - The Microcirculatory Society, Inc.; (2) Awards Committee - APS Cardiovascular Section
- **Editorial Boards:** Microcirculation, Lymphatic System Research Special Topics Issue (Guest Editor)

### Dr. Partha Chandra

- **Grant Submission:** NIH NIMH R01, 12/19/22
- **Chair of a Symposia:** "Emerging Role of Extracellular Vesicles in Central Nervous System Pathogenesis," Foundational Science Session, APS Summit 2023, 4/21/23
- **Invited Speaker:** "Circulating Plasma Extracellular Vesicle Proteins Indicates a Link to Neurodegeneration," APS Summit 2023, Long Beach, CA, 4/21/2023
- **Poster Presentations:** (1) "Human serum fibrinogen induces brain microvascular endothelial dysfunction and blood-brain barrier dysregulation via dynamin related protein 1 dependent pathway," APS Summit 2023 Long Beach, CA; (2) "Proteomic profile of circulating plasma extracellular vesicles in SHIV-infected rhesus macaque indicates the development and progression of neurodegeneration," International Society for Extracellular Vesicles Annual Meeting 2023, Seattle, WA, 5/17-21/2023
- **Journal Reviewer:** *Viruses*, *Aquaculture*

### Dr. Suttira Intapad

- **Grant Submission:** NIH R01, 3/5/2023



## Faculty News continued

### Dr. Prasad Katakam

- **Grant Award:** NIH R01, "Role of Irg-1/itaconate in modulating secondary brain damage after traumatic brain injury in mice," PI: Xiaoying Wang, Co-I: P. Katakam, 01/01/2023-12/31/2027
- **Grant Submissions:** Co-Investigator (6) and Consultant (2) for NIH grant applications and Mentor and Co-Mentor for 2 AHA Career Development Awards
- **Grant Reviewer:** (1) NIH Study Section: Acute Neural Injury and Epilepsy Study Section (ANIE), 2/23/2023; (2) Co-Chairman, AHA Career Development Award Vascular Sciences 2 Peer Review Panel, 2/16/2023; (3) Oregon Partnership for Alzheimer's Research program-peer reviewer 3/27/2023; (4) NSF Physiological Mechanisms and Biomechanics (PMB) Program-Peer Reviewer, 4/1/2023; (5) Chairman: AHA Innovative Project Award Vascular 1 Peer Review Panel, 5/3/2023; (6) AHA Transformational Project Award Vascular 1 Peer Review Panel, 5/4/2023; (7) ZRD1 NURC-C (01)1 Neurobiology; VA Biomedical Laboratory/Clinical Science (BL/CS) Scientific Merit Review Board (SMRB), 5/23/2023
- **Mentoring:** BIRCWH and COBRE Aging Center

### Dr. Sarah Lindsey

- **Grant Submissions:** (1) American Heart Association Established Investigator Award (PI), January 2023; (2) NIH COBRE Resubmission (Co-I), January 2023; (3) NIH R01 Renewal (PI), March 2023; (4) Paul G. Allen Frontiers Group, Allen Institute, Distinguished Detection, Affinity, and Efficacy of Estrogen Metabolites, 3/2023.
- **Invited Speaker:** (1) "Sex, Estrogen, and Aging in Cardiovascular Disease" Tulane BIRCWH seminar, 1/24/23; (2) "Sex Differences in the Vascular Responses to Aging and Hypertension," APS Summit 2023, Long Beach, CA, 4/23/23
- **Grant Reviewer:** NIH Study Section, Respiratory and Cardiovascular Fellowships, March 23-24, 2023
- **Editor and Editorial Boards:** (1) Associate Editor:

*Endocrine Research*; (2) Editorial Board: *Biology of Sex Differences*; (3) Editorial Board: *American Journal of Physiology-Heart & Circulatory*

### Dr. John McLachlan

- **Cited by The Sunday Post (Scotland) news article:** "Congressman: Scotland will lead world on forced adoption," by The Sunday Post, May 17th 2023, concerning Scotland's Prime Minister, Nicola Sturgeon's, proposed apology to an estimated 60,000 Scots women forced to give up their babies and also to address the scandal of the synthetic oestrogen hormone (Silbestrol, also known as DES) given to these women and around 10 million women world-wide and now known to cause vaginal and breast cancer, reproductive organ defects and infertility among and women, their children, and grandchildren. Dr. McLachlan, whose work on DES has won international acclaim, was interviewed by the Sunday Post: "This is a critical moment because for decades the diseases and disorders that resulted from taking this drug have continued to affect those who took it, their sons and daughters and their grandchildren too, all are suffering the health consequences. When the drug was developed in the '50s, nobody could speculate how it could affect future generations. Because of what we now know about this drug, the way we understand risks in pregnancy has changed forever. In the early '70s, the first indications emerged linking this drug to rare cancers of the vagina and cervix, and we are aware too of changes to the reproductive system. But there are still many things we do not know, such as how it affects menopausal women. That is why it is vital we do more research while raising awareness, and for countries to co-operate with each other so we can properly see how this drug has affected people."

### Dr. Ricardo Mostany

- **Grant Submissions:** NIH, March 2023, R01: Engler-Chiurazzi, PI; Mostany, Co-I
- **Poster Presentations:** (1) "Intermittent infection via

**University and SOM Committees:** **Dr. Braun:** Tulane Primate Research Center (TNPRC) Space Committee; **Dr. Busija:** Tulane Professionalism Program Advisory Board; **Dr. Clarkson:** SOM Pass/Fail Task Force, BMS Steering, Student Professionalism & Promotion, Phase 2 Curriculum Advisory, Innovation Council; **Dr. Lindsey:** Tulane University Senate, Tulane Professionalism Program Peer Messenger, Women in Medicine and Science (GWIMS) Programming, **Dr. Intapad:** Faculty Advisory, BMS Social Media-Recruiting; **Dr. Katakam:** Chairman: BMS Curriculum, BMS PhD Admissions, BMS Steering (Standby), GMF Faculty Advisory and Admissions, Vice-Chair: GMF Personnel & Honors, SOM Admissions Committee, Neuroscience PhD Program Committee; **Dr. Mostany:** Director, Tulane Brain Institute Neuroscience PhD Program, Tulane Brain Institute Executive Committee, SOM Student Professionalism and Promotion, School of Science and Engineering Graduate Programs Committee.

## Faculty News continued

cytomegalovirus induces cognitive deficits and inflammation in nervous tissue," Tulane Research Innovation and Creativity Summit (TRICS), March 1-2, 2023; (2) "Intermittent viral exposure induces cognitive deficits and inflammation in nervous tissue," Symposium on Post COVID Conditions (Long COVID): Current Status and Future Directions, Tulane University, April 15, 2023

- **Professional Service:** Society for Neuroscience, Trainee Professional Development Awards (TPDA) Selection Committee

### Dr. Ibolya Rutkai

- **Invited Speaker:** (1) "The Beneficial Effects of SS-31

on Aging Mice Cerebral Microvasculature," Mitochondrial Metabolic and Redox Pathways in Vascular Health and Disease, APS Summit 2023, April 23, 2023

- **Notable Publication:** "Neuropathology and virus in brain of SARS-CoV-2 infected non-human primates," *Nature Communications* 13, Article number 1745 (2022) by first author **Dr. Ibolya Rutkai** and final authors **Dr. Jay Rappaport & Tracy Fisher** has been recognized by *Nature Communications* as one of the Top 25 COVID-19 Articles of 2022. This publication was reported in the Spring 2022 issue of the Pharmacology Newsletter.

**Laboratory News:** Pharmacology (Pharm), Brain Institute (BI), Biomedical Sciences (BMS), Neuroscience Undergraduate (NU), Neuroscience Program (NP), School of Science and Engineering (SSE), Biomedical Engineering (BE), Tulane National Primate Research Center (TNPRC)

### Laboratory of Dr. Castorena-Gonzalez

**Mary Schulz**, PhD Student (BMS) has joined the Castorena-Gonzalez lab. Please see New Faces.

### Laboratory of Dr. Suttira (Joy) Intapad

**Benjamin Bhunu**, Graduate Student (BMS) gave a seminar, "Age and Sex Specific Evaluation of Renal Function in Offspring of a Novel Mouse Model of Placental Insufficiency," in the Physiology Seminar Series on 3/17/23.

### Laboratory of Dr. Sarah Lindsey, [Our webpage](#)

**Dr. Bruna Visniauskas**, Instructor (Pharm) (1) received a grant for "Novel link between nocturnal blood pressure and circadian clocks in adipose tissue during menopause," from LAUNCHED (The Louisiana Center for Advancing Underrepresented Scientists Careers in Health, Nutrition, Obesity, and Disparities Research), and (2) published two first author papers. Please see Page 6. **Congratulations Dr. Visniauskas!!**

**Isabella Kilanowski-Dorah**, PhD student (BMS) (1) gave a Department of Pharmacology Seminar, "Interactions of Estrogen & Aging in Arterial Stiffening," and defended her dissertation on 4/18/23, and (2) will graduate in May. **Congratulations Isabella!!**

**Ariane Imulinde Sugi**, (BMS) PhD student passed her preliminary exam on 12/14/22. **Congratulations Ariane!!**

**Dr. Ana Paula de Oliveira Leite**, Postdoctoral Fellow,

presented a poster, "Sex Differences and the Impact of G Protein-coupled Estrogen Receptor Deletion in the Vascular and Renal Response to Aldosterone," on April 21, 2023 at APS Summit 2023.

### Laboratory of Dr. Ricardo Mostany [Our website](#)

**Courtney Hospes** (NU) won the 1st Place Award for Excellence in Research and Presentation by an Undergraduate Student of the School of Science and Engineering, Tulane Research Innovation and Creativity Summit (TRICS), March 2023. **Congratulations Courtney!!**

**Cemo Semmedi**, Ph.D. student (SSE) presented a poster, "Aging dysregulates expression of homeostatic plasticity markers in cortical neurons independently of amyloid- $\beta$  pathology," TRICS, March 2023

**Alexis Ducote** (Pharm) presented two posters, (1) "Effects of normal aging on proteins of the cortical inhibitory synaptosome," TRICS, March 2023; and (2) "A Markov chain model of spine survival profiles in aging cortex suggests altered stabilization by inhibitory synapses," TRICS, March 2023

**Dr. Irene Fernandez Ugidos**, Postdoctoral Fellow (Pharm) presented a poster, "Effect of insulin-induced recurrent hypoglycemia on neurovascular coupling in the diabetic brain," TRICS, March 2023



## Master's in Pharmacology Graduate Spotlight: Mashli Fleurestil, Tulane SOM Class of 2023



I showed up at the library three hours late that day. The plan was to study for the GRE and apply for a graduate school program after a failed medical school application cycle. *Little did I know I was about to have a conversation that would change my life. Lauren told me she had just completed an MS in Pharmacology at Tulane University School of Medicine that had been revolutionary for her.* She shared how many members of her cohort had aspirations for professional school but needed some help sharpening their academic prowess and learning how to tell their stories. They sounded a lot like me. I looked into the program and saw that the application was due in three days. So with my last bit of hope, I quickly sent emails, made phone calls, and wrote as passionately as I knew how. A week later, I received my letter of acceptance, and three weeks later, I moved to New Orleans to start an adventure that would mark my life forever. After attending a large state university, this was my first time in a graduate learning environment where every faculty member knew my name. *Every professor and even the administrators had a vested interest in helping us achieve our goals.* They knew we had challenges, and with their years of experience, they showed us how to overcome each one. *As a result, I learned how to read and critically evaluate scientific literature, and many MCAT concepts like biochemistry and physiology that had seemed so nebulous came to life within clinical contexts.* Before we graduated, our leadership helped us put together strong

applications to reach our desired end. This program gave me an academic foundation and confidence reset that I built my medical education upon. Our professors believed in us, which gave us the courage to believe in ourselves.

*Five years and a #1 choice internal medicine residency match later, I have had ample time to reflect on my journey and all the people who helped me reach this point. I would not have been able to endure the challenges I faced in medical school without the lifetime friends and mentors I met and the skills I developed during this program. Thank you to the Pharmacology Department for investing in me; I will pay it forward and hope to continue to make you all proud.*

## New Faces

**Mary Schulz** has joined the **Castorena-Gonzalez** lab. Mary is a PhD student in Biomedical Sciences. She graduated with a B.A. from Lawrence University in Appleton, Wisconsin. Mary has worked in many health facilities including University of Wisconsin-



Madison, Mayo Clinic, Medical College of Wisconsin, and Adaptive Biotechnologies. In the **Castorena-Gonzalez** lab, Mary is studying Trpv-4 regulation of lymphatic vascular function and its implications for the metabolic syndrome.

*Thank you to those who have donated to **The Dr. Krishna C. Agrawal Education Fund** to support our students*

This endowed fund supports students in the Department of Pharmacology.

To read the biography of Dr. Krishna please go to: [Agrawal Fund](#)

*To support Pharmacology students* through The Dr. Krishna C. Agrawal Education Fund or to make a gift to the Department of Pharmacology,

contact Jean Paul Perrilliat, Senior Development Officer for Tulane University School of Medicine,  
504-314-7380, or [jperril@tulane.edu](mailto:jperril@tulane.edu)

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## Publications

**Chandra PK, Braun SE, Maity S, Castorena-Gonzalez JA, Kim H, Shaffer JG, Cिकic S, Rutkai I, Fan J, Guidry J, Worthylake DK, Li C, Abdel-Mageed AB, Busija DW.** Circulating Plasma Exosomal Proteins of Either SHIV-Infected Rhesus Macaque or HIV-Infected Patient Indicates a Link to Neuropathogenesis. *Viruses* 2023, 15, 794. <https://doi.org/10.3390/v15030794>

Davis MJ, Scallan JP, **Castorena-Gonzalez JA, Kim HJ, Ying LH, Pin YK, Angeli V.** Multiple aspects of lymphatic dysfunction in an ApoE<sup>-/-</sup> mouse model of hypercholesterolemia. *Front Physiol.* 2023 Jan 6;13:1098408. doi: 10.3389/fphys.2022.1098408

Taghavi S, Abdullah S, Shaheen F, Packer J, Duchesne J, **Braun SE, Steele C, Pociask D, Kolls J, Jackson-Weaver O.** Exosomes and Microvesicles From Adipose-derived Mesenchymal Stem Cells Protects the Endothelial Glycocalyx From LPS Injury. Online ahead of print. *Shock*, PMID: 37086080

**Visniauskas B, Reverte V, Abshire CM, Ogola BO, Rosales CB, Galeas-Pena M, Sure VN, Sakamuri SSVP, Harris NR, Kilanowski-Doroh I, McNally AB, Horton AC, Zimmerman M, Katakam PVG, Lindsey SH, Prieto MC.** High plasma soluble prorenin receptor (sPRR) is associated with vascular damage in male but not female mice fed a high fat diet. *Am J Physiol Heart Circ Physiol.* 2023 Mar 17. PMID: 36930656.

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**Sakamuri SSVP, Sure VN, Katakam PVG.** Iron che-

lation therapy to prevent poststroke cognitive impairments: role of diabetes and sex. *Am J Physiol Heart Circ Physiol.* 2023 Feb 1;324(2):H210-H211. PMID: 36607799.

Liu N, Li Y, Jiang Y, Shi S, Niamnud A, Vodovoz SJ, **Katakam PVG, Vidoudez C, Dumont AS, Wang X.** Establishment and Application of a Novel In Vitro Model of Microglial Activation in Traumatic Brain Injury. *J Neurosci.* 2023 Jan 11;43(2):319-332. doi: 10.1523/JNEUROSCI.1539-22.2022. Epub 2022 Nov 29. PMID: 36446585.

Clark-Patterson GL, Buchanan, LM, Ogola BO, Florian-Rodriguez M, **Lindsey SH, De Vita R, Miller KS.** (2023) Smooth Muscle Contribution to Vaginal Viscoelastic Response. *Journal of the Mechanical Behavior of Biomedical Materials.* PMID: 36764168.

Daniel JM, **Lindsey SH, Mostany R, Schrader LA, Zsombok A.** (2023) Cardiometabolic health, menopausal estrogen therapy and the brain: how effects of estrogens diverge in healthy and unhealthy preclinical models of aging. *Front Neuroendocrinol.* In press. PMID: 37061205

Ogola BO, Abshire CM, **Visniauskas B, Kiley JX, Horton AC, Clark-Patterson GL, Kilanowski-Doroh I, Diaz Z, Bicego AN, McNally AB, Zimmerman MA, Groban L, Trask AJ, Miller KS, Lindsey SH.** (2022) Sex Differences in Vascular Aging and Impact of GPER Deletion. *Am J Physiol Heart Circ Physiol.* 323(2):H336-H349. PMID: 35749718.

**Visniauskas B, Kilanowski-Doroh I, Ogola BO, Alexandra B. McNally, Horton AC, Imulinde Sugi A, Lindsey SH.** (2022) Estrogen-mediated mechanisms in hypertension and other cardiovascular diseases. *Journal of Human Hypertension.* PMID: 36319856.

**Pharmacology News is a publication of the  
Department of Pharmacology, Tulane University**

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**Chair: Dr. David W. Busija**

Department Administrator: Debbie Sanders

Senior Editor/Newsletter Preparation: Nancy Busija

Newsletter Oversight: Dr. Sarah Lindsey

**Departmental Mission Statement:**

*We will educate and train medical and graduate students in the principles of pharmacology using modern techniques and will conduct state-of-the-art research in pharmacology-related fields in order to expand the frontiers of science and medicine.*