

Pharmacology News

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Spring 2020

TULANE UNIVERSITY SCHOOL OF MEDICINE DEPARTMENT OF PHARMACOLOGY

Message from the Chair: Meeting the Challenges of Difficult Times

The COVID-19 pandemic has placed a severe strain on our personal and professional lives as well as departmental activities. We are rising to the occasion by protecting our students, staff, and faculty and by maintaining our education program by transiting to Zoom conferences and distance learning for our graduate and medical students. **Dr. Craig Clarkson has led these efforts with the help of Dave Maag and other faculty.** (Please see story on page 5.) I want to thank everyone for joining together during this difficult period and for maintaining the standards of our MS Program. **Specifically, we went to online teaching and testing, and our graduate students and faculty had a weekly social meeting.** While departmental activities are beginning to be restored, with the hope of restoring everything to near normal sometime in June, we had to cancel our usual graduation ceremonies. However, due to the efforts of the BMS Graduate School and our MS Program students and faculty, we had our first Zoom graduation ceremony. In addition, our graduate students created a commemorative video characterizing their year with us and with living in New Orleans. **The faculty and staff of the Pharmacology Department wish our graduates success in their efforts and we want to remind them that we remain here to help them. Pharmacology Master's graduates have had approximately 80% acceptance rate into medical school. This year, eight former Pharmacology Master's students received their M.D. degrees from Tulane School of Medicine.** (Please see Master's Spotlight article on page 5.)

Other changes have occurred in the department. Drs. Margaret Zimmerman and Bruce Bunnell have left to assume other positions consistent with their professional goals and we wish them well. **We will be welcoming Dr. Jorge Castorena-Gonzalez from the University of Missouri** as an Assistant Professor on July 1, 2020. Dr. Castorena-Gonzalez is an expert in studying the lymphatic system and is funded by a K99/K00 grant award from NIH.

Other great news: **Drs. Katakam and Mostany** have been funded by a multi-PI grant from NIH. **Congratulations to them both!** I have also been funded by a R01 from NIH. These grants will add over \$5 million in total dollars to the already impressive departmental research funding portfolio.

Dr. Busija receives NIH NHLBI R01: Mitochondrial Structure and Function in Cerebral Arteries during Diabetes and Ischemic Stress, \$2,593,012.

We will investigate the consequences of type 2 diabetes (T2D) alone or combined with experimental strokes on the brain microcirculation in mice and devise therapeutic strategies to lessen the impact of these diseases on the brain. An important component of the project is to examine sex differences in response to T2D and strokes. **Drs. Prasad Katakam, Ibolya Rutkai, and Ricardo Mostany are collaborators.** Adverse changes in small cerebral blood vessels due to T2D lead to cognitive impairment, memory deficits and dementias, and potentiate brain injury due to cerebrovascular accidents such as strokes. Our studies are based on discoveries by our laboratory: (1) major sex-differences in mitochondrial abundance under normal conditions, (2) preferential effects on mitochondria in microvessels compared with arteries in T2D, (3) differential expression of mitodestructive and mitoprotective proteins in male and female blood vessels, (4) sex-dependent responses of mitochondria in the cerebral vasculature following strokes, and (5) major changes in vascular mitochondrial characteristics at sites distant from brain injury. Technical innovations include a mouse model that genetically labels mitochondria only in endothelium, a high throughput method, and RNAseq and proteomics to elucidate mechanisms underlying changes observed during aging and T2D. *We believe that understanding and targeting mitochondrial mechanisms will lead to therapies to improve the cerebral vascular health of people.*

Drs. Katakam and Mostany receive NIH NINDS R01: Cerebral Microvascular Bioenergetics and Neurovascular Coupling, \$2,542,779.

We will investigate the detrimental effects of recurrent hypoglycemia on cerebral microvessels. Patients with diabetes are at increased risk of cerebrovascular complications including dementia and stroke. We believe that anti-diabetic therapy-induced hypoglycemia is as harmful as hyperglycemia. To date, recurrent severe hypoglycemia has been recognized as a diabetes-associated cardiovascular risk. However, patients receiving anti-diabetic medications, particularly insulin, experience numerous episodes of mild hypoglycemia that are accompanied by mild or no symptoms and are unreported due to a 'hypoglycemia unawareness' phenomenon. We believe this may contribute to impaired cerebral microvascular function and neurovascular coupling in diabetes leading to dementia. Recently, we made technological breakthroughs in the measurements of mitochondrial function in the brain microvessels and in the determination of neurovascular coupling in awake animals. We will study the impact of recurrent mild and severe hypoglycemia on the brain microvessels, neurovascular coupling, and cognitive function utilizing novel genetic models of diabetes with focus on mitochondrial and free radical mechanisms. **Our studies are expected to provide breakthrough findings to change the therapeutic paradigms for diabetic complications.**

Faculty News

Dr. David Busija

- **Grant Award:** NIH NHLBI R01, "Mitochondrial Structure and Function in Cerebral Arteries during Diabetes and Ischemic Stress," 2/15/2020 - 12/31/2023, \$2,593,012.
- **Invited Speaker:** University of Arkansas Medical School, Department of Pharmacology and Toxicology, "Mitochondrial Dynamics during Health and Disease," Little Rock, AK, January 8, 2020.
- **Poster Presentations:** Author on multiple posters scheduled for Experimental Biology 2020 (EB2020), published in the *FASEB Journal*, please see below and page 4.
- **Submitted Grants:** (1) NIH R01, 11/5/2019; and (2) NIH R01, 3/5/2020.
- **Grant Reviewer:** Ad hoc reviewer, NIH Study Section ZRG1 MDCN-M (91), The blood-brain barrier, neurovascular system and CNS Therapeutics, 3/18/2020.

Dr. Stephen Braun

- **Grant Awards:** (1) NIH NIAID R33 extension, Co-I: Steven Braun, PI: Namita Rout, PhD, "Genetically modified gamma delta T cells to target SIV reservoirs," 9/1/2019-8/31/22; (2) PI (subcontract), Steven Braun, PI: Richard P. Junghans, PhD: "Advanced Generation Infection-proof Anti-HIV CAR T with YY1 RNAi to Block T cell Exhaustion," SBIR NIH NIAID; and (3) Tulane SOM Bridge Funding, \$25,000.
- **Submitted Grants:** (1) NIH NIAID R01, MPI with Partha Chandra, PhD; (2) MPI, US-Egypt Joint Board, PI, Magda Mohamed Hagrass, PhD.
- **Reviewer:** *European Journal of Pharmacology*

Dr. Partha Chandra

- **Invited Speaker:** (1) "Exosomes from latent HIV-1 infected cells induces defective mitophagy and mitochondrial hyperfusion in brain microvascular endothelial cells," Pharmacology Seminar Series, Tulane School of Medicine, October 18, 2019, and (2) "The Effects of Exosomes from Latent HIV-1 Infected Cells on Mitophagy and Mitochondrial Fusion in Brain Microvasculature," Department of Physiology, Tulane School of Medicine, New Orleans, LA, November 25, 2019
- **Grant Submission:** NIH NIAID R01, MPI with Dr. Stephen Braun.
- **Poster Presentations:** The following first-authored posters were scheduled for Experimental Biology 2020 (EB2020), April 4-7 2020, are published in the *FASEB Journal*: (1) **Partha K Chandra, Sinisa Čikić, Ibolya Rutkai, Hogyoun Kim,**

Asim B Abdel-Mageed, and David W Busija. "The effects of Exosomes from Latent HIV- 1 Infected Cells on Mitophagy and Mitochondrial Fusion in Brain Microvasculature," and (2) **Partha K Chandra, Sinisa Čikić, Melody C Baddoo, Ibolya Rutkai, Erik K Flemington, and David W Busija,** "Transcriptome Analysis Reveals Sexual Disparities in Differential Gene Expression Signature in Rat Brain Microvessels," (*This abstract was also invited for an oral presentation to the Physiological Omics Interest Group (POG) of the American Physiological Society at EB2020.*)

- **Journal Reviewer:** *Biomolecules, Clinical Biochemistry*

Dr. Craig Clarkson

- *Please see pages 1 and 5.*

Dr. Suttira Intapad

- **Grant Submission:** NIH R01, May 1, 2020.
- **Journal Reviewer:** *Cardiovascular Research and Reproductive Biology*

Dr. Prasad Katakam

- **Grant Award:** NIH NINDS R01: "Cerebral Microvascular Bioenergetics and Neurovascular Coupling," MPIs: Drs. Prasad Katakam with Ricardo Mostany, 5/1/2020 - 2/28/2025, \$2,542,779.
- **Grant Submissions:** NIH: Six R01 grants as Co-I and consultant (2/2020) from universities including Tulane, Loma Linda, UNO, and UT-Memphis.
- **Invited Speaker:** (1) International Stroke Conference 2020, "Microvascular Mitochondria: The Epicenter of Impaired Neurovascular Coupling," 2/20/2020, Los Angeles, CA; (2) Department of Pharmacology, Seminar Program. "Vascular Cell Bioenergetics and Cerebral Microvascular Dysfunction," Tulane University School of Medicine, March 6, 2020.
- **Poster Presentations:** Contributing author to posters from the Lindsey and Busija labs scheduled for EB2020, published in the *FASEB Journal*. Please see page 4.
- **Reviewer: Grants:** (1) University of Utah-Washington University DRC Pilot and Feasibility Grants, Consultant (11/18/2019); (2) Chairman, American Heart Association (AHA) Career Development Award Vascular Basic Sciences 2 (01/24/2020); (3) NIH Vascular Cell and Molecular Biology, ad hoc member (02/03/2020); (4) Committee Member, AHA Grant Applications to study COVID-19 effects on Cardiovascular System (04/16/2020). *Journals: Am J Physiol, JCBFM*

Faculty News continued

- **Editorial Boards:** *AJP Heart and Circulatory Physiology, J Cardiovascular Pharmacology, Microcirculation, Translational Stroke Research, NeuroMolecular Medicine, Scientific Reports, Exploration of Medicine.*
- **Professional Service:** Nominations Committee; American Physiological Society Cardiovascular Section; Member: Awards Committee, Microcirculatory Society.
- **Outreach:** AHA HBCU Scholar Mentor, 2019-2020, Mentee: Brianna Allen, Sophomore, Xavier University of New Orleans.

Dr. Sarah Lindsey

- **Award: Early Career Award:** American Society for Pharmacology and Experimental Therapeutics (ASPET), May 1, 2020.
- **Conference Scholarship Award:** Tulane Group on Women in Medicine and Science funded attendance at the AAMC Mid-Career Women Faculty Leadership Development Conference, New Orleans, December 7-10, 2019.
- **Invited Speaker: Keynote Speaker:** Wake Forest School of Women Annual Women & Cardiovascular Health Event, "Estrogen: A Major Player in Women's Cardiovascular Health," February 4, 2020.
- **Poster Presentations:** Author on multiple posters from the Lindsey lab scheduled for EB2020, published in *FASEB Journal*, please see page 4.
- **Reviewer:** Co-Chair, Fellowship Cardiorenal Basic Sciences Review, 2020 AHA.

Dr. Howard Mielke

- **Invited Speaker:** Sixteenth International Symposium on Recent Advances in Environmental Health Research, "Soil Lead Contamination in Children's Play Areas - Consequences of Cultural Differences Between New Orleans, Louisiana, USA, and Oslo, Norway," The Westin Jackson Hotel, Jackson, MS, March 31, 2020.
- **National Service:** Centers for Disease Control and Pre-

vention Lead Exposure and Prevention Advisory Committee (LEPAC): *Invited member participant*, April 29, 2020. Meeting converted to Zoom due to COVID-19.

- **Reviewer: Journals:** *Environmental Research, Current Problems in Pediatric and Adolescent Health*
- **Outreach and Service to Community:** (1) Member: Louisiana Childhood Lead Prevention and Healthy Homes Advisory Committee, and (2) Participated in the Lead and Health Homes Fair, Stallings Playground, March 7, 2020.

Dr. John McLachlan

- *Please see pages 5 and 6.*

Dr. Ricardo Mostany

- **Grant Award:** NIH NINDS R01: "Cerebral Microvascular Bioenergetics and Neurovascular Coupling," MPIs: Drs. Ricardo Mostany with Prasad Katakam, 5/1/2020 - 2/28/2025, \$2,542,772.
- **Invited Speaker:** (1) Augusta University Department of Neuroscience and Regenerative Medicine, "Altered structural plasticity in the aged brain," Augusta, GA. December 16, 2019; (2) BIO on the Bayou: An Academic Research Expo sponsored by Louisiana State University Health Sciences Center and Tulane University School of Medicine, "Synaptic plasticity in aging and neurodegenerative diseases," New Orleans, LA, December 10, 2019.
- **Poster Presentations:** Contributing author to multiple posters scheduled for EB2020, published in *FASEB Journal*, please see page 4.
- **Journal Reviewer:** *Acta Neuropathologica Communications, Cellular and Molecular Neurobiology.*
- **Grant Reviewer:** (1) AHA Career Development Award, Organ Basic Sciences 2, and (2) Grant reviewer. January 2020, and (3) Swiss National Science Foundation (SNSF), Sinergia Grant reviewer 2020.

SOM Committees: **Dr. Braun:** Tulane Primate Research Center (TNPRC) Space Committee; **Dr. Busija:** Basic Science Chairs, BMS Curriculum Task Force; **Dr. Clarkson:** BMS Curriculum Task Force, Curriculum, BMS Steering, Personnel & Honors, Student Professionalism & Promotion, Phase 2 Curriculum Advisory, Innovation Council; **Dr. Lindsey:** SOM Rep. to University Equal Opportunity Grievance Committee; Tulane BMS Curriculum; Women in Medicine and Science: Programming; Tulane Professionalism Program Peer Messenger; Faculty Committee on Sexual Harassment; Tulane Chapter of the American Medical Women's Association; Institutional Animal Care and Use; **Dr. Intapad:** Faculty Advisory; **Dr. Katakam:** Curriculum, BMS PhD Admissions, BMS Steering (Standby); **Dr. Mostany:** Nominating; Student Professionalism and Promotion Committee; Tulane Brain Institute Executive Committee; Chair: Tulane Brain Institute Seminar Series; President, Greater NOLA Society for Neuroscience Chapter.

Laboratory News: Pharmacology (Pharm), Brain Institute (BI), Biomedical Sciences (BMS), Neuroscience Undergraduate (NU), Stem Cell and Regenerative Medicine (SCRM), Neuroscience Program (NP), Cell & Molecular Biology Program (CMB), School of Science and Engineering (SSE), Biomedical Engineering (BE), School of Public Health and Tropical Medicine (SPH&TM), Tulane National Primate Research Center (TNPRC)

Laboratory of Dr. David Busija

Dr. Siniša Čikić, Postdoctoral Fellow (Pharm) (1) has a first-authored publication, (2) is a contributing author on another published paper (Please see page 6 for both publications.), and (3) is a contributing author to posters that were scheduled for EB2020 and are published in *FASEB J.* Please see page 2. **Congratulations Dr. Čikić!!**

Laboratory of Dr. Stephen E. Braun

Dr. Fayez M. Saleh, MD, MS, and PhD candidate (TN-PRC) (1) has published a first-authored paper in the *Journal of Immunology*. (Please see page 6, and (2) recently defended his PhD dissertation, "Recent Advances and Opportunities in Immunotherapy Approaches for HIV-1," April, 2020. **Congratulations Dr. Saleh!**

Nathan Johnson, MD/PhD student (TNPRC), (1) published a first-authored paper in the *Journal of Stem Cell & Regenerative Medicine*. (Please see page 6), and (2) recently defended his PhD dissertation, "Modifying CMV-Specific T cells with a Novel Bicistronic CD4-CAR/maC46 Vector to Target HIV," April 2020. **Congratulations Nathan!**

Laboratory of Dr. Suttira (Joy) Intapad

Benjamin Bhunu, Graduate Student, (BMS) received the 2020 Caroline tum Suden/Francis A. Hellebrandt Professional Opportunity Award from the Women in Physiology Committee, American Physiology Society (APS) **Congratulations Benjamin!!**

Isabel Riccio, (NU) received the Spring 2020 Newcomb Grant Program (\$1,435) to do independent research in Dr. Intapad's laboratory. **Congratulations Isabel!**

Laboratory of Dr. Prasad Katakam

Wesley Evans, Ph.D. Student (NP), (1) presented a poster at the International Stroke Conference 2020, "Recurrent Hypoglycemia Induces Cerebral Microvessel Mitochondrial Dysfunction, Impairs Sensory Cognition, and Exacerbates Ischemic Brain Injury," at the International Stroke Conference 2020, in Los Angeles, LA, 2/19/2020; and (2) received an American Heart Association Predoctoral Fellowship Award for "The Effects of Recurrent Hypoglycemia on Microvascular Ischemic Injury," 01/01-12/31/2020. **Congratulations Wesley!!**

William Wisen (NP) received a Summer Undergraduate Research Fellowship from ASPET, Summer 2020, to complete studies in the Katakam Lab. **Congratulations William!!**

Dr. Siva Sakamuri, Postdoctoral Fellow (Pharm) has a first authored paper and is a contributing author to posters published in the *FASEB Journal*. Please see page 6. **Congratulations Dr. Sakamuri!!**

The following posters from the Katakam Lab were scheduled to be presented at EB2020 (April 4-7) and are published in FASEB J, 16 April 2020, Volume 34; Issue SI

Sakamuri SSVP, Sure VN, Evans WR, Kolli L, Albuick AL, Mostany R, Busija DW, Katakam PVG. Energy Deficit Phenotype of Cerebral Microvascular Network in the Aged Brains.

Kolli L, Sakamuri SSVP, Evans WR, Sure VN, Albuick AL, Mostany R, Busija DW, Katakam PVG. Effect of peroxynitrite scavenger on brain microvascular nitrotyrosination and S-nitrosylation.

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

The following posters from the Lindsey Lab were scheduled for EB2020 (April 4-7) and are published in FASEB J, 16 April 2020, Volume 34; Issue SI.

Wong TJ, Ogola BO, Kilanowski-Doroh IM, Harris NR, Clark GL, Miller KS, Lindsey SH. Impact of Ovariectomy on Arterial Stiffness.

Ogola BO, Zimmerman MA, Harris NR, Kilanowski-Doroh I, Groban L, Lindsey SH. Impact of Aging and G Protein-Coupled Estrogen Receptor Deletion in Arterial Stiffening and Cardiac Function in Male and Female Mice.

Harris NR, Ogola BO, Visniauskas B, Katakam PV, Meadows SM, Prieto MC, Lindsey SH. (2020) Trafficking of the Prorenin Receptor in Endothelial Cells.

Kilanowski-Doroh I, Ogola BO, Harris NR, Gentry K, Satou R, Lindsey SH. (2020) Impact of GPER, Sex, and Age on Arterial Stiffness and Fibrotic Gene Expression. **(Also invited for an oral presentation.)**

Dr. Benard Ogola, Postdoctoral Fellow (Pharm), received the Mark Frank Diversity Travel Award for EB2020. **Congratulations Ben!!**

Isabella Kilanowski-Doroh, PhD student (BMS), received a Tulane BMS Travel Grant for EB2020. **Congratulations Isabella!!**

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

Alexis Ducote, PhD student (BI), (1) presented a poster, "Fluorescence-Assisted Sorting of Genetically Defined Neuronal Populations for scRNA-seq and Mitochondrial Respiration Assay," at the Neuroscience PhD Program Retreat on March 6, 2020, and (2) passed his Qualifying Exam on December 2, 2019. The title of his proposal was, "Characterization of Age-related Changes in GABAergic Interneuron Properties in Somatosensory and Motor Cortex and Functional Consequences for Cognition," **Congratulations Alexis!!**

Master's in Pharmacology Graduate Spotlight: Lt. Michael J. Lauth, MD, MPH&TM, MS President, Class of 2020, Tulane School of Medicine



It seems incredible to me that it has been six years since I moved to New Orleans to get a Master's Degree in Pharmacology at Tulane. I enjoyed the subject as an undergraduate, but I could not have imagined how much I would enjoy the subject and the people that I met in this Tulane department. The Master's Degree in Pharmacology was a first step, which culminated this year in my graduation from Tulane University School of Medicine as a physician. In fact, seven of my fellow classmates graduating with me this year with their M.D. degrees were also in the Tulane Pharmacology Master's Degree program at the same time I was. What began on that first day of orientation in the Pharmacology program did indeed further our dreams of becoming physicians, and I greatly appreciate being where I am and going through medical school with them.

Throughout the time in this master's program you definitely learn deeply, from the "Mechanism of Action" of a drug to understanding how drugs influence the pathophysiology of disease. This foundation was a great help for medical school, so much so that I was also able to earn another Master's Degree in Public Health and Tropical Medicine at Tulane as well as my medical degree.

I am very grateful for all the support and experience that this department provided for me, from starting my Master's Degree to finishing medical school in an incredible city that I now call my second home. *Next up: Pediatric Residency at my number one choice: the United States Navy at Balboa Hospital in my first home town, San Diego, California.*

Lt. Michael J. Lauth, MD, MPH&TM, MS

Pharmacology Classes Go Online a note from Drs. John McLachlan and Craig Clarkson

In response to the COVID-19 pandemic, Tulane University made the decision to cease classroom instruction and to convert all forms of teaching to an online format during the week of March 16, 2020. The Pharmacology Department began transitioning to an online format during the previous week under the leadership of Dr. Craig Clarkson, Director of Graduate Studies. Several faculty members attended tutorial classes to learn or improve their skills in conducting Zoom meetings for virtual classrooms. Later that week the department met physically as a group for the last time to outline the strategies for moving the entire curriculum online.

The first course to be offered by the Department in the new online format was Environmental Signaling in Medicine taught by Drs. John McLachlan and Howard Mielke for March 23 when classes reconvened for all Tulane students. The entire department worked together to develop the structure of this opening session to welcome the students back and acquaint them with the features of Zoom meetings that would become the standard for their online education for the rest of the semester.

After welcoming comments from Dr. David Busija, Department Chair, Dr. Clarkson added a welcome and outlined the plan for online courses. This was followed by hellos from the many other faculty members present in the Zoom space. Dr. McLachlan asked each of the twenty-eight Pharmacology Masters students in attendance to tell the other students and faculty where they had ended up, and to share their feelings with classmates and faculty about what it was like to be self-distancing off campus. Dr. McLachlan then introduced the guest lecturer, Dr. Dawn Wesson, Professor of Tropical Medicine in the Tulane School of Public Health and Tropical Medicine and an expert in emerging infectious disease vectors. Dr. Wesson lectures annually in this class, and ironically just happened to have been scheduled to give a lecture on the coronavirus pandemic. She presented a comprehensive and detailed discussion of what was on everyone's mind. Following the lecture there was a discussion and a question and answer period. At closing, one of the graduate students, Camille Grey, suggested that the students show each other their pets. Before long the Zoom field was full of dogs and cats sitting with both students and faculty. Dr. Howard Mielke, co-course director, held up a beautiful flower blossom he had just picked in his garden. All in all, a successful return to both graduate education and socializing (from a distance) for the Department of Pharmacology.

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 Mark McKeown, Senior Director of Development for Tulane University School of Medicine, 504-314-7380, or mmckeown@tulane.edu
Tulane University School of Medicine Office of Development #8745, 1430 Tulane Avenue, New Orleans, Louisiana 70112

New Faces will appear in the next issue of Pharmacology News

Publications

Čikić S, Chandra PK, Harman JC, Rutkai I, Katakam PV, Guidry JJ, Gidday JM, Busija DW. Sexual differences in mitochondrial and related proteins in rat cerebral microvessels: A proteomic approach. *Journal of Cerebral Blood Flow and Metabolism*, 2020 Apr 2:271678X20915127.

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Saleh FM, Chandra PK, Lin D, Robinson JE, Izadpanah R, Mondal D, Bollensdorff C, Alt EA, Zhu Q, Marasco WA, Braun SE, Abdel-Motal U. A new humanized mouse model mimics humans in lacking anti-Gal epitopes and secreting anti-Gal antibodies. *J Immunol*, 2020 Apr 1;204(7):2998-2005.

Lin D, Ochoa J, Barabadi Z, Pfnür A, Braun SE, Kadowitz PJ, Izadpanah R, and Alt EU. Novel function of Nebivolol: Stimulation of Stem Cell Proliferation and Inhibition of Differentiation. *J Stem Cell & Reg Med*, accepted.

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Romero-López M, Li Z, Rhee C, Maruyama M, Pajarinen J, O'Donnell B, Lin TH, Lo CW, Hanlon J, Dubowitz R, Yao Z, Bunnell BA, Lin H, Tuan R, Goodman SB. Macrophage Effects on Mesenchymal Stem Cell Osteogenesis in a Three-Dimensional in vitro Bone Model. *Tissue Eng Part A*. 2020 Apr 20.

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2020 Lead Poisoning, Katner A, Mielke H. In: *A Handbook of Environmental Toxicology: Human Disorders and Ecotoxicology* Editor: D'Mello F. CAB International, Oxfordshire, England. ISBN: 9781786394675. Chapter 25: Pp 371-383.

Mielke HW, McLachlan, JA, Schachter AE, Galley AD, Egendorf SP, Etsel, RA. "Impact of Soil on Children's Health," In: *Current Problems in Pediatric and Adolescent Health Care*, Editor: Fierman, AH, St. Louis, Missouri, Elsevier, Inc. 2020, Jan;50(1):100739. Also appearing in this publication: (1) Mielke HW, McLachlan JA. "Air, water, soil and environmental signaling"; (2) Schachter AE, Gailey A, Egendorf SP, Mielke HW, "Mechanisms of children's soil exposure"; (3) Egendorf SP, Gailey AD, Schachter AE, Mielke HW, "Soil toxicants that potentially affect children's health"; and (4) Gailey AD, Schachter AE, Egendorf SP, Mielke HW. "Quantifying soil contamination and identifying interventions to limit health risks."

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

1430 Tulane Avenue, Suite 3700, #8683, New Orleans, LA 70112; Phone: 504-988-5444

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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.