

Curriculum Vitae

Personal Information

Name: Lorena Machado Amaral, Ph.D

Gender: Female

Date of birth: July, 20th1984

Language: Portuguese (native speaker)

English (good)

Mailing Address: The University of Mississippi Medical Center
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Academic Appointments

2019- Pr: Assistant Professor Department Pharmacology/Toxicology, University of Mississippi Medical Center (UMMC) – Jackson, USA

2017-2019: Instructor- Department Pharmacology/Toxicology, University of Mississippi Medical Center (UMMC) – Jackson, USA

2016-2017: Scientist— Department Pharmacology/Toxicology, University of Mississippi Medical Center (UMMC) – Jackson, USA

2013-2016: Post-Doctoral Research Fellow – Department Pharmacology/Toxicology, University of Mississippi Medical Center (UMMC) – Jackson, USA

Mentor: Prof. Dr. Birdie B LaMarca

Academic Background

2010-2012: Ph.D.-Department of Pharmacology at FMRP, Laboratory of Cardiovascular Pharmacology / Pharmacogenetics, University of Sao Paulo(USP), Ribeirao Preto, Brazil

Major Area: Biological Sciences / **Area:** Pharmacology. Title: “Effects of inducible nitric oxide synthase inhibition in experimental pre-eclampsia.”

2009-2010 Master Degree- Department of Pharmacology at FMRP, Laboratory of Cardiovascular Pharmacology / Pharmacogenetics, University of Sao Paulo(USP), Ribeirao Preto, Brazil

Major Area: Biological Sciences / **Area:** Pharmacology. Title: “Effects of inducible nitric oxide synthase inhibition in experimental pre-eclampsia.”

2004-2008: Pharmacy – Federal University of Juiz de Fora, Faculty of Pharmacy, Juiz de Fora, Brazil

Professional Experience

2004-08 Pharmacist Course (Pharm.D)- University of Juiz de Fora, Brazil

2005-08 Scientific initiation- Department of Microbiology, Faculty of Pharmacy, Federal University of Juiz de Fora, Juiz de Fora, Brazil

2007-08 Instructor in Pharmacy course at Federal University of Juiz de Fora, MG, Brazil

2009-10 Master’s degree-Faculty of Medicine of Ribeirao Preto,University of Sao Paulo,Brazil

2011-12 Instructor in Chemistry course at Faculty of Medicine of Ribeirao Preto, University of Sao Paulo, Ribeirao Preto, Brazil

2010-12 Doctorate (Ph.D.)-Faculty of Medicine of Ribeirao Preto, University of Sao Paulo, Ribeirao Preto, Brazil

2013-16 Postdoctoral Research Fellow – Department of Pharmacology, School of Medicine, University of Mississippi Medical Center, Jackson, USA

2016-17 Scientist— Department Pharmacology/Toxicology, University of Mississippi Medical Center (UMMC) – Jackson, USA

2017- 2019 Instructor- Department Pharmacology/Toxicology, University of Mississippi Medical Center (UMMC) – Jackson, USA

2019- Present Assistant Professor Department Pharmacology/Toxicology, University of Mississippi Medical Center (UMMC) – Jackson, USA

Honors, Awards, and Distinctions

2014: International Society for Study of Hypertension in Pregnancy President Award: The Most Outstanding Basic Science Oral Presentation in Relation to the Study of Hypertension in Pregnancy, New Orleans, USA

2014: International Society for Study of Hypertension in Pregnancy New Investigator Travel Award, New Orleans, USA

2014: The American Physiological Society Water and Electrolyte Homeostasis Postdoctoral Research with Distinction Award, San Diego, USA

2015: Best abstract of AHA Specialty Conferences at Scientific Sessions, Orlando, FL, USA.

2015: Annual Hypertension Conference Travel Awards for New Investigators, Washington, D.C., USA

2015: WEH/AJP: Regulatory, Integrative, and Comparative Trainee Abstract Award, Boston, USA

2015: Caroline tum Suden/Hellebrandt Professional Opportunity Award, Boston, USA

2016: 20th World Congress of International Society for the Study Hypertension in Pregnancy Travel Award, Sao Paulo, Brazil

2017: APS Minority Travel Fellowship Awards, Chicago, IL, USA.

2017: Underrepresented Postdoctoral Scientist Travel Award, Chicago, IL, USA.

2018: The American Physiological Society Water and Electrolyte Homeostasis Postdoctoral Research with Distinction Award, San Diego, USA

2019: Finalist for the Stephanie Watts Career Development Award. High Blood Pressure Council (HBPR) Scientific Sessions, New Orleans, USA.

2019: Onsite Poster Competition award at the HTN 2019 Scientific Sessions, New Orleans USA.

2020: AFHRE Travel Grants Award for Support of Underrepresented Minorities. High Blood Pressure Council (HBPR) Scientific Sessions.

Invited Talks

2013 : Progesterone supplementation attenuates hypertension and AT1-AA in response to elevated IL-6 during pregnancy". 3rd ISH New Investigators' Symposium on Hypertension and Cardiovascular Disease. New Orleans, USA

2014: Progesterone supplementation improves blood pressure and uterine artery resistance in response to placental ischemia during pregnancy. High Blood Pressure Council (HBPR) Scientific Sessions, San Francisco, USA

2014: 17- Hydroxyprogesterone attenuates hypertension and uterine artery resistance in response to reduced uterine perfusion pressure (RUPP) in pregnant rats." International Society for Study of Hypertension in Pregnancy (ISSHP), New Orleans, USA

2015: Early administration of 17-hydroxyprogesterone caproate improves fetal growth restriction possibly by reducing sFlt-1 and placental cytolytic NK cells in response to placental ischemia during pregnancy. High Blood Pressure Council (HBPR) Scientific Sessions, Washington, D.C., USA

2016: 17-hydroxyprogesterone caproate improves fetal growth restriction possibly by reducing sFlt-1 and placental cytolytic NK cells in the Reduced Uterine Perfusion Pressure (RUPP) rat model of Preeclampsia. 20th World Congress of International Society for the Study Hypertension in Pregnancy Travel Award, Sao Paulo, Brazil

2018: Progesterone induced blocking factor improves clinical characteristics of preeclampsia in Rupp rats. High Blood Pressure Council (HBPR) Scientific Sessions, Chicago, USA.

2019.

2019: Inhibition of Progesterone induced blocking factor causes clinical characteristics of preeclampsia in Sprague Dawley rats. High Blood Pressure Council (HBPR) Scientific Sessions, New Orleans, USA.

2020: Progesterone induced blocking Factor attenuates hypertension and placental mitochondrial dysfunction and reactive oxygen species in response to sFlt-1 during pregnancy. SRI 2020, Vancouver, Canada.

National, Institutional and Local Service

2014 Science Fair Judge for Local and District High School Science Fairs
2013-14 American Physiological Society's Physiology Understand (PhUn) Week Outreach
2017- Bruce Award judges for Experimental Biology 2017
2017- ASPET mentoring program for Experimental Biology
2017-18 Group on Women in Medicine and Science (GWIMS) Membership Committee
2020-Pr GWIMS Mentoring Committee Chair
2020-Pr Ph.D advisory committee for Owen Herrock
2021-Pr Graduate Committee- UMMC
2021-Pr GWIMS Secretary- UMMC
2021-Pr Curriculum Committee- Foundational Science- UMMC

UMMC Teaching Experience

2014-Pr Instructor in Research Tools Molecular Biology MFM Fellows courses at University of Mississippi Medical Center (Jackson, MS)
2014-Pr Instructor in Medical Pharmacology course; Small group leader-UMMC, Pharmacology and Toxicology department
2019-Pr Course director, PH702. Recent Advances in Pharmacology and Toxicology, Pharmacology and Toxicology department- UMMC.

This course comprises reading, formal presentations and discussion of topics in pharmacology, toxicology and related disciplines from the current scientific literature. Critical evaluation of experimental design, data analysis, and interpretation are emphasized.

2020- Pr Lecturer, PH723: Mechanisms of drug action, Pharmacology and Toxicology department-UMMC

Mechanisms of Drug Action is a graduate course in general pharmacology designed to complement and add greater depth of understanding of the mechanisms of actions of the drugs addressed in the introductory pharmacology courses. Emphasis is placed on various aspects of systems pharmacology, including drug-drug interactions, multidrug combinations, and the effect of the disease state on drug action.

2020-Pr Instructor; MSCI 730: Perspectives in Multidisciplinary Clinical and Translational Research, Master of Science Degree Programs-UMMC

This multidisciplinary course will introduce students to scientific methods used for clinical translational research. The course will stress the importance of multidisciplinary approaches to solving clinical questions and will incorporate multiple examples of research discoveries that were advanced through multidisciplinary collaborations. This course will emphasize a variety of research study designs and approaches that involve quantitative research methods to study clinically relevant research questions and problems.

2020-Pr Graduate Course, Lecturer, NSCI 708 Special Topics in Neuroscience, summer 2020, Department of Neurobiology & Anatomical Sciences- UMMC

Advanced critical reading of current literature on a hot topic in Neuroscience.

Professional/ Society Memberships

2009-11 Brazilian Society for Pharmacology and Experimental Therapeutics
2013-Pr American Heart Association
2013-Pr American Society of Physiology
2014-Pr International Society of Hypertension (ISH)

- 2014-Pr** International Society for Study of Hypertension in Pregnancy (ISSHP)
2014-Pr American Society for Pharmacology and Experimental Therapeutics (ASPET)
2016-Pr GWIMS member
2018-Pr Society for Maternal Fetal Medicine (SMFM)
2019-Pr Society for Reproductive Investigation (SRI)

<u>Trainees</u>	<u>capacity during training</u>	<u>Time in Training</u>
<u>Current positions</u>		
Jose Santiago Font, M.D.	MFM Fellow Private Practice in Ponce, Puerto Rico	2013-2016
Jesse Cottrell, M.D.	MFM Fellow Associate Professor at Marshall University MFM Specialist, Marshall Health, Hunnigton, West Virginia	2016-2019
Elfarra Jamil, M.D.	MFM Fellow Private Practice in Louisville, Ky, Norton Children's Maternal - Fetal Medicine	2014-2017
Kristin Reeve, M.D.	MFM Fellow	2018-present
Evangeline Deer, Ph.D.	Postdoctoral Fellow	2019-present
Alexis Wincher	MSRP Student	2018-2021
Francis Lawson	MSRP Student	2020
Owen Herrock	Pharmacology Graduate Student	2019-present

Peer-reviewed Original Papers (54 total)

- 54-** Progesterone induced blocking factor improves blood pressure, inflammation and pup weight in response to reduced uterine perfusion pressure (RUPP). Jesse N Cottrell, Alexis Witcher, Kyleigh M Comley, Mark W Cunningham Jr, Tarek Ibrahim, Denise C Cornelius, Babbette D LaMarca, **Lorena M Amaral**. *Am J Physiol Regul Integr Comp Physiol* 2021 Feb 3.
- 53-** **Lorena M. Amaral**, Valeria C. Sandrim, Matthew E. Kutcher, Frank T. Spradley, Ricardo C. Cavalli, Jose E. Tanus-Santos, Ana C. Palei *. Circulating total cell-free DNA levels are increased in hypertensive disorders of pregnancy and associated with prohypertensive factors and adverse clinical outcomes. *International Journal of Molecular Sciences*. 2021, 22, 564.
- 52-** Mark W Cunningham Jr, **Lorena M Amaral**, Nathan E Campbell, Denise C Cornelius, Tarek Ibrahim, Venkata Ramana Vaka, Babbette LaMarca. Investigation of interleukin-2 mediated changes in blood pressure, fetal growth restriction, and innate immune activation in normal pregnant rats and in a preclinical rat model of preeclampsia. *Biol Sex Differ* 2021 Jan 6;12(1):4.
- 51-** Deer E, Vaka VR, McMaster KM, Wallace K, Cornelius DC, **Amaral LM**, Cunningham MW, LaMarca B. Vascular endothelial mitochondrial oxidative stress in response to preeclampsia: a role for angiotensin II type 1 autoantibodies. *Am J Obstet Gynecol MFM*. 2021 Jan;3(1):100275.
- 50-** Cunningham MW, Jayaram A, Deer E, **Amaral LM**, Vaka VR, Ibrahim T, Cornelius DC, LaMarca B. Tumor necrosis factor alpha (TNF- α) blockade improves natural killer cell (NK) activation, hypertension, and mitochondrial oxidative stress in a preclinical rat model of preeclampsia. *Hypertens Pregnancy*. 2020 Nov;39(4):399-404.
- 49-** Travis OK, Baik C, Tardo GA, **Amaral L**, Jackson C, Greer M, Giachelli C, Ibrahim T, Herrock OT, Williams JM, Cornelius DC. Adoptive transfer of placental ischemia-stimulated natural killer cells causes a preeclampsia-like phenotype in pregnant rats. *Am J Reprod Immunol*. 2020 Dec 14;:e13386.

- 48-** Deer E, Reeve KE, **Amaral LM**, Vaka VR, Franks M, Campbell N, Fitzgerald S, Herrock OT, Ibrahim T, Cornelius DC, LaMarca BD. CD4⁺ T Cells cause Renal & Placental Mitochondrial Oxidative Stress as mechanisms of hypertension in response to placental ischemia. *Am J Physiol Renal Physiol*. 2021 Jan 1;320(1):F47-F54.
- 47- Lorena M. Amaral**, Jesse N.Cottrell, Kyleigh M. Comley, Mark W. Cunningham Jr, Alexis Witcher, Venkata Ramana Vaka, Tarek Ibrahim, Babbette LaMarca. 17-Hydroxyprogesterone caproate improves hypertension and renal endothelin-1 in response to sFit-1 induced hypertension in pregnant rats. *Pregnancy Hypertension*. 2020 Oct;22:151-155.
- 46-** Elfarrar JT, Cottrell JN, Cornelius DC, Cunningham MW Jr, Faulkner JL, Ibrahim Lamarca B, **Amaral LM**. 17-Hydroxyprogesterone caproate improves T cells and NK cells in response to placental ischemia; new mechanisms of action for an old drug. *Pregnancy Hypertension*, 2020 Jan;19:226-232.
- 45-** Vaka VR, Cunningham MW, Deer E, Franks M, Ibrahim T, **Amaral LM**, Usry N, Cornelius DC, Dechend R, Wallukat G, LaMarca BD. Blockade of endogenous angiotensin II type I receptor agonistic autoantibody activity improves mitochondrial reactive oxygen species and hypertension in a rat model of preeclampsia. *Am J Physiol Regul Integr Comp Physiol*. 2020 Feb 1;318(2):R256-R262.
- 44-**Vaka VR, McMaster KM, Cornelius DC, Ibrahim T, Jayaram A, Usry N, Cunningham MW Jr, **Amaral LM**, LaMarca B. Natural killer cells contribute to mitochondrial dysfunction in response to placental ischemia in reduced uterine perfusion pressure rats. *Am J Physiol Regul Integr Comp Physiol*. 2019 May 1;316(5):R441-R447.
- 43-** Harmon AC, Ibrahim T, Cornelius DC, Amaral LM, Cunningham MW Jr, Wallace K, LaMarca B. Placental CD4⁺ T cells isolated from preeclamptic women cause preeclampsia like symptoms in pregnant nude-athymic rats. *Pregnancy Hypertens*. 2019 Jan;15:7-11.
- 42-** Cottrell JN, **Amaral LM**, Harmon A, Cornelius DC, Cunningham MW Jr, Vaka VR, Ibrahim T, Herse F, Wallukat G, Dechend R, LaMarca B. Interleukin-4 supplementation improves the pathophysiology of hypertension in response to placental ischemia in RUPP rats. *American journal of physiology. Regulatory, integrative and comparative physiology*. 2019; 316(2):R165-R171.
- 41-**Cunningham MW Jr, Castillo J, Ibrahim T, Cornelius DC, Campbell N, **Amaral L**, Vaka VR, Usry N, Williams JM, LaMarca B. AT1-AA (Angiotensin II Type 1 Receptor Agonistic Autoantibody) Blockade Prevents Preeclamptic Symptoms in Placental Ischemic Rats. *Hypertension*. 2018 May;71(5):886-893.
- 40-** Cornelius DC, Cottrell J, **Amaral LM**, LaMarca B, Inflammatory mediators: a causal link to hypertension during preeclampsia. *Br J Pharmacol*. 2018 Aug 10.
- 39-** Vaka VR, McMaster KM, Cunningham MW Jr, Ibrahim T, Hazlewood R, Usry N, Cornelius DC, **Amaral LM**, LaMarca B. Role of Mitochondrial Dysfunction and Reactive Oxygen Species in Mediating Hypertension in the Reduced Uterine Perfusion Pressure Rat Model of Preeclampsia. *Hypertension*. 2018 Jul 16.
- 38-** Faulkner JL, Plenty NL, Wallace K, **Amaral LM**, Cunningham MW, Murphy S, LaMarca B. Selective inhibition of 20-hydroxyeicosatetraenoic acid lowers blood pressure in a rat model of preeclampsia. *Prostaglandins Other Lipid Mediat*. 2018 Jan; 134:108-113
- 37- Amaral LM**, Jessica L.Faulkner, Jamil Elfarrar, Denise C. Cornelius, Mark W. Cunningham, Tarek Ibrahim, Venkata Ramana Vaka, Jessica McKenzie, Babbette LaMarca. Continued Investigation Into 17-OHPC: Results from the Preclinical RUPP Rat Model of Preeclampsia. *Hypertension*. 2017 Dec; 70(6):1250-1255.
- 36-** Elfarrar J, **Amaral LM**, McCalmon M, Scott JD, Cunningham MW Jr, Gnam A, Ibrahim T, LaMarca B, Cornelius DC. Natural Killer Cells Mediate Pathophysiology in Response to Reduced Uterine Perfusion Pressure. *Clin Sci (Lond)*. 2017 Oct 17. pii: CS20171118.
- 35- Amaral LM**, Wallace K, Owens M, LaMarca B. Pathophysiology and Current Clinical Management of Preeclampsia. *Curr Hypertens Rep*. 2017 Aug; 19(8):61.
- 34-** Ibrahim T, Przybyl L, Harmon AC, **Amaral LM**, Faulkner JL, Cornelius DC, Cunningham MW, Hünig T, Herse F, Wallukat G, Dechend R, LaMarca B. *Am J Reprod Immunol*. 2017 Jul 6. doi: 10.1111/aji.12724. Proliferation of endogenous regulatory T cells improve the

pathophysiology associated with the placental ischaemia of pregnancy.

33- Faulkner JL, **Amaral LM**, Cornelius DC, Cunningham MW Jr, Ibrahim T, Heep A, Campbell N, Usry N, Wallace K, Herse F, Dechend R, LaMarca BD. Vitamin D supplementation reduces some AT1-AA induced downstream targets implicated in preeclampsia including hypertension. *Am J Physiol Regul Integr Comp Physiol*. 2017; 312(1):R125-R131.

32- Cornelius DC, **Amaral LM**, Wallace K, Campbell N, Thomas AJ, Scott J, Herse F, Wallukat G, Dechend R, LaMarca BD. Reduced Uterine Perfusion Pressure T-helper 17 cells cause Pathophysiology Associated with Preeclampsia during Pregnancy. *Am J Physiol Regul Integr Comp Physiol*. 2016; 311(6):R1192-R1199.

31- Santiago-Font JA, **Amaral LM**, Faulkner JL, Ibrahim T, Vaka VR, Cunningham MW Jr, LaMarca BD. Serelaxin improves the pathophysiology of placental ischemia in the Reduced Uterine Perfusion Pressure (RUPP) rat model of Preeclampsia. *Am J Physiol Regul Integr Comp Physiol*. 2016 Dec 1; 311(6):R1158-R1163.

30- Cunningham MW Jr, Williams JM, **Amaral L**, Usry N, Wallukat G, Dechend R, LaMarca B. Agonistic Autoantibodies to the Angiotensin II Type 1 Receptor Enhance Angiotensin II Induced Renal Vascular Sensitivity and Reduce Renal Function During Pregnancy. Hypertension. 2016 Nov; 68(5):1308-1313

29- Luizon MR, Palei AC, Belo VA, **Amaral LM**, Lacchini R, Duarte G, Cavalli RC, Sandrim VC, Tanus-Santos JE. Gene-gene interactions in the NAMPT pathway, plasma visfatin/NAMPT levels, and antihypertensive therapy responsiveness in hypertensive disorders of pregnancy. *Pharmacogenomics J*. 2017; 17(5):427-434.

28- LaMarca BD, Cornelius DC, Harmon AC, **Amaral LM**, Cunningham MW Jr, Faulkner JL, Wallace K. Identifying Immune Mechanisms Mediating the Hypertension During Preeclampsia. *Am J Physiol Regul Integr Comp Physiol*. 2016 Jul 1; 311(1):R1-9.

27- LaMarca B, **Amaral LM**, Harmon AC, Cornelius DC, Faulkner JL, Cunningham MW Jr. Placental Ischemia and Resultant Phenotype in Animal Models of Preeclampsia. *Curr Hypertens Rep*. 2016 Apr;18(5):38.

26- Jorge Neto SD, Machado JS, Araujo Júnior E, Palei AC, Amaral LM, Tanus-Santos JE, Marcolin AC, Duarte G, Sandrim VC, Cavalli RC. Longitudinal assessment of maternal-fetal Doppler parameters and maternal plasma level of matrix metalloproteinases 2 and 9. *J Matern Fetal Neonatal Med*. 2016 Feb 8:1-17 (Ahead of print).

25- Harmon AC, Cornelius DC, **Amaral LM**, Faulkner JL, Cunningham MW Jr, Wallace K¹, LaMarca B. The role of inflammation in the pathology of preeclampsia. *Clin Sci (Lond)*. 2016 Mar 1; 130 (6):409-19.

24- Faulkner JL, Cornelius DC, **Amaral LM**, Harmon AC, Cunningham M W Jr, Darby MM, Ibrahim T, Thomas DS, Herse F, Wallukat G, Dechend R, LaMarca BD. Vitamin D supplementation improves pathophysiology in a rat model of preeclampsia. *Am J Physiol Regul Integr Comp Physiol*. 2016 Feb 15; 310(4):R346-54.

23- Jorge Neto SD, Machado JS, Palei AC, Martins WP, Sandrim VC, Araujo Júnior E, **Amaral LM**, Tanus-Santos JE, Duarte G, Cavalli RC. Assessment of nitrite oxide and maternal-fetal Doppler parameters during pregnancy. *J Matern Fetal Neonatal Med*. 2015 Dec 10:1-16.

22- **Amaral LM**, LaMarca B (2015). 17-Hydroxyprogesterone Caproate as a Potential Therapeutic to Add to the Management of Preeclampsia. *J Pharmacol Clin Toxicol*3(4):1059.

21- Cornelius DC, Castillo J, Porter J, **Amaral LM**, Campbell N, Paige A, Thomas AJ, Harmon AC, Cunningham MW Jr, Wallace K, Herse F, Wallukat G, Dechend R, LaMarca BD. Blockade of CD40 ligand for intercellular communication reduces hypertension, placental oxidative stress, and AT1-AA in response to adoptive transfer of CD4⁺ T. *Am J Physiol Regul Integr Comp Physiol*. 2015 Nov 15; 309(10):R1243-50.

20- Cornelius DC, **Amaral LM**, Harmon AC, Wallace K, Thomas AJ, Campbell N, Scott J, Herse F, Haase N, Moseley J, Wallukat G, Dechend R, LaMarca BD. An increase population of regulatory T Cells improves the pathophysiology of placental ischemia in a rat model of preeclampsia. *Am J Physiol Regul Integr Comp Physiol*. 2015 Oct 15;309(8):R884-91

19- **Amaral LM**, Cunningham MW Jr, Cornelius DC, LaMarca B. Preeclampsia: long-term

consequences for vascular health. *Vasc Health Risk Manag.* 2015 Jul 15; 11:403-15.

18- Harmon A, Cornelius D, **Amaral L**, Paige A, Herse F, Ibrahim T, Wallukat G, Faulkner J, Moseley J, Dechend R, LaMarca B. IL-10 supplementation increases Tregs and decreases hypertension in the RUPP rat model of preeclampsia. *Hypertens Pregnancy.* 2015 May 2015 Aug; 34(3):291-306

17- Luizon MR, Belo VA, Palei AC, **Amaral LM**, Lacchini R, Sandrim VC, Duarte G, Cavalli RC, Tanus-Santos JE. Effects of NAMPT polymorphisms and haplotypes on circulating visfatin/NAMPT levels in hypertensive disorders of pregnancy. *Hypertension research: official journal of the Japanese Society of Hypertension.* 2015; 38(5):361-6.

16- **Amaral LM**, Cornelius DC, Harmon A, Moseley J, Martin JN Jr, LaMarca B. 17-Hydroxyprogesterone caproate significantly improves clinical characteristics of preeclampsia in the Reduced Uterine Perfusion Pressure Rat Model. *Hypertension.* 2015 Jan; 65(1):225-3.

15- Luizon MR, Palei AC, Sandrim VC, **Amaral LM**, Machado JS, Lacchini R, Cavalli RC, Duarte G, Tanus-Santos JE. Tissue inhibitor of matrix metalloproteinase-1 polymorphism, plasma TIMP-1 levels, and antihypertensive therapy responsiveness in hypertensive disorders of pregnancy. *Pharmacogenomics Journal.* 2014 Dec; 14(6):535-41.

14- **Amaral LM**, Kiprono L, Cornelius DC, Shoemaker C, Wallace K, Moseley J, Wallukat G, Martin JN Jr, Dechend R, LaMarca B. Progesterone supplementation attenuates hypertension and the autoantibody to the angiotensin II type I receptor in response to elevated interleukin-6 during pregnancy. *American Journal of Obstetrics and Gynecology.* 2014 Aug;211(2):158.e1-6.

13- **Amaral LM**, Pinheiro LC, Guimaraes DA, Palei AC, Sertório JT, Portella RL, Tanus-Santos JE. Antihypertensive effects of inducible nitric oxide synthase inhibition in experimental preeclampsia. *Journal of Cellular and Molecular Medicine.* 2013 Oct; 17(10):1300-7.

12- Machado JS, Palei AC, **Amaral LM**, Bueno AC, Antonini SR, Duarte G, Tanus-Santos JE, Sandrim VC, Cavalli RC. Polymorphisms of the adiponectin gene in gestational hypertension and pre-eclampsia. *Journal of Human Hypertension.* 2014 Feb;28(2):128-32.

11- Miyague AH, Martins WP, Machado JS, Palei AC, **Amaral LM**, Teixeira DM, Sandrim VC, Sertorio JT, Tanus-Santos JE, Duarte G, Cavalli RC. Maternal Flow-Mediated Dilation and Nitrite Concentration During Third Trimester of Pregnancy and Postpartum Period. *Hypertension in Pregnancy.* 2013; Aug;32(3):225-34.

10- Sertório JT, Lacchini R, **Amaral LM**, Palei AC, Cavalli RC, Sandrim VC, Duarte G, Tanus-Santos JE. Haptoglobin polymorphism affects nitric oxide bioavailability in preeclampsia. *J Hum Hypertens.* 2013; Jun; 27(6):349-54.

9- Luizon MR, **Amaral LM**, Palei AC. Matrix metalloproteinases (MMPs) and tissue inhibitors of MMPs genetic polymorphisms and plasma levels in hypertensive disorders of pregnancy. *J Hum Hypertens.* 2013; Apr;27(4):278-9.

8- Rezende VB, Sandrim VC, PALEI AC, **Machado L**, Cavalli RC, Duarte G, Tanus-Santos JE. Vitamin D receptor polymorphisms in hypertensive disorders of pregnancy. *Mol Biol Rep.* 2012; 39(12):10903-6.

7- PALEI AC, Sandrim VC, **Amaral LM**, Machado JSR, Cavalli RC, Lacchini R, Duarte G, Tanus-Santos JE. Association of matrix metalloproteinase (MMP)-9 polymorphisms with plasma MMP-9 levels and with responsiveness to anti-hypertensive therapy in preeclampsia and gestational hypertension. *Pharmacogenomics J.* 2012; 12(6):489-98.

6. Palei AC, Sandrim VC, **Amaral LM**, Machado JS, Cavalli RC, Lacchini R, Duarte G, Tanus-Santos JE. Effects of matrix metalloproteinase (MMP)-2 polymorphisms on responsiveness to antihypertensive therapy of women with hypertensive disorders of pregnancy. *Basic & Clinical Pharmacology & Toxicology.* 2012 Oct; 111(4):262-7.

5- Palei AC, Sandrim VC, **Amaral LM**, Machado JS, Cavalli RC, Duarte G, Tanus-Santos JE. Association between matrix metalloproteinase (MMP)-2 polymorphisms and MMP-2 levels in hypertensive disorders of pregnancy. *Experimental and Molecular Pathology.* 2012;92(2):217-21

- 4- Sandrim VC, Palei AC, Sertório JT, **Amaral LM**, Cavalli RC, Tanus-Santos JE. Alterations in cyclic GMP levels in preeclampsia may reflect increased B-type natriuretic peptide levels and not impaired nitric oxide activity. *Clinical Biochemistry*. 2011; 52(2):402-7
- 3- **Amaral LM**, Palei AC, Sandrim VC, Luizon MR, Cavalli RC, Duarte G, Tanus-Santos JE. Maternal iNOS genetic polymorphisms and hypertensive disorders of pregnancy. *Journal of Human Hypertension*. 2012; 26 (9):547-52.
- 2- Palei AC, Sandrim VC, **Amaral LM**, Machado JS, Cavalli RC, Lacchini R, Duarte G, Tanus-Santos JE. Matrix metalloproteinase-9 polymorphisms affect plasma MMP-9 levels and antihypertensive therapy responsiveness in hypertensive disorders of pregnancy. *Pharmacogenomics Journal*. 2012;12(6):489-98.
- 1- de Almeida CG, Garbois GD, **Amaral LM**, Diniz CC, Le Hyaric M. Relationship between structure and antibacterial activity of lipophilic N-acyldiamines. *Biomedicine & Pharmacotherapy*. 2010; 64(4):287-90.

Posters and Presentations

Abstracts (Selected from 64)

49. Progesterone Induced Blocking Factor Attenuates Hypertension, Placental and Endothelial Cell Mitochondrial Dysfunction and Reactive Oxygen Species in Response to sFlt-1 During Pregnancy. **Lorena M Amaral**, Evangeline Deer, Kyleigh Comley, Denise C Cornelius, Jalisa Jones, Tarek Ibrahim, Ramana Vaka, Michael Franks, Babbette LaMarca. SRI, March 2021.
48. IL-17 causes hypertension and multi-organ tissue dysfunction which is attenuated with blockade of agonistic autoantibodies to the angiotensin II type I (AT1-AA) receptor during pregnancy. Sarah Fitzgerald, James Hogg, Evangeline Deer, James P. Lemon **Lorena M. Amaral**, Denise C. Cornelius, Owen Herrock, Tarek Ibrahim¹ and Babbette LaMarca. 2021 Experimental Biology, 27-30 April 2021. (Oral)
- B Cell Depletion During Pregnancy Improves Hypertension, Natural Killer Cell Activation, and May Not Worsen Fetal Outcomes in Response to Placental Ischemia. Nathan Campbell, Owen Herrock, **Lorena Amaral**, Babbette LaMarca. 2021 Experimental Biology, 27-30 April 2021. (Oral)
47. Deer EM, Vaka R, McMaster M, Wallace K, Cornelius C, **Amaral LM**, Lamarca BB. AT1-AAs cause Vascular Endothelial Mitochondrial Oxidative Stress associated with Preeclampsia. The FASEB Journal. 2021 Experimental Biology, 27-30 April 2021. (Oral)
46. The importance of B Cells in causing hypertension during pregnancy; to B or not to B. Owen Herrock, Kristen Reeve, **Lorena Amaral**, Evangeline Deer, and Babbette LaMarca. Experimental Biology, 27-30 April 2021. (Oral)
45. Progesterone and PIBF: new insights into treatment options for preeclampsia. **Lorena M. Amaral**, Jesse N. Cottrell, Alexis C. Witcher, Kyleigh Comley, Denise C. Cornelius, Mark W. Cunningham Jr., Tarek Ibrahim, Babbette LaMarca. Experimental Biology, 27-30 April 2021.
44. Placental CD4+ T cells from PE women cause hypertension, stimulation of AT1-AA and cytolytic NK cells in nude-athymic pregnant rats. Kristin E. Reeve, **Lorena M. Amaral**, Sarah Fitzgerald, Tarek Ibrahim, Evangeline Deer, Owen Herrock, Ashlyn C. Harmon, Gerd Wallukat, Ralf Dechend, and Babbette LaMarca. SMFM, Jan 2021.
43. A Role for IL-17 to stimulate B cells to secrete AT1-AA to cause hypertension and multi-organ tissue dysfunction during pregnancy. James Hogg, Sarah Fitzgerald, Evangeline Deer, Lorena M. Amaral, Denise C. Cornelius, James P. Lemon, Kristin E. Reeve, Owen Herrock, Tarek Ibrahim and Babbette. SMFM, Jan 2021.
42. Inhibiting Progesterone induced blocking factor induces markers of endothelial dysfunction and inflammation in pregnant rats. Lorena M. Amaral¹, Alexis C. Witcher, Kyleigh

Comley, Jesse N. Cottrell, Mark W. Cunningham Jr. , Tarek Ibrahim. Experimental Biology 2020. San Diego, CA.

41. Placental Ischemia Stimulated Natural Killer Cells Play a Direct Role in Causing Hypertension and Intrauterine Growth Restriction in Pregnant Rats Olivia K Travis, Cedar Baik, Geilda Ann Tardo, **Lorena Amaral**, Carmilya Jackson, Mallory Greer, Chelsea Giachelli, Jan M Williams, Denise C Cornelius. Experimental Biology 2020. San Diego, CA. (*Oral*).

40. Progesterone induced blocking factor inhibition causes inflammation and endothelial dysfunction in pregnant Sprague Dawley rats. Alexis C. Witcher, Kyleigh Comley, Jesse N. Cottrell, Mark W. Cunningham Jr. , Tarek Ibrahim , Babbette LaMarca, **Lorena M. Amaral** SMFM Annual Pregnancy meeting 2020, Grapevine, USA. (*Oral*).

39. Role of Tumor necrosis factor in mitochondrial dysfunction in the placenta and kidneys of normal pregnant rats. SMFM Annual Pregnancy meeting 2020, Grapevine, USA.

38. CD4+ T Cells from a rat model of preeclampsia activate NK cells to cause mitochondrial oxidative stress and hypertension in normal pregnant rats. Kristin E. Reeve, Evangeline Deer, **Lorena M. Amaral**, Venkata Ramana Vaka, Michael Franks, Sara Fitzgerald, Owen Herrock, Tarek Ibrahim, and Babbette LaMarca. SMFM Annual Pregnancy meeting 2020, Grapevine, USA.

37. Tumor Necrosis Factor (TNF α) Blockade improves Natural Killer Cell (NK) Activation and Hypertension in a Preclinical Rat Model of Preeclampsia. Aswathi Jayaram, Mark W Cunningham, Jr., **Lorena Amaral**, Denise Cornelius, Tarek Ibrahim, Venkata Ramana Vaka, Babbette LaMarca. SMFM Annual Pregnancy meeting 2019, Las Vegas, USA. (*Oral*).

36. Tumor Necrosis Factor (TNF α) Blockade: A novel approach in management of preeclampsia by improving placental ischemia and hypertension in a preclinical rat model of preeclampsia. Aswathi Jayaram, Mark W Cunningham, Jr. **Lorena Amaral**, Denise Cornelius, Tarek Ibrahim, Venkata Ramana Vaka, Babbette LaMarca. SRI 2019, Paris, France.

35. RUPP CD4+T Cells activate NK cells, cause mitochondrial oxidative stress, and hypertension in normal pregnant rats. Evangeline Deer, Kristin E. Reeve, **Lorena M. Amaral**, Venkata Ramana Vaka, Michael Franks, Sara Fitzgerald, Owen Herrock, Tarek Ibrahim, and Babbette LaMarca. UMMC Research Day 2019.

34. Progesterone induced blocking Factor attenuates hypertension and placental mitochondrial dysfunction and reactive oxygen species in response to sFlt-1 during pregnancy Jalisa Jones, **Lorena M. Amaral**, Evangeline Deer, Denise C. Cornelius, Tarek Ibrahim, Ramana Vaka, Michael Franks, Babbette LaMarca. UMMC Research Day 2019.

33. **Lorena M Amaral**, Mark W. Cunningham Jr., Venkata Ramana Vaka, Tarek Ibrahim, Babbette LaMarca. Progesterone Supplementation Abolishes Sflt-1 Induced Hypertension In Pregnant Rats High Blood Pressure Council (HBPR) Scientific Sessions, Chicago, USA, 2018.

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27. Venkata Ramana Vaka, Kristen M. McMaster, Mark W. Cunningham Jr, **Lorena M. Amaral**, Tarek Ibrahim, Denise Cornelius, Babbette LaMarca. Natural Killer Cells Contribute to Placental Mitochondrial Dysfunction in Response to Placental Ischemia in Reduced Uterine Perfusion Pressure (RUPP) Rat Model of Preeclampsia. Experimental Biology, Chicago, IL, 2017.

26. **Lorena M. Amaral**, Jamil Elfarrar, Denise C. Cornelius, Jessica L Faulkner, Mark W. Cunningham Jr., Babbette LaMarca. 17-hydroxyprogesterone caproate improves fetal growth restriction possibly by reducing inflammation and placental cytolytic NK cells in response to placental ischemia during pregnancy. Experimental Biology, Chicago, IL, 2017

25. **Lorena M. Amaral**, Jamil Elfarrar, Denise C. Mark W. Cunningham Jr., Tarek Ibrahim, Babbette LaMarca. 17-hydroxyprogesterone caproate improves and placental cytolytic NK cells in response to placental ischemia during pregnancy. High Blood Pressure Council (HBPR) Scientific Sessions, Orlando, FL, 2016.

24. **Lorena M. Amaral**, Jamil Elfarrar, Denise C. Cornelius, Jessica L Faulkner, Mark W. Cunningham Jr., Taia R. McAfee, D'andrea S. Thomas, Babbette LaMarca. Early administration of 17-hydroxyprogesterone caproate improves fetal growth restriction possibly by reducing sFlt-1 and placental cytolytic NK cells in response to placental ischemia during pregnancy. High Blood Pressure Council (HBPR) Scientific Sessions, Washington, D.C., USA, 2015.

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Preeclampsia". (Accepted for Poster Presentation at SMFM's 35th Annual Meeting: The pregnancy meeting, San Diego, USA, 2015).

16. Amaral LM, Moseley J, Cornelius DC, Martin JN Jr, LaMarca B. "17-Hydroxyprogesterone attenuates hypertension and uterine artery resistance in response to reduced uterine perfusion pressure (RUPP) in pregnant rats." International Society for Study of Hypertension in Pregnancy (ISSHP), New Orleans, USA, 2014. *Oral presentation*

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7. Amaral LM, Cornelius DC , Kiprono L, Shoemaker C, Wallace K, Moseley J, Wallukat G, Martin JN Jr, Dechend R, LaMarca B. "Progesterone supplementation attenuates hypertension and AT1-AA in response to elevated IL-6 during pregnancy". 3rd ISH New Investigators' Symposium on Hypertension and Cardiovascular Disease. New Orleans, USA, 2013. *Oral Presentation*

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5. Amaral LM, Pinheiro LC, Guimaraes DA, Palei AC, Sertório JT, Portella RL, Tanus-Santos JE. "Antihypertensive effects of inducible nitric oxide synthase inhibition in experimental preeclampsia." HBPR Scientific Sections. Washington, USA, 2012. Published in J Cell Mol Med. 2013 Jul 24.

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1. **AMARAL LM**, Palei AC, Sandrim VC; Cavalli R C; Tanus-Santos JE. "Increased circulating cell-free DNA levels in preeclampsia and gestational hypertension." 42^o SBFTe Meeting. Brazil, 2010.

Research Support

Current

April 2019- March 2022 2019 Career Development Award 19CDA34670055. Title: "Benefits of progesterone: missing in action during preeclampsia. (\$77,000.00/year).

Dec 2020- November 2021. Mississippi Center for Clinical and Translational Research (MCCTR). Title: Progesterone and PIBF: new insights into treatment options for preeclampsia (\$40,000.00)

Previous

Jun 2018 - May 2019 NIH/ NIGMS Pilot project on grant 5P20GM121334-02. Title: "Anti-inflammatory effects of progesterone: missing in action during preeclampsia". (\$50,000.00)

Oct 2016 - Oct 2018 AMAG Pharmaceuticals. Title: "17-Hydroxyprogesterone Caproate Supplementation: A Novel Therapeutic for the Management of Preeclampsia?" Role: **Amaral Co-investigator** / LaMarca (PI)

Feb 2011-Nov 2012: Predoctoral fellowship from 'Fundação de Amparo à Pesquisa de São Paulo' (FAPESP), Sao Paulo, Brazil. Title: "Effects of inducible nitric oxide synthase inhibition in experimental pre-eclampsia."

Feb 2009-Dec2010 Graduate fellowship from 'Conselho Nacional de Desenvolvimento Científico e Tecnológico' (CNPq), Brazil. Title: "Effects of genetics polymorphisms of iNOS on the susceptibility in hypertensive disorders of pregnancy".

Apr 2007-Aug 2008 Undergraduate fellowship from Federal University of Juiz de Fora, MG, Brazil. Title: "Pharmaceutical Care"

Aug 2008-Dez 2008 Undergraduate fellowship from Federal University of Juiz de Fora, MG, Brazil. Title: "Relationship between structure and antibacterial activity of lipophilic N-acyldiamines".