BIOGRAPHICAL SKETCH

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NAME: Jussara Marcia do Carmo

eRA COMMONS USER NAME (credential, e.g., agency login): JDOCARMO

POSITION TITLE: Associate Professor

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
State University of Paraiba, Brazil	BS	12/1993	Physical Therapy
Federal University of Pernambuco, Brazil	M.S.	05/1999	Physiology
University of Sao Paulo	Ph.D.	10/2006	Physiology
Univ. Mississippi Medical Center, Jackson, MS	Postdoctoral Fellow	06/2008	Physiology

A. Personal Statement

I am an Associate Professor of Physiology and Biophysics at the University of Mississippi Medical Center and the Mississippi Center for Obesity Research, Jackson, MS where I serve as Sub-Core Leader for the NIH/COBRE Cardiorenal and Metabolic Diseases. I received my postdoctoral training at the University of Mississippi Medical Center in the laboratory of Dr. John E. Hall, after which I was appointed as Instructor, and soon after promoted to Assistant Professor of Physiology & Biophysics in 2011 before risen to my current position as Associate Professor of Physiology.

My research focuses on understanding the mechanisms of obesity-induced hypertension and target organ injury. For the past few years my laboratory has been investigating the mechanisms by which obesity leads to hypertension and renal diseases using a variety of rodent models. In particular, I have mainly focused on central nervous system (CNS) signaling mechanisms and brain regions by which the leptin-melanocortin system axis differentially regulates metabolic and cardiovascular functions. We have generated novel genetic mouse models that allow us to unravel the role of the leptin-melanocortin pathway in specific brain nuclei which, accompanied, by our expertise in conducting acute and chronic sophisticated and integrative physiological studies in mice provide an unique and powerful approach to determine the complex circuits and signaling pathways of CNS control of appetite, BP regulation, and metabolic and kidney function with broad implication for clinical treatment of cardiovascular and metabolic diseases. More recently, my laboratory has dedicated its efforts to better understand the consequences and mechanisms of parental obesity in promoting excess weight gain, metabolic syndrome, hypertension and renal dysfunction in the offspring.

B. Positions and Honors

PROFESSIONAL EXPERIENCE/POST GRADUATE TRAINING

1993-1996 Assistant Professor, State University of Paraiba, Campina Grande, State of Paraiba, Brazil.

1996-2002 Assistant Professor, University of Tiradentes, Aracaju, State of Sergipe, Brazil.

1996-1999 Graduate Student, Master in Physiology, Federal University of Pernambuco, State of Pernambuco, Brazil.

2002-2006 Graduate Student – Doctorate in Physiology, University of Sao Paulo, State of Sao Paulo, Brazil.

2006-2008 Postdoctoral Fellowship, University of Mississippi Medical Center, Dept. Physiology, Jackson, Mississippi, USA

2009-2010 Instructor, University of Mississippi Medical Center, Dept. Physiology, Jackson, Mississippi, USA**.**

2011-218 Assistant Professor, University of Mississippi Medical Center, Dept. Physiology, Jackson, Mississippi.

2012-present Fellow, American Heart Association.

2018-present Associate Professor, University of Mississippi Medical Center, Dept. Physiology, Jackson, Mississippi.

Other Experience and Professional Memberships

1995-present – Member, Brazilian Physiology and Therapeutics Society

2006-present – Member, American Physiological Society

2006-present – Member, American Heart Association

2012-present – Fellow, American Heart Association

FELLOWSHIPS, AWARDS, HONORS

1993-1996 Scholarship recipient, Pre-Doc, Coordination of the Improvement of Higher Education Personnel (CAPES), Research Foundation, Brazil

2002-2006 Doctoral fellowship grant from Coordination of the Improvement of Higher Education Personnel (CAPES), Research Foundation, Brazil

2003 Travel Award from Foundation of Support to Teaching and Research (FAEPA), University of Sao Paulo, Brazil

2004 Travel Award from Office of Dean for Doctoral Program (Pro-Reitoria), University of Sao Paulo

2007 Young Investigator Travel Award, Council for High Blood Pressure Research, Tucson, AZ

2011 Physiological Society (APS)/NIDDK Minority Travel Fellowship Award, Experimental Biology 2011, Washington, DC.

2011-2014 Scientist Development Grant – American Heart Association (AHA)

2011 Finalist, Harry Goldblatt Award for New Investigators, American Heart Association, Council for High Blood Pressure Research

2012 Recipient, Harry Goldblatt Award for New Investigators American Heart Association, Council for High Blood Pressure Research

2013 Young Investigator Award, American Heart Association - Council for High Blood Pressure Research in Australia. Melbourne, Australia

2013 Excellence in Research Award – University of Mississippi Medical Center – Silver Medallion

2014 NISBRE Highlighted Poster, Mississippi IDeA Network of Biomedical Research Excellence (INBRE) Conference, Biloxi, MS – Cardiovascular Section

2016 Excellence in Research Award – University of Mississippi Medical Center – Gold Medallion

2017 Distinction in Scholarship; Selection for APS Select, *The American Journal of Physiology – Endocrinology and Metabolism,* article title: "Role of autonomic nervous system in chronic CNS-mediated antidiabetic action of leptin" APS Select.

2019 One of the Best Published Articles in Physiology Research; Selection for APS Select, The American Physiological Society, article title: "Impact of leptin deficiency compared to neuronal specific leptin receptor deletion on cardiometabolic regulation" APS Select.

C. Contributions to Science

(Selected from over 65 publications which can be found at My NCBI Bibliography)
https://www.ncbi.nlm.nih.gov/sites/myncbi/jussara.docarmo.1/bibliography/57658706/public/?sort=date&direction=ascending

a. The past few decades have witnessed an unprecedented increase in the incidence of cardiovascular, renal and metabolic diseases such as diabetes. Of the people diagnosed with diabetes, about 80 to 90 percent are diagnosed as obese suggesting a close link between diabetes and obesity. Obesity is a major independent risk factor for hypertension and diabetes which are leading causes of chronic kidney disease and its progression to end-stage renal disease. We demonstrated that obesity is associated with glomerular hyperfiltration, renal injury associated with mitochondrial and endoplasmic reticulum injury.
    a. **do Carmo JM**, Tallam SM, Roberts JV, Brandon EL, Biglane J, Silva AA Hall JE. Impact of obesity on renal structure and function in the presence and absence of hypertension: evidence from melanocortin-4 receptor deficient mice. *Am J Physiol Regul Integr Comp Physiol.* 297: R803:R812, 2009. PMID: 19605765.
    b. Wang Z, **do Carmo JM**, da Silva AA, Aberdein N, Hall JE. Synergistic interaction of hypertension and diabetes in promoting kidney injury and the role of endoplasmic reticulum stress. *Hypertension* 2017; 69: 879-891. PMID: 28348018
    c. Munusamy S, **do Carmo JM**, Hosler JP, Hall JE. Obesity-induced changes in kidney mitochondrial and endoplasmic reticulum in the presence or absence of leptin. *Am J Physiol: Renal Physiology* 2015; 309: F731-F743. PMID: 26290368
    d. Hall JE, **do Carmo JM**, da Silva AA, Wang Z, Hall ME. Obesity-induced hypertension: interaction of neurohumoral and renal mechanisms. *Circulation Res* 2015; 116: 991-1006. PMID: 25767285
    e. Hall JE, **do Carmo JM**, da Silva AA, Wang Z, Hall ME. Obesity, kidney dysfunction and hypertension: Mechanistic links. *Nature Reviews Nephrology* 2019; 15: 367-385. PMID: 31015582

b. The leptin-melanocortin system plays a crucial role in regulating appetite, energy expenditure and sympathetic nervous system (SNS) activity. This is evident by the fact that mutation of ob (leptin) gene or melanocortin-4 receptors (MC4R) result in severe obese phenotype in mice and human due to increased food intake and reduced energy expenditure but they have normal or slightly reduced blood pressure. Besides its effect on body weight regulation and SNS activity, leptin-melanocortin system also regulates peripheral glucose uptake. My early paper examined the role of leptin on glucose regulation and baroreflex sensitivity in streptozotocin (STZ) - induced diabetes. We showed that central nervous system actions of leptin abolished the hyperglycemia and altered baroreflex sensitivity and intrinsic heart rate in this model of diabetes. We also showed that leptin receptor in proopiomelanocortin neurons is necessary for the chronic effects of leptin to raise blood pressure and reduce glucose levels. However, many questions still unanswered, for instance, the central nervous system mechanisms triggered by chronic leptin infusion that mediates increased peripheral glucose uptake is still unknown and it is one of the focus of our research effort.
    a. da Silva AA, Spradley FT, Granger JP, Hall JE, **do Carmo JM**. Brain-mediated antidiabetic, anorexic, and cardiovascular actions of leptin require melanocortin-4 receptor signaling. *J Neurophysiol* 113: 2786-91, 2015. PMID: 25717164.
    b. **do Carmo JM**, da Silva AA, Cai Z, Lin S, Dubinion JH, Hall JE. Control of blood pressure, appetite, and glucose by leptin in mice lacking leptin receptors in proopiomelanocortin neurons. *Hypertension*. 57: 918-926. 2011. PMID: 21422382
    c. **do Carmo JM**, da Silva AA, Moak, da Silva FS, Spradley FT, Hall JE. Role of melanocortin 4 receptor in hypertension induced by chronic intermittent hypoxia. *Acta Physiologica*, 2019; 225: e13222. PMID: 30466186.
    d. **do Carmo** JM, Hall JE, da Silva AA. Chronic central leptin infusion restores cardiac sympathetic-vagal balance and baroreflex activity in diabetic rats. Am J Physiol Heart Circ Physiol. 295: H1974-81, 2008. PMID: 18790839

e. In addition to the studies described above, we have also examined the role of the brain leptin-melanocortin system in linking obesity with increased sympathetic activity and hypertension. These studies emphasized which specific brain regions are most important in mediating the effects of leptin-melanocortin-4 receptor activation on food intake, energy expenditure and blood pressure regulation. This body of work is providing us fundamental insights into metabolic and cardiovascular regulation that may lead to therapeutic

approaches to improve body weight control and metabolic functions independent of increased blood pressure.

a. **do Carmo JM**, da Silva AA, Hall JE. Role of hindbrain melanocortin-4 receptor activity in controlling cardiovascular and metabolic functions in spontaneously hypertensive rats. *J Physiol Hypertens* 33: 1201-6, 2015. PMID: 25668357

b. **do Carmo JM**, da Silva AA, Dubinion J, Sessums PO, Ebaady SH, Wang Z, Hall JE. Control of metabolic and cardiovascular function by the leptin-brain melanocortin pathway. *IUBMB Life* 65(8):692-8, 2013.

c. do Carmo JM, da Silva AA, Rushing JS, Pace B, Hall JE. Differential control of appetite and cardiovascular function in mice with selective rescue of melanocortin-4 receptor in proopiomelanocortin neurons. *Am J Physiol Regul Integr Comp Physiol* 305(4):R359-68, 2013.

d. **do Carmo JM**, Bassi M, da Silva AA, Hall JE. Systemic but not central nervous system nitric oxide synthase inhibition exacerbates the hypertensive effects of chronic melanocortin-3/4 receptor activation. *Hypertension*. 57: 428-34, 2011. PMID: 21263126

e. **do Carmo JM**, da Silva AA, Rushing JS, Hall JE. Activation of the central melanocortin system contributes to the increased arterial pressure in obese Zucker rats. *Am J Physiol Regul Integr Comp Physiol* 302(5):R561-R567, 2012. PMID: 22204957

f. The complex central nervous system (CNS) circuits and cell signaling mechanisms for the differential control of leptin's metabolic and cardiovascular effects remain poorly understood. We are using novel genetically engineered mouse models and sophisticated state-of-the-art molecular and integrative physiological phenotyping to study the role of leptin receptor signaling via downstream signaling in specific areas of the CNS in mediating its chronic metabolic and cardiovascular effects. The outcome from our experiments will provide important and novel information that could lead to new therapeutic approaches for the treatment of hypertension and metabolic disorders, including obesity and diabetes, which are major causes of cardiovascular and renal disease worldwide.

a. **do Carmo JM**, da Silva AA, Freeman JN, Wang Z, Moak SP, Hankins MW, Drummond HA, Hall JE. Neuronal Suppressor of Cytokine Signaling 3: Role in Modulating Chronic Metabolic and Cardiovascular Effects of Leptin. Hypertension *Hypertension*. 71: 1248-1257, 2018. PMID: 29686012.

b. da Silva AA, Freeman JN, Hall JE, **do Carmo JM**. Control of Appetite, Blood Glucose ad Blood Pressure During Melanocortin-4 Activation in Normoglycemic and Diabetic NPY Deficient Mice. *Am J Physiol Integr Comp Physiol*. 314: R533-R539, 2017PMID: 29351428

c. **do Carmo JM**, da Silva AA, Ebaady SE, Sessums PO, Abraham RS, Elmquist JK, Lowell BB, Hall JE. Shp2 signaling in Pomc neurons is important for leptin's actions on blood pressure, energy balance and glucose regulation. *Am J Physiol Regul Integr Com Physiol* 307: R1438-47, 2014. PMID: 25339680

d. **do Carmo JM**, da Silva AA, Gava FN, Moak SP, Dai X, Hall JE. Impact of leptin deficiency compared with neuronal-specific leptin receptor deletion on cardiometabolic regulation. *Am J Physiol Regul Comp Physiol* 317:R552-R562, 2019.

e. **do Carmo JM**, da Silva AA, Moak SP, Browing JR, Dai X, Hall JE. Increased sleep time and reduced energy expenditure contribute to obesity after ovariectomy and a high fat diet. *Life Sci*. 2018. Doi: 10.1016/j.lfs. [Epub ahead of print]. PMID: 30273560.

D. Additional Information: Research Support and/or Scholastic Performance

Ongoing Research Support

RO1 DK121411 do Carmo (PI) 09/19/2019-09/18/2022 4.8
National Institutes of Health
"Long-term consequences of parental obesity on development programming of cardiorenal diseases in offspring"
The major goal of this project is to investigate the effects of parental obesity on kidney dysfunction in offspring, NO OVERLAP

PO1 HL519717 Hall (Director and PI of Project I) 08/01/2014-05/31/2020 0.8
NIH/NHLBI
"Cardiovascular dynamics and their control"

The major long-term goal of this project is to investigate the central nervous system signaling pathways that mediate the antidiabetic actions of leptin.
Role: Co-Investigator of Project I

P20GM104357 Hall (PI) 07/16/2018-04/30/2023 0.8
National Institutes of Health, National Institute of General Medical Science
Cardiorenal and Metabolic Diseases Research Center
Role: Sub-Core Director, Basic Science

P20GM104357 Pilot Grants Program-Center of Biomedical Research Excellence (COBRE) “Obesity, Cardiorenal and Metabolic Disease Center”
da Silva (PI) 07/01/2019-06/30/2020 $40,000/year 0.0
Title: “CNS mechanisms of cardiac protection in heart failure.”
The major long-term goal of this project is to generate key preliminary data for R01 application aiming to identify the mechanisms by which activation of the brain leptin-melanocortin system protects against myocardial infarction-induced progression of heart failure.
Role: Co-PI

P20GM121334 Reckelhoff (PI) 12/01/2018-05/31/2022 0.8
National Institutes of Health, National Institute of General Medical Science
Role of microRNA-21 in the androgen-induced metabolic effects in Polycystic Ovary Syndrome – Mississippi Center of Excellence in Perinatal Research – Damian Romero (PI) - Project V.
Role: Co-investigator

Past Research Support

Completed Research Support

P20 RR024217 do Carmo (PI of Project II) 09/05/2013-04/30/2018 $175,000/year
NIH/NHLBI
"Hypertension and Cardiorenal Diseases Research Center"
The major long-term goal of this project is to investigate the effects of ambient temperature in modulating the actions of leptin on appetite, metabolic and cardiovascular function.
Role: PI of Project II

SDG – AHA 11SDG5680016 Jussara M. do Carmo (PI)1/1/11-12/31/14 $69,000/year
“Differential control of metabolic and cardiovascular functions by leptin at thermoneutral and cold ambient temperature”
These studies focus on the role of leptin receptors in contributing to divergent control of cardiovascular and metabolic function by leptin at different ambient temperature.
Role: Principal Investigator

RO11HL066072-08 – Jane F. Reckelhoff (PI) 01/01/2012 – 12/31/2017 $250,000/year
“Humoral Factors in Gender Differences in BP Control”
The major long-term goal of this project is to investigate the gender differences in blood pressure control.
Role: Co-investigator