

CURRICULUM VITAE

Name: Mónica M. Santisteban
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Position: Instructor in Neuroscience
Institution: Brain and Mind Research Institute
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My research interests are directed toward understanding mechanisms underlying neurovascular dysfunction and cognitive impairment in hypertension. Specifically, I am interested in (1) the neurovascular mechanisms affected by hypertension, (2) how do these mechanisms affect cognition, and (3) identifying novel tools and approaches to improve cognitive health in hypertension. Hypertension is a condition that affects almost 50% of the population, and it is a leading risk factor for stroke and dementia as the brain is one of the major targets of the end-organ damage produced by blood pressure elevation. By inducing neurovascular dysfunction, hypertension greatly increases the brain's susceptibility to vascular insufficiency, ischemic injury, and cognitive impairment. Therefore, it is essential to identify new targets to counteract the deleterious effects of hypertension on the brain.

EDUCATION/TRAINING

01/2016 – 03/2020 New York, NY Weill Cornell Medicine	Postdoctoral Associate in Neuroscience Brain and Mind Research Institute <u>Mentor:</u> Costantino Iadecola, M.D.
08/2015 – 12/2015 Gainesville, FL University of Florida	Postdoctoral Associate College of Medicine, Department of Physiology and Functional Genomics <u>Mentor:</u> Mohan K. Raizada Ph.D.
08/2011 – 08/2015 Gainesville, FL University of Florida	Ph.D. in Medical Sciences Interdisciplinary Program in Biomedical Sciences College of Medicine, Department of Physiology and Functional Genomics <u>Mentor:</u> Mohan K. Raizada Ph.D.
08/2012 – 08/2015 Gainesville, FL University of Florida	Certificate in Clinical Translational Science College of Medicine Partner Program Clinical Translational Science Institute
08/2008 – 08/2011 Gainesville, FL University of Florida	B.S. in Biology Minor in Chemistry College of Liberal Arts and Sciences

MEMBERSHIP IN PROFESSIONAL SOCIETIES

2012 – 2016	Member, American Physiological Society – NCAR Section
2016 – 2020	Member, New York Academy of Sciences
2016 – 2018	Member, Society for Neuroscience
2012 – Present	Member, American Heart Association – Hypertension Council

AWARDS AND HONORS

2008 – 2011	Florida Academic Scholars Award, Bright Futures Scholarship
2014	Investigator Grant (<i>International Society for Hypertension</i>)
2014	UF Medical Guild Advancement to Candidacy Award
2014	Alec Courtelis Award (<i>UF International Center</i>)
2015	Steven M. Horvath Professional Opportunity Award (<i>Graduate research; APS</i>)
2015	James Willerson Young Investigator Award in Cardiovascular Medicine (<i>International Academy of Cardiovascular Sciences</i>)
2016	Steven M. Horvath Professional Opportunity Award (<i>Postdoctoral research; APS</i>)
2017	Stanley Stahl Research Fellowship (<i>American Heart Association</i>)
2019	HHMI Inclusive Excellence Fellowship (<i>Mercy College</i>)
2020	Leon Levy Neuroscience Fellow (<i>Leon Levy Foundation</i>)

RESEARCH SUPPORT

Ongoing Research Support

Source: Leon Levy Foundation, Leon Levy Fellowship in Neuroscience Research

Title: Neurovascular mechanisms of cognitive impairment in salt-sensitive hypertension

Direct Cost: \$200,000

Period: 03/2020 – 02/2022

Completed Research Support

Source: American Heart Association, Greater Southeast Affiliate, Predoctoral Fellowship (14PRE18590018)

Title: The involvement of microglial cell activation in the development and establishment of hypertension

Direct Cost: \$54,813

Period: 01/2014 – 08/2015

Source: American Heart Association, National, Postdoctoral Fellowship (17POST33370064)

Title: Role of brain perivascular macrophages in the cognitive dysfunction of chronic hypertension

Direct Cost: \$98,950

Period: 01/2017 – 12/2018

PEER REVIEW AND COMMITTEES

2015 - 2016 APS – Neural Control and Autonomic Regulation Section

Chair of Data NCARnation organization subcommittee

Member of NCAR awards subcommittee

2019 - Present AHA – Hypertension Council Trainee Advocacy Committee (Member)

2020 - Present WCM – Brain and Mind Research Institute Anti-Racism & Diversity Committee (Member)

Ad hoc reviewer *Hypertension, Cellular and Molecular Neurobiology, Journal of Chemical Neuroanatomy, Frontiers in Cellular and Infection Microbiology*

TEACHING

Graduate:

GMS 6472

Spring 2014

Fundamentals of Physiology and Functional Genomics II

University of Florida

Invited discussion leader

PSYCH 2051

Spring 2018

Health Psychology

New York University

Invited lecture: Cerebrovascular System

Undergraduate:

PHYS 120

Fall 2019

Physics of the Human Body

Mercy College, Adjunct Professor

BIOL 117

Spring 2020

Nutrition

Mercy College, Adjunct Professor

MENTORING

High School Students:

Summer 2018

Olivia Yoo

Darien High School, Connecticut

Undergraduate Students:

2012 - 2014

Jessica Joseph

B.S. in Biology and Psychology, University of Florida

2012 - 2013

Jessica Marulanda Carvajal

B.S. in Animal Sciences and Wildlife Ecology Conservation, University of Florida

Summer 2013

Monika A. McCarter (*APS Undergraduate Summer Research Fellowship*)

Summer 2014

B.S. Bioengineering, Lehigh University

- 2014 - 2015 **Gilberto O. Lobaton**
B.S. in Physiology and Applied Kinesiology, University of Florida
- Summer 2017 **Nahid Anna Baghdadi** (*ACCESS Summer Internship Program*)
B.S. in Chemistry, Michigan State University

Medical Students:

- Spring 2017 **Gabriele De Luca**
Sapienza Università di Roma, Italy

Residents:

- Spring 2018 **Virginia Cipollini, MD**
Sapienza Università di Roma, Italy
S. Andrea Hospital

CONFERENCES AND INVITED PRESENTATIONS

- 2016 Experimental Biology (**Session Chair – Data NCARnation**)
2016 Experimental Biology (**Symposium Speaker**)
2017 AHA Research Leaders Academy
2019 NIH/NIA Concepts in Geroscience Series: Postdoctoral Fellows Symposia
Tissue Resident Immune Cells

PUBLICATIONS

Complete List of Published Work in MyBibliography:

<https://www.ncbi.nlm.nih.gov/myncbi/browse/collection/42865039/?sort=date&direction=descending>

Peer-Reviewed Articles

1. Zubcevic J, Jun JY, Kim S, Perez PD, Afzal A, Shan Z, Li W, **Santisteban MM**, Yuan W, Febo M, Mocco J, Feng Y, Scott E, Baekey DM, and Raizada MK. Altered inflammatory response is associated with an impaired autonomic input to the bone marrow in the spontaneously hypertensive rat. *Hypertension*. 2014; 63(3):542-50. PMID: 24366083
2. Yang T*, **Santisteban MM***, Rodriguez V*, Li E, Ahmari N, Marulanda J, Zadeh M, Gong M, Qi Y, Zubcevic J, Sahay B, Pepine CJ, Raizada MK, Mohamadzadeh M. Gut dysbiosis is linked to hypertension. *Hypertension*. 2015; 65: 1331-1340. PMID: 25870193 *equal contribution
3. **Santisteban MM**, Ahmari N, Marulanda Carvajal J, Zingler MB, Qi Y, Kim S, Joseph J, Garcia-Pereira F, Johnson RD, Shenoy V, Raizada MK, Zubcevic J. Involvement of bone marrow cells and neuroinflammation in hypertension. *Circ Res*. 2015;117:178-91. PMID: 25963715 (Cover illustration)
4. Stewart D*, Rubiano A*, **Santisteban MM**, Shenoy V, Qi Y, Pepine CJ, Raizada MK, Simmons CS. Hypertension-linked mechanical changes of rat gut. *Acta Biomaterialia*. 2016;45:296-302. PMID: 27567964
5. **Santisteban MM***, Qi Y*, Zubcevic J, Kim S, Yang T, Shenoy V, Cole-Jeffrey CT, Lobaton GO, Stewart DC, Rubiano A, Simmons CS, Garcia-Pereira F, Johnson RD, Pepine CJ, Raizada MK. Hypertension-linked pathophysiological alterations in the gut. *Circ Res*. 2017;120:312-323. PMID: 27799253 *equal cont.
6. Faraco G, Sugiyama Y, Lane D, Garcia Bonilla L, Chang H, **Santisteban MM**, Racchumi G, Murphy M, Van Rooijen N, Anrather J, Iadecola C. Perivascular macrophages mediate the neurovascular and cognitive dysfunction of hypertension. *J Clin Inv*. 2016;126:4674-4689. PMID: 27841763
7. Zubcevic J, **Santisteban MM**, Perez PD, Arocha R, Hiller H, Malphurs WL, Colon-Perez LM, Sharma RK, de Kloet A, Karuse EG, Febo M, Raizada MK. A single angiotensin II hypertensive stimulus is associated with prolonged neuronal and immune system activation in Wistar-Kyoto rats. *Front Physiol*. 2017;8:592. PMID: 28912720
8. Faraco G, Brea D, Garcia-Bonilla L, Wang G, Racchumi G, Chang H, Buendia I, Koizumi K, **Santisteban MM**, Sugiyama Y, Murphy M, Voss H, Anrather J, Iadecola C. Dietary salt promotes neurovascular and cognitive dysfunction through a gut-initiated TH17 response. *Nature Neurosci*. 2018; 21:240-249. PMID: 29335605

9. Ahmari N, **Santisteban MM**, Miller DR, Geis NM, Larkin RM, Redler TL, Denson H, Khoshbouei H, Baekey DM, Raizada MK, Zubcevic J. Elevated bone marrow sympathetic drive precedes systemic inflammation in angiotensin II hypertension. *Am J Physiol Heart Circ Physiol*. 2019; 317:HH279-H289. PMID:31150271
10. Faraco G, Hochrainer K, Segarra SG, Schaeffer S, **Santisteban MM**, Menon A, Jiang H, Holtzman DM, Anrather J, Iadecola C. Dietary salt promotes cognitive impairment through tau phosphorylation. *Nature*. 2019; 574:686-690. PMID: 31645758
 - a. Publisher Correction. *Nature*. 2020; 578:E9. PMID: 31932732
11. **Santisteban MM**, Ahn S, Lane D, Faraco G, Garcia-Bonilla L, Racchumi G, Poon C, Schaeffer S, Segarra SG, Korbelin J, Anrather J, Iadecola C. Endothelium-macrophage crosstalk mediates blood-brain barrier dysfunction in hypertension. *Hypertension*. 2020; 76:795-807. PMID: 32654560

Reviews

1. **Santisteban MM**, Zubcevic J, Baekey DM, Raizada MK. Dysfunctional brain-bone marrow communication: A paradigm shift in the pathophysiology of hypertension. *Curr Hypertens Rep*. 2013; 15(4):377-89. PMID: 23715920
2. Zubcevic J, **Santisteban MM**, Pitts T, Baekey DM, Perez PD, Bolser DC, Febo M, Raizada MK. Functional neural-bone marrow pathways: Implications in hypertension and cardiovascular disease. *Hypertension*. 2014; 63: e129-39. PMID: 24688127
3. **Santisteban MM**, Kim S, Pepine CJ, Raizada MK. Brain-gut-bone marrow axis: implications for hypertension and related therapeutics. *Circ Res*. 2016; 118:1327-36. PMID: 27081113
4. **Santisteban MM**, Iadecola C. Hypertension, dietary salt, and cognitive impairment. *J Cereb Blood Flow Metab*. 2018;38:2112-28. PMID: 30295560

ABSTRACTS – National and International Meetings (Oral Presentations)

1. **Santisteban MM**, Jun JY, Marulanda Carvajal J, Zingler MB, Zubcevic J, Qi Y, and Raizada MK. Activation of microglia in the PVN precedes increase in blood pressure in chronic angiotensin II infusion rat model of hypertension. Hypertension 2012;60:A81. *American Heart Association, High Blood Pressure Research Council Meeting*, Washington DC, September 2012. Session: Brain mechanisms.
2. **Santisteban MM**, Zubcevic J, Kim S, Marulanda Carvajal J, Zingler MB, Joseph J, Raizada MK. Iba1+ microglia/macrophages in the rat hypothalamic paraventricular nucleus are both resident and bone marrow-derived in Ang II induced hypertension. *Experimental Biology Meeting Abstract#2601*, San Diego, April 2014. Session: Data NCARNation.
3. **Santisteban MM**, Zubcevic J, Qi Y, Marulanda Carvajal J, Zingler MB, Raizada MK. Attenuation of hypertension in the spontaneously hypertensive rat by bone marrow reconstitution with normotensive WKY cells. *HYPERTENSION: Joint meeting European Society of Hypertension – International Society of Hypertension*, Athens, Greece, June 2014. Session: Inflammation and uric acid.
4. **Santisteban MM**, Zubcevic J, Marulanda Carvajal J, Zingler MB, Raizada MK. Oral minocycline reduces blood pressure and restores autonomic balance in chronic Ang II-infusion model of hypertension. Hypertension 2014; 63:A82. *American Heart Association, High Blood Pressure Research Council Meeting*, San Francisco, September 2014. Session: Brain and renin-angiotensin (Top-scoring abstract – selected for Best of AHA Specialty Conferences at Scientific Sessions)
5. Ahmari N, **Santisteban MM**, Baekey DM, Raizada MK, Zubcevic J. Angiotensin II-dependent increase in the bone marrow sympathetic drive initiates the inflammatory and endothelial progenitor cell imbalance independently of the effects on blood pressure. *Experimental Biology Meeting*, Boston, March 2015. Session: Translational physiology: focus on obesity, hypertension, and diabetes.
6. Kim S, Rodriguez V, **Santisteban M**, Yang T, Qi Y, Raizada MK, Pepine C. Hypertensive patients exhibit gut microbial dysbiosis and an increase in Th17 cells. *European Meeting on Hypertension and Cardiovascular Protection*, Milan, Italy, June 2015. Session: Experimental hypertension.

7. **Santisteban MM**, Ahmari N, Marulanda Carvajal J, Zingler MB, Qi Y, Kim S, Joseph J, Garcia-Pereira F, Johnson RD, Shenoy V, Raizada MK, Zubcevic J. Role of bone marrow and neuroinflammation in hypertension. *Annual Meeting of the International Academy of Cardiovascular Sciences – North American Section*, Omaha, September 2015. James Willerson young investigator competition in cardiovascular research.
8. **Santisteban MM**, Rubiano A, Stewart D, Yang T, Cole-Jeffrey CT, Zingler MB, Lobaton G, Zubcevic J, Simmons C, Raizada MK. Intestinal permeability and dysbiosis are linked to hypertension. *American Heart Association, Council on Hypertension Meeting*, Washington DC, September 2015. Session: Microbiota and hypertension.
9. Yang T, Li E, Eric Li, Ahmari N, Marulanda-Carvajal J, **Santisteban MM**, Kim S, Raizada MK, Zubcevic J. Reduced bone marrow adrenergic receptor signaling modulates inflammatory factors and alters gut microbiota. *American Heart Association, Council on Hypertension Meeting*, Washington DC, September 2015. Session: Microbiota and hypertension.
10. Shenoy V, Yang T, Rubiano A, Guzzo D, Horowitz A, **Santisteban MM**, Rathinasabapathy A, Simmons C, Katovich M, Raizada MK. ACE2 activator, Diminazene, rebalances gut microbial dysbiosis and attenuates pulmonary hypertension. *American Heart Association, Council on Hypertension Meeting*, Washington DC, September 2015. Session: Microbiota and hypertension.
11. **Santisteban MM**, Zubcevic J, Febo M, Raizada MK. Microglia modulate Ang II induced neuronal activity and neuroinflammation. *Experimental Biology Meeting*, San Diego, March 2016. Session: Neural control of inflammation-mediated hypertension
12. **Santisteban MM**, Faraco G, Racchumi G, Anrather J, Iadecola C. Cerebrovascular and cognitive dysfunction in DOCA-Salt hypertension is mediated by perivascular macrophages. *Hypertension* 2017;70:A104. *American Heart Association, Council on Hypertension Meeting*, San Francisco, September 2017. Session: Salt and hypertension.
13. **Santisteban MM**, Faraco G, Lane D, Racchumi G, Segarra S, Schaeffer S, Cipollini V, Anrather J, Iadecola C. Cellular mechanisms of blood-brain barrier disruption in Ang II-induced hypertension. *Hypertension* 2018;72:A025. *American Heart Association, Council on Hypertension Meeting*, Chicago, September 2018. Session: Cerebrovascular disease, stroke, and aging.
14. **Santisteban MM**, Ahn SJ, Lane D, Faraco G, Garcia-Bonilla L, Racchumi G, Segarra SG, Schaeffer S, Poon C, Shahanoor Z, Cipollini V, Anrather J, Iadecola C. Essential role of cerebral endothelial AT1 receptors in the blood-brain barrier disruption induced by angiotensin II-hypertension. *Hypertension* 2019;74:A050. *American Heart Association, Council on Hypertension Meeting*, New Orleans, September 2019. Session: Cerebrovascular disease and stroke.

ABSTRACTS – National and International Meetings (Poster Presentations)

1. Regenhardt RW, **Santisteban MM**, Desland F, Mecca AP, Raizada MK, Sumners C. Prorenin receptor up-regulation in the brain following ischemic stroke is blunted by angiotensin-(1-7). *ASCI/AAP Joint Meeting*, Chicago, IL, April 2012.
2. **Santisteban MM**, Zubcevic J, Kim S, Jun JY, Shi P, Scott EW, Sumners C, Raizada MK. Role of Microglia Activation in Neurogenic Hypertension. *Glia* 61:S168;T10-22B. *XI European Meeting on Glial Cells in Health and Disease*, Berlin, Germany, July 2013.
3. Zubcevic J*, **Santisteban MM***, Baekey DM, Raizada MK. Brain angiotensin II elevates bone marrow sympathetic drive. *Hypertension* 2013;62:A181. *American Heart Association, High Blood Pressure Research Council Meeting*, New Orleans, September 2013. (Poster Competition Winner)
4. **Santisteban MM**, Zubcevic J, Kim S, Marulanda Carvajal J, Zingler MB, Joseph J, McCarter MA, Raizada MK. Reconstitution of bone marrow with WKY cells lower central/peripheral inflammation and blood pressure in the SHR. *Hypertension* 2013;62:A606. *American Heart Association, High Blood Pressure Research Council Meeting*, New Orleans, September 2013.
5. **Santisteban MM**, Zubcevic J, Qi Y, Marulanda Carvajal J, Zingler MB, Raizada MK. Bone marrow reconstitution with WKY cells attenuated inflammation in the SHR. *1st PanAmerican Congress of Physiological Sciences*, Iguassu Falls, Brazil, August 2014.

6. Zubcevic J, **Santisteban MM**, Marulanda Carvajal J, Zingler MB, Raizada MK. Elucidation of a novel sensory afferent bone marrow – brain signaling pathway in the rat. *1st PanAmerican Congress of Physiological Sciences*, Iguassu Falls, Brazil, August 2014.
7. Song CJ, **Santisteban M**, Zubcevic J, Raizada M. Involvement of neuronal high mobility group box 1 (HMGB1) in Angiotensin II-mediated neuronal-microglial interaction. *American Heart Association, High Blood Pressure Research Council Meeting*, San Francisco, September 2014.
8. **Santisteban MM**, Zubcevic J, Marulanda Carvajal J, Zingler MB, Raizada MK. Oral minocycline reduces blood pressure and restores autonomic balance in chronic Ang II-infusion model of hypertension. *American Heart Association, Scientific Sessions*, Chicago, November 2014. (Best of AHA Specialty Conferences)
9. **Santisteban MM**, Garcia-Pereira F, Ahmari N, Marulanda Carvajal J, Johnson RD, Raizada MK, Zubcevic J. Reconstitution of WKY and SHR bone marrow alters vascular hemodynamics and sympathetic drive. *Experimental Biology Meeting*, Boston, March 2015.
10. Rubiano A, Stewart D, **Santisteban MM**, Shenoy V, Pepine C, Raizada MK, Simmons C. Hypertension-linked stiffening of gastrointestinal tissue in rat model. *Biomedical Engineering Society Annual Meeting*, Tampa, October 2015.
11. Zubcevic J, **Santisteban MM**, Ahmari N, Schmidt JT, Martyniuk CJ, Marulanda Carvajal J, Kim S, Raizada MK. Is hypertension a disease of the bone marrow? *American Heart Association, Council on Hypertension Meeting*, Washington DC, September 2015.
12. Yanfei Q, Singh Mandloi A, **Santisteban MM**, Shenoy V, Cole-Jeffrey CT, Lobaton GO, Stewart D, Rubiano A, Simmons CS, Katovich MJ, Pepine CJ, Raizada MK. Hypertension is associated with profound pathological changes in the gut. *Hypertension* 2016;68:AP610. *American Heart Association, Council on Hypertension Meeting*, Orlando, September 2016.
13. Sharma RK, **Santisteban M**, Lobaton GO, Richards EM, Raizada MK. CMT-3, an anti-inflammatory, non-antibiotic tetracycline, attenuates Ang II-induced hypertension. *Experimental Biology Meeting*, Chicago, April 2017.
14. **Santisteban M**, Faraco G, Racchumi G, Anrather J, Iadecola C. Perivascular macrophages mediate the cerebrovascular and cognitive dysfunction in DOCA-salt hypertension. *Society for Neuroscience*, Washington DC, November 2017.
15. Faraco G, Wang G, **Santisteban MM**, Segarra S, Chang H, Anrather J, Iadecola C. Dietary salt impairs cognitive function through suppression of endothelial nitric oxide synthesis and hippocampal BDNF signaling. *Stroke* 2018;49:ATMP94. *International Stroke Conference*, Los Angeles, January 2018.