OMB No. 0925-0001 and 0925-0002 (Rev. 09/17 Approved Through 03/31/2020)

BIOGRAPHICAL SKETCH

NAME: Jeanie Park

eRA COMMONS USER NAME (credential, e.g., agency login): JEANIEPARK75

POSITION TITLE: Associate Professor of Medicine and Physiology

EDUCATION/TRAINING

| INSTITUTION AND LOCATION | DEGREE  (if applicable) | Completion Date  MM/YYYY | FIELD OF STUDY |
| --- | --- | --- | --- |
| Rice University, Houston TX  University of Alabama at Birmingham, Birmingham AL | B.A.  M.D. | 05/1997  06/2001 | English  Medicine |
| Keck School of Medicine at University of Southern California, Los Angeles, CA | M.S. | 05/2008 | Biomedical and Clinical Investigations |
| Washington University/Barnes-Jewish Hospital, St. Louis, MO | Residency | 06/2004 | Internal Medicine Residency |
| University of Southern California, /LAC+USC Medical Center, Los Angeles, CA  University of Southern California and University of California, Los Angeles, Los Angeles, CA | Clinical Fellowship  Research Fellowship | 06/2007  08/2008 | Nephrology and Hypertension  Human Physiology |

**A. Personal Statement**

As a Nephrologist, Clinical Specialist in Hypertension, and translational researcher with expertise in neural control of the circulation, my patient-oriented research program focuses on studying sympathetic nervous system regulation and neurovascular control in patients at high cardiovascular risk, particularly those with hypertension, chronic kidney disease (CKD), and post-traumatic stress disorder (PTSD). My human physiology laboratory leverages the vast resources and research infrastructure at both the Atlanta VA and Emory University, and is adept in performing direct measures of sympathetic activity via microneurography, arterial baroreflex testing using pharmacologic manipulation, lower body negative pressure, 24-hour ambulatory blood pressure monitoring, near infrared spectroscopy, randomized controlled trials of investigational drugs and devices, among other advanced techniques to study sympathetic control in humans. As a practicing physician and a trained human physiologist, I am in a unique position to recognize and tackle pressing clinical questions, apply rigorous methodologies in a laboratory setting, and test therapeutic interventions in a clinical setting. I have had a longstanding interest in understanding the mechanistic role of autonomic imbalance and sympathetic overactivity in the profoundly increased cardiovascular disease risk that characterizes CKD, and testing novel interventions with real biological efficacy and high potential for improving sympathetic function and long-term cardiovascular risk in our patients. I have extensive experience training postdoctoral fellows and students, many of whom have continued in research careers. I am delighted to contribute to Dr. Anish Shah’s F32 application as an advisor and mentor and support his career development and goal to become an clinical-scientist studying autonomic mechanisms of cardiovascular disease.

1. **Park J**, Marvar PJ, Liao P, Kankam ML, Norrholm S, Rothbaum BO. Baroreflex dysfunction and augmented sympathetic nerve responses during mental stress in veterans with post-traumatic stress disorder. *J Physiol*. 2017 Jul 15;595(14): 4893-4908 PMC5509856

2. Fonkoue I, Marvar P, Norrholm S, Kankam M, Li Y, DaCosta D, Rothbaum B, **Park J**. Acute Effects of Device-Guided Slow Breathing on Sympathetic Nerve Activity and Baroreflex Sensitivity in Posttraumatic Stress Disorder. *Am J Physiol Heart Circ Physiol.* 2018 Jul 1;315(1):H141-H149 PMC6087774

3. Fonkoue IT, Norrholm SD, Marvar PJ, Li Y, Kankam ML, **Park J**. Elevated Resting Blood Pressure Augments Autonomic Imbalance in Posttraumatic Stress Disorder (PTSD). *Am J Physiol Regul Integr Comp Physiol*. 2018 Dec 1;315(6): R1272-R1280

4. Fonkoue IT, Le NA, Kankam ML, DaCosta D, Jones TN, Marvar PJ, **Park J**. Sympathoexcitation and Impaired Arterial Baroreflex Sensitivity are Linked to Vascular Inflammation in Individuals with Elevated Resting Blood Pressure. *Physiol Rep*. 2019 Apr 7(7):e14057

**B. Positions and Honors**

Positions and Employment

2001-2004 Internal Medicine residency, Washington University, St. Louis, MO

2004-2005 Staff Hospitalist Physician, Hollywood Presbyterian hospital, Los Angeles, CA

2005-2007 Nephrology fellowship, University of Southern California, Los Angeles, CA

2006-2008 Visiting Assistant Researcher, University of California, Los Angeles, CA

2007-2008 Clinical Instructor/Postdoctoral research fellow, USC, Los Angeles, CA

2008-2018 Assistant Professor of Medicine, Emory University, Atlanta, GA

2018- Associate Professor of Medicine, Emory University, Atlanta, GA

2008- Staff Nephrologist, Atlanta VA Medical Center, Decatur, GA

Honors, Professional Memberships, and Other Experience

2003-2004 Washington University Clinical Scientist Training and Research (C-STAR) program

2006-2008 NIH Ruth L. Kirschstein NRSA (F32) individual postdoctoral fellowship

2007 UKDRA John McKay Memorial Renal Research fellowship award

2007 NKF Postdoctoral fellowship award

2007-2009 NIH Loan Repayment Award for Clinical Research

2008 American Society of Hypertension Designated Clinical Specialist in Hypertension

2008- Manuscript Reviewer for 18 distinct journals

2012 NIH LIFE Ancillary Study Committee, Biomarkers Subcommittee

2015- AHA Cardiac Biology Regulation - Clinical, Peer Review Study Section

2015- Editorial Board Member, American Journal of Physiology – Renal Physiology

2015- APS Women in Physiology Committee

2016- AHA, Council on the Kidney in Cardiovascular Disease (KCVD), Membership and Communications Committee

2017- AHA, KCVD Leadership Council member

2018 Fellow of the American Heart Association (FAHA)

**C. Contributions to Science**

**1) Sympathetic Regulation in Disease States. As a Hypertension specialist, my research program is focused on elucidating mechanisms and therapeutic approaches targeting sympathetic nervous system over-activity and dysregulation in disease states. My patient-oriented translational research program employs advanced human physiology research techniques to investigate the sympathetic nervous system in humans including microneurography and baroreflex testing. I have contributed to the understanding of sympathetic nerve regulation in humans at high cardiovascular risk, including smokers, obesity, chronic stress, and kidney disease, in continuous lines of research since my postdoctoral research and clinical fellowships.**

a. **Park J**, Campese VM, Nobakht N, Middlekauff HR. Differential Distribution of Muscle and Skin Sympathetic Nerve Activity in Patients with End-Stage Renal Disease. *J Appl Physiol.* 2008 Dec;105(6):1873-6. PMCID: PMC2612470

b. **Park J**, Middlekauff HR. Altered pattern of sympathetic activity with the ovarian cycle in premenopausal smokers. 2009 *Am J Physiol Heart Circ Physiol.* 2009 Aug; 297(2): H564-8. PMC2724219

c. **Park J**, Middlekauff HR, Campese VM. Abnormal Sympathetic Reactivity to the Cold Pressor Test in Overweight Humans. *Am J Hypertens*. 2012 Dec; 25(12): 538-49. PMCID: PMC3577042

c. Park S, Fonkoue I, Li Y, DaCosta D, Middlekauff HR, **Park J**. Augmented Cardiopulmonary Baroreflex Sensitivity in Intradialytic Hypertension. *Kidney Int Rep*. 2018 Aug 17;3(6): 1392-1402

2) Sympathetic Regulation During Exercise in Chronic Kidney Disease. As a Clinical Nephrologist caring for patients with kidney disease, I investigated the role of sympathetic overactivation in exercise intolerance and increased cardiovascular risk in patients with kidney disease. I was the first to show that patients with chronic kidney disease (CKD) and end-stage renal disease (ESRD) have exaggerated increases in blood pressure during physical activity that is in part mediated by augmented sympathetic nerve reactivity due to heightened muscle mechanoreflex activation. Furthermore, we have shown that muscle blood flow and functional sympatholysis are impaired in patients with kidney disease, further contributing to exercise-induced hypertension and exercise intolerance. These papers are the first to demonstrate a role of abnormal hemodynamic and neurocirculatory responses during exercise that contribute to cardiovascular risk and exercise intolerance in patients with reduced renal function.

a. **Park J**, Campese VM, Middlekauff HR. Exercise pressor reflex in humans with end-stage renal disease. *Am J Physiol Regul Integr Comp Physiol.* 2008 Oct;295(4):R1188-94. PMC2576092

b. **Park J**, Quyyumi AA, Middlekauff HR. Exercise Pressor Response and Arterial Baroreflex Unloading During Exercise in Chronic Kidney Disease. *J Appl Physiol.* 2013 Mar; 114(5):538-49. PMC3615589

c. Downey RM, Liao P, Millson EC, Quyyumi AA, **Park J**. Endothelial dysfunction predicts systolic blood pressure slope during whole body maximal exercise in patients with chronic kidney disease. *Am J Physiol Renal Physiol.* E Pub2017 Mar 8.

d. Sprick J, Downey R, Morison D, Fonkoue I, Li Y, DaCosta D, Rapista D, **Park J**. Impaired Functional Sympatholysis in End-stage Renal Disease. 2019 (in press, *Am J Physiol Regul Integr Comp Physiol*)

**3) Therapeutic Approaches Targeting Sympathetic Over-Activity in CKD. In addition to my mechanistic work examining chronic overactivation of sympathetic nervous system in kidney disease, I have examined potential novel therapeutic interventions that could ameliorate sympathetic overactivation in these patients. These investigations have included clinical trials on investigational drugs, nonpharmacologic interventions, and behavioral approaches. These studies demonstrate the potential benefits of novel nonpharmacologic (such as mindfulness meditation and exercise training) and pharmacologic (such as tetrahydrobiopterin) interventions targeting sympathetic overactivity in renal disease, with the long-term clinical goal of reducing cardiovascular risk in this growing patient population.**

a**. Park J**, Lyles RH, Bauer-Wu S. Mindfulness meditation lower muscle sympathetic nerve activity and blood pressure in patients with chronic kidney disease. *Am J Physiol Regul Integr Comp Physiol.* 2014 Jul 1;307(1):R93-R101 PMC4080275

b. **Park J**, Liao P, Sher S, Lyles RH, Deveaux DD, Quyyumi AA. Tetrahydrobiopterin lowers muscle sympathetic nerve activity and improves augmentation index in patients with chronic kidney disease. *Am J Physiol Regul Integr Comp Physiol.* 2015 Feb 1;308(3):R208-18. PMC4313073

c. Kutner N, Zhang R, Huang Y, Kaysen, G, **Park J**. Lower C-reactive Protein and Better Hemodialysis Survival are Associated with Regular Exercise Activity: Longitudinal Outcomes from the ACTIVE-ADIPOSE Special Study. *Hemodial Int*. 2016 Jul;20(3):473-83.

d. Lin AM, Liao P, Millson E, Quyyumi AA, **Park J**. Tetrahydrobiopterin ameliorates the exaggerated exercise pressor response in patients with chronic kidney disease: a randomized controlled trial. *Am J Physiol Renal Physiol*. 2016 May 1;310(10)F1016-25. PMC5002055

4) Sympathetic Overactivation and Dysregulation in Posttraumatic Stress Disorder (PTSD). As a VA physician treating Veterans with comorbid PTSD, I became interested in the underlying mechanisms contributing to increased cardiovascular risk in my patients. No prior studies had used rigorous and direct measurements to evaluate sympathetic regulation in PTSD, and this area has been a new emerging theme in my laboratory. To address this gap, my laboratory is examining the roles of abnormal SNS reactivity and regulation on future cardiovascular disease risk in PTSD. My findings demonstrate that PTSD patients have augmented MSNA responses during mental stress, and impaired sympathetic and cardiovagal baroreflex sensitivity. Our findings also demonstrate that symptom severity, elevated resting blood pressure and chronic inflammation modulate autonomic dysregulation in PTSD. These studies ongoing studies investigate mechanistic underpinnings linking PTSD with future cardiovascular disease and hypertension risk.

a. **Park J**, Marvar PJ, Liao P, Kankam ML, Norrholm S, Rothbaum BO. Baroreflex dysfunction and augmented sympathetic nerve responses during mental stress in veterans with post-traumatic stress disorder. *J Physiol*. 2017 Jul 15;595(14): 4893-4908 PMC5509856

b. Fonkoue IT, Norrholm SD, Marvar PJ, Li Y, Kankam ML, **Park J**. Elevated Resting Blood Pressure Augments Autonomic Imbalance in Posttraumatic Stress Disorder (PTSD). *Am J Physiol Regul Integr Comp Physiol*. 2018 Dec 1;315(6): R1272-R1280

c. Young M, Howell L, Hopkins L, Moshfegh C, Yu Z, Clubb L, Seidenberg J, **Park J**, Swiercz A, Marvar P. A Peripheral Immune Response to Remembering Trauma Contributes to the Maintenance of Fear Memory in Mice. *Psychoneuroendocrinology.* 2018, 94: 143-151 PMC6003662

d. Fonkoue I, Le N, Kankam M, DaCosta D, Jones T, Marvar P, **Park J.** Sympathoexcitation and Impaired Arterial Baroreflex Sensitivity are Linked to Vascular Inflammation in Elevated Resting Blood Pressure. 2019 (in press, *Phys Rep*)

**5. Based on our mechanistic work on sympathetic dysregulation in PTSD, o**ur ongoing interventional trials are testing novel treatment approaches to ameliorate sympathetic overreactivity and impaired baroreflex function in PTSD. Our work has also linked PTSD symptoms with inflammation and derangements in autonomic control in PTSD.

a. Brudey C, **Park J**, Marvar P. Stress and anxiety disorders and the risk for cardiometabolic disease development. *Am J Physiol Regul Integr Comp Physiol*. 2015 Aug 15;309(4):R315-21. PMC4538229

b. Fonkoue I, Marvar P, Norrholm S, Kankam M, Li Y, DaCosta D, Rothbaum B, **Park J**. Acute Effects of Device-Guided Slow Breathing on Sympathetic Nerve Activity and Baroreflex Sensitivity in Posttraumatic Stress Disorder. *Am J Physiol Heart Circ Physiol.* 2018 Jul 1;315(1):H141-H149 PMC6087774

c. Swiercz A, Seligowski A, **Park J**, Marvar P. Extinction of Fear Memory Improves Conditioned Cardiovascular Fear Reactivity in Mouse. *Front Behav Neurosci.* 2018 Nov 13; 12:276

d. Fonkoue I, Le N, Kankam M, DaCosta D, Jones T, Marvar P, **Park J.** Sympathoexcitation and Impaired Arterial Baroreflex Sensitivity are Linked to Vascular Inflammation in Individuals with Elevated Resting Blood Pressure. *Physiol Rep.* 2019 Apr;7(7):e14057. PMCID: PMC6456445

**Complete List of Published Work in MyBibliography:** [http://www.ncbi.nlm.nih.gov/sites/myncbi/1DG5fbq2-FtAA/bibliography/43999333/public/?sort=date&direction=descending](about:blank)

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

**Ongoing Research Support**

VA Merit Review 7/1/2015-6/30/2020

I01CX001065

Role: PI

Title: Mechanisms of Sympathetic Overactivity in Post-traumatic Stress Disorder (PTSD).

The major goals of this grant are to investigate the mechanistic role of arterial baroreflex dysfunction on sympathetic activation during mental stress in PTSD, and the therapeutic role of device-guided slow breathing on sympathetic regulation during stress in PTSD.

$650,000

**NIH/NHLBI 1/1/2017-12/31/2021**

1 R01 HL135183-01

**Role: PI**

**Title: Neurovascular Transduction During Exercise in Chronic Kidney Disease.**

**The major goals of this grant are to elucidate the mechanisms of augmented neurovascular transduction of sympathetic nerve activity during exercise in CKD patients, and to test the potential benefits of exercise training on hemodynamic reactivity during physical activity.**

**$1,950,000**

**AHA SDG 7/1/2017-6/30/2020**

**Role: Co-I (PI, Raj Dedhia)**

**Title: Hypoglossal Nerve Stimulation for Obstructive Sleep Apnea on Sympathetic Activity.**

**$231,000 (total)**

**NIH/NHLBI 2/20/2018-1/31/2021**

**R15 HL140596**

**Role: Co-I (PI, John Durocher)**

**Title: Mindfulness and Neural Cardiovascular Control in Humans**

**The major goals of this grant are to investigate the effects of mindfulness meditation on neural and cardiovascular reactivity in prehypertension.**

**$231,000 (total funding)**

**NIH/NCCIH 9/1/2019-8/30/2021**

R61AT010457

Role: PI

Title: Sympatho-inhibition with Mindfulness in Chronic Kidney Disease.

The major goals of this study are to test the effects of mindfulness-based stress reduction (MBSR) on sympathetic overactivation and the potential role of transcutaneous vagus nerve stimulation to enhance the beneficial effects on autonomic function in CKD.

$600,00 (direct)

**Completed Research Support**

AHA Collaborative Science Grant 7/1/2015-6/30/2018

Role: Co-PI (Paul Marvar, Co-PI; Kerry Ressler, Co-PI)

Title: Post Traumatic Stress Disorder and Cardiovascular Disease Risk: Role of Sympathetic Overactivity and Angiotensin II.

The major goals of this grant are to investigate the potential beneficial effects of angiotensin receptor blocker (ARB) losartan on arterial baroreflex function and sympathetic overactivation during mental stress in PTSD

$750,000

Norman S. Coplon Award 7/1/2013-6/30/15

Satellite Dialysis Foundation

Role: PI

Title: Sympathetic regulation in intradialytic hypertension

This grant seeks to understand the mechanistic roles of sympathetic overactivity, arterial and cardiopulmonary baroreflex dysfunction, and blood pressure responses to orthostatic stress in patients with intradialytic hypertension.

$200,000

NIH NHLBI 9/1/2010-8/31/15

K23HL098744

Role: PI

Title: The role of oxidative stress and neurovascular dysfunction in the exercise intolerance of renal failure

The major goals of this grant are to elucidate the roles of sympathetic overactivity, endothelial dysfunction, and oxidative stress, and the potential therapeutic role of BH4 in the exercise intolerance of renal failure.