
CURRICULUM VITAE

ZHIYING SHAN, Ph.D

CONTACT INFORMATION

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EDUCATION & TRAINING

1982-1986: Liaoning Normal University, China, Department of Biology.
Bachelor of Science
1986-1989: Liaoning University, China, Department of Zoology.
Master of Science
2001-2004: Nankai University, China, Institute of Molecular Biology.
Doctor of Philosophy

EMPLOYMENT

1989,07-1992,12: Institute of Traditional Chinese Medicine of Liaoning Province, China,
Pathology and Physiology Lab. Research Assistant Fellow
1993,01-1997,07: Tianjin Medical University Teaching Hospital, Tianjin, China,
Research Assistant Professor
1997,08-2001,10: Tianjin Medical University Teaching Hospital. Tianjin, China,
Research Associate Professor
2004,11-2005,11: University of Florida, Department of Molecular Genetics and Microbiology.
Postdoctoral Associate
2005,12-2010,10: University of Florida, Department of Physiology and Functional Genomics.
Postdoctoral Associate
2010,11-2013,7: University of Florida, Department of Physiology and Functional Genomics.
Research Assistant Professor.
2013,8 - present: Michigan Technological University, Department of Kinesiology and
Integrative Physiology. Assistant Professor

HONORS & AWARDS

1993: Science & Technology Achievement of Liaoning Province, China
1997: Science & Technology Achievement of Tianjin City, China
2004: Major Award for Outstanding Graduates, Hong Kong Qiushi Foundation, Hong Kong
2004: Science & Technology Achievement of Tianjin City, China
2006: Science & Technology Achievement of Tianjin City, China
2007: Science & Technology Achievement of Tianjin City, China
2010: New Investigator Award: American Heart Association Annual High Blood Pressure
Research Conference

MEMBERSHIPS

2005 - Present: Member of American Heart Association
2005 - Present: Member of the American Physiology Society
2014 - Present: Member of Michigan Physiology Society

ORAL PRESENTATIONS AND INVITED TALKS AT SCIENTIFIC CONFERENCES

1. Oral presentation: "Involvement of the brain (pro)renin receptor in cardiovascular homeostasis". 64th High Blood Pressure Research Conference, Washington, DC, 2010.
2. Oral presentation: "(pro)renin receptor (PRR) mediates antihypertensive effects in the nucleus of solitary tract of Spontaneously Hypertensive Rats (SHR)". 65th High Blood Pressure Research Conference, Orlando, FL, 2011.
3. Oral presentation: "Chronic blockade of the NTS AT1 receptor decreases circulating endothelial progenitor- inflammatory cells ratio and exacerbates hypertension in the SHR. Gordon Research Seminar: Angiotensin, Ventura, CA, 2012.
4. Oral presentation: Paradoxical action of the NTS AT1 receptors on inflammation and hypertension. Gordon Research Conference: Angiotensin, Ventura, CA, 2012.
5. Invited Talk: Brain prorenin receptor and hypertension. Michigan technological University, Houghton, Michigan, 2013.
6. Invited Talk: The role of brain prorenin receptor in neurogenic hypertension. Louisiana State University Health Sciences Center, College of Medicine, New Orleans, 2013.

RESEARCH SUPPORT

A. Completed Research Project

1. American Heart Association, National Center (\$308,000)
Scientist Development Grant 11SDG7420029: 7/1/2011-6/30/2016.
"Role of Brain (Pro)renin Receptor in Hypertension
Role: P.I.
2. Michigan Tech Research Excellence Fund 07/1/2016 - 08/31/2017 (\$30,000)
Proinflammatory Cytokines and Sympathetic Activation in Salt Sensitive Hypertension
Role: PI
3. 1R15 HL 122952-01A1. 12/01/2014-11/30/2017
ER stress and reduced SK channel function in PVN in rats with high salt diet.
PI: Qinghui Chen at Michigan Technological University.
Role: Consultant

B. Active Research Funding

1. NIH 1R15HL129213-01A1: 08/01/2016 - 07/31/2019 (\$433,814)
Brain (Pro)renin Receptor and Sympathetic Activation in Salt Sensitive Hypertension
Role: PI
2. Michigan Tech Research Excellence Fund 07/1/2018 - 08/31/2019 (\$34,000)
Vasopressin Regulation in Salt Sensitive Hypertension
Role: PI
3. NIDA R01 (NIDA R01 2DA021274): 05/01/2014-04/30/2019
Sex Differences in the Mechanisms that Promote Nicotine Reward and Withdrawal".
PI: Laura E. O'Dell in the University of Texas at El Paso.
Role: Consultant

SERVICE IN ACADEMIC AREA:

A. Serve as an Editorial Review Board Member for the Journals as Follows:

1. 2014- Present Cellular and Molecular Neurobiology
2. 2018-Present International Journal of Biochemistry and Physiology

B. Serve as a Reviewer for the Journals as Follows:

1. Acta Physiologica
2. American Journal of Physiology, Heart Circulation Physiology.
3. American Journal of Physiology, Regulatory-Integrative and Comparative Physiology
4. Brain Research
5. Cellular and Molecular Neurobiology
6. Experimental Physiology
7. Frontier in Physiology
8. Hypertension
9. Journal of the American Heart Association
10. International Journal of Biological Sciences
11. Molecular Medical Research
12. Medical Science Monitor
13. Neuroscience Bulletin
14. Plos One
15. Pediatric Research
16. Scientific Reports

PEER REVIEWED PUBLICATIONS (47)

1. Chapp AD, Behnke JE, Driscoll KM, Fan Y, Hoban E, **Shan Z**, Zhang L, Chen QH. Acetate Mediates Alcohol Excitotoxicity in Dopaminergic-like PC12 Cells. ACS Chem Neurosci. PMID: 30247872. 2019
2. Jiang E, Chapp AD, Fan Y, Larson RA, Hahka T, Huber MJ, Yan J, Chen QH, **Shan Z**. Expression of proinflammatory cytokines is upregulated in the hypothalamic paraventricular nucleus of Dahl salt-sensitive hypertensive rats. Front Physiol 9, 104. 2018
3. Chapp AD, Schum S, Behnke JE, Hahka T, Huber MJ, Jiang E, Larson RA, **Shan Z**, Chen QH. Measurement of cations, anions, and acetate in serum, urine, cerebrospinal fluid, and tissue by ion chromatography. Physiol Rep 6, e13666. 2018
4. Fan Y, Jiang E, Hahka T, Chen Q, Yan J, **Shan Z**. Orexin A increases sympathetic nerve activity through promoting expression of proinflammatory cytokines in Sprague-Dawley rats. *Acta physiologica*, 2017
5. Chapp AD, Cheng Z, **Shan Z**, Chen QH. Long-term high salt intake involves reduced SK currents and increased excitability of PVN neurons with projections to the rostral ventrolateral medulla in rats. Neural Plasticity, 7282834, 2017
6. Huber MJ, Chen QH, **Shan Z**. The Orexin System and Hypertension. Cell Mol Neurobiol. 2017 Mar 27.

7. Huber MJ, Fan Y, Jiang E, Zhu F, Larson RA, Yan J, Li N, Chen QH, **Shan Z**: Increased Activity of the Orexin System in the Paraventricular Nucleus Contributes to Salt-Sensitive Hypertension. *American journal of physiology Heart and circulatory physiology*, 2017.
8. Larson RA, Chapp AD, Gui L, Huber MJ, Cheng ZJ, **Shan Z**, Chen QH: High Salt Intake Augments Excitability of PVN Neurons in Rats: Role of the Endoplasmic Reticulum Ca²⁺ Store. *Frontiers in neuroscience*, 11: 182, 2017.
9. Qi X, Guzhva L, Yang Z, Febo M, **Shan Z**, Wang KK, Bruijnzeel AW. Overexpression of CRF in the BNST diminishes dysphoria but not anxiety-like behavior in nicotine withdrawing rats. *Eur Neuropsychopharmacol*. 2016 1378-1389, 2016.
10. Huber MJ, Basu R, Cecchetti C, Cuadra AE, Chen QH, **Shan Z**. Activation of the (pro)renin receptor in the paraventricular nucleus increases sympathetic outflow in anesthetized rats. *Am J Physiol Heart Circ Physiol*. 309(5):H880-7. 2015
11. Larson RA, Gui L, Huber MJ, Chapp AD, Zhu J, LaGrange LP, Shan Z, Chen QH. Sympathoexcitation in ANG II-salt hypertension involves reduced SK channel function in the hypothalamic paraventricular nucleus. *Am J Physiol Heart Circ Physiol*. 15; 308 (12):H1547- 55. 2015.
12. Shi P, Grobe JL, Desland FA, Zhou G, Shen XZ, **Shan Z**, Liu M, Raizada MK, Sumners C. Direct pro-inflammatory effects of prorenin on microglia. *PLoS One*. 9(10):e92937. 2014
13. Qi X **Shan Z**, Ji Y, Guerra V, Alexander JC, Ormerod BK, Bruijnzeel AW. Sustained AAV-mediated overexpression of CRF in the central amygdala diminishes the depressive-like state associated with nicotine withdrawal. *Transl Psychiatry*. 4: e385. 2014
14. 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, Raizada MK. Altered Inflammatory Response Is Associated With an Impaired Autonomic Input to the Bone Marrow in the Spontaneously Hypertensive Rat. *Hypertension*, 63(3):542-50. 2014
15. **Shan Z**, Zubcevic J, Shi P, Jun JY, Dong Y, Murça TM, Lamont GJ, Cuadra A, Yuan W, Qi Y, Li Q, Paton JF, Katovich MJ, Sumners C, Raizada MK. Chronic knockdown of the nucleus of the solitary tract AT1 receptors increases blood inflammatory-endothelial progenitor cell ratio and exacerbates hypertension in the spontaneously hypertensive rat. *Hypertension*, 61(6):1328-1333. 2013
16. Zubcevic J, Jun JY, Lamont GL, Murca Tatiane, Shi P, Carvajal JM, Lin F, Li Q, Raizada MK, **Shan Z**. NTS (pro)renin receptor (PRR)-mediated antihypertensive effect involves NF-KappaB-cytokine signaling in the spontaneously hypertensive rats. *Hypertension*, 61:622-627. 2013
17. Agassandian K, **Shan Z**, Raizada MK, Sved AF, Card JP. C1 Catecholamine neurons form local circuit synaptic connections within the rostroventrolateral medulla of rat. *Neuroscience*, 227:247-59. 2012
18. Verma A, **Shan Z**, Lei B, Yuan L, Liu X, Nakagawa T, Grant MB, Lewin AS, Hauswirth WW, Raizada MK, Li Q . ACE2 and Ang-(1-7) Confer Protection Against Development of Diabetic Retinopathy. *Mol Ther*, 20, 28-36. 2012
19. Card JP, Kobiler O, McCambridge J, Ebdlahad S, **Shan Z**, Raizada M, Sved AF, Enquist L. Microdissection of neural networks by conditional reporter expression from a brainbow herpesvirus. *PNAS* 108(8):3377-82. 2011