CURRICULUM VITAE
ZHIYING SHAN, PhD

CURRENT POSITION

Associate Professor, Department of Kinesiology and Integrative Physiology
Michigan Technological University (MTU)

Adjunct Associate Professor, Department of Biological Sciences, MTU

Adjunct Associate Professor, Department of Biomedical Engineering, MTU

Adjunct Associate Professor, Biochemistry and Molecular Biology (BMB) program, MTU

CONTACT INFORMATION

Address: Michigan Technological University
Department of Kinesiology and Integrative Physiology (KIP)
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Houghton, MI 49931
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EDUCATION

2001-2004: **PhD**
Nankai University, China.
Major: Molecular Genetics

1986-1989: **Master of Science**
Shandong University, China
Major: Zoology

1982-1986: **Bachelor of Science**
Liaoning Normal University, China,
Major: Biology.

EMPLOYMENT

2019,09 - Present: Michigan Technological University, Department of Kinesiology and Integrative Physiology, Associate Professor
2013,08 - 2019,08: Michigan Technological University, Department of Kinesiology and Integrative Physiology, Assistant Professor
2010,11 - 2013,07: University of Florida, Department of Physiology and Functional Genomics, Research Assistant Professor
2004,11 - 2010,10: University of Florida, Department of Physiology and Functional Genomics, Postdoctoral Associate
1997,08 - 2001,10: Tianjin Medical University Teaching Hospital, China, Research Associate Professor
1993,01-1997,07: Tianjin Medical University Teaching Hospital, China, Research Assistant Professor
1989,08 -1992,12: Institute of Traditional Chinese Medicine of Liaoning Province, China, Research Assistant Fellow

PROFESSIONAL MEMBERSHIPS

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

TEACHING ACTIVITY

Courses Taught at Michigan Tech

2014-2015: EH 5920, Graduate Seminar (1-credit).
2014, 2019, 2021: EH5350/KIP5510, Molecular Physiology (3 credit).
2015-Present: BL4370/BL5371, Advanced Cell Biology (3 credit).
2016-2017: EH4750, Molecular Exercise Physiology (2 credit)
2018: BMB6020, Advanced Molecular Biology (3 credit).
2018-Present: KIP4120, Molecular Exercise Physiology 3 credit)
2020-Present: BMB6030, Modern BMB Laboratory (Co-instructor, 3 credit).
2021-Present: KIP 2700, Essential Biochemistry (3 credit).

Student Evaluations in Last Three Years (maximum rating score: 5)

KIP4120: Molecular Exercise Physiology (3 Credit)

2019 Fall Average Rating=4.35
2020 Fall Average Rating=4.49
2021 Fall Average Rating=4.13

KIP2700 Essential Biochemistry (3 Credit)

2021 Fall Average Rating=3.74

BL4370/BL5371 Advanced Cell Biology (3 Credit)

2020 Spring Average Rating=4.43
2021 Spring Average Rating=4.49
2022 Spring Average Rating=4.86

KIP5510 Molecular Physiology (3 Credit)

2019 Spring Average Rating=4.71
2021Spring Average Rating=4.53

Student Mentoring

A. Served as a committee chair/co-chair for three MTU PhD students, and supervised two international visiting PhD students:

2018-2022: Steven Stelly, MTU KIP department PhD student. Degree awarded.
2018-Present: Jessica Bruning, MTU KIP department PhD student.
2020-present: Xinqian Chen, MTU KIP department PhD student
2016-2017: Yuanyaun Fan, international visiting PhD student.
2019-2020: Huanjia Gao, international visiting PhD student.

B. Served as a committee chair for four MTU master students, and supervised one visiting master student

2014-2016: Michael Huber, MTU Biological Sciences department master student.
2016-2018: Tajia Hahka, MTU Biological Sciences department master student.
2018-2019: Wafa Fhad Alharbi, MTU Biological Sciences department master student.
2018-2019: Jeremy Bigalke, MTU KIP department master student.
2019-2020: Cassie Bloch, visiting master student.

C. Served as a committee member for seven PhD students and six master students:

2013-2016: Robert Larson, PhD student in Department of Biological Sciences
2013-2016: Ida Fonkoue, PhD student in Biological Sciences Department
2013-2016: Ramkumar Mohan, PhD student in Biological Sciences Department
2013-2017: Yiping Mao, PhD student in Biological Sciences Department
2014-2017: Andrew Chapp, PhD student in Biological Sciences Department
2018-2020: Dhavan Divyanshu Sharma, PhD student in Biomedical Engineering (BME) Department
2017-2022: Arslan Amer, PhD student in Biochemistry and Molecular Biology program.
2016-2018: Dhavan Divyanshu Sharma, master student in BME Department
2017-2018: Jessica Behnke, master student in BME Department.
2018-2019: Sabha Salem M Alhewati, master student in Biological Sciences Department.
2019-2010: Basirat Tolulope Shittu, master student in Biological Science department.
2020-2022: Spencer Snider, master student in Biological Sciences Department.
2020-2022: Greg Miodonski, master student in KIP department.

D. Served as a supervisor for two postdoctoral associate, one visiting scholar, and nine undergraduate students.

2016-2017: Enshe Jiang, postdoctoral associate.
2022: Xin Yan, postdoctoral associate.
2016-2017: Fengli Zhu, visiting scholar
2014-2016: Cassie Cecchettini, undergraduate student in Biological Sciences Depart.
2015: Mesuur Iorkighir, undergraduate in Grand Rapids Community College.
2014-2015: Jonathan Vajko, undergraduate student, Biomedical Engineering Depart.
2016: Stephen Berridge, undergraduate student, BME Department
2018: Anthoni Phonxana, GrandRapids Community College
2020-2021: Jenna Disser, Biological Sciences department
2020-2021: Delilah Hauswirth, Biological Sciences department
2020-2022: Lilly Vanloon, Biological Sciences Department
2020-Present: Sophia Bancker, Biological Sciences department

E. Served on the qualifying committee for four PhD students in Biochemistry and Molecular Biology (BMB) program

2019: Avik Ghosh, PhD student in MTU BMB program
2019: Prajakta Kotate, PhD student in MTU BMB program
2019: Ryan Ghannam, PhD student in MTU BMB program
2019: Arslan Amer, PhD student in MTU BMB program

RESEARCH ACTIVITY

Michigan Technological University is an Undergraduate-Focused Institution, which has not been a major recipient of NIH support (i.e. not totaling more than $6 Million /year in 4 of the last 7 fiscal years) and is eligible for the Academic Research Enhancement Award (NIH R15) application.

A. Active Research Funding

1. NIHR01HL163159 04//15/2022-03/31/2026 **$1,665,903**
   Contribution of Orexin System to Hypertension
   Role: **PI**
2. NIHR15HL150703: 08/11/2020-06/30/2023 **$459,000**
   Involvement of the Brain Orexin System in Hypertension
   Role: **PI**
3. NIHR15HL145655: 09/01/2019-08/31/2023 **$459,000**
   Neural Mechanism of Sympathetic Activation in Heart Failure"
   PI: Qinghui Chen (MTU)
   Role: **Co-Investigator**.
4. Internal Pandemic Impact Grant 12/01/2021-11/30/2022 **$5,170**
   Role: **PI**

B. Completed Research Project

1. Portage Health Middle Career Fund 07/01/2020-08/31/2022 **$15,000**
   Brain Orexin System and Salt Sensitive Hypertension
   Role: **PI**
2. NIH 1R15HL129213: 08/01/2016 - 06/30/2020 **$433,814**
   Brain (Pro)renin Receptor and Sympathetic Activation in Salt Sensitive Hypertension
   Role: **PI**
3. AHA11SDG7420029: 07/01/2013 -06/30/2016 **$210,833**
   Role of Brain (Pro)renin Receptor in Hypertension
   Role: **PI**
4. MTU Research Excellence Fund 07/01/2016-08/31/2017 **$30,000**
   Proinflammatory Cytokines and Sympathetic Activation in Salt Sensitive Hypertension
   Role: **PI**
5. MTU Research Excellence Fund 07/1/2018-08/31/2019 **$34,000**
   Vasopressin Regulation in Salt Sensitive Hypertension.
   Role: **PI**
6. NIHR15HL122952 11/01/2014-10/31/2018 **$460,486**
   ER Stress and Reduced SK Channel Function in PVN of Rats with High Salt Intake
   PI: Qinghui Chen (MTU)
   Role: **Consultan**t
7. NIDAR01DA021274 05/01/2014-04/30/2019 **$2,1723,534**
   Sex Differences in the Mechanisms that Promote Nicotine Reward and Withdrawal".
   PI: Laura E. O'Dell (University of Texas at El Paso)
   Role: **Consultant**

PROFESSIONAL SERVICES

A. Served as A Reviewer for National and International Funding Agencies and Others

2022: Ad Hoc grant Reviewer for NIH Integrative Physiology & Pathology Study Section.
2022: Ad-hoc grant Reviewer for Israel Science Foundation.
2022: External reviewer for faculty promotion of California Health Science University
2015-2018: Michigan Physiology Society meeting poster and oral presentation judge.

B. Served on Editorial Review Boards of Three Scientific Journals (1-3) and a Guest Associate Editor for One Journal (4):

1. 2014- Present Cellular and Molecular Neurobiology
2. 2018-Present International Journal of Biochemistry and Physiology
3. 2022- Present: Frontiers in Cellular Neurophysiology
4. 2022: Guest Associate Editor for Frontiers in Physiology-Molecular Physiology of Blood Pressure Regulation" Special Issue.

C. Served as an Ad Hoc Reviewer for 19 Scientific Journals:

1. Acta Physiologica (IF:5.97)
2. American Journal of Physiology (AJP)- Heart Circulation Physiology (IF: 4.73)
3. AJP- Regulatory-Integrative and Comparative Physiology (IF: 3.62)
4. Brain Research (IF:3.25)
5. Cellular and Molecular Neurobiology (IF:5.05)
6. Circulation Research (IF:17.37)
7. Experimental Physiology (IF:2.96)
8. Frontiers in Neuroscience (IF:4.87)
9. Frontiers in Physiology (IF:4.56)
10. Frontiers in Cellular Neurophysiology (IF:5.78)
11. Hypertension (IF:10.19)
12. Journal of the American Heart Association (IF:5.02)
13. International Journal of Biological Sciences (IF:6.58)
14. Molecular Medical Research (IF: 6.35)
15. Medical Science Monitor (IF:3.38)
16. Neuroscience Bulletin (IF:5.20)
17. Plos One (IF:3.75)
18. Pediatric Research (IF:3.75)
19. Scientific Reports (IF:4.54)

D. Served on Multiple Committees in the KIP Department and MTU

2013-Present: KIP Department Council Committee
2013-Present: KIP Department Graduate Candidate Reviewer
2013: KIP Department New Faculty Search Committee member
2013: KIP Department Graduate Proposal Committee member
2013: Member of Biotechnology Research Center (BRC) in MTU

2013-2016: Biological Science Dept. Graduate Candidate Review member
2015: KIP Department Program Assessment Committee member
2016: PHF (Portage Health Foundation) endowed professorships search committee
2016: MTU Life Science & Technology Institute Research Forum Judge
2016: KIP Department PhD program Proposal Committee member
2016-2017: Michigan Tech Summer Undergraduate Research Fellowship (SURF) reviewer
2016: Michigan Tech Research Excellence Fund (REF) reviewer
2018-Present: BMB program qualifying Committee
2019-2020: ECM committee for Kelly Kamm, an Assistant Professor in KIP Department
2019-2021: MTU Senate Administrative Policy Committee member
2021-Present: MTU Senate Research Policy Committee member
2018-2019: MTU Academic and Instructional Policy Committee
2018-Present: Michigan Tech Senate Alternate
2019-2022: KIP Department Curriculum Committee Chair
2019-2022: KIP Department Curriculum Coordinator
2019-2021: KIP Tenure and Promotion Committee Member
2021-2022: KIP Department Tenure and Promotion Committee Chair
2020-2021: ECM Advisor for Hoda Hatoum, Assistant Professor in BME Department
2021-2022: Early Career Management (ECM) advisor for Robert Larson, Assistant Professor in Biological Sciences Department
2021-2022: MTU Research Excellence Fund Proposal Review Panel.
2022: MTU Century II Campaign Endowed Equipment Fund Committee Member.
2022: MTU Undergraduate Student Research Forum Judge.

HONORS & AWARDS

(Including Awards of Students Under my Mentorship)

2022: Xinqian Chen (PhD student), received 2nd place in the MPS poster presentation.

2022: Sophia Bancker (undergraduate student), received the first place in Michigan Tech Research Forum poster presentation.

2022: Vincet Pellizzon (undergraduate student), received MTU Songer Research Award ($4,000).

2021: Sophia Bancker (undergraduate student), received Pavlis Honors College Undergraduate Research Internship Program (URIP, $800).

2021: Lilly Vanloon (undergraduate student), received Pavlis Honors College URIP ($800)

2019: Jeremy Bilgake (master student), Outstanding Presentation Award in Michigan Physiological Society meeting.

2019: Jeremy Bigalke (master student), 2nd place in MTU Life Science and Technology Institute Research Forum oral presentation.

2019: Jeremy Bigalke (master student), Best KIP Department Scholar Award.

2018: Jeremy Bigalke (master student), received MTU Songer Research Award ($6,000).

2016: Michael Huber (master student), received American Physiological Society Caroline tum

Student Award at Experimental Biology Conference 2016.

2016: Michael Huber (master student), received best poster presentation award in MTU Life Science and Technology Institute Research Form.

2010: New Investigator Award: American Heart Association Annual High Blood Pressure Research Conference.

2007: Science & Technology Achievement of Tianjin City, China.

2006: Science & Technology Achievement of Tianjin City, China.

2004: Major Award for Outstanding Graduates, Hong Kong Qiushi Foundation.

2004: Science & Technology Achievement of Tianjin City, China

1997: Science & Technology Achievement of Tianjin City, China

1993: Science & Technology Achievement of Liaoning Province, China

ORAL PRESENTATIONS AND INVITED TALKS

1. 2022: Oral Presentation: “Brain Orexin System and Salt Sensitive Hypertension”. KIP department, Michigan Tech.
2. 2018: Jeremy Bigalke (a master student under my mentorship) Gull Lake Hypertension meeting, "Increased PVN Orexin Signaling Contributes to Sympathoexcitation in Salt Sensitive Hypertension, oral presentation.
3. 2013: Invited Talk: The role of brain prorenin receptor in neurogenic hypertension. Louisiana State University Health Sciences Center, College of Medicine, New Orleans,
4. 2013: Invited Talk: Brain prorenin receptor and hypertension. Michigan technological University, Houghton, Michigan.
5. 2012: 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
6. 2012: Oral presentation: Paradoxical action of the NTS AT1 receptors on inflammation and hypertension. Gordon Research Conference: Angiotensin, Ventura, CA.
7. 2011: 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.
8. 2010: Oral presentation: "Involvement of the brain (pro)renin receptor in cardiovascular homeostasis". 64th High Blood Pressure Research Conference, Washington, DC.

PEER REVIEWED PUBLICATIONS (53)

1. Bigalke J, Shan Z, Carter J. Orexin, sleep, sympathetic neural activity and cardiovascular function. Hypertension, 2022 (accepted)

2. Fan Y, Jiang E, Gao H, Bigalke J, Chen B, Yu C, Chen Q, Shan Z. Activation of Orexin System Stimulates CaMKII Expression. Front Physiol. doi: 10.3389/fphys.2021.698185. 2021.

3. Gao H, Bigalke J, Jiang E, Fan Y, Chen B, Chen QH, Shan Z. TNFα Triggers an Augmented Inflammatory Response in Brain Neurons from Dahl Salt-Sensitive Rats Compared with Normal Sprague Dawley Rats. Cell Mol Neurobiol. doi: 10.1007/s10571-021-01056-9, 2021

4. Bigalke JA, Gao H, Chen Q, **Shan Z**. Activation of Oorexin 1 receptors in the paraventricular nucleus contributes to the development of DOCA-salt hypertension through regulation of vasopressin (Front. Phsiol: doi: 10.3389/fphys.2021.641331), 2021.

5. Uribe KP, Correa VL, Pinales BE, Flores RJ, Cruz B, **Shan Z**, Bruijnzeel AW, Khan AM, O'Dell LE. Overexpression of corticotropin-releasing factor in the nucleus accumbens enhances the reinforcing effects of nicotine in intact female versus male and ovariectomized female rats. Neuropsychopharmacology 2020, 45, 394-403.

6. Chapp AD, Behnke JE, Driscoll KM, Hahka T, LaLonde Z, **Shan Z**, Chen QH. Elevated L-lactate Promotes Major Cellular Pathologies Associated with Neurodegenerative Diseases. Neurosci Bull 2020.

7. 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 2019, 10, 235-245.

8. 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

9. Chapp AD, Schum S, Behnke JE, Hahka T, Huber MJ, Jiang E, Larson RA, S**han Z**, Chen QH. Measurement of cations, anions, and acetate in serum, urine, cerebrospinal fluid, and tissue by ion chromatography. Physiol Rep 6, e13666. 2018

10. 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*, 222, 2018

11. 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

12. Huber MJ, Chen QH, **Shan Z**. The Orexin System and Hypertension. Cell Mol Neurobiol. 2018 Mar;38(2):385-391.

13. 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. Am J Physiol Heart Circ Physiol 313: H1075-H1086, 2017.

14. 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.

15. Qi X, Guzhva L, Yang Z, Febo M, **Shan Z**, Wang KK, Bruijnzeel AW. Overexpression of CRF in the BNST diminishes dysphoria but notanxiety-like behavior in nicotine withdrawing rats. Eur Neuropsychopharmacol. 2016 1378-1389, 2016.

16. Huber MJ, Basu R, Cecchettini 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.

17. 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.

18. 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.

19. 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

20. 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

21. **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-endothel ial progenitor cell ratio and exacerbates hypertension in the spontaneously hypertensive rat. *Hypertension*, 61(6):1328-1333. 2013

22. 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

23. 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

24. 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

25. Card JP, Kobiler O, McCambridge J, Ebdlahad S, **Shan Z**, Raizada M, Sved AF, Enquis t L. Microdissection of neural networks by conditional reporter expression from a brainbow herpesvirus. *PNAS* 108(8):3377-82. 2011

26. **Shan Z**, Shi P, Cuadra AE, Dong Y, Lamont GJ, Li Q, Navar LG, Katovich MJ, Sumners C and Raizada MK. Involvement of the brain (pro)renin receptor in cardiovascular homeostasis. *Circulation Research*, 107, 934-938. 2010

27. Cuadra AE, **Shan Z**, Sumners C and Raizada MK. A current view of brain renin - angiotensin system: is the (pro)renin receptor the missing link? *Pharmacology & Therapeutics*, 27-38. 2010

28. **Shan Z**, Cuadra A, Sumners C and Raizada MK. Characterization of a functional (pro)renin receptor in rat brain neurons. *Experimental Physiology,* 93, 701-708. 2008

29. Li Q, Dinculescu A, **Shan Z**, Miller R, Pang J, Lewin AS , Raizada MK and Hauswirth WW. Downregulation of p22phox in retinal pigment epithelial cells inhibits choroidal neovascularization in mice. *Molecular Therapy,* 16, 1688-1694. 2008

30. Yao H, Zhang L, **Shan Z**, Li Y, Xu H and Qiao M. Impact of *Pseudomonas aeruginos a* gene PA1550 on its swimming and twitching motility*. Wei Sheng Wu Xue Bao*, 48, 959- 962. 2008

31. **Shan Z**, Qiao M, Xu H *et al*. The study of genes involved in swimming motility of *Pseudomonas aeruginosa. Front. Biol. China,* 3(4), 1-6. 2008

32. Yang H, **Shan Z**, Kim J, Wu W, Lian W, Zeng L, Xing L and Jin S. Regulatory r o l e of PopN and its interacting partners in Type III secretion of Pseudomonas *aeruginos a. Journal of Bacteriology*, 189, 2599-2609. 2007

33. Li Y, Bai F and **Shan Z**. Identification of two new genes involved in swimming motility of *Pseudomonas aeruginosa. Acta Microbiologica Sinica*, 46, 18-22. 2006

34. **Shan Z**, Xu H, Shi X *et al*. The Investigation of genes involved in swimming motility of *Pseudomonas aeruginosa. Journal of Nankai University,* 39, 21-25. 2006

35. Xu H, **Shan Z**, Lin W *et al*. Study on genes involved in biosynthesis a n d regulation of pigments

in *Pseudomonas aeruginosa. Acta Microbiologica Sinica,* 45, 14-18. 2005

36. Si J, Bi L and **Shan Z**, Analysis of the pathogenic bacteria causing respiratory tract infection of newborn. *Journal of Tianjin Medical University*, 11, 411-413. 2005

37. Shan Z, Xu X, Shi X *et al*. Identification of two new genes involved in twitching motility of *Pseudomonas aeruginosa. Microbiology*, 150, 2653-2661. 2004

38. Shan Z, Xu H, Shi X *et al*. The study of optimal conditions of electroporation in *Pseudomonas aeruginosa. Acta Genetica Sinica*, 31, 311-316. 2004

39. Shan Z, Xu H, Shi X *et al*. Study of genes Involved in twitching motility of *Pseudomonas aeruginosa. Acta Microbiologica Sinica,* 44, 319-323. 2004

40. Yu S, Qi W, **Shan Z** *et al*, Study on the mutation of gyrA gene quinolone-resistant clinical isolates of *Enterobacter cloacae*. *Journal of Tianjin Medical University*, 10, 240-242. 2004

41. Yu S, Bi L, Si J, **Shan Z** *et al*. Analysis of 284 cases of senile patients suffering bronchitis. *Clinical Focus*, 17, 375-376. 2002

42. Shan Z, Ge G. Detection of extended spectrum β-Lactamases of 294 Enterobacteriaceae isolates. *Chinese Journal of Practical Internal Medicine*, 21, 117- 118. 2001

43. Li H, Wu H, **Shan Z** *et al*. Production, detection and control of bacterial extended spectrum β-Lactamases. *Clinical Focus*, 16, 524-525. 2001

44. Ge G, Bi L, **Shan Z** *et al*. Analysis of antibiotics resistance of Enterobacteriaceae in senile patients with lower respiratory tract infection. *Tianjin Medical Journal*, 28, 477- 479. 2000

45. Ge G, **Shan Z**, Bi L *et al*. Discussion of antibiotic application on lower respiratory tract infection. *Journal of Tianjin Medical University,* 6, 60-62. 2000

46. Ge G and **Shan Z**. Detection of extended spectrum β-Lactamases in members of the family Enterobacteriaceae. *Journal of Tianjin Medical University*, 6, 315-317. 2000

47. Wu H and **Shan Z**, Wang H. The mechanism analysis of cefuroxime-resistant Proteus isolated from urinary tract infection. *Chinese Journal of Laboratory Medicine,* 21, 244. 1998

48. Shan Z, Wang H, Wu H *et al*. The resistance analysis of pathogen isolated from urinary tract infection. *Journal of Tianjin Medical University*, *26*, 303-304. 1998

49. Wang H, Wu H and **Shan Z**. An analysis of resistance to 18 antibiotics in Bacteroides *fragilis* and a study on resistant gene to clindamycin. *Chinese Journal of Internal Medicine*, 37, 444-446. 1998

50. Shan Z, Ji D and Qiu S. Study on reassociation kinetics of repeated sequences of DNA of *Agkistrodon* species from northeast of China. *Journal of Liaoning University (Natural Science Edition)*, 25, 273-276. 1998.

51. Shan Z, Bi L and Wang H. Evaluation of two methods for laboratory detection of high-level gentamicin and streptomycin resistance in Enterococci. *Journal of Tianjin Medical University*, 3, 48-50. 1997

52. Shan Z and Wang H. Investigation of high-level resistance of aminoglycosides of 163 Enterococcus isolates. *Tianjin Medical Journal*, 25, 611-613. 1997

53. Shan Z, Bi L, Wang H. Antibiotic resistance assay of 431 Enterobacteriaceae isolates.*Tianjin Medical Journal*, 25 (suppl), 6-8. 1997

SELECTED ABSTRACTS (After 2007)

Abstracts Presented at Scientific Conferences Since I Joined Michigan Tech

1. Chen X, Vanloon L, Bancker S, Chen QH, **Shan Z**, Vasopressin and Orexin System Expressions Are Altered in Response to Single Prolonged Stress in Sprague Dawley Rats. Upper Peninsula Medical Conference 2022. Poster presentation.

2. Pellizzon V, Yan X, Chen X, Gao X, **Shan Z**, Bi L, Neuroprotective effect of A novel autophagy-modulating agent in an in vitro human cell-based stroke model. Upper Peninsula Medical Conference 2022. Poster presentation.

3. Chen X, Vanloon L, Bancker S, Chen QH, **Shan Z**. Acute Stress Alters Vasopressin and Orexin System Expression in Sprague Dawley Rats. Michigan Physiological Society annual Meeting 2022, Poster presentation.

4. Bagheri R, Chen X, **Shan Z**, Abadi P.S.S.P. 3D Nano-Biohybrid Carbon Nanotube Forest for Cardiac Tissue Engineering. ASME 2022 International Mechanical Engineering Congress and Exposition (IMECE2022). Accepted.

5. Bagheri R, Kasraie M, Chen X, **Shan Z**, Abadi P.S.S.P. 3D Nano-biohybrid Carbon Nanotube Forest for Cardiac Tissue Engineering. Materials Research Society (MRS) meeting. 2022. Accepted.

6. Bagheri R, Chen X, Abbasi S, Mochalin V, **Shan Z**, Abadi P.S.S.P. Enhancement of Cardiomyocyte Maturation by Through-Thickness Electrical Stimulation and The Effect of Scaffold Materials. BMES Annual Meeting, 2022. Accepted.

7. Miodonski G, Bruning J, Johnson C, Gu M, **Shan Z**, Chen QH. Exercise Training Upregulates SK+ Channel Function in the Hypothalamic Paraventricular Nucleus (PVN) of Animals. Experimental Biology 2022. Poster Presentation.

8. Larson R, Chen X, Gu M, **Shan Z**, Chen QH. SK Channel Dysfunction in the Hypothalamic Paraventricular Nucleus Contributes to Sympathoexcitation in Dahl Salt-Sensitive Rats. Experimental Biology 2022.

9. Chen X, VanLoon L, Bancker S, Chen QH, **Shan Z**. Single Prolonged Stress Alters Vasopressin and Orexin System Expression in Sprague Dawley Rats. Experimental Biology 2022.

10. Gao H, Bigalke J, Bloch C, Chen QH, **Shan Z**. Plasma Orexin A Level is Increased in Salt-Sensitive Hypertension. Experimental Biology 2019.

11. Bruning J, Ghannam R, Miodonski G, **Shan Z**, Techiman S , Chen QH, Microbial Derived Short Chain Fatty-Acids and Autonomic Regulation of Cardiovascular Function. Experimental Biology 2019

12. Bigalke J, Chen QH, Shan Z. The Orexin System in DOCA-Salt Hypertension: Regulation of Vasopressin" Michigan Physiological Society annual Meeting 2019, oral Presentation.

13. Stelly S, Bigalke J, Shan Z. The effects of prorenin in normotensive male rat neurophysiology. Michigan Physiological Society annual Meeting 2019, Poster Presentation.

14. Jiang E, Huber MJ, Fan Y, Chen QH, **Shan Z**. PRR activation in the RVLM has different effect on sympathetic outflow in male and female Sprague Dawley Rats. *Golden Research Conference-Angiotensin*, 2018

15. Bigalke J, Chen QH, **Shan Z**. Increased PVN Orexin Signaling Contributes to Sympathoexcitation in Salt Sensitive Hypertension. *Gull Lake hypertension meeting*, 2018. (***Oral presentation***).

16. Bigalke J, Jiang E, Hakha T, Chen QH, **Shan Z.** PVN Orexin Receptor 1 Knockdown Effect on Metabolism and Fluid Homeostasis. *Michigan Physiology Society annual meeting,* 2018 *(**Oral Presentation**)*

17. Haska T, Fan Y, Chen QH, **Shan Z**. High salt diet may stimulate fructose uptake in brain neurons and contribute to neuronal apoptosis. *Experimental Biology*, 2018

18. Bigalke J, Jiang E, Haska T, Chen QH, **Shan Z**. PVN Orexin Receptor 1 Knockdown Effect on Metabolism and Fluid Homeostasis. *Experimental Biology,* 2018.

19. LaLonde Z, Behnke JE, Chapp AD, **Shan Z**, Chen QH. L-lactate increases apoptosis in dopaminergic-like PC12 Cells. *Experimental Biology*, 2018

20. Behnke JE, Chapp AD, **Shan Z**, Chen QH. Nicotine attenuates acetate-induced increase of cytosolic reactive oxygen species in dopaminergic-like PC12 cells. *Experimental Biology*, 2018

21. Chapp AD, Schum S, Behnke JE, Huber MJ, Jiang E, Larson RA, **Shan Z**, Chen QH. Measurement of electrolytes, including acetate in various physiological samples using ion chromatography. *Experimental Biology*, 2018

22. Chapp AD, Huber MJ, Larson R, Shan Z, Zhang L, Chen QH. Aldehyde dehydrogenase inhibitor, cyanamide, attenuates ethanol induced sympathoexcitatory response in the central nucleus of amygdala. *Research Society on Alcoholism,* 2018**.**

23. Chapp AD, Behnke JE, Driscoll K, Fan Y, **Shan Z**, Zhang L, Chen QH. Acetate mediates ethanol toxicity in dopaminergic-like PC12 cells. *Research Society on Alcoholism* 2018.

24. Jiang E, Huber MJ, Fan Y, Zhu F, Chen Q, **Shan Z**. High salt challenge induces sympathetic activation in the PVN through activation of orexin-TNF signaling in Dahl salt sensitive rats. *Experimental Biology, 2017.*

25. Fan Y, Jiang E, Hakha T, Chen QH, **Shan Z**. Orexin A receptor activation increases CamK2 expression in PC12 cells. *Experimental Biology 2017*.

26. Hakha T, Fan Y, Jiang E, Chen QH, **Shan Z**. High salt diet plus fructose water intake induces hypertension in male SD rats after 21 days.

27. Chapp AD, Driscoll KM, Behnke J, **Shan Z**, Chen Q. Acetate, an Ethanol Metabolite Increases Neuroinflammation and Neuronal Death: Implications in Ethanol Neurodegeneration. *Experimental Biology 2017*.

28. Behnke J, Discoll KM, **Shan Z** and Chen Q. Acetate, the Metabolite of Ethanol, Increases Cytosolic Calcium and mRNA Expression Levels of EGR1 and TNFα in Dopaminergic Like PC12 Cells. *Experimental Biology 2017*

29. Chapp AD, Driscoll KM, Huber MJ, **Shan Z**, Carter J, Zhang L, Chen QH**.** The Excitatory and Cytotoxic Actions of Acetate on Neurons. *Research Society on Alcoholism 2017.*

30. Chapp AD, Driscoll KM, Behnke J, **Shan Z**, Zhang L, Chen Q. Chen. Acidification with Acetic Acid Activates NMDAR and Increases Central Nucleus of Amygdala Neurons with Axon Projecting to Rostral Ventrolateral Medulla. *Research Society on Alcoholism 2017.*

31. Jiang E, Huber MJ, Fan Y, Zhu F, Chen Q, **Shan Z**. High salt challenge induces sympathetic activation in the PVN through activation of orexin-TNF signaling in Dahl salt sensitive rats. *Michigan Physiology Society annual meeting, 2017 **(oral presentation**).*

32. Fan Y, Jiang E, Hakha T, Chen QH, **Shan Z**. Orexin A receptor activation increases CamK2 expression in PC12 cells. *Michigan Physiology Society annual meeting, 2017* ***(oral presentation****)*

33. Hakha T, Fan Y, Jiang E, Chen QH, **Shan Z**. High salt diet plus fructose water intake induces hypertension in male SD rats after 21 days. *Michigan Physiology Society annual meeting, 2017*

34. Huber MJ, Zhu F, Larson RA, Chen C, and **Shan Z**. Increased Brain iNOS Contribute to Salt Sensitive Hypertension in Dahl Salt Sensitive Rats. *69th High Blood Pressure Research Conference*, 2016.

35. Chapp AD, Discoll KM, **Shan Z** and Chen Q. Acetate, the Metabolite of Ethanol, Increases Neuroinflammation and Cellular Death: implications in ethanol neurodegeneration. *Experimental Biology, 2016*

36. Huber MJ, Zhu F, Li N, Chen QH, **Shan Z**. Increased expression of orexin in the PVN contributes to Dahl salt sensitive hypertension. *3rd Annual Meeting of Michigan Physiological Society 2016.*

37. Larson RA, Zhu F, Berridge S, Powdhar A, Chen Q, **Shan Z**. Increased brain proinflammatory cytokines may contributes to elevated neuronal activity in salt sensitive hypertension**.** *3rd Annual Meeting of Michigan Physiological Society 2016*

38. Huber MJ, Zhu F, Li N, Chen QH, **Shan Z**. Upregulation of Orexin in the Paraventricular Nucleus Contributes to Salt Sensitive Hypertension. *Experimental Biology 2016.*

39. Zhu F, Larson RA, Li N, Shi P, Chen Q, **Shan Z**. High Salt Challenge Augments Expression of Proinflammatory Cytokines and Contributes to Elevated Neuronal Activity in the Hypothalamic Paraventricular Nucleus**.** *Experimental Biology 2016.*

40. Chapp AD, Huber MJ, **Shan Z**, Chen QH. Intraneuronal Acidification with Acetic Acid, an Ethanol Metabolite, Increases Excitability of Central Nucleus of Amygdala Neurons with Axon Projecting to Rostral Ventrolateral Medulla (CeA-RVLM). *Experimental Biology 2016.*

41. Larson RA, Chapp AD, Huber MJ, Cheng Z, **Shan Z**, Chen QH. High salt intake augments excitability of pre-sympathetic PVN neurons through dysfunction of the endoplasmic reticulum Ca2+ ATPase. *69th High Blood Pressure Research Conference*, 2015.

42. Larson RA, Gui L, Chapp AW, Huber MJ, Zhu J, Cheng Z, **Shan Z**, Chen QH. Inhibition of Endoplasmic Reticulum Function in PVN by Thapsigargin Increases Neuronal Excitability and Sympathetic Nerve Activity. *Michigan Physiological Society Annual Meeting*, 2015.

43. Huber MJ, Basu R, Cecchettini C, Chen QH, **Shan Z**. Sympathoexcitation by PVN Prorenin Receptor Activation May Involve Reactive Oxygen Species and iNOS. *2nd Annual Michigan Physiological Society Meeting*, 2015.

44. Huber MJ, Basu R, Cecchettini C, Chen QH, **Shan Z**. Stimulation of the Prorenin Receptor in the Paraventricular Nucleus Increases Sympathetic Outflow in Anesthetized Rat. *Experimental Biology 2015.*

45. Huber MJ, Gui L, Chapp AD, Gu M, Zhu J, **Shan Z**, Chen QH. Sympathoexcitation by inhibition of SK channel activity in the hypothalamic PVN is attenuated by local AT1 receptor blockade. *Experimental Biology 2015.*

46. Li Y, Li L, Bernstein EK, Shen ZX, **Shan Z**, Shi P. Action of multifaceted microglia on blood pressure control. *68th High Blood Pressure Research Conference*, 2014.

47. Qi X, Yuan W, Chen QH, **Shan Z**. Activation of ER stress and inflammation by neuronal (pro)renin receptor is mediated TLR4 activation. *1st Annual Michigan Physiological Society Meeting*, 2014.

48. Larson RA, Gui L, Chapp A, Huber M, Zhu J, Chen Z, **Shan Z**, Chen GH. Inhibition of endoplasmic reticulum function in PVN by thapsigargin increased neuronal excitability and sympathetic nerve activity (SNA). *Experimental Biology,* 2014.

49. Yuan W, QI X, Chen QH, **Shan Z**. "Stimulation of endoplasmic reticulum stress and inflammation by neuronal (pro)renin receptor is mediated by toll like receptor 4 activation. *Experimental Biology.* 2014.

50. Qi X, **Shan Z**, Ji Y, Guerra V, Alexander JC, Ormerod BK, Bruijnzeel AW. Sustained AAV2/5-mediated overexpression of CRF in the central nucleus of the amygdala diminishes the dysphoric-like state associated with nicotine withdrawal in rats. *Florida Genetics 9th annual symposium, Gainesville, FL.* 2014

51. Shan Z, Yuan W. Blockage of Toll-Like Receptor 4 Inhibits Renin Stimulation Of NF-KB-Mediated Cytokine Signaling in Brain Neurons. *67th High Blood Pressure Research Conference*. 2013

Selected Abstracts Presented Before I Joined Michigan Tech (2007-2013)

52. Qi X, **Shan Z**, Ji Y, Guerra V, Alexander JC, Ormerod BK, Bruijnzeel AW. Overexpression of CRF in the central nucleus of the amygdala diminishes the dysphoric-like state associated with nicotine withdrawal in rats. American College of Neuropsychopharmacology, 52nd Annual Meeting, 2013.

53. Shan Z, Zubcevic Z, Joo YJ, Yuan W, Qi Y. Increased Expression of Prorenin Receptor in the NTS of Spontaneously Hypertensive Rats Maybe a Compensatory Mechanism of Hypertension. *Experimental Biology Annual Meeting,* 2013.

54. Shi P, Zhou G, Desland FA, **Shan Z**, Mohan K. Raizada, Colin Sumners; Elevated brain MCP-1 contributes to neuroinflammation in hypertension**.** *66th High Blood Pressure Research Conference*. 2012**.**

55. Shan Z, Zubcevic Z, Shi P, Lamont GL, Murça T, Lin F, Li Q, Katovich M, Sumners C and Raizada MK**.** Chronic knockdown of the NTS AT1R results in changes in blood pressure set point and exacerbates hypertension in the SHR. *66th High Blood Pressure Research Conference*. 2012.

56. Zubcevic J, **Shan Z**, Li W, Feng Y, Raizada MK, Elevated sympathetic drive to the bone marrow contributes to the inflammatory response and dysfunctional endothelial progenitor cells in the spontaneously hypertensive rat. *66th High Blood Pressure Research Conference*. 2012.

57. Shan Z, Zubcevic Z, Shi P, Jun JY, Dong Y, Lamont GL, Murça T, Lin F, Li Q, Katovich M, Sumners C and Raizada MK**.** Chronic blockade of the NTS AT1R decreases circulating endothelial progenitor-inflammatory cells ratio and exacerbates hypertension in the SHR. *Gordon Research Conference*, *Angiotensin,* 2012.

58. Shi P, Grobe GL, Desland FA, Rodriguez V, **Shan Z**, Richards E, Raizada MK, Sumners C Microglial-neuronal interactions in the paraventricular nucleus: a potential mechanism underlying neurogenic hypertension. *Gordon Research Conference: Angiotensin,* 2012**.**

59. Li Q, Verma A, **Shan Z**, Hauswirth WW, Raizada MK. Hyperglycemia Induced Methylation Changes in Genes of Ocular Renin Angiotensin System. *Gordon Research Conference: Angiotensin,* 2012.

60. Li Q, Verma A, **Shan Z**, Raizada MK, Hauswirth WW. Prorenin and pro/renin receptor in pathogenesis of retinal Pathophysiology. *Gordon Research Conference: Angiotensin,* 2012.

61. 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 (SHR). *Experimental Biology Annual Meeting.* 2012

62. Shan Z, Zubcevic J, Jun JY, Lamont GL, Murca T, Shi P, Lin F, Li Q, Raizada MK. (pro)renin receptor (PRR) mediates antihypertensive effects in the nucleus of solitary tract (NTS) of Spontaneously Hypertensive Rats (SHR). *65th High Blood Pressure Research Conference*. 2011

63. Shi P, Grobe GL, Desland FA, Rodriguez V, **Shan Z**, Richards E, Raizada MK, Sumners C. Stimulatory action of the renin-angiotensin-aldosterone system on the production of microglial derived cytokines. *65th High Blood Pressure Research Conference*. 2011**.**

64. Verma A, **Shan Z**, Li B, Liu X, Nakagawa T, Grant MB, Houswirth W, Xu X, Raizada MK, Li Q. Hyperglycemia induced methylation changes in genes of ocular renin angiotensin system. *AVRO Annual meeting*, 2011.

65. Shan Z, Lamont GL, Shi P, Lin F, Summers C and Raizada MK. Neuronal (pro)renin receptor stimulation of proinflammatory cytokines involves NF-kappa B signaling. *Experimental Biology Annual Meeting.* 2011**.**

66. Shan Z, Shi P, Dong Y, Lamont GJ, Lin F, Cuadra AE, Li Q, Sumners C and Raizada MK. Chronic reduction in paraventricular nucleus (PVN) AT1R expression by AAV-mediated transfer of a small hairpin RNA (shRNA) produces a decrease in blood pressure in spontaneously hypertensive rats. *Experimental Biology Annual Meeting.* 2011.

67. Li W, **Shan Z**, Raizada MK, Sigmund CD and Feng Y. Brain targeted (pro)renin receptor over-expression induces the development of hypertension via modulation of baroreflex sensitivity and renal sympathetic nerve activity in renin transgenic mice. *Experimental Biology Annual Meeting.* 2011**.**

68. Dong Y, **Shan Z**, Shi P, Raizada MK and Sumners C. Evidence for a depressor action of AT1 receptors in the nucleus of the solitary tract (NTS). *Experimental Biology Annual Meeting*. 2010.

69. Lei B, Verma A, **Shan Z**, Hauswirth WW, Peng H, Raizada MK, Li Q. Over-expression of (pro)renin receptor in the retina induces breakdown of blood-retinal-barrier**.** *ARVO Annual Meeting*. 2010**.**

64. Shi P, Dong Y, **Shan Z**, Lin F, Raizada MK and Sumners C. Central hypertonic NaCl increases cytokines in the hypothalamic paraventricular nucleus. *Experimental Biology Annual Meeting*. 2010.

70. Shan Z, Shi P, Cuadra AE, Dong Y, Lamont GJ, Li Q, Seth DM, Navar LG, Katovich MJ, Sumners C and Raizada MK. Involvement of the brain (pro)renin receptor in cardiovascular homeostasis. *64th High Blood Pressure Research Conference*. 2010**.**

71. Li W, **Shan Z**, Raizada MK, Sigmund CD and Feng Y. Brain targeted gene delivery of (pro)renin receptor induces development of hypertension in renin transgenic rats. *The 64th High Blood Pressure Research Conference*. 2010.

72. Shan Z, Shi P, Lin F, Sumners C and Raizada MK. AAV-mediated increases in (pro)renin receptor expression in the supraoptic nucleus regulates vasopressin secretion and body fluid homeostasis. *The 63rd High Blood Pressure Research Conference*. 2009.

73. Shan Z, Cuadra AE, Lin F, Sumners C and Raizada MK**.** Increased expression of (pro)renin receptor in the brain from the spontaneously hypertensive rat. *The 62nd High Blood Pressure Research Conference*. 2008.

74. Li Q, **Shan Z**, Yuan L, Miller R, Lewin A, Hauswroth W, and Raizada MK. AAV-mediated gene transfer of ACE2 protects retinal vascular dysfunction in an animal model of diabetic retinopathy. *Hypertension*, *Joint Meeting of ESH and ISH*, Berlin, Germany, 2008.

75. Cuadra AE, Gillies R, **Shan Z,** Jiang N, Li H, Sumners C and Raizada MK. Characterization of the rostral ventrolateral medulla (RVLM) neurons from adult rat brain in primary culture. *18th Scientific Meeting of the European Society of Hypertension*, 2008**.**

76. Shan Z, Raizada MK. (Pro)renin receptor (PRR) expression in the spontaneously hypertensive rats (SHR) brain. *Experimental Biology Annual Meeting.* 2007**.**

77. Craig BT, Sved JC. Sved AF, Raizada MK, **Shan Z** and Card JP. Catecholamine afferents to the marginal layer of rat medulla. *Experimental Biology Annual Meeting.* 2007.

78. Card JP, Sved JC, Corbin T, Shively C, Li X, Yen JW, Raizada MK, **Shan Z** and Sved AF. Anterograde tracing of A1 and A5 efferents using phenotypically restricted lentivirus vector mediated reporter gene expression. *Experimental Biology Annual Meeting.* 2007

79. Sun C, **Shan Z** and Raizada MK. Increased expression of apelin and its receptor APJ in the cardiovascular regulatory brain regions of spontaneously hypertensive rats. *The Endocrine Society's 89th Annual Meeting*. 2007.

80. Card JP, Sved JC, Shively C, **Shan Z,** Raizada MK and Sved AF. Lentivirus mediated definition of the efferent projections of neurons in the A5 area. *Neuroscience.* 2007.

81. Sved AF, Sved JC, Corbin T, **Shan Z**, Raizada MK and Card JC. Lentivirus mediated definition of the efferent projections of neurons in the A1 area. *Neuroscience.* 2007.

GENE SEQUENCES PUBLISEHD IN NCBI GENEBANK DATABASE

1. Li Y, Bai F, **Shan Z,** et al., ESSION: DQ097892, 2006. (http://www.ncbi.nlm.nih.gov/nuccore/71897465)

2. Shan Z, Xu H, Shi X et al. *Pseudomonas aeruginosa* PA68 16S rRNA gene. ACCESSION: AY521230. 2004. (http://www.ncbi.nlm.nih.gov/nuccore/46403851)

3. Shan Z, Xu H, Shi X et al. *Pseudomonas aeruginosa* PA68 PA0171 gene. Complete cds. ACCESSION: AY502957. 2004 (http://www.ncbi.nlm.nih.gov/nuccore/46578126)

4. Shan Z, Xu H, Shi X et al. *Pseudomonas aeruginosa* PA68 fimL gene. Complete cds. ACCESSION: AY502958. 2004. (http://www.ncbi.nlm.nih.gov/nuccore/46578128