BIOGRAPHICAL SKETCH

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NAME: Wang, Jinju

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

POSITION TITLE: Assistant 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
Nanhua University (Hunan, China)	B.S.	07/2007	Nursing
Wright State University (Dayton, OH)	M.S.	08/2011	Pharmacology & Toxicology
Wright State University (Dayton, OH)	Ph.D.	06/2016	Integrative Biology & Toxicology
Wright State University (Dayton, OH)	Post-doctoral	06/2020	Cerebrovascular Pharmacology

A. Personal Statement

I have a long-standing interest in cerebrovascular disease research. My research interests primarily focus on the physiological and pathological roles of extracellular vesicles (EVs) and their potential as therapeutic agents in cerebrovascular diseases, including ischemic stroke and vascular dementia. Stroke is the fifth leading cause of death in the United States. Ischemic stroke accounts for over 85% of all strokes. Vascular dementia is the second most common type of dementia, accounting for 15-20% of dementia cases in North America and Europe. Despite the high prevalence, treatment options remain limited. Vascular dementia, particularly vascular cognitive impairment and dementia (VCID), is characterized by endothelial dysfunction, white matter injury, and progressive cognitive deficits. Currently, there are no effective therapies that target the cerebrovascular and white matter damage underlying VCID. My work aims to uncover how EVs contribute to neurovascular health and disease, particularly under conditions such as hypertension, diabetes, and aging, which are key risk factors for both stroke and dementia. We have demonstrated that exosomes derived from endothelial progenitor cells (EPC-EXs) exert protective effects in the ischemic brain. Furthermore, interventions such as exercise or targeting specific microRNAs and proteins may enhance the beneficial properties of these exosomes, even in hypertensive models of stroke. More recently, we have shown that exosome-mediated communication between EPCs and brain cells (neurons and brain microvascular endothelial cells) is impaired under hypertensive conditions, potentially contributing to early cerebrovascular dysfunction and the progression of vascular dementia. These findings have sparked new investigations into how hypertension alters EV signaling and function. We aim to advance understanding of EV biology in the context of cerebrovascular disease and ultimately develop novel EV-based strategies to protect brain health, decelerate cognitive decline, and promote healthy aging.

Ongoing and recently completed projects that I would like to highlight include:

Ongoing projects
AHA Transformational Project Award 07/01/2024-06/30/2027
Wang (PI)
"ACE2 primed exosomes: therapeutic application for aging hypertension-related ischemic stroke"

Marshall University Undergraduate Creative Discovery Award 06/01/2025-12/31/2025
Wang (mentor); Shaffer (PI)
"Neuroinflammation and adipose dysregulation under high-fat diets and alcohol consumption."

Recently completed projects
AHA Career Development Award 04/01/2022-03/31/2025
Wang (PI)
"The role of EPC exosomal communication in the beneficial effects of exercise on hypertension-associated ischemic stroke"

NASA WV Undergraduate Grant Space Grant Consortium 05/16/2023-05/15/2024
Wang (Mentor); Sigdel (PI)
"The effects of exercise-intervened circulating extracellular vesicles on endothelial cell injury"

WVCTSI 2023 OPEN Grant 03/01/2023-02/28/2024
Wang (PI)
"Pro-inflammatory role of diabetic perivascular adipose tissue exosomes in vascular endothelium"

WVCTSI 2021 Pilot Grant 11/01/2021-04/30/2022
Wang (PI)
"MiRNA profiling of exosomes derived from perivascular adipocyte tissue in type 2 diabetic condition"

Citations:

1) Sigdel S, Chen S, Udoh G, and **Wang J***. Exercise-Intervened Circulating Extracellular Vesicles Alleviate Oxidative Stress in Cerebral Microvascular Endothelial Cells Under Hypertensive Plus Hypoxic Conditions. Antioxidants, *Antioxidants 2025, 14(1), 77.*
2) Sigdel S, Udoh G, Albalawy R, and **Wang J***. Perivascular Adipose Tissue and Perivascular Adipose Tissue-Derived Extracellular Vesicles: New Insights in Vascular Disease. Cells 2024, 13, 1309. https:// doi.org/10.3390/cells13161309.
3) Sigdel S, Swenson S, **Wang J***. Extracellular Vesicles in Neurodegenerative Diseases: An Update. Int J Mol Sci. 2023 Aug 24;24(17). PMID: 37685965
4) Chen S, Polaki V, Bihl J, **Wang J***. Compromised endothelial progenitor cell exosomal communication with endothelial cells in hypertension ischemia conditions. Frontiers in Stroke. 2022.

B. Positions, Scientific Appointments, and Honors

Positions and Employment

2022.5 -: Assistant Professor, Department of Biomedical Sciences, Joan C. Edwards School of Medicine, Marshall University, Huntington, WV
2021.1 - 2022.4: Research Assistant Professor, Department of Biomedical Sciences, Joan C. Edwards School of Medicine, Marshall University, Huntington, WV
2020. 7 - 2020.12: Research Assistant Professor, Department of Pharmacology & Toxicology, Boonshoft School of Medicine, Wright State University (WSU), Dayton, OH
2016. 7 - 2020.6: Post-doctoral Researcher, Department of Pharmacology & Toxicology, Boonshoft School of Medicine, WSU, Dayton, OH

Professional Memberships

2023- current: Early-stage Investigator Advisory Board Member, WVCTSI (West Virginia Clinical and Translational Science Institute)

2021- current: Member, Neuroscience Research Cluster (Marshall University)
2021- current: Member, Cardiovascular Disease Research Cluster (Marshall University)
2021- current: Member, West Virginia Clinical and Translational Science Institute (WVCTSI)
2014- current: Member, International Society for Extracellular Vesicles (ISEV)
2011- current: Member, American Heart Association (AHA)

Scientific Appointments and Other Professional Activities

2025: NIH Ad hoc Reviewer: The special emphasis panel: Neuroimmunology and Glia in Brain Physiology and Diseases
2024: AHA Grant Reviewer: CDA-Basic Science 1; TPA-brain Science
2023: WVCTSI Grant Reviewer: Open grant
2022- current: AHA Grant Reviewer: Fellowship Award
2022- current: Associate Editor: Frontiers in Stroke
2023- current: Guest Editor: International Journal of Molecular Sciences
2017- current: Manuscript Reviewer: Cardiovascular Research, Cellular and Molecular Neurobiology, Oxidative Medicine and Cellular Longevity, Scientific Reports, Neuropsychiatric Disease and Treatment, Journal of International Medical Research, Experimental Neurology, Toxicology, Metabolic Brain Disease, BMC in Genomics, Current Stem Cell Research and Therapy, Biomedicine and pharmacotherapy, Frontiers in Stroke, Frontiers in Pharmacology, Journal of Neuroinflammation, Journal of Controlled Release, Molecular Neurobiology, Skin Research and Technology, etc.

Honors and Awards

2025: 2024-2025 Distinguished Artists and Scholars Award-Junior Faculty Award, Marshall University, Huntington, WV
2023.5: Early-stage Investigator Poster Award, WVCTSI annual meeting, Morgantown, WV
2021.10: Junior Faculty Oral Presentation winner, 33rd Annual Health Science Research Day, Huntington, WV
2018 - 2020: Postdoctoral Fellowship Awardee, AHA
2015 - 2016: Predoctoral Fellowship Awardee, AHA
2012: Distinguished Master's Thesis Award Nominee (1 nomination/institute)

C. Contributions to Science

1) I have led efforts to study the roles of extracellular vesicles (EVs) in aging and hypertension-related cerebrovascular diseases. Aging and hypertension are the major risk factors for stroke, vascular dementia, and cognitive impairment. The incidences of stroke and cognitive impairment rise significantly in the aging and hypertension population. EVs are small vesicles of cellular membranes released from almost all types of cells in response to physiological and pathological stimuli. Accumulating evidence suggests that EVs represent a novel way of intercellular communication by transferring their cargoes (proteins and miRs). EVs can pass through the BBB and enter the circulatory system. Increasing evidence indicates that circulating EVs could be biomarkers for neurological pathologies and diseases associated with aging. My previous studies have demonstrated the effects of stem cell-derived EVs in rejuvenating aging cells and the changes in intercellular communications mediated by EVs. I have several co-authored peer-reviewed papers in this field.

a. Zhang C+, **Wang J** +, Ma X, Wang W, Zhao B, Chen Y, Chen C, Bihl J. ACE2-EPC-EXs protect ageing ECs against hypoxia/reoxygenation-induced injury through the miR-18a/Nox2/ROS pathway. J. Cell. Mol. Med. Vol 22, No 3, 2018 pp. 1873-1882. PMID: 29363860.
b. Mattingly J, Li Y, Bihl J, **Wang J***. The promise of exosome applications in treating central nervous system diseases. CNS Neurosci Ther. 2021; 00:1–9. PMID: 34636491
c. Chen S, Polaki V, Bihl J, **Wang J***. Compromised endothelial progenitor cell exosomal communication with endothelial cells in hypertension ischemia conditions. Frontiers in Stroke. 2022. https://doi.org/10.3389/fstro.2022.1015463

2) I also investigated the roles of stem-cell-derived EVs in cerebrovascular diseases such as ischemic stroke, hemorrhagic stroke, hypertension, and diabetes. It is proposed that EVs could be the novel therapeutic target/approach for stroke; and could be the biomarkers for stroke patients. However, the EVs are nanoscale, and accurate analysis of specific extracellular vesicles from biofluids is critical and challenging, which significantly hampers the advance of extracellular vesicle research over the past years. Inspired by the rapid development of nanoparticle tracking analysis tools and immunoassay techniques, I established a novel approach to isolate and analyze specific extracellular vesicles from culture medium and plasma. Notably, this method is not limited to ischemic stroke but can readily be adapted to other systems, ranging from cardiovascular diseases to inflammatory to neoplastic disorders. I have several co-authored peer-reviewed papers in this field.

a. **Wang J**, Chen S, Ma X, Cheng C, Xiao X, Chen J, Liu S, Zhao B, Chen Y, "Effects of endothelial progenitor cell-derived microvesicles on hypoxia-reoxygenation induced endothelial dysfunction and apoptosis," Oxid Med Cell Longev, 2013, 2013: 572729. PMCID: PMC3830832.
b. **Wang J**, Chen S, Sawant H, Chen Y, Bihl J, "The miR-210 primed endothelial progenitor cell exosomes alleviate acute ischemic brain injury," Curr Stem Cell Res Ther, 2023: Nov 10. PMID: 37957914.
c. **Wang J**, Guo R, Yang Y, Jacobs B, Chen S, Iwuchukwu I, Gaines KJ, Chen Y, Simman R, Lv G, Wu K, Bihl JC. The Novel Methods for Analysis of Exosomes Released from Endothelial Cells and Endothelial Progenitor Cells. Stem Cells Int. 2016;2016: 2639728. PMID: 27118976.
d. **Wang J**, Chen S, Zhang W, Chen, Y, Bihl J, Exosomes from miRNA-126-modified endothelial progenitor cells alleviate brain injury and promote functional recovery after stroke. CNS Neurosci Ther. 2020;00:1–11. PMID: 33009888

3) I have investigated the potential role of exosomal communications in exercise intervention-induced beneficial effects on the vasculature. Exercise is a widely recognized non-pharmaceutical approach for vascular diseases, although the underlying mechanisms have yet to be well understood. EXs carrying bioactive molecules (miRs & proteins) mediate intercellular communication and are important players of tissue "microenvironment" that is involved in physiological processes and the development/progression of vascular diseases. Recently, emerging evidence indicated that exercise promotes the release of EXs into circulation and raises the exosomal miR level. However, the subpopulation and biological functions of EXs are unclear. I have further demonstrated that moderate exercise enhances the function of EPC-EXs on protecting endothelial cells (ECs) from hypoxia injury. The findings provide novel insights into how exercise elicits favorable effects on ischemic stroke. In addition, vascular disease is one of the major complications of diabetes, a disease affecting > 23 million people in the United States. Recent studies indicate that increased inflammation in perivascular adipose tissue (PVAT) contributes to endothelial dysfunction, ultimately leading to vascular disease. I have recently shown that moderate exercise intervention can improve endothelial function associated with alleviated inflammation and oxidative stress of perivascular adipose tissue in type 2 diabetic mice. I have several co-authored and 2 corresponding-authored papers in this field.

a. Ma C, Ma X, **Wang J**, Liu H, Chen Y, Yang Y*. Physical exercise induces hippocampal neurogenesis and prevents cognitive decline. Behav Brain Res. 2017 Jan 15;317:332-339. PMID: 27702635.
b. Liu H, Lei H, Shi Y, **Wang J**, Chen N, Li Z, Chen Y, Ye Q, Yang Y. Autophagy inhibitor 3-methyladenine alleviates overload-exercise-induced cardiac injury in rats. Acta Pharmacol Sin. 2017 Jul; 38(7): 990-997. PMID: 28260802
c. **Wang J***, Liu H, Chen S, Zhang W, Chen Y, Yang Y*. Moderate exercise has beneficial effects on mouse ischemic stroke by enhancing the functions of circulating endothelial progenitor cell-derived exosomes. Exp Neurol. 2020 Apr 20; 330: 113325. PMID: 32325158
d. **Wang J** *, Polaki V, Chen S, Bihl J*. Exercise improves endothelial function associated with alleviated inflammation and oxidative stress of perivascular adipose tissue in type 2 diabetic mice. Oxid Med Cell Longev. 2020; 2020: 8830537. PMID: 33425218

Complete List of Published Work in My Bibliography:

40 peer-reviewed publications; 9 corresponding authored papers.

https://www.ncbi.nlm.nih.gov/myncbi/1fuddaqj3sm5j/bibliography/public/