Curriculum Vitae

Wenhao Liu
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EDUCATION

- Ph.D. Student in Department of Cardiovascular Medicine, The University of Tokyo, Tokyo Japan, since April 2022
- Master of Internal Medicine, Tianjin University of Traditional Chinese Medicine, Tianjin China, September 2017 to June 2020
- Bachelor of Medicine & Bachelor of Surgery, Tianjin University of Traditional Chinese Medicine, Tianjin China, September 2012 to June 2017
- No.6 Senior High School, Zibo Shandong China, September 2009 to June 2012

TRAINING

- Foreign Research Student in Department of Cardiovascular Medicine, The University of Tokyo, Tokyo Japan, September 2020 to March 2022
- Residency training in Internal Medicine, First Teaching Hospital of Tianjin University of Traditional Chinese Medicine, Tianjin China, September 2017 to June 2020
- Fellow of echocardiography in Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences & Peking Union Medical College (CAMS & PUMC), Beijing China, September 2019 to October 2019

RESEARCH EXPERIENCE

1. Left ventricular dysfunction and exercise intolerance of heart failure with preserved ejection fraction (2017-2020) - Clinical Research (T2 Phase)
   - Conducted a randomized controlled trial investigating the effect of resistance training combined with conventional therapy on cardiac function and exercise tolerance in HFpEF patients.
   - Measured outcomes using echocardiography (LAVI, GLS, E/e'), cardiopulmonary exercise testing (Peak VO_2, VE/VCO_2 slope), and BNP levels."

- Analyzed data using ANCOVA and multiple linear regression to assess treatment effects and correlations between cardiac function and exercise capacity.
- Investigated mechanisms of exercise intolerance using CPET and mathematical modeling, quantifying contributions of cardiac output, pulmonary hemodynamics, and peripheral oxygen uptake/diffusion.
- Demonstrated that reduced cardiac output and impaired skeletal muscle oxygen diffusion significantly contribute to exercise intolerance, highlighting the importance of peripheral mechanisms and combined therapeutic strategies.
- Utilized speckle tracking imaging (STI) to detect subtle systolic dysfunction (e.g., GLS) and CPET for comprehensive exercise capacity assessment.

2. SCN5A gene mutations in sprinters (2019-2019) – Case Report
   - Revealed that a significant increase in heart rate over a short period may trigger malignant arrhythmias in carriers of SCN5A mutations.
3. Rhabdomyolysis caused by bezafibrate (2018-2019) – Case Report
   - Revealed that inhibition of the CYP3A4 enzyme system can lead to increased concentrations of bezafibrate in the body, thereby elevating the incidence of rhabdomyolysis.
4. The changes in extracellular ATP in cardiomyocytes under pressure overload in vivo (2021-2023) - Basic research (T1 Phase)
   - Developed a novel biological probe using genetic engineering and viral vector technology to achieve real-time visualization of extracellular ATP.
   - Provided the first in vivo evidence linking dynamic changes in extracellular ATP to inflammation during pressure overload-induced cardiac remodeling
   - Revealed that the inducible nuclear protein IκBζ plays a pivotal role in the transition from adaptive to maladaptive cardiac hypertrophy during pressure overload
   - Demonstrated that the NLRP3 inflammasome activation through the heart-brain interaction contributes to adaptive cardiac hypertrophy during pressure overload
5. The roles of RNA-binding proteins in heart failure - Basic research (T1 Phase)
   - Employing molecular biology techniques including pooled library screening, RNA sequencing (omics), genetic engineering (e.g., viral vectors), and cell culture
   - Utilizing in vivo animal models (e.g., pressure overload) to study cardiac remodeling and test therapeutic interventions
   - Aiming to identify novel RNA-binding proteins and pathways involved in heart failure pathogenesis and explore them as potential therapeutic targets

SKILLS

1. Clinical & Research Techniques
   - Echocardiography (Speckle Tracking, Doppler)
   - Cardiopulmonary Exercise Testing
   - Clinical Trial Design & Management (RCT)
   - Animal Models (Pressure Overload & MI)
   - Molecular Biology (Pooled Library Screening, Cloning, Viral Vectors, qPCR, Western Blot, Cell Culture)
   - Immunohistochemistry

2. Bioinformatics & Computational Skills
    - NGS Data Analysis Expertise: Design and analysis for RNA-seq, scRNA-seq, ChIP-seq, CLIP-seq, RIP-seq, Ribo-seq.
    - Transcriptome Analysis: Differential expression, alternative splicing (rMATS, Piranha), functional enrichment, pathway analysis.
    - Single-Cell Analysis: Workflow familiarity.
    - Interaction & Epigenomics Analysis: Peak calling, motif analysis (ChIP-seq, CLIP-seq, RIP-seq).
    - Translation Analysis: Ribosome profiling data interpretation (Ribo-seq).
3. Data Analysis & Statistics
    - Statistical Methods: ANCOVA, Multiple Linear Regression, t-tests, ANOVA, etc.
    - Clinical & Experimental Data: Analysis of RCT and laboratory data.
    - Advanced Modeling Knowledge: Ridge Regression, LASSO, GLMM.
    - Statistical Software: SPSS, R, Python
4. Languages
    - Chinese (Native)
    - English (Fluent)
    - Japanese (Fluent).
5. Professional Skills
    - Translational Research (T1 & T2)
    - Project Management
    - Scientific Writing
    - Presentation Skills
    - Cross-functional Communication
    - Problem-Solving
    - Planning & Organization, Persistence.

PUBLICATIONS

1. **Liu W**, Higashikuni Y, Sata M. Chronobiological rhythms and artificial light at night in vascular physiology and pathology. Hypertens Res. 2024 Dec 04.
2. Higashikuni Y, **Liu W**, Sata M. Nocturnal blood pressure and left ventricular hypertrophy in patients with diabetes mellitus. Hypertens Res. 2023 Dec 26.
3. Higashikuni Y, **Liu W**, Sata M. Self-DNA sensing in cigarette smoke-induced vascular inflammation: the role of mitochondrial DNA release in vascular endothelial cells. Hypertens Res. 2023 Dec 19.
4. Higashikuni Y, **Liu W**, Sata M. Not a small frog in a big pond: targeting bradykinin receptor B2 signaling in vascular smooth muscle cells for treatment of hypertension. Hypertens Res. 2023 Jul 28.
5. **Liu W**, Higashikuni Y, Sata M. Optimizing antihypertensive therapy in patients with diabetes mellitus. Hypertens Res. 2023 Mar;46(3):797-800
6. Higashikuni Y, **Liu W**, Numata G, Tanaka K, Fukuda D, Tanaka Y, Hirata Y, Imamura T, Takimoto E, Komuro I, Sata M. NLRP3 Inflammasome Activation Through Heart-Brain Interaction Initiates Cardiac Inflammation and Hypertrophy During Pressure Overload. Circulation. 2023 Jan 24;147(4):338-355.

7. **Liu, W**., Higashikuni, Y., & Sata, M. (2022). Linking RNA dynamics to heart disease: The lncRNA/miRNA/mRNA axis in myocardial ischemia–reperfusion injury. Hypertension Research, 45(6), 1067-1069.
8. Higashikuni, Y., **Liu, W**., & Sata, M. (2022). Give a leg up: Screening for peripheral artery disease after acute myocardial infarction. Journal of Atherosclerosis and Thrombosis, 29(7), 989-991.
9. Higashikuni, Y., **Liu, W**., Obana, T., & Sata, M. (2021). Pathogenic basis of thrombo inflammation and endothelial injury in covid-19: Current findings and therapeutic implications. International Journal of Molecular Sciences, 22(21)
10. **LIU Wenhao**, SHI Liu, LI Bin & LIU Yu. (2020). Non-diastolic mechanisms of exercise intolerance in heart failure with preserved ejection fraction. Journal of Clinical Cardiology (12),1150-1154.
11. LI Bin, **LIU Wenhao**, LI Xuesong, SHI Liu, GU Shaoke, ZHAO Yangyang & MAO Jingyuan. (2020). Using Speckle Tracking Imaging to Evaluate the Left Ventricular Systolic Function of Heart Failure with Preserved Ejection Fraction by Treatment of YangyinShuxin Decoction. Chinese Journal of Integrated Traditional And Western Medicine (09),1064-1069.
12. **LIU Wenhao** & LI Bin. (2019). Rhabdomyolysis associated with bezafibrate therapy: a case report. Chinese Circulation Journal (08),828-829.

CONFERENCE PRESENTATIONS

1. **W. Liu**, Y. Higashikuni, T. Obana et al. "The DEAD-box RNA helicase Ddx41 contributes to adverse cardiac remodeling during pressure overload through modulation of RNA metabolism" AHA Scientific Sessions 2023, Nov 11-13, poster presentation.
2. **W. Liu**, Y. Higashikuni, T. Hirata et al. "The DEAD-box RNA helicase Ddx41 contributes to adverse cardiac remodeling induced by pressure overload through modulation of RNA metabolism" The 88th Annual Scientific Meeting of the Japanese Circulation Society (JCS2024) 2024, Mar 8-10, poster presentation.
3. **W. Liu**, Y. Higashikuni, T. Hirata et al. "Rbm15b is an RNA-binding protein that protects against adverse cardiac remodeling during pressure overload" The 88th Annual Scientific Meeting of the Japanese Circulation Society (JCS2024) 2024, Mar 8-10, poster presentation.
4. **W. Liu**, Y Higashikuni, Y Hirata, M Sata, T Matsumura, N Takeda. "N6-methyladenosine regulator Rbm15b protects against adverse cardiac remodeling under pressure overload" ISHR 2024, 2024, Dec 11-13, poster presentation.