

# Lingmin Lin

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## Education

### Tianjin Medical University

Department of Neurology, Tianjin Neurological Institute, Tianjin Medical University General Hospital

Master's /Bachelor's Degree (joined program)

Aug. 2013-Jun. 2020

Major: Clinical Medicine (Neurology)

GPA: 3.5/4.0 (86/100)

Thesis title: The genetic causality study of serum 25OHD and FGF23 levels on ischemic stroke

## Working Experiences

- Department of Rehabilitation Medicine, First Affiliated Hospital, College of Medicine, School of Brain Science and Brain Medicine, Zhejiang University, Zhejiang, China.

**Research Assistant**

Aug. 2020-Apr. 2022

- Department of Rehabilitation Medicine, Hongji Hospital, Zhejiang, China

**Physician**

May. 2022-Jun. 2023

## Publications and Patents

1. Zuo Y<sup>#</sup>, Ye J<sup>#</sup>, Cai W, Guo B, Chen X, **Lin L**, et al. Controlled delivery of a neurotransmitter-agonist conjugate for functional recovery after severe spinal cord injury. *Nat Nanotechnol.* 2023 Jun 12.
2. Cao J<sup>#</sup>, Wu J<sup>#</sup>, Mu J, **Lin L**, Zhang X, Huang T, et al. ROS filter coating scaffold protects 3D mesenchymal stem cell spheroids for dual-phase treatment of spinal cord injury. *Chem Eng J.* 2023;462:142192.
3. Fang A<sup>#</sup>, Wang Y<sup>#</sup>, Guan N<sup>#</sup>, Zuo Y, **Lin L**, Guo B, Cai W, et al. Porous microneedle patch with sustained delivery of extracellular vesicles mitigates severe spinal cord injury. *Nat Commun* (under consideration)
4. **Lin L**<sup>#</sup>, He Z<sup>#</sup>, Zhang T<sup>#</sup>, Zuo Y, Chen X, Abdelrahman Z, et al. A biocompatible two-photon absorbing fluorescent mitochondrial probe for deep in vivo bioimaging. *J Mater Chem B.* 2022;10(6):887-98.
5. Zheng K<sup>#</sup>, **Lin L**<sup>#</sup>, Jiang W, Chen L, Zhang X, Zhang Q, et al. Single-cell RNA-seq reveals the transcriptional landscape in ischemic stroke. *J Cereb Blood Flow Metab.* 2022;42(1):56-73.
6. Zheng K<sup>#</sup>, **Lin L**<sup>#</sup>, Cui P, Liu T, Chen L, Yang C, et al. Association of Fibroblast Growth Factor 23 With Ischemic Stroke and Its Subtypes: A Mendelian Randomization Study. *Front Genet.* 2020;11:608517.
7. **Lin L**<sup>#</sup>, Liu K<sup>#</sup>, Feng H<sup>#</sup>, Li J, Chen H, Zhang T, et al. Glucose trajectory prediction by deep learning for personal home care of type 2 diabetes mellitus: modeling and applying. *Math Biosci Eng.* 2022;19(10):10096-107.
8. Wang X, He S, Chen Z, Fang A, **Lin L**, He Z, et al. The fabrication and application of a photoinitiator. Zhejiang University. **Patent** CN114644561A
9. Wang X, He S, Chen Z, **Lin L**, Si K, Gong W, et al. The synthesis and application of a carboxylate two-photon dye with a bone of fluorene ring. Zhejiang University. **Patent** CN114644836A

## Professional skills

- **Dry lab skills:** Biostatistics, MATLAB/R/python programming; Electrophysiology (EEG/EMG signal analysis), quantitative analysis of animal behaviors (like kinetics), Mendelian randomization/single cell analysis, deep learning in blood glucose prediction (LSTM/RNN, health management)
- **Wet lab skills:** Animal care and surgery (certificated, including **stereotaxic surgery**), histological and confocal techniques (**imaging techniques**), cell culture, cell separation (e.g., flow cytometry), biochemistry (like ELISA, WB, & PCR), etc.
- English: IELTS 6.5 (all  $\geq 6.0$ ), GRE (167+150, 3.0)

## Main Research Projects

### **In vivo electrophysiology and quantitative behavior recording & analysis (EMG-EEG)**

(Supervised by Prof. Xuhua Wang)

Oct. 2020-Apr. 2022

- Participated in three projects requiring in vivo electrophysiological data with two articles published (*Chem Eng J.* 2023; *Nat Nanotechnol.* 2023; *Nat Commun.*, under consideration), as well as two patents
- Established in vivo EMG implantation and EEG monitoring methods
- Developed skills: Electrophysiology, behavioral analysis, further in animal care and surgery; advanced use of **MATLAB** and Python in signal processing and visualization and R in biostatistics

### **Two-photon mitochondrial probe (FO2) study**

Sep. 2020-Dec.2021

(Supervised by Prof. Xuhua Wang, Dr. Zuobin Chen)

- Designed and accomplished the project with a published article (*J Mater Chem B.* 2023) and a patent
- Investigated the characteristics of a mitochondria probe FO2 ex vivo and in vivo
- Developed skills: mice stereotaxic injection, cell culture, microscope imaging technologies like two-photon imaging; one-dimensional signal and two-dimensional image analyses (MATLAB)

### **Single-cell analysis of MCAO stroke model (Single-cell)**

Sep. 2018-Dec. 2019

(Supervised by Dr. Junwei Hao)

- Participated in the project with a published article (*J Cereb Blood Flow Metab.* 2022)
- Co-investigated the further landmarks of microglia with distinct genetic landmarks for ischemic stroke
- Developed skills: Immunohistology, ELISA, Flow cytometry, PCR, WB, single-cell analysis, etc.;

### **Causal inference of FGF23 and ischemic stroke (FGF23)**

Dec. 2019-Apr. 2020

(Supervised by Dr. Junwei Hao, Prof. Guiyou Liu)

- Designed and accomplished the project as the master's thesis with a published article (*Front Genet.* 2020)
- Discovered another explanation for the association between vitamin D and ischemic stroke, by introducing the causality of FGF23 and large atherosclerotic stroke through Mendelian randomization framework
- Developed skills: Mendelian randomization; Developed R in bioinformatics

### **Diabetes glucose prediction and health management based on deep learning (DLDM)**

(Supervised by Prof. Jiarui Si, Dr. Jin Li)

May. 2017-May. 2018

- Designed and accomplished the project with the help of other students, finally published an article (*Math Biosci Eng.* 2022)
- Used the LSTM framework to predict the following glucose trajectory for type 2 diabetic patients to facilitate self-management.
- Developed skills: Clinical trial steps; deep learning frameworks (e.g., LSTM-RNN) in Python

## Honors and Awards

- Dec. 2015, Tianjin Medical University, Scientific research projects for college students in the School of Basic Medical Sciences, The third prize.
- Jun. 2015, The IV **physics competition** of college students in Tianjin, Municipal first prize.
- Jul. 2014, The **mathematics competition** of college students in Tianjin, Municipal first prize of Humanities and Medicine class.
- Jun. 2017, Tianjin Medical University, School scholarship of the 2015-16 school year, The third prize.
- Nov. 2016, The Games of the III Tianjin Climbing, Memorial Award.
- Sep. 2015, Tianjin Medical University, Excellent member of the Department student union.
- Jun. 2014, China Foundation for Poverty Alleviation, the Excellent service provider.