Yuqian Li

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• Google Scholar: https://scholar.google.com/citations?user=DzzW7r0AAAAJ.

EDUCATION

Xuanwu Hospital, Capital Medical University, Beijing, China 09/2021 - 06/2024
Master of Science in Neurobiology
Core Courses *(Biomedical aspects)*:
Neurobiology, Flow Cytometry, Animal Cell Culture, Histochemistry, Biostatistics, etc.

Shenyang University of Chemical Technology, Shenyang, China 09/2016 - 06/2020
Bachelor of Engineering in Applied Chemistry
Core Courses *(Chemical aspects)*:
Organic Chemistry; Inorganic Chemistry; Analytical Chemistry; Spectral Analysis; Principles of Chemical Engineering, etc.

VISITING EXPERIENCES

Girton College, University of Cambridge, Cambridge, UK 07/2023 - 08/2023
Neurobiology Summer School
Core Courses *(Neuroscience aspects)*: Synaptic Plasticity; Sensory System; Somatosensory Processing and Pain, etc.

Irkutsk National Research Technical University, Irkutsk, Russia 07/2017 - 08/2017
Biochemistry Summer School
Core Courses: Irkutsk Traditional Culture and Religion of Baikal Region; Ecological Environment of Lake Baikal, etc.

PLATFORM DEVELOPMENT

cSVD Subtype Validation Index Platform for Subtype-Specific cSVD Profiling
Abstract: Develope a multi-dimensional classification framework for cSVD subtyping.
Pipeline*(planned roadmap v1.0-3.0, 2026; validated across GEO/UKBB/INSVD subsets)***:**
GEO dataset extraction, Vascular cell subpopulation selection, Multi-source cSVD Subtype Validation Index (Ver.1.0 to 3.0), UMAP/ROC-based feature validation, GO/KEGG enrichment, INSVD calibration, Subtype-specific ROC refinement, Modular tag output by phenotype (Genetic / Chronic / Acute / Else), and matrix-based cross-validation.

REGISTERED INTELLECTUAL PROPERTY

Software Copyright Registration Certificate No. (China): 2025SR1455217
- ***scRNA-seq Analysis Software for Cell-Subpopulation Heterogeneity Following TBI***

Abstract: Designed customized pipelines for transcriptomic data processing in neuroinflammatory models.
Pipeline*(Published in J Neuroimmune Pharmacol, Mol Neurobiol, etc.)***:**
Package management, Batch normalization, Group selection, Data import, Cluster annotation, Group comparison, GO/KEGG enrichment analysis, Cell-cell interaction, Trajectory inference, Visualization, RNA velocity (Linux only).

Software Copyright Registration Certificate No. (China): 2025SR1628110
- ***Integrated Small Molecule Sensing Protein Platform for Protein Engineering***

Abstract: Developed automated workflows for receptor–ligand docking, dynamics simulations, and protein modification.
Pipeline*(Delivered containerised workflow in Olfactory Perception Project)***:**
Alphafold3, Diffdock-L, Molecular Dynamics(Gromacs), MMPBSA, Prodigy-lig, etc.

Work Copyright Registration Certificate No. (China): 渝作登字-2025-L-00704028
- ***Research Framework of scRNA-seq Analysis on TBI***

Abstract: Comprehensive framework for analyzing single-cell transcriptomic heterogeneity in TBI models.
Objective: The spatiotemporal and severity-dependent cellular heterogeneity across different brain regions following traumatic brain injury (TBI) remains poorly characterized. To address this gap, we utilized the GEO database for analysis.

Work Copyright Registration Certificate No. (China): 渝作登字-2025-L-00699626
- ***Research Design Diagram of the Small Molecule Sensing Protein Platform***

Abstract: Original conceptual design of a synthetic receptor-based sensing platform and workflow.
Objective: Olfactory function is essential for sensory perception, but the individual variability poses challenges for direct access. Based on these insights, we aim to develop an artificial pathway to modulate olfactory function.

Work Copyright Registration Certificate No. (China): 渝作登字-2025-L-00699654
- ***GN Cell Mechanism and Electrode Implantation Recovery Map (non-public version)***

Abstract: This work proposes and visualizes a novel Glia-Neuron (GN) intermediate cell population and its mechanism of action in post-electrode implantation recovery, based on single-nucleus transcriptomic analysis.
Objective: To construct an original cellular trajectory and communication map that explains GN cell emergence and its regulatory role in neural-glial remodeling following brain electrode implantation.

SELECTED PRESENTATION & CONFERENCE

3rd International Qi-Blood Conference and the 8th Chinese Microcirculation Week 09/2024

- ***Excellent Young Investigator Presentation (6 selected from 500+ participants)***

Topic: Presented translational insights into post-stroke neuroinflammation and vascular remodeling.

PROFESSIONAL EXPERIENCES

Bioinformatics Consulting for Translational Projects 06/2025 - Present

- ***Provide PhD-level analytics support across Medical Sciences and Biomedical Engineering.***

Scope:

Study Design; Research Pipeline Construction; Statistical Modelling; Visualisation; Methods Documentation (Python/R/Docker; containerised environments).

Project 1: BCI-induced neural plasticity *(School of Biomedical Engineering, Tsinghua university)*:

Methods: Mouse snRNA-seq

Delivered an end-to-end analysis pipeline (QC, integration, trajectory inference) within 8 weeks. Produced manuscript and methods documentation that supported the candidate's thesis analyses.

Project 2: Albumin-mediated VLDL signalling *(School of Life Sciences, Tsinghua university)*:

Methods: Mouse scRNA-seq

Designed the analysis framework and implemented the initial pipeline (QC, clustering, pathway enrichment). Project ongoing, with handover documentation provided.

Department of Neurology, Peking University People's Hospital 05/2025 - Present

- ***Research Collaborator (Part-time)***

Objective *(Essential Tremor research)*:

To investigate the functional effects of transcranial magnetic stimulation (TMS) in patients with Essential Tremor compared to healthy controls, and to identify potential molecular targets through single-cell RNA sequencing (scRNA-seq).

Methods: Utilized scRNA-seq, mouse models, qPCR, diffusion tensor imaging (DTI), and immunofluorescence staining.

Current Progress *(Experiment phase)*:

Functional brain imaging localized altered activity in specific regions of tremor patients. Parallel scRNA-seq analysis of relevant brain tissues revealed distinct gene expression signatures, potentially implicating novel therapeutic targets.

School of Biomedical Engineering, Tsinghua University 05/2024 - 05/2025

- ***Research Assistant***

Objective 1 *(Neural flexible electrode)*:

Investigated the long-term neuroimmune response to flexible versus rigid neural electrodes in vivo.

Methods: Implanted flexible and rigid electrodes in wild-type mice and assessed neuronal and glial responses after one month using histological and functional analyses.

Key Results *(Manuscript In Preparation)*:

Found that flexible electrodes supported recovery of neuronal function, while rigid electrodes primarily promoted synaptic plasticity, accompanied by glial scarring.

Objective 2 *(Modification of olfactory receptors)*:

Developed a biosensor system to enhance odor recognition through targeted receptor modification.

Methods: Implanted AAV vectors encoding engineered receptor constructs into the mitral/tufted cell layer and olfactory epithelium, and optimized detection strategies for volatile compounds.

Key Results *(Published as Intellectual Property)*:

Established a functional biosensor capable of modifying mucosal epithelial neuron odor receptors to selectively detect target odors in complex environments.

Chinese Institute for Brain Research, Beijing 06/2023 - 07/2023

- ***Intern***

Objective *(PNS research)*: Investigated the neural circuits and molecular mechanisms underlying sensory-induced behavioral changes using optogenetic and chemogenetic modulation in mice.

Methods: Performed stereotaxic AAV injections targeting the thalamus and hippocampus, followed by optical fiber and DCZ stimulation. Conducted Go/No-Go behavioral assays and neuroelectrophysiological recordings. Collected whole-brain and trigeminal nerve samples for downstream analysis.

Bullet Points:

Identified specific neuronal pathways transmitting thalamic signals to cortical and peripheral somatosensory regions, elucidating mechanisms of behavior modulation by targeted stimulation.

State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, CAMS 08/2021 - 09/2021

- ***Intern***

Objective *(IL-2Ra research)*:

Investigated the relationship between macrophage, lymphocyte and neuroinflammatory recovery in transgenic mice.

Methods: Isolated bone marrow-derived macrophages for single-cell RNA sequencing. Collected peripheral blood to assess cytokine profiles and inflammatory signaling pathways.

Bullet Points:

Found reduced cytokine expression and attenuated inflammatory signaling, indicating improved immune recovery.

RESEARCH EXPERIENCES

National Natural Science Foundation of China: Project No. 82071314

The role and mechanism of the HDAC2 transcription complex in regulating IL-2/sIL-2R balance mediating CD4⁺ T lymphocyte transdifferentiation in ischemic stroke Participated

Objective: Investigate the role of IL-2/IL-2 receptor pathways in modulating immune responses and recovery following IS.

Methods:

Applied single-nucleus RNA sequencing, gene knockout mouse models, qPCR, DTI imaging, electrophysiology, and immunofluorescence to assess Treg proliferation, $CD8^+$ T cell infiltration, and white matter integrity.

Key Results *(Published in J Neuroimmune Pharmacol, Cytokine Growth Factor Rev, etc.)*:

Demonstrated that IL-2RA knockout improved sensory and motor recovery by reducing white matter damage, supporting IL-2/IL-2RA as potential biomarkers for early diagnosis and prognosis in ischemic stroke.

National Natural Science Foundation of China: Project No. 82271309

The mechanism of IL-2RA regulating the remodeling of thalamic-cortical junction after cerebral ischemia by targeting specific astrocyte subtypes through the autocrine pathway Participated

Objective: Investigated the differentiation of mouse myeloid immune cells and evaluated IL-2 signaling in Treg subsets.

Methods:

Analyzed immune cell lineage development and Treg subset activation influenced by inflammatory cytokines. Reviewed the potential clinical applications of IL-2 mutants as biomarkers for prognosis in immune-related diseases.

Key Results *(Published in J Neuroimmune Pharmacol, Cytokine Growth Factor Rev, etc.)*:

Identified key pathways linking IL-2-mediated regulation of Treg differentiation to peripheral immune modulation, supporting the potential of IL-2 mutants as diagnostic and prognostic biomarkers.

National Natural Science Foundation of China: Project No. 81771260

The effect and mechanism of rapid, selective intraarterial hypothermia on ischemia-reperfusion injury in rhesus monkeys with acute ischemic stroke (IS) Participated

Objective: Examine the plasma miRNA associated with IS in rhesus monkeys to identify potential therapeutic targets.

Methods:

Performed differential expression analysis and clustering of circulating miRNAs pre-ischemia and post-ischemia. Focused on miRNAs that sharing target genes related to neurovascular injury and repair.

Key Results *(Published in Front Neurosci)*:

Identified mml-let-7g-5p and let-7g-3p_1ss22CT as oppositely regulated miRNAs targeting RB1CC1, GNG5, and CXCR4, suggesting mml-let-7g as a potential therapeutic target for ischemic stroke.

National Natural Science Foundation of China: Project No. 22172085

Electrochemical bimodal neural interface and its stability in living environment Participated

Objective: Evaluate hippocampal cellular responses to flexible versus rigid neural electrode implantation in mice.

Methods: Conducted scRNA-seq and immunofluorescence to analyze cell type composition and gene expression.

Key Results *(Manuscript In Preparation)*:

Discovered a transitional cell population between oligodendrocytes and neurons associated with electrode type.

PUBLICATION & MANUSCRIPT

- Li X, Geng X, Fan J, Yan F, Wang R, Yang Z, **Li Y**, Wang J. Molecular Mediators of Neutrophil Primary Granule Release Following Acute Ischemic Stroke and their Associated Epigenetic Modulation by HDAC2. ***Mol Neurobiol.*** ***Q1, DOI: 10.1007/s12035-025-04699-7*** 01/2025 **(IF: 4.6)**
- **Li Y#**, Jiang Q#, Geng X, Zhao H. The High-Affinity IL-2 Receptor Affects White Matter Damage after Cerebral Ischemia by Regulating $CD8^+$ T Lymphocyte Differentiation. ***J Neuroimmune Pharmacol.*** ***Q1, DOI:10.1007/s11481-025-10169-7*** 01/2025 **(IF: 5.2)**
- **Li Y#**, Li X#, Geng X, Zhao H. The IL-2A receptor pathway and its role in lymphocyte differentiation and function. ***Cytokine Growth Factor Rev.*** ***Q1, DOI:10.1016/j.cytogfr.2022.06.004*** 10/2022 **(IF: 17.6)**
- Chen J, Zhao H, Huang Y, **Li Y**, Fan J, Wang R, Han Z, Yang Z, Wu L, Wu D, Luo Y, Ji X. Dysregulation of Principal Circulating miRNAs in Non-human Primates Following Ischemic Stroke. ***Front Neurosci***. ***Q2, DOI:10.3389/fnins.2021.738576*** 08/2021 **(IF: 5.1)**

CERTIFICATES & AWARDS

• **Summer Exchange Student Excellence Award**	Xuanwu Hospital, CCMU, China	08/2023
• **Summer Exchange Student Project Certificate**	Girton College, University of Cambridge, UK	08/2023
• **Academic Scholarship**	Xuanwu Hospital, CCMU, China	2021 - 2024
• **Laboratory Animal Practitioner Qualification**	Experimental Animal Training Center, China	09/2021
• **Summer Exchange Student Excellence Award**	Irkutsk State University, Russia	09/2017

LANGUAGE PROFICIENCY & SKILLS

Languages: Mandarin(Native), English (Proficient; IELTS expected by Dec 2025), Russian (Conversational)

Biomedicine Skills: scRNA-seq, AAV design, ELISA, WB, qPCR, MCAO model, Electrophysiology, Flow cytometry, etc.

Computational Skills: R, Python, AutoDock, Gromacs, DiffDock, fMRI Analysis, Computer-Aided Drug Design, etc.

RESEARCH INTERESTS

- Molecular mechanisms of cerebral small vessel disease (cSVD).
- Multi-omic data integration and Clinical-based disease subtyping.