Miao Li

Professor Miao Li is a neurosurgeon affiliated with the Department of Neurosurgery at the China-Japan Union Hospital of Jilin University, located in Changchun, China. With a robust background in both clinical practice and academic research, Professor Li has made significant contributions to the field of neurosurgery.

Latest Publication

Experimental research studies

Wang et al and the neurosurgeon Miao Li from the China-Japan Union Hospital of Jilin University in a experimental research study investigated the possible functions of AQP3 in peripheral nerve rehabilitation based on AQP3-deficient mice.

Mature 8-week-old female AQP3-deficient (AQP3-/-) mice and C57BL/6 mice initially weighing 25~30 g were used in this study. Schwann cells were isolated from sciatic nerves of WT and AQP3-/- mice, respectively. AQP3 mRNA and protein expression in sciatic nerve tissues and Schwann cells were detected by RT-PCR, immunoblot analysis, and immunofluorescence staining. Sciatic nerve cross sections from the WT and AQP3-/- mice were stained by a toluidine-blue agent to identify the potential influence of AQP3 deficiency on the morphology of nerve fibers. The proliferation and migration ability of AQP3-/- and WT Schwann cells were observed in primary cell cultures. To explore the possible role of AQP3 in nerve repair processes, sciatic nerve contusion models were established, and walking track analysis was performed on both WT and AQP3-/- mice.

AQP3 was localized in the membrane of Schwann cells. AQP3 deficiency did not alter the morphology of fibers in the sciatic nerve. There was an increase in AQP3 protein expression in the sciatic nerve of wild-type mice after injury. Primary culture of Schwann cells and in vitro wound healing model revealed that AQP3-deficient Schwann cells exhibited the same morphology, while showing lower proliferation and migration ability compared with wild-type Schwann cells. There was an obvious delay in motor function rehabilitation in AQP3-deficient mice compared with that of wild-type mice.

The study suggested that AQP3 is localized in the membrane of Schwann cells and facilitates Schwann cells' proliferation and migration. AQP3 deficiency impaired nerve rehabilitation in the wound healing model, both in vitro and in vivo. The study supports the hypothesis that AQP3 participates in myelin damage and repair, and the mechanisms underlying AQP3 in the field of myelin repair and regeneration in peripheral nerves deserve further investigation and exploration in detail [1)]

This preclinical study investigates the role of **Aquaporin-3 (AQP3)** in **peripheral nerve regeneration** using AQP3-deficient ($AQP3^{-/-}$) and wild-type (WT) mice in a **sciatic nerve contusion model**. The authors analyze Schwann cell behavior and functional recovery to assess how AQP3 deficiency influences nerve healing.

✅ Strengths

- **Clear Hypothesis**: Explores a novel role of AQP3 in nerve repair.
- **Robust Design**: Combines _in vivo_ and _in vitro_ experiments with molecular and functional techniques (RT-PCR, immunostaining, walking track).
- **Biological Significance**: Shows that AQP3 is involved in Schwann cell migration and regeneration.

⚠ Limitations

- **Lack of Mechanistic Insight**: No exploration of molecular pathways affected by AQP3.
- **Narrow Model**: Only contusion injuries studied; no comparison with other injury types (e.g., crush, transection).
- **Sex Bias**: Only female mice were used.
- **Limited Functional Testing**: No electrophysiology to confirm functional deficits.
- **Translational Gap**: No data supporting the potential for clinical translation or pharmacological modulation of AQP3.

🧠 Conclusion

This study provides promising evidence that **AQP3 facilitates Schwann cell function and nerve regeneration**. It opens new research lines in molecular neurorehabilitation but lacks mechanistic depth and broader model validation. Future research should explore:

- AQP3-regulated signaling pathways
- Sex and age variation
- Additional functional readouts
- Pharmacological manipulation of AQP3

👤 Professional Profile

Position: Professor, Department of Neurosurgery

Institution: China-Japan Union Hospital of Jilin University

Location: Changchun, Jilin Province, China

Contact: limiao@jlu.edu.cn

🔬 Research Contributions

Professor Li has been actively involved in research focusing on various aspects of neurosurgery, including:

Cerebrovascular Disorders: Investigating risk factors associated with transient cortical blindness following cerebral angiography. PubMed

Spinal Cord Pathologies: Co-authoring studies on longitudinally extensive transverse myelitis associated with Mycobacterium tuberculosis infection.

Neuroimaging and Surgical Techniques: Advancing three-dimensional computed tomography reconstruction-guided stereotactic aspiration methods for pontine hemorrhage.

Selected Publications

Risk Factors of Transient Cortical Blindness After Cerebral Angiography: A Multicenter Study Frontiers in Neurology, 2019. This study analyzes the incidence and risk factors of transient cortical blindness post-cerebral angiography across multiple centers.

Longitudinally Extensive Transverse Myelitis with Mycobacterium Tuberculosis Infection Acta Neurologica Belgica, 2023. A case report detailing the presentation and management of transverse myelitis linked to tuberculosis infection.

Three-Dimensional Computed Tomography Reconstruction-Guided Stereotactic Aspiration of Pontine Hemorrhage: A Case Report International Journal of Clinical and Experimental Medicine, 2019. This case report discusses the application of 3D CT-guided stereotactic techniques in treating pontine hemorrhage.

Professional Affiliations

Loop (Frontiers): Professor Li maintains a professional profile on Loop, the research network by Frontiers, highlighting her contributions to the field.

Professor Miao Li's extensive experience and research in neurosurgery underscore her commitment to advancing medical knowledge and improving patient outcomes in neurological care.

Latest PubMed

- Programmed intermittent bolus for erector spinae plane block versus intercostal nerve block in minimally invasive direct coronary artery bypass surgery: a randomized controlled trial
- Outcomes and safety of repeated microvascular decompression for recurrent trigeminal neuralgia
- Evaluation of cerebral blood flow after subarachnoid hemorrhage using near-field coupling and machine learning
- Delayed peripheral nerve rehabilitation in aquaporin-3 deficiency in mouse models of sciatic nerve contusion
- Comparative effectiveness of monotherapy vs. combination therapy for postoperative central nervous system infections in neurosurgical patients: a retrospective cohort study
- Closing the loop: autonomous intelligent control for hypoxia pre-acclimatization and high-

altitude health management
- A zinc transporter drives glioblastoma progression via extracellular vesicles-reprogrammed microglial plasticity
- Baicalein ameliorates cognitive decline induced by chronic cerebral hypoperfusion through the SIRT1-mediated Notch1 pathway to improve angiogenesis and suppress neuroinflammation

1)

Wang J, Li S, Huang H, Wang Y, Li M. Delayed peripheral nerve rehabilitation in aquaporin-3 deficiency in mouse models of sciatic nerve contusion. Neuro Endocrinol Lett. 2025 Apr 28;46(1):49-57. Epub ahead of print. PMID: 40319457.