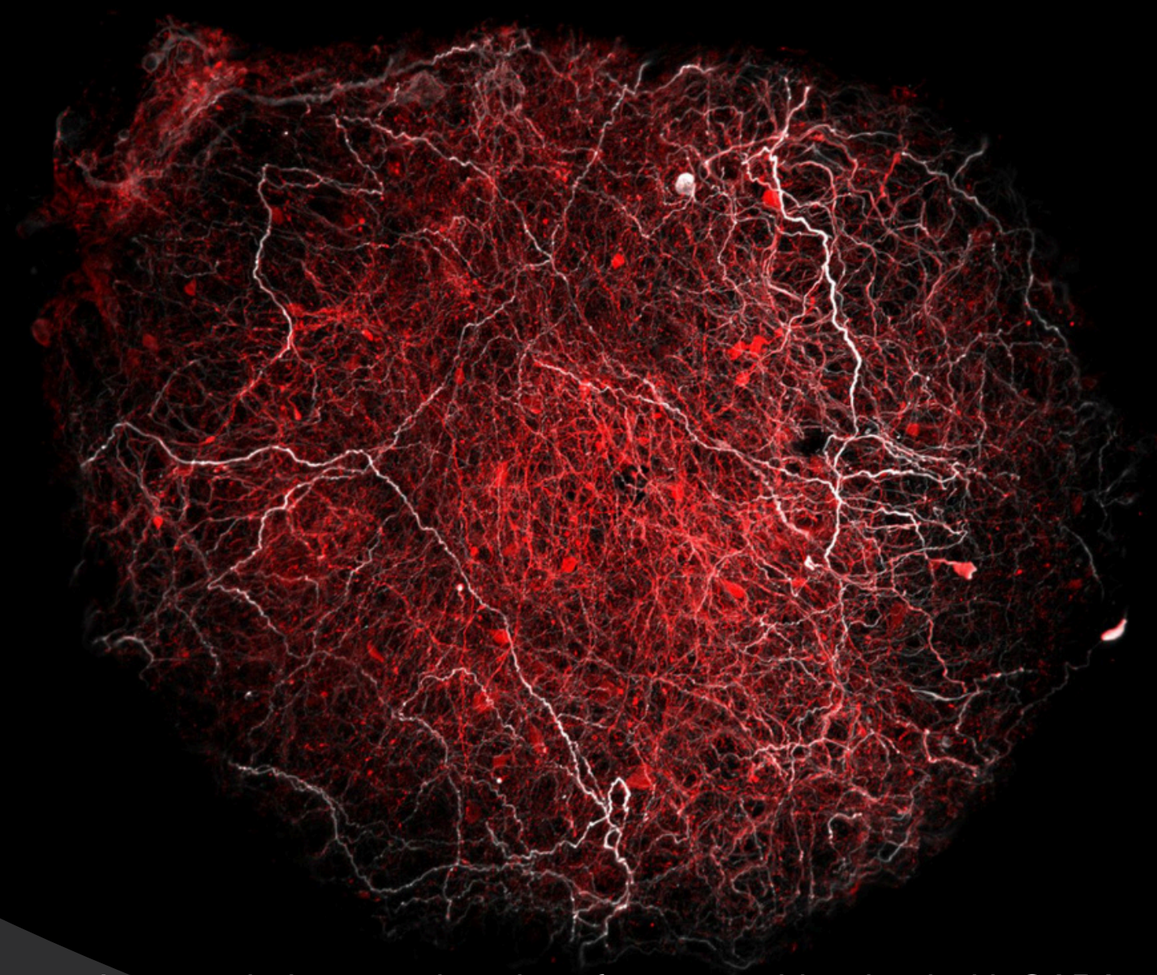

Image: whole mount imaging of an organoid stained with GABA
Courtesy of Dr Selin Pars

ASSOCIATE PROFESSOR
LATA VADLAMUDI
SENIOR STAFF SPECIALIST, NEUROLOGY, RBWH

METRO NORTH CLINICIAN RESEARCH FELLOW 2021-2025

Precision medicine approaches to improve epilepsy care

Epilepsy is a serious and common neurological condition, characterised by seizures, affecting more than 50 million people worldwide. This research is driven by the need to improve patient care evidenced by the tumultuous journey our patients face when current anti-seizure medications are not effective (around 30%); the diagnostic odyssey when attempting to find a cause; and the need to better understand the complex role hormones play.

This program of research had three aims:

1. Create a neurogenomics service in Queensland
2. Utilise a patient-specific in-vitro brain organoid model to inform anti-seizure medication selection for drug-resistant epilepsy patients and utilise this model for drug discovery
3. Focus on women with epilepsy and the unique challenges they face with fluctuating hormonal levels and the complex interplay with epilepsy

For details on more of our Clinician Research Fellows visit
metronorth.health.qld.gov.au/research/support/grants/crf

Metro North Health | Queensland Government

Research Impact

The roadmap for creating a neuro-genomics service was to advance knowledge by optimising genomic diagnosis and precision-based treatment. With the increasing breath of genomic information, this model will enable a collaboration of expertise for maximal patient outcomes, optimize choice of genetic testing based on the phenotypic assessment, ensure optimal patient informed consent and adequate return of results process.

The development of a patient-specific brain organoid model will fundamentally change epilepsy clinical practice from the current trial-and-error drug approach to a personalised evidence-based strategy. This model has then led to the opportunity for drug discovery in genetic epilepsies with venom peptide research. Importantly it will improve quality of life for drug-resistant epilepsy patients through effective and faster seizure control, thus reducing the economic and societal burden of epilepsy.

The Women with Epilepsy in Later Life (WELL) study is investigating the hidden burden of epilepsy. The health and social impacts are the overarching outcomes for this project with the development of evidence-based practice and consumer guidelines. The new knowledge gained from this project and future global collaboration will inform more targeted research, to enable consistency and equity of care for all women with epilepsy.

Reflections

I sincerely thank Metro North Health for enabling me to have this opportunity to dream and put my research aspirations into action. The four years have built my confidence as a researcher, and I hope the momentum generated will enable this research to continue to grow and improve outcomes for patients with epilepsy.

It was an amazing opportunity, and I feel very privileged that Metro North believed in me and enabled this dedicated research time, giving me the capacity to be Chief investigator on four MRFF grants and obtaining a Queensland Health Clinical Research Fellowship.

I'm so grateful to have had the time to foster many new collaborations, it was so great to work with enthusiastic people with the same vision, to improve outcomes. This includes clinicians from around the world, basic scientists, consumer advocacy and support groups. Building connections with basic scientists has been a highlight, each bringing something different to the table. This two-sided synergy is what makes our collaborations so strong and fun!!

I have had some incredible new opportunities to share the findings with a broader audience;

- TV coverage of venom peptide research
- ABC live TV coverage of women with epilepsy research
- writing a senate inquiry
- Canadian podcast
- an article for Epilepsy Action in the UK and the Conversationalist
- facilitating an EmpowerHER Forum for women with epilepsy

Key Fellowship Publications

- Sundman, A.K., Jin, S. **Vadlamudi, L.**, King, G.F. The Molecular basis of KCNH1-related epileptic encephalopathy and the challenge of developing targeted therapeutics. Brain 2025
- Voinescu, P.E., Smith, K.M., Latt, T., Alkaldi, M., Puntambekar, P., Zarroli, K., Pegg, E., Becker, B., Sheth, A.S., Conner, K. R., Ortiz-Guerrero, G., Snehal, I., Blank, L., Bromely, R., Cavitt, J., Krishnaienger, S.R., Mihaylova, T., Moore-Hill, D., Norton, A., Bui, E., **Vadlamudi, L**. The intersection of menopause and epilepsy: A review of current knowledge and gaps. EMJ Neurol. 2025
- **Vadlamudi L**, Ashley DP and Voinescu PE. Insights into neurosteroids and their role in women with epilepsy. Front Glob Womens Health 2024
- **Vadlamudi L**. Bennett C.M., Tom M., Abdulrasool G., Brion K., Lundie, B., Aung H., Lau C., Rodgers J., Riney K., Gordon L.G. A multi-disciplinary team approach to genomic testing for drug-resistant epilepsy patients- the GENIE study. J Cl Med 2022
- Hunter Z., Leeson H. C., Shaker M., Wolvetang E. J., **Vadlamudi L**. Human induced pluripotent stem cells generated from epilepsy patients for use as in vitro models for drug screening. Stem Cell Res 2022

Key Fellowship Presentations

Invited speaker at international meetings

- American Epilepsy Society Annual Meeting: Menopause Committee ECAM (Epilepsy in the Childbearing Ages through Menopause) Consortium - 7 Dec 2025
- American Epilepsy Society Annual Meeting: Menopause Committee ECAM Consortium - 9 Dec 2024
- Channelopathy and Epilepsy Conference: Spider venom as precision therapy for genetic epilepsies - 6 Dec 2024
- American Epilepsy Society Annual Meeting: Menopause Committee ECAM Consortium - 3 Dec 2023

Invited speaker at national meetings

- Communities of Practice Webinar: The unique impact of epilepsy on women - 23 September 2025
- EmpowerHer Forum: Waves and cycles: navigating epilepsy in the lives of women - 26 July 2025
- Epilepsy Society of Australia Webinar series: The nuance of epilepsy care for women - 9 July 2025
- Epilepsy Action Australia Webinar Series: Women with Epilepsy: Healthy pregnancies - Managing medications - 26 February 2025
- 38th Epilepsy Society of Australia Annual Scientific Meeting (ASM): Neurosteroids and epilepsy - 7 November 2024
- HealthED lecture: Epilepsy and menopause - 5 Oct 2024
- 47th Human Genomics Society of Australia ASM: Genomics-guided precision treatment for epilepsy - 12 August 2024
- Queensland Women's Health Forum: The complex interplay between epilepsy and hormones - 11 July 2024
- EmpowerHER Forum: The complex interplay between epilepsy and hormones - 6 July 2024
- Australasian Menopause Congress: The complex interplay between epilepsy and menopause - 2 September 2023
- Society of Obstetric Medicine Australia and New Zealand (SOMANZ) Obstetric Medicine: Management of women with epileptic disorders in pregnancy - 25 May 2023
- Epilepsy Society of Australia ASM: Integrating Genomics into clinical epilepsy care - 5 November 2021
- UCB Neurology Day: Panel discussion Optimizing the management of women with epilepsy - 7 August 2021
- Society of Obstetric Medicine Australia and New Zealand Scientific Meeting: Epilepsy and Pregnancy - 23 July 2021

Selected funding that has arisen during the Fellowship

- MRFF - Stem Cell therapies Mission Transforming the paradigm of epilepsy care with precision medicine - Personalising Epilepsy Regimes with Stem cells and artificial Intelligence models for Superior Treatment outcomes. (PERSIST) Study
- MRFF - Spider venom peptides: precision therapy for genetic epilepsies
- Queensland Health - Women with epilepsy - a life course approach to improving clinical care
- MRFF - Emerging priorities and consumer driven research initiatives - Australian Perimenopause and Menopause Study (A-PaM)