




## Juliet Klasing Knowles

Assistant Professor of Neurology (pediatric Neurology) and of Pediatrics

 Curriculum Vitae available Online

### CLINICAL OFFICE (PRIMARY)

- **Child Neurology**

730 Welch 2nd Floor

Palo Alto, CA 94304

**Tel** (650) 723-0993

**Fax** (650) 721-6350

### Bio

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#### BIO

Juliet Knowles is Assistant Professor in Neurology at Stanford. Dr. Knowles is a physician-scientist who provides clinical care for children with epilepsy and leads a lab team conducting basic, translational and clinical research on pediatric epilepsy. She completed her M.D. and Ph.D. in Neurosciences at Stanford University, followed by residency training in Pediatrics and Child Neurology at Stanford, where she also served as Chief Resident. Following clinical fellowship training in Pediatric Epilepsy, Dr. Knowles completed post-doctoral research related to myelin plasticity in epilepsy, under the mentorship of Drs. Michelle Monje and John Huguenard. Dr. Knowles is passionate about providing thorough, compassionate and innovative care for her patients, and her overarching goal is to use research as a tool to discover improved therapies for children with epilepsy. She is committed to mentoring the next generation of scientists and clinicians, from undergraduates interested in learning about lab research to medical students, residents and post-doctoral scholars. When she is not in the clinic or the lab, Dr. Knowles loves to spend time with her husband, Josh, and their two children. She also enjoys reading, training and running in marathons, and spending time in the great outdoors of California.

#### CLINICAL FOCUS

- Pediatric Epilepsy
- Epilepsy

#### ACADEMIC APPOINTMENTS

- Assistant Professor - University Medical Line, Neurology
- Assistant Professor - University Medical Line, Pediatrics
- Member, Bio-X
- Member, Maternal & Child Health Research Institute (MCHRI)

#### HONORS AND AWARDS

- Stroup Award for Rising Star in Epilepsy, Johns Hopkins University (2021)
- Elterman Research Award, Pediatric Epilepsy Research Foundation (2020)
- First place, Stanford Neuroscience Research Forum, Stanford University (2016)
- Outstanding Young Scientist Award, Northern California Alzheimer's Association (2009)

## **BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS**

- Scientific Program Committee, American Epilepsy Society (2021 - present)
- Research Committee, Child Neurology Society (2020 - present)

## **PROFESSIONAL EDUCATION**

- Board Certification: Neurology with Special Qualifications in Child Neurology, American Board of Psychiatry and Neurology (2016)
- Internship: Stanford Health Care at Lucile Packard Children's Hospital (2013) CA
- Medical Education: Stanford University School of Medicine (2011) CA
- Board Certification: Epilepsy, American Board of Psychiatry and Neurology (2018)
- Fellowship: Stanford University Pediatric Epilepsy Fellowship (2018) CA
- Residency: Stanford University Child Neurology Residency (2016) CA

## **LINKS**

- Knowles Lab Website: <https://med.stanford.edu/pedsepilepsy-lab.html>

## **Research & Scholarship**

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### **RESEARCH INTERESTS**

- Brain and Learning Sciences
- Research Methods

### **CURRENT RESEARCH AND SCHOLARLY INTERESTS**

Epilepsy affects ~1% of all children and is defined by recurrent, unprovoked seizures, impaired cognitive abilities, and diminished quality of life. The predisposition for seizures is thought to result from abnormal plasticity and excessive synchrony in affected neural networks. Myelin plasticity is a newly recognized mode of activity-dependent neural network adaptation. The potential for dysregulated myelin plasticity in disease states such as epilepsy is unexplored. Myelination of axons increases conduction velocity and promotes coordinated network function including oscillatory synchrony. During and after age-dependent developmental myelination, increases in myelin occur when humans and rodents acquire new skills. While adaptive myelin plasticity modulates networks to support function in the healthy state, it is unknown whether this process also contributes to network dysfunction in neurological disease.

The Knowles lab conducts basic, translational and clinical research to study how seizures shape white matter, and how changes in white matter shape the course of epilepsy and its co-morbidities. We discovered that generalized (absence) seizures induce aberrant myelination that promotes seizure progression. Thus, maladaptive myelination may be a novel pathogenic mechanism in epilepsy and other neurological diseases. Using innovative imaging, electrophysiological, histological and molecular biology techniques, we are studying multiple questions.

- How does white matter structure change throughout the brain over the course of epilepsy?
- How does white matter structure impact network synchronization, seizures and cognition?
- What signaling pathways underlie aberrant white matter plasticity in different forms of epilepsy?
- What can we learn from white matter changes found with various imaging modalities in humans with epilepsy?

Our overarching goals are to better understand how epilepsy occurs and to develop treatments that improve the lives of children with epilepsy.

## Teaching

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### STANFORD ADVISEES

#### Postdoctoral Faculty Sponsor

Azin Ebrahim Amini, Lei Peng, Kala Prasannalatha Nair

#### Doctoral Dissertation Reader (NonAC)

Clara Bacmeister, Shreya Malhotra, Emma O'Connell

## Publications

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### PUBLICATIONS

- **Quantitative MRI reveals widespread, network-specific myelination change during generalized epilepsy progression.** *NeuroImage*  
Kung, G. C., Knowles, J. K., Batra, A., Ni, L., Rosenberg, J., McNab, J. A.  
2023: 120312
- **Adaptive and maladaptive myelination in health and disease.** *Nature reviews. Neurology*  
Knowles, J. K., Batra, A., Xu, H., Monje, M.  
2022
- **Maturation and circuit integration of transplanted human cortical organoids.** *Nature*  
Revah, O., Gore, F., Kelley, K. W., Andersen, J., Sakai, N., Chen, X., Li, M. Y., Birey, F., Yang, X., Saw, N. L., Baker, S. W., Amin, N. D., Kulkarni, et al  
2022; 610 (7931): 319-326
- **Precision medicine for genetic epilepsy on the horizon: recent advances, present challenges and suggestions for continued progress.** *Epilepsia*  
Knowles, J. K., Helbig, I., Metcalf, C. S., Lubbers, L. S., Isom, L. L., Demarest, S., Goldberg, E., George, A. L., Lerche, H., Weckhuysen, S., Whitemore, V., Berkovic, S. F., Lowenstein, et al  
2022
- **Maladaptive myelination promotes generalized epilepsy progression.** *Nature neuroscience*  
Knowles, J. K., Xu, H., Soane, C., Batra, A., Saucedo, T., Frost, E., Tam, L. T., Fraga, D., Ni, L., Villar, K., Talmi, S., Huguenard, J. R., Monje, et al  
2022
- **Practical Advice on Surviving and Thriving as an Academic Physician-Neuroscientist.** *JAMA neurology*  
Knowles, J. K., Porter, B. E.  
2021
- **A Standardized Protocol to Improve Acute Seizure Management in Hospitalized Pediatric Patients.** *Hospital pediatrics*  
Pavitt, S., Carley, A., Porter, B., Knowles, J. K.  
2021
- **Improving Bedside Seizure Care of Pediatric Epilepsy Monitoring Unit (EMU) Patients: Creation and Implementation of a Standardized Protocol**  
Pavitt, S., Carley, A., Porter, B., Knowles, J.  
LIPPINCOTT WILLIAMS & WILKINS.2020
- **Neonatal genetic epilepsies display convergent white matter microstructural abnormalities.** *Epilepsia*  
Sandoval Karamian, A. G., Wusthoff, C. J., Boothroyd, D. n., Yeom, K. W., Knowles, J. K.  
2020
- **Refractory focal epilepsy in a paediatric patient with primary familial brain calcification.** *Seizure*  
Knowles, J. K., Santoro, J. D., Porter, B. E., Baumer, F. M.  
2018; 56: 50–52
- **A Small Molecule p75NTR Ligand, LM11A-31, Reverses Cholinergic Neurite Dystrophy in Alzheimer's Disease Mouse Models with Mid- to Late-Stage Disease Progression.** *PloS one*  
Simmons, D. A., Knowles, J. K., Belichenko, N. P., Banerjee, G., Finkle, C., Massa, S. M., Longo, F. M.

2014; 9 (8): e102136

- **A small molecule p75<sup>NTR</sup> ligand, LM11A-31, reverses cholinergic neurite dystrophy in Alzheimer's disease mouse models with mid- to late-stage disease progression.** *PloS one*  
Simmons, D. A., Knowles, J. K., Belichenko, N. P., Banerjee, G., Finkle, C., Massa, S. M., Longo, F. M.  
2014; 9 (8)
- **A small molecule p75(NTR) ligand prevents cognitive deficits and neurite degeneration in an Alzheimer's mouse model.** *Neurobiology of aging*  
Knowles, J. K., Simmons, D. A., Nguyen, T. V., Vander Griend, L., Xie, Y., Zhang, H., Yang, T., Pollak, J., Chang, T., Arancio, O., Buckwalter, M. S., Wyss-Coray, T., Massa, et al  
2013; 34 (8): 2052-2063
- **The p75 Neurotrophin Receptor Promotes Amyloid-beta(1-42)-Induced Neuritic Dystrophy In Vitro and In Vivo** *JOURNAL OF NEUROSCIENCE*  
Knowles, J. K., Rajadas, J., Nguyen, T. V., Yang, T., LeMieux, M. C., Griend, L. V., Ishikawa, C., Massa, S. M., Wyss-Coray, T., Longo, F. M.  
2009; 29 (34): 10627-10637
- **Small Molecule, Non-Peptide p75(NTR) Ligands Inhibit A beta-Induced Neurodegeneration and Synaptic Impairment** *PLOS ONE*  
Yang, T., Knowles, J. K., Lu, Q., Zhang, H., Arancio, O., Moore, L. A., Chang, T., Wang, Q., Andreasson, K., Rajadas, J., Fuller, G. G., Xie, Y., Massa, et al  
2008; 3 (11)
- **Small molecule neurotrophin receptor ligands: Novel strategies for targeting Alzheimer's disease mechanisms** *7th International Conference on Alzheimers Disease Drug Discovery*  
Longo, F. M., Yang, T., Knowles, J. K., Xie, Y., Moore, L. A., Massa, S. M.  
BENTHAM SCIENCE PUBL LTD.2007: 503–6

## PRESENTATIONS

- Maladaptive Myelination in Pediatric Epilepsy - Cold Spring Harbor Glia in Health and Disease meeting
- Abnormal white matter in neonates with genetic epilepsy - American Epilepsy Society
- A standardized protocol to improve acute seizure management in the Pediatric EMU - Child Neurology Society
- Precision Medicine in Pediatric Genetic Epilepsy - Stanford Children's Health