Stanford

Richard J. Reimer, MD

Associate Professor of Neurology and, by courtesy, of Molecular and Cellular Physiology at the Palo Alto Veterans Administration Health Care System

Neurology & Neurological Sciences

CLINICAL OFFICES

- **VA Palo Alto Health Care System Dept of Neurology**

  3801 Miranda Ave

  MS 127

  Palo Alto, CA 94306

  Tel (650) 493-5000 **Fax** (650) 858-3999

Bio

BIO

Dr. Reimer specializes in treatment of lysosomal storage disorders that affect the nervous system. He has been practicing as a neurologist for over 20 years. He has a particular interest in Fabry disease and Gaucher disease.

CLINICAL FOCUS

- Neurology

ACADEMIC APPOINTMENTS

- Associate Professor - Med Center Line, Neurology & Neurological Sciences
- Associate Professor - Med Center Line (By courtesy), Molecular & Cellular Physiology
- Member, Bio-X
- Member, Maternal & Child Health Research Institute (MCHRI)
- Member, Wu Tsai Neurosciences Institute

HONORS AND AWARDS

- Basil O'Connor Award, March of Dimes (2003-05)
- Brain and Immuno imaging Grant, Dana Foundation (2007-09)

PROFESSIONAL EDUCATION

- Medical Education: Emory University Hospital Emergency Medicine Residency (1991) GA
- Residency: University of California at San Francisco School of Medicine (1995) CA
- Internship: University of California at San Francisco School of Medicine (1992) CA
- Board Certification: Neurology, American Board of Psychiatry and Neurology (1998)
- Residency, UCSF , Neurology (1995)
- MD, Emory University , Medicine (1991)

- BA, Yale University , Mol Biochem and Biophysics (1985)

LINKS

- Reimer Lab Site: https://web.stanford.edu/~rjreimer
- Get a Second Opinion: https://stanfordhealthcare.org/second-opinion/overview.html

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Reimer Lab interests

A primary interest of our lab is to understand how nerve cells make and recycle neurotransmitters, the small molecules that they use to communicate with each other. In better defining these processes we hope to achieve our long-term goal of identifying novel sites for treatment of diseases such as epilepsy and Parkinson Disease. In our studies on neurotransmitter metabolism we have focused our efforts on transporters, a functional class of proteins that move neurotransmitters and other small molecules across membranes in cells. Transporters have many characteristics that make them excellent pharmacological targets, and not surprisingly some of the most effective treatments for neuropsychiatric disorders are directed at transporters. We are specifically focusing on two groups of transporters # vesicular neurotransmitter transporters that package neurotransmitters into vesicles for release, and glutamine transporters that shuttle glutamine, a precursor for two major neurotransmitters glutamate and GABA, to neurons from glia, the supporting cells that surround them. We are pursuing these goals through molecular and biochemical studies, and, in collaboration with the Huguenard and Prince labs, through physiological and biosensor based imaging studies to better understand how pharmacological targeting of these molecules will influence neurological disorders.

A second interest of our lab is to define mechanism underlying the pathology of lysosomal storage disorders. Lysosomes are membrane bound acidic intracellular organelles filled with hydrolytic enzymes that normally function as recycling centers within cells by breaking down damaged cellular macromolecules. Several degenerative diseases designated as lysosomal storage disorders (LSDs) are associated with the accumulation of material within lysosomes. Tay-Sachs disease, Neimann-Pick disease and Gaucher disease are some of the more common LSDs. For reasons that remain incompletely understood, these diseases often affect the nervous system out of proportion to other organs. As a model for LSDs we are studying the lysosomal free sialic acid storage disorders. These diseases are the result of a defect in transport of sialic acid across lysosomal membranes and are associated with mutations in the gene encoding the sialic acid transporter sialin. We are using molecular, genetic and biochemical approaches to better define the normal function of sialin and to determine how loss of sialin function leads to neurodevelopmental defects and neurodegeneration associated with the lysosomal free sialic acid storage disorders.

Teaching

COURSES

2017-18

- Molecular Mechanisms of Neurodegenerative Disease: BIO 267, GENE 267, NENS 267 (Win)

STANFORD ADVISEES

Doctoral Dissertation Reader (NonAC)

Jacob Blum, Kevin Guttenplan, Garam Kim, John Vaughen

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Molecular and Cellular Physiology (Phd Program)
- Neurosciences (Phd Program)

Publications

PUBLICATIONS

- **Targeted genomic CRISPR-Cas9 screen identifies MAP4K4 as essential for glioblastoma invasion.** *Scientific reports*
  Prolo, L. M., Li, A., Owen, S. F., Parker, J. J., Foshay, K., Nitta, R. T., Morgens, D. W., Bolin, S., Wilson, C. M., Vega L, J. C., Luo, E. J., Nwagbo, G., Waziri, et al
  2019; 9 (1): 14020

- **Bassoon Controls Presynaptic Autophagy through Atg5.** *Neuron*
  Okerlund, N. D., Schneider, K., Leal-Ortiz, S., Montenegro-Venegas, C., Kim, S. A., Garner, L. C., Gundelfinger, E. D., Reimer, R. J., Garner, C. C.
  2017; 93 (4): 897-913 e7

- **Human Astrocyte Maturation Captured in 3D Cerebral Cortical Spheroids Derived from Pluripotent Stem Cells.** *Neuron*
  Sloan, S. A., Darmanis, S., Huber, N., Khan, T. A., Birey, F., Caneda, C., Reimer, R., Quake, S. R., Barres, B. A., Pa#ca, S. P.
  2017; 95 (4): 779–90.e6

- **Trio, a Rho Family GEF, Interacts with the Presynaptic Active Zone Proteins Piccolo and Bassoon** *PLOS ONE*
  Terry-Lorenzo, R. T., Torres, V. I., Wagh, D., Galaz, J., Swanson, S. K., Florens, L., Washburn, M. P., Waites, C. L., Gundelfinger, E. D., Reimer, R. J., Garner, C. C.
  2016; 11 (12)

- **Plasma taurine levels are not affected by vigabatrin in pediatric patients.** *Epilepsia*
  Spelbrink, E. M., Mabud, T. S., Reimer, R., Porter, B. E.
  2016; 57 (8): e168-72

- **Piccolo Directs Activity Dependent F-Actin Assembly from Presynaptic Active Zones via Daam1** *PLOS ONE*
  Wagh, D., Terry-Lorenzo, R., Waites, C. L., Leal-Ortiz, S. A., Maas, C., Reimer, R. J., Garner, C. C.
  2015; 10 (4)

- **Endozepines.** *Advances in pharmacology (San Diego, Calif.)*
  Farzampour, Z., Reimer, R. J., Huguenard, J.
  2015; 72: 147-164

- **alpha 5-GABAA receptors negatively regulate MYC-amplified medulloblastoma growth** *ACTA NEUROPATHOLOGICA*
  Sengupta, S., Weeraratne, S. D., Sun, H., Phallen, J., Rallapalli, S. K., Teider, N., Kosaras, B., Amani, V., Pierre-Francois, J., Tang, Y., Brian Nguyen, B., Yu, F., Schubert, et al
  2014; 127 (4): 593-603

- **A local glutamate-glutamine cycle sustains synaptic excitatory transmitter release.** *Neuron*
  Tani, H., Dulla, C. G., Farzampour, Z., Taylor-Weiner, A., Huguenard, J. R., Reimer, R. J.
  2014; 81 (4): 888-900

- **SLC17: a functionally diverse family of organic anion transporters.** *Molecular aspects of medicine*
  Reimer, R. J.
  2013; 34 (2-3): 350-359

- **Vesicular uptake and exocytosis of L-aspartate is independent of sialin** *FASEB JOURNAL*
  Morland, C., Nordengen, K., Larsson, M., Prolo, L. M., Farzampour, Z., Reimer, R. J., Gundersen, V.
  2013; 27 (3): 1264-1274

- **Glutamate biosensor imaging reveals dysregulation of glutamatergic pathways in a model of developmental cortical malformation** *NEUROBIOLOGY OF DISEASE*
  Dulla, C. G., Tani, H., Brill, J., Reimer, R. J., Huguenard, J. R.
  2013; 49: 232-246

- **Biochemistry to the Rescue: A CIC-2 Auxiliary Subunit Provides a Tangible Link to Leukodystrophy** *NEURON*
  Maduke, M. C., Reimer, R. J.
  2012; 73 (5): 855-857

- **Glutamate biosensor imaging reveals dysregulation of glutamatergic pathways in a model of developmental cortical malformation.** *Neurobiology of disease*
  Dulla, C. G., Tani, H., Brill, J., Reimer, R. J., Huguenard, J. R.
  2012; 49C: 232–46
- **Structure-Function Studies of the SLC17 Transporter Sialin Identify Crucial Residues and Substrate-induced Conformational Changes** *JOURNAL OF BIOLOGICAL CHEMISTRY*
  Courville, P., Quick, M., Reimer, R. J.
  2010; 285 (25): 19316-19323
- **Glutamine Is Required for Persistent Epileptiform Activity in the Disinhibited Neocortical Brain Slice** *JOURNAL OF NEUROSCIENCE*
  Tani, H., Dulla, C. G., Huguenard, J. R., Reimer, R. J.
  2010; 30 (4): 1288-1300
- **The Lysosomal Sialic Acid Transporter Sialin Is Required for Normal CNS Myelination** *JOURNAL OF NEUROSCIENCE*
  Prolo, L. M., Vogel, H., Reimer, R. J.
  2009; 29 (49): 15355-15365
- **GLUTAMINE POTENTIATES GLUTAMATE RELEASE DURING HIGH FREQUENCY STIMULATION OF ISOLATED LAYER 1 AXONS**
  Reimer, R. J., Tani, H., Dula, C., Huguenard, J.
  WILEY-BLACKWELL PUBLISHING, INC.2009: 479–80
- **Synaptic Vesicle Protein NTT4/XT1 (SLC6A17) Catalyzes Na+-coupled Neutral Amino Acid Transport** *JOURNAL OF BIOLOGICAL CHEMISTRY*
  Zaia, K. A., Reimer, R. J.
  2009; 284 (13): 8439-8448
- **Imaging of glutamate in brain slices using FRET sensors** *JOURNAL OF NEUROSCIENCE METHODS*
  Dulla, C., Tani, H., Okumoto, S., Frommer, W. B., Reimer, R. J., Fluguenard, J. R.
  2008; 168 (2): 306-319
- **G328E and G409E sialin missense mutations similarly impair transport activity, but differentially affect trafficking** *MOLECULAR GENETICS AND METABOLISM*
  Myall, N. J., Wreden, C. C., Wlizla, M., Reimer, R. J.
  2007; 92 (4): 371-374
- **Analysis of glutamate recycling in maintenance of epileptiform activity the acute slice**
  Reimer, R. J., Tani, H., Dulla, C. G., Huguenard, J. R.
  BLACKWELL PUBLISHING.2007: 240
- **Membrane topology of the Drosophila vesicular glutamate transporter** *JOURNAL OF NEUROCHEMISTRY*
  Fei, H., Karnezis, T., Reimer, R. J., Krantz, D. E.
  2007; 101 (6): 1662-1671
- **Modulation of epileptiform activity by glutamine and system A transport in a model of post-traumatic epilepsy** *NEUROBIOLOGY OF DISEASE*
  Tani, H., Bandrowski, A. E., Parada, I., Wynn, M., Huguenard, J. R., Prince, D. A., Reimer, R. J.
  2007; 25 (2): 230-238
- **Biochemical and genetic analysis of ANK in arthritis and bone disease** *AMERICAN JOURNAL OF HUMAN GENETICS*
  Gurley, K. A., Reimer, R. J., Kingsley, D. M.
  2006; 79 (6): 1017-1029
- **Detection of glutamate release from neurons by genetically encoded surface-displayed FRET nanosensors** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Okumoto, S., Looger, L. L., Micheva, K. D., Reimer, R. J., Smith, S. J., Frommer, W. B.
  2005; 102 (24): 8740-8745
- **Varied mechanisms underlie the free sialic acid storage disorders** *JOURNAL OF BIOLOGICAL CHEMISTRY*
  Wreden, C. C., Wlizla, M., Reimer, R. J.
  2005; 280 (2): 1408-1416
- **Organic anion transport is the primary function of the SLC17/type I phosphate transporter family** *PFLUGERS ARCHIV-EUROPEAN JOURNAL OF PHYSIOLOGY*

Reimer, R. J., Edwards, R. H.
2004; 447 (5): 629-635

- **Vesicular neurotransmitter transporter expression in developing postnatal rodent retina: GABA and glycine precede glutamate** *JOURNAL OF NEUROSCIENCE*
  Johnson, J., Tian, N., Caywood, M. S., Reimer, R. J., Edwards, R. H., Copenhagen, D. R.
  2003; 23 (2): 518–29