

The University of Pennsylvania – The Perelman School of Medicine
Curriculum Vitae

Ethan M. Goldberg, M.D., Ph.D.

May 2017

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Education:

1995	Diploma	Friends School of Baltimore, Baltimore, MD
1999	B.A.	Harvard University, Cambridge, MA (Neurobiology)
2006	Ph.D.	New York University School of Medicine, New York, NY
2008	M.D.	New York University School of Medicine, New York, NY (Physiology & Neuroscience)

Post-graduate Training:

2008-2009	Intern in Pediatrics, The Children’s Hospital of Philadelphia, Philadelphia, PA
2009-2010	Resident in Pediatrics, The Children’s Hospital of Philadelphia
2010-2012	Resident in Neurology, The Hospital of the University of Pennsylvania
2010-2013	Resident in Child Neurology, The Children’s Hospital of Philadelphia

Faculty Appointments:

2015-present	Assistant Professor of Neurology (Tenure Track), The Perelman School of Medicine at The University of Pennsylvania
2015-present	Assistant Professor of Neuroscience, The Perelman School of Medicine at The University of Pennsylvania (Secondary)
2015-present	Assistant Professor of Pediatrics, The Children’s Hospital of Philadelphia (Secondary)

Hospital Appointments:

2013-present	Attending Physician, The Children’s Hospital of Philadelphia
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Specialty Certification

2013-present	American Board of Psychiatry and Neurology
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Licensure:

2010-present State of Pennsylvania

Awards and Honors:

1994 Maryland Scholastic Association Wrestling Champion, 145 lbs.
1995 Maryland Scholastic Association Wrestling Champion, 152 lbs.
1996-1999 John Harvard Scholarship, Harvard University
1999 Certificate in Mind/Brain/Behavior, Harvard University, Faculty of Arts and Sciences Standing Committee on the Mind/Brain/Behavior Initiative
2006 William Randolph Hearst Foundation Fellowship
2008 American Academy of Neurology Medical Student Prize for Excellence in Neurology
2009 Epilepsy Foundation Research and Training Fellowship for Clinicians
2011 AAN Annual Meeting Resident Research Travel Scholarship
2013 Samuel Zeritsky Award for Excellence in Research
2014 CURE Taking Flight Award
2014 Burroughs Wellcome Fund Career Award for Medical Scientists
2014 Grass Foundation - AES Young Investigator Travel Award
2017 American Society of Clinical Investigation Young Physician-Scientist Award

Membership in Professional Societies:

2004-present Society for Neuroscience
2010-present American Academy of Neurology
2011-present American Epilepsy Society
2012-present Child Neurology Society
2016-present American Physiological Society

Editorial positions:

2010-present Ad hoc reviewer, *Pediatric Emergency Care*
2012-present Ad hoc reviewer, *Neuroscience Letters*
2012-present Ad hoc reviewer, *Journal of Pediatric Epilepsy*
2014-present Ad hoc reviewer, *PLoS One*
2014-present Ad hoc reviewer, *Epilepsy and Behavior*
2014-present Ad hoc reviewer, *Cell Stem Cell*
2015-present Ad hoc reviewer, *Human Mutation*
2015-present Ad hoc reviewer, *PNAS*
2016-present Ad hoc reviewer, *The Journal of Neuroscience*
2016-present Ad hoc reviewer, *eNeuro*
2017-present Ad hoc reviewer, *Biological Psychiatry*
2017-present Ad hoc reviewer, *Scientific Reports*

Professional and Academic Service:

2013-present Education Committee, Division of Neurology, The Children's Hospital of Philadelphia
2013-present Neurocritical Care Advisory Committee, Division of Neurology, The Children's Hospital of Philadelphia
2015-present Research Committee, Department of Neurology, The University of Pennsylvania

2015-present Member, UPenn Neuroscience Graduate Group (NGG) Program
2016-present Member, UPenn NGG MD/PhD student selection committee
2016-present CHOP Division of Neurology Resident Selection Committee

Teaching and Mentorship:

2014-present Resident Mentor to Carlyn Patterson-Gentile, M.D., Ph.D. (Child Neurology Resident trainee)
2015-present Thesis committee, Tanziyah Muqeem (M.D./PhD student in Neuroscience/Laboratory of Manual Covarrubias, Thomas Jefferson University Sidney Kimmel Medical College)
2016-present Preliminary committee, Felicia Davatolhagh (Ph.D. student, Neuroscience Graduate Group/Laboratory of Marc Fuccillo, The University of Pennsylvania)
2016-present Co-mentor, Nathaniel Sotuyo (V.M.D./Ph.D. student, Neuroscience Graduate Group, The University of Pennsylvania)
2017-present Thesis committee, Sarah Reitz (Ph.D. student, Neuroscience Graduate Group/Laboratory of Max Kelz, The University of Pennsylvania)

Selected Lectures by Invitation:

June 2006 "Fast-spiking neocortical GABAergic interneurons: Molecular determinants of cell function." Center for Theoretical Neuroscience, Columbia University, New York, NY. Host: Larry Abbott, Ph.D.
Aug 2006 "Fast-spiking neocortical GABAergic interneurons: Molecular determinants of cell function." National Institute of Physiology, Okazaki, Japan. Host: Yasuo Kawaguchi, Ph.D.
Oct 2013 "Cortical interneurons and epilepsy: Mechanisms of disease, and development of experimental therapies." Department of Neurology Grand Rounds, The University of Iowa, Iowa City, IA. Host: George Richerson, M.D., Ph.D.
Jan 2015 "Novel treatments for epilepsy: from the lab to the clinic." Division of Neonatology Research Seminar Series, The Children's Hospital of Philadelphia, Philadelphia, PA. Host: Harry Ischiropoulos.
Dec 2015 "Application of precision medicine in patients with *KCNT1* mutation." Scientific Symposium, American Epilepsy Society 69th Annual Meeting, December 4-8, 2015, Philadelphia, PA, U.S.A.
May 2016 "All-optical physiology." The Department of Pharmacology Seminar Series, Northwestern University Feinberg School of Medicine, Chicago, IL. Host: Alfred George.
May 2016 "Precision Medicine for Epilepsy." Seizure Focus Forum, Department of Pediatrics, Division of Child Neurology, Northwestern University Feinberg School of Medicine, Chicago, IL. Host: Alfred George.
June 2016 "All-optical physiology." Center for Cellular and Molecular Therapeutics, The Children's Hospital of Philadelphia, Philadelphia, PA. Host: Beverly Davidson.
January 2017 "Simultaneous two photon calcium imaging and optogenetics for the study of cerebral cortical circuits." Department of Physiology Seminar Program, The Perelman School of Medicine at The University of Pennsylvania, Philadelphia, PA. Host: Toshinori Hoshi.

- March 2017 “Mechanistic insights into a severe pediatric epilepsy.” Center for Neural Therapeutics, The Perelman School of Medicine at The University of Pennsylvania, Philadelphia, PA. Host: Brian Litt.
- May 2017 “Mechanisms of epilepsy in Dravet syndrome.” Department of Pediatrics Frontiers in Pediatric Research Seminar Series, The University of Iowa, Iowa City, IA. Host: Alex Bassuk, M.D., Ph.D.

Bibliography:

Research publications, peer-reviewed:

1. Platzer, K., Yuan, H., Schütz, H., **Goldberg, E.M.**, *et al.* GRIN2B encephalopathy – novel phenotypic, genetic and functional aspects. J Med Genet [accepted].
2. Shen, D., Hernandez, C.C., Shen, W., Hu, N., Poduri, A., Shiedley, B., Rotenberg, A., Datta, A.N., Leiz, S., Patzer, S., Boor, R., Ramsey, K., **Goldberg, E.**, Helbig, I., Ortiz-Gonzalez, X.R., Lemke, J.R., Marsh, E.D., Macdonald, R.L. De novo GABRG2 mutations associated with epileptic encephalopathies. Brain 2017 140:49-67.
3. Natan, R.G., Briguglio, J.J., Mwilambwe-Tshilobo, L., Jones, S., Aizenberg, M., **Goldberg, E.M.**, Geffen, M.N.: Complementary control of sensory adaptation by two types of cortical interneurons. Elife 4. pii: e09868, 2015.
4. Tyson J.A., **Goldberg E.M.**, Maroof A.M., Xu Q., Petros T.J., Anderson S.A.: Duration of culture and sonic hedgehog signaling differentially specify PV versus SST cortical interneuron fates from embryonic stem cells. Development 142:1267-1278, 2015.
5. Zhou J., **Goldberg E.M.**, Leu N.A., Zhou L., Coulter D.A., Wang P.J.: Respiratory failure, cleft palate and epilepsy in the mouse model of human Xq22.1 deletion syndrome. Hum Mol Genet 23:3823-3829, 2014.
6. **Goldberg E.M.**, Jeong H.-Y., Kruglikov I., Tremblay R., Lazarenko R.M., Rudy B.: Rapid developmental maturation of neocortical FS cell intrinsic excitability. Cerebral Cortex 21:666-82, 2011.
7. **Goldberg E.M.**, Clark B.D., Zagha E.W., Nahmani M., Erisir A., Rudy B.: K+ channels at the axon initial segment produce delayed firing and dampen near-threshold excitability of neocortical fast-spiking GABAergic interneurons. Neuron 58:387-400, 2008.
8. **Goldberg E.M.**, Watanabe S., Chang S., Joho R., Huang Z.J., Leonard C.S., Rudy B.: Specific functions of synaptically-localized potassium channels in synaptic transmission at the neocortical GABAergic fast-spiking cell synapse. J Neurosci 25:5230-35, 2005.
9. *Yan L., *Herrington J., ***Goldberg E.**, Dulski P.M., Bugianesi R.M., Slaughter R.S., Banerjee P., Brochu R.M., Priest B.T., Kaczorowski G.J., Rudy B., Garcia M.L.: ShK, a Pharmacological Tool for Studying Kv3.2 Channels. Mol Pharmacol 67:1513-21, 2005.
* = authors contributed equally.
10. Nadal M.S., Ozaita A., Vega-Saenz de Miera E., Ma Y., Mo W., **Goldberg E.M.**, Amarillo Y., Ikehara Y., Neubert T.A., Rudy B.: The CD26-related dipeptidyl aminopeptidase-like protein DPPX is a critical component of neuronal A-type K⁺ channels. Neuron 37:449-61, 2003.
11. Szeszko P.R., **Goldberg E.** Gunduz-Bruce H., Ashtari M., Robinson D., Malhotra A.K., Lencz T., Bates J., Crandall D.T., Kane J.M., Bilder R.M.: Smaller anterior hippocampal formation volume in antipsychotic-naive patients with first-episode schizophrenia. Am J Psychiatry 160:2190-7, 2003.

Clinical/Case reports:

1. Tian, G., Cristancho, A.G., Dubbs, H.G., Liu, G.T., Cowan, N.J., **Goldberg, E.M.**: A patient with lissencephaly, developmental delay, and infantile spasms, due to de novo heterozygous mutation of KIF2A. *Molecular Genetics & Genomic Medicine* 4:599-603, 2016.
2. Harding B, Vossough A, **Goldberg E**, Santi M. Pontine Tegmental Cap Dysplasia: Neuropathologic Confirmation of a Rare Clinical/Radiologic Syndrome. *Neuropathol Appl Neurobiol* 42:301-306, 2015.
3. Bearden D., Strong A., Ehnot J., DiGiovine M., Dlugos D., **Goldberg E.M.**: Targeted treatment of migrating partial seizures of infancy with quinidine. *Ann Neurol* 76:457-461, 2014.
4. Turkeltaub P., **Goldberg E.M.**, Postman-Caucheteux W., Palovcak M., Quinn C., Cantor C., Coslett H.B.: Pure alexia due to ischemic stroke of the visual word form area. *Neurocase* 20:230-5, 2014.
5. Lang S.S., **Goldberg E.**, Zarnow D., Johnson M.P., Storm P.B., Heuer G.G.: Case Report: Prenatal diagnosis of hemimegalencephaly. *World Neurosurgery* 82:e5-8, 2013.
6. **Goldberg E.M.**, Titulaer M., De Blank, P.M., Sievert A., Ryan N.: Anti-N-methyl-D-aspartate receptor mediated encephalitis in infants and toddlers: Case report and review of the literature. *Pediatr Neurol* 50:181-184, 2014.
7. Matalon D., **Goldberg E.**, Medne L., Marsh E.D.: Confirming an expanded spectrum of SCN2A mutations: a case series. *Epileptic Disord* 16:13-18, 2014.
8. **Goldberg E.M.**: Fever and bulging fontanelle in a 7-month-old due to transient intracranial hypertension of infancy. *Pediatr Emerg Care* 29:513-514, 2013.
9. **Goldberg E.M.**, Taub K.S., Kessler S.K., Abend N.S.: Anti-NMDA receptor encephalitis presenting with focal non-convulsive status epilepticus in a child. *Neuropediatrics* 42:188-190, 2011.
10. **Goldberg E.M.**, Schwartz E.S., Younkin D., Myers S.R.: Atypical syncope in a child due to colloid cyst of the third ventricle. *Pediatr Neurol* 45:331-334, 2011.
11. **Goldberg E.M.**, Balamuth F., Desrochers C.R., Mittal M.K.: Seizure and Altered Mental Status in a 12-Year-Old Child With *Shigella sonnei* Gastroenteritis. *Pediatr Emerg Care* 27:135-37, 2011.

Abstracts (recent):

1. **Goldberg, E.M.** Simultaneous two-photon calcium imaging and optogenetics using GCaMP6 and ChrimsonR. *Soc Neurosci Abstr*:92.28, 2016.
2. **Goldberg, E.M.**, Zhou J., Yue C., Wang P.J., Coulter D.A. A novel mouse model of chromosome Xq22.1 deletion syndrome displays epilepsy and cortical circuit dysfunction. Platform Session C.06 at American Epilepsy Society 68th Annual Meeting in Seattle, WA.
3. **Goldberg, E.M.**, Zhou J., Yue C., Wang P.J., Coulter D.A.: A novel mouse model of X-linked epilepsy. *American Academy of Neurology*:P1.266.
4. **Goldberg, E.M.**, Coulter D.A.: Cell type-specific responsiveness of hippocampal dentate gyrus neurons to perforant path stimulation. *American Epilepsy Society*:3.101, 2013.
5. **Goldberg, E.M.**, Turkeltaub P.E., Postman-Cauchetaux W.A., Palovcak M., Quinn C., Cantor C., Coslett H.B.: A case of alexia due to ischemic stroke of the visual word form area. Platform Presentation at the 2011 American Academy of Neurology Annual Meeting).
6. **Goldberg, E.M.**, Takano H., Coulter D.A.: Cell type-specific processes regulate gating behavior in the dentate gyrus. *Soc Neurosci Abstr*:150.1, 2010.

Editorials, Reviews and Book Chapters:

1. Goldberg, E.M.: Workup for a child with significant developmental delay. In Licht, D.J. and Ryan, N.R. (Eds.) *Curbside Consultation in Pediatric Neurology*, SLACK Incorporated, Thorofare, NJ, 2015.
2. **Goldberg, E.M.**, Coulter, D.A.: Seizing the opportunity: Stem cells take on epilepsy. *Cell Stem Cell* 15:527-528, 2014. Preview.
3. Abend, N.S., Wusthoff, C.J., **Goldberg, E.M.**, Dlugos, D.J.: Electrographic Seizures and Status Epilepticus in Critically Ill Encephalopathic Neonates and Children. *Lancet Neurol* 12:1170-1179, 2013. Review.
4. **Goldberg, E.M.**, Coulter, D.A.: Mechanisms of epileptogenesis: A convergence on brain circuits. *Nat Rev Neurosci* 14:337-49, 2013. Review.
5. Coulter D.A., Yue C., Ang C.W., Weissinger F., **Goldberg E.**, Hsu F.C., Carlson G.C., Takano H.: Hippocampal Microcircuit Dynamics Probed Using Optical Imaging Approaches. *J Physiol* 589:1893-1903, 2011. Review.
6. Clark B.D., **Goldberg E.M.**, Rudy B.: Electrogenic tuning of the axon initial segment. *Neuroscientist* 15:651-68, 2009. Review.
7. Rudy B., Maffie J., Amarillo Y., Clark B., **Goldberg E.M.**, Jeong H.J., and others: Voltage gated potassium channels: structure and function of Kv1 to Kv9 subfamilies. In Squire L. (Ed.). *Encyclopedia of neuroscience*, Oxford Academic Press, Oxford, U.K., 2009, 397-425.
8. Rudy B., Maffie J., Amarillo Y., Clark B.D., **Goldberg E.M.**, Jeong H.Y., Kruglikov I., Kwon E., Nadal M., Zagha E.: Voltage-gated K⁺ channels. In Kew J., Davies C. (Ed.). *Ion Channels: Structure and Function*, Oxford University Press, New York, NY, 2009.

Current support:

NIH NINDS K08 NS097633

08/01/16 – 07/31/21

PI

“Dynamic two-photon calcium imaging and optogenetic manipulation of epileptic brain circuits in an experimental model of temporal lobe epilepsy”

Career development award; proposed research investigates mechanisms of brain circuit dysfunction in an experimental model of acquired temporal lobe epilepsy after brain injury using electrophysiology and imaging.

Burroughs Wellcome Fund Career Award

09/01/14 – 08/30/19

PI

“Analysis of circuit function informs novel therapeutic interventions in an epilepsy model”

Career development award provides research funds to support the transition from post-doctoral fellowship training to independence; proposed research investigates mechanisms of brain circuit dysfunction in an experimental model of acquired temporal lobe epilepsy after brain injury.

NIH NIMH R01 MH110185

09/01/16 – 08/31/19

Co-I (PI Anderson)

“IPSC phenotype, mitochondrial haplotype and psychosis in 22q11 deletion syndrome”

This study explores the possibility that a “second hit” (mitochondrial haplotype) produces metabolic dysfunction that leads to schizophrenia in patients with 22q11 deletion syndrome.

CHOP/UPenn IDDRC

07/01/17 – 06/30/19

PI

“Novel precision therapy in an experimental model of a progressive myoclonus ataxia”

New Program Development Award to pilot a novel precision therapy for epilepsy, intellectual disability and ataxia in a mouse model of a progressive myoclonus ataxia.