

# Stanford

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## Michelle Cheng

Sr Res Scientist-Basic Life, Neurosurgery

### Bio

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#### CURRENT ROLE AT STANFORD

I am a senior scientist in Dr. Gary's Steinberg's lab. I supervise several projects that use optogenetics, imaging techniques and next generation sequencing to study post-stroke neural circuit dynamics and recovery mechanisms. My main interests are to study how the brain recovers from injury at both the neural circuit and molecular level, and to develop strategies to promote the recovery process.

#### HONORS AND AWARDS

- Honors in Excellence in Research, University of California, Irvine, Dept of Biological Sciences (1999)
- NIDA Training Grant - Predoctoral Fellowship, University of California, Irvine, Dept of Pharmacology (2001)
- PhRMA Pharmacology/Toxicology Pre-Doctoral Fellowship, PhRMA Foundation (2003-2005)
- Henry Wood Elliot Ph.D., M.D. Award, University of California, Irvine (2005)
- Western States Affiliate, Postdoctoral Fellowship, American Heart Association (2005-2007)
- NIH National Research Service Award Postdoctoral Fellowship (NRSA), NIH-NINDS (2008-2011)
- Julius Axelrod Travel Award, Society for Neuroscience (2010)

#### EDUCATION AND CERTIFICATIONS

- Postdoc, Stanford University, Dept of Biology & Neurosurgery , Brain injury (2011)
- PhD, University of California, Irvine, Dept of Pharmacology , Neuropharmacology (2005)
- BS, University of California, Irvine , Biological Sciences (1999)

### Professional

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#### PROFESSIONAL INTERESTS

My research interests include 1) mechanisms of neuron survival and recovery during injury; 2) use of molecular, pharmacological and optogenetic approaches to study neuronal circuits and plasticity during recovery; 3) identification of potential targets and biomarkers for neurological/neurodegenerative diseases.

### Publications

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#### PUBLICATIONS

- **Comprehensive Profiling of Secreted Factors in the Cerebrospinal Fluid of Moyamoya Disease Patients.** *Translational stroke research*  
Abhinav, K., Lee, A. G., Pendharkar, A. V., Bigder, M., Bet, A., Rosenberg-Hasson, Y., Cheng, M. Y., Steinberg, G. K.  
2023

- **Unique Subtype of Microglia in Degenerative Thalamus After Cortical Stroke.** *Stroke*  
Cao, Z. n., Harvey, S. S., Chiang, T. n., Foltz, A. G., Lee, A. G., Cheng, M. Y., Steinberg, G. K.  
2021; STROKEAHA120032402
- **Brain-wide neural dynamics of poststroke recovery induced by optogenetic stimulation.** *Science advances*  
Vahdat, S., Pendharkar, A. V., Chiang, T., Harvey, S., Uchino, H., Cao, Z., Kim, A., Choy, M., Chen, H., Lee, H. J., Cheng, M. Y., Lee, J. H., Steinberg, et al  
2021; 7 (33)
- **Optogenetic Stimulation Reduces Neuronal Nitric Oxide Synthase Expression After Stroke.** *Translational stroke research*  
Pendharkar, A. V., Smerin, D., Gonzalez, L., Wang, E. H., Levy, S., Wang, S., Ishizaka, S., Ito, M., Uchino, H., Chiang, T., Cheng, M. Y., Steinberg, G. K.  
2020
- **Inflammatory Responses in the Secondary Thalamic Injury After Cortical Ischemic Stroke.** *Frontiers in neurology*  
Cao, Z., Harvey, S. S., Bliss, T. M., Cheng, M. Y., Steinberg, G. K.  
2020; 11: 236
- **Consensus Paper: Experimental Neurostimulation of the Cerebellum.** *Cerebellum (London, England)*  
Miterko, L. N., Baker, K. B., Beckinghausen, J. n., Bradnam, L. V., Cheng, M. Y., Cooperrider, J. n., DeLong, M. R., Gornati, S. V., Hallett, M. n., Heck, D. H., Hoebeek, F. E., Kouzani, A. Z., Kuo, et al  
2019
- **Multimodal image registration and connectivity analysis for integration of connectomic data from microscopy to MRI.** *Nature communications*  
Goubran, M. n., Leuze, C. n., Hsueh, B. n., Aswendt, M. n., Ye, L. n., Tian, Q. n., Cheng, M. Y., Crow, A. n., Steinberg, G. K., McNab, J. A., Deisseroth, K. n., Zeineh, M. n.  
2019; 10 (1): 5504
- **RNA-Sequencing Analysis Revealed a Distinct Motor Cortex Transcriptome in Spontaneously Recovered Mice After Stroke.** *Stroke*  
Ito, M., Aswendt, M., Lee, A. G., Ishizaka, S., Cao, Z., Wang, E. H., Levy, S. L., Smerin, D. L., McNab, J. A., Zeineh, M., Leuze, C., Goubran, M., Cheng, et al  
2018; 49 (9): 2191-2199
- **Optogenetic neuronal stimulation of the lateral cerebellar nucleus promotes persistent functional recovery after stroke.** *Scientific reports*  
Shah, A. M., Ishizaka, S., Cheng, M. Y., Wang, E. H., Bautista, A. R., Levy, S., Smerin, D., Sun, G., Steinberg, G. K.  
2017; 7: 46612-?
- **Optogenetic Approaches to Target Specific Neural Circuits in Post-stroke Recovery** *NEUROTHERAPEUTICS*  
Cheng, M. Y., Aswendt, M., Steinberg, G. K.  
2016; 13 (2): 325-340
- **Optogenetic neuronal stimulation promotes functional recovery after stroke.** *Proceedings of the National Academy of Sciences of the United States of America*  
Cheng, M. Y., Wang, E. H., Woodson, W. J., Wang, S., Sun, G., Lee, A. G., Arac, A., Fenno, L. E., Deisseroth, K., Steinberg, G. K.  
2014; 111 (35): 12913-12918
- **Prokineticin 2 is an endangering mediator of cerebral ischemic injury** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*  
Cheng, M. Y., Lee, A. G., Culbertson, C., Sun, G., Talati, R. K., Manley, N. C., Li, X., Zhao, H., Lyons, D. M., Zhou, Q., Steinberg, G. K., Sapolsky, R. M.  
2012; 109 (14): 5475-5480
- **Blocking glucocorticoid and enhancing estrogenic genomic signaling protects against cerebral ischemia** *JOURNAL OF CEREBRAL BLOOD FLOW AND METABOLISM*  
Cheng, M. Y., Sun, G., Jin, M., Zhao, H., Steinberg, G. K., Sapolsky, R. M.  
2009; 29 (1): 130-136
- **Dependence of olfactory bulb neurogenesis on prokineticin 2 signaling** *SCIENCE*  
Ng, K. L., Li, J. D., Cheng, M. Y., Leslie, F. M., Lee, A. G., Zhou, Q. Y.  
2005; 308 (5730): 1923-1927
- **Prokineticin 2 transmits the behavioural circadian rhythm of the suprachiasmatic nucleus** *NATURE*  
Cheng, M. Y., Bullock, C. M., Li, C. Y., Lee, A. G., Bermak, J. C., Belluzzi, J., Weaver, D. R., Leslie, F. M., Zhou, Q. Y.  
2002; 417 (6887): 405-410

- **Expression of prokineticin 2 and its receptor in the Macaque monkey brain.** *Chronobiology international*  
Burton, K. J., Li, X., Li, B., Cheng, M. Y., Urbanski, H. F., Zhou, Q. Y.  
2016; 1-9
- **Optogenetic approaches to study stroke recovery.** *ACS chemical neuroscience*  
Cheng, M. Y., Wang, E. H., Steinberg, G. K.  
2014; 5 (12): 1144-1145
- **Mammalian Target of Rapamycin Cell Signaling Pathway Contributes to the Protective Effects of Ischemic Postconditioning Against Stroke** *STROKE*  
Xie, R., Wang, P., Cheng, M., Sapolsky, R., Ji, X., Zhao, H.  
2014; 45 (9): 2769-?
- **PRAS40 plays a pivotal role in protecting against stroke by linking the Akt and mTOR pathways** *NEUROBIOLOGY OF DISEASE*  
Xiong, X., Xie, R., Zhang, H., Gu, L., Xie, W., Cheng, M., Jian, Z., Kovacina, K., Zhao, H.  
2014; 66: 43-52
- **Akt isoforms differentially protect against stroke-induced neuronal injury by regulating mTOR activities** *JOURNAL OF CEREBRAL BLOOD FLOW AND METABOLISM*  
Xie, R., Cheng, M., Li, M., Xiong, X., Daadi, M., Sapolsky, R. M., Zhao, H.  
2013; 33 (12): 1875-1885
- **Corticosterone treatment impairs auditory fear learning and the dendritic morphology of the rat inferior colliculus** *HEARING RESEARCH*  
Dagnino-Subiabre, A., Angel Perez, M., Terreros, G., Cheng, M. Y., House, P., Sapolsky, R.  
2012; 294 (1-2): 104-113
- **Prokineticin 2 is involved in the thermoregulation and energy expenditure** *REGULATORY PEPTIDES*  
Zhou, W., Li, J., Hu, W., Cheng, M. Y., Zhou, Q.  
2012; 179 (1-3): 84-90
- **A novel form of oxytocin in New World monkeys** *BIOLOGY LETTERS*  
Lee, A. G., Cool, D. R., Grunwald, W. C., Neal, D. E., Buckmaster, C. L., Cheng, M. Y., Hyde, S. A., Lyons, D. M., Parker, K. J.  
2011; 7 (4): 584-587
- **An Insult-Inducible Vector System Activated by Hypoxia and Oxidative Stress for Neuronal Gene Therapy** *TRANSLATIONAL STROKE RESEARCH*  
Cheng, M. Y., Lee, I., Jin, M., Sun, G., Zhao, H., Steinberg, G. K., Sapolsky, R. M.  
2011; 2 (1): 92-100
- **Attenuated circadian rhythms in mice lacking the prokineticin 2 gene** *JOURNAL OF NEUROSCIENCE*  
Li, J., Hu, W., Boehmer, L., Cheng, M. Y., Lee, A. G., Jilek, A., Siegel, J. M., Zhou, Q.  
2006; 26 (45): 11615-11623
- **Expression of prokineticins and their receptors in the adult mouse brain** *JOURNAL OF COMPARATIVE NEUROLOGY*  
Cheng, M. Y., Leslie, F. M., Zhou, Q.  
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- **Nicotine modulation of stress-related peptide neurons** *JOURNAL OF COMPARATIVE NEUROLOGY*  
Loughlin, S. E., Islas, M. I., Cheng, M. Y., Lee, A. G., Villegier, A., Leslie, F. M.  
2006; 497 (4): 575-588
- **Prokineticin 2 and circadian clock output** *FEBS JOURNAL*  
Zhou, Q. Y., Cheng, M. Y.  
2005; 272 (22): 5703-5709
- **Regulation of prokineticin 2 expression by light and the circadian clock** *BMC NEUROSCIENCE*  
Cheng, M. Y., Bittman, E. L., Hattar, S., Zhou, Q. Y.  
2005; 6
- **Expression of the melanin-concentrating hormone (MCH) receptor mRNA in the rat brain** *JOURNAL OF COMPARATIVE NEUROLOGY*  
Saito, Y., Cheng, M., Leslie, F. M., Civelli, O.  
2001; 435 (1): 26-40