

CURRICULUM VITAE

1. NAME, POSITION, ACADEMIC DEPARTMENT

Qing Ouyang PhD

Assistant Professor (Research)

Department of Molecular Biology, Cell Biology and Biochemistry (MCB)

Research Laboratory Address:
Laboratories for Molecular Medicine
Brown University
70 Ship Street
Providence, RI 02903
Telephone: 401-863-9766
Email: Qing_Ouyang@brown.edu

2. EDUCATION

1992-1996 B.S. Biology

College of Life Sciences, Central China Normal University,
China

1996-1999 M.S. Botany

Department of Biology, Xiamen University, China

1999-2003 Ph.D. Genetics

Institute of Microbiology, Chinese Academy of Sciences
(CAS), China

Dissertation: "Functional studies of the gamma tocopherol methyltransferase gene from *Brassica oleracea* in transgenic *Arabidopsis* and soybean", Advisor: Wenqi Cai Ph.D.

3. PROFESSIONAL APPOINTMENTS

- 1996-1999 Research Assistant
Laboratory of Genetics, Department of Biology, Xiamen University, Xiamen City, Fujian Province, China
- 1999-2003 Research Assistant
Laboratory of Dr. Wenqi Cai, Institute of Microbiology, Chinese Academy of Sciences (CAS), Beijing, China
- 2003-2006 Postdoctoral Associate
Laboratory of Dr. Ronald M. Harris-Warrick, Department of Neurobiology and Behavior, Cornell University, Ithaca, NY 14850, USA
- 2006-2009 Research Associate
Laboratory of Dr. Ronald M. Harris-Warrick, Department of Neurobiology and Behavior, Cornell University, Ithaca, NY 14850, USA
- 2009-2010 Postdoctoral Research Associate
Laboratory of Dr. Eric M. Morrow, Department of Molecular Biology, Cell Biology and Biochemistry, Brown University, Providence, RI 02903, USA
- 2010-2017 Investigator
Laboratory of Dr. Eric M. Morrow, Department of Molecular Biology, Cell Biology and Biochemistry, Brown University, Providence, RI 02903, USA
- 2017-Present Assistant Professor (Research)
Department of Molecular Biology, Cell Biology and Biochemistry, Brown University, Providence, RI 02903, USA

4. PUBLICATIONS AND PRESENTATIONS

a. Refereed Journal Articles

1. Kefu Zhou, Jun Zhang, Tiansheng Chen, Hong Xu, Yan Qin, **Qing Ouyang**, Shilin Lou, Renhai Liu and Zhenlian Ke (2001). Preparation and determination of polyclonal antibody to thymosin α 1. *Chinese Journal of Immunology* 17 (1): 43-47.
2. Jun Zhang, Yan Qin, **Qing Ouyang**, Hong Xu, Lan Huang, Renhai Liu, Kefu Zhou and Shilin Lou (2001). Construction of high level expression system by heat shock induced in cyanobacterium. *High Technology Letters* 8: 17-21.
3. Guojie Mao, **Qing Ouyang**, Wenqi Cai and Jiashu Yang (2001). An effective DNA extraction method for PCR detection of transgenic tomato. *Journal of Agricultural Biotechnology* 9 (4): 363-365.
4. Guojie Mao, **Qing Ouyang**, Hui Sun and Wenqi Cai (2001). Inhibition activity of resveratrol on pathogenic fungi of tomato. *Acta Phytopathologica Sinica* 31 (3): 139-140.
5. Qinglin Liu, Shuangyi Bai, **Qing Ouyang**, Hao Qu and Wenqi Cai (2002). Cloning and sequence analysis of ethylene receptor *ETR1* cDNA from cut roses. *Acta Horticulturae Sinica* 29 (4): 363-366.
6. Jun Zhang, Yan Qin, **Qing Ouyang**, Hong Xu, Kefu Zhou, Renhai Liu and Shilin Lou (2003). Construction of shuttle expression vector and expression of thymosin alpha 1 in *Synechococcus* sp. PCC7942. *Acta Biologiae Experimentalis Sinica* 36 (1): 1-4.
7. Shangyi Bai, Qinglin Liu, **Qing Ouyang** and Wenqi Cai (2003). Differential display and sequence analysis of senescence-associated genes in cut roses. *Journal of Agricultural Biotechnology* 11 (2): 154-157.
8. **Qing Ouyang** and Wenqi Cai (2003). Nature vitamin E biosynthesis pathway. *Plant Physiology Communications* 39 (5): 501-507.
9. **Qing Ouyang**, Chuntao Fan, Hui Sun, Yuman Zhang, Shuangyi Bai and Wenqi Cai (2003). Cloning and analysis of a γ -tocopherol methyltransferase gene from *Brassica oleracea* and the function of its recombinant protein. *Progress in Natural Science* 13 (7): 17-22.

10. Hongnian Guo, Yantao Jia, Yonggang Zhou, Zhenshan Zhang, **Qing Ouyang**, Ying Jiang and Yingchuan Tian (2004). Effects of transgenic tobacco plants expressing ACA gene from *Amaranthus caudatus* on the population development of *Myzus persicae*. *Acta Botanica Sinica* 46 (9): 1100-1105.
11. Yun Zhang, Qinglin Liu, **Qing Ouyang** and Wenqi Cai (2004). Cloning of flower development associated MADS box gene fragments in *Lilium*. *Acta Horticulturae Sinica* 31 (3): 332-336.
12. Xiaohu Kang, **Qing Ouyang**, Cunxiang Wu, Yuman Zhang, Yangnian Bai, Ziyi Cao, Wenqi Cai and Tianfu Han (2004). Transformation of soybean with γ -TMT from *Brassica oleracea* for α -tocopherol elevation. *Soybean Science* 23 (3): 236-238.
13. **Qing Ouyang**, Marie Goeritz and Ronald M. Harris-Warrick (2007). The *Panulirus interruptus* I_h -channel gene PIIH: modification of channel properties by alternative splicing and role in rhythmic activity. *Journal of Neurophysiology* 97 (6): 3880-3892.
14. Hongnian Guo, Hanna Hou, **Qing Ouyang** and Jiahe Wu (2008). Progress in the study and application of aphid-resistant genes. *China Biotechnology* 28 (6): 118-124.
15. **Qing Ouyang**, Vinay Patel, Jacqueline Vanderburgh and Ronald M. Harris-Warrick (2010). Cloning and distribution of Ca^{2+} -activated K^+ channels in Lobster *Panulirus interruptus*. *Neuroscience* 170 (3): 692-702.
16. Marie L. Goeritz, **Qing Ouyang** and Ronald M. Harris-Warrick (2011). Localization and function of I_h channels in a small neural network. *Journal of Neurophysiology* 106 (1): 44-58.
17. Ece D. Gamsiz, **Qing Ouyang**, Michael Schmidt, Shailender Nagpal and Eric M. Morrow (2012). Genome-wide transcriptome analysis in murine neural retina using high-throughput RNA sequencing. *Genomics* 99 (1): 44-51.
18. **Qing Ouyang**, Sofia B. Lizarraga, Michael Schmidt, Unikora Yang, Jingyi Gong, Debra Ellisor, Julie A. Kauer and Eric M. Morrow (2013). Christianson syndrome protein NHE6 modulates TrkB endosomal signaling required for neuronal circuit development. *Neuron* 80 (1): 97-112. **[cover photo; highlighted by commentary in same issue; chosen as an Editors' Choice in Science Signaling]**

19. **Qing Ouyang**, Tojo Nakayama, Ozan Baytas, Shawn M. Davidson, Chendong Yang, Michael Schmidt, Sofia B. Lizarraga, Sasmita Mishra, Malak El-Quessny, Saima Niaz, Mirrat Gul Butt, Syed Imran Murtaza, Afzal Javed, Haroon Rashid Chaudhry, Dylan Vaughan, R. Sean Hill, Jennifer N. Partlow, Seung-Yun Yoo, Anh-Thu N. Lam, Ramzi Nasir, Muna Al-Saffar, A. James Barkovich, Matthew Schwede, Shailender Nagpal, Anna Rajab, Ralph J. DeBerardinis, David E. Housman, Ganeshwaran H. Mochida and Eric M. Morrow (2016). Mutations in mitochondrial enzyme GPT2 cause metabolic dysfunction and neurological disease with developmental and progressive features. *Proceedings of the National Academy of Sciences of the United States of America* 113 (38): E5598-E5607. [highlighted in **Brain in the News**, a Charles A. Dana Foundation publication]

20. Li Ma, **Qing Ouyang**, Gordon C. Werthmann, Heather M. Thompson and Eric M. Morrow (2017). Live-cell Microscopy and fluorescence-based measurement of luminal pH in Intracellular organelles. *Frontiers in Cell and Developmental Biology* (5):71.

21. Meiyu Xu, **Qing Ouyang**, Jingyi Gong, Matthew F. Pescosolido, Brandon S. Pruetz, Sasmita Mishra, Michael Schmidt, Richard N. Jones, Ece D. Gamsiz Uzun, Sofia B. Lizarraga and Eric M. Morrow (2017). Mixed neurodevelopmental and neurodegenerative pathology in *Nhe6*-null mouse model of Christianson Syndrome. *eNeuro* 4 (6): ENEURO.0388-17.2017

22. **Qing Ouyang**, Brian C. Kavanaugh, Lena Joesch-Cohen, Bethany Dubois, Qing Wu, Michael Schmidt, Ozan Baytas, Stephen F. Pastore, Ricardo Harripaul, Sasmita Mishra, Abrar Hussain, Katherine H. Kim, Yolanda Holler-Managan, Muhammad Ayub, Asif Mir, John B. Vincent, Judy S. Liu and Eric M. Morrow (2019). *GPT2* mutations in autosomal recessive developmental disabilities: extending the clinical phenotypes and population prevalence estimates. *Human Genetics* 138 (10): 1183-1200

23. **Qing Ouyang**, Lena Joesch-Cohen, Sasmita Mishra, Hasib A. Riaz, Michael Schmidt and Eric M. Morrow. Functional assessment *in vivo* of the mouse homologue of the human Ala-9-Ser NHE6 variant. *eNeuro*. 1 November 2019, ENEURO.0046-19.2019; DOI: <https://doi.org/10.1523/ENEURO.0046-19.2019> (One image has been selected as a highlighted image on the homepage at eNeuro.org)

24. Sofia B. Lizarraga, Li Ma, Abbie M. Maguire, Laura I. van, Qing Wu, **Qing Ouyang**, Brian C. Kavanaugh, Dipal Nagda, Liane L. Livi, Matthew F.

Pescosolido, Michael Schmidt, Shanique Alabi, Mara H. Cowen, Paul BritoVargas, Diane Hoffman-Kim, Ece D. Gamsiz Uzun, Avner Schlessinger, Richard N. Jones, and Eric M. Morrow (2021). Human neurons from Christianson Syndrome iPSCs reveal mutation-specific responses to rescue strategies. *Science Translational Medicine* 13 (580): eaaw0682. doi: 10.1126/scitranslmed.aaw0682

25. Matthew F Pescosolido, **Qing Ouyang**, Judy S Liu, Eric M Morrow (2021). Loss of Christianson Syndrome Na⁺/H⁺ exchanger 6 (NHE6) causes abnormal endosome maturation and trafficking underlying lysosome dysfunction in neurons. *The Journal of Neuroscience* 41(44): 9235-9256

26. Youjin Lee, Morgan R Miller, Marty A Fernandez, Elizabeth L Berg, Adriana M Prada, **Qing Ouyang**, Michael Schmidt, Jill L Silverman, Tracy L Young-Pearse, Eric M Morrow (2021). Early lysosome defects precede neurodegeneration with amyloid-B and tau aggregation in NHE6-null rat brain. *Brain*: doi: 10.1093/brain/awab467

b. Poster Abstracts

1. **Qing Ouyang**, Marie L. Goeritz and Ronald M. Harris-Warrick (2005) “Cloning, characterization and localization of I_h in the STG”. Poster 377.2, the Society for Neuroscience 35th Annual Meeting, Washington DC. Poster presented by QO.

2. **Qing Ouyang** and Ronald M. Harris-Warrick (2006) “Differential cAMP modulation of *PIIH* splice variants and overexpression of PIH in the stomatogastric ganglion of *Panulirus interruptus*”. Poster 334.1, the Society for Neuroscience 36th Annual Meeting, Atlanta, GA. Poster presented by QO.

3. Marie L. Goeritz, **Qing Ouyang** and Ronald M. Harris-Warrick (2007) “Distribution of I_h channels and their role in synaptic integration in the stomatogastric ganglion of *Panulirus Interruptus*”. Poster 407.8, the Society for Neuroscience 37th Annual Meeting, San Diego, CA. Poster presented by MLG.

4. Ece D. Gamsiz, **Qing Ouyang**, Michael Schmidt, Shailender Nagpal and Eric M. Morrow (2011) “Novel features of neural retina transcriptome revealed

by high-throughput RNA-sequencing”. American Society of Human Genetics 61st Annual Meeting, Montreal, Canada. Poster presented by EDG.

5. Sofia B. Lizarraga, Debra Ellisor, Michael Schmidt, **Qing Ouyang** and Eric M. Morrow (2011) “Analysis of NHE6 expression during neuronal circuit development”. 14th Annual Research Symposium on Mental Health Sciences, Providence, RI. Poster presented by SBL.

6. **Qing Ouyang**, Sofia B. Lizarraga, Michael Schmidt, Unikora Yang, Jingyi Gong, Debra Ellisor, Julie A. Kauer and Eric M. Morrow (2013) “The function of NHE6, a new autism-associated gene, during circuit development”. 16th Annual Research Symposium on Mental Health Sciences, Providence, RI. Poster presented by QO.

7. Eric M. Morrow, Julie A. Kauer, **Qing Ouyang**, and Sofia B. Lizarraga (2013) “Intra-endosomal pH, BDNF, signaling and circuit development”. American College of Neuropsychopharmacology 52nd Annual Meeting, Hollywood, FL. Poster presented by EMM. Poster chosen for 1 of 10 “Voice Poster in Basic Science” out of >400 posters.

8. Eric M. Morrow, **Qing Ouyang** and Sofia B. Lizarraga (2013) “Christianson syndrome protein NHE6 regulates intra-endosomal pH, signaling and neuronal morphogenesis”. American Society for Cell Biology Annual Meeting, New Orleans, LA. Poster presented by EMM.

9. Nakayama, T.# , Al-Maawali, A., **Qing Ouyang**, Wu, J., Vaughan, D.J., El-Quessny, M., Rajab, A., Khalil, S., Niaz, S., Gul Butt, M., Imran Murtaza, S., Javed, A., Rashid Chaudhry, H., AlZahrani, A.A., Galvin-Parton, P., Weiss, J., Andriola, M.R., Amudhavalli, S.M., Cross, L., Baytas, O., Schmitz-Abe, K., Markianos, K., Hill, R.S., Partlow, J.N., Barry, B.J., Al-Saffar, M., Barkovich, A.J., Morrow, E.M., Ling, J., and Mochida, G.H. (2017). Deficient activity of genes associated with amino acid metabolism underlies an autosomal recessive syndrome of microcephaly and hypomyelination. American Society of Human Genetics 67th Annual Meeting, Orlando, FL. October 17-21, 2017. Presented by TN. #Selected for Platform Session presentation under the theme “Gene Discovery and Functional Models of Intellectual Disability.”

10. Li Ma, **Qing Ouyang**, Gordon C. Werthmann, Heather M. Thompson and Eric M. Morrow (2018). Live-cell microscopy and fluorescence-based measurement of luminal pH in intracellular organelles. Mind Brain Research

Day 2018, Brown University and Warren Alpert Medical School of Brown University, Providence, RI. March 27, 2018. Poster presented by LM.

11. Ozan Baytas, **Qing Ouyang**, Chendong Yang, Michael Schmidt and Eric M. Morrow (2019). Mutations in mitochondrial enzyme GPT2 cause metabolic dysfunction and neurological disease with developmental and progressive features. Mind Brain Research Day 2019, Brown University and Warren Alpert Medical School of Brown University, Providence, RI. March 26, 2019. Poster presented by OB.

12. **Qing Ouyang**, Brian Kavanaugh, Giulia Righi, Anthony Crown, Michael Schmidt, Lisa Pavinato, Alfredo Brusco and Eric M. Morrow (2019). Novel SLC9A6 mutations in patients with autism. Mind Brain Research Day 2019, Brown University and Warren Alpert Medical School of Brown University, Providence, RI. March 26, 2019. Poster presented by QO.

13. **Qing Ouyang**, Matthew F. Pescosolido, Michael Schmidt and Eric M. Morrow (2019). A high throughput assay to study endosomal pH in neurons. BioImage Informatics Annual Meeting 2019. The Allen Institute, Seattle, WA. Poster presented by QO.

c. Oral Presentations

Dynamic Neural Networks: The Stomatogastric Ganglion Meeting, “Cloning, characterization and localization of I_h in the STG”. Washington DC (2005)

Christianson Syndrome Meeting 2022: Healing, Happiness, Hope, “Current ideas about the cellular causes of CS”. Providence, Rhode Island (2022)

d. Work in Progress

Chapters in Book:

1. **Qing Ouyang**, Michael Schmidt and Eric M. Morrow (2022). “Dynamic measurement of endosome-lysosome fusion in neurons using high-content imaging” In: Y. Alvin Huang and Changhui Pak, eds. *Stem Cell Based Neural Model Systems for Brain Disorders*. 2023. (submitted)

2. Matthew F. Pescosolido, **Qing Ouyang**, Judy S. Liu and Eric M. Morrow (2022). “Live-imaging detection of multivesicular body-plasma membrane

fusion and exosome release in cultured primary neurons” In: Y.Alvin Huang and Changhui Pak, eds. *Stem Cell Based Neural Model Systems for Brain Disorders*. 2023. (submitted)

Manuscripts

Qing Ouyang, others and Eric M. Morrow (2022). Mild mutations in the Christianson Syndrome endosomal Na⁺/H⁺ exchanger 6 (NHE6) cause intermediate neuronal phenotypes and neuropsychiatric disorders including non-syndromic autism. (in preparation)

5. RESEARCH GRANTS

Ongoing Research Support

2019/09/15-2024/06/30

R01 NS113141, NIA/NINDS

Morrow, Eric M. (PI)

Neurodegenerative Mechanisms in Christianson Syndrome and NHE6-related Disorders

Role: Co-I

Completed Research Support

2017/09/18-2019/08/31

R21 MH115392, NIMH

Morrow, Eric M. (PI)

Convergent Cellular Mechanisms Governed by UBE3A and NHEs in Neurons

Role: Co-I

10/01/2018-09/30/2019

Simons Foundation Autism Research Initiative Explorer Award 600432

Morrow, Eric M. (PI)

Analysis of UBE3A- and NHE6-mutant cells to determine social communication gene networks

Role: Co-I

2018/08/27-2019/05/31

R01 MH105442-05S1, NIMH

Morrow, Eric M. (PI)

Mechanisms of Circuit Failure and Treatments in Patient-derived Neurons in Autism

Role: Postdoctoral Investigator

2017/09/15-2019/09/14

25701 NARSAD Independent Investigator Grant, Brain & Behavior Research Foundation

Morrow, Eric M. (PI)

Genetic Investigation of Mitochondrial Metabolism in Circuit Development and Behavior

Role: Postdoctoral Investigator

2015/04/01-2019/02/28

R01 MH102418, NIMH

Morrow, Eric M. (PI)

Autism-linked Endosomal Mechanisms in Neuronal Arborization and Connectivity

Role: Postdoctoral Investigator

2014/09/16-2021/05/31

R01 MH105442, NIMH

Morrow, Eric M. (PI)

Mechanisms of Circuit Failure and Treatments in Patient-derived Neurons in Autism

Role: Postdoctoral Investigator

6. SERVICE

a. Service to the University

2021-present Human Resources Advisory Board

b. Journal Review:

Harvard Review of Psychiatry

BMC Neuroscience

PLoS ONE

Journal of Bioscience and Bioengineering

Protein & Cell, the Biological Bulletin

Chinese Science Bulletin

General Physiology and Biophysics

Journal of Biological Regulators and Homeostatic Agents

Journal of Molecular Endocrinology

Journal of Cytology & Molecular Biology

Human Molecular Genetics

Journal of Neurodevelopmental Disorders

Human Genome Variation

Professional Societies:

Society for Neuroscience

7. ACADEMIC HONORS, FELLOWSHIPS, HONORARY SOCIETIES

1993 2nd class of University Scholarship, Central China Normal University, China

1994 2nd class of University Scholarship, Central China Normal University, China

1995 2nd class of University Scholarship, Central China Normal University, China

1996 1st class of University Scholarship, Central China Normal University, China

1998 Awards for Moral, Academic, and Physical Excellence, Xiamen University, China

8. PATENT

Wenqi Cai, **Qing Ouyang**, Tianfu Han, Hui Sun, Chuntao Fan, Yuman Zhang, et al. *Brassica oleracea* gamma-tocopherol methyltransferase (TMT) gene and its application. (Chinese patent: 02158079.0)

9. TEACHING

Contributed to Supervision of Students:

a. Undergraduates:

1. Mark Sabbagh, 2012, Neuroscience. Mark was winner of the John Donoghue award for top undergraduate thesis. Mark matriculated with full funding in the MD-PhD Program at Johns Hopkins Medical School in August 2012.

2. Unikora Yang, 2012, Neuroscience. Unikora matriculated at Warren Alpert Medical School of Brown University in August 2012.

3. David Stein, 2013, Neuroscience. David was the 2013 recipient of the Whalen Award for Excellence in Neuroscience and Behavioral Biology. He also won First Prize in the Undergraduate Oral Presentation Competition at the 2013 Biology New England South (BioNES) 7th Annual Meeting. David matriculated in August 2014 in the MD Program at University of Massachusetts-Worcester.

4. Jingyi Gong, 2013, Neuroscience. Jingyi completed her thesis in Julie Kauer's laboratory on a collaborative project with Eric Morrow's laboratory. She subsequently completed a gap year in his laboratory. She matriculated in August 2014 in the MD Program at Harvard Medical School in the Harvard-MIT Division of Health Science and Technology (HST).

5. Jacob Thomas, 2016, Computational Biology. Jacob matriculated in August 2016 at University of Pittsburgh.

6. Sangho S Myung, 2017, Undergraduate student in Department of Molecular Biology, Cell Biology and Biochemistry.

7. Bethany Dubois, 2018, Computational Biology. Bethany completed a senior thesis for the Icahn School of Medicine at Mount Sinai FlexMed Program.

8. Jolie A. Ren, 2019-2020, Biochemistry & Molecular Biology Sc.B.

9. Kevin L Ma, 2019-2020, Brown University

10. Jacob Koster, 2022, Brown University

11. Naomi Kissel, 2022, Brown University

b. Graduates

Anthony Crown, rotation graduate student of the Department of Molecular Biology, Cell Biology and Biochemistry. Brown University 2018

Noelle Curtis-Joseph, rotation graduate student of the Department of Molecular Biology, Cell Biology and Biochemistry. Brown University 2022

Yu Liu, Master student in ScM in Biotechnology program. Brown University 2022