BIOGRAPHICAL SKETCH

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NAME	POSITION TITLE
Cheng, Hwai-Jong	Distinguished Research Fellow
eRA COMMONS USER NAME hjcheng	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
National Taiwan University, Taiwan	M.D.	1989	Medicine
Harvard University	Ph.D.	1995	Cell & Developmental Biology
UC San Francisco / Stanford University	Postdoctoral Training	1997-2002	Neurobiology

A. Positions and Honors

Positions and Professional Experience

1982-1989 Medical Student, College of Medicine, National Taiwan University, Taipei, Taiwan

1987 Summer Student, Drs. Kung-Ming Jan and Shu Chien, Institute of Biomedical Sciences, Academia Sinica, Taipei, Taiwan

1989-1991 Clinical Resident, Pathology, National Taiwan University Hospital, Taipei, Taiwan

1991-1995 Graduate Student, Dr. John G. Flanagan, Department of Cell Biology, Harvard Medical School, Harvard University

1996-1997 Clinical Resident, Pathology, National Taiwan University Hospital, Taipei, Taiwan

1997-2002 Postdoctoral Fellow, Dr. Marc Tessier-Lavigne, Howard Hughes Medical Institute, Department of Anatomy, University of California at San Francisco, and Department of Biological Sciences, Stanford University

2002-2008 Assistant Professor, Center for Neuroscience, Department of Neurobiology, Physiology and Behavior, College of Biological Sciences, and Department of Pathology and Laboratory Medicine (starting 2003), School of Medicine, University of California, Davis

2004-2012 Advisory Research Committee (ARC), Department of Pathology and Laboratory Medicine, School of Medicine, University of California, Davis

2008-2011 Associate Professor, Center for Neuroscience, Department of Neurobiology, Physiology and Behavior, College of Biological Sciences, and Department of Pathology and Laboratory Medicine, School of Medicine, University of California, Davis

2008-2012 Executive Committee, NIH T32 Training Grant Program in Molecular and Cellular Biology (MCB), College of Biological Sciences, University of California, Davis

2008-2012 Master Adviser, Neuroscience Graduate Group, University of California, Davis, California, Davis

2010-2013 Director, Diagnostic and Research Electron Microscopy Laboratory, Department of Pathology and Laboratory Medicine, School of Medicine, University of California, Davis

2012-2013	Research Scholar, Graduate Institute of Brain and Mind Sciences, College of Medicine, National Taiwan University, Taiwan (Sabbatical leave)
2013-2015	Master Advisor, Department of Neurobiology, Physiology and Behavior, College of Biological Sciences, University of California, Davis
2014-2016	Committee on Courses of Instruction member, Academic Senate, UC Davis
2015-2017	Faculty Executive Committee member, College of Biological Science, UC Davis
2016-2019	Master Advisor, Department of Neurobiology, Physiology and Behavior, College of Biological Sciences, University of California, Davis
2017-2019	Committee on Courses of Instruction member, Academic Senate, UC Davis
2018-2020	Executive Committee, NIH T32 Training Grant Program in Molecular and Cellular Biology (MCB), College of Biological Sciences, University of California, Davis
2019	Visiting Professor, Brain Research Center and Institute of Neuroscience, National Yang-Ming University, Taiwan (Sabbatical leave)
2002-2020	Faculty Member, Neuroscience (NSC) Graduate Group, and Biochemistry, Molecular, Cellular and Developmental Biology (BMCDB) Graduate Group, University of California, Davis
2011-2020	Professor, Center for Neuroscience, Department of Neurobiology, Physiology and Behavior, College of Biological Sciences, and Department of Pathology and Laboratory Medicine, School of Medicine, University of California, Davis
2014-2020	Executive Committee member, Neuroscience Graduate Group, UC Davis
2018-2020	Chair, Neuroscience Graduate Group, UC Davis
2020-	Director and Distinguished Research Fellow, Institute of Molecular Biology, Academia Sinica, Taipei, Taiwan

Honors and Professional Activities

1996	Pharmacia Biotech & Science Prize for Young Scientists in Molecular Biology, Regional winner from North America
1997-2002	Howard Hughes Medical Institute Physician Postdoctoral Fellowship
2003	Whitehall Foundation Grant Award
2004	Alfred P. Sloan Research Fellow
2004	Klingenstein Fellowship Award
2004	The M.I.N.D. Institute Research Grant Award
2012	Faculty Service Award, Neuroscience Graduate Group, UC Davis
2012-2018	NIH study section ZRG1 F03A (20) ad hoc member for 12 times
2014	NIH study section ZRG1 MDCN-G (05)
2015	UC Davis Academic Advising Award
2016	NACADA Region 9 Excellence in Advising Award
2017	Marshal, Undergraduate Commencement, College of Biological Sciences, UC Davis
2018	NIH study section ZAG1 ZIJ-7 (J1)
2019-2020	NIH study section ZRG1 F03B
1997-now	Pathologist Board Certification, Taiwan
2002-now	Member, Society for Neuroscience

B. Publications (complete list)

1. Chuang, P.-T., **Cheng, H.-J.**, Lin, S.-J., Jan, K.-M., Lee, M.-M. and Chien, S.. Macromolecular transport across arterial and venous endothelium in rats, studies with Evan blue-albumin and horseradish peroxidase. Arteriosclerosis 10:188-197. (1990)

2. **Cheng, H.-J.** and Flanagan, J. G.. Transmembrane kit ligand cleavage does not require a signal in the cytoplasmic domain and occurs at a site determined by spacing from the membrane. Molecular Biology of the Cell 5: 943-953. (1994)

3. **Cheng, H.-J.** and Flanagan. J.G.. Identification and cloning of ELF-1, a developmentally-expressed ligand for the Mek4 and Sek receptor tyrosine kinases. Cell 79:157-168. (1994)

4. Bergemann, A. D., **Cheng, H.-J.**, Brambilla, R., Klein, R. and Flanagan, J. G.. ELF-2, a new member of the Eph ligand family, is segmentally expressed in the mouse embryo in the region of the hindbrain and newly forming somites. Molecular and Cellular Biology 15:4921-4929. (1995)

5. **Cheng, H.-J.**, Nakamoto, M., Bergemann, A. D. and Flanagan, J. G.. Complementary gradients in expression and binding of ELF-1 and Mek4 in development of the topographic retinotectal projection map. Cell 82:371-381. (1995)

6. Nakamoto, M.*, **Cheng, H.-J.***, Friedman, G. C., McLaughlin, T., Hansen, M. J., Yoon, C. H., O'Leary, D. D. M. and Flanagan, J. G.. Topographically specific effects of ELF-1 on retinal axon guidance in vitro and retinal axon mapping in vivo. Cell 86:755-766. (1996) (***equal contributions**)

7. Flanagan, J. G., **Cheng, H.-J.**, Feldheim, D. A., Hattori, M., Lu, Q., Vanderhaeghen, P.. Alkaline phosphatase fusions of ligands or receptors as in situ probes for staining of cells, tissues, and embryos. Methods Enzymol. 327: 19-35. (2000)

8. Flanagan, J. G. and **Cheng, H.-J.**. Alkaline phosphatase fusion proteins for molecular characterization and cloning of receptors and their ligands. Methods Enzymol. 327: 198-210. (2000)

9. **Cheng, H.-J.** and Flanagan, J. G.. Cloning and characterization of RTK ligands using receptor-alkaline phosphatase fusion proteins. Methods Mol. Biol. 124: 313-34. (2001)

10. **Cheng, H.-J.***, Bagri, A.*, Yaron, A., Stein, E., Pleasure, S. J., and Tessier-Lavigne, M.. Plexin-A3 Mediates Semaphorin Signaling and Regulates the Development of Hippocampal Axonal Projections. Neuron 32:249-63. (2001) (***equal contributions**)

11. Huang, X., **Cheng, H.-J.** Tessier-Lavigne, M., Jin, Y.. Max-1, a novel PH/Myth4/FERM domain cytoplasmic protein implicated in netrin-mediated axon repulsion. Neuron 34:563-576 (2002)

12. Bagri, A.*****, **Cheng, H.-J.***, Yaron, A., Pleasure, S. J., and Tessier-Lavigne, M.. Stereotyped pruning of long hippocampal axon branches triggered by retraction inducers of the Semaphorin family. Cell 113: 285-299. (2003) (***equal contributions**)

13. Yaron, A., Huang, P.-H., **Cheng, H.-J.*** and Tessier-Lavigne, M.* . Differential requirement for Plexin-A3 and -A4 in mediating responses of sensory and sympathetic neurons to distinct class 3 Semaphorins. Neuron 45:513-523 (2005) (***Co-corresponding authors**)

14. Liu, X.-B., Low, L. K., Jones, E. G., and **Cheng, H.-J.**. Stereotyped axon pruning via plexin signaling is associated with synaptic complex elimination in the hippocampus. J. Neurosci.

25:9124-9134 (2005) (Highlighted in this week in the journal) (Also highlighted in Nature Review Neuroscience 6:914-915 (2005))

15. Low, L. K. and **Cheng, H.-J.**. A little nip and tuck: axon refinement during development and axonal injury. Curr. Opin. Neurobiol. 15:549-556 (2005) (Invited review)

16. Low, L. K. and **Cheng, H.-J.**. Axon pruning: an essential step underlying the developmental plasticity of neuronal connections. Phil. Trans. R. Soc. B 361:1531-1544 (2006) (Invited review)

17. Waimey, K. E. and **Cheng, H.-J.**. Axon pruning and synaptic development: how are they per-plexin? The Neuroscientist 12:398-409 (2006) (Invited review)

18. Lucanic, M., Kiley, M., Ashcroft, N., L'Etoile, N. and **Cheng H.-J.**. The C. elegans p21 activated kinases are differentially required for UNC-6/Netrin mediated commissural motor axon guidance. Development 133: 4549-4559 (2006)

19. Faulkner, R. L., Low, L. K. and **Cheng, H.-J.**. Axonal pruning in the developing vertebrate hippocampus. Developmental Neuroscience 29:6-13 (2007) (Invited review)

20. Chung, L., Yang, T.-L., Huang, H.-R., Hsu, S.-M., **Cheng, H.-J.***, and Huang, P.-H.*. Semaphorin signaling facilitates cleft formation in the developing salivary gland. Development 134:2935-2945 (2007) (***Co-senior authors**)

21. Duan, X., Chang, J. H., Ge, S., Faulkner, R. L., Kim, J. Y., Kitabatake, Y., Liu, X.-b., Yang C.-H., Jordan, J. D., Ma, D. K., Liu, C. Y., Ganesan, S., **Cheng, H.-J.,** Ming, G.-l., Lu, B., and Song, H. Disrupted-In-Schizophrenia 1 regulates integration of newly generated neurons in the adult brain. Cell 130:1146-1158 (2007). PMCID: PMC2002573

22. Waimey, K. E., Huang, P.-H., Chen, M., and **Cheng, H.-J**.. Plexin-A3 and plexin-A4 restrict the migration of sympathetic neurons but not their neural crest precursors. Developmental Biology 315:448-458 (2008). PMCID: PMC2365924

23. Low, L. K., Liu, X.-B., Faulkner, R. L., Coble, J., and **Cheng, H.-J.**. Plexin signaling selectively regulates the stereotyped pruning of corticospinal axons from visual cortex. Proc. Natl. Acad. Sci. USA 105:8136-8141 (2008). PMCID: PMC2430372

24. Faulkner, R. L., Low, L. K., Liu, X.-B., Coble, J., Jones, E. G., and **Cheng, H.-J.**. Dorsal turning of motor corticospinal axons at the pyramidal decussation requires plexin signaling. Neural Development 3:21 (2008). PMCID: PMC2532682

25. Faulkner, R. L., Jang, M.-H., Liu, X.-B., Duan, X., Sailor, K. A., Kim, J. Y., Ge, S., Jones, E. G.*, Ming, G.-L., Song, H.*, and **Cheng, H.-J.***. Development of hippocampal mossy fiber synaptic outputs by new neurons in the adult brain. Proc. Natl. Acad. Sci. USA 105:14157- 14162 (2008). (***Co-corresponding authors**) PMCID: PMC2544594

26. Schwarz, Q., Waimey, K. E., Golding, M., Takamatsu, H., Kumanogoh, A., Fujisawa, H., **Cheng, H.-J.**, and Ruhrberg, C.. Plexin A3 and plexin A4 convey semaphorin signals during facial nerve development. Developmental Biology 324: 1-9 (2008). PMCID: PMC2814064

27. Lucanic, M., and **Cheng, H.-J.**. A RAC/CDC-42 independent GIT/PIX/PAK signaling pathway mediates cell migration in *C. elegans*. PLoS Genetics 4(11): e1000269 (2008). PMCID: PMC2581894

28. Maro, G. S., Shen, K., and **Cheng, H.-J.**. Deal breaker: semaphorin and specificity in the spinal stretch reflex circuit. Neuron 63:8-11 (2009) (Invited Preview)

29. Chen, S.-Y. and **Cheng, H.-J.**. Functions of axon guidance molecules in synapse formation. Curr. Opin. Neurobiol. 19:471-478 (2009) (Invited Review). PMCID: PMC2812565

30. Vanderhaeghen, P.* and **Cheng, H.-J.***. Guidance molecules in axon pruning and cell death. Cold Spring Harb. Perspect. Biol. 2:a001859 (2010) (Invited Review). **(*Co-corresponding authors)** PMCID: PMC2869516

31. Cheng, T.-W., Liu, X.-B., Faulkner, R. L., Stephan, A. H., Barres, B. A., Huberman, A. D., and **Cheng H.-J.**. Emergence of lamina-specific retinal ganglion cell connectivity by axon arbor retraction and synapse elimination. J. Neurosci. 30:16376-16382 (2010). PMCID: PMC3073606

32. Chen, S.-Y., Huang, P.-H.* and **Cheng, H.-J.***. Disrupted-in-Schizophrenia 1-mediated axon guidance involves TRIO-RAC-PAK small GTPase pathway signaling. Proc. Natl. Acad. Sci. USA 108: 5861-5866 (2011). (***Co-corresponding authors**) PMCID: PMC3078365.

33. Tseng, C.-H., Murray, K. D., Jou, M.-F., Hsu, S.-M., **Cheng, H.-J.*** and Huang, P.-H.*. Sema3E/Plexin-D1 mediated epithelial-to-mesenchymal transition in ovarian endometrioid cancer. PLoS One 6(4):e19396 (2011). (***Co-senior authors**) PMCID: PMC3084850.

34. Liu, W.-W., Chen, S.-Y., Cheng, C.-H., **Cheng, H.-J.*** and Huang, P.-H.*. *Blm-s*, a BH3-only protein enriched in postmitotic immature neurons, is transcriptionally upregulated by p53 during DNA damage. Cell Reports 9: 166-179 (2014). (***Co-corresponding authors**) Free Article.

35. Speer, C.M., Sun, C., Liets, L.C., Stafford, B.K., Chapman, B. and **Cheng, H.-J.**. Eye-specific retinogeniculate segregation proceeds normally following disruption of patterned spontaneous retinal activity. Neural Development 9:25 (2014). PMCID: PMC4289266.

36. Davis, Z.W., Sun, C., Derieg, B., Chapman, B., and **Cheng, H.-J.**. Epibatidine blocks eye-Specific segregation in ferret dorsal lateral geniculate nucleus during stage III retinal waves. PLoS One 10(3): e0118783 (2015). PMCID: PMC4368645

37. Failor, S., Chapman, B., and **Cheng, H.-J.**. Retinal waves regulate afferent terminal targeting in the early visual pathway. Proc. Natl. Acad. Sci. USA 112: E2957-E2966 (2015). PMCID: PMC4460437

38. Davis, Z.W., Chapman, B., and **Cheng, H.-J.**. Increasing spontaneous retinal activity before eye opening accelerates the development of geniculate receptive fields. J. Neurosci. 35:14612-14623 (2015). PMCID: PMC4623229

39. Failor, S.*, Ng, A., and **Cheng, H.-J.***. Monocular enucleation alters retinal waves in the surviving eye. Neural Development 13:4 (2018). (***Co-corresponding authors**). PMCID: PMC5866508.

40. Chen, S.-Y., Ho, C.-T., Liu, W.-W., Lucanic, M., Shih, H.-M., Huang, P.-H.* and **Cheng, H.-J.***. Regulation of axon repulsion by MAX-1 SUMOylation and AP-3. Proc. Natl. Acad. Sci. USA 115: E8236-E8245 (2018). (***Co-corresponding authors**). PMCID: PMC6126772.

41. Murray, K.D.*, Liu, X.-B., King, A.N., Luu, J. and **Cheng, H.-J.***. Age-related changes in synaptic plasticity associated with mossy fiber terminal integration during adult neurogenesis. eNeuro 7(3):ENEURO.0030-20 (2020) (***Co-corresponding authors**).

C. Research Support

Ongoing Research Support

1R01AG054649-01A1 Cheng (PI) 9/15/2017 – 3/31/2022
NIH/NIA
Neuronal Integration of Newborn Granule Cells in Aged Brains
Role: PI (30%)
Direct cost: 205K/year
Indirect cost: 107K/year

1R21NS115092-01 Cheng (PI) 9/15/2019 – 8/31/2021
NIH/NINDS
Proteomic analysis of maturing adult-born hippocampal mossy fiber boutons
Role: PI (20%)
Direct cost: 125K/year
Indirect cost: 71K/year

Pending Research Support

None

Completed Research Support

Cheng (PI) 5/1/2018-6/30/2019
Advisory Research Committee (ARC), Department of Pathology and Laboratory Medicine, UC Davis
Voltage-gated potassium (Kv) channel regulation of adult neurogenesis
Role: PI (10%)
Direct cost: 30K/year

5R01EY011369 Cheng (PI) 8/1/2012 – 7/31/2015
NIH/NEI
Development of Visual Pathways.
Role: PI (30%)

Cheng (PI) 1/1/2014- 12/31/2014
Advisory Research Committee (ARC), Department of Pathology and Laboratory Medicine, UC Davis
Integration of Newborn Hippocampal Mossy Fiber Synapses During Adult Neurogenesis

Role: PI (20%)

5R21EY020743-02 Cheng (PI) 8/1/2012 – 3/31/2013
Development of a non-rodent model using light-activated channel technology to cure blindness
Role: PI (30%)

Cheng (PI) 7/1/2012- 6/30/2013
Advisory Research Committee (ARC), Department of Pathology and Laboratory Medicine, UC Davis
Mechanisms of Neuronal Connectivity in Schizophrenia
Role: PI (20%)

Cheng (PI) 7/1/2011-6/30/2013
Cancer Research Coordinating Committee (CRCC), UC
Sema3E-Mediated Epithelial-to-Mesenchymal-Transition in Ovarian Cancer
Role: PI (20%)

Cheng (PI) 10/1/2011-6/30/2013
UC Davis Alzheimer's Disease Center (NIH)
Synaptic Integration of Adult-Born Hippocampal Neurons in Alzheimer's Disease
Role: PI (20%)

R01 MH077556 Cheng (Co-PI) 7/1/2011 – 11/30/2012
National Institutes of Health
Monkey Cortical Connections Database
Role: Co-PI (20%)

1R01HD045757-01A1 Cheng (PI) 9/1/2004 – 6/30/2010
NIH/NICHD
Plexins and molecular mechanisms of axon guidance.
The goal of this grant is to investigate the roles of plexin-A3 and plexin-A4 in axon guidance.
Role: PI (30%)

1-FY07-459 Cheng (PI) 6/1/2007 – 5/31/2010
March of Dimes Birth Defects Foundation
Molecular and Cellular Basis of Stereotyped Axon pruning in the Central Nervous System
The goal of this grant is to study the pruning of corticospinal tract.
Role: PI (10%)

Cheng (PI) 6/30/2008 – 6/30/2010
UC Davis Health System
Signaling Pathways Involved in the Guidance of C. elegans Motor axons
50,000 total
Role: PI (5%)

Cheng (PI) 7/1/2009 – 6/30/2010
UC Davis Academic Senate
Axon Pruning Defects and Neuro-inflammation in Neuro-developmental Disorders
25,000 total
Role: PI (5%)

#1378 Cheng (PI) 7/1/2006 – 6/30/2008
NAAR-Autism Speaks
Axon pruning and autism spectrum disorders
The goal of this grant is to study the pruning defect in *fmr1* mutant mice.
Role: PI

Cheng (PI) 7/1/2004 – 6/30/2007
The Esther A. & Joseph Klingenstein Fund, Inc.
Mechanisms of stereotyped axon pruning.
I described the general activities of my research program in the application, i.e. the studies of molecular and cellular mechanisms of axon guidance.
Role: PI

Cheng (PI) 9/16/2004 – 9/15/2006

Alfred P. Sloan Foundation
The application didn't require a title.
I described the general activities of my research program in the application, i.e. the studies of molecular and cellular mechanisms of axon guidance. There is no specific restriction on the use of the award.
Role: PI

2003-08-54 APL Cheng (PI) 9/1/2003 – 8/31/2006

Whitehall Foundation, Inc.
The role of plexins in stereotyped axon pruning.
The major goals of this project are to explore the role of plexins in developmental axon pruning and to study the signaling pathway of plexin-mediated axon pruning.
Role: PI