CHONG CHEN

M.D., Ph.D.

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Professional Summary

As a neuroscientist who has transitioned from anesthesiology, I am dedicated to pain, opioid, and anesthesia research. Leveraging both hands-on techniques and computational approaches, my work aims to deepen our understanding of the neurobiology of pain, opioids, and general anesthesia at the circuit, cellular, and synaptic levels, ultimately improving patient care.

Scientific Training

University of North Carolina, Chapel Hill — Chapel Hill, NC
Research Associate, Neuroscience Center — *11/2019 - present*
Research Field: Neurobiology of Pain and Opioids

Stanford University — Palo Alto, CA
Postdoctoral Fellow, Grégory Scherrer Group — *07/2018 - 10/2019*
Research Field: Neurobiology of Pain and Opioids

Institute of Science and Technology Austria (ISTA) — Vienna, Austria
Graduate Student, Peter Jonas Group — *06/2015 - 05/2018*
Research Field: Synaptic Transmission at Inhibitory Synapses

Shanghai Jiaotong University — Shanghai, China
Medical Student in Yingwei Wang Group — *09/2011 - 06/2014*
Research Field: Anesthesiology and Pain

Education

Institute of Science and Technology Austria (ISTA) — Vienna, Austria
Ph.D. in Neuroscience — *09/2014 - 05/2018*
Thesis: “Synaptotagmins Ensure Speed and Efficiency of Inhibitory Neurotransmitter Release”

Shanghai Jiaotong University — Shanghai, China
M.S. in Anesthesiology — *09/2011 - 06/2014*
Thesis: “Low-Dose Sevoflurane Promotes Hippocampal Neurogenesis and Facilitates the Development of Dentate Gyrus-Dependent Learning in Neonatal Rats”

Wenzhou Medical University — Wenzhou, China
M.D. — *10/2004 - 07/2009*

Medical Training

Yuying Children's Hospital — Wenzhou, China
Residency in Anesthesia Department — *08/2009 - 06/2011*

Sir Run Run-Shaw Hospital affiliated with Zhejiang University — Hangzhou, China
Internship in Anesthesia Department — *06/2008 - 07/2009*

Certification and Licensure

Qualification for Practicing Doctors of P. R. China

Selected Awards & Honors

2024	Publication of the Year Award, Department of Cell Biology & Physiology, UNC-chapel hill.
2024-2026	International Anesthesia Research Society (IARS) Mentored Research Awards (IMRA) – $150,000
2023	Society of General Physiologists Annual Meeting Poster Award
2023	Society of General Physiologists Annual Meeting Travel Award
2022	Inscopix Tech Award
2019-2020	Stanford School of Medicine Dean's Postdoctoral Fellowship
2017	Outstanding Self-financed Chinese Students Abroad | China Scholarship Council (500 recipients from 500,000 Chinese students worldwide)
2010	Excellent Resident Physician | Yuying Children's Hospital
2009	Excellent Intern
2007	Outstanding Individual in Social Practice | Wenzhou Medical University
2006	Excellent Leader of the University Student Association
2006	ATD Leader Scholarship of Student Association
2004	Activist of the University Student Association

Mentorship and Teaching

University of North Carolina, Chapel Hill Chapel Hill, NC

Patch Clamp

- Yuechen Qiu (PhD student in Neuroscience Curriculum, 2022)
- Nicole Ochandarena (MD-PhD student in Neuroscience Curriculum, 2021)
- Matan Geron (Postdoc in Grégory Scherrer Group, 2021)

Virus Injection

- Nicole Ochandarena (MD-PhD student in Neuroscience Curriculum, 2020)
- Adrien Tassou (Postdoc in Grégory Scherrer Group, 2020)
- Yuechen Qiu (PhD student in Neuroscience Curriculum, 2022)
- Takanori Matsubara (Postdoc in Grégory Scherrer Group 2022)

Miniscope

- Nicole Ochandarena (MD-PhD student in Neuroscience Curriculum, 2020)
- Adrien Tassou (Postdoc in Grégory Scherrer Group, 2020)
- Yuechen Qiu (PhD student in Neuroscience Curriculum, 2022)
- Kushal Channabasappa Kolar (PhD student in Neuroscience Curriculum, 2022)

Stanford University Palo Alto, CA

Patch Clamp

- Shibi Li (Postdoc in Luis de Lecea Group, 2018)

Institute of Science and Technology Austria (ISTA) Vienna, Austria

Teaching Assistant

- Molecules, Cells, and Models (2013)

Patch Clamp

- Jingjing Chen (PhD student in Neuroscience, 2013)

- Marijo Jevtic (PhD student in Neuroscience, 2013)

Virus Injection

- Jingjing Chen (PhD student in Neuroscience, 2013)

Peer Review

I am a member of the Reviewer Board for the International Journal of Molecular Sciences and actively participate in the manuscript review process for several scientific journals, including:

- Science
- Frontiers in Pharmacology
- Molecular Pain
- International Journal of Molecular Sciences
- Cells
- Journal of clinical medicine

Technical Expertise

- Optogenetics/Chemogenetics
- Single-cell RNA sequencing
- Tissue clearing (CLARITY)
- Miniature microscope to image calcium dynamics in freely moving mice
- *In vitro* electrophysiology: whole-cell recording, paired recording
- *In vivo* electrophysiology: whole-cell recording, single-unit recording
- Histology: immunohistochemistry, fluorescence in situ hybridization
- Molecular biology: PCR, RT-PCR, *In situ* hybridization (ISH)
- Behavioral testing: water maze, open field, fear conditioning, von Frey mechanical sensitivity test, hot/cold-plate thermal sensitivity tests
- Anterograde and retrograde neural circuit tracing with AAVs and rabies viruses

Computer Skills

- Calcium imaging data analysis
- Machine Learning
- Graph Theory
- Single-cell RNA Sequencing data analysis (Seurat)
- Programming languages: R, MATLAB, Python
- 3D design (Autodesk Fusion 360)
- Other programs: Illustrator, Fiji

Publications

- **Chen, C.**, Niehaus, J. K., Dinc, F., Huang, K. L., Barnette, A. L., Tassou, A., Shuster, S. A., Wang, L., Lemire, A., Menon, V., Ritola, K., Hantman, A., Zeng, H., Schnitzer, M. J., & Scherrer, G. (2024). Neural circuit basis of placebo pain relief. *Nature*, 1–3.

  Selected Press Coverage:

  - Nature: Placebo effect involves unexpected brain regions
  - Nature: How do placebos ease pain? Mouse brain study offers clues
  - NEJM: What Is the Neural Basis of Placebo Pain Relief?

- PNAS: Seeking the roots of the placebo effect, neuroscientists find the brain circuit that delivers relief
- NIH Director's Blog: Study Identifies Previously Unknown Pain Control Pathway Underlying Placebo Effect
- Migraine Science Collaborative: A Newly Discovered Neural Circuit for Placebo Pain Relief
- NIH: Scientists find brain circuit for placebo pain relief
- NeurologyToday: Novel Brain Circuit Underlies Placebo Pain Relief in Animal Model

- Chen, J.*, Kaufmann, W.*, **Chen, C.**, Arai, I., Kim, O., Shigemoto, R., Jonas, P. (2024). Developmental transformation of Ca^{2+} channel-vesicle nanotopography at a central GABAergic synapse. *Neuron*. https://doi.org/10.1016/j.neuron.2023.12.002 *Equal contribution

- **Chen, C.***, Tassou, A., Morales, V., & Scherrer, G.* (2023). Graph theory analysis reveals an assortative pain network vulnerable to attacks. *Scientific Reports*, 13(1), 21985. *Corresponding author

- Li, S.-B.*, Damonte, V. M.*, **Chen, C.**, Wang, G. X., Kebschull, J. M., Yamaguchi, H., Bian, W.-J., Purmann, C., Pattni, R., Urban, A. E., Mourrain, P., Kauer, J. A., Scherrer, G., & de Lecea, L. (2022). Hyperexcitable arousal circuits drive sleep instability during aging. *Science*, *375*(6583), eabh3021. * Equal contribution

- Mercer Lindsay, N., **Chen, C.**, Gilam, G., Mackey, S., & Scherrer, G. (2021). Brain circuits for pain and its treatment. *Science Translational Medicine*, *13*(619), eabj7360.

- **Chen, C.**, Satterfield, R., Young, S. M., Jr, & Jonas, P. (2017). Triple Function of Synaptotagmin 7 Ensures Efficiency of High-Frequency Transmission at Central GABAergic Synapses. *Cell Reports*, *21*(8), 2082–2089.

- **Chen, C.**, & Jonas, P. (2017). Synaptotagmins: That's Why So Many. *Neuron*, *94*(4), 694–696.

- **Chen, C.**, Arai, I., Satterfield, R., Young, S. M., Jr, & Jonas, P. (2017). Synaptotagmin 2 Is the Fast Ca^{2+} Sensor at a Central Inhibitory Synapse. *Cell Reports*, *18*(3), 723–736.

- Shen, F.-Y., Chen, Z.-Y., Zhong, W., Ma, L.-Q., **Chen, C.**, Yang, Z.-J., Xie, W.-L., & Wang, Y.-W. (2015). Alleviation of neuropathic pain by regulating T-type calcium channels in rat anterior cingulate cortex. *Molecular Pain*, *11*, 7.

- **Chen, C.**, Shen, F.-Y., Zhao, X., Zhou, T., Xu, D.-J., Wang, Z.-R., & Wang, Y.-W. (2015). Low-dose sevoflurane promotes hippocampal neurogenesis and facilitates the development of dentate gyrus-dependent learning in neonatal rats. *ASN Neuro*, *7*(2).

Presentations

Invited Talks

- “Accessing the power of the mind: Dissecting the neural basis of placebo analgesia.” Department of Anesthesiology at UNC-Chapel Hill, October, 2024.
- “Accessing the power of the mind: Dissecting the neural basis of placebo analgesia.” Duke Department of Anesthesiology, October, 2024.
- “Accessing the power of the mind: Dissecting the neural basis of placebo analgesia.” School of Medicine, Westlake University, September, 2024.
- “Accessing the power of the mind: Dissecting the neural basis of placebo analgesia.” Department of Anesthesiology, Perioperative and Pain Medicine, Stanford University, March, 2024.
- “Accessing the power of the mind: A cortico-ponto-cerebellar circuit mediates placebo analgesia.” Neuroscience Institute, UT Southwestern Medical Center, January 2024.
- “Accessing the power of the mind: A cortico-ponto-cerebellar circuit mediates placebo analgesia.“ Cell Biology & Physiology, University of North Carolina at Chapel Hill, April 2023.
- “Accessing the power of the mind: A cortico-ponto-cerebellar circuit mediates placebo analgesia.“ Institute for Translational Neuroscience, Saint Louis University, January 2023.
- “Accessing the power of the mind: A cortico-ponto-cerebellar circuit mediates placebo analgesia.“ Department of Anesthesia & Critical Care, Chicago University, September, 2022.

Conference Presentations:

- “Impaired feedforward inhibition of corticopontine neurons drive placebo analgesia” Maixner Pain Research Symposium, Duke University, November, 2023. (Poster)
- “Impaired feedforward inhibition of corticopontine neurons drive placebo analgesia” Rachlin Symposium, the University of North Carolina at Chapel Hill, October, 2023. (Poster)
- “Impaired feedforward inhibition of corticopontine neurons drive placebo analgesia” Society of General Physiologists Annual Meeting, Woods Hole, September 2023. (Poster)
- “Impaired feedforward inhibition of corticopontine neurons drive placebo analgesia” Society for Neuroscience, San Diego, November 2022. (Poster)
- “A Cortico-ponto-cerebellar Circuit Mediates Placebo Analgesia.” Rachlin Symposium, the University of North Carolina at Chapel Hill, October, 2022. (Poster)
- “Accessing the power of the mind: A cortico-ponto-cerebellar circuit mediates placebo analgesia.“ The University of North Carolina at Chapel Hill, Neuroscience center, September, 2022. (Oral)

- “Accessing the power of the mind: A cortico-ponto-cerebellar circuit mediates placebo analgesia.“ OHSU, Anesthesiology Department, June 2022. (Oral)
- “A Cortico-ponto-cerebellar Circuit Mediates Placebo Analgesia.” International Narcotics Research Conference (virtual), June 2021. (Oral)
- “Resolving the molecular identity and connectivity of amygdalar neural ensembles active during pain.” Society for Neuroscience, Chicago, November 2019. (Poster)
- “From an anesthesiologist to a neuroscientist.” The NO.10 People's Hospital of Shanghai, Shanghai, China, July 2018. (Oral, invited)
- “Triple function of synaptotagmin 7 ensures efficiency of high-frequency transmission at central GABAergic synapses.” Society for Neuroscience, Washington D.C., November 2017. (Poster)
- “Synaptotagmin 7 promotes sustained high–frequency transmission at central inhibitory synapses.” Austrian Neuroscience Association, Vienna, Austria, September 2017. (Poster)
- “Synaptotagmin 7 promotes sustained high–frequency transmission at central inhibitory synapses.” GRC Inhibition in the CNA, Les Diablerets, Switzerland, June 2017. (Poster)
- “Synaptotagmin 7 Functions as Ca^{2+} Sensor for Synaptic VesicleReplenishment During RepetitiveActivity at an Inhibitory Synapse.” IST Austria Neuroscience Seminar Talks, Vienna, Austria, April 2017. (Oral)