

CURRICULUM VITAE

Won Chan Oh, Ph.D.

CONTACT

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EDUCATION

2006 **B.S.** in Biology, Dongguk University, Seoul, Korea
2008 **M.S.** in Life Science (Developmental Genetics), Gwangju Institute of Science and Technology (GIST), Gwangju, Korea
2013 **Ph.D.** in Cellular and Developmental Biology (Cellular Neurobiology), University of California, Davis, CA

PROFESSIONAL APPOINTMENTS / EMPLOYMENT

2006 - 2008 **Research Assistant / M.S. Student** with Drs. Joohong Ahnn and Do Han Kim
Department of Life Science, GIST, Gwangju, Korea
2008 - 2013 **Research Assistant / Ph.D. Student** with Dr. Karen Zito
Cellular and Developmental Biology Graduate Group, University of California, Davis, CA
2014 - 2018 **Postdoctoral Fellow** with Dr. Hyung-Bae Kwon
Max Planck Florida Institute for Neuroscience (MPFI), Jupiter, FL
2018 - Present **Assistant Professor**
Department of Pharmacology, University of Colorado School of Medicine (SOM), Aurora, CO

TEACHING EXPERIENCE

2010 - 2013 Teaching Assistant for Neurobiology, University of California, Davis, CA
(Winter Quarter 2010, Winter Quarter 2013, Fall Quarter 2013)
2013 Teaching and Research Assistant for 2013 CSHL Course on Imaging Structure and Function in the Nervous System, Cold Spring Harbor Laboratory (CSHL), NY
2016 - 2018 Teaching and Research Assistant for MPFI Courses on Neuroimaging Techniques,
Max Planck Florida Institute for Neuroscience, FL
2018 - Present Participation in Frontiers in Pharmacology (PHCL 7600), Univ. of Colorado SOM, CO
2021 Participation in Developmental Neurobiology (NRSC 7615), Univ. of Colorado SOM, CO
2022 - Present Participation in Principles of Pharmacology (Course Director, PHCL 7620), Univ. of Colorado SOM, CO
2023 - Present Participation in Cellular and Molecular Neurobiology (NRSC 7600), Univ. of Colorado SOM, CO

AWARDS, HONORS, FELLOWSHIPS

1999 - 2005 **Academic Scholarships**, Dongguk University, Seoul, Korea
2004 **Summer Research Travel Fellowship** (Univ. of Toronto, McGill Univ.), Dongguk University
2005 **Exemplary Achievement Scholarship**, Dongguk University
2006 **Best Undergraduate Thesis Award**, Dongguk University
Magna cum laude, Dongguk University

2006 - 2008	Government Research Fellowship , Ministry of Science and Technology, GIST, Korea
2012	KUSCO-KSEA Graduate Student Scholarship , Korea-U.S. Science Cooperation Center (KUSCO) and Korean-American Scientists and Engineers Association (KSEA), USA
2012	US-Korea Conference (UKC) Travel Award , KUSCO, USA (<i>Invited Speaker</i>)
2013	Gordon Research Conference (GRC) Travel Award (<i>Invited Speaker</i>), Excitatory Synapses and Brain Function, Switzerland
2017	MPFI Postdoctoral Travel Fellowship , Max Planck Florida Institute for Neuroscience, Jupiter, FL
2019	GRC Travel Award (<i>Invited Speaker</i>), Dendrites: Molecules, Structure and Function, CA
2020	NARSAD Young Investigator Award , Brain and Behavior Research Foundation
2020	CO-Pilot Grant Award , CCTSI (Colorado Clinical and Translational Sciences Institute)
2020	Fay/Frank Seed Grant Award , Brain Research Foundation
2022	Faculty Award for Excellence in Research , Department of Pharmacology, University of Colorado SOM
2022	Research Collaboration Award for the CU Anschutz Research Award Program , University of Colorado SOM
2022	Junior Faculty Award for Outstanding Research , Association of Korean Neuroscientists in America
2023	Travel Award (<i>Invited Speaker</i>), Sunposium (Neural Circuits Research Conference), MPFI, FL
2023	AB Nexus Grant Award , CU Anschutz Medical Campus and CU Boulder, University of Colorado

PUBLICATIONS

Research Articles

1. Cho, J.H., Song, H.O., Singaravelu, G., Sung, H., **OH, W.C.**, Kwon, S., Kim do, H., and Ahnn, J. (2009) Pleiotropic roles of calumenin (calu-1), a calcium-binding ER luminal protein, in *Caenorhabditis elegans*. **FEBS Lett** 583:3050-3056.
2. **OH, W.C.***, Song, H.O.*, Cho, J.H.*, and Park, B.J. (2011) ANK repeat-domain of SHN-1 is indispensable for *in vivo* SHN-1 function in *C. elegans*. **Mol Cells** 31:79-84. ***co-first**
3. Woods, G.F., **OH, W.C.**, Boudewyn, L.C., Mikula, S.K., and Zito, K. (2012) Loss of PSD-95 Enrichment is not a Prerequisite for Spine Retraction. **J Neurosci** 31:12129-12138.
4. Hamilton, A.M., **OH, W.C.**, Vega-Ramirez, H., Patrick, G.N., and Zito, K. (2012) Activity-dependent growth of new dendritic spines is regulated by the proteasome. **Neuron** 74:1023-1030.
5. **OH, W.C.**, Hill, T.C., and Zito, K. (2013) Synapse-specific and size-dependent mechanisms of spine structural plasticity accompanying synaptic weakening. **PNAS** Jan 22;110(4):E305-12
6. **OH, W.C.**, Parajuli, L.K., and Zito, K. (2015) Heterosynaptic structural plasticity on local dendritic segments of hippocampal CA1 neurons. **Cell Reports** 10:162-169. [F1000 Prime Recommended]
7. Villa, K.L., Berry, K.P., Subramanian, J., Cha, J.W., **OH, W.C.**, Kwon, H.-B., Kubota, Y., So, P.T.C. and Nedivi, E. (2016) Inhibitory synapses are repeatedly assembled and removed at persistent sites *in vivo*. **Neuron** 89:1-14.
8. Kim, T.*, **OH, W.C.***, Choi, J.H., and Kwon, H.-B. (2016) Emergence of functional subnetworks in layer 2/3 cortex induced by sequential spikes *in vivo*. **PNAS** 113:E1372-81. ***co-first**
9. **OH, W.C.**, Lutz, S., Castillo, P.E., and Kwon, H.-B. (2016) De novo synaptogenesis induced by GABA in the developing mouse cortex. **Science** 353, 1037-1040.
[Jansen, L. (2017) Making Connections With GABA. Current Literature In Basic Science, Epilepsy Currents]
[Lewis, S. (2016) Neuronal development: Signalling synaptogenesis. Research Highlight, Nature Reviews Neuroscience]
10. Lee, D., Creed, M., Jung, K., Stefanelli, T., Wendler, D.J., **OH, W.C.**, Mignocchi, N.L., Lüscher, C., and Kwon, H.-B. (2017) Temporally precise labeling and control of neuromodulatory circuits in mammalian brain. **Nat. Methods** 14:495-503
11. Sigler, A.*, **OH, W.C.***, Imig, C.*, Altas, B., Kawabe, H., Cooper, B. H., Kwon, H.-B., Lee, J.-S., Brose, N. (2017) Formation and maintenance of functional spines in the absence of presynaptic glutamate release. **Neuron** 94:304-311. ***co-first** [F1000 Prime Recommended]

12. Sutton, L.P., Orlandi, C., Song, C., **OH, W.C.**, Muntean, B., Xie, K., Filippini, A., Xie, X., Satterfield, R., Yaeger, J.D. W., Renner, K.J., Young, S.M., Xu, B., Kwon, H.-B., and Martemyanov, K.A. (2018) Orphan receptor GPR158 controls stress-induced depression. *eLife* 7:e33273
13. Kim, J.*, Lee, S.*, Jung, K.*, **OH, W.C.**, Kim, N., Son, S., Jo, Y., Kwon, H.-B., and Heo, W. D. (2019) Intensiometric biosensors visualize the activity of multiple small GTPases *in vivo*. *Nat Commun.* 10(1):211.
14. Parajuli, L.K., Urakubo, H., Takahashi-Nakazato, A., Ogelman, R., Iwasaki, H., Koike, M., Kwon, H.-B., Ishii, S., **OH, W.C.**, Fukazawa, Y., Okabe, S. (2020) Geometry and the organizational principle of spine synapses along a dendrite. *eNeuro* 0248-20.2020
15. **OH, W.C.**#, Rodríguez, G., Aseda, D., Jung, K., Hwang, I.-W., Ogelman, R., Bolton, M., and Kwon, H.-B.# (2021) Dysregulation of mesoprefrontal dopamine circuit mediates early life stress-induced excitatory/inhibitory synaptic imbalance in the prefrontal cortex. *Cell Reports* 35(5):109074 #Corresponding authors
16. Dong, C., Ly, C., Dunlap, L.E., Vargas, M.V., Sun, J., Hwang, I.-W., Azinfar, A., **OH, W.C.**, Wetsel, W.C., Olson, D.E., and Tian, L. (2021) Psychedelic-Inspired Drug Discovery Using an Engineered Biosensor. *Cell* 184(10):2779-2792.e18
17. Jang, J., **OH, W.C.**, and Zito, K. (2021) Induction of input-specific spine shrinkage by two-photon glutamate uncaging. *STAR Protoc.* 2(4):100996
18. Kim, J., Kim, S., Kim, H., Hwang, I.-W., Bae, S., Karki, S., Ogelman, R., Kim, D., Eun, J., Bang, G., Kim, J.-Y., Kajander, T., Um, J.W., **OH, W.C.**#, and Ko, J.# (2022) MDGA1 negatively regulates amyloid precursor protein-mediated synapse inhibition in the hippocampus. *PNAS* 119 (4) e2115326119 #Corresponding authors
19. Kleinjan, M., Buchta, W., Ogelman, R., Hwang, I.-W., Kuwajima, M., Hubbard, D., Kareemo, D., Prihodko, O., Olah, S., Gomez Wulschner, L. E., Abraham, W., Franco, S., Harris, K. , **OH, W.C.**#, and Kennedy, M.J.# (2022) Dually-innervated dendritic spines develop in the absence of synaptic input and resist structural plasticity through tonic inhibitory crosstalk. *Neuron* 2023 Feb 1;111(3):362-371.e6 #Corresponding authors
20. Swenson, K.S., Gomez Wulschner, L. E., Hoelscher, V.M., Folts, L., Korth, K.M., **OH, W.C.**, Bates, E., A. (2023) Fetal cannabidiol (CBD) exposure alters thermal pain sensitivity, cognition, and prefrontal cortex excitability. / *In Press, Molecular Psychiatry* /

Review Articles and Book Chapters

1. Hill, T.C., **OH, W.C.**, and Zito, K. (2009) Optical Manipulation of Neural Activity: Recent Advances for Applications using Two-Photon Microscopy, In: Thompson S, Blanpied T, (ed), *The Change We Need: New Frontiers in Live-Cell Imaging*, Washington, DC: Society for Neuroscience, pp.51-60.
2. **OH, W.C.**#, Smith, K.R.# (2019) Activity-dependent development of GABAergic synapses. *Brain Research* 1707:18-26 #Corresponding authors
3. Stein, I. S., Hill, T.C. **OH, W.C.**, Parajuli, L.K. and Zito, K. (2019) Two-Photon Glutamate Uncaging to Study Structural and Functional Plasticity of Dendritic Spines. *Neuromethods Multiphoton Microscopy* 148: 65-85
4. Ogelman, R., Hwang, I., **OH, W.C.** (2020) Cloaked caged glutamate eliminates off-target GABA-A receptor antagonism and opens a new door in neuroscience. *Lab Anim* 49, 177-179
5. Lee, D., Creed, M., Jung, K., Stefanelli, T., Wendler, D.J., **OH, W.C.**, Mignocchi, N.L., Lüscher, C., and Kwon, H.-B. (2021) Shining light on neuromodulator function with iTango, a new reporting system of ligand-receptor interactions. *Research Square Preprint* <https://doi.org/10.21203/rs.3.rs-334367/v1>
6. Kim, J., Gomez Wulschner, L.E., **OH, W.C.**, Ko, J. (2022) Trans-synaptic signaling mechanisms orchestrated by synaptic cell adhesion molecules. *BioEssays (selected for cover)*, 2022 Sep 11:e2200134

Submitted / In revision

1. Ogelman, R., Gomez Wulschner, L. E., Hoelscher, V., Hwang, I.-W., **OH, W.C.** (2023) Serotonin modulates excitatory synapse maturation in the prefrontal cortex / *In Revision, Nat Commun* /

RESEARCH SUPPORT (On-going)

1. **BrightFocus Foundation Alzheimer's Disease Research Program**, Co-I: OH, 01/01/2023 - 12/31/2025
The BrightFocus Foundation
Title: Co-activation of selective nicotinic acetylcholine receptors improves hippocampal inhibitory activity and oscillations in Alzheimer's disease

2. **AB Nexus Research Collaboration Grant**, Co-PI: OH, 6/01/2023 - 05/31/2024
CU Anschutz Medical Campus and CU Boulder
Title: Prefrontal mechanisms underlying the enduring impact of early life adversity
3. **R01 EY031461**, Co-I: OH, 05/01/2020 - 04/30/2024
NIH / NEI
Title: Engineered multi-therapeutic agents delivery system towards retinal ganglion cell axon regeneration
4. **R01 MH124778**, PI: OH, 12/01/2020 - 10/31/2025
NIH / NIMH
Title: Serotonergic modulation of excitatory synapse formation and maturation during development
5. **R21 MH126073**, PI: OH, 4/01/2021 - 04/31/2024 (*NCE*)
NIH / NIMH
Title: Dissecting neural circuits underlying early life stress-induced PFC dysfunction
6. **R21 NS133681**, PI: OH, 7/01/2023 - 06/31/2025 (*To be paid; 10 percentile, 27 impact score*)
NIH / NINDS-NIMH
Title: A new approach to understanding cognitive disabilities in Down syndrome

Completed

1. **2020 CSU/CU-Pilot Collaboration Grant**, Co-PI: OH, 05/01/2020 - 04/30/2021
CCTSI (Colorado Clinical and Translational Sciences Institute)
Title: Beta amyloid-induced hippocampal network dysfunction via selective inhibition of nicotinic acetylcholine receptors in interneurons
2. **2020 NARSAD Young Investigator Grant**, PI: OH, 01/15/2020 - 01/14/2022
Brain & Behavior Research Foundation
Title: Dissecting neural circuits underlying early life stress-induced autism-like social deficits
3. **2020 Fay/Frank Seed Grant**, PI: OH, 07/01/2020 - 05/31/2022
Brain Research Foundation
Title: Role of inhibitory synapses in shaping excitatory circuits
4. **2021 Crnic Blumenthal Grant**, PI: OH, 9/01/2021 - 08/31/2022
The Linda Crnic Institute for Down Syndrome
Title: Dissecting the impact of serotonin dysfunction on the Dp16 mouse model of DS

RESEARCH TRAINING RECORD

Trainees

Roberto Ogelman (Neuroscience PhD Program, 2019-present), *F31 NRSA Fellow (2022 - present)*

Luis Gomez Wulschner (Neuroscience PhD Program, 2021-present), *Blumenthal Fellow & T32 Pharm Trainee (2021-2023)*

Victoria Chang (Neuroscience PhD Program, 2023-present)

Victoria Hoelscher (Post-bac researcher, 2021 - April 2023)

In-Wook Hwang (Post-bac researcher, Oct 2019 - June 2022)

Thesis & Comprehensive Exam Committees

Susana Restrepo (Pharmacology PhD program, Aoto lab; member, 2016-2021)

Alexandra Huffman (Pharmacology PhD program, Dell'Acqua lab; member, 2020-2021)

Sarah Zych (Medical Scientist Training Program, Ford lab; member, 2017-2022)

Joshua Garcia (Pharmacology PhD program, Smith lab; member, 2017-2022)

Hannah Actor-Engel (Neuroscience PhD program, Kennedy lab; member, 2018-2023)

Jonathan Tullis (Pharmacology PhD program, Bayer lab; member, 2018-2023)

Tyler P Martinez (Pharmacology PhD program, Dell'Acqua lab; member, 2015-present)

Katie Hahm (Neuroscience PhD program, Dell'Acqua lab; member, 2018-present)

Mason Kleinjan (Biomedical Sciences PhD program, Kennedy lab; member, 2018-present)

Theresa Welle (Neuroscience PhD program, Smith lab; member, 2019-present)

Jungmin Kim (Neuroscience PhD program, Aoto lab; member, 2019-present)
 Brian Lloyd (Neuroscience PhD program, Aoto lab; member, 2019-present)
 Eric Stokes (Pharmacology PhD program, Aoto lab; member, 2020-present)
 Kyle Northington (Cell Biology, Stem Cells and Development PhD program, Bates lab; member, 2020-present)
 Mostafa El-Kalliny (Medical Scientist Training Program, Zoe lab; member, 2021-present)
 Carley Miller (Medical Scientist Training Program, Aoto lab; member, 2021-present)
 Harrison Ramsay (Neuroscience PhD program, Kennedy lab; member, 2021-present)
 Robin Vareed (Neuroscience PhD program, Peters lab; member, 2020-present)
 Sarah Wolfe (Neuroscience PhD program, Smith lab; member, 2021-present)
 Matthew Larsen (Neuroscience PhD program, Bayer lab; member, 2021-present)
 Amber Stewart (Pharmacology PhD program, Smith lab; member, 2022-present)

Mentoring Program

Pharmacology PhD Program, Major Seminar Advisor for Eric G. Stokes
 Medical Scientist Training Program, Pharmacology Seminar Advisor for Carley Miller
 Biomedical Sciences PhD Program, BSP Seminar Advisor for Samantha Oetjen and Jessica Olivas-Corral
 Neuroscience PhD Program, Speaking and Presenting Seminar Advisor for Theresa Welle
 Developmental Biology Section, Post-Doctoral Fellow Mentoring Advisor for Yong-II Kim
 Optics and Photonics Group, University of Colorado Boulder, NSF Innovation Corps (I-Corps) Advisor for Samuel Gilinsky

PROFESSIONAL SERVICES

Ad Hoc Journal Reviewer

Nature Communication, Cell Reports, Frontiers in Cellular Neuroscience, Frontiers in Synaptic Neuroscience, Journal of Neuroscience Research, Neuron, Translational Psychiatry

Ad Hoc Grant Review Work

2020 - 2021 K to R Grant Review Panel, CCTSI, University of Colorado School of Medicine
 June, 2021 Molecular Neuropharmacology and Signaling Study Section (MNPS), NIH
 2022 AB Nexus Grant Review Panel, University of Colorado Anschutz and Boulder

Editorial and Advisory Board

Review Editor on the Editorial Board of Frontiers in Synaptic Neuroscience
 Science Mentor on the Editorial Board of Frontiers for Young Minds
 International Advisor for Yonsei University Division of Biological Science and Technology BK21 Program, Korea
 Global Mentor for University of Science and Technology (UST) Graduate School, Korea
 eTALK Committee Member, AKN (Association of Korean Neuroscientists in America)

Univ. of Colorado School of Medicine Committees and Service

2022 - Present Pharmacology Department & Neurotechnology Center (NTC) Faculty Search Committee
 2020 - Present Biomedical Sciences PhD Program Admissions Committee
 2022 - Present Pharmacology PhD Program Admissions Committee
 2022 Frontiers in Pharmacology (PHCL 7600) Course Director
 2022 - Present Principles of Pharmacology (Course Director, PHCL 7620) Course Director
 2019 - Present NTC Seminar Committee (Chair)
 2020 - Present Neuroscience PhD Program Seminar Committee (Chair)
 2022 - Present Pharmacology Department & PhD Program Seminar Committee
 2022 - Present Neuroscience PhD Program Preliminary Exam Committee
 2019 - Present Pharmacology PhD Program, student interviewer

2019 - Present	Neuroscience PhD Program, student interviewer
2020 - Present	Biomedical Sciences PhD Program, student interviewer
2019 - Present	Medical Scientist Training Program (MD/PhD Program), student interviewer
2019 - Present	Poster Judge, Student Research Day, Pharmacology PhD Program
2020 - 2023	Pharmacology Department, Annual Retreat Organizer
2021 - 2022	Neuroscience PhD Program, Annual Retreat Organizer

INVITED TALKS (selected, since 2018)

2018	Neuroscience Graduate Program, Univ. of Colorado SOM, CO
2019	GRC: Dendrites: Molecules, Structure and Function, CA
2019	Department of Pharmacology, Univ. of Colorado SOM, CO
2020	Department of Anesthesiology, Univ. of Colorado SOM, CO
2021	2021 International Conference of the Korean Society for Molecular and Cellular Biology, Korea
2021	Department of Physiology and Biomedical Sciences, Seoul National University, Korea
2021	Division of Biological Science and Technology, Yonsei University, Korea
2021	Brain Science Institute Korea Institute of Science and Technology (KIST), Korea
July, 2022	UST Global Mentoring Conference, Korea
Sept, 2022	Career Development Seminar, School of Life Science, GIST, Korea
Sept, 2022	Neuroscience Seminar Series, University of Colorado Boulder
Oct, 2022	Department of Molecular and Integrative Physiology, University of Michigan Medical School
Nov, 2022	Department of Molecular, Cellular and Integrative Neurosciences, Colorado State University
Nov, 2022	Department of Molecular and Cellular Biology, Kennesaw State University
Nov, 2022	Center for Cognition and Sociality, Institute for Basic Science (IBS), Korea
Mar, 2023	Sunposium (Neural Circuits Research Conference), Max Planck Florida Institute, FL
July, 2023	Department of Biological Sciences, KAIST
July, 2023	Department of Brain and Cognitive Sciences, DGIST, Korea
Aug, 2023	Symposium Organizer & Speaker, Japanese Neuroscience Meeting, Japan

PROFESSIONAL ACTIVITIES

2001 - 2003	Mandatory military service in the Republic of Korea Marine Corps
2003 - 2004	Cambridge ESOL (First Certificate in English) Courses, Dublin, Republic of Ireland
2009 - 2010	UC Davis Representative of KOLIS (UCD-KOLIS)
2009 - 2013	Member of Korean-American Scientists and Engineers Association (KSEA) and Korean life scientists in the bay area (KOLIS, KSEA-APS)
2014 - 2018	Member of MPFI Postdoctoral Association and Panel
2013 - Present	Society for Neuroscience, USA
2021 - Present	Member of Linda Crnic Institute for Down Syndrome