

CURRICULUM VITAE

Mean-Hwan Kim

Meanhwan Kim, Ph.D.

Senior Scientist | Human Cell Types Department | Allen Institute for Brain Science

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Education

- Ph.D. 2008, Pohang University of Science and Technology (POSTECH), Pohang, South Korea, Dept. of Physics, Advisor: Dr. Duk-Su Koh, *Thesis Title*: Ca^{2+} -dependent exocytosis in neuroendocrine and epithelial cells.
- M.Sc. 2003, Pohang University of Science and Technology (POSTECH), Pohang, South Korea, Dept. of Physics, Advisor: Dr. Duk-Su Koh, *Thesis Title*: Exocytosis induced by Proteinase-activated receptor-2 (PAR-2) in epithelial cells.
- B.Sc. 2001, Sungkyunkwan University, Suwon, South Korea, Dept. of Physics

Research Experience and Scientific positions

- 2017 - Senior Scientist, Human Cell Types Department, Allen Institute for Brain Science, Seattle, Washington, USA
- 2018 - 2020 Co-lead of Synaptic Physiology Project, Cell Type Program, Allen Institute for Brain Science, Seattle, Washington, USA
- 2013 - 2017 Postdoctoral Fellow, The Biozentrum, University of Basel, Basel, Switzerland, Advisors: Drs. Thomas Mrcic-Flogel and Sonja Hofer
- 2008 - 2013 Postdoctoral Fellow, The Vollum Institute, Oregon Health & Science University, Portland, Oregon, USA, Advisors: Drs. Henrike von Gersdorff and W. Rowland Taylor
- 2005 - 2008 Visiting Student Researcher, Dept. of Physiology and Biophysics and Dept. of Medicine, University of Washington, Seattle, Washington, USA, Advisors: Drs. Duk-Su Koh, Toan Nguyen, and Bertil Hille
- 2003 - 2005 Graduate Student Researcher, Dept. of Physics, Pohang University of Science and Technology (POSTECH), Pohang, South Korea, Advisor: Dr. Duk-Su Koh
- 2001 - 2003 Graduate Student Researcher, Dept. of Physics, Pohang University of Science and Technology (POSTECH), Pohang, South Korea, Advisor: Dr. Duk-Su Koh
Visiting Student Researcher, Dept. of Physiology and Biophysics, University of Washington, Seattle, Washington, USA, Advisors: Drs. Duk-Su Koh and Bertil Hille.

Curriculum Vitae of Mean-Hwan Kim

Honors, Awards, Fellowships, Grants

Awardee of the N.L. Tartar Research Fellowship, Oregon Health & Science University, Portland, Oregon, USA, 2011-2012

Scholarship from the Korea Research Foundation, Postdoctoral Research Program, South Korea, 2008-2009

Scholarship from the Korea Research Foundation, International Collaborative Research Program, South Korea, 2007-2008

Scholarship from the Korea Science and Engineering Foundation, South Korea, 2003

Professional Activities

Member of the Distinguished Seminar Series Selection Committee at the Allen Institute for Brain Science, Seattle, Washington, USA, 2021-2023

Member of the Laboratory Safety Committee at the Allen Institute for Brain Science, Seattle, Washington, USA, 2021-2023

Member of the Next Generation Leader Selection Committee at the Allen Institute for Brain Science, Seattle, Washington, USA, 2020

Attendee of “NEURON simulator” Summer Course at the Institute for Neural Computation, University of California, San Diego, CA, USA, 2010

Teaching/Mentoring Experiences

Mr. Jacob Brawer, Summer Internship Program, Allen Institute for Brain Science, 2019

Ms. Haleigh Schwartz, Summer Student Program, Dept. of Neurological Surgery, University of Washington, 2019

Mr. Justin Lee, Summer Internship Program, Allen Institute for Brain Science, 2018

Ms. Quynh Pham, Summer Student Program, Dept. of Neurological Surgery, University of Washington, 2018

Teaching assistant, the undergraduate course of “Classical Mechanics”, Dept. of Physics, Pohang University of Science and Technology (POSTECH), Pohang, South Korea, 2004

Research assistant, the graduate course of “Advanced Experiments in Physics”, Dept. of Physics, Pohang University of Science and Technology (POSTECH), Pohang, South Korea, 2003

Teaching assistant, the undergraduate course of “General Physics”, Dept. of Physics, Pohang University of Science and Technology (POSTECH), Pohang, South Korea, 2001

Editorial Board Experiences as a Review Editor

2023 - Frontiers in Neural Circuits

2023 - Frontiers in Human Neuroscience

Ad hoc Manuscript Reviewer

Journal of Neuroscience

Journal of Neurophysiology

Scientific Reports

Publications

Research Papers:

1. **Kim, M.H.**, Junior, P.S., Puthussery, T., Gross, O.P., Taylor, R.T., von Gersdorff, H. (2023). Functional maturation of the rod bipolar to AII-amacrine ribbon synapse in the mouse retina [under revision of *Cell Reports*].
2. **Kim, M.H.** et al. (2023). Target cell-specific synaptic dynamics of excitatory to inhibitory neuron connections in supragranular layers of human cortex. *ELife*, **12**, e81863, doi: 10.7554/eLife.81863.
3. Znamenskiy, P.*, **Kim, M.H.***, Muir, D.R.*, Iacaruso, M.F., Hofer, S.B., Mrsic-Flogel, T. (2023). Functional selectivity and specific connectivity of inhibitory neurons in primary visual cortex [* equal contribution; under revision of *Neuron*].
4. Campagnola, L., Seeman, S.C., ..., **Kim, M.H.**, et al. (2022). Connectivity and synaptic physiology in the mouse and human neocortex. *Science*, **375**, eabj5861. doi: 10.1126/science.abj5861.
5. Berg, J., Sorensen, S.A., Ting, J.T., Miller, J.A., ..., **Kim, M.H.**, et al. (2021). Human cortical expansion involves diversification and specialization of supragranular intratelencephalic-projecting neurons. *Nature* **598**, 151-158.
6. Lee, J.H., **Kim, M.H.**, Vijayan, S. (2020). Temporal learning of bottom-up connections via spatially nonspecific top-down inputs. *Neurocomputing* **411**, 128-138.
7. **Kim, M.H.***, Znamenskiy, P.*, Iacaruso, M.F., Mrsic-Flogel, T. (2018). Segregated subnetworks of intracortical projection neurons in primary visual cortex. *Neuron* **100**, 1313-1321 [* equal contribution].
8. **Kim, M.H.**, von Gersdorff, H. (2016). Postsynaptic plasticity triggered by Ca^{2+} -permeable AMPA receptor activation in retinal amacrine cells. *Neuron* **89**, 507-520.
9. Balakrishnan, V., Puthussery, T., **Kim, M.H.**, Taylor, W.R., von Gersdorff, H. (2015). Synaptic vesicle exocytosis at the dendritic lobules of an inhibitory interneuron in the mammalian retina. *Neuron* **87**, 563-575.
10. **Kim, M.H.**, Seo, J.B. Burnette, L., Hille, B., Koh, D.S. (2013). Characterization of store-operated Ca^{2+} channels in pancreatic duct epithelia. *Cell Calcium* **54**, 266-275.
11. Vickers, E., **Kim, M.H.**, Vigh, J., von Gersdorff, H. (2012). Paired pulse plasticity in the strength and latency of light-evoked lateral inhibition to retinal bipolar cell terminals. *J. Neurosci.* **32**, 11688-11699.
12. **Kim, M.H.**, Vickers, E., von Gersdorff, H. (2012). Patch-clamp capacitance measurements and Ca^{2+} imaging at single nerve terminals in retinal slices. *J. Vis. Exp.* **59**, pii: 3345. doi:10.3791/3345.
13. Cho, J.H., Chen, L., **Kim, M.H.**, Chow, R.H., Hille, B., Koh, D.S. (2010). Characteristics and functions of α -amino-3-hydroxy-5-methyl-4-isoxazolepropionate receptors expressed in mouse pancreatic α -cells. *Endocrinology* **151**, 1541-1550.
14. Jung, S.R., **Kim, M.H.**, Hille, B., Koh, D.S. (2009). Control of granule mobility and exocytosis by Ca^{2+} -dependent formation of F-actin in pancreatic duct epithelial cells. *Traffic* **10**, 392-410.
15. **Kim, M.H.**, Uehara, S., Muroyama, A., Hille, B., Moriyama, Y., Koh, D.S. (2008). Glutamate transporter-mediated glutamate secretion in the mammalian pineal gland. *J. Neurosci.* **28**, 10852-10863.

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16. **Kim, M.H.**, Choi, B.H., Jung, S.R., Sernka, T.J., Kim, S., Kim, K.T., Hille, B., Nguyen, T.D., Koh, D.S. (2008). Protease-activated receptor-2 increases exocytosis via multiple signal transduction pathways in pancreatic duct epithelial cells. *J. Biol. Chem.* **283**, 18711-18720.
17. Kim, H.S., Yumkham, S., Lee, H.Y., Cho, J.H., **Kim, M.H.**, Koh, D.S., Ryu, S.H., Suh, P.G. (2005). C-terminal part of AgRP stimulates insulin secretion through calcium release in pancreatic beta Rin5mf cells. *Neuropeptides* **39**, 385-393.
18. Kim, J.H., Nam, J.H., **Kim, M.H.**, Koh, D.S., Choi, S.J., Kim, S.J., Lee, J.E., Min, K.M., Uhm, D.Y., Kim, S.J. (2004). Purinergic receptors coupled to intracellular Ca^{2+} signals and exocytosis in rat prostate neuroendocrine cells. *J. Biol. Chem.* **279**, 27345-27356.
19. Jung, S.R., **Kim, M.H.**, Hille, B., Nguyen, T.D., Koh, D.S. (2004). Regulation of exocytosis by purinergic receptors in pancreatic duct epithelial cells. *Am. J. Physiol., Cell Physiol.* **286**, C573-579.
20. Lee, I.S., Hur, E.M., Suh, B.C., **Kim, M.H.**, Koh, D.S., Rhee, I.J., Ha, H., Kim, K.T. (2003). Protein kinase A-and C-induced insulin release from Ca^{2+} -insensitive pools. *Cell. Signal.* **15**, 529-537.

Review Papers:

1. **Kim, M.H.**, Li, G.L., von Gersdorff, H. (2013). Single Ca^{2+} channels and exocytosis at sensory synapses. *J. Physiol.* **591**, 3167-3178.
2. **Kim, M.H.**, von Gersdorff, H. (2010). Extending the realm of membrane capacitance measurements to nerve terminals with complex morphologies. *J. Physiol.* **588**, 2011-2012.

Manuscripts under preparation:

1. **Kim, M.H.**, von Gersdorff, H. Ca^{2+} -permeable AMPA receptors and synaptic plasticity at developmental retinal circuits [Invited review, Frontiers in CELLULAR NEUROSCIENCE: Neural Circuit and Synaptic Plasticity in Health and Disease: Retina Perspective; under the submission of abstract and preparation].
2. **Kim, M.H.**, Mrsic-Flogel, T. Selective cortical feedback loops onto layer 5 projection neurons in mouse visual cortex [under preparation].

Abstracts presented in Scientific Meetings:

1. **Kim, M.** et al. Cell-type specific cellular actions of psilocin on mouse and human cortical pyramidal neurons. Conference for Psychedelics at Oregon Health & Science University, Portland, OR, USA (May 12, 2023)
2. **Kim, M.** et al. Cross species comparison of short-term synaptic dynamics in mammalian cortex. Society for Neuroscience, San Diego, CA, USA (November 12-16, 2022)
3. Dembrow, N., Perlmutter, S.I., Owen, S.F., Radaelli, C., **Kim, M.** et al. Cross-areal differences in the multimodal properties of non-human primate pyramidal neurons. Society for Neuroscience, Virtual Poster Session (November 11, 2021)
4. Radaelli, C., **Kim, M.** et al. Characterization of intrinsic and synaptic properties of genetically-targeted human neocortical neurons using an *ex vivo* brain slice culture and viral labeling paradigm. Society for Neuroscience, Chicago, IL, USA (October 19-23, 2019)
5. **Kim, M.** et al. Establishing correspondence between morphology, electrophysiology, synaptic connectivity and gene expression in specific cell types in local human cortical networks. Society for Neuroscience, San Diego, CA, USA (November 3-7, 2018)

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6. Znamenskiy, P., **Kim, M.**, Iacaruso, M.F., Mrcic-Flogel, T. Interdigitating subnetworks of intracortical projection neurons in mouse V1. Cosyne meeting, Salt Lake City, UT, USA (February 23-26, 2017)
7. **Kim, M.**, Znamenskiy, P., Iacaruso, M.F., Hofer, S.B., Mrcic-Flogel, T. Visual response similarity predicts the strength of PV-pyramidal neuron connections in mouse V1. Cosyne meeting, Salt Lake City, UT, USA (February 23-26, 2017)
8. **Kim, M.**, Iacaruso, M.F., Znamenskiy, P., Mrcic-Flogel, T. Local connectivity of long-range projection neurons in mouse primary visual cortex. Society for Neuroscience, Chicago, IL, USA (October 17-21, 2015)
9. **Kim, M.H.**, Puthussery, T., Balakrishnan, V., Gross, O.P., Taylor, W.R., von Gersdorff, H. Light responses of AII amacrine cells and the vesicle pool dynamics at rod bipolar cell ribbon-type synapses. FASEB Science Research Conferences (Retinal Neurobiology and Visual Processing), Saxtons River, Vermont, USA (June 22-27, 2014)
10. **Kim, M.H.**, Puthussery, T., Balakrishnan, V., Gross, O.P., Taylor, W.R., von Gersdorff, H. Light responses and vesicle pool sizes at rod bipolar cell to AII amacrine cell ribbon-type synapses. Gordon Research Conference (Inhibition in the CNS), Les Diablerets, Switzerland (June 16-21, 2013)
11. **Kim, M.**, von Gersdorff, H. Synaptic gain changes in the inner retina *via* postsynaptic plasticity. Society for Neuroscience, Washington, DC, USA (November 12-16, 2011)
12. Vickers, E.D., **Kim, M.**, Vigh, J., von Gersdorff, H. Light-evoked short-term synaptic plasticity in the inner plexiform layer of the retina. European Retina Meeting, Amsterdam, Netherlands (September 22-24, 2011)
13. **Kim, M.H.**, Nguyen, T.D., Hille, B., Koh, D.S. Store-operated Ca^{2+} channels in pancreatic duct epithelial cells. Biophysical Society, Long Beach, USA (February 2-6, 2008)
14. **Kim, M.H.**, Choi, B.H., Kim, K.T., Sernka, T.J., Nguyen, T.D., Koh, D.S. Proteinase-activated receptor-2 (PAR-2) increases mucin exocytosis *via* multiple signal transduction pathways in dog pancreatic duct epithelial cells. Digestive Disease Week, Los Angeles, USA (May 20-25, 2006)
15. **Kim, M.H.**, Muroyama, A., Uehara, S., Moriyama, Y., Hille, B., Koh, D.S. Glutamate exocytosis induced by glutamate transporter in pineal gland. Society for Neuroscience, San Diego, CA, USA (October 23-27, 2004)
16. Cho, J.H., **Kim M.H.**, Koh D.S. Characterization of ionotropic glutamate receptors in pancreatic islet cells. Korean Physiological Society, Suwon, Korea (October 13-14, 2004)
17. **Kim, M.H.**, Hille, B., Nguyen, T.D., Koh, D.S. Ca^{2+} -dependent exocytosis induced by PAR-2 receptor in epithelial cells. Society for Neuroscience, New Orleans, USA (November 8-12, 2003)
18. Koh, D.S., Jung, S.R., **Kim, M.H.**, Hille, B., Nguyen, T.D. Regulation of exocytosis by purinergic receptors in epithelial cells. Biophysical Society, San Francisco, USA (February 23-27, 2002)

Invited Talks presented in Scientific Meetings:

1. Talk title: Translational approaches of neuromodulation and synaptic physiology studies from mouse to human cortical neurons. Vollum Institute, Oregon Health & Science University, Portland, OR, USA (May 11, 2021)
2. Talk title: Supragranular excitatory to inhibitory neurons connectivity and synaptic dynamics in human cortex. Association of Korean Neuroscientists eTalk Series. Virtual meeting (December 6, 2021)

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3. Talk title: Supragranular excitatory to inhibitory neurons connectivity and synaptic dynamics in human cortex. Seoul National University. School of Medicine Online Seminar Series. Virtual meeting (November 14, 2021)
4. Talk title: Supragranular excitatory to inhibitory neurons connectivity and synaptic dynamics in human cortex. Vollum Institute, Oregon Health & Science University. Virtual meeting (November 11, 2021)
5. Talk title: Seeking for cell type-specific local synaptic connectivity in human cortex. Current Topics in Neuroanatomy Research (41th). Korean Academy of Medical Science. Virtual meeting (November 21, 2020)
6. Talk title: Molecular and genetic approaches for assaying human cell type synaptic connectivity. Human Single Neuron Conference 2020. Virtual meeting (November 13, 2020)
7. Talk title: Characterizing synaptic connectivity in local microcircuits of human neocortex. Neurodevelopment and Brain Science. DGIST Global Innovation Festival, Department of Brain and Cognitive Sciences, Daegu Gyeongbuk Institute of Science & Technology (DGIST). Daegu, South Korea (November 21-22, 2019)

Personal Activities

Finisher of The Seattle Marathon (Full course), Seattle, WA, USA, 2022
Finisher of The Seattle Marathon (Full course), Seattle, WA, USA, 2021
Finisher of The Seattle Marathon (Full course, Virtual Run), Seattle, WA, USA, 2020
Finisher of 100 Mile Challenge, “Social Distancing” Run, Seattle, WA, USA, 2020
Finisher of The Basel Marathon (Half course), Basel, Switzerland, 2013
Finisher of The Portland Marathon (Olympic), Portland, OR, USA, 2009
Finisher of The Apple Capital Triathlon (Sprint), Wenatchee, WA, USA, 2007

References

Ed Lein, Ph.D., edl@alleninstitute.org
Senior Investigator,
Allen Institute for Brain Science

Tom Mrsic-Flogel, Ph.D., t.mrsic-flogel@ucl.ac.uk
Professor of Neuroscience & Director
Sainsbury Wellcome Centre, University College London

Henrique von Gersdorff, Ph.D., vongersd@ohsu.edu
Senior Scientist, Professor,
Vollum Institute, Oregon Health & Science University

Bertil Hille, Ph.D., hille@uw.edu
Emeritus Professor, Wayne E. Crill Endowed Professor,
Department of Physiology & Biophysics, University of Washington

Duk-Su Koh, Ph.D., koh@uw.edu
Research Professor,
Department of Physiology & Biophysics, University of Washington

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