

LIANG HAN, PH.D.
ASSOCIATE PROFESSOR
SCHOOL OF BIOLOGICAL SCIENCES

I. Earned Degrees

2004-2009 Ph.D. in Neuroscience, Univ. of Medicine and Dentistry of New Jersey
2001-2004 M.S. in Developmental Biology, Tsinghua University, Beijing, China
1997-2001 B.S. in Biological Sciences, Tsinghua University, Beijing, China

II. Employment History

2022-present Associate Professor, School of Biological Sciences, Georgia Tech
2016-2022 Assistant Professor, School of Biological Sciences, Georgia Tech
2014-2015 Research Associate, Johns Hopkins University
2009-2014 Postdoctoral Fellow, Johns Hopkins University

III. Honors and Awards

2018 Pfizer Aspire Dermatology Award
2014 K99/R00 Pathway to Independence Award (NINDS)
2014 Albert Lehninger Young Investigator Award (Johns Hopkins Univ.)
2010 Best Poster Award (Johns Hopkins Univ. Neuroscience Department Retreat)
1997 Scholarship for Excellent Freshman (Tsinghua Univ., China)

IV. Research, Scholarship, and Creative Activities

Google Scholar profile:

[Liang Han - Google Scholar](#)

NIH NCBI My Bibliography:

[My Bibliography - NCBI](#)

Bold text indicates graduate and undergraduate students of the Han Lab

GT Indicates work done at Georgia Tech

PD Indicates Han group postdoc author

G Indicates Han group graduate student author

UG Indicates Han group undergraduate student author

TE Indicates Han group research technician author

***** Indicates corresponding authorship

A. Published Books, Book Chapters, and Edited Volumes

A1. Books

No data

A2. Refereed Book Chapters

Steele H^G, Dong, X, & Han L^{*}, (2020) Book Chapter, Itch and Pain: Similarities, Interactions, and Differences Chapter 16: Mrgpr receptors in itch and pain. IASP Press (International Association for the Study of Pain).

A3. Edited Volumes

No data

B. Refereed Publications and Submitted Articles

B1. Published and Accepted Journal Articles

- 29^{GT} Osuoji C, DeGrazia T, Cole E, Lawson K^{TE}, Hilley H^{TE}, Xing Y^{PD}, Han L, Chisolm S, Yan X, Sun Y, Liu Y, Chen SC, Feldman RJ, Exploring Pruritus in Bullous Pemphigoid; Analysis of Quality-of-Life Metrics and Potential Biological Mechanisms, ***J Invest Dermatol. Innovations*** 2024 November in press (Official journal of the Society for Investigative Dermatology)
[Han group research in collaboration with Dr. Feldman's group at Emory]
- 28^{GT} Xing Y^{PD}, **Nho Y^G**, Lawson K^{TE}, Zhu Y^{PD}, **Ellison AE^{UG}**, **Chang MY^{UG}**, Hancock W^{TE}, Han L. MrgprC11+ Jugular Neurons Control Airway Hyperresponsiveness in Allergic Airway Inflammation. ***Am J Respir Cell Mol Biol***. 2024 Oct 15. (IF:7.74, Official journal of the American Thoracic Society)
[Han group research]
- 27^{GT} Jiang H, Cui H, Chen M, Li F, Shen X, Guo CJ, Hoekel GE, **Zhu Y^{PD}**, Han L, Wu K, Holtzman MJ, Liu Q. Divergent sensory pathways of sneezing and coughing. ***Cell***. 2024 Oct 17 (IF:45.5)
[Han group research in collaboration with Dr. Liu's group at Washington University in St. Louis.]
- 26.^{GT} Xing Y^{PD}, **Nho Y^G**, Lawson K^{TE}, **Steele H^G**, Han L. Regional Differences in Itch Transmission. ***J Invest Dermatol***. 2024 Nov (IF: 7.143, Official journal of the Society for Investigative Dermatology)
[Han group research.]
- 25^{GT} Feng J, Zhao Y, Xie Z, Zang K, Sviben S, Hu X, Fitzpatrick JAJ, Wen L, Liu Y, Wang T, **Lawson K^{TE}**, Liu Q, Yan Y, Dong X, Han L, Wu GF, Kim BS, Hu H. Miswiring of Merkel cell and pruriceptive C fiber drives the itch-scratch cycle. ***Sci Transl Med***. 2022 Jul (IF:15.8)
[Han group research in collaboration with Dr. Hu's group at Washington University in St. Louis.]
- 24^{GT} **Nho Y^G**, **Lawson K^{TE}**, Banovic F, Han L. Staphylococcus aureus phenol-soluble modulins induce itch sensation. ***J Dermatol Sci***. 2022 Jul;107(1):48-51. (IF:3.98)
[Han group research in collaboration with Dr. Banovic's group at University of Georgia.]

- 23.^{GT} **Steele H^G**, Xing Y^{PD}, Zhu Y^{PD}, **Hilley H^G**, Lawson K^{TE}, **Nho Y^G**, **Niehoff T^{UG}**, Han L^{*} (2021) MrgprC11⁺ sensory neurons mediate glabrous skin itch. **PNAS** 118 (15) (IF: 9.41) **(Reported by Georgia Tech Research Horizons, Science Daily, MedicalResearch.com, neurosciencenews.com, and more than 15 other websites.)**
[Han group research.]
- 22.^{GT} Xing Y^{PD}, **Steele H^G**, **Hilley H^G**, Zhu Y^{PD}, **Niehoff T^{UG}**, Lawson K^{TE}, Han L^{*} (2021) Visualizing the itch-sensing skin arbors. **Journal of Investigative Dermatology** May 141(5):1308-1316 (IF: 7.143, Official journal of the Society for Investigative Dermatology)
[Han group research.]
- 21.^{GT} **Steele H^G**, Han L^{*} (2020) The signaling pathway and polymorphisms of Mrgprs. **Neuroscience Letters** 744:135562. (IF: 2.18)
[Han group research.]
- 20.^{GT} Xing Y^{PD}, Chen J, **Hilley H^G**, **Steele H^G**, Yang J, Han L^{*} (2020) Molecular signature of pruriceptive MrgprA3⁺ neurons. **Journal of Investigative Dermatology** 140(10):2041-2050 (IF: 7.143, Official journal of the Society for Investigative Dermatology)
[Han group research in collaboration with Dr. Yang's group at Emory University.]
- 19.^{GT} Han L^{*}, Limjunyawong N, Ru F, Li Z, Hall OJ, **Steele H^G**, Zhu Y^{PD}, Wilson J^{TE}, Mitzner W, Kollarik M, Undem BJ, Canning BJ, Dong X^{*} (2018). Mrgprs on vagal sensory neurons contribute to bronchoconstriction and airway hyperresponsiveness. **Nature Neuroscience** Mar;21(3):324-328. *corresponding authors. **(Reported by ScienceDaily, Hopkins Medicine, Sciencenewsline and many others)**
[Han was project leader, designed and implemented experiments and wrote paper. Project was started when Han was a postdoc in Dong lab. Manuscript was submitted after Han started at GT. Han lab members Steele H^G, Zhu Y^{PD}, and Wilson J^{TE} contributed to experiments required for manuscript revision.]
- 18.^{GT} Zhu Y^{PD}, Hanson CE^{TE}, Liu Q, Han L^{*} (2017) Mrgprs activation is required for chronic itch conditions in mice. **Itch** Vol 2;3. (Official journal of the International Forum for the Study of Itch)
[Han group research in collaboration with Dr. Qin Liu at Washington Univ. in St. Louis.]
- 17.^{GT} Li Z, Tseng PY, Tiwari V, Xu Q, He SQ, Wang Y, Zheng Q, Han L, Wu Z, Blobaum AL, Cui Y, Tiwari V, Sun S, Cheng Y, Huang-Lionnet JH, Geng Y, Xiao B, Peng J, Hopkins C, Raja SN, Guan Y, Dong X (2017) Targeting human Mas-related G protein-coupled receptor X1 to inhibit persistent pain. **PNAS** 114(10):E1996-E2005.
[Han's collaborative postdoc research in Dong Lab.]
- 16.^{GT} Zacccone EJ, Lieu T, Muroi Y, Potenziari C, Undem BE, Gao P, Han L, Canning BJ, Undem BJ (2016) Parainfluenza 3-Induced Cough Hypersensitivity in the Guinea Pig Airways. **PLoS One**. 11(5):e0155526.
[Han's collaborative postdoc research in Dong Lab]

- 15.^{GT} Chang AY, Mann TS, McFawn PK, Han L, Dong X, Henry PJ (2016) Investigating the role of MRGPC11 and capsaicin-sensitive afferent nerves in the anti-influenza effects exerted by SLIGRL-amide in murine airways. **Respiratory Research** 17(1):62.
[Han's collaborative postdoc research in Dong Lab.]
14. McNeil BD, Pundir P, Meeker S, Han L, Undem BJ, Kulka M, Dong X (2015) Identification of a mast-cell-specific receptor crucial for pseudo-allergic drug reactions. **Nature**. 519(7542):237-41.
[Han's collaborative postdoc research in Dong Lab]
13. Han L*, Dong X* (2014). Itch mechanisms and circuits. **Annu Rev Biophys.** 43:331-55.,
*corresponding authors.
[Invited, peer-reviewed review written by Han and Dong]
12. Han L, Ma C, Liu Q, Weng HJ, Cui Y, Tang Z, Kim Y, Nie H, Qu L, Patel KN, Li Z, McNeil B, He S, Guan Y, Xiao B, Lamotte RH, Dong X (2013) A subpopulation of nociceptors specifically linked to itch. **Nature Neuroscience** 16(2):174-82. (**Reported by The New York Times, NBC News, FOX News, The Baltimore Sun, Huffington Post, Daily Mail, Science Daily, Scientific American and many others**)
[Work performed as a postdoc in Dong lab.]
11. Kim YS, Chu Y, Han L, Li M, Li Z, LaVinka PC, Sun S, Tang Z, Park K, Caterina MJ, Ren K, Dubner R, Wei F, Dong X (2014) Central terminal sensitization of TRPV1 by descending serotonergic facilitation modulates chronic pain. **Neuron**. 81(4):873-87.
10. Li Z, He SQ, Xu Q, Yang F, Tiwari V, Liu Q, Tang Z, Han L, Chu YX, Wang Y, Hin N, Tsukamoto T, Slusher B, Guan X, Wei F, Raja SN, Dong X, Guan Y (2014) Activation of MrgC receptor inhibits N-type calcium channels in small-diameter primary sensory neurons in mice. **Pain**. 155(8):1613-21.
9. Qu L, Fan N, Ma C, Wang T, Han L, Fu K, Wang Y, Shimada SG, Dong X, LaMotte RH (2014) Enhanced excitability of MRGPRA3- and MRGPRD-positive nociceptors in a model of inflammatory itch and pain. **Brain**. 137(Pt 4):1039-50.
8. He SQ, Han L, Li Z, Xu Q, Tiwari V, Yang F, Guan X, Wang Y, Raja SN, Dong X, Guan Y (2014) Temporal changes in MrgC expression after spinal nerve l injury. **Neuroscience**. 261:43-51.
7. He SQ, Li Z, Chu YX, Han L, Xu Q, Li M, Yang F, Liu Q, Tang Z, Wang Y, Hin N, Tsukamoto T, Slusher B, Tiwari V, Shechter R, Wei F, Raja SN, Dong X, Guan Y (2014) MrgC agonism at central terminals of primary sensory neurons inhibits neuropathic pain. **Pain**. 155(3):534-44.
6. Liu Q, Sikand P, Ma C, Tang Z, Han L, Li Z, Sun S, LaMotte RH, Dong X (2012) Mechanisms of itch evoked by beta-alanine. **J Neuroscience** 32(42):14532-7.

5. Han L, Wen Z, Lynn RC, Baudet ML, Holt CE, Sasaki Y, Bassell GJ, and Zheng JQ (2011). Regulation of chemotropic guidance of nerve growth cones by microRNA. **Mol Brain** 4, 40.
4. Zhang Y, Wang F, Han L, Wu Y, Li S, Yang X, Wang Y, Ren F, Zhai Y, Wang D, Jia B, Xia Y, Chang Z (2011). GABARAPL1 negatively regulates Wnt/beta-catenin signaling by mediating Dvl2 degradation through the autophagy pathway. **Cell Physiol Biochem** 27, 503-512.
3. Lee CW, Han J, Bamberg JR, Han L, Lynn R, and Zheng JQ (2009). Regulation of acetylcholine receptor clustering by ADF/cofilin-directed vesicular trafficking. **Nature Neuroscience** 12, 848-856.
2. Wen Z§, Han L§, Bamberg JR, Shim S, Ming GL, and Zheng JQ (2007). BMP gradients steer nerve growth cones by a balancing act of LIM kinase and Slingshot phosphatase on ADF/cofilin. **J Cell Biol** 178, 107-119. (§ co-first author)
1. Han J, Han L, Tiwari P, Wen Z, and Zheng JQ (2007). Spatial targeting of type II protein kinase A to filopodia mediates the regulation of growth cone guidance by cAMP. **J Cell Biol** 176, 101-111.

B2. Conference Presentation with Proceedings (Refereed)

- 2.^{GT} Cole E, DeGrazia T, Hilley H^{TE}, Xing Y^{PD}, Han L, Chisolm S, Chen SC, Feldman R (2020) Comparative analysis of pruritus and intraepidermal nerve fiber density in atopic dermatitis and bullous pemphigoid, **Journal of Investigative Dermatology** 140:7 Supplement S21
[Collaboration with Dr. Feldman at Emory University]
- 1.^{GT} Han L*, Zhu Y^{PD}, Hanson C^{TE}, Liu Q (2019) Mrgprs activation is required for chronic itch conditions in mice. **Journal of Investigative Dermatology** 139:5 Supplement S111
[Han group research in collaboration with Dr. Qin Liu at Washington University at St. Louis.]

C. Other Publications and Creative Products

No data

D. Presentations

D1. Invited Seminars and Conference Talks since 2016

Sensory neurons mediating nocifensive responses

Emory Dermatology Day, Atlanta, Georgia (Feb 2025)

Sensory neurons mediating nocifensive responses

Emory University, Department of Pharmacology and Chemical Biology (Feb 2025)

Sensory neurons mediating nocifensive responses

University of Texas Medical Branch, Department of Neurobiology (December 2023)

Regional differences in itch transmission

12th World Congress on Itch, Miami, Florida (November 2023)

Sensory neurons mediating itch sensation

Frontiers in Neuroscience seminar series, Emory University (Feb 2022)

Neurobiology of itch sensation

Georgia Tech College of Science Explore Open House (April 2022)

MrgprC11⁺ neurons mediate glabrous skin itch

Washington University in St. Louis Department of Anesthesiology, St. Louis, MO (2021)

Mrgprs activation is required for chronic itch conditions in mice

Society for Investigative Dermatology Meeting, Nanosymposium, Chicago IL (2019)

Neurobiology of itch sensation

Atlanta Itch Symposium, Atlanta, GA (2019)

An itch receptor contributes to asthma symptoms

Truett McConnell University, Cleveland, GA (2019)

Itch receptors in the airway

Emory University Department of Cell Biology, Atlanta, GA (2018)

Itch receptors in the airway

Emory University Department of Dermatology, Atlanta, GA (2018)

An itch receptor contributes to asthma symptom

Southeastern Pediatric Research Conference, Atlanta, GA (2017)

Mechanisms of Somatosensation

Georgia Tech College of Science Advisory Board meeting, Atlanta, GA (2017)

Itch receptors in the airway

Suddath Symposium, Atlanta, GA (2017)

Mrgprs mediate itch sensations

Mercer University Department of Pharmaceutical Sciences, Atlanta, GA (2017)

Itch receptors in the airway.

Georgia Tech Neuro Seminar series, Atlanta, GA (2016)

Mrgprs mediate itch sensations.

Georgia Tech School of Biological Sciences Annual Retreat, Atlanta, GA (2016)

D2. Conference Posters (only listed posters after 2016)

MrgprC11⁺ jugular neurons are critical in the neuroimmune interactions controlling airway constriction

Society of Neuroscience annual meeting, Chicago, Illinois (Nov 2024)

Presented by Dr. Liang Han

Regional differences in itch transmission

12th World Congress on Itch, Miami, Florida (Nov 2023)

Presented by Dr. Liang Han

Jugular sensory neurons controlling airway constriction

2nd Annual NIH Investigator Meeting for Interoception, Washington, D.C., (Nov 2023)

Presented by Dr. Liang Han

Function analysis of jugular sensory nerves in the airway (January 2023)

Miami Winter Symposium 2023-Molecular Neuroscience: Focus on Sensory Disorders

Presented by Han Lab Ph.D. student Rossie Nho

MrgprC11⁺ sensory neurons mediate glabrous skin itch.
 SfN Global Connectome (Society of Neuroscience annual meeting-Virtual) (2021)
Presented by Han Lab Ph.D. student Haley Steele

Visualizing the itch-sensing skin arbors.
 SfN Global Connectome (Society of Neuroscience annual meeting-Virtual) (2021)
Presented by Han Lab postdoc Yanyan Xing

Terminal arborizations of itch-sensing neurons exhibit large receptive field in the skin and regionally specific organization in the spinal cord.
 Society for Investigative Dermatology Annual Meeting, Scottsdale AZ, (2020)
Presented by Dr. Liang Han, canceled due to COVID

Comparative analysis of pruritus and intraepidermal nerve fiber density in atopic dermatitis and bullous pemphigoid
 Society for Investigative Dermatology Annual Meeting Scottsdale AZ (2020)
Presented by collaborator, canceled due to COVID

Longitudinal analysis of INF₁ in atopic dermatitis and bullous pemphigoid.
 2nd Georgia Annual CTSA Conference, Pine Mountain, GA (2020)
Presented by collaborator

Comparing Clinical and Biological Aspects of Pruritus in the Immune-Mediated Diseases Atopic Dermatitis and Bullous Pemphigoid,
 Southeastern Immunology Symposium, Atlanta GA (2019)
Presented by collaborator

Mrgprs on vagal sensory neurons contribute to bronchoconstriction and airway hyperresponsiveness.
 Keystone Symposia-Mammalian Sensory Systems, Seattle, WA (2019)
Presented by Dr. Liang Han

Phosphodiesterase 4 Inhibitors Block Neuronal Activation and Reduce Scratching Behavior: Investigating Novel Treatments for Atopic Dermatitis.
 Georgia Bio Innovation Summit, Atlanta GA, (2019)
Presented by Han Lab Ph.D. student Claire Hanson

Identifying staphylococcus aureus as a novel stimulator for itch.
 Georgia Bio Innovation Summit, Atlanta GA (2019)
Presented by Han Lab Ph.D. student Yeseul Nho

MrgprC11⁺ sensory neurons mediate glabrous skin itch
 Georgia Tech School of Biological Sciences Annual Retreat, Atlanta, GA (2018)
Presented by Han Lab Ph.D. student Haley Steele

Molecular Mechanisms of Itch
 Three Minute Thesis Competition, Georgia Tech, Atlanta, GA (2017)
Presented by Han Lab Ph.D. student Haley Steele

MrgprC11⁺ sensory neurons mediate glabrous skin itch
 Georgia BioSummit, Atlanta, GA, (2017)
Presented by Han Lab Ph.D. student Haley Steele

MrgprC11⁺ sensory neurons mediate glabrous skin itch
 Southeastern medical Scientist Symposium, Atlanta, GA (2017)
Presented by Han Lab Ph.D. student Haley Steele

An itch receptor contributes to asthma symptoms
6th Annual Pediatric Research Conference, Atlanta, GA (2016)
Presented by Dr. Liang Han

An itch receptor contributes to asthma symptoms
Society for Neuroscience Annual Meeting, San Diego, CA (2016)
Presented by Dr. Liang Han

E. Grants and Contracts

Currently Funded:

Title: Interoceptors controlling airway constriction
Agency: NIH NIHLB R01 HL 173002
Total Amount: \$2,469,938
Role: PI
Collaborators: Jingjing Yang at Emory University
Contract Period: 4/1/2024-3/31/2029
Candidate's Share: 95%

Title: Regional differences in itch transmission
Agency: NSF 2334697
Total Amount: \$550,000
Role: PI
Collaborators: N/A
Contract Period: 3/1/2024-2/28/2027
Candidate's Share: 100%

Previously Funded:

Title: Functional analysis of MrgprC11⁺ vagal sensory neurons in the airway
Agency: NIH NIHLB R01 HL141269
Total Amount: \$1,917,280
Role: PI
Collaborators: Bradly Undem, Wayne Mitzner at Johns Hopkins
Contract Period: 4/1/2018-3/31/2023
Candidate's Share: 100%

Title: Ultrasonic Actuation of Mechanosensitive Ion Channels
Agency: GT-IBB Seed Grant
Total Amount: \$100,000
Role: Co-PI
Collaborators: Costas Arvanitis
Contract Period: 11/1/2021-10/30/2023
Candidate's Share: 50%

Title: Exploring JAK/STAT Signaling in Autoimmune Blistering Diseases
Agency: Pfizer
Total Amount: \$175,000
Role: Co-PI
Collaborators: Ron Feldman at Emory University
Contract Period: 8/1/2021-7/31/2022
Candidate's Share: 50%

Title: Anti-pruritic mechanisms of PDE4 inhibitor
Agency: Pfizer
Total Amount: \$174,940
Role: PI
Collaborators: N/A
Contract Period: 12/1/2018-5/15/2021
Candidate's Share: 100%

Title: Molecular and Cellular Mechanisms of Itch Sensation
Agency: NIH NINDS R00NS08708
Total Amount: \$746,997
Role: PI
Collaborators: Bradly Undem, Brendan Canning, Wayne Mitzner at Johns Hopkins
Contract Period: 4/1/2016-3/31/2019
Candidate's Share: 100%

Title: Molecular and Cellular Mechanisms of Itch Sensation
Agency: NIH NINDS K99NS087088
Total Amount: \$189,540
Role: PI
Collaborators: Bradly Undem, Brendan Canning, Wayne Mitzner at Johns Hopkins
Contract Period: 3/1/2014-12/30/2015 (at Johns Hopkins)
Candidate's Share: 100%

G. Societal and Policy Impacts

Media coverage of the identification of itch-sensing neurons in 2013: *The New York Times*, *NBC News*, *FOX News*, *The Baltimore Sun*, *Huffington Post*, *Daily Mail*, *Science Daily*, *Scientific American*, *News-Medical*, *Pittsburgh Post-Gazette*, and many others.

Media coverage of the identification of vagal sensory neurons controlling cholinergic bronchoconstriction in 2018: *Science Daily*, *Hopkins Medicine*, *Sciencenewsline*, and many others.

Media coverage of the investigation of glabrous skin itch mechanisms in 2021: *Science Daily*, *Georgia Tech Horizon*, *MedicalResearch.com*, *neurosciencenews.com*, and many others.

V. Education

A. Courses Taught

Fall 2016	BIOL/BMED 4752	Intro Neuroscience	47 students
Fall 2017	BIOL 8803	Frontier in Molecular and Cellular Biology	7 students
Fall 2018	NEUR 3001	Cell and Molecular Neuroscience	62 students
Spring 2019	NEUR 3001	Cell and Molecular Neuroscience	68 students
Fall 2019	NEUR 4001	Research Project Lab	10 students
Spring 2020	NEUR 3001	Cell and Molecular Neuroscience	90 students
Spring 2021	NEUR 3001	Cell and Molecular Neuroscience	76 students
Fall 2021	NEUR 4001	Research Project Lab	10 students
Spring 2022	NEUR 3001	Cell and Molecular Neuroscience	50 students
Spring 2023	NEUR 3001	Cell and Molecular Neuroscience	58 students
Fall 2023	NEUR 4001	Research Project Lab	16 students
Spring 2024	NEUR 4802	Mechanisms of Neurological Disorders	27 students
Spring 2025	NEUR 4803	Mechanisms of Neurological Disorders	7

C. Educational Innovations and Other Contributions

2016-	Co-designed and co-taught the BIOL/BMED 4752 (Intro Neuroscience) in 2016 The first Intro Neuroscience class offered at Georgia Tech College of Science
2018-	Solo-designed the Neur 3001 (Cell & Molecular Neuroscience) A core course for Neuroscience major. Teaching or co-teaching it every year since 2018
2019-	Solo-designed the Neur 4001 (Research Project Lab) The first Capstone project lab focusing on Molecular and Cellular Neuroscience at GT. Teaching it every two years.
2018-	Guest Lecture for Neur 3010 Methods in Neuroscience every year
2019	Guest Lecture for BIOL 8106 Tools of Science Seminar
2024-	Solo-designed the Special Topic Neur 4802 (Mechanisms of Neurological Disorders)