

Curriculum Vitae

Thomas A. Longden, B.Sc. (Hons), PhD
Assistant Professor, Department of Physiology
University of Maryland Baltimore

Date: 07.30.24

ORCID: 0000-0002-7950-7677

Scholar Profile: https://scholar.google.com/citations?user=Q_Ta30MAAAAJ&hl=en

Contact Information

505 Howard Hall
655 West Redwood Street
Baltimore
MD 21202
USA
Telephone: (410) 706 1956
Email: thomas.longden@som.umaryland.edu

Education

2003-2006 **B.Sc (Hons), Pharmacology, University of Manchester, UK**
Thesis: "Identification of GPRC6A in rat mesenteric arteries"
Mentor: Dr. Gillian Edwards.

2006-2010 **PhD, Pharmacology, University of Manchester, UK**
Thesis: "Studies on the Expression of Calcium-Activated Potassium Channels in Astrocytes – A Potential Role in Neurovascular Coupling".
Mentors: Prof. Arthur Weston and Dr. Gillian Edwards.
Examiners: Prof. Christopher Garland (University of Oxford) and Dr. Paulo Tammaro (University of Oxford).

Postdoctoral Training

2010-2011 **Postdoctoral Associate, University of Manchester, UK**
Mentors: Prof. Arthur Weston and Dr. Gillian Edwards.

2011-2015 **AHA Postdoctoral Fellow, University of Vermont, USA**
Mentor: Prof. Mark Nelson.

Academic Positions

2015-2019 **Assistant Professor, Research Track, Dept of Pharmacology, University of Vermont, USA**
2019-present **Assistant Professor, Tenure Track, Dept of Physiology, SOM, University of Maryland Baltimore, USA**

Professional Society Memberships

2006-2012 British Pharmacological Society
2011-2015 American Society for Pharmaceutical and Experimental Therapeutics
2011-present American Physiological Society
2015-present Society of General Physiologists
2019-present Society for Neuroscience

2019-present Microcirculatory Society

Honors and Awards

2012 **Durwood J Smith Award for Excellence in Pharmacology**
Best presentation. University of Vermont Annual Pharmacology Retreat.

2012 **ASPET Young Scientist Travel Award**
Experimental Biology 2012.

2013 **Durwood J Smith Award for Excellence in Pharmacology**
Best presentation. University of Vermont Annual Pharmacology Retreat.

2014 **Durwood J Smith Award for Excellence in Pharmacology**
Best presentation. University of Vermont Annual Pharmacology Retreat.

2014 **Cardiovascular Pharmacology Postdoc Competition, first runner-up**
American Society for Pharmacology and Experimental Therapeutics. Experimental Biology 2014.

2015 **Symposium Award winner**
Best poster. Society of General Physiologists Annual Meeting 2015.

2015 **Cardiovascular Research Institute of Vermont Travel Award**
Experimental Biology 2015.

2015 **Cardiovascular Research Institute of Vermont Travel Award**
Society of General Physiology 2015 Annual Meeting.

2015 **Japanese Microcirculatory Society Travel Award**
10th World Congress for Microcirculation.

2016 **Society of General Physiology Travel Award**
Society of General Physiology 2016 Annual Meeting.

2016 **Cardiovascular Research Institute of Vermont Young Investigator Award**
Society of General Physiologists 2016 Annual Meeting.

2020 **NIH Director's New Innovator Award**

2023 **Fellow of the American Physiological Society Cardiovascular Section**

2024 **MOVD Brian Duling Plenary Lecture.** Magdalen College, Oxford, UK.

2025 **40th IUPS Congress Keynote Lecture.** Frankfurt Am Main, Germany.

Administrative Service

Institutional

2018 – 2019 Member, Cardiovascular Research Institute of Vermont Early Career Advisory Committee.

2019 Qualifying Exam Committee, Kevin Herold, Program in Molecular Medicine

2019 – 2020 Faculty Advisory Committee, Brent Stewart, Program in Neuroscience

2019 Member, GPLS award committee, Program in Neuroscience representative

2019 – present Alternate representative on the School of Medicine Council

2019 SOM Career and Professional Development Office NRSA Mock Study Section

2020 – 2023 Member, Program in Molecular Medicine Admissions Committee

2020 Qualifying Exam Committee, Kristen Montgomery, Program in Neuroscience

2020 Qualifying Exam Committee, Bosung Shim, Program in Molecular Medicine

2020 – 2021 Faculty Advisory Committee, Dominic Isaacs, Program in Neuroscience

2020 – present Thesis Committee, Mashhood Wani, Program in Molecular Medicine

2020 – present Judicial Board

2021 Qualifying Exam Committee, Emily DeMarco, Program in Neuroscience

2021 Qualifying Exam Committee, Taylor Crawford, Program in Molecular Medicine

2021 – 2022 Faculty Advisory Committee, Ruchael McNair, Program in Neuroscience
2021 – 2022 Faculty Advisory Committee, Alexandra Falls, Program in Neuroscience
2021 – present Thesis Committee, Bosung Shim, Program in Molecular Medicine
2021 – 2023 Thesis Committee and Dissertation Reader, Alexa Blanchard, Program in Molecular Medicine
- Graduated
2022 Member, Transdisciplinary Exploratory Committee
2022 – present Member, Physiology Space Utilization Committee
2022 – present Thesis Committee, Naibo Zhang, Program in Molecular Medicine
2022 Faculty Advisory Committee, America Bustos Segura, Program in Neuroscience
2022 Faculty Advisory Committee Chair, Aiden Pham, Program in Neuroscience
2022 – present External member, Center for Biomedical Engineering and Technology (BioMET)
2023 Member, Physiology Chair Search Committee
2023 Member, UM-MIND Seminars and Workshops Committee
2023 Faculty Advisory Committee, Becca Aitken, Program in Neuroscience
2023 Faculty Advisory Committee Chair, Krystal Flores-Felix, Program in Neuroscience
2023 Member, ADRC Working Group
2024 – present Associate Director, Program in Neuroscience

Local and National

2007-2010 British Pharmacological Society Young Pharmacologists Committee.
2011-Present Ad hoc journal peer review; *Journal title (# manuscripts)* :
Advances in Pharmacology (1) *Journal of Cerebral Blood Flow and Metabolism* (4)
American Journal of Physiology (2) *Journal of Vascular Research* (1)
Arteriosclerosis, Thrombosis and Vascular Biology (3)
British Journal of Pharmacology (13) *Journal of Physiology* (3)
Cardiovascular Research (1) *Microcirculation* (3)
Cell Reports (1) *Nature Communications* (2)
Clinical and Translational Medicine (1) *Neurosignals* (1)
Communications Biology (1) *Physiological Reports* (2)
Experimental Physiology (1) *Proceedings of the National Academy of Sciences* (13)
Frontiers (3) *Science Signaling* (1)
Function (1) *Vascular Pharmacology* (1)
Hypertension (2)
2012-2014 Postdoctoral Representative for the Society for Neuroscience, Vermont Chapter.
2017 Reviewer, French National Research Agency.
2017 Guest Editor, *Microcirculation* Special Themed Issue, January 2017.
2017 Member, 11th World Congress for Microcirculation Scientific Advisory Committee.
2018 Reviewer, American Heart Association/Allen Brain Health Initiative.
2018-2019 Conference organizer, SMUG 2019, Experimental Biology 2019 Satellite, Orlando FL.
2018 Member, ISRA 2020 Scientific Advisory Committee.
2019 Reviewer, National Science Foundation.
2019 Reviewer, American Heart Association.
2019 - Present Reviewing Editor, *Frontiers in Physiology*.
2019 - Present Treasurer, Greater Baltimore Society for Neuroscience
2020 - Present Editorial Board Member, *Microcirculation*

- 2020 Session Chair, "Signals and the pathogenesis of vascular disease." *Vascular Biology 2020, North American Vascular Biology Organization.*
- 2021 Reviewer, NIH Special Emphasis Panel September 2021, Cellular and Molecular Neuroscience.
- 2021 – 2024 Thesis Committee and Dissertation Reader, Bilal Moiz, University of Maryland Baltimore County
- Graduated
- 2022 Reviewer, American Heart Association Career Development Award.
- 2022 Reviewer, MPower Seed Grant Challenge.
- 2022 Guest Editor, *Proceedings of the National Academy of Sciences (3 manuscripts)*
- 2023 Reviewer, NHLBI Program Project Grant Study Section.
- 2023 Reviewer, American Heart Association Career Development Award.
- 2023 Reviewer, NIH CDIN Study Section.

International

- 2024 Thesis External Reader, Line Mathilde Brostrup Hansen, Aarhus University, Denmark
- 2024 Thesis External Reader, Lowri Evans, University of Manchester, UK

Teaching

- 2006-2010 Postgraduate Demonstrator, University of Manchester, UK.
- 2015-2016 Lecturer, Molecular Physiology and Biophysics (MPBP301)
10 1st-2nd year graduate students – 3 contact hours/year.
- 2017 Lecturer, Topics in Molecular and Cellular Pharmacology (PHARM290)
40 2nd year undergraduate students – 3 contact hours.
- 2017 Lecturer, Neuropsychopharmacology (PSYS316)
40 3rd year undergraduate students – 3 contact hours.
- 2018 Lecturer, Topics in Molecular and Cellular Pharmacology (PHARM290)
40 2nd year undergraduate students – 3 contact hours.
- 2019 GPLS 601 Mechanisms in Biomedical Sciences Core Course
– Sorting in the *Trans* Golgi Network and Targeted Delivery of Membrane Proteins
Lecturer and paper sponsor – 3 contact hours.
- 2020 GPLS 601 Mechanisms in Biomedical Sciences Core Course
– Protein Trafficking in the ER
– Vesicle Trafficking Mechanisms and Exocytosis
– Sorting in the *Trans* Golgi Network and Targeted Delivery of Membrane Proteins
Lecturer and paper sponsor – 6 contact hours
– Signaling problem set group leader
Medical School Renaissance Curriculum
– Action Potential Generation and Propagation – 3 contact hours
GPLS 691 Current Topics in Neuroscience
– Multiphoton Imaging at the Blood-Brain Interface - 1 contact hour
GPLS 737 Proseminar in Experimental Design
– Teaching Assistant - 2 contact hours per week, fall semester
GPLS 750 Topics in Molecular Medicine
– Vascular Physiology and Pathophysiology - 2 contact hours.
- 2021 GPLS 601 Mechanisms in Biomedical Sciences Core Course
– Vesicle Trafficking Mechanisms and Exocytosis
– Sorting in the *Trans* Golgi Network and Targeted Delivery of Membrane Proteins

- Lecturer and paper sponsor – 5 contact hours total
- 2022
- GPLS 737 Proseminar in Experimental Design
– Course director and instructor - 30 contact hours through fall semester
- GPLS 691 Current Topics in Neuroscience
– Multiphoton Imaging at the Blood-Brain Interface – 1.5 contact hours
- GPLS 750 Topics in Molecular Medicine
– Vascular Physiology and Pathophysiology - 2 contact hours.
- GPLS 601 Mechanisms in Biomedical Sciences Core Course
– Vesicle Trafficking Mechanisms and Exocytosis
– Sorting in the *Trans* Golgi Network and Targeted Delivery of Membrane Proteins
Lecturer and paper sponsor – 5 contact hours total
- GPLS 737 Proseminar in Experimental Design
– Course director and instructor - 30 contact hours through fall semester
- GPLS 691 Current Topics in Neuroscience
– Multiphoton Imaging at the Blood-Brain Interface – 1.5 contact hours
- Medical School Renaissance Curriculum
– Action Potential Generation and Propagation – 3 contact hours
- 2023
- Cajal Advanced Neuroscience Training Program,
Bordeaux School of Neuroscience, Bordeaux, France
– Patch clamp electrophysiology of brain vascular cells – 34 contact hours
- Developed and taught an intensive hands-on course to teach students patch clamp electrophysiology on acutely isolated brain vascular cells
- GPLS 665 Advanced Neuroscience Investigation
– Brain Energy Supply and Demand – 4 contact hours
- GPLS 601 Mechanisms in Biomedical Sciences Core Course
– Vesicle Trafficking Mechanisms and Exocytosis
– Sorting in the *Trans* Golgi Network and Targeted Delivery of Membrane Proteins
Lecturer and paper sponsor – 5 contact hours total
- GPLS 737 Proseminar in Experimental Design
– Course director and instructor: ~30 contact hours through fall semester
- GPLS 691 Current Topics in Neuroscience
– Multiphoton Imaging at the Blood-Brain Interface – 2 contact hours
- GPLS 750 Topics in Molecular Medicine
– Vascular Physiology & Pathophysiology – 4 contact hours
- Medical School Renaissance Curriculum
– Action Potential Generation and Propagation Lectures and Small Groups – 3.5 contact hours
- 2024
- GPLS 665 Advanced Neuroscience Investigation
– Brain Energy Supply and Demand – 4 contact hours
- GPLS 601 Mechanisms in Biomedical Sciences Core Course
– Sorting in the *Trans* Golgi Network and Targeted Delivery of Proteins – 1 contact hour
- GPLS 691 Current Topics in Neuroscience
– Multiphoton Imaging at the Blood-Brain Interface – 2 contact hours
- Medical School Renaissance Curriculum
– Action Potential Generation and Propagation Lectures and Small Groups – 3.5 contact hours

Mentored Students (Directly supervised PhD students underlined)

2014	Julia Campbell (B.Sc in Psychology, final year thesis). Present position: Masters Candidate, Boston University.
2015-2017	Benjamin Dahlgren (M.Sc in Pharmacology, final year thesis). Present position: Investigator at GlaxoSmithKline.
2018	Matthew Broomer (B.Sc in Psychology). Present position: PhD Candidate, University of Vermont.
2018	Daniel Enders (M.Sc in Pharmacology). Present position: Research technician, University of Vermont.
2019	Brent Stewart. PhD Candidate, Program in Neuroscience, University of Maryland. Advisor.
2020	Colin Robertson. PhD Candidate, Program in Neuroscience, University of Maryland. Lab rotation.
2020-present	<u>Luiruimin Xiang</u> . PhD Candidate, Program in Neuroscience, University of Maryland.
2021	Isabella Zafra. PhD Candidate, Program in Neuroscience, University of Maryland. Lab rotation. Ryan Mayers. PhD Candidate, Program in Neuroscience, University of Maryland. Lab rotation.
2021-present	<u>Abigail Vigderman</u> . PhD Candidate, Program in Neuroscience, University of Maryland.
2021-present	<u>Dominic Isaacs</u> . PhD Candidate, Program in Neuroscience, University of Maryland.
2022	Ro Whitten. PhD Candidate, Program in Neuroscience, University of Maryland. Lab rotation.
2023	<u>Geralin Virata</u> . PhD Candidate, Program in Neuroscience, University of Maryland.
2024	Kim Patapstrat. PhD Candidate, Program in Neuroscience, University of Maryland. Lab rotation.
2024	Jessica Crowder. MS Candidate, CMBS Program, University of Maryland. Lab rotation.
2024	Kevin Wilkinson. PhD Candidate, Program in Molecular Medicine, University of Maryland. Lab rotation.
2024	Danashree Deore. PhD Candidate, Program in Immunology, University of Maryland. Lab rotation. Lab rotation.

Grant Support

Active

R01NS138179 (PI: Thomas Longden) 8/1/24-7/31/29

National Heart Lung & Blood Institute

Title: A pericyte Cl⁻ clamp controls capillary electrical signaling and brain blood flow

This project reveals the unique interactions of ion channels and signaling proteins that constitute an important novel aspect of an electrical signaling mechanism that brain pericytes use to precisely match blood flow to local brain energy needs, which we call the “pericyte chloride clamp”.

Role: Principal Investigator

R01AG066645 (PI: Thomas Longden) 9/1/20-8/31/25

National Institute on Aging

Title: Pericytes as metabolic sentinels in the control of brain blood flow in health and Alzheimer's disease

This project examines the role of pericytes in the control of cerebral blood flow, and how changes in metabolic substrate availability regulate their function in health and Alzheimer’s disease.

Role: Principal Investigator

DP2OD02944801 (PI: Thomas Longden) 8/15/20-6/30/25

NIH Directors New Innovator Award Program

Title: Vascular Signaling Plasticity - Novel Concepts and Tools for Studying Neurovascular Interactions in Health and Disease

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This project examines the reprogramming of vascular function in response to neuroplasticity, to precisely match energy demand to supply.

Role: Principal Investigator

CP2-1-000000385 (Co-PIs: Thomas Longden & Osama Harraz) 6/1/24-12/30/25

Chan Zuckerberg Initiative Collaborative Pairs Pilot Award

Title: Interoceptive Vascular Plasticity in Neurodegeneration

Here we will elucidate how loss of interoceptive mechanisms driving plasticity in vascular signaling pathways to adapt blood delivery to areas of neuronal energy need contributes to neurodegeneration.

Role: Co-Principal Investigator

Pending

R21NS142439 (PI: Thomas Longden) 4/1/25-3/31/27

National Institute of Neurological Disorders and Stroke

Title: Developing a toolbox to study proteome plasticity in brain endothelial cells

This project will quantify ribogenesis in capillary endothelial cells undergoing vascular signaling plasticity (VSP) and use RiboTag technology to perform an unbiased RNA-seq screen to identify changes to the translatoome of these cells during VSP. We will also apply puro-PLA to capillaries undergoing VSP, which will enable both the broad visualization of proteins undergoing translation, and the specific tracking of proteins of interest involved in blood flow control.

Role: Principal Investigator

Completed

12POST12090001 (PI: Thomas Longden) 07/01/12-06/30/14

American Heart Association Founders Affiliate Postdoctoral Fellowship

Title: Neurovascular Coupling in Chronic Stress

The goal of this study was to elucidate the molecular mechanism underlying the impairment of neurovascular coupling by chronic stress.

Role: Principal Investigator

Total awarded: \$87,000

14POST20480144 (PI: Thomas Longden) 07/01/14-06/30/15

American Heart Association Founders Affiliate Postdoctoral Fellowship

Title: Hemodynamic Contributions to the Control of Neuronal Function

The goal of this study was to apply optogenetic and pharmacological techniques *in vivo* to elucidate whether changing cerebral blood flow to specific brain regions influences neuronal activity and animal behavior.

Role: Principal Investigator

Total awarded: \$47,000

4P20GM103644-04 (PI: Stephen Higgins) 8/1/17-12/31/18

NIH/DHHS Vermont Center on Behavior and Health COBRE

Title: The effects of stress on capillary-to-arteriole communication

This project examines how stress impacts control of cerebral blood flow by capillaries by disrupting capillary electrical and Ca²⁺ signaling mechanisms

Role: Project Director (equivalent to PI for one sub-project of the COBRE) (35%)

Total awarded: \$561,600

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17SDG33670237/1-3 (PI: Thomas Longden) 7/1/17-6/30/20

American Heart Association Scientist Development Grant

Title: Vascular signaling plasticity in the brain

This project examines the metacontrol of cerebral blood flow by tuning of the expression of key molecular players in the vasculature in response to neural activity.

Role: Principal Investigator (50%)

Total awarded: \$231,000

19IPLOI34660108 (PI: Thomas Longden) 7/1/19-6/30/21

American Heart Association Innovative Project Award

Title: Blood flow in learning and memory

This project uses advanced imaging approaches to assess the role of adequate blood flow in learning and memory, and how disruption of blood flow in dementia impacts this.

Role: Principal Investigator

Total awarded: \$243,000

5R01NS115401 (PI: Sava Sakadzic)

5/1/21-04/30/24

National Institute of Neurological Disorders and Stroke

Title: Investigating the microvascular mechanisms of O₂ supply-demand mismatch in small vessel disease using novel high-resolution optical imaging.

Here we aim to contribute to this larger project by understanding the disruption of smooth muscle and pericyte calcium in the CADASIL model of cerebral small vessel disease.

Role: Subcontracted co-investigator.

Publications

Peer reviewed journal articles

1. **Longden T**, Dunn K, Draheim H, Nelson M, Weston A, Edwards G (2011) "Intermediate-Conductance Calcium-Activated Potassium Channels Participate in Neurovascular Coupling." *British Journal of Pharmacology*, **164(3)**: 922-33.

2. **Longden T**, Dabertrand F, Hill-Eubanks D, Hammack S, Nelson M (2014) "Stress-Induced Glucocorticoid Signaling Remodels Neurovascular Coupling Through Impairment of Cerebrovascular Inwardly Rectifying K⁺ Channel Function." *Proceedings of the National Academy of Sciences USA*, **111(20)**: 7462-7.

- Selected as Editor's Choice in the May 2014 issue of *Science Signaling*, doi: 10.1126/scisignal.2005510.

- Selected for Commentary in the July 2014 issue of *Channels*, doi: 10.4161/chan.29969.

3. Villalba N, Sonkusare S, **Longden T**, Tran T, Sackheim A, Nelson M, Wellman G, Freeman K (2014) "Traumatic brain injury disrupts cerebrovascular tone through endothelial inducible nitric oxide synthase expression and nitric oxide gain of function." *Journal of the American Heart Association*, **3(6)**: e001474.

4. **Longden T**, Nelson M (2015) "Vascular Inward Rectifier K⁺ Channels as External K⁺ Sensors in the Control of Cerebral Blood Flow." *Microcirculation*, **22(3)**: 183-196.

- Selected as a 'Featured Article' in *The Microcirculatory Society Newsletter*, May 2015 issue.

5. Balbi M, Ghosh M, **Longden T**, Vega M, Gesierich B, Hellal F, Lourdopoulos A, Nelson M, Plesnila N (2015) "Dysfunction of mouse cerebral arteries during early aging" *Journal of Cerebral Blood Flow & Metabolism* **35(9)**: 1445-1453.

Role: Performed multiphoton imaging experiments and analyzed data. Edited manuscript.

6. **Longden T**, Hill-Eubanks D, Nelson M (2016) "Ion Channel Networks in the Control of Cerebral Blood Flow" *Journal of Cerebral Blood Flow & Metabolism*, **36(3)**: 492-512.

7. Klitgaard-Povlsen G, **Longden T**, Bonev A, Hill-Eubanks D, Nelson M (2016) "Uncoupling of Neurovascular Communication After Transient Global Cerebral Ischemia is Caused by Impaired Parenchymal Smooth Muscle K_{IR} Channel Function" *Journal of Cerebral Blood Flow & Metabolism*, **36(7)**: 1195-1201.

Role: Performed multiphoton imaging experiments and analyzed data. Wrote and edited manuscript.

8. Tykocki N, Bonev A, **Longden T**, Heppner T, Nelson M (2017) "Inhibition of vascular smooth muscle inward-rectifier K^+ channels restores myogenic tone in mouse urinary bladder arterioles" *American Journal of Physiology Renal Physiology*, **312(5)**: F836-F847.

Role: Performed electrophysiological experiments and analyzed data. Edited manuscript.

9. **Longden T**, Dabertrand F, Koide M, Gonzales A, Tykocki N, Brayden J, Hill-Eubanks D, Nelson M (2017) "Capillary K^+ -sensing initiates retrograde hyperpolarization to locally increase cerebral blood flow" *Nature Neuroscience*, **20**: 717-726.

- Covered in a 'News and Views' article in *Nature Neuroscience* (doi:10.1038/nn.4542).

- Featured on the May 2017 cover of *Nature Neuroscience*.

- Recommended in F1000Prime as being of special significance in its field.

10. Harraz O, **Longden T**, Dabertrand F, Hill-Eubanks D, Nelson M (2018) "Endothelial GqPCR activity controls capillary electrical signaling and brain blood flow through PIP_2 depletion" *Proceedings of the National Academy of Sciences USA*, **115(15)**: E3569-E3577.

Role: Performed multiphoton imaging experiments and analyzed data. Edited manuscript.

11. Harraz O, **Longden T**, Hill-Eubanks D, Nelson M (2018) "PIP₂ depletion promotes TRPV4 channel activity in mouse brain capillary endothelial cells" *eLife*. **7**: e38689.

Role: Performed initial electrophysiological experiments and analyzed data. Edited manuscript.

12. Moshkforoush A, Ashenagar B, Harraz O, Dabertrand F, **Longden T**, Nelson M, Tsoukias N. (2020) "Capillary Kir channel as sensor and amplifier of neuronal signals: modeling insights on K^+ -mediated neurovascular communication." *Proceedings of the National Academy of Sciences USA*. **117(28)**: 16626-16637.

Role: Provided raw data to support modeling. Edited manuscript.

13. Cleary C, Moreira T, Takakura A, Nelson M, **Longden T**, Mulkey D. (2020) "Vascular control of the CO_2/H^+ -dependent drive to breathe in mice." *eLife* **9**: e59499.

Role: Guided Ca^{2+} imaging data acquisition and analysis. Edited manuscript.

14. Mughal A, Sackheim A, Sancho M, **Longden T**, Russell S, Lockette W, Nelson M, Freeman K. (2020) "Impaired capillary-to-arteriolar electrical signaling after traumatic brain injury." *Journal of Cerebral Blood Flow & Metabolism* **41(6)**: 1313-1327.

Role: Acquired and analyzed imaging data. Edited manuscript.

15. Hariharan A, Weir N, Robertson C, He L, Betsholtz C, **Longden T** (2020) "The ion channel and GPCR signaling toolkit of CNS pericytes" *Frontiers in Cellular Neuroscience* **14**: 423.

16. Dabertrand F, Harraz O, Koide M, **Longden T**, Rosehart A, Hill-Eubanks A, Joutel A, Nelson M (2021) "PIP₂ corrects cerebral blood flow deficits in small vessel disease by rescuing capillary Kir2.1 activity" *Proceedings of the National Academy of Sciences USA* **118**: e2025998118.

Role: Performed *in vivo* imaging experiments and analyzed data. Edited manuscript.

17. **Longden T***, Mughal A, Hennig G, Harraz O, Shui B, Lee F, Lee J, Reining S, Kotlikoff M, Konig G, Kostenis E, Hill-Eubanks D, Nelson M (2021) "Local IP₃ receptor-mediated Ca^{2+} signals compound to direct blood flow in brain capillaries". *Science Advances*. **7**: eabh0101.

*First and co-corresponding author.

Role: Directed experimental design, performed experiments and analyzed data, wrote and edited the paper.

18. Rosehart A, **Longden T**, Weir N, Fontaine J, Joutel A, Dabertrand F (2021) "Prostaglandin E2 dilates intracerebral arterioles when applied onto capillaries, implication in small vessel diseases" *Frontiers in Aging Neuroscience* **13**: 402.

Role: Performed experiments and analyzed data, edited the paper.

19. Koide M, Harraz O, Dabertrand F, **Longden T**, Ferris H, Wellman G, Hill-Eubanks D, Greenstein A, Nelson M (2021) "Differential restoration of functional hyperemia by antihypertensive drug classes in hypertension-related cerebral small vessel diseases" *Journal of Clinical Investigation*, **131**: e149029.

Role: Performed experiments and analyzed data, edited the paper.

20. Hariharan A, Robertson C, Garcia D, **Longden T** (2022) "Brain capillary pericytes are metabolic sentinels that control blood flow through a K_{ATP} channel-dependent energy switch". *Cell Reports*, **41**: 111872.

- In the top 10% of most-viewed preprints within the first week of its publication on *bioRxiv*.

- Featured on the cover of the *Cell Reports* December 27th 2022 issue.

21. **Longden T**, Hariharan A, Zhao G, Lederer WJ. (2023) "Pericytes and the Control of Blood Flow in Brain and Heart". *Annual Review of Physiology* **85**: 137-164.

22. **Longden T**, Lederer WJ. (2024) "Electrometabolic signaling". *Journal of General Physiology*. **156**: e202313451.

23. Isaacs D, Xiang L, Hariharan A, **Longden T**. " K_{ATP} channel-Dependent Electrical Signaling Links Capillary Pericytes to Arterioles During Neurovascular Coupling". Submitted.

24. Fuller P, Collis V, Sharma P, Burkett A, Wang S, Brown K, Weir N, Goulbourne C, Nixon R, **Longden T**, Gould T, Monteiro M. "Pathophysiologic abnormalities in transgenic mice carrying the Alzheimer disease PSEN1 Δ 440 mutation". Submitted.

Role: Directed cerebral blood flow data acquisition and analysis.

25. Lim X, Abd-Alhasee M, Ippolito M, Koide M, Senatore A, Plante C, Hariharan A, **Longden T**, Laprade K, Stafford J, Ziemens D, Schwaninger M, Wenzel J, Postnov D, Harraz O. "Mechano-feedback control of brain blood flow". Submitted.

Role: Directed microelectrode impalement and multiphoton imaging data acquisition and analysis.

26. Isaacs D, **Longden T**. "Cerebrovascular Bioelectricity in the Control of Brain Hemodynamics". Invited Review. In preparation.

27. Vigderman A, **Longden T** "Using miniscopes to measure hemodynamics in awake freely behaving mice". In preparation.

28. Weir N, Xiang L, Garcia DG, **Longden T** "Vascular signaling plasticity precisely matches metabolic supply to neuronal demand in the brain". In preparation.

29. Xiang L, **Longden T** "Pericyte Ca^{2+} -activated Cl^- channels shape capillary electrical signaling in the brain". In preparation.

Commentaries:

1. Weir N, **Longden T** (2021) "Pathologically Entangled: Brain trauma-evoked ROS imbalance disrupts Kir channel function in distant peripheral vessels". *Function*, **2**: zqab021.

Book Chapters:

1. Garcia D, **Longden T** (2020) "Ion channels and Ca^{2+} signaling in the capillary endothelium". *Current Topics in Membranes*, **85**: 261-300.

Editorials:

1. Welsh D, **Longden T** (2017) "Endothelial Signaling and the Dynamic Regulation of Arterial Tone: A Surreptitious Relationship" *Microcirculation*, **24(3)**: 10.1111/micc.12370.

Abstracts:

1. Harno E, Weston A, **Longden T**, Absi M, Ruat M, Dodd R, Edwards G (2006) "Evidence for the presence of GPRC6A in the rat mesenteric artery." *Acta Pharmacologica Sinica* **27 (1)**: 155-156.
2. **Longden T**, Edwards G, Weston A, Draheim H, Hengerer B (2008) "Evidence in favour of an intermediate-conductance calcium-activated potassium channel in cortical astrocytes" *Fundamental and Clinical Pharmacology* **22(2)**: 9.
3. **Longden T**, Draheim H, Weston A, Edwards G (2009) "The Expression of Small- and Intermediate-Conductance Calcium-Activated Potassium Channels in Astrocytes of the Mouse Brain" *Proceedings of the British Pharmacological Society* at www.pa2online.org/abstracts/Vol7Issue4abst001P.pdf
4. **Longden T**, Nelson M (2011) "Recruitment of the Vascular Endothelium into Neurovascular Coupling" *Proceedings of the British Pharmacological Society* at bps.conference-services.net/resources/344/2833/pdf/bpswinter2011_0113.pdf
5. **Longden T**, Nelson M (2012) "Recruitment of the Vascular Endothelium into Neurovascular Coupling." *FASEB Journal* **26**: 842.4.
6. **Longden T**, Dabertrand F, Hammack S, Nelson M (2013) "Impairment of Neurovascular Coupling by Chronic Stress" *FASEB Journal* **27**: 925.9.
7. N Villalba, **T Longden**, M Nelson, G Wellman, K Freeman (2014) "Enhanced endothelial nitric oxide production impairs cerebrovascular tone after brain trauma" *FASEB Journal* **28**: 1070.1.
8. **Longden T**, Bonev A, Nelson M (2014) "Calcium Signaling in the Choroid Plexus Epithelium." *FASEB Journal* **28**: 1097.11.
9. **Longden T**, Dabertrand F, Hill-Eubanks D, Hammack S, Nelson M (2014) "Glucocorticoid Signaling Mediates Stress-Induced Impairment of Neurovascular Coupling" *FASEB Journal* **28**: 841.4.
10. **Longden T**, Nelson M (2015) "Unique Ion Channel Properties of Brain Capillary Endothelial Cells" *FASEB Journal* **29**: 832.9.
11. **Longden T**, Nelson M (2015) "Potassium sensing by capillary K_{IR} channels regulates cerebral blood flow" *Journal of General Physiology* **146(3)**: 10A.
12. Gonzales A, **Longden T**, Shui B, Kotlikoff M, Nelson M (2015) "Contractile Pericytes Determine the Direction of Blood Flow at Capillary Bifurcations." *Journal of General Physiology* **146(3)**: 6A-7A.
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26. **Longden T**, Weir N, Xiang L, Garcia D, Qadir H, Patton M, Mathur B, Dabertrand F (2023) "Vascular signaling plasticity reprograms neurovascular coupling pathways to precisely match energy delivery to neuronal metabolic needs" *Physiology* **38**: 5731521.
27. Hariharan A, **Longden T** (2023) "Impaired KATP channel-mediated electro-metabolic signaling in capillary pericytes disrupts brain blood flow control in aging and Alzheimer's disease" *Alzheimer's & Dementia* **19**: e074863.
28. Isaacs D, Xiang L, Hariharan A, **Longden T** (2024) "A brain vascular electrical network links capillary pericytes to arterioles and is recruited for neurovascular coupling" *Physiology* **39**: 1826.
29. Xiang L, **Longden T** (2024) "Calcium-activated chloride channels in pericytes shape capillary electrical signaling" *Physiology* **39**: 1141.
30. Vigderman A, Hariharan A, Weir N, Xiang L, **Longden T** (2024) "Contractile pericyte-mediated cerebrovascular deficits in a mouse model of CADASIL" *Physiology* **39**: 1784.
31. Weir N, Xiang L, Garcia D, Qadir H, Patton M, Juarez B, Mathur B, Dabertrand F, **Longden T** (2024) "Vascular Signaling Plasticity Reprograms Blood Delivery Mechanisms to Meet Fluctuating Neuronal Energy Needs" *Physiology* **39**: 2017.

Major Invited Speeches

1. **Federation of European Pharmacological Societies.** Platform talk. “The role of Astrocytic IK channels in Neurovascular Coupling”. Manchester, UK, 2008.
2. **NBH Research Forum.** Vermont chapter of the Society for Neuroscience. Speaker. “Neurovascular coupling in the stressed amygdala”. Burlington, VT, 2014.
3. **Neuroscience.** Nanosymposium speaker. “Stress-induced glucocorticoid signaling remodels neurovascular coupling through impairment of cerebrovascular K_{IR} channel function”. Washington, DC, 2014.
4. **University of Oxford, UK.** Department of Pharmacology, invited seminar. “Stress-induced glucocorticoid signaling remodels neurovascular coupling through impairment of cerebrovascular K_{IR} channel function”. Oxford, UK, 2014
5. **Smooth Muscle Underground.** Invited speaker. “Stress-induced glucocorticoid signaling remodels neurovascular coupling through impairment of cerebrovascular K_{IR} channel function”. San Diego, CA, 2014.
6. **Experimental Biology.** Invited speaker. “Potassium Sensing by Capillary K_{IR} Channels Regulates Cerebral Blood Flow”. San Diego, CA, 2016.
7. **FASEB Smooth Muscle Congress.** Invited Speaker. “Control of brain blood flow by capillary-to-arteriole communication”. Lisbon, Portugal, 2016.
8. **UC Davis Distinguished Lecture in Physiology.** Department of Physiology and Membrane Biophysics, invited seminar. “Translating thought into blood flow: Capillary-to-arteriole communication in the brain”. Davis, CA, 2016
9. **University of Reno, NV.** Department of Physiology, invited seminar. “Translating thought into blood flow: Capillary-to-arteriole communication in the brain.” Reno, NV, 2016
10. **NBH Research Forum.** Vermont chapter of the Society for Neuroscience. Speaker. “Brain capillaries act as a sensory web to translate neural activity into blood flow”. Burlington, VT, 2017.
11. **ISRA 2017.** Invited speaker. Title: “Capillary-to-arteriole communication regulates blood flow into the brain”. Manchester, UK, 2017.
12. **University of Maryland.** Department of Physiology, invited seminar. Title: “Control of brain blood flow by capillary calcium signaling”. Baltimore, MD, 2017.
13. **11th World Congress for Microcirculation.** Platform talk. “Capillary Ca^{2+} Signals Generate Nitric Oxide to Tune Local Brain Blood Flow”. Vancouver, Canada, 2018.
14. **UC Davis, CA.** Department of Physiology and Membrane Biophysics, invited seminar. “Food for Thought: Capillary Control of Cerebral Blood Flow”. Davis, CA, 2018.
15. **University of Pennsylvania.** Department of Physiology, invited seminar. “Food for Thought: Capillary Control of Cerebral Blood Flow”. Philadelphia, PA, 2018.
16. **University of Maryland.** Department of Anatomy and Neurobiology, invited seminar. “Food for Thought: Capillary Control of brain blood flow”. Baltimore, MD, 2020.
17. **Microcirculatory Society Cerebral Blood Flow Webinar.** Invited speaker. “Capillary Calcium Signaling in the Brain.” Online, 2020.

18. **Texas A & M University.** Department of Medical Physiology, invited seminar. “Capillary Control of Brain Blood Flow”. Online, 2021.
19. **University of Virginia.** Department of Molecular Physiology and Biological Physics, invited seminar. “Metabolic Control of Brain Blood Flow Through Endothelial and Pericyte Interactions”. Online, 2021.
20. **Tulane University.** Department of Pharmacology, invited seminar. “Vascular Signaling Plasticity”. New Orleans, LA, 2021.
20. **ISRA 2021.** Invited speaker. “Vascular Signaling Plasticity”. Lake Tahoe, CA, USA, 2021. Postponed until 2023.
21. **12th World Congress for Microcirculation.** Platform talk. “Pericytes are metabolic sentinels that protect brain energy supply”. Beijing, China, 2022. Postponed to 2023.
22. **7th UC Davis Cardiovascular Symposium.** Discussion leader. Davis, CA, 2022.
23. **University of Tennessee Health Science Center.** Department of Physiology, invited seminar. “A pericyte energy switch controls brain blood flow”. Memphis, TN, 2022.
24. **Inaugural NIH High Risk High Reward Research Symposium.** Invited speaker. “Neuronal reprogramming of vascular signaling mechanisms: A novel dimension to brain plasticity.” Online, 2022.
25. **Society of General Physiologists Annual Meeting 2022.** Invited speaker. “A pericyte energy switch controls brain blood flow”. Woods Hole, MA, 2022.
26. **University of Maryland.** NAPPS seminar series, invited seminar. “Food for Thought: Pericyte electro-metabolic signaling controls brain blood flow”. Baltimore, MD, 2023.
27. **American Physiology Summit 2023.** Invited speaker. “Pericyte control of brain blood flow through electro-metabolic signaling”. Long Beach, CA, 2023.
28. **Scott Earley International Symposium on Ion Channels & Cardiovascular Diseases.** Invited speaker. “A pericyte energy switch controls brain blood flow”. Reno, NV, 2023.
29. **George Mason University.** Interdisciplinary Program in Neuroscience, invited seminar. “Electro-metabolic control of blood flow by brain pericytes”. Fairfax, VA, 2024.
30. **Johns Hopkins University.** “Pericytes as electro-metabolic sentinels optimizing energy delivery to meet neuronal metabolic demands”. Baltimore, MD, 2024.
31. **Command and Control: Unveiling the Regulation of Smooth Muscle Function.** “Pericyte Electrical Commands Control Arteriolar Smooth Muscle in the Brain”. Dundalk Institute of Technology, Ireland, 2024.
32. **The Brian Duling Plenary Lecture, Mechanisms of Vasodilation 2024.** “Mechanisms of capillary control of blood flow in the brain”. Oxford, UK, 2024.
33. **FASEB Cellular and Molecular Mechanisms of Brain Aging.** “The pericyte energy switch—physiological functions and breakdown in aging and dementia”. Niagara Falls, NY, 2024.
34. **FASEB Vasoregulation: Signaling and Multicellular Inputs.** “Vascular Signaling Plasticity”. Tucson, AZ, 2024.
35. **West Virginia University.** “Pericytes as electro-metabolic sentinels optimizing energy delivery to meet neuronal metabolic demands”. Morgantown, WV, 2024.

36. **Aarhus University**. Department of Biomedicine, invited seminar. "Electro-metabolic control of brain blood flow". Aarhus, Denmark, 2024.
37. **Vanderbilt University Medical Center**. "Vascular Signaling Plasticity". Online, 2024.
38. **Brain Microcirculation Workshop**. "Vascular Signaling Plasticity". Aarhus, Denmark 2024.
39. **8th UC Davis Cardiovascular Symposium**. "Vascular signaling plasticity". Davis, CA, 2025.
40. **40th International Union of Physiological Sciences Congress**. "Ion channels in brain capillaries". Frankfurt am Main, Germany, 2025.

Proffered Communications

1. **World Pharma**. Poster presentation "Astrocytic IK channels contribute to neurovascular coupling". Copenhagen, Denmark, 2010.