

Understanding Brain-Body Interactions to Advance Brain Health

A Virtual Workshop

Wednesday, October 22, 2025: 11:00 am – 3:00 pm ET

Thursday, October 23, 2025: 11:00 am – 3:00 pm ET

Objectives

- Highlight case studies that document the state of science on brain-body interactions between the central nervous system, peripheral nervous system, and other organ systems.
- Examine current tools and technologies available to study brain-body connections and how large-scale data collection efforts, data science, and artificial intelligence, can contribute to advancing research.
- Explore the implications of brain-body interactions for therapeutic development including clinical trial design and endpoints.
- Discuss what factors (e.g., interdisciplinary research, increased awareness, and workforce training) may be needed to facilitate a paradigm shift that considers the interconnectedness of the brain and body systems in clinical diagnosis, prognosis, and treatment.

Program At-A-Glance

- **Day 1 (October 22)**

Welcome & Introductory Remarks

Workshop Overview

Keynote Presentations

Session 1: Mechanistic Axes of Brain-Body Communication

Part A: Organ Systems

Part B: Molecular Messengers and Systemic Signals

Concluding Remarks

- **Day 2 (October 23)**

Welcome & Day 1 Recap

Session 2: Emerging Technologies and Model Systems

Session 3: Translating Science into Action

Session 4: Workshop Reflections & Potential Directions Moving Forward

Concluding Remarks

WEDNESDAY, OCTOBER 22, 2025

11:00am **Introductory Remarks**

Frances Jensen, University of Pennsylvania; *Forum on Neuroscience and Nervous System Disorders Co-chair*

Deanna Barch, Washington University in St. Louis; *Forum on Neuroscience and Nervous System Disorders Co-chair*

11:05am **Workshop Overview**

Katja Brose, Science Advisor, *Workshop Co-chair*

Sharyn Rossi, BrightFocus Foundation, *Workshop Co-chair*

11:10am **Keynote Presentations**

Kevin Kwok, Davis Phinney Foundation for Parkinson's; *Planning Committee Member*

Emeran Mayer, University of California, Los Angeles

11:40am **Audience Q&A for Keynote Presentation**

Diane Bovenkamp, BrightFocus Foundation; *Planning Committee Member*

11:50am **Session 1: Mechanistic Axes of Brain-Body Communication**

Objective: Explore the integrative neural, hormonal, immune, and autonomic mechanisms by which the brain monitors, coordinates, and regulates internal bodily states across organ systems, and to examine how disruptions in these pathways contribute to dysfunction in behavior, cognition, and overall physiological health.

PART A: Organ Systems

Key Discussion Questions:

- How do neural circuits involved in interoception enable the brain to sense and regulate internal bodily states across organ systems?
- What are the mechanisms by which the brain exerts control over whole-body states such as sleep, arousal, and circadian rhythms?
- How do autonomic pathways—including sympathetic, parasympathetic, and vagal circuits—coordinate organ function, and what are the consequences of their dysregulation?
- In what ways do neuromodulators like serotonin and dopamine act as systemic regulators, influencing both brain function and peripheral physiology?

11:50am **Overview**

Katja Brose, Science Advisor; *Workshop Co-Chair*

11:55am **Speaker Presentations**

Olujimi Aijola, University of California, Los Angeles; *Planning Committee Member*

Xin Sun, University of California, San Diego

Asya Rolls, Tel Aviv University

12:40pm **Moderated Panel and Audience Q&A**

1:15pm **BREAK**

PART B: Molecular Messengers and Systemic Signals

Key Discussion Questions:

- How do immune and endocrine signals influence brain function, and what are the mechanisms of bidirectional communication across the brain-immune and gut-brain axes?
- What roles do molecular messengers—such as cytokines, hormones, and metabolites—play in modulating neural activity, behavior, and cognition?
- How does hypothalamic regulation integrate metabolic and hormonal cues (e.g., leptin, GLP-1) to maintain energy balance, and what happens when these systems break down?
- In what ways do vascular and inflammatory pathways contribute to neural health or dysfunction, and how can we disentangle causality in these complex interactions?

1:25pm **Overview**

Katerina Akassoglou, Gladstone Institutes, University of California, San Francisco;
Planning Committee Member

1:30pm **Speaker Presentations**

Costantino Iadecola, Weill Cornell Medicine
Tony Wyss-Coray, Stanford University
Ana Domingos, Oxford University

2:15pm **Moderated Panel and Audience Q&A**

2:50pm **Day 1 Concluding Remarks**

Katja Brose, Science Advisor, *Workshop Co-chair*
Sharyn Rossi, BrightFocus Foundation, *Workshop Co-chair*

3:00pm **Adjourn Day 1**

THURSDAY, OCTOBER 23, 2025

11:00am Review of Day 1 and Preview of Day 2

Katja Brose, Science Advisor, *Workshop Co-chair*

Sharyn Rossi, BrightFocus Foundation, *Workshop Co-chair*

11:05am Session 2: Emerging Technologies and Model Systems

Objective: Explore emerging technologies and computational approaches that enable deeper understanding and modulation of brain-body circuits, with an emphasis on cross-tissue resolution, translational potential, and implementation challenges.

Key Discussion Questions:

- How are novel tools—such as multi-omic profiling, brain-organ imaging, and neuromodulation—reshaping the field's ability to study brain-body interactions at cellular and circuit levels?
- What are the opportunities and limitations of using digital phenotyping and wearable devices to capture dynamic, real-world brain-body states?
- How can computational modeling, theory, and artificial intelligence help bridge across biological scales and data modalities to generate testable hypotheses about systemic brain-body regulation?

11:05am Session Overview

Keith Hengen, Washington University in St. Louis; *Planning Committee Member*

11:10am Speaker Presentations

Woodrow Shew, University of Arkansas

Polina Anikeeva, Massachusetts Institute of Technology

Viviana Gradinaru, California Institute of Technology; *Planning Committee Member*

11:55am Moderated Panel and Audience Q&A

12:35pm BREAK

12:45pm Session 3: Translating Science into Action

Objective: Examine how a more holistic understanding of brain-body interactions might reshape neuroscience research, therapeutic strategies, and public health approaches—while addressing health disparities and elevating patient-centered perspectives.

Key Discussion Questions:

- What mechanisms can support cross-sector and cross-disciplinary collaboration to advance this work?
- How can lived experience and patient perspectives inform the identification of research priorities, study design, and development of interventions?
- How do social and environmental conditions—such as stress, diet, and pollution—shape brain-body health outcomes, and how can these influences be better incorporated into research frameworks?
- What strategies are most effective in translating insights about brain-body interactions into equitable healthcare and public health interventions?

12:45pm Session Overview

Merit Cudkowicz, Massachusetts General Hospital; Harvard Medical School; *Planning Committee Member*

12:50pm Speaker Presentations

Rima Kaddurah-Daouk, Duke University; Planning Committee Member

Nikki Schultek, AlzPI; Philadelphia College of Osteopathic Medicine;

Intracell Research Group

Kevin Sheth, Yale University

1:35pm Moderated Panel and Audience Q&A

2:10pm Session 4: Workshop Reflections & Potential Directions Moving Forward

Objective: Reflect on the key themes highlighted throughout the workshop and consider future research questions, gaps, and opportunities needed to move the field forward.

Key Discussion Questions:

- What factors (e.g., interdisciplinary research, increased awareness, and workforce training) may be needed to facilitate a paradigm shift that considers the interconnectedness of the brain and body systems in clinical diagnosis, prognosis, and treatment.
- How might computational and AI-based approaches accelerate discovery in this space?

2:10pm Session Overview

Katja Brose, Science Advisor, *Workshop Co-chair*

Sharyn Rossi, BrightFocus Foundation, *Workshop Co-chair*

2:15pm Themes & Future Opportunities Discussion

Nicole Rust, University of Pennsylvania

Peter Lansbury, Harvard Medical School; Lysosomal Therapeutics, Inc.

Julie Harris, Allen Institute

2:55pm Concluding Remarks

Katja Brose, Science Advisor, *Workshop Co-chair*

Sharyn Rossi, BrightFocus Foundation, *Workshop Co-chair*

3:00pm Adjourn Day 2