

# **Neuroimmunophysiology of the Gastrointestinal Tract**

The Banff Centre for Arts and Creativity  
Banff, Alberta, Canada

28th-30th September 2023

Conference Chairs: Manon Defaye,<sup>1,2,3</sup> Wally MacNaughton,<sup>1,2,3</sup> Derek McKay,<sup>1,2</sup> Yasmin Nasser,<sup>2,4</sup> Sruthi Rajeev,<sup>1,2</sup> and Keith Sharkey,<sup>1,2,5</sup>

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Cumming School of Medicine, University of Calgary

***Neuroimmunophysiology of the Gastrointestinal (GI) Tract 2023*** is a unique two-day conference where basic and clinical researchers will explore new paradigms in integrative physiology to better understand the control and regulation of gut function in health and disease.

Disorders of the GI tract plague society. For example, irritable bowel syndrome (IBS) occurs in over 10% of North Americans and inflammatory bowel disease (IBD) is increasing in prevalence, now affecting at least 1 in 130 Canadians, with comparable numbers in northern Europe and very significant populations in the rest of the world. While new treatments have been introduced and are improving the lives of those with GI disease, there are substantial unmet clinical needs and ongoing efforts to discover potential drug targets are urgently required.

Advancing progress towards new treatments for GI disease requires an integrated approach to understanding the functions of the gut. Rarely are there opportunities to learn about the latest developments in critical aspects of gut function in a multi-disciplinary forum focused on the challenges of GI disease.

The organizers of *Neuroimmunophysiology of the Gastrointestinal (GI) Tract 2023* have created an opportunity for leading scientists and trainees to interact in an informal atmosphere to discuss current and emerging data that will:

- (1) Advance an understanding of the neuroimmunophysiology of the GI tract,
- (2) Shape future approaches to the treatment of gut dysfunction and disease,
- (3) Provide trainees with a forum to present and discuss their research.

Welcome to Neuroimmunophysiology of the Gastrointestinal (GI) Tract 2023

We hope that you will approach this meeting with enthusiasm and an open mind. The breadth and diversity of the program will challenge and inspire you. The concepts that will be developed over the two days of the meeting will broaden your thinking and can provide a new impetus to your research. The meeting will be a success if lasting friendships are formed, and new collaborations emerge. We hope that you will enjoy some great science surrounded by the awe-inspiring Rocky Mountains.

The organizers extend a special thanks to the sponsors of the meeting who are acknowledged below. Without their support this meeting could not have taken place and we are grateful to each of you for your incredible generosity. We also extend our thanks to Judy Wong, University of Calgary for her assistance with all aspects on implementing this conference and to Jody Kelly, Banff Centre for Arts and Creativity, for helping make this conference possible.

With Warmest regards,  
Derek, Keith, Manon, Sruthi, Wally and Yasmin

## PROGRAM

### Thursday September 28, 2023

- 16:00-17:30 Registration | Kinnear Centre (KC 303)
- 17:00-20:00 Welcome and Dinner | Kinnear Centre (KC 303)
- Keynote Presentation: Guy Boeckxstaens, KU Leuven, Belgium  
How resident macrophages shape and maintain the enteric nervous system
- Introduction by Yasmin Nasser, U. Calgary
- 20:00-21:30 Trainee Poster Session | Kinnear Centre 303

### Friday September 29, 2023

- 07:00-08:30 Breakfast | Vistas Dining Room, Sally Borden Building

#### SCIENTIFIC SESSIONS WILL BE HELD IN THE MAX BELL AUDITORIUM

- 08:20-08:30 Welcoming remarks

#### Session 1: New concepts in enteric neurobiology

Chairs: Keith Sharkey (U. Calgary) & Jean-Pierre Timmermans (U. Antwerp)

- 08:30-09:00 Brian Gulbransen, Michigan State University, East Lansing, MI  
Enteric glia tune myenteric gut neurocircuits
- 09:00-09:30 Kristen Smith-Edwards, Mayo Clinic, Rochester, MN  
Neural control of colon function: a tale of two brains
- 09:30-09:45 Sima Sohi, Liberty University College of Osteopathic Medicine, Lynchburg, VA  
(Trainee prize abstract)  
Endotoxin endotheliopathy induced vascular leak of IgG causes ileus
- 09:45-10:15 Ulrika Marklund, Karolinska Institutet, Stockholm, Sweden  
Cellular diversity and connectivity within the enteric nervous system

#### 10:15-10:35 Coffee break

#### Session 2: Microbiome-gut-brain axis

Chairs: Valerie Taylor (U. Calgary) & Nathalie Vergnolle (INSERM)

- 10:35-11:05 Giada De Palma, McMaster University, Hamilton, ON  
Microbial mechanisms underlying gut-brain axis dysfunction
- 11:05-11:35 Melanie Gareau, University of California, Davis, Davis, CA  
The developing microbiota-gut-brain axis: impacts of neonatal dysbiosis

- 11:35-11:50 Nasser Abdullah, University of Calgary, Calgary, AB  
(Trainee prize abstract)  
Early-life microbiota colonization programs nociceptor excitability and pain sensitivity via mast cell-derived NGF
- 11:50-12:20 Stuart Brierley, Flinders University, Adelaide, Australia  
Dialogue between specialized gut cells and nerves contributes to the sex bias of gut pain

**12:30-13:30 Lunch | Vistas Dining Room, Sally Borden Building**

**Session 3: Neuroimmunophysiology: The Next Generation**

Chairs: Manon Defaye (U. Calgary) & Sruthi Rajeev (U. Calgary)

- 13:30-13:45 Ramsha Mahmood, University of Manitoba, Winnipeg (Trainee prize abstract)  
Altered gut microbiota composition and functions suggests fibre fermentation is reduced in children with MS
- 13:45-14:00 Armaan Mohan, University of Calgary, Calgary, AB (Trainee prize abstract)  
Commensal bacteria and pathobiont crosstalk in the gut: *E. coli*-LF82-induced fragmentation of epithelial mitochondrial networks is reduced by co-treatment with butyrate through FFAR3
- 14:00-14:15 Wilmarie Morales-Soto, Mayo Clinic, Rochester, MN (Trainee prize abstract)  
Circuit mechanisms underlying region-specific colon dysmotility during inflammation
- 14:15-14:45 Career Talk – Academic – Kathy McCoy, University of Calgary, Calgary, AB  
Letting your gut guide you
- 14:45-15:15 Career Talk – Clinician-Scientist route – Nicola Jones, University of Toronto, Toronto, ON  
Pathways to becoming a clinician scientist/ investigator

**15:15-15:35 Coffee Break**

**Session 4: Pathophysiology of GI disorders**

Chairs: Derek McKay (U. Calgary) & Bruce Vallance (U. British Columbia)

- 15:35-16:05 Elena Verdu, McMaster University, Hamilton, ON  
Novel mechanisms in the pathophysiology of celiac disease: from basics to therapies
- 16:05-16:35 Yasmin Nasser, University of Calgary, Calgary, AB  
Chronic pain in IBD: mechanisms and translational perspective
- 16:35-16:50 Samuel Van Remoortel, University of Antwerp, Antwerp, Belgium  
(Trainee prize abstract)  
Pseudo-allergic mast cell signaling safeguards acute colitis progression in mice
- 16:50-17:20 Nicola Jones, University of Toronto, Toronto, ON  
Understanding disease pathophysiology to drive drug discovery for prevention of gastric cancer

**19:00            Dinner | Kinnear Centre (KC 303)**

**Saturday September 30, 2023**

**07:00-08:30    Breakfast | Vistas Dining Room, Sally Borden Building**

**Session 5: Neural control of gut immunity**

Chairs: Christophe Altier (U. Calgary) & Blanca Callejas (U. Calgary)

- 08:30-09:00    Isaac Chiu, Harvard University, Boston, MA  
Nociceptor neuron regulation of gut barrier protection and immunity
- 09:00-09:30    Samantha Gruenheid, McGill University, Montréal, QC  
Investigating the links between the immune activation and neuron dysfunction in a mouse model of Parkinson's Disease
- 09:30-09:45    Patricia Souza, Federal University of Sergipe, Brazil  
(Prize abstract)  
T cells regulate intestinal motility and shape enteric neuronal responses to intestinal microbiota
- 09:45-10:15    Milena Bogunovic, U. Massachusetts Chan Medical School, Worcester, MA  
Mechanisms of enteric nervous system remodeling by mucosal inflammation

**10:15-10:35    Coffee Break**

**Session 6: Role of the epithelium in GI disorders**

Chairs: Wally MacNaughton (U. Calgary) & Francois Boudreau (U. Sherbrooke)

- 10:35-11:05    Waliul Khan, McMaster University, Hamilton, ON  
Understanding the roles of enterochromaffin cells and serotonin in colitis: recent advances
- 11:05-11:35    Arshad Ayyaz, University of Calgary, Calgary, AB  
Origins of regenerative plasticity in the intestinal epithelium and development of disease
- 11:35-11:50    Vilcy Reyes Nicolas, University of Sherbrooke, QC  
(Trainee prize abstract)  
Telocyte BMP signaling influences niche factors secretion and fibrillar collagen homeostasis protecting against colitis-associated cancer
- 11:50-12:20    Jakob von Moltke, University of Washington, Seattle, WA  
Tuft cells regulate epithelial ion flux in homeostasis and type 2 inflammation
- 12:20-12:40    **Perspectives:** Kim Barrett (UC Davis) and John Furness (U. Melbourne)

**Closing remarks and Departures**

**Lunch | Vistas Dining Room, Sally Borden Building**

**Sunday October 1, 2023**

07:00-08:30    **Breakfast | Vistas Dining Room, Sally Borden Building  
for those staying Saturday night**