



Neuronal Control of Appetite, Metabolism and Weight

May 9–13, 2017 | Tivoli Hotel and Congress Center | Copenhagen | Denmark

Scientific Organizers:

Lora K. Heisler, University of Aberdeen, UK

Scott M. Sternson, HHMI/Janelia Research Campus, USA

Joint with the meeting on *Gastrointestinal Control of Metabolism*

Obesity, a condition that is becoming a leading cause of human morbidity and mortality, is among the global healthcare challenges of the 21st century. Obesity is primarily a result of the cumulative effect of increased food intake beyond the body's energetic requirements over time. Emerging research reveals critical integrative neuronal systems that control both energy and glucose homeostasis, which have encouraging implications for the future treatment of obesity. This symposium will fuse existing knowledge with the latest discoveries in the neural circuits underpinning nutrient sensation, satiety, food reward, developmental programming and glucoregulatory function. Furthermore, recent findings will be presented on the peripheral regulation of these neural circuits by gut and adipocyte-derived signals. The application of cutting-edge neuroscience approaches and the clinical relevance of basic science discoveries to obesity research will also be highlighted. Recent advances in emerging treatment options will be discussed, including surgical interventions and next-generation pharmacotherapies. In combination with a joint symposium on the "Gastrointestinal Control of Metabolism," this exciting program will bring together breaking research from both basic science and translational realms on the etiology and treatment of obesity and type 2 diabetes.

Session Topics:

- Nutrient Sensing and Gut Signaling (Joint)
- Workshop 1: Disorders and Diseases Associated with Weight Loss
- Interactions between Ingestive Signals and Reward Circuits
- Emerging Energy Homeostasis Neurocircuitry
- Signaling from Periphery to Brain to Modulate Energy Balance (Joint)
- Hypothalamic Signals Modulating Hunger and Complex Behavior
- Cutting Edge Approaches in Obesity Research
- Pharmacotherapies for Obesity and Type 2 Diabetes (Joint)
- Workshop 2: CNS Regulation of Adipose Tissue
- Programming Obesity: Early Environmental Influences

Scholarship Application & Discounted Abstract Deadline: January 12, 2017

Abstract Deadline: February 9, 2017

Discounted Registration Deadline: March 9, 2017



Note: Scholarships are available for graduate students and postdoctoral fellows and are awarded based on the abstract submitted.

Upper image courtesy of: National Institute on Drug Abuse, National Institutes of Health

Meeting Hashtag: #KSneuron

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KEYSTONE SYMPOSIA

on Molecular and Cellular Biology

Neuronal Control of Appetite, Metabolism and Weight (Z5)

Scientific Organizers: Lora K. Heisler and Scott M. Sternson

Lead Sponsor: Novo Nordisk A/S. Sponsored by Arena Pharmaceuticals, Inc.

Gastrointestinal Control of Metabolism (Z6)

Scientific Organizers: Randy J. Seeley, Matthias H. Tschöp and Fiona M. Gribble

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TUESDAY, MAY 9

Arrival and Registration

WEDNESDAY, MAY 10

Welcome and Keynote Session (Joint)

- ***Lora K. Heisler**, University of Aberdeen, UK
- ***Randy J. Seeley**, University of Michigan, USA
- Stephen O'Rahilly**, University of Cambridge, UK
Metabolic Disease: Lessons from Natural Human Variation
- Klaus H. Kaestner**, University of Pennsylvania School of Medicine, USA
The Intestinal Stem Cell Niche – At the Base of It All

Nutrient Sensing and Gut Signaling (Joint)

- ***Andrew Butler**, St. Louis University, USA
- ***Fiona M. Gribble**, University of Cambridge, UK
- Ronald M. Evans**, Howard Hughes Medical Institute, Salk Institute, USA
Gut Feelings: Systemic Reach of Intestinal FXR
- Kristina Schoonjans**, École Polytechnique Fédérale de Lausanne – EPFL, Switzerland
Bile Acid Signaling in Metabolic Disease
- Joshua Thaler**, University of Washington, USA
Short Talk: Prevention of Microglial Inflammatory Signaling Reduces Susceptibility to Diet-Induced Obesity

Workshop 1: Disorders and Diseases Associated with Weight Loss (Z5)

- ***Thomas Alexander Lutz**, University of Zürich, Switzerland
- ***Petra Kotzbeck**, Medical University of Graz, Austria
- Yong Xu**, Baylor College of Medicine, USA
5-HT Neurons and Eating Disorders
- Manon Duquenne**, Université Lille 2 - INSERM, France
A Role for Tanyocyte Exocytosis in the Central Control of Energy Homeostasis?
- Christian Stockmann**, PARCC – Paris Cardiovascular Research Center, France
The Role of Vascular Endothelial Growth Factor-A in the Context of Cancer Cachexia and Chemotherapy
- Kevin G. Murphy**, Imperial College London, UK
Investigating Disorders Associated with Weight Loss
- Serge Luquet**, Université Paris Diderot, France
Palatability Can Drive Feeding Independent of AgRP Neurons
- Christin Kosse**, Francis Crick Institute, UK
Functional Properties of GAD65 Neurons in the Lateral Hypothalamus
- Yunlei Yang**, SUNY Upstate Medical University, USA
Deciphering Anorexigenic Septohypothalamic Feeding Circuits

Workshop 1 (Z6)

- ***Timo D. Müller**, Institute for Diabetes and Obesity, Germany
- Anne-Charlotte Jarry**, Paris Diderot University, France
Neuromedin U Blocks Gastric Emptying through Vagal-Dependent Mechanisms and Improves Oral Glucose Tolerance
- Geke Aline Boer**, University of Copenhagen, Biomedical Institute, Denmark
Acute Reduction of GIP: Effects on Lipid and Bone Metabolism
- Emily C. Bruggeman**, University of Texas Southwestern Medical Center, USA
Ghrelin Receptor Deletion Increases Morbidity and Mortality in a Prader-Willi Syndrome Mouse Model
- Natalia Petersen**, University of Copenhagen, Denmark
"Tailoring" the Intestinal Epithelium for Type 2 Diabetes Treatment: Modulation of L-Cell Differentiation
- Hai-Bin Ruan**, University of Minnesota, USA
Diet- and Microbiota-Sensitive Intestinal O-GlcNAc Signaling Controls Enteroendocrine Cell Development and Function
- Sara Lind Jepsen**, University of Copenhagen, Denmark
Somatostatin Regulates GLP-1 Secretion through the Somatostatin Receptor Subtype 2

Interactions between Ingestive Signals and Reward Circuits (Z5)

- ***Matt Carter**, Williams College, USA
- ***Agatha A. van der Klaauw**, University of Cambridge, UK
- Michael A. Cowley**, Monash University, Australia
Leptin Receptor Expressing Neurons of the Dorsomedial Hypothalamus Play a Limited Role in Regulating Food Intake but a Critical Role in Regulating Metabolism
- Suzanne Lee Dickson**, Sahlgrenska Academy, Gothenburg University, Sweden
Brain Ghrelin Signaling and Food Reward Behavior
- Christian Lüscher**, University of Geneva, Switzerland
Feeding Circuits that Can Override Metabolic Needs
- Claire J. Foldi**, Monash University, Australia
Short Talk: CNS Reward Pathways in Anorexia Nervosa: Insights from a Rat Model

Gut Bacteria as Cause and Treatment of Metabolic Diseases (Z6)

- ***Gilles Mithieux**, INSERM, France
- Fredrik Bäckhed**, University of Gothenburg, Sweden
Microbial Signaling from the Gut and Resulting Effects on Host Metabolism
- Martin J. Blaser**, New York University School of Medicine, USA
Effects of the Early Life Microbiota on the Development of Metabolic Illnesses

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Karine Clément, ICAN, France
Microbiome as Therapy

Edna A. Trujillo, University of Wisconsin Madison, USA
Short Talk: Metabolite Profiling of Plasma and Cecum Elucidates the Impacts of Host Genetics and Environment on the Gut Microbiota

Poster Session 1

THURSDAY, MAY 11

Emerging Energy Homeostasis Neurocircuitry (Z5)

***Qingchun Tong**, University of Texas Medical School at Houston, USA

***Matthew R. Hayes**, University of Pennsylvania, USA

Sabrina Diano, Yale University School of Medicine, USA
Mitochondrial Control of the Melanocortin System

Martin G. Myers, Jr., University of Michigan, USA
LepRb Signaling and the Regulation of Transcription

Joseph T. Bass, Northwestern University, USA
Identification of an SCN-AgRP Circadian Neurocircuit Regulating Obesity and Systemic Metabolism

Lori M. Zeltser, Columbia University, USA
Gene X Environment Interactions that Promote Anorexia-Like Behavior

Ali Guler, University of Virginia, USA
Short Talk: Dopamine Signaling in the SCN Regulates Circadian Consumption of High-Fat Diet

Mathias Treier, Max-Delbrueck-Center for Molecular Medicine, Germany
Short Talk: Identification of the Hypothalamic Circuit Maintaining Food Foraging

Stem Cells, Gut–Pancreas Development I (Z6)

***Praveen Sethupathy**, Cornell University, USA

Fiona M. Gribble, University of Cambridge, UK
The Biology of Enteroendocrine Cells

Heiko Lickert, Institute of Diabetes and Regeneration, Germany
Dissecting Intestinal Stem Cell Lineage Decisions

James M. Wells, Cincinnati Children's Hospital Research Foundation, USA

Human Pluripotent Stem Cell-Derived Gastrointestinal Organoids as New Models to Study Metabolic and Digestive Diseases

Lori Susse, University of Colorado, USA
Loss of Beta Cell Identity Related to Diabetes

John Furness, University of Melbourne, Australia
Short Talk: Diversity of Enteroendocrine Cells between Species and Regions Studied at a Cellular and Subcellular Level

Sandra Guilmeau, Institut Cochin, France
Short Talk: Contribution of ChREBP in Intestinal GLP-1 Production

Signaling from Periphery to Brain to Modulate Energy Balance (Joint)

***Suzanne M. Appleyard**, Washington State University, USA

***David Olson**, University of Michigan, USA

Jeffrey M. Friedman, Rockefeller University, USA
Neural Control of Food Intake, Locomotion and Glucose Metabolism

Randy J. Seeley, University of Michigan, USA
How the Gut Regulates Metabolic Status

Ivan E. de Araujo, Yale University School of Medicine, USA
What Does Sugar Do to the Brain? Circuit Logic for Sugar Sensing

Céline E. Riera, Cedars-Sinai Medical Center, USA
Short Talk: The Sense of Smell Impacts Metabolic Health and Obesity

Poster Session 2

FRIDAY, MAY 12

Hypothalamic Signals Modulating Hunger and Complex Behavior (Z5)

***Clemence Blouet**, University of Cambridge, UK

***J. Nicholas Betley**, University of Pennsylvania, USA

Scott M. Sternson, HHMI/Janelia Research Campus, USA
Motivational Mechanisms Controlling Hunger

Garret D. Stuber, University of North Carolina at Chapel Hill School of Medicine, USA

Lateral Hypothalamic Circuits for Feeding and Reward

Tamas L. Horvath, Yale School of Medicine, USA
Appetite Circuits in the Regulation of Complex Behavior

Roger D. Cone, University of Michigan, USA
Melanocortins: From Pharmacology to Pharmacotherapy

Tatiana Korotkova, Max Planck Institute for Metabolism Research, Germany

Short Talk: Gamma Oscillations Organize Top-Down Signaling to Hypothalamus and Enable Food-Seeking

Marcelo O. Dietrich, Yale University, USA
Short Talk: Behavioral Ontogeny of Hypothalamic Neurons

Controversies in Obesity/Diabetes Treatment: Surgery vs. Devices vs. Medicines – What Does the Future Hold? (Z6)

***Ruth E. Gimeno**, Eli Lilly & Company, USA

Jens Juul Holst, University of Copenhagen the Panum Institute, Denmark

The Role of the Gut in the Development of Type 2 Diabetes

Tricia M. Tan, Imperial College London, UK
Triple Gut Hormones as Therapy

David E. Cummings, University of Washington, USA
Metabolic Surgery: Mechanisms and Use of "Bariatric" Operations to Treat Type 2 Diabetes

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Niels Vrang, Gubra, Denmark

Short Talk: *The Effect of FXR, PPAR- α/δ and GLP-1 Agonism on Liver Disease in Diet-Induced Obese and Biopsy-Confirmed Mouse Models of NASH*

Wendy M. McKimpson, Columbia University, USA

Short Talk: *Foxo1-Expressing Cells in the Gut as a Source of Insulin for Diabetes Treatment*

Makoto Fukuda, Baylor College of Medicine, USA

Short Talk: *Gut Hormone GIP Drives Hypothalamic Pathogenesis of Obesity*

Workshop 2 (Z6)

***Lene Jessen**, Zealand Pharma, Denmark

Maria H. Hauge, Copenhagen University, Denmark

Gq and Gs Signaling Acting in Synergy to Control GLP-1 Secretion

Youngjung R. Kim, Columbia University, USA

Pyruvate Kinase as a Novel Metabolic Regulator of Beta Cell Loss in Diabetes

Alyce M. Martin, Flinders University, Australia

Gut Serotonin Is a Signaling Nexus between the Gut Microbiome and Host Metabolism

Louise Olofsson, University of Gothenburg, Sweden

Role of the Gut Microbiota in Diet-Induced Hypothalamic Inflammation

Anette Christ, University of Massachusetts Medical School, USA

Long-Term Epigenetic Re-Programming of Myeloid Precursor Cells in a Hyperlipidemic Environment

Nadja Gebert, Leibniz Institute on Aging, Germany

Age and Diet Affect the Intestinal Crypt Proteome

Jonathan D. Douros, Duke University, USA

Increased Glucose-Dependent Insulinotropic Polypeptide (GIP) Secretion and Signaling Improves Beta-Cell Function following Vertical Sleeve Gastrectomy (VSG)

Cutting-Edge Approaches in Obesity Research (Z5)

***Jeffrey M. Zigman**, University of Texas Southwestern Medical Center, USA

***Daniela Cota**, Neurocentre Magendie, France

Stephen Liberles, Harvard Medical School, USA

Molecular and Genetic Analysis of the Vagus Nerve

Andres Lozano, University of Toronto, Toronto Western Hospital, Canada

Deep Brain Stimulation to Treat Obesity or Anorexia

Kevin L. Grove, Novo Nordisk and Oregon National Primate Research Center, USA

Obesity-Related Genes in the Rhesus Macaque

John N. Campbell, Beth Israel Deaconess Medical Center, USA

Short Talk: *A Molecular Census of Arcuate Hypothalamus and Median Eminence Cell Types*

Stem Cells, Gut-Pancreas Development II (Z6)

***Lori Susse**, University of Colorado, USA

Andrew B. Leiter, University of Massachusetts Medical School, USA

Differentiation of Enteroendocrine Cells

Praveen Sethupathy, Cornell University, USA

Microbiota, MicroRNAs, and Intestinal Stem Cell Function

Susumu Seino, Kobe University Graduate School of Medicine, Japan

Beta-Cell Glutamate Signaling Is Critical for Incretin-Induced Insulin Secretion

William L. Holland, University of Texas Southwestern Medical Center, USA

Short Talk: *Glucagon Receptor Inhibition Restores Functional Beta Cell Mass and Reverses Hyperglycemia in Type-1 Diabetic Mice*

Poster Session 3

SATURDAY, MAY 13

Pharmacotherapies for Obesity and Type 2 Diabetes (Joint)

***Malcolm J. Low**, University of Michigan, USA

***Roger A. Adan**, Brain Center Rudolf Magnus, Netherlands

Daniel J. Drucker, Lunenfeld-Tanenbaum Research Institute, Canada

The Control of Gut Hormone Activity: Role of Dipeptidyl Peptidase-4

Matthias H. Tschöp, Helmholtz Zentrum München and Technische Universität München, Germany

Gut Peptide Combination Therapy to Treat Obesity

Lora K. Heisler, University of Aberdeen, UK

Modifying CNS 5-HT Circuits to Reverse Obesity and Type 2 Diabetes

Ruth E. Gimeno, Eli Lilly & Company, USA

Current and Emerging Targets for Obesity Treatment

Tamer Coskun, Eli Lilly & Company, USA

Short Talk: *Confirming Efficacy of Celastrol and Withaferin A in a Diet-Induced Obese (DIO) Mouse Model*

Shamina M. Rangwala, Janssen, Johnson & Johnson, USA

Short Talk: *Gdf15-Mediated Mechanisms of Food Intake Reduction and Weight Loss*

Poster Session 4

Workshop 2: CNS Regulation of Adipose Tissue (Z5)

***Kate Ellacott**, University of Exeter Medical School, UK

***Mads Tang-Christensen**, Novo Nordisk A/S, Denmark

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Justin J. Rochford, University of Aberdeen, UK

Inhibition of Gamma Synuclein Directly Alters Adipocyte Mitochondrial Function and Lipid Metabolism

Barbara Cannon, Stockholm University, Sweden

Peripheral and Central Regulation of UCP1-Dependent Thermogenesis

Miguel López, Universidad de Santiago de Compostela, Spain
Hypothalamic AMPK: A Canonical Regulator of Energy Balance

Sangho Yu, Pennington Biomedical Research Center, USA
Preoptic Leptin Function Modulates Diet-Induced Weight Gain

Claire H. Feetham, University of Manchester, UK
Prolactin-Releasing Peptide Neurons Project from Dorsomedial to Paraventricular Hypothalamic Nucleus to Affect Energy Expenditure

Pablo B. Martinez de Morentin, Rowett Institute of Nutrition and Health, UK
Raphe Pallidus Serotonin Cells Modulate Brown Adipose Tissue Thermogenesis

SUNDAY, MAY 14

Departure

Programming Obesity: Early Environmental Influences (Z5)

***Michael Krashes**, NIDDK, National Institutes of Health, USA

***Alicja A. Skowronski**, Columbia University, USA

Elinor L. Sullivan, Oregon National Primate Research Center, USA
Maternal Metabolic and Dietary Environmental Influences on Offspring Metabolic Health and Behavior

John Speakman, Institute of Genetics and Developmental Biology, CAS, China
The Impact of Maternal Diet on Hypothalamic Remodeling during Development and Subsequent Susceptibility to High Fat Diets in the Mouse

Jens C. Brüning, Max Planck Institute for Metabolism Research, Germany
Effect of Insulin on Brain Development and Metabolic Programming

Novel Aspects of Gut Function (Z6)

***John Furness**, University of Melbourne, Australia

Thue W. Schwartz, University of Copenhagen, Denmark
Nutrient and Gut Microbiota Metabolite Sensing through GPCRs in the GI Tract

Gilles Mithieux, INSERM, France
Central Regulation of Metabolism Initiated by Intestinal Gluconeogenesis

Tony K.T. Lam, Toronto General Research Institute, Canada
Gut Nutrient Sensing

Meeting Wrap-Up: Outcomes and Future Directions (Organizers) (Z5)

Meeting Wrap-Up: Outcomes and Future Directions (Organizers) (Z6)