Endocrinology and Metabolism Section of the American Physiological Society Newsletter Spring 2014

EB 2014
EB 2014 will be held in San Diego, CA April 26-30. The section is sponsoring several sessions that promise to be at the forefront of endocrinology and metabolism. We look forward to seeing you there.

Section Programming and Special Events
The E&M Section will sponsor the Solomon Berson Lecture, three symposia, and two featured topics at EB. Also, don’t forget to join us for the Section Business Meeting and Awards Reception. We have also included a sneak peak of our programming (as of the time of this publication) before it’s available in the official program.

Trainee Events at Experimental Biology 2014

2014 Meet the Nobel Laureate Reception at EBB: Make plans to stay at EB: Nobel Laureate Dr. Beutler the 2011 recipient of the Nobel Prize in Physiology or Medicine and Professor and Director, Center for the Genetics of Host Defense, University of Texas-Southwestern Medical Center. The reception will take place Wednesday, April 30th immediately following the APS Nobel Prize in Physiology or Medicine Lecture in Room 20A.

Trainee Advisory Committee (TAC) Symposium: "The Other Side of the Submit Button: The In’s and Out’s of the Manuscript Review Process", Weds, April 30, 10:30 am - 12:30 pm, Room 28A. Send your questions to our speakers about becoming a reviewer, responsibilities of a reviewer, what is included in a review, etc.

Publishing 101: How to Get Your Work Published and Avoid Ethical Minefields, Dr. Hershel Raff and Dr. Rita Scheman, Sunday, April 27, 10:30 AM-12:30 PM, Room 25C.

2014 Career Symposium: "Conscious Choice and Serendipity in Your Career Trajectory: A Panel Discussion" (sponsored by the Career Opportunities in Physiology Committee)
Tips on How to Succeed at Your First Experimental Biology Meeting by Kathy L. Ryan, Ph.D. US Army Institute of Surgical Research can be found here: http://www.the-aps.org/forum-eb
Sunday, April 27, 2014

**Special Event:** **Section Steering Committee Meeting**
Time: 11:00 AM  
Location: Cardiff Room, San Diego Marriott

**Symposium: Diabetes-Related Contractile Dysfunction of the Heart: Clinical Implications, Underlying Molecular Mechanisms, and Exercise-Related Cardio-protection**
Time: 3:15-5:15 PM  
Location: San Diego Convention Center, Room 22  
Chairs: M. Faadiel Essop, Stellenbosch University  
Monte S. Willis, University of North Carolina

Diabetes is an escalating health crisis and constitutes a significant, pressing concern for both developed and developing countries. Since cardiovascular complications and mortalities are common in diabetic patients this will further increase the overall burden of disease. These alarming projections therefore necessitate a comprehensive understanding of the underlying biochemical and molecular mechanisms orchestrating the development of diabetes-related cardiovascular complications. In this symposium we will focus on metabolic perturbations that play a fundamental role in the onset of diabetes-related contractile dysfunction.

**Speakers/Times:**

3:15 PM  
Diabetic cardiomyopathy: pathology, diagnosis and epidemiology.  
Francisco Villareal. Univ. of California, San Diego

3:55 PM  
The damaging effects of hyperglycemia on the heart.  
M. Faadiel Essop. Stellenbosch Univ., South Africa

4:35 PM  
Exercise and its beneficial role on the diabetic heart.  
Ellen Aasum. Univ. of Tromso, Norway

**Sunday E&M Sponsored Poster Sessions:**
San Diego Convention Center Exhibit Center  
12:30 p.m.

1117: Cardiovascular Endocrinology, including angiotensin and aldosterone
1118: Exercise Nutrition and Muscle Protein Synthesis
1128: Stress and Trauma, including Adrenal Gland

Monday, April 28, 2014
**Solomon A. Berson Distinguished Lectureship of the APS**

Endocrinology & Metabolism Section Named Lecture

Time: 10:30-11:30 a.m.
Speaker: Carol Elias, University of Michigan
Location: San Diego Convention Center, Room 24
Topic: Energy for reproduction: how the brain reads fat stor(i)es.

Chair: Josh Anthony, Campbell Soup Company

Dr. Elias is an internationally recognized expert in physiological mechanisms by which metabolic imbalances lead to disruptions in the reproductive neuroendocrine axis (http://medicine.umich.edu/dept/molecular-integrative-physiology/carol-elias-phd). Dr. Elias is well known for her use of innovative genetically modified animal models to investigate the intersection between energy homeostasis and reproduction. In particular, Dr. Elias is interested in the role of kisspeptin in the control of the reproductive neuroendocrine axis, as well as the ability of leptin and other metabolic hormones to regulate the activity of hypothalamic neurons involved in reproductive function.

**Monday E&M Sponsored Sessions:**
San Diego Convention Center Exhibit Center
12:30 p.m.
1119: Gestation, Fetal, and Neonatal biology, including mammary gland and lactation
1123/1127: Neuroendocrinology, pituitary, reproduction, and sex hormones

**Section Business Meeting and Awards Reception**
Time: 6:30-9:30 p.m.
Location: La Costa Room, San Diego Marriott
(No tickets necessary)

The Annual Business Meeting and Awards Reception is a great opportunity to get up to date on Section activities and to share research and refreshments with friends and colleagues. **We will also announce award winners for the New Investigator Award, the Virendra B. Mahesh Award of Excellence in Endocrinology, the Mead Johnson Research Award in Endocrinology and Metabolism, and Endocrinology & Metabolism Section Research Recognition Award.** NEW THIS YEAR: This year, the Section is hosting the Campbell Poster Competition in which selected applicants were invited to participate. Award winners will have their posters displayed for review and discussion. Please make time to attend and bring a colleague to learn more about our Section.

**Tuesday, April 29, 2014**
**Featured topic:** *Inflammation in Beta Cell Dysfunction: From Mouse to Man*

**Time:** 8:00-10:00 AM  
**Location:** San Diego Convention Center, Room 27  
**Chair:** John Corbett, Med. Col. of Wisconsin

**Speakers/Times:**

8:00 AM  
Inflammation in beta cell dysfunction: lessons from mouse models.  
John Corbett, Med. Col. of Wisconsin

8:30 AM  
Resistance is not futile: mechanisms protecting against autoimmune destruction of the beta cell and implications for type 1 diabetes.  
Clayton E. Mathews. Univ. of Florida Col. of Med.

**Sympoisa:** *Novel Aspects of G Protein-Coupled Receptor Signaling*

**Time:** 10:30 AM-12:30 PM  
**Location:** San Diego Convention Center, Room 23  
**Chair:** Willis K. Samson, St. Louis University  
Kathryn Sandberg, Georgetown Univeristy

**Summary:** G protein-coupled receptors couple hormones, neurotransmitters, adipokines, cytokines and extracellular matrix proteins to cellular signaling mechanisms that underlie all aspects of integrative physiology. In addition, approximately 50% of all drugs prescribed in North America target these receptors and thus they are a focal point for the translation aspects of basic research. Bioinformatic-based approaches have led to major advances in the field, many of these are based upon the founding hypothesis that G proteins conserved throughout evolution, must have physiological relevance in mammals, including humans. Insight gained from analysis of this conservation has enabled the discovery of additional receptor signaling cascades and cell-cell interactions (Dr. Hsueh). In addition, the importance of proteins that modify the signaling capability of these G protein-coupled receptors has been recognized as a major determinant of ligand specificity (Dr. Caron). Most recently, upstream short open reading frames in genes encoding known G protein-coupled receptors have been demonstrated to encode peptides that alter the receptor’s expression and signal transduction capability, demonstrating the possibility of an endogenous mechanism to control ligand specificity and action (Dr. Sandberg). The promise of the development of novel therapeutics has been strengthened by innovative approaches developed to match orphan G protein-coupled receptors to their cognate ligands (Dr. Yosten). This Symposium will highlight the work of both senior and junior investigators with a focus on the translational potential of these approaches to the understanding of G protein coupled receptor signaling. The potential clinical relevance of the methodologies and findings presented will be a highlight of these presentations. Because of that aspect of the Symposium, it might qualify for CME credit status, and attract outside funding.

**Speakers/Times:**
Tuesday E&M Sponsored Poster Sessions:
San Diego Convention Center Exhibit Center
12:30 p.m.

1124: Obesity and Satiety
1125: Pancreatic Hormones and Diabetes

Summary: Rates of obesity, diabetes and cardiovascular disease have been increasing at an alarming rate over the past few decades. These cardiometabolic disorders are associated with decreased quality of life and life expectancy and increased economic burden. The identification of novel risk factors for cardiometabolic disease is necessary to help stem this epidemic. Sleep deficiency, i.e. sleep that is insufficient in duration or quality and circadian disruption of the sleep - wake cycle (caused by shift work or travel across time zones, etc) have become extremely common behaviors in industrialized countries, and accumulating evidence supports their central role in elevating the risk of cardiometabolic diseases.

Dr. Knutson will present data from epidemiologic studies that have demonstrated associations between sleep deficiency and cardiometabolic disease risk factors. In particular, she will focus on the CARDIA Sleep Study, which is a community - based study that incorporated objective estimates of habitual sleep duration and quality. Results from this study indicate that habitual sleep duration and quality are indeed associated with clinical measures of cardiometabolic disease risk even after adjustment for potential confounders. The implications of these results for public health will be discussed.

Dr. Markwald will discuss the impact of sleeping at an adverse circadian phase, as occurs in shift workers or in individuals travelling across time zones, on energy expenditure. Night
shift workers experience significant increases in metabolic, autonomic and endocrine predictors of obesity, diabetes and cardiovascular disease risk. Even the one-hour shift associated with daylight savings time increases myocardial infarction rates by 6 - 10%. Recent findings indicate that maintaining short sleep schedules may lead to circadian misalignment and altered circadian timing of food intake may independently contribute to obesity risk. Recent findings have also identified multi-synaptic projections from the master clock (the SCN) in the brain to the pancreas. Melatonin receptors have been discovered on human pancreatic β-cells and administration of melatonin reduces their glucose-induced insulin secretion. These findings suggest an important impact of circadian timing on metabolic function.

Dr. Broussard will review potential mechanisms on how sleep curtailment may lead to increased diabetes risk. During sleep restriction, insulin sensitivity decreases rapidly and markedly without adequate compensation in beta-cell function, resulting in an elevated risk of diabetes. Moreover, tissue biopsies from healthy participants have shown drastic reductions in insulin signaling after sleep loss. Multiple factors appear to mediate the adverse impact of sleep loss on glucose regulation, including increased sympathetic nervous activity, decreased brain glucose uptake and elevated evening cortisol levels.

Sleep deficiency has also been associated with cardiovascular changes. As reviewed by Dr. Haack, sleep deficiency, either in the form of short sleep duration or insomnia, is associated with elevated blood pressure and increases the risk for developing hypertension. In addition, insufficient sleep is associated with vascular dysfunctions and an elevated inflammatory state, which may present potential pathways through which insufficient sleep increases the risk for cardiovascular diseases.

Taken together, the current evidence strongly suggests that chronic sleep deficiency and/or circadian disruption contributes to the current epidemic of obesity, diabetes and cardiovascular disease.

Speakers/Times:

3:15 PM  Habitual sleep and cardiometabolic disease risk.
Kristen Knutson. Univ. of Chicago

3:45 PM  Effects of sleep loss and circadian disruption on energy balance.

4:15 PM  Mechanisms linking sleep loss to insulin resistance and diabetes risk.

4:45 PM  The role of insufficient sleep in the regulation of blood pressure and inflammation.
**Wednesday, April 30, 2014**

**Featured topic:** Brown and Beige Adipose Tissue: New Insights into Primary Targets for Obesity Prevention  
**Time:** 8:00-10:00 AM  
**Location:** San Diego Convention Center, Room 25B  
**Chair:** Michael Symonds, University of Nottingham

**Speakers/Time:**

- **8:00 AM** Multiple pathway regulation of beige adipocytes: which ones count?  
  Jun Wu, Dana - Farber Cancer Inst.

- **8:30 AM** A bioinformatic approach to brown adipose tissue biology and function.  
  Jamie Timmons, Loughborough Univ., Leicestershire

**Tuesday E&M Sponsored Poster Sessions:**

San Diego Convention Center Exhibit Center  
12:30 p.m.

- **1115** Brown and Beige Adipose Tissue; New insights into primary targets for obesity prevention  
- **1122** Mitochondrial Function  
- **1126** Metabolism: protein, amino acid, lipid, and carbohydrate