

The 14th Annual International Conference on Dose-Response

# *PRECONDITIONING* **IN BIOLOGY AND MEDICINE**

## Mechanisms and Translational Research

*The Annual Meeting of the*  
International **DOSE-RESPONSE** Society  
[www.Dose-Response.org](http://www.Dose-Response.org)

*Conference Directors:* Edward J. Calabrese, Ph.D., Paul Kostecki, Ph.D

**April 21-22, 2015**  
**University of Massachusetts**  
**Amherst, MA**

Threshold  
Adaptive  
Bidirectional  
Biphasic  
Hormetic  
Non-Monotonic  
U/J Shaped  
Linear



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National Board of Public Health Examiners*

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# PLATFORM PRESENTATIONS

## TUESDAY, APRIL 21, 2015

8:15am **Welcome**

### **Session I: PLENARY SESSION**

**Moderator:** James Mitchell, *Harvard University, Cambridge, MA*

8:30am **Preconditioning by Ethanol Ingestion Prevents Postischemic Microvascular and Tissue Dysfunction: Role of the Immune System**  
**Ronald J. Korthuis**, *University of Missouri School of Medicine, Columbia, MO*

10:30am **Adaptive Response: Modulation of Response by Low Dose Diagnostic Radiation, Exercise, and Diet**  
**Doug Boreham**, *Northern Ontario School of Medicine, Sudbury, ON, Canada*

9:15am **Hydrogen Sulfide: A Mediator and Modulator of Conditioning**  
**Kenneth R. Olson**, *University of Indiana, South Bend, IN*

11:15am **Preconditioning, Nanoneuropharmacology and the BRAIN Initiative: Neuroethical Obligations and Responsibilities**  
**James Giordano**, *Georgetown University, Washington, DC*

10:00am **Break**

## LUNCH Noon • Amherst Room, 10th Floor Campus Center

### **Session II: NEUROLOGICAL SESSION**

**Moderator:** James Giordano, *Georgetown University, Washington, DC*

1:00pm **Significance and Mechanisms of Ischemic Postconditioning against Stroke**  
**Heng Zhao**, *Stanford University, Stanford, CA*

2:30pm **Microglia Regulate Blood Clearance in Subarachnoid Hemorrhage by Heme Oxygenase-1**  
**Nils Schallner**, *Harvard Medical School, Boston, MA and University Medical Center Freiburg, Freiburg, Germany*  
**Rambhau Pandit, Robert LeBlanc**, *Harvard Medical School, Boston, MA*  
**Leo E. Otterbein**, *Harvard Medical School, Boston, MA and Aston University, Birmingham U.K.*  
**Khalid A. Hanafy**, *Harvard Medical School, Boston, MA*

1:30pm **Unleashing the Brain's Endogenous Neuroprotective Strategies through Toll-like Receptors**  
**Mary P. Stenzel-Poore**, *Frances R. Bahjat, Sara N. Christensen, Valerie K. Conrad, Raffaella Gesuete, Christine C. Glynn, Mingyue Liu, Susan L. Stevens and Keri B. Vartanian*, *Oregon Health and Science University, Portland, OR*

2:00pm **Dietary Preconditioning Limits Neurological Impairment in Stroke Models**  
**Alexis Stranahan**, *Medical College of Georgia, Georgia Regents University, Augusta, GA*  
**Silvia Manzanero**, *The University of Queensland, St Lucia, Australia*  
**Thiruma V. Arumugam**, *Yong Loo Lin School of Medicine, National University of Singapore*

3:00pm **Break**

### **Session III: CARDIOVASCULAR SESSION**

**Moderator:** Scott Powers, *University of Florida, Gainesville, FL*

3:30pm **Nitrite Mediates Delayed Protection through Modulation of Mitochondrial Function**  
**Sruti Shiva**, *University of Pittsburgh, Pittsburgh, PA*

4:30pm **Protecting the Heart with Exercise**  
**John Calvert**, *Emory University, Atlanta, GA*

4:00pm **Cytoprotective Actions of Hydrogen Sulfide in Cardiovascular Disease**  
**David J. Lefer**, *Louisiana State University, New Orleans, LA*

## TUESDAY EVENING

**POSTER SESSION & SOCIAL 5:00pm – 6:30pm • 10th Floor Campus Center**

**DINNER 6:30pm • Amherst Room, 10th Floor Campus Center**

# PLATFORM PRESENTATIONS (cont.)

WEDNESDAY, APRIL 22, 2015

## Session I: **CARDIOVASCULAR SESSION** (*continued*)

Moderator: **Scott Powers**, *University of Florida, Gainesville, FL*

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|--------|--|--------|---|
| 8:00am | <b>Chemical and Pharmacological Preconditioning of Heart against Injury from Ischemia: Importance of the Dose-Response Relationship</b><br><b>John E. Baker</b> , <i>Medical College of Wisconsin, Milwaukee, WI</i> | 8:30am | <b>Cardioprotection with Ischemic Conditioning: The Comorbidity Conundrum</b><br><b>Karin Przyklenk</b> and <b>Peter Whittaker</b> , <i>Wayne State University School of Medicine, Detroit MI</i> |
|--------|--|--------|---|

## Session II: **BIOMEDICAL AND ENVIRONMENTAL SESSION**

Moderator: **Douglas Boreham**, *Northern Ontario School of Medicine, Sudbury, ON, Canada*

- |         |  |         |  |
|---------|--|---------|--|
| 9:00am  | <b>Cancer: A Metabolic Disease with Metabolic Solutions</b><br><b>Thomas Seyfried</b> , <i>Boston College, Boston, MA</i>                    | 11:00am | <b>Bystander Effects, Adaptive responses and Hormesis: Being on the Right Part of the Stress Response Curve</b><br><b>Carmell Mothersill</b> , <b>Colin Seymour</b> , <i>McMaster University, Hamilton, ON, Canada</i>                   |
| 9:30am  | <b>Adaptive Homeostasis, Oxidative Stress, and Aging</b><br><b>Kelvin Davies</b> , <i>University of Southern California, Los Angeles, CA</i> | 11:30am | <b>Extracellular Oxidized DNA: A Novel Stressor with Hormetic Potential</b><br><b>Ancha Baranova</b> , <i>George Mason University, Fairfax, VA</i><br><b>Natalia Veyko</b> , <i>Research Centre for Medical Genetics, Moscow, Russia</i> |
| 10:00am | <b>Break</b>   |         |  |
| 10:30am | <b>Low-dose Radiation and Diabetes, and its Complications</b><br><b>Lu Cai</b> , <i>University of Louisville, Louisville, KY</i>             |         |  |

**LUNCH Noon • Amherst Room, 10th Floor Campus Center**

**Dose and Response: A Foundational Concept for Health and Healing**

**Speaker: Wayne Jonas**, *Samueli Institute, Alexandria, VA*

## Session III: **APPLICATIONS AND PERSPECTIVES SESSION**

Moderator: **Colin Seymour**, *McMaster University, Hamilton, ON, Canada*

- |        |  |        |  |
|--------|--|--------|--|
| 1:30pm | <b>Clinical Applications of Pre-, Post- and Remote Ischemic and Pharmacologic Conditioning in Ischemic Disease: Promise and Limitations</b><br><b>Ronald J. Korthuis</b> , <i>University of Missouri, Columbia, MO</i> | 3:00pm | <b>The Case for Hormetic Dose-Response and Against the LNT</b><br><b>Richard A. Williams</b> , <i>Mercatus Center at George Mason University, Arlington, VA</i><br><b>Edward J. Calabrese</b> , <i>University of Massachusetts, Amherst, MA</i><br><b>Dima Yaziqi Shamoun</b> , <i>Mercatus Center at George Mason University, Arlington, VA</i><br><b>James Broughel</b> , <i>Mercatus Center at George Mason University, Arlington, VA</i> |
| 2:00pm | <b>Exercise-Induced Preconditioning in Cardiac and Skeletal Muscles</b><br><b>Scott K. Powers</b> , <i>University of Florida, Gainesville, FL</i>  |        |  |
| 2:30pm | <b>Preconditioning can modulate Therapeutic Index of Photobiomodulation</b><br><b>Praveen Arany</b> , <i>National Institutes of Health/ NIDCR, Bethesda, MD</i>  | 3:30pm | <b>Conference Overview</b><br><b>Colin Seymour</b> , <i>McMaster University, Hamilton, ON, Canada</i>  |

***A Partial List Of Poster Presentations***

**Post-Conditioning Stress (PCS) Responses in HaCaT Cell Line and a Comparison between PCS with the Adaptive Stress Response**

Jason Cohen, *McMaster University, Hamilton, ON, Canada*

Colin Seymour, Carmel Mothersill, *McMaster University, Hamilton, ON, Canada*

**Opposite Bystander Effect Induced by the Low-Dose Hyper-Radiosensitive Region in C6 and F98 Rat Glioma Cell Lines**

Cristian Fernandez-Palomo, *McMaster University, Hamilton, ON, Canada*

Colin Seymour, Carmel Mothersill, *McMaster University, Hamilton, ON, Canada*

**Association between Air Temperature and Circulatory System Disease Mortality in New England Counties**

John Hart, *Sherman College of Chiropractic, Spartanburg, SC*

**Measures for Monitoring Adaptability of the Nervous System**

John Hart, *Sherman College of Chiropractic, Spartanburg, SC*

**Low-Level Laser Therapy for Neuromusculoskeletal Conditions: A Mini-Review**

Lucian Henry, *Prime Care, Greenville, SC*

**The Use of X-rays in the Treatment of Bronchial Asthma: An Historical Assessment**

Edward J. Calabrese, Gaurav Dhawan, *University of Massachusetts Amherst, Amherst, MA*

Rachna Kapoor, *University of Massachusetts Amherst, Amherst, MA*

**One Dose...Many Consequences**

David Kirkland, *Ottersgill, Stromness, Orkney, UK*

**Chernobyl-Related Cancer: On the Role of Late Diagnostics in the Incidence Increase**

Sergei V. Jargin, *Peoples' Friendship University of Russia, Moscow, Federation of Russia*

**Hormesis: General Principle only for the Environmental Agents**

Sergei V. Jargin, *Peoples' Friendship University of Russia, Moscow, Federation of Russia*

**Radiation-Stimulated Ultraviolet Signal Generation and Response by Various Cell Lines**

Michelle Le, *McMaster University, Hamilton, ON, Canada*

Fiona McNeill, Colin Seymour, Andrew J. Rainbow, Carmel Mothersill, *McMaster University, Hamilton, ON, Canada*

**Astrocytes Remain Neuroprotective even after Severe Stress and Loss of Glutathione Defenses**

Rehana K. Leak, *Duquesne University, Pittsburgh, PA*  
Amanda M. Gleixner, Deepti B. Pant, Jessica M. Posimo, *Duquesne University, Pittsburgh, PA*

**Beneficial and Neutral Effects of Radiation: Data Gaps in Radiobiological Literature**

Nicole Pachal, *McMaster University, Hamilton, ON, Canada*

Carmel Mothersill, Colin Seymour, Ben Su, *McMaster University, Hamilton, ON, Canada*

**Estimation of Lifetime Risk of Cancer with Long-term Survival Rates from Radiation Exposure**

Songwon Seo, *Korea Institute of Radiological & Medical Sciences, Seoul, South Korea*

Eun-Kyeong Moon, Won Jin Lee, *Korea University, Seoul, South Korea*

Dal Nim Lee, Min-Jung Kim, Ki Moon Seong, Sunhoo Park, Seung-Sook Lee, Young Woo Jin, *Korea Institute of Radiological & Medical Sciences, Seoul, South Korea*

**Microarray Analysis for Breast Cancer Cells with the Decreased Malignant Properties by Low-Dose Radiation**

Ki Moon Seong, *Korea Institute of Radiological & Medical Sciences, Seoul, South Korea*

Min-Jeong Kim, Songwon Seo, Won-Suk Jang, *Korea Institute of Radiological & Medical Sciences, Seoul, South Korea*

Su-Jae Lee, *Hanyang University, Seoul, South Korea*  
Sunhoo Park, Seung-Sook Lee, Young Woo Jin, *Korea Institute of Radiological & Medical Sciences, Seoul, South Korea*

**Deposition of 226Ra in Fish Fed with Environmental Relevant Activities of 226Ra**

Xiaopei Shi, *McMaster University, Hamilton, ON, Canada*  
Richard W. Smith, *McMaster University, Hamilton, ON, Canada*

Nick Priest, *Canadian Nuclear Laboratories, Chalk River, ON, Canada*

Carmel Mothersill, Colin Seymour, *McMaster University, Hamilton, ON, Canada*

*The International Dose-Response Society is proud to announce the Recipients of the annual awards for **Outstanding Career Achievement**, **Outstanding New Investigator** and **Outstanding Leadership**. These Awards are presented to individuals in each category who have made outstanding contribution to the field of Dose-Response.*

*This year's awards go to: **Kelvin J A Davies** for Outstanding Career Achievement; **James Mitchell** for Outstanding New Investigator; and **Douglas Boreham** for Outstanding Leadership. Congratulations to all.*

## AWARDEE PROFILE: CAREER ACHIEVEMENT



### **KELVIN J. A. DAVIES, PH.D., D.SC.**

James E. Birren Chair and Dean of Faculty  
University of Southern California's, School of Gerontology  
Professor of Molecular and Computational Biology in  
USC's College of Letters, Arts,  
and Sciences

Kelvin J. A. Davies, Ph.D., D.Sc. is the James E. Birren Chair and Dean of Faculty at the University of Southern California's, School of Gerontology. He is also Professor of Molecular and Computational Biology in USC's College of Letters, Arts, and Sciences. Professor Davies was born and raised in London, England and is a dual citizen of Great Britain and the U.S.A. Educated at London and Liverpool Universities, the University of Wisconsin, Harvard University, and the University of California at Berkeley, he was previously a faculty member at Harvard University and Harvard Medical School. Before moving to USC in 1996, Professor Davies was Chairman of the Department of Biochemistry & Molecular Biology at the Albany Medical College, where he was also professor of Molecular Medicine. Deeply involved in research into oxidative stress, free radicals, and Aging, Professor Davies is the (founding) Editor-in-Chief of the premier scientific journal, *Free Radical Biology & Medicine*. He pioneered the study of protein oxidation and proteolysis during oxidative stress, and gene expression during stress-adaptation. He uncovered the role of free radicals in mitochondrial adaptation to exercise. He discovered five stress-genes including RCAN1 which regulates calcineurin and whose mis-regulation contributes to Alzheimer disease, Down syndrome, and Huntington disease. Davies demonstrated that impaired induction of proteasome and mitochondrial lon protease genes contributes to senescence and severely diminished stress-resistance in aging. He has pioneered the concept of impaired 'Adaptive Homeostasis' as a major factor in aging. Professor Davies is past President of the Oxygen Club of California, the Society for Free Radical Biology & Medicine, and the International Society for Free Radical Research. He was also founding President of the California Philharmonic Orchestra. The organizer of over 20 scientific meetings and conferences, he has been chairman of both the Oxygen Radicals in Biology Gordon Conference and the Oxidative Stress and Disease Gordon Conference. Davies has been awarded seven honorary doctoral degrees and professorships from European, South American, and Asian Universities. He has won numerous medals, prizes, distinguished/lifetime scientific achievement awards, and mentoring awards; and has been elected a Fellow of no less than seven national/international scientific societies including the Royal Institution and the Royal Society of Medicine. Kelvin Davies was knighted as a Chevalier de l'Ordre National du Mérite de France (Knight of the National Order of Merit of France) in 2012 by French President Nicolas Sarkozy for his services to science, humanity, and international cooperation.

# 2015 INTERNATIONAL DOSE-RESPONSE SOCIETY AWARDS

## AWARDEE PROFILE: NEW INVESTIGATOR



### JAMES MITCHELL

Associate Professor of Genetics and Complex Diseases  
Harvard T. H. Chan School of Public Health, Boston, MA, USA

After graduating from the University of Virginia in 1993, Dr. Mitchell worked as a technician at Cold Spring Harbor Laboratory in Dr. Bruce Stillman's lab for two years, where he became interested in biochemistry, the genetics of DNA replication in yeast, and fishing in the Long Island Sound. He chose biochemistry and moved to California to do his graduate studies at UC Berkeley, where he worked on human telomerase ribonucleoprotein structure and function in the lab of Dr. Kathleen Collins. There, he helped to identify the aplastic anemia syndrome dyskeratosis congenita as the first recognized telomere maintenance disorder, or telomeropathy.

Dr. Mitchell moved to Rotterdam in the Netherlands to learn mouse genetics as a postdoc in Prof. Jan Hoeijmakers' lab, where he worked on premature aging in a DNA repair-deficient mouse models of the segmental progeria Cockayne syndrome. He found that these mice, although short-lived, display many key adaptive metabolic and physiologic features of dietary restriction, an intervention best known for extending lifespan in organisms as diverse as roundworms, fruit flies, and rodents. These studies sparked his interest in the benefits of dietary restriction and its potential translation to the clinic.

Dr. Mitchell started his own lab at the Harvard T.H. Chan School of Public Health in Boston in 2008, where the main focus remains on the use of dietary restriction to protect against acute inflammatory stressors ranging from ischemia reperfusion injury to metabolic syndrome to experimental rodent malaria. Dr. Mitchell's team uncovered the ability of short-term dietary interventions lasting one week or less, and consisting of reduced overall food intake or reduction of specific amino acids such as methionine and cysteine, to improve outcomes in preclinical models of surgical stress. Mechanistically, these benefits require upstream nutrient sensing pathways involving amino acid sensing kinases including GCN2 and mTORC1, and novel downstream effector molecules including a beneficial product of the transsulfuration pathway, hydrogen sulfide. Dr. Mitchell's long-term goal is to translate these findings to best practice in the clinic, beginning with the question of what we should or shouldn't eat before the planned stress of major surgery.

## AWARDEE PROFILE: LEADERSHIP



### DR. DOUGLAS BOREHAM

DR. DOUGLAS BOREHAM currently holds positions as Professor and Division Head of Medical Sciences at the Northern Ontario School of Medicine (Sept 2012-Present) and is an Adjunct Professor in the Department of Medical Physics and Applied Radiation Sciences at McMaster University (2000-Present). He is also Principal Scientist and Manager of the Integration Department at Bruce Power. He was an undergraduate student in biology at Laurentian University and earned his Ph.D. from the University of Ottawa in 1990. Dr. Boreham worked for 14 years as a radiobiology research scientist at Atomic Energy of Canada Limited. He has published research on a variety of topics including health effects and anti-carcinogenic processes induced by low doses of medical diagnostic radiation (CT and PET), radioprotective dietary supplements that prevent age related

cognitive decline, radiation therapy predictive assays to identify radiosensitive patients, and developed cytogenetic assays to detect DNA damage and for emergency biological dosimetry. Dr. Boreham has won several teaching awards including McMaster Students Union Teaching Award, McMaster President's Award for Excellence in Instruction, Canadian Nuclear Society - Canadian Nuclear Achievement Award for Education and Communications, McMaster President's Award for Course Design, the Hamilton Spectator Publisher's Award for Education, and recently received the Canadian Radiation Protection Association – 2009 Distinguished Achievement Award in Recognition of Outstanding Contributions in the Field of Radiation Protection. In 2010 he was awarded the Radiation Research Society – 2010 Mentor of the Year Award for Scholars in Training. In 2011 he was voted "Professor of the Semester in Life Sciences" by 800 first year biology students. He was also the 2012 Canadian delegate for the United Nations Scientific Committee on the Effects of Atomic Radiation. From 1995-2005 Dr. Boreham owned and operated a 50 acre vineyard and winery on the Beamsville Bench in the Niagara wine region.

# ANNOUNCEMENT

*The 15th International Conference on*  
**Adaptive Responses/Preconditioning**  
*The Annual Meeting of the International Dose-Response Society*

**APRIL 19-20, 2016**

University of Massachusetts at Amherst

- *Adaptive* • *Bidirectional* • *Biphasic* • *Hormetic* • *Non-Monotonic* • *Yerkes-Dodson Law (Psychology)*
- *U-Shaped* • *J-Shaped* • *Subsidiy-Stress Gradient (Ecology)* • *Reverse Dose-Responses*

## TOPICS WILL INCLUDE:

### PRE- POST-CONDITIONING

Alzheimer's Disease/Dementia  
Parkinson's Disease  
Depression and PTSD  
Concussions/Traumatic Brain Injury  
Improving Surgical Outcomes  
Stroke/Cardiovascular Disease  
Diabetes  
Glaucoma  
Stem Cell Transplantation Therapy

### HEALTHY LIFESTYLES, AGING AND LIFE EXTENSION

Intermittent Fasting  
Exercise  
Chemical/Nutritional Supplements  
Low Dose Radiation and Longevity  
Adaptive response-based cosmetics

### ENHANCING HUMAN PERFORMANCE

Cognition  
Endurance, Strength and Speed  
Fatigue/Jet Lag: Prolong Onset/  
Speed Up Recovery  
Wound Healing Acceleration - skin,  
tendon, muscle, bone, and vascular

## ENHANCING HEALTHY LIVING AND PERFORMANCE

*Please visit our website for more information, Abstract Submission Guidelines and Abstract Submission*

**[www.dose-response.org](http://www.dose-response.org)**

### For further Information contact:

Edward J. Calabrese, Ph.D. or Paul T. Kostecki, Ph.D.  
Environmental Health Sciences, Morrill I, N344, University of Massachusetts Amherst, MA 01003  
Phone: (413) 545-3164 • FAX: (413) 545-4692 • [edwardc@schoolph.umass.edu](mailto:edwardc@schoolph.umass.edu)

**DEADLINE FOR SUBMISSION: January 29, 2016**

*E-mail to [dleonard@schoolph.umass.edu](mailto:dleonard@schoolph.umass.edu)*

## INTERNATIONAL DOSE-RESPONSE SOCIETY MEMBERSHIP

The **INTERNATIONAL DOSE-RESPONSE SOCIETY** is a professional society designed to enhance understanding of the nature of the dose response and its implications for science and society. Those Individuals with a professional interest in these areas are invited to join the Society. Applications for membership can be found at [www.dose-response.org](http://www.dose-response.org).

International **DOSE-RESPONSE** Society  
[www.Dose-Response.org](http://www.Dose-Response.org)

As part of the **INTERNATIONAL DOSE-RESPONSE SOCIETY** membership, each member will receive a subscription to the e-journal Dose-Response, which is a peer-reviewed quarterly journal. Members will receive a 25% reduction in registration fees to Dose-Response 2015: Implications for Toxicology, Medicine, and Risk Assessment, the Annual Meeting of the International Dose-Response Society.

*To Become a Member, Visit [www.dose-response.org](http://www.dose-response.org)*

# INTERNATIONAL DOSE-RESPONSE SOCIETY

## 2015 Membership Form for New and Renewing Members

**Please choose one membership category (Payment in US Funds):**

- Individual Membership–1 year  \$125–1 year  
Individual Membership–2 years  \$225–2 years  
Retiree Membership–1 year  \$75–1 year  
Retiree Membership–2 years  \$125–2 years  
Post-Graduate Membership–1 year  \$75–1 year (up to three years post-graduation)  
Post-Graduate Membership–2 years  \$125–2 years (up to three years post-graduation)  
Student Membership–1 year  \$10–1 year  
Student Membership–2 years  \$15–2 years  
Sustaining Member  \$1000/year  
Corporate Membership  \$5000/year

Additional Donation  \$25  \$50  \$100  \$200

Renewal Membership  New Membership

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*Country code Area code Number*

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**Completed application form along with a check or money order in US dollars should be mailed to:**

### Dose-Response/BELLE Offices

Environmental Health Sciences Program, School of Public Health

Morrill 1, Room N344, University of Massachusetts

Amherst, MA 01003

Telephone: 413-545-3164 Email: [Sorensen@ehs.umass.edu](mailto:Sorensen@ehs.umass.edu)

\_\_\_\_\_  
*Signature of Applicant*

\_\_\_\_\_  
*Date*