The 15th Annual International Conference on Dose-Response

PRECONDITIONING
ADAPTIVE RESPONSES IN BIOLOGY AND MEDICINE
Building Biological Shields Against Disease and Injury

The Annual Meeting of the

International DOSE-RESPONSE Society
www.Dose-Response.org

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

April 19-20, 2016
University of Massachusetts
Amherst, MA

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

Approved for CPH Recertification by the National Board of Public Health Examiners

PLATFORM PRESENTATIONS

TUESDAY, APRIL 19, 2016

Welcome 8:15am

Session I: PLENARY SESSION

Moderator: George Perdrizet, *University of California, San Diego CA*

8:30am **Facilitating Preconditioning through Neurotechnology: Using New Tools to Optimize "Old Tricks"**
James Giordano, *Georgetown University, Washington, DC*
Nikola B. Kohls PhD, *Coburg University of Applied Sciences and Arts, Coburg, Germany*

9:15am **It's Adaptation to Reactive Intermediates, But Not As We Know It: Time is of the Essence**
Jaap Hanekamp, *University College Roosevelt, Middelburg, The Netherlands and University of Massachusetts, Amherst, MA*
Aalt Bast, *Maastricht University, Maastricht, The Netherlands*

10:00am **Break**

10:30am **Stimulus Frequency and Consequent Duration of the Induced Phenotype: Further Characterizations of the Hormetic Dose-Response Relationship**
Jeff M Gidday, *LSU School of Medicine, New Orleans LA*

11:15am **Molecular Dissection of Hormesis**
Thomas E. Johnson, James R Cypser, *University of Colorado Boulder, Boulder CO*
Shane L. Rea Barshop, *University of Texas Health Science Center San Antonio, San Antonio, TX*
Alexander R. Mendenhall, *Brent Laboratory, Seattle, WA*

LUNCH Noon • Amherst Room, 10th Floor Campus Center

Session II: PRECONDITIONING BIOMEDICAL AND THERAPEUTIC APPLICATIONS: PART I

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

1:00pm **Ethanol Ingestion Elicits an Anti-inflammatory Phenotype to Limit Ischemia/Reperfusion Injury by a Neutrophil-Dependent Mechanism**
Ronald J Korthuis, *University of Missouri, Columbia, MO*

1:30pm **The Optimal Ischemic Postconditioning Protocol and Its Relevance to Clinical Cardiology**
James M Downey, Michael V. Cohen, *University of South Alabama, Mobile, AL*

2:00pm **Linking Mechanism with Clinical Findings: Preconditioning and Prevention of Myocardial Infarction Damage**
Andrew Redington, *Cincinnati Children's Hospital Medical Center, Cincinnati, OH*

2:30pm **Exercise is Medicine in the 21st Century - Emphasis on Efficacy, Dosing, Safety/Toxicity**
Carl J Lavie, *Ochsner Health System, New Orleans, LA*

3:00pm **Break**

3:30pm **Remote Ischemic Conditioning To Prevent Organ Injury Following Hemorrhagic Shock**
Chung Ho Leung, *University of Toronto, Toronto, ON, Canada*
Thomas P. Reid, *McGill University, Montreal, QC, Canada*
Christopher A. Caldarone, *Hospital for Sick Children, Toronto, ON, Canada*
Xiao-Yan Wan, *St. Michael's Hospital, Toronto, ON, Canada*
Ori D. Rotstein, *University of Toronto and the Keenan Research Centre, St. Michael's Hospital, Toronto, ON, Canada*

4:00pm **Neuroprotective Mechanism of Preconditioning Against Intracranial Stenosis and Ischemic Stroke**
Yuchuan Ding, *Wayne State University School of Medicine, Detroit, MI*

4:30pm **Stress-Induced Preconditioning in the Inner Ear**
Lisa L. Cunningham, Elyssa L. Monzack, Lindsey A. May, *National Institute on Deafness and Other Communication Disorders National Institutes of Health, Bethesda MD*
Soumen Roy, *National Cancer Institute, National Institutes of Health, Bethesda MD*
Matthew M. Ryals, *National Institute on Deafness and Other Communication Disorders National Institutes of Health, Bethesda MD*
Tiffany G. Baker, *Medical University of South Carolina, Charleston, SC*
Shimon P. Francis, *National Institute on Deafness and Other Communication Disorders National Institutes of Health, Bethesda MD*

TUESDAY EVENING

POSTER SESSION & SOCIAL

5:00pm – 6:30pm • 10th Floor Campus Center

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

WEDNESDAY, APRIL 20, 2016

Session I: PRECONDITIONING BIOMEDICAL AND THERAPEUTIC APPLICATIONS PART II

Moderator: Colin Seymour, *McMasters University, Hamilton, ON*

8:00am **Fighting Neurotoxicity with a Double-Edged Sword: The Dual Role of Thrombin in Neuron Health**
Paul Garcia, *Emory University School of Medicine and VA Medical Center, Atlanta, GA*
Vincent T. Ciavatta, *VA Medical Center, Atlanta, GA*
Jonathan A. Fidler, Anna Woodbury, William R. Tyor, *Emory University School of Medicine and VA Medical Center, Atlanta, GA*

8:30am **Intermittent Hypoxia-Induced Spinal Motor Plasticity: Implications for Spinal Injury**
Gordon S. Mitchell, *University of Florida, Gainesville, FL*

9:00am **Hypoxia Induction of Vascular Remodeling in the Brain: Defining the Dose-Response Relationship**
Richard Milner, Amin Boroujerdi, *The Scripps Research Institute, La Jolla, CA*

9:30am **Parameters of Hormetic Preconditioning Stress and Resilience to Trauma in Rats**
Thomas Minor, *University of California Los Angeles, Los Angeles, CA*
Traci N. Plumb, *Robert Stone Dow Neurobiology Laboratories, Portland, OR*

10:00am **Break**

10:30am **Is Hyperbaric Oxygen the Preconditioning Agent of Choice?**
George Perdrizet, *University of California, San Diego, CA*

11:00am **Redox Modulation of Vitagenes by Hormetic Antioxidants: Relevance to Aging and Neurodegeneration**
Maria Laura Ontario, **Vittorio Calabrese**, *University of Catania, Catania, Italy*

11:30am **Preconditioning for Traumatic Brain Injury**
Shyam Gajavelli, *Lois Pope LIFE Center, Miami, FL*
S. Yokobori, *Nippon Medical School, Tokyo, Japan*
A. T. Mazzeo, *University of Turin, Turin, Italy*
K. Hosein K, W. D. Dietrich, M. R. Bullock, *Lois Pope LIFE Center, Miami, FL*

LUNCH Noon - 1:30pm • Amherst Room, 10th Floor Campus Center

Treatment Of Alzheimer Disease With CT Scans
Speaker: **Jerry Cuttler**, *Atomic Energy of Canada Limited (ret)*

Session III: CHEMICAL AND RADIATION IMPLICATIONS OF PRECONDITIONING

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

1:30pm **Age during Pre-Conditioning Hormesis Might be as Important as Dose for Improving Performance in Insect Models**
Giancarlo Lopez-Martinez, *New Mexico State University, Las Cruces, NM*

2:00pm **Low Doses, Adaptive Responses and Bystander Effects; Where are We Now?**
Carmel Mothersill, Colin Seymour, *McMaster University, Hamilton, Ontario, Canada*

2:30pm **Radiation Induced Adaptive Protection**
Eduoard Azzam, *Rutgers University, Newark, NJ*

3:00pm **Panel Discussion**
Moderator: **Chris Hine**, *Harvard T.H. Chan School of Public Health, Boston, MA*

Ori Rotstein, *University of Toronto and the Keenan Research Centre, St. Michael's Hospital, Toronto, ON, Canada*
Richard Korhuis, *University of Missouri, Columbia, MO*
Jaap Hanekamp, *University College Roosevelt, Middelburg, The Netherlands and University of Massachusetts, Amherst, MA*
George Perdizet, *University of California, San Diego CA*
Paul Garcia, *Emory University School of Medicine and VA Medical Center, Atlanta, GA*

A Partial List Of Poster Presentations

Use of Low Oxygen Treatment to Reduce Symptoms of Parkinson's Disease in a Drosophila Model
Zachary L. Clifford, *New Mexico State University, Las Cruces, NM*
Giancarlo Lopez-Martinez, *New Mexico State University, Las Cruces, NM*

How the Conditioning Dose Mediates Protection: Dose Optimization within Temporal and Mechanistic Frameworks
Edward J. Calabrese, **Gaurav Dhawan**, *University of Massachusetts Amherst, Amherst, MA*
Rachna Kapoor, *Saint Barnabas Medical Center, Livingston, NJ*

Preconditioning is Hormesis Part I: Documentation, Dose-Response Features and Mechanistic Foundations
Edward J. Calabrese, **Gaurav Dhawan**, *University of Massachusetts Amherst, Amherst, MA*
Rachna Kapoor, *Saint Barnabas Medical Center, Livingston, NJ*

Finding Interventions that Reduce Infarct Size Beyond that from Platelet Inhibitors Alone
James M. Downey, Michael V. Cohen, *University of South Alabama, Mobile, AL*

The Thermal and Radiological Stress Dichotomy: Adaptive Response in Lake Whitefish (Coregonus clupeaformis)
Adomas V. Kulesza, Shayen Sreetharan, *McMaster University, Hamilton, Ontario, Canada*
Richard G. Manzon, Christopher M. Somers, *University of Regina, Regina, Saskatchewan, Canada*
Douglas R. Boreham, *Northern Ontario School of Medicine, Sudbury, Ontario, Canada*
Joanna Y. Wilson, *McMaster University, Hamilton, Ontario, Canada*

Investigating the Contribution of L-Tryptophan to the UV Fluorescence Observed from Beta-Irradiated Cells
Michelle Le, Fiona McNeill, Colin Seymour, Andrew J. Rainbow, Carmel Mothersill, *McMaster University, Hamilton, Ontario, Canada*

Bionic Motion Platform to Increase Exercise-Induced Hormesis in Wider Population
Lawrence J. Licklider, PhD, *Better Standing Company, Inc. Framingham, MA*

Hormesis Mechanism Based on Quorum Sensing: A Case Study on Sulfonamides to Photobacterium phosphoreum
Zhifen Lin, *Tongji University, Shanghai, China*

Alteration of the Immunological Parameters in Animals Pre-exposed to Radiofrequency Electromagnetic Fields before Infection with Salmonella typhimurium and Klebsiella pneumoniae
Saeed Tajbakhsh, *Bushehr University of Medical Sciences and the Persian Gulf Tropical Medicine Research Center, Bushehr, Iran*
SMJ Mortazavi, Samira Zarei, *Shiraz University of Medical Sciences, Shiraz, Iran*
Abdollah Jafarzadeh, *Rafsanjan University of Medical Sciences, Rafsanjan, Iran*
Mohammad Taheri, *Kerman University of Medical Sciences, Kerman, Iran*
Samaneh Nematollahi, *Shiraz University of Medical Sciences, Shiraz, Iran*

A Discrete Drug Dilution Model for Personalized Medicine Based on Non-Linear Threshold Philosophy
Jahangir A. Satti, *Albany Medical College, Albany, New York, USA*

A Novel Nanodosimetry Drug Quantification Model to Treat Chronic Diseases
Jahangir A. Satti, *Albany Medical College, Albany, New York, USA*

The Adaptive Response Induced by Chronic Radiation from 226Ra in Fish Cells and Human Cells
Xiaopei Shi, Carmel Mothersill, Colin Seymour, *McMaster University, Hamilton, Ontario, Canada*

Examining The Effects of Low-dose Radiation on The Primary Cilium Biology in Human Epithelial Cells
Nguyen (Nathan) T. K. Vo, Cristian Fernandez-Palomo, Colin Seymour, Carmel Mothersill, *McMaster University, Hamilton, Ontario, Canada*

Evaluation of Radiotherapeutic Efficacy of Terpenes for Low Dose Irradiation
Dusan Vukmirovic, Colin Seymour, Carmel Mothersill, *McMaster University, Hamilton, Ontario, Canada*

2016 INTERNATIONAL DOSE-RESPONSE SOCIETY AWARDS

OVERVIEW

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: ***Carol S. Marcus, Mark L. Miller,*** *and* ***S.A.R.I. Scientists for Accurate Radiation Information*** *for Outstanding Leadership,* ***Giancarlo Lopez-Martinez*** *for Outstanding New Investigator; and* ***Thomas E. Johnson*** *for Outstanding Career Achievement. Congratulations to all.*

Awardee Profile: CAREER ACHIEVEMENT

THOMAS E. JOHNSON

Tom Johnson, the recipient of the 2016 Outstanding Career Achievement Award, is a Professor at the University of Colorado Boulder in the Department of Integrative Physiology. He is also a Fellow of the Institute of Behavioral Genetics where he first affiliated in 1981.

Dr. Johnson received his BS at MIT, where he worked with David Baltimore and Harvey Lodish. He received his PhD at the University of Washington under Ben Hall and was a postdoc with Bill Wood at the University of Colorado. Dr. Johnson is a pioneer in the application of molecular and genetic analyses to the study of aging with his seminal work on the nematode C. elegans being published in 1982. He has been called the father of genetic research in aging. He has won most of the awards in the field of aging and gerosciences and is a Fellow of the American Academy of Sciences.

Dr. Johnson will focus on the nature of hormesis. Using the nematode C. elegans, he found a profound response to exposure to a range of toxins that include heat, heavy metals, paraquat, hydrogen peroxide, and other forms of oxidative stress. The age-1 mutation, for which he is largely credited, causes increased tolerance to a similar set of stressors. Most Age mutants modify this response to stress, demonstrating that extended longevity is directly associated with increased multi-focal stress resistance.

Johnson's lab demonstrated a profound non-linear relationship between heat and other stressors: at low stressor levels, there is a consistent ~20% increase in stress resistance and longevity. This relationship has since been shown to be modulated by the insulin-like pathway that includes age-1. Dietary restriction (probably also a form of hormesis) has been studied in some detail in worms and in mice. The hormetic response occurs as soon as a worm is exposed to a moderate stress. He has extended these studies partly by establishing a stochastic model of response to stress. His current work utilizes an ingenious method for identifying novel drug targets for increased healthspans in a mouse model.

(Dr. Johnson would like to acknowledge seminal funding from the Glenn Foundation, the Ellison Foundation, anonymous donors, as well as substantive support from the State of Colorado and especially the NIH and NSF.)

Awardee Profile: LEADERSHIP

SCIENTISTS FOR ACCURATE RADIATION INFORMATION (SARI)

In 2013, in response to the harm caused by the misinformation propagated regarding radiation effects in Fukushima, following the initiative of Dr. Bobby Scott of Lovelace Respiratory Research Institute, a group of about 20 scientists formed a new group known as Scientists for Accurate Radiation Information (SARI) with the following Charter and Mission:

Charter: The objective of this group is to monitor for and counter nuclear/radiological misinformation that could adversely impact the world's ability to respond effectively to nuclear and radiological challenges, to the end point of saving lives.

Mission: To help prevent unnecessary, radiation-phobia-related deaths, morbidity, and injuries associated with distrust of radio-medical diagnostics/therapies and from nuclear/radiological emergencies through countering phobia-promoting misinformation spread by alarmists via the news and other media, including journal publications.

New Members are required to be nominated by a present member and supported by two additional members. There is an Associate Member category for non-scientists who are interested in furthering SARI's Charter and Mission. SARI membership has grown steadily since 2013 and it currently has 97 members and 10 Associate Members.

Continued on next page

SCIENTISTS FOR ACCURATE RADIATION INFORMATION (SARI) *Continued*

Discussions among SARI members take place in a very active Google Group. SARI has written several open letters to advisory bodies, government agencies, etc. in an attempt to influence them to recognize the growing evidence for the baselessness of the linear no-threshold (LNT) model and for the validity of radiation hormesis. SARI has also responded to government requests for public input on radiation matters.

Recently SARI submitted a petition to US Nuclear Regulatory Commission (NRC) signed by 24 members (in support of a similar one by Dr. Carol Marcus of UCLA) urging NRC to abandon the LNT model and instead use radiation hormesis as the scientific basis for setting radiation safety regulations. NRC is currently considering these petitions. This is indeed an encouraging sign.

Awardee Profile: LEADERSHIP

CAROL MARCUS

Carol Marcus was born and raised in New York City. She received her B.S. in General Biology in 1960, an M.S. in Radiation Biology in 1961, and a Ph.D. in Physical Biology in 1963, all at Cornell University. She spent a year doing radiobiology research at the RVO-TNO in Rijswijk, The Netherlands. She then worked at the Laboratory of Nuclear Medicine and Radiation Biology at UCLA, taught general biology at Santa Monica College for several years, and then went to USC to teach radiobiology, radioisotope methodology, and journal club in their new radiopharmacy graduate program. This continued for 17 years. Several years after starting at USC she began medical school, graduating valedictorian and doing an internship and residency in internal medicine and then a second residency in nuclear medicine. She then became Assoc, Director of Nuclear Medicine at Harbor-UCLA Medical Center, a position she held for 17 years until retirement as Professor of Radiological Sciences at UCLA. After retirement she became Prof. of Radiation Oncology at UCLA and taught radiopharmaceutical therapy to the radiation oncology residents and nuclear medicine residents, and eventually became a Prof. of Molecular and Medical Pharmacology (Nuclear Medicine) at UCLA as well. She has had a consulting business on the side since 1970. Throughout her career she has been active in government affairs, serving as Chair of the Government Relations Committee of the Society of Nuclear Medicine and of the American College of Nuclear Physicians for many years and being a member or Chairman of advisory committees at the FDA, NRC, and U.S. Pharmacopoeia. She was President of the California Chapter of the American College of Nuclear Physicians for eight years and Vice-President of the Society of Nuclear Medicine.

She has been married for 57 years and has two children and seven grandchildren.

Awardee Profile: NEW INVESTIGATOR

GIANCARLO LOPEZ-MARTINEZ

A Puerto Rico native, Dr López-Martínez received his MS and PhD from the Ohio State University with a focus on stress physiology of temperate and polar insects. A big component of his graduate work was rooted in hormesis and the protective benefits that low-levels of stress have against higher levels of different stressors (cross tolerance). He joined the lab of Dr Daniel Hahn at the University of Florida where he worked on low-oxygen hormesis and the reduction of post-irradiation oxidative damage. It was while at Florida that he became interested in the long-term effects of hormesis and how sexual performance and longevity can be improved by hormetic approaches. This work led to real world hormetic applications in pest control by improving a commonly used pesticide-free control tactic called the sterile insect technique (SIT).

During his time at the University of Florida, Dr López-Martínez became more interested in free radical-mediated damage and how damage from all types of environmental stresses is driven by free radicals and lead to oxidative damage. Thus, he started using oxidative damage markers as indicators for environmental stress and as a potential way of tracking the effectiveness of hormetic interventions. Through the use of oxidative damage biochemistry, he has linked free radical damage to decreases in performance, reproduction, and longevity. At the same time, he has used hormetic approaches to reduce free radical damage and improve organismal performance.

Dr López-Martínez started his own lab in the Biology Department at New Mexico State University in 2013 where he focuses on the short and long-term effects of environmental stressors in animals (mostly insects). He has received funding from the United States Department of Agriculture (USDA) to improve radiation-based pest control strategies and from the National Science Foundation (NSF) to purchase a cabinet x-ray irradiator to continue his work on the improvement of post-irradiation performance via low-oxygen hormesis. Additionally, his lab is currently funded by the National Institute of Health (NIH) on a project aimed at the long-term effects of hormesis at improving lifespan (longevity) and healthspan (reproductive output and immune function).

Awardee Profile: LEADERSHIP

MARK L. MILLER, CHP

Registration: Certified Health Physicist (Comprehensive and Power Reactor), American Board of Health Physics (1986); Recertified through 2018.

New Mexico Certificate of Registration 386-8.

Fields of Competence: Radiation dose and risk assessment; radiation measurement and sampling techniques and procedure development; design and implementation of environmental and personnel radiation monitoring programs; emergency planning and response; transportation and disposal of radioactive waste; computer programming as required for data management and analysis; radiation safety training and public speaking; and as low as reasonably achievable (ALARA) program design and implementation.

Credentials: M.S., Radiological Health Physics—Colorado State University (1976); B.S., Physical Science—University of Wyoming (1975); Member of the National Health Physics Society; Health Physics Society, Rio Grande Chapter (President, 1992); Member of the American Nuclear Society

Employment History:

2016 - Retired!
2004-2015
Sandia National Laboratories
1987-2004
Weston Solutions, Inc.

1982-1987
Northern States Power,
Monticello Power Plant

1979-1982
Washington Public Power
Supply System

1979
Exxon Nuclear Company
1976-1979
Battelle, Pacific Northwest
Laboratory

Key Projects:

Sandia - Radiological Environmental Monitoring and Assessment, Sandia National Laboratories, New Mexico and Tonopah, Nevada, Project Manager

Weston - Radiological Risk Assessment and Project Health Physics Support, Sandia Environmental Restoration Project, Characterization Support to Demolition and Decommissioning (D&D); Program Development, Radioactive Discharge Management Program, City of Albuquerque, New Mexico; Program and Technical Management, Uranium Mill Tailings Remedial Action (UMTRA) Program, Albuquerque, NM, Department of Energy.

Northern States Power, Monticello, MN, Nuclear Generating Plant, Health Physics Support, Lead Health Plant Physicist.

Washington Public Power Supply System, Environmental Health Physicist - Radiological Environmental Monitoring Programs Design, Hanford and Satsop, Washington.

Battelle Northwest Labs, Richland, WA, Statistical Data Analysis, , Senior Research Scientist.

Over 55 Publications and Presentations

INTERNATIONAL DOSE-RESPONSE SOCIETY

2016 Membership Form for New and Renewing Members

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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**

_____ _____
Signature of Applicant *Date*