

The 17th 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

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

April 17-18, 2018
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 17, 2018

Welcome 8:00am: Edward J. Calabrese, *Environmental Health, University of Massachusetts, Amherst, MA*

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

PLENARY SESSION

8:30am Enhancing the Amplitude and Duration of Hormesis-Induced Resilience; Workshop Summary October 2017

Walter J. Kozumbo, *Hormesis Project, University of Massachusetts, Amherst, MA*

Rehana K. Leak, *Graduate School of Pharmaceutical Sciences, Duquesne University, Pittsburgh, PA*

Co-Authors: Melvin E. Anderson, Aalt Bast, Regina G. Belz, Hans E. Bøtker, Edward J. Calabrese, Jeffrey M. Gidday, Randy J. Jirtle, Thomas E. Johnson, Sebastian Koch, Mark P. Mattson, James R. Mitchell, Charles Keith Ozaki, Roger P. Simon, and. Reinhard Wetzker.

9:15am Photobiomodulation: Mechanisms, Dose Response, and Applications to the Brain

Michael R Hamblin, *Wellman Center for Photomedicine, Massachusetts General Hospital, and Department of Dermatology, Harvard Medical School, and Harvard-MIT Division of Health Science and Technology, Boston, MA*

10:00am Break

10:30am Carbon Monoxide: A Promising Gaseous Therapeutic Molecule in Experimental and Human Inflammatory Disease

Augustine M. K. Choi, *Division of Pulmonary and Critical Care Medicine, Joan and Sanford I. Weill Department of Medicine, Weill Cornell Medical College, New York, NY*

Session I: CARDIOVASCULAR DISEASE AND HORMESIS

11:00am Gaseous Transmitters and Hormesis in Vascular Cells

William Durante, *University of Missouri, School of Medicine, Department of Medical Pharmacology and Physiology, Columbia, MO*

11:30am Circulating Nitrite is a Mediator of Remote Ischemic Preconditioning

Sruti Shiva, *Vascular Medicine Institute and Department of Pharmacology & Chemical Biology, University of Pittsburgh School of Medicine, Pittsburgh, PA*

Cameron Dezfulian, *Department of Critical Care Medicine, University of Pittsburgh, Pittsburgh, PA*

Frank X Guyette, *Department of Emergency Medicine, University of Pittsburgh School of Medicine, Pittsburgh, PA*

LUNCH Noon • Amherst Room, 10th Floor Campus Center

Session II: NEUROLOGICAL DISEASE AND HORMESIS

1:30pm Hormesis: Zinc Pre-conditioning Enhances Hippocampal Stem Cell Proliferation and Improves Behavior in a Model of TBI

Cathy W. Levenson, *Department of Biomedical Sciences and Program in Neuroscience, Florida State University College of Medicine, Tallahassee, FL*

Elise C. Cope, *Princeton Neuroscience Institute and Department of Psychology, Princeton University, Princeton, NJ*

Deborah R. Morris, *Department of Biomedical Sciences, Florida State University College of Medicine, Tallahassee, FL*

2:00pm Oxidative Stress, Senescence and Hormesis in the Aging Brain

Mina Königsberg, *Departamento de Ciencias de la Salud, División de Ciencias Biológicas y de la Salud, Universidad Autónoma Metropolitana-Iztapalapa, Mexico City, Mexico.*

2:30pm Clinical Psychology and Hormesis: A Developmental Perspective

Richard T. Liu, *Department of Psychiatry and Human Behavior, Alpert Medical School of Brown University and Bradley Hospital, East Providence, RI*

3:00pm Break

Session III: DIETARY STRESS AND HORMESIS

3:30pm Fasting Mimicking Diets, Multi-System Regeneration, and Aging

Valter Longo, *University of Southern California, Los Angeles, CA*

4:00pm The Hormetic Effects of Dietary Sulfur Amino Acids

Michael MacArthur, *Harvard T.H. Chan School of Public Health, Boston, MA*
James Mitchell, *Harvard T.H. Chan School of Public Health, Boston, MA*

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

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

PLATFORM PRESENTATIONS (cont.)

WEDNESDAY, APRIL 18, 2018

Morning Moderator: **Douglas Boreham**, North Ontario School of Medicine, Ontario, Canada

Session IV - OTHER BIOMEDICAL DEVELOPMENTS

9:00am Skeletal Muscle Mitochondria and ER Stress Mediate Hormetic Mechanisms that Regulate Whole Body Glucose Metabolism

E. Dale Abel, Fraternal Order of Eagles Diabetes Center and the Division of Endocrinology, Metabolism and Diabetes, Carver College of Medicine, University of Iowa, Iowa City, IA

Renata Pereira and Antentor J. Hinton Jr, Fraternal Order of Eagles Diabetes Center and the Division of Endocrinology, Metabolism and Diabetes, Carver College of Medicine, University of Iowa, Iowa City, IA

9:30am Does Increasing Current Intensity of tDCS Boosts Outcomes?

Marom Bikson, Department of Biomedical Engineering, The City College of New York, NY

10:00am BREAK and HOTEL CHECK OUT

10:30am Stem Cells-Based Therapy For Ischemic Stroke

Paul M. George, Stanford University, Department of Neurology and Neurological Sciences, Stanford, CA

Byeongtaek Oh and Alexa Levinson, Stanford University, Department of Neurology and Neurological Sciences, Stanford, CA

11:00am Retrotransposons and Aging: The Enemy Within

Jill A. Kreiling, Brown University, Department of Molecular Biology, Cell Biology, and Biochemistry, Providence, RI

John Sedivy, Brown University, Department of Molecular Biology, Cell Biology, and Biochemistry, Providence, RI

LUNCH 11:30am - 1:00pm • Amherst Room, 10th Floor Campus Center

Afternoon Moderator: **Walter J. Kozumbo**, Hormesis Project, University of Massachusetts, Amherst, MA

Session V - RADIATION: ENVIRONMENT AND THERAPY

1:00pm Distinct Biological Responses of Normal and Cancerous Human Cells to LDR potentially Enhances Tumor Therapy

Lu Cai, Departments of Pediatrics, Radiation Oncology & Pharmacology and Toxicology, University of Louisville School of Medicine, Louisville, KY

1:30pm Immunological Effects of Low Dose Radiation

Benjamin Frey, Department of Radiation Oncology, Universitätsklinikum Erlangen, Friedrich-Alexander-Universität Erlangen-Nürnberg, Erlangen, Germany

Co-Authors: Deloch L, Donaubaue A-J, Becker I, Ott OJ, Gryc T, Rödel F, Klein G, Fournier C, Fietkau R, Gaipl US

2:00pm Dose and Dose Rate in Radiation Risk Assessment and Medicine

Douglas Boreham, North Ontario School of Medicine, Sudbury, Ontario, Canada

2:30pm Low Doses of Radiation and Secondary Plant Compounds Eliminate Malignant Cells through Autoamplificatory Mechanisms

Georg Bauer, Institute of Virology, University Medical Centre, University of Freiburg, Freiburg, Germany

3:00pm CONFERENCE IN PERSPECTIVE

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

Lanthanum Induces Hormesis in Plants:

A Perspective for Agronomy

Evgenios Agathokleous, *Forest Research and Management Organization, Forestry and Forest Products Research Institute (FFPRI), Sapporo, Hokkaido, Japan*

Mitsutoshi Kitao, *Forest Research and Management Organization, Forestry and Forest Products Research Institute (FFPRI), Sapporo, Hokkaido, Japan*

Edward J. Calabrese, *Environmental Health, University of Massachusetts, Amherst, MA*

Hormesis for Predicting the Effect of Ozone on Vegetation

Evgenios Agathokleous, *Forest Research and Management Organization, Forestry and Forest Products Research Institute (FFPRI), Sapporo, Hokkaido, Japan*

Co-Authors: Regina G. Belz, Vicent Calatayud, Alessandra De Marco, Yasutomo Hoshika, Mitsutoshi Kitao, Costas J. Saitanis, Pierre Sicard, Elena Paoletti, and Edward J. Calabrese

ATF-4 Orchestrates Light Dose-Dependent Biological Response:

Therapeutic Clinical Implications For Photodynamic Versus Photobiomodulation Therapy

Praveen R Arany, *Oral Biology and Biomedical Engineering, University at Buffalo, NY*

Drosophila melanogaster and the Invisible UV Stress

Raymond Berry III, *Biology, New Mexico State University, Las Cruces, New Mexico*

Giancarlo López-Martínez, *Biology, New Mexico State University, Las Cruces, New Mexico*

Manual Ischemic Conditioning Technique to Prevent and Reduce Musculoskeletal Tissue Damage from a Reperfusion Injury

Vinita Chandra-Mody, *Stroma Physical Therapy, New York, NY*

Adaptive Response & Post-Conditioning Stress in Radiobiology:

A Complex Web to Uncover the Biological Mechanisms

Jason Cohen, *Radiation Sciences, McMaster University Hamilton, Ontario, Canada*

Carmel Mothersill, *Radiation Sciences, McMaster University Hamilton, Ontario, Canada*

Colin Seymour, *Radiation Sciences, McMaster University Hamilton, Ontario, Canada*

Funding Trends in Hormetic Research

Maureen Cottrell, *Environmental Health, University of Massachusetts, Amherst, MA*

Whitney Mills, *Environmental Health, University of Massachusetts, Amherst, MA*

Edward J. Calabrese, *Environmental Health, University of Massachusetts, Amherst, MA*

Cell Line Specific Low-Dose Irradiation Responses to Serotonin

Jacob J. Curtis, *Biology, McMaster University, Hamilton, Ontario, Canada*

Colin B. Seymour, *Biology, McMaster University, Hamilton, Ontario, Canada*

Carmel E. Mothersill, *Biology, McMaster University, Hamilton, Ontario, Canada*

Characterizing Hormetic Costs and Developmental Effects of Anoxia Preconditioning on Adult Lifespan in *Tenebrio molitor*

Alyssa M. De La Torre, *Biology-Comparative Stress Physiology Laboratory, New Mexico State University, Las Cruces, NM*

Giancarlo López-Martínez, *Biology-Comparative Stress Physiology Laboratory, New Mexico State University, Las Cruces, NM*

The Effect of Resveratrol Administration in Irradiated Mice on the Induction of Micronuclei in Bone Marrow

Farideh Koohian, *Medical Physics, School of Medicine, Isfahan University of Medical Sciences, Isfahan, Iran*

Breast Cancer Patients who Lived in Areas with Elevated Levels of Natural Background Radiation Show Decreased Erythema Incidence and Higher 10 year Survival rate after Radiotherapy

S.M. Javad Mortazavi, *Diagnostic Imaging, Fox Chase Cancer Center, Philadelphia, PA*

Shahram Taeb, *Diagnostic Imaging, Fox Chase Cancer Center, Philadelphia, PA*

Mohan Doss, *Diagnostic Imaging, Fox Chase Cancer Center, Philadelphia, PA*

X-ray Preconditioning and its Possible Implications on Parkinson's Disease Symptoms in *Drosophila melanogaster*

Nubia Rivas, *New Mexico State University, Las Cruces, NM*

Giancarlo López-Martínez, *New Mexico State University, Las Cruces, NM*

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.

International **DOSE-RESPONSE** Society
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 2018: 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

2018 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 Leadership** and **Outstanding New Investigator**. These Awards are presented to individuals in each category who have made outstanding contributions to the field of Dose-Response.*

*This year's awards go to: **Michael R. Hamblin**, for Outstanding Career Achievement. **James S. Bus** for Outstanding Leadership, and **Evgenios Agathokleous** for Outstanding New Investigator. Congratulations to All!*

AWARDEE PROFILE: CAREER ACHIEVEMENT



MICHAEL R. HAMBLIN

Michael R Hamblin *Ph.D.* is a Principal Investigator at the Wellman Center for Photomedicine at Massachusetts General Hospital, an Associate Professor of Dermatology at Harvard Medical School and is a member of the affiliated faculty of the Harvard-MIT Division of Health Science and Technology. He gained his PhD in organic chemistry from Trent University in England. His research interests now lie in the areas of photodynamic therapy (PDT) for infections, cancer, and stimulation of the immune system, and in photobiomodulation (low-level light therapy, LLLT) for wound healing, arthritis, traumatic brain injury, neurodegenerative diseases and psychiatric disorders. He directs a laboratory of around a dozen post-doctoral fellows, visiting scientists and graduate students. His research program is supported by NIH, CDMRP, USAFOSR and CIMIT among other funding agencies. He has published over 400 peer-reviewed articles, over 150 conference proceedings, book chapters and International abstracts and holds 10 patents. He is Editor or Associate Editor for 10 journals, on the editorial board of a further 20 journals and serves on NIH Study Sections. He has an h-factor 85 and >28,000 citations. He has authored/edited 23 textbooks on PDT and photomedicine including 12 SPIE proceedings. Dr Hamblin was elected as a Fellow of SPIE in 2011, and received 1st Endre Mester Lifetime Achievement Award Photomedicine from NAALT in 2017. He is a Visiting Professor at universities in China, South Africa and Northern Ireland.

2018 INTERNATIONAL DOSE-RESPONSE SOCIETY AWARDS

AWARDEE PROFILE: LEADERSHIP



JAMES S. BUS

James S. Bus, Ph.D., DABT, Fellow ATS, is a Senior Managing Scientist in the Health Sciences Group of Exponent, Inc. (May 2013-present). Dr. Bus retired from The Dow Chemical Company as Director of External Technology and Fellow in the Toxicology and Environmental Research and Consulting unit (1989-2013). Prior to Dow, he was Associate Director of Toxicology and Director of Drug Metabolism at The Upjohn Company (1986-1989); Senior Scientist at the Chemical Industry Institute of Toxicology (CIIT, 1977-1986); and Assistant Professor of Toxicology, University of Cincinnati (1975-1977). Dr. Bus has been an advisor to a variety of institutions including ILSI, ILSI-HESI, The Hamner Institutes (formerly CIIT), American Chemistry Council Long-Research Initiative, and on advisory boards of the EPA (BOSC and Chartered SAB), FDA (NCTR), the National Toxicology Program, the National Academy of Sciences (BEST), and BELLE. He has served as President of the Society of Toxicology, The American Board of Toxicology, and the Academy of Toxicological

Sciences, and in editorial roles including Toxicology and Applied Pharmacology, Environmental Health Perspectives, and Regulatory Toxicology and Pharmacology. Dr. Bus has received the Society of Toxicology Achievement (1987) and Founders (2010) awards, the Toxicology Forum George Scott Award (2013), Rutgers University Robert A. Scala Award (1999), the Michigan State University K.E. Moore Outstanding Alumnus Award, and the International Society of Regulatory Toxicology and Pharmacology International Achievement Award (2015). He received a B.S. in Medicinal Chemistry from the University of Michigan (1971) and PhD in pharmacology from Michigan State University (1975), and currently is an Adjunct Professor in the Dept. Pharmacology and Toxicology at that institution. He has authored/co-authored over 130 publications, books, and scientific reviews. His primary research interests include modes of toxic action of industrial chemicals and pesticides including the role of non-linear toxicokinetics as a key consideration for improving the human relevance of in vitro and in vivo toxicity test findings.

AWARDEE PROFILE: NEW INVESTIGATOR



EVGENIOS AGATHOKLEOUS

Evgenios Agathokleous, Ph.D. After completing a 25-month compulsory service to the Cypriot National Guard (2007), Evgenios was admitted to the Agricultural University of Athens (AUA), Greece, for a five-year Diploma in Crop Science. Having completed his experimental thesis by 2010, in 2012 he started researching on topics related to the effects of tropospheric ozone on vegetation with Assoc. Prof. Costas J. Saitanis at the Lab. of Ecology and Environmental Sciences. He was awarded full scholarship by the Japanese Government for research studies and thus moved to Japan as a Research Student at Hokkaido University in April 2014. There he began researching the effects of several factors (e.g. ozone, carbon dioxide, soil fertility) on forest trees. Evgenios, being supported

by the Japanese Government, enrolled into the Special Postgraduate Program in Biosphere Sustainability Science, School of Agriculture, Hokkaido University, under the guidance of Prof. Takayoshi Koike (October 2016). He was awarded the PhD in Environmental Resources within 2.5 years (March 2017). In 2016, he successfully competed for a Postdoctoral Fellowship by the Japan Society for the Promotion of Science (JSPS). Since April 2017, he is a JSPS International Research Fellow (ID No: P17102) and a Special Researcher at Forestry and Forest Products Research Institute, Sapporo, Japan. Evgenios is also a deputy coordinator of WP7.01.09 "Ground-level ozone" of the International Union of Forest Research Organizations. He authored 27 SCI articles, of which 16 as first author, and 4 book chapters. He also authored ≈50 presentations in scientific conferences (17 oral, 31 poster). He reviewed ≈100 papers for 23 SCI journals, and he was awarded two Publons Peer Review Award 2017 as one of the top 1% of peer reviewers in Agricultural and Biological Sciences and in Environmental Science. His research revealed hormesis induced by ethylenediurea along with mechanistic insights. Currently, he is investigating the occurrence of environmental hormesis and its implications to scientific research and regulations. globalscience@frontier.hokudai.ac.jp and www.evgenios.info

ANNOUNCEMENT

The 18th International Conference on
Adaptive Responses/Preconditioning
The Annual Meeting of the International Dose-Response Society

APRIL 16-17, 2019

University of Massachusetts at Amherst

- *Adaptive* • *Bidirectional* • *Biphasic* • *Hormetic* • *Non-Monotonic* • *Yerkes-Dodson Law (Psychology)*
- *U-Shaped* • *J-Shaped* • *Subsidy-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

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

DEADLINE FOR SUBMISSION: January 31, 2019

E-mail to mbglavin@umass.edu

INTERNATIONAL DOSE-RESPONSE SOCIETY

2018 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

Please type or print clearly in ink only:

Last Name: _____ Middle Initial(s): _____

First Name: _____ Date of Birth: _____

Title: _____

Organization: _____

Department: _____

Street/PO Box: _____

City: _____ State: _____

Country: _____ Postal Code: _____

Telephone: _____ / _____ / _____
Country code Area code Number

Fax: _____ / _____ / _____
Country code Area code Number

Email Address: _____

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

Signature of Applicant

Date