

**U.S. Environmental Protection Agency  
Epigenetics and Cumulative Risk Workshop  
Arlington, VA  
September 2 – 3, 2015**

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**Agenda**

**Wednesday, September 2, 2015**

**8:45 – 9:30      Opening Session**

**Welcome**

*Kenneth Olden | U.S. EPA/ National Centers for Environmental Assessment*

**Epigenetic change as an indicator of impact of multiple stressors on human health – Overview and scientific introduction**

*Andrea Baccarelli | Harvard University*

**9:30 – 12:00      Session I – Epigenetic changes associated with diverse stressors**

*Includes a 15 minute break and speaker Q&A*

**Air pollutants**

*David Diaz Sanchez | U.S. EPA/ National Health and Environmental Effects Research Laboratory*

**Dietary imbalance**

*Robert Waterland | Baylor College of Medicine*

**Interaction between toxic substances and stress: Research on lead toxicity**

*Deborah Cory-Slechta | University of Rochester*

**Epigenetic effects in toxicity of arsenic and other metals**

*Rebecca Fry | University of North Carolina at Chapel Hill*

**Maternal smoking**

*Stephanie London | U.S. NIH/ National Institute of Environmental Health Sciences*

**Social aspects of stress**

*Patrick McGowan | University of Toronto Scarborough*

**1:00 – 2:00      Session I Panel Session**

*Andrea Baccarelli; Deborah Cory-Slechta; David Diaz-Sanchez; Rebecca Fry; Stephanie London; Patrick McGowan; Robert Waterland*

1. How strong is the case for epigenetic change as a measure of cumulative, multi-stressor exposure and impact?
2. In what areas is scientific leadership most needed to advance understanding of the role of the environment in inducing epigenetic change of significance to health? Where might EPA efforts have the greatest impact?

**2:00 – 4:30      Session II – Key science considerations in understanding epigenetic changes**

*Includes a 15 minute break and speaker Q&A*

**Epigenetic associations for selected major diseases and potential to serve as marker for cumulative stress**

*Stella Aslibekyan | University of Alabama*

**Different epigenetic marks and significance for risk assessment**

*Ron Hines | U.S. EPA/ National Health and Environmental Effects Research Laboratory*

**Measuring epigenetic change: Technological advances and options**

*Paul Giresi | Epinomics*

**Readily measurable epigenetic marks (e.g., DNA methylation in leukocytes) and significance**

*Carmen Marsit | Dartmouth College*

**Statistical considerations in studying epigenetic changes**

*Peter Song | University of Michigan*

**Epigenetics and multiple risk factors in development: Perspectives from autism research**

*Janine LaSalle | University of California, Davis*

**4:30 – 5:30      Session II Panel Session**

*Stella Aslibekyan; Paul Giresi; Ron Hines; Janine LaSalle; Carmen Marsit; Peter Song*

1. What approaches to characterizing and interpreting the health significance of epigenetic change resulting from diverse environmental stressors are most viable today?
2. In what areas is scientific leadership most needed to advance understanding of the role of the environment in inducing epigenetic change of significance to health? Where might EPA efforts have the greatest impact?

## Thursday, September 3, 2015

### 8:30 – 9:00      **Opening Session**

#### **Understanding current cumulative risk and health disparities challenges in environmental protection**

*Charles Lee | U.S. EPA/ Office of Environmental Justice*

### 9:00 – 10:15      **Session III – Practical application of epigenetic tools to address cumulative risks from environmental stressors**

#### **Moving towards a scientific framework for consideration of epigenetic change in cumulative risk assessment**

*Danielle Fallin | Johns Hopkins University*

#### **Toxicological considerations in interpreting epigenetic data**

*Elaine Faustman | University of Washington*

#### **Reality Check – How far has science brought us?**

*Trevor Archer | U.S. NIH/ National Institute of Environmental Health Sciences*

#### **Questions and comments**

### 10:30 – 11:45      **Panel – State of science for use of epigenetic change in cumulative risk assessment, considering epidemiological, toxicological and mechanistic data**

*Trevor Archer, U.S. NIH/ National Institute of Environmental Health Sciences; Andrea Baccarelli, Harvard University; Danielle Fallin, Johns Hopkins University; Elaine Faustman, University of Washington; Catherine Hoyo, North Carolina State University; Reza Rasoulpour, Dow Chemical Company; Alexandra Shields, Harvard Medical School*

1. What are the prospects for practical application of metrics reflecting cumulative epigenetic change in human health risk assessment?
2. How relevant is the concept of additivity to epigenetic change resulting from multiple causes? This is related to the concept of exceeding a “tipping point” as a result of effects of multiple stressors.
3. What scientific progress is needed to more fully answer these questions?

#### **Questions and comments**

**12:45 – 3:15 Breakout groups and report-out session**

1. Discuss the opportunities for application of epigenetic measures in cumulative risk assessment to address:
  - a. Lifestage and developmental risks from multiple stressor exposures
  - b. Disparities in environmental health and neighborhood level differences in health status and stressor exposure.
2. Do some applications have more potential in the shorter term, while others are longer term?
3. How high a priority would you assign to research and methods development for epigenetic approaches to cumulative risk assessment (recognizing many competing needs in public health research)?

**3:30 – 4:30 Panel – Research needs including: Information from population and neighborhood level studies of cumulative risk; advancing mechanistic understandings, using in vitro methods for uncharacterized agents; what’s needed to support the use of epigenetic measures to look at attributable risk from stressors as compared to overall community risk**

*Tsu-Fan Cheng, U.S. Food and Drug Administration; Deborah Cory-Slechta, University of Rochester; Bob Devlin, U.S. EPA/ National Health and Environmental Effects Research Laboratory; Stephanie London, U.S. NIH/ National Institute of Environmental Health Sciences; Shaun McCullough, U.S. EPA/ National Health and Environmental Effects Research Laboratory*

**Questions and comments**

**4:30 – 5:00 Closing Remarks**

*Paul White | U.S. EPA/ National Centers for Environmental Assessment*

*Kenneth Olden | U.S. EPA/ National Centers for Environmental Assessment*