



EMERGING SCIENCE FOR ENVIRONMENTAL HEALTH DECISIONS

AGENDA

Exploring Human Genomic Plasticity and Environmental Stressors: Emerging Evidence on Telomeres, Copy Number Variation, and Transposons

OCTOBER 4-5, 2012* ■ THURSDAY 8:30–5:00, FRIDAY 8:30–12:15
KECK CENTER, ROOM 100, 500 FIFTH STREET NW, WASHINGTON, DC

Ready to S-T-R-E-T-C-H Your Thinking About the Human Genome?

THE HUMAN GENOME IS ROUTINELY THOUGHT OF as a static component of the cell, one that is subject to just two fates: to be inherited or to mutate. However, since the completion of the sequencing of the human genome, scientists have been exploring how the genome responds to environmental stressors and chemical exposure. It turns out the genome is much more dynamic than we thought. Genomes have the characteristic of plasticity, which makes it possible to adapt quickly in order to survive changes in environmental conditions.

CHANGES IN THE GENOME can have a big impact on human health. The Standing Committee on Emerging Science for Environmental Health Decisions has been exploring factors that influence human health in its meeting series. An earlier forum on Epigenetics (<http://nas-sites.org/emergingscience/meetings/epigenetics/>) looked at how genes are expressed and silenced in response to environment stressors. Mobile and evolving elements such as telomeres, transposons, and copy number variants are other important factors in understanding the potential effect of our environment on human health.

THE GENOMIC PLASTICITY MEETING will look beyond random mutation and discuss the fundamental changes

in genomic alterations that can contribute to disease and ageing, as well as new technologies and tools to identify and study genome plasticity events. The meeting will initiate/foster the exploration of how environmental stressors may impact the genome, by exploring the intersection of mechanisms leading to genomic changes and mechanisms targeted by environmental stressors.

THURSDAY, OCTOBER 4 (8:30AM–5:00PM)

- 8:30 Opening Remarks—John Balbus[†], *National Institute of Environmental Health Sciences*
- 8:40 Introduction to the Standing Committee and Objectives of Today's Meeting—Cheryl Lyn Walker[†], *Texas A&M Health Science Center*

SESSION 1 INTRODUCTION TO GENOMIC PLASTICITY

- 8:50 Thea Tlsty, *University of California, San Francisco*

SESSION 2 TELOMERES/TELOMERASE

- 9:45 Telomeres as Key Modulators of Aging and Longevity—Maria A. Blasco, *Centro Nacional de Investigaciones Oncológicas (Spanish National Cancer Research Center)* (via videoconference; 30 min. presentation and 10 min. Q&A)

(continued)

* On Friday, October 5, the committee and liaisons will meet following the forum.

† indicates a member of the Standing Committee on Use of Emerging Science for Environmental Health Decisions.

THURSDAY, OCTOBER 4 (8:30AM–5:00PM)
(CONTINUED)

SESSION 2 TELOMERES/TELOMERASE (CONTINUED)

- 10:25 Lifespan and Psychosocial Factors Associated with Telomere Length—Elissa Epel, *University of California, San Francisco (via videoconference; 25 min. presentation and 5 min. Q&A)*
- 10:55 Break
- 11:10 Environmental Linkages with Telomeres/Telomerase (25 min. presentation and 5 min. Q&A for each presenter)
- Telomere Dysfunction in Breast Differentiation, Aging, and Cancer—David P. Gilley, *Indiana University School of Medicine*
 - Lifestyle and Environmental Factors Associated with Telomere Length—Dale P. Sandler, *National Institute of Environmental Health Sciences*
- 12:10 Discussion—Shuk-mei Ho, *University of Cincinnati*
- 12:40 Lunch

SESSION 3 COPY NUMBER VARIATION AND CHROMOTHRIPSIS

- 1:40 Genomic Disorders, Mechanisms for Copy Number Variation, and CNV in Evolution—James R. Lupski, *Baylor College of Medicine (30 min. presentation and 10 min. Q&A)*
- 2:20 Environmental Linkages with Copy Number Variation (25 min. presentation and 5 min. Q&A for each presenter)
- Experimental Insights into Genetic and Environmental Risk Factors for CNV Formation—Thomas W. Glover, *University of Michigan Medical School*
 - Discovering the Role of Copy Number Variation in Populations—Joseph R. Shaw, *Indiana University*
 - Role of Chemical Exposure in Generating Spontaneous CNVs—Jennifer L. Freeman, *Purdue University*
 - Origins and Consequence of Copy Number Variation in Cancer—Randal Johnston, *University of Calgary (via videoconference)*
- 4:20 Discussion—Helmut Zarbl†, Discussion Leader, *Robert Wood Johnson Medical School*
- 5:00 Adjourn

FRIDAY OCTOBER 5 (8:30AM–12:15PM)

- 8:30 Morning Remarks—Cheryl Lyn Walker†, *Texas A&M Health Science Center*

SESSION 4 JUMPING GENES AND MOBILE ELEMENTS

- 8:40 Studies of a Human Retrotransposon—John V. Moran, *University of Michigan Medical School (30 min. presentation and 10 min. Q&A)*
- 9:30 Environmental Linkages with Jumping Genes (25 min. presentation and 5 min. Q&A)
- A Story of LINES and the Intersection of Genetic and Epigenetic Mechanisms in Reprogramming the Mammalian Genome by Environmental Injury—Kenneth Ramos, *University of Louisville, Kentucky*
- 10:00 Discussion—Cheryl Walker†, Discussion Leader, *Texas A&M Health Science Center*
- 10:30 Break

SESSION 5 DISCUSSION OF IMPLICATIONS AND RESEARCH NEEDS

- 10:45 Moderator—Daniel Shaughnessy, *National Institute of Environmental Health Sciences*
- Helmut Zarbl†, *Robert Wood Johnson Medical School*
 - Thomas W. Glover, *University of Michigan Medical School*
 - George Daston†, *Procter & Gamble Company*
 - Thea Tlsty, *University of California, San Francisco*
 - Laurence H. Baker, *Southwest Oncology Group; University of Michigan*
- 11:45 Closing Comments – Kenneth Ramos, *University of Louisville, Kentucky*
- 12:15 Adjourn – Committee and liaisons meet until 2:15pm

For more information and to subscribe for updates, please visit <http://nas-sites.org/emergingscience>
Emerging Science meetings are free and open to the public.

About the Committee

At the request of the National Institute of Environmental Health Sciences (NIEHS), the National Research Council formed the Standing Committee on Use of Emerging Science for Environmental Health Decisions to facilitate communication among government, industry, environmental groups, and the academic community about scientific advances that may be used in the identification, quantification, and control of environmental impacts on human health.

