PPTOX IV meeting explores early-life exposures and long-term disease

By Thaddeus Schug

Experts from around the world gathered Oct. 26-29 at the Boston Marriott Long Wharf Hotel, to discuss the effects of environmental exposures during early life and later-onset disease consequences. The meeting, attended by more than 300, showcased 130 posters and 60 presentations.

The conference, "Environmental Stressors in Disease and Implications for Human Health," was the fourth International Summit of Prenatal Programming and Developmental Toxicity (PPTOX), *(https://www.endocrine.org/meetings/pptox-iv/pptox-iv-program)* and was co-sponsored by The Endocrine Society. The PPTOX series of meetings is one of the premier international venues for scientists to evaluate current knowledge in developmental toxicity and guide forward momentum for this burgeoning field.

Philippe Grandjean, M.D., of the Harvard School of Public Health, opened the meeting with a creative cloud-based presentation that summarized the history of research on later-life consequences of early-life exposures, and outlined the history of PPTOX.

From left, Emiko Todaka, Ph.D., of the World Health Organization, shown with Grandjean and Birnbaum, discussed the importance of birth cohort studies in providing evidence of a causal relationship between exposure and disease. (Photo courtesy of Christine Flowers)

Developmental effects of early-life exposures

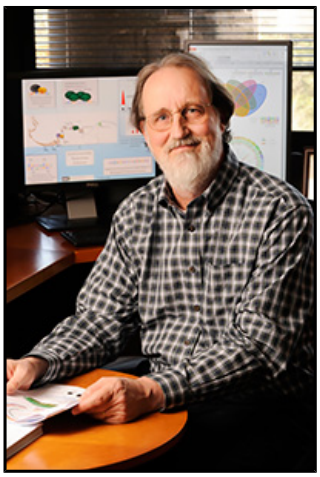
Linda Birnbaum, Ph.D., director of NIEHS and the National Toxicology Program, followed with "A Good Start Will Last a Lifetime." Birnbaum emphasized the need for reducing exposure to environmental agents, during multiple developmental windows, for primary prevention of disease. Birnbaum noted that developmental toxicity is a particularly difficult field to study. "We must focus our concerns on low dose and combined exposures occurring during susceptible time periods, rather than just on acute exposures resulting in diseases such as cancer," she said.

The conference sessions included a wide range of topics, including the developmental origins of endocrine disorders, advances and insights from epigenetics, the role of placenta in prenatal programming, novel strategies for prospective birth cohorts, and strategies for translating scientific research to improve public health.

The future of PPTOX

NIEHS health scientist administrator Jerrold Heindel, Ph.D., co-chair of the conference organizing committee, summarized the meeting with a word cloud, illustrating the evolution of scientific terms from the first PPTOX meeting held in the Faroe Islands in 2007 to those on the current program.

"While some of the terms from 2007 are still in use, there have been many changes," Heindel explained. "For instance, we are now focusing on epigenetics, instead of just gene expression, and we are also looking at combined exposures and stressors, instead of just a single chemical."



NIEHS senior investigator Douglas Bell, Ph.D., contributed to a large number of presentations demonstrating epigenetic changes resulting from environmental exposures. Bell's research focuses on the validation of altered epigenetic marks in human blood cells. (Photo courtesy of Steve McCaw)

Delivering the conference's closing remarks, Grandjean compared the paradigm-shifting science presented at the PPTOX meetings, to the changes brought about by the famed Boston Tea Party that occurred more than 200 years ago in nearby Boston Harbor. Grandjean, whose research focuses on neural development, said, "It is essential that we toss out the old dogmas and institute this new paradigm of action, to protect the brain development of the next generation."

The conference statement will be published in the peer-reviewed journal Endocrinology. The next PPTOX meeting will be held Nov. 13-16, 2016 in Kitakyushu, Japan.

(Thaddeus Schug, Ph.D., is a health scientist administrator in the NIEHS Division of Extramural Research and Training.)

From left, NIEHS program analyst Liam O'Fallon and Heindel gathered with NIEHS grantees Frederica Perera, Dr.P.H., Ph.D., of Columbia University, and Philip Landrigan, M.D., of the Icahn School of Medicine at Mount Sinai. (Photo courtesy of Christine Flowers)

From left, NIEHS health scientist administrators Lisa Chadwick, Ph.D., and Kimberly Gray, Ph.D., joined Division of Extramural Research and Training Director Gwen Collman, Ph.D., at the NIEHS and EPA Children's Environmental Health and Disease Prevention Research Centers Annual Meeting just prior to the PPTOX meeting. (Photo courtesy of Christine Flowers)

The Environmental Factor is produced monthly by the National Institute of Environmental Health Sciences (NIEHS) *(http://www.niehs.nih.gov/)*
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