Introduction to the 60th Annual Thomas L. Petty Aspen Lung Conference. Environment and Global Lung Health: Exposure, Susceptibility, and Intervention

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The 60th Annual Thomas L. Petty Aspen Lung Conference took place from June 7 to 10, 2017, in Aspen, Colorado, with a focus on Environment and Global Lung Health: Exposure, Susceptibility, and Intervention. Using a global approach, with international speakers and talks, the conference promoted multidisciplinary discussions regarding the field of environmental and global health, emphasizing exposure assessment, molecular mechanisms of exposure, and epigenetic, genetic, and genomic interactions with exposure to define approaches to reduce exposure and improve lung health.

It is now recognized that chronic respiratory diseases account for more than 4 million deaths per year and impact the lives of hundreds of millions of other people worldwide (1). Exposures, including tobacco smoke (first- and secondhand) (2), indoor and outdoor air pollutants (3, 4), allergens, and occupational toxicants (5, 6), result in the vast majority of chronic respiratory diseases. The chronic respiratory diseases that result from exposure (7) include most classes of lung diseases, such as chronic obstructive pulmonary disease, asthma (8, 9), interstitial lung diseases (10), and cancer (11). The 2009 Aspen Lung Conference (the last to focus on exposure-induced lung disease) highlighted several mechanistic and clinical concepts relevant to exposure-induced lung disease (12). Since that conference more than 8 years ago, there have been a number of major advances in epigenetics (13), genetic susceptibility (14),

Figure 1. The 60th meeting of the Thomas L. Petty Aspen Lung Conference. Left to right: Arnold R. Brody, Ph.D., Co-Chair; Lisa A. Maier, M.D., M.S.P.H., Chair; Jonathan M. Samet, M.D., M.S., Conference Summarizer; David A. Schwartz, M.D., M.P.H., Co-Chair.

and the transcriptome (15, 16), and our understanding of their role in pathogenesis of exposure-induced diseases, as well as an expanded understanding of the impact of specific exposures, including home air pollution, climate change (6), and others in the pathogenesis of chronic respiratory diseases. This conference highlighted these recent developments and approaches to understand the molecular underpinnings of these diseases, to spark discussions regarding: 1) ways to prevent and treat

chronic exposure-induced respiratory diseases; 2) effective translation of scientific endeavors into meaningful ways to promote lung health and patient care; and 3) integration and collaboration across the research spectrum.

As in prior years, the conference was organized around a number of thematic sessions: 1) global health and the burden of environmental disease; 2) exposure biology and susceptibility to exposures; 3) the molecular mechanisms of exposure that

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result in disease; 4) epigenetics, genetics, genomics, and their interactions with the environment; and 5) prevention and interventions to promote lung health. State of the Art talks, delivered by outstanding, world-renowned leaders in the field, were slated based on the thematic session; each of the 12 State of the Art presentations was followed by significant stimulating conversation. After each of the State of the Art speakers, oral presentations of original research were given, usually by junior investigators, augmenting the overall session themes. Additional original research was presented at two poster sessions highlighting 24 posters. This format resulted in significant scientific debate across the 120 session attendees from six countries. During this conference, a new session format was introduced on career development, to promote development of researchers in the scientific area and enhance interactions between junior and senior conference attendees, as well as a new lectureship, the Marvin I. Schwarz Lecture. Both were very well received.

As is usual at the Thomas L. Petty Aspen Lung Conference, Dennis Doherty, M.D., started the conference with an introduction to Dr. Tom Petty and the conference. To begin the discussion regarding exposures and susceptibility, Joel D. Kaufman, M.D., M.P.H., gave the Reuben M. Cherniack Lecture on a topic that impacts all of us: outdoor air pollution and specific susceptible populations. The next lecture, given by Ana Navas-Acien, M.D., M.P.H., Ph.D., the Roger S. Mitchell Lecture, provided an overview of a global problem that continues to cause persistent but changing exposure and health effects: tobacco use and its old and new means of exposure. Both of these talks were timely, with significant implications for health policy, and generated lively conversations. Moving from exposure to its effects on epigenetics, genetics, and genomics of

disease, Raphael Bueno, M.D., gave a State of the Art talk reviewing the comprehensive genomic analyses that have been undertaken in the evaluation of malignant mesothelioma. Furthering the conversation on asbestos, cancer, and Omics, Karl T. Kelsey, M.D., discussed the use of epigenetics or “immunomethylomics” as a novel prediction tool for cancer.

On the second day of the conference, the scientific exchange continued with a focus on the molecular mechanisms of exposure: Andrew P. Fontenot, M.D., presented a State of the Art lecture addressing the immunologic mechanisms of metal-induced toxicity, primarily focused on chronic beryllium disease. The second talk of the morning, given by State of the Art speaker Rik Derynck, Ph.D., provided an accessible overview on the complex transforming growth factor- β signaling pathways and the many implications for disease. After a lively question and answer session, the ongoing scientific dialogue continued at the Lazy T Ranch for the traditional Aspen Conference picnic.

The third day of the conference resumed with a global focus provided by David Warburton, M.D., in a State of the Art talk addressing the environmental, social, and health impact of extreme air pollution in Ulaanbaatar, Mongolia. After the animated conversations generated by this talk, the Giles F. Filley Lecture, given by Penny Nymark, Ph.D., provided a paradigm to evaluate the health effects and genetic responses to the growing global use of and exposure to nanomaterials. The afternoon session started with the inaugural Marvin I. Schwarz Lecture, given by John R. Balmes, M.D., M.P.H. Dr. Balmes's talk focused on a growing globally important problem, climate change, and the efforts that California has taken and is taking to reduce the impact of climate change and its health effects. The final session of the day, by Thomas A. Neff Lecturer, Rachel L. Miller, M.D., integrated a number of prior themes to address perinatal exposures and

their impact on epigenetic regulation in asthma causation.

On the final day of the conference, Roger I. Glass, M.D., Ph.D., gave the Parker B. Francis Lecture on the international approach to evaluating environment and lung health, along with examples of ongoing work being supported by the Fogarty Institute and opportunities that the Institute provides. The last State of the Art lecture was given by Max A. Seibold, Ph.D., eloquently describing work being conducted using genomic signatures of lung cells that are being applied to evaluate the impact of environmental exposures in lung disease. Finally, Jonathan M. Samet, M.D., M.S., provided an overarching perspective as the conference summarizer, integrating the many themes and ideas discussed at the conference by the State of the Art speakers, original research short talks, poster presenters, and conference attendees. Dr. Samet outlined areas of emphasis needed to move the field forward as well as additional approaches to be taken to minimize and prevent the impact of exposure on lung health. Because of the work that Dr. Samet has conducted in exposure-induced lung disease, including tobacco and air pollution, his conference summary was given as the Thomas L. Petty Lecture, which is not usual but was certainly befitting of his outstanding overview.

Overall, the conference was a success, in large part due to the speakers and attendees and the conversations generated by all. We thank the presenters and attendees for their contributions to the conference and to enhancing our understanding of the impact of exposure on chronic respiratory diseases as well as means to reduce the burden of disease, translating scientific endeavors to promote lung health and patient care, and providing collaborative conversations across this diverse, research area. ■

Author disclosures are available with the text of this article at www.atsjournals.org.

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