3101 Plenary: Epigenetics: How the Environment Affects Gene Expression and the Development of Asthma and Allergic Disease

Sunday, February 24, 2013: 8:15 AM-9:45 AM

**Moderator:**
Rachel L. Miller, MD FAAAAI  
Associate Professor of Medicine (In Pediatrics) and Environmental Health Sciences at NYPH/Columbia University Medical Center

**Learning Objectives:**
- Describe how specific exposures during pregnancy can predispose the child to allergic disease and asthma.
- Discuss how the environment and epigenetics can skew the development of the immune system.
- Interpret the epigenetic effects of common environmental exposures on the expression of asthma.

8:15 am Epigenetics Overview  
**Shuk-Mei Ho, PhD**  
Professor and Chair  
University of Cincinnati College of medicine  
Department of Environmental Health  
http://www.eh.uc.edu/dir_individual_details.asp?qcontactid=702

Dr. Shuk-mei Ho is internationally recognized for her expertise in the role of hormones, endocrine disruptors (EDC), and their receptor signaling on disease development including tumorigenesis in the prostate, ovary, endometrium and breast. Dr. Ho's current research extends to developmental bases of disease susceptibility by applying epigenetics to epidemiological studies, addressing two of the important challenges of research in environmental exposure and human health - multiple exposures at various developmental stages and the trans-generational effects of exposure. She has data implicating epigenetic dysregulation of transcriptional regulation as the bases of polycyclic aromatic hydrocarbons (PAHs)-associated disorders such as asthma and cancer, some of which she will discuss today.

8:45 am Epigenetic Modulation of Helper T Cell Differentiation and Plasticity  
**John O'Shea Jr, MD**  
Senior investigator, Molecular Immunology and Inflammation Branch  
Scientific Director, National Institute of Arthritis and Musculoskeletal and Skin Diseases  
NIH  
http://irp.nih.gov/pi/john-oshea

Dr. O'Shea is an award winning scientific leader in the field of cytokine signal transduction, dissecting the role of Jaks and Stats family transcription in immunoregulation. Dr. O'Shea and his colleagues cloned the tyrosine kinase, Jak3, and demonstrated its role in pathogenesis of severe combined immunodeficiency. Dr. O'Shea was awarded two US Patents related to Janus Family Kinases and identification of immune modulators (7,070,972, and 7,488,808). Dr. O'Shea and colleagues at the NIH identified the role of Stat3 in regulating T cell cytokine production in Job's syndrome. More recently, Dr. O'Shea’s laboratory has employed deep sequencing to understand the epigenetic regulation of T cell differentiation and the role of STATs in these processes.

For today’s talk, he will focus on his latest research published this past November in Cell (151: 981-993) on STATS Shape the Active Enhancer landscape of T Cell Populations.
Dr Ian Yang is a thoracic physician at The Prince Charles Hospital, and Associate Professor at the School of Medicine, The University of Queensland, Brisbane, Australia. His clinical work is in the field of adult thoracic medicine, and his research focuses on gene-environment interaction in COPD, asthma, lung cancer and air pollution.

For today’s talk, Dr. Yang will review the evidence supporting the effects of different environmental exposures (cigarette smoke, air pollution, diet, allergens) on DNA methylation and the expression of asthma genes as well as review twin studies and the associations between age and methylation.