Youngja Park et al., Metabolomics 2013, 2:7
http://dx.doi.org/10.4172/2153-0769.S1.022

OMICS Group Conferences
Accelerating Scientific Discovery

2nd International Conference and Exhibition on
Metabolomics & Systems Biology
April 08-10, 2013 Hilton Chicago/Northbrook, USA

High resolution metabolomics for simultaneous environmental chemical surveillance and bioeffect monitoring

Youngja Park and Dean P Jones
Emory University School of Medicine, USA

High Resolution Metabolomics (HRM) measures thousands of chemicals simultaneously in biologic samples including the low levels of environmental pollutants. This method is based on mass spectrometry with a dual chromatography (DC) approach, i.e., alternatively using anion exchange and reverse phased C18 columns. In principle, the approach could be useful to detect complex metabolic response patterns to environemental exposures and to detect unusual abundances. Our study with HIV-1 showed that respiratory infections continue to occur in subjects with high CD4 counts and low viral loads in otherwise healthy HIV-1 infected subjects. We applied HRM to determine metabolic phenotypes in bronchoalveolar lavage fluid from otherwise healthy 24 HIV-1-infected subjects compared to healthy subjects. False discovery rate (FDR q=0.05) determined 115 significant metabolites (total 2446 metabolites) between otherwise healthy HIV-1 subjects and healthy subjects. Among 115 features, environmental chemicals were identified extremely high in otherwise healthy HIV-1 infected subjects, including 4-methylimidazole (105.04 m/z), 1,2,3,7,8-pentachlorodibenzofuran (360.85 m/z), S-Seven (368.96 m/z), and fipronil (436.94 m/z). 4-methylimidazole is a byproduct formed during the normal heating and browning process (3 times higher); 1,2,3,7,8-pentachlorodibenzofuran is persistent organic pollutant (10 times higher); S-Seven is organophosphorus insecticide (270 times higher); Fipronil is pyrazole insecticide (35 times higher) in otherwise healthy HIV-1infected subjects. In conclusion, environmental exposure may increase their risk for further infection in otherwise healthy HIV-1 infected subjects. The capability of HRM to determine very low concentration of environmental exposure enables us to lead the underlying mechanism of immune suppression to otherwise healthy HIV-1 infected subjects.

Biography

Youngja Park has completed her M.S. and Ph.D. in Pharmacology and Toxicology under Dr. James P. Kehrer at the University of Texas at Austin in 1990. In 2004, she came back to the science to collaborate with Dr. Dean Jones on the development of a metabolomics research using 1H NMR (nuclear magnetic resonance spectroscopy). She has served as an assistant director of the Clinical Biomarkers Laboratory since 2005 and been an assistant professor in the Department of Medicine at the Emory University School of Medicine since 2009. She has published more than 17 papers in reputed journals in the field of metabolomics.

youngja.park@emory.edu