Metabolomics for Characterizing the Human Exposome: The need for a unified and high-throughput way to ascertain environmental exposures

Chirag J Patel
5/29/2015, Day 2

http://nas-sites.org/emergingscience/
Session Recaps

Session 1
Heritability and attributable risk: $E$
Heterogeneity and *large dynamic range*
Study design/temporal dependence of $E$

Session 2
*Emerging platforms*: separation/detection
*Bias*: measurements and association studies

Session 3
Need for large analyte *databases*
*Multiplicity* of data processing methods
Methods for *crowd* annotation
Interactions with *genome*
Cohort data *sharing*: what to share? How?

Session 4
Searching for risk factors in EoE
Toward *EWAS*
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Studying the Elusive Environment in Large Scale

eliminate selection biases
systematic analyses (e.g. EWAS)

John P. A. Ioannidis, MD, DSc
Stanford Prevention Research Center, Department of Health Research and Policy, Department of Medicine, Stanford University School of Medicine, Stanford, California, Department of Statistics, Stanford University School of Humanities and Sciences, Stanford, California, and Meta-Research Innovation Center at Stanford (METRICS), Stanford, California.

JAMA, 2014
JECH, 2014
The exposome: transitioning to clinical and environmental decision making in large scale

Studying the Elusive Environment in Large Scale

evacuate selection biases
systematic analyses (e.g. EWAS)

dense correlational web
what causes what? confounding

A Serum cotinine
37 Total correlations

B Serum total mercury
42 Total correlations

JAMA, 2014
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The exposome: transitioning to clinical and environmental decision making in large scale

Studying the Elusive Environment in Large Scale

eliminate selection biases
systematic analyses (e.g. EWAS)
dense correlational web
what causes what? confounding

New paradigms/methods required for decision making with these emerging data!

JAMA, 2014
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… can enable the comprehensive and accessible assessment of the high-throughput human exposome,

…accelerate data-driven discovery in health and disease,

…and have wide-reaching implications in health policy and decision making.
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