NIH GENES, ENVIRONMENT, AND HEALTH INITIATIVE WORKSHOP ON

Gene-Environment Interplay in Common Complex Diseases: Forging an Integrative Model

January 25, 2010 | Natcher Conference Center | NIH Campus | Bethesda, Maryland

Meeting Summary

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National Human Genome Research Institute

National Human Genome Research Institute

NIEHS National Institute of Environmental Health Sciences

Charge from GEI Retreat

- Identify strategic opportunities for a possible next phase of GEI
- Apply developments from the EBP and Genetics Programs for one or more proof of principle studies
- Conduct Gene-Environment Interaction Workshop

Speakers and Breakout Leads

Laura Bierut, Washington University
Linda Birnbaum, NIEHS
Jason Boardman, U of CO at Boulder
Eric Boerwinkle, UT at Houston
Neil Caporaso, NCI
Nancy Cox, University of Chicago
Priya Duggal, Johns Hopkins
M. Danielle Fallin, Johns Hopkins
Lynn Goldman, Johns Hopkins
Eric Green, NHGRI
Megan Gunnar, U of Minnesota
Irva Hertz-Picciotto, UC Davis
Kristen Jacobson, University of Chicago
Peter Kraft, Harvard University
William Lowe, Jr., Northwestern
Teri Manolio, NHGRI
Mary Marazita, U of Pittsburgh
Deborah Olster, OBSSR
Frederica Perera, Columbia University
Stephen Rappaport, UC Berkeley
Stephen Suomi, NICHD
Eric Turkheimer, UVA

Overarching Question

Given the current state-of-the-science and the progress made in the GEI program, what are optimal ways to move forward with investigations of gene-environment interplay in health and disease?

Theory and Study Design

Q1: Discovery-driven vs. hypothesis driven approaches

Q2: Targeted vs. comprehensive designs for GxE studies

Q3: Leverage existing studies vs. developing new cohorts

Q4: Large vs. small studies

Methods and Analysis

Q5: Single study vs. multiple studies

Q6: Integration of complex environmental measures and statistical/computational methods needed

Q7: Necessity of replication of GWAS hits and follow-up studies

Q8: Statistical tools and resources needed

Phenotypes, Endophenotypes and Other Variables

Q9: Diseases/traits ready for GxE investigation

Q10: Complex phenotypes vs. endophenotypes

Q11: Strategies to integrate environmental variables into GxE studies

Q12: Incorporation of “next-generation” environmental measurement tools into large cohort studies

Summary of Recommendations

One Size Does Not Fit All

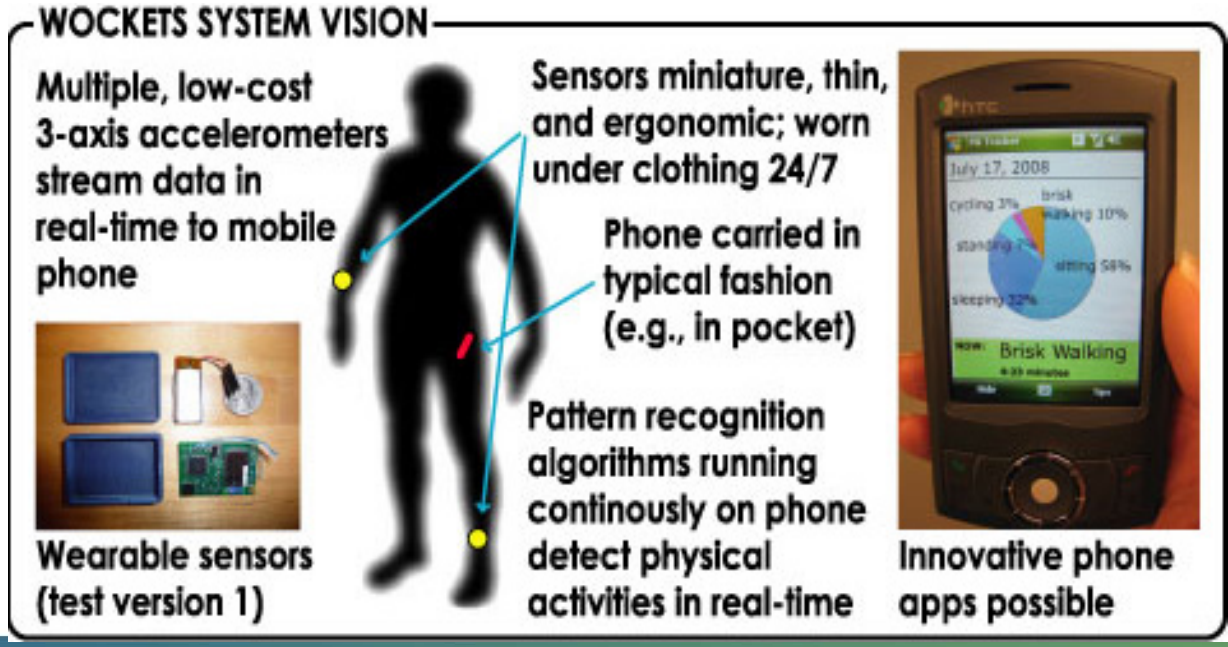
- Value in both discovery- and hypothesis-driven studies
- Heterogeneity of disciplines, hypotheses, and endpoints necessitates various approaches
- Value in adding G to E studies, and also adding E to G studies
- Design studies around the goal: with end or intervention in mind, whether prevention, treatment, or policy change

Planning and Coordination

- Design studies with populations across a range of exposures
- Target understudied populations
- Conduct longitudinal studies with measures of environment starting early in life or prenatally
- Leverage existing data, specimens and partnerships
- Develop and/or use consensus measures for phenotype harmonization

Incorporate New Strategies and Methods

- Develop strategies/methodologies for integration of future technologies
- Integration of new statistical and computational methodology
- Minimize misclassification



Meeting Products

- Public meeting summary
- Workshop manuscript
- Position papers
- Next steps

Workshop Planning Committee

Co-Chairs

David Balshaw, PhD (NIEHS)
Ebony Bookman, PhD (NHGRI)
Kay Wanke, PhD, MPH (OBSSR)

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