NIH Genes and Environment Initiative
Exposure Biology Program

Field-Deployable Tools for Quantifying Exposures to Psychosocial Stress and to Addictive Substances for Studies of Health and Disease

NIEHS National Institute of Environmental Health Sciences
NATIONAL CANCER INSTITUTE
NIDA NATIONAL INSTITUTE ON DRUG ABUSE
National Heart Lung and Blood Institute People Science Health
NIAAA National Institute on Alcohol Abuse and Alcoholism of the National Institutes of Health
OBSSR
U.S. Department of Health and Human Services National Institutes of Health National Institute of Environmental Health Sciences

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Background & Rationale

- Repeated exposures to psychosocial stress and addictive substances are associated with myriad human diseases (e.g., drug addiction, heart disease, depression) of tremendous public health burden.
- Extant measures of exposure to psychosocial stress and addictive substances are limited and can represent barriers to application in large-scale population studies detecting gene-by-environment interactive effects.
- The ability to precisely measure exposure to psychosocial stress and addictive substances will advance our understanding of how these exposures interact with genetic factors in the etiology of prevalent human diseases.

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Definition of Psychosocial Stress

- Psychosocial stress refers to acute or chronic events of psychological or social origin which challenge the homeostatic state of biological systems.
- Psychosocial stressors include, but are not limited to, exposure to adverse environments and life experiences such as natural disasters, crowding or isolation, relative position in a social hierarchy, stigma and discrimination, catastrophic/traumatic events (e.g., war, terrorism), loss of job, disease, family violence, deprivation, child abuse, adverse social environments or situations (e.g., being a chronic caregiver to an ailing family member), and detrimental parental behaviors.

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Definition of Addictive Substances

- Addictive substances refers to nicotine, alcohol, cannabis, stimulants, and opiates, but also includes the range of substances of potential addiction and their component mood-altering chemicals.
- Exposure includes active/voluntary as well as inactive/passive contact between an individual and one or more substances either acutely or chronically.
- Measurement spans from initial contact, experimentation or use, to frequent contact or chronic contact and/or use.
- Emphasis on point of contact with or entry to the body via routes of administration including dermal absorption, inhalation, ingestion, and injection.

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RFA Objectives

- To address barriers to personal exposure assessment by fostering the development, improvement and/or adaptation, and validation of measurement technologies which, by the end of the funding period, will be field-deployable tools (rather than laboratory-based prototypes) that detect personal exposure to psychosocial stress and/or addictive substances (licit and illicit).
- To promote the measurement of exposure with maximal precision, quantification, and reliability with a high degree of temporal (acute or chronic) and spatial resolution for application in large-scale studies of human health and disease.
- To generate technologies and devices that are ready for application to population studies at the end of the funding period.

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Three Categories of Research

Three specific categories of research activities are targeted by this initiative. In their applications, investigators must indicate to which of the following Categories they are responding.

- **Category 1**: tools to detect personal exposure to psychosocial stress.
- **Category 2**: tools to detect personal exposure to addictive substances
- **Category 3**: tools to detect personal exposure to psychosocial stress *AND* addictive substances

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Programmatic Priority

- Balance of funding between the areas of psychosocial stress and addictive substances assessment
- Development of field-deployable devices that detect multiple addictive substances, multiple stress events, or a panel that combines psychosocial stress and substance exposures measurement
- Detection of meaningful variations in extent of and response to exposures across age, developmental periods, sex, and population groups

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Budget & Grant Mechanism

- $2 million (total costs) per year over 4 years
- 3-5 awards are anticipated
- Cooperative Agreement Project Grant (U01) Mechanism

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Additional Review Criteria

- The potential that the proposed technology will be an improvement over existing methods or provide unique information
- The likelihood that the proposed project will produce field-deployable tools by the end of the funding period
- The feasibility of incorporating the produced tools in population studies to measure risk factors for a wide range of diseases and disorders
- The reasonableness of the product development plan, including milestones, timelines, and goals in relation to the proposed research
- Identification of critical partnerships needed to conduct the research and development activities that are specific to the facets of technology conceptualization, prototype device development, small-scale field testing, and functional validation

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Key Dates

- Letters of Intent Receipt: November 22, 2006
- Application Receipt: December 22, 2006
- Peer Review: March-April 2007
- Council Review: May 2007
- Earliest Start: July 2007

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NIEHS National Institute of Environmental Health Sciences · National Cancer Institute · NIDA National Institute on Drug Abuse · National Heart Lung and Blood Institute People Science Health · NIAAA National Institute on Alcohol Abuse and Alcoholism of the National Institutes of Health · OBSSR · U.S. Department of Health and Human Services National Institutes of Health National Institute of Environmental Health Sciences