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What Can the Center Offer for Students?

- Research Assistant positions
- Special Studies
- Doctoral and master thesis work
  - Mentorship and resources
  - Databases from our established cohorts
  - Field data collection and data management
  - Wet lab to measure biomarkers
- Multi-disciplinary team environment
  - Laboratory, clinical medicine, epidemiology
## Prospective Study Cohorts

<table>
<thead>
<tr>
<th>Boston Birth Cohort</th>
<th>Chinese Twin Cohort</th>
<th>Chicago Family Cohort</th>
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</thead>
<tbody>
<tr>
<td>8,500 mother-infant pairs (~2,500 preterm)</td>
<td>2,000 twin pairs MZ: DZ ratio 1:1 6 years and older</td>
<td>Over 1,000 families Biological parents and children 0-21 yr</td>
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<tr>
<td>Enrolled at Birth F/U at pediatric primary care visits</td>
<td>Baseline 6 yr follow-up</td>
<td>Baseline study completed</td>
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<tr>
<td>Inner city, minority (65% blacks) in Boston</td>
<td>Homogeneous Rural Chinese</td>
<td>White, suburb in Chicago</td>
</tr>
<tr>
<td>8 NIH grants 3 MOD, 1 DOD, 1MCHB</td>
<td>3 NIH grants philanthropy</td>
<td>5 NIH grants 2 foundation, philanthropy</td>
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</tbody>
</table>
Comprehensive Data Collection
Gene to Society and Life Course Framework
Ongoing Research

• Preterm birth, FGR, Pregnancy Complications
• Obesity
• Asthma, Food allergy
• Early Life Precursors of Adult Diseases:
  • Cardiovascular diseases
  • Diabetes
  • Metabolic syndrome
New Initiative (R40 MC 27443)

A Prospective Birth Cohort Study to identify pre- and peri-natal determinants of Autism Spectrum Disorders and Developmental Disabilities

Leverage the well-established Boston Birth Cohort, a predominant urban minority population
Explore the Biological Mechanisms for Early Life Origins of Pediatric and Adult Diseases

- Genetics
- Environment
- Epigenetics
Genome-wide Association Study (GWAS) of Food Allergy:

Hong et al, Nature Communication, in revision
Inter-relationship of Genotypes, DNA Methylation and Peanut Allergy

Figure. Differentially methylated positions (DMPs) that associated with rs7192 and rs9275596 and with peanut allergy, and DMPs that mediate genetic risk in peanut allergy.

a

450k probes

SNP

DMP

DMP-PA association

Gene

rs7192

rs9275596

Position on chromosome 6 (Mb)

b

Methylation

0.20 0.30 0.40 0.50

GG GT TT

Methylation

0.20 0.30 0.40 0.50

Control Peanut Allergy

OR with 95% CI

Y~pG Y~pG+oM Y~pG+oM+oM2
Early Life Origin of Metabolic Disease

Preterm Birth and Random Plasma Insulin Levels at Birth and in Early Childhood
Guoying Wang, MD, PhD; Sara Divall, MD; Sally Radovick, MD; David Paige, MD; Yi Ning, MD, ScD; Zhu Chen, PhD; Yuelong Ji, MS; Xiumei Hong, PhD; Sheila O. Walker, PhD; Deanna Caruso, MS; Colleen Pearson, BA; Mei-Cheng Wang, PhD; Barry Zuckerman, MD; Tina L. Cheng, MD; Xiaobin Wang, MD, MPH, ScD

ORIGINAL ARTICLE
Placental transfer and concentrations of cadmium, mercury, lead, and selenium in mothers, newborns, and young children
Zhu Chen, Robert Myers, Taiyin Wei, Eric Bind, Prince Kassim, Guoying Wang, Yuelong Ji, Xiumei Hong, Deanna Caruso, Tami Bartell, Yiwei Gong, Paul Strickland, Ana Navas-Acien, Eliseo Guallar, and Xiaobin Wang

Curr Envr Health Rpt
DOI 10.1007/s40572-013-0004-6

EARLY LIFE ENVIRONMENTAL HEALTH (J SUNYER, SECTION EDITOR)
Early Life Origins of Metabolic Syndrome: The Role of Environmental Toxicants
Guoying Wang & Zhu Chen & Tami Bartell & Xiaobin Wang
Early Life Origins of Metabolic Syndrome: The Role of Environmental Chemicals

By Megan Avakian

A growing body of evidence suggests that disease and poor adult health may originate during fetal development and early childhood. This concept, called the developmental origins of health and disease (DOHaD) hypothesis, suggests that early life environmental exposures can alter development in a way that leads to disease later in life. In a recent review, NEIHS grantee Xiaobin Wang, M.D., Sc.D., and her colleague Guoying Wang, M.D., examined new evidence for early life origins of metabolic syndrome (MeS) and draw attention to important research gaps in this area.

Early life exposure to endocrine disrupting chemicals and heavy metals may lead to development of metabolic syndrome later in life. These environmental toxins are found in air, food, water, and soil. (Photo courtesy of Shutterstock)
Clinical, Public Health, and Policy Implications