Early Life Experiences
Environmental Influences During Infancy & Childhood

Poverty

Childhood Abuse & Neglect

Social & Physical Environment
Epigenetic Control of Gene Activity
Prenatal Origins of Health & Disease

stress, immune toxins, drugs mood, diet

offspring development
Prenatal Maternal Influences: Translational Approaches

Perceived psychosocial stress during pregnancy

- placenta DNA methylation
- fetal neurobehavior
- infant development

0.47***
maternal psychosocial stress during pregnancy
placental DNA methylation of Hsd11b2

0.32*
environmental exposure
epigentic effect

-0.51***
fetal neurodevelopment
offspring outcome

Epigenetic age during pregnancy

[Graph showing a scatter plot with epigenetic age on the x-axis and chronological age on the y-axis. The data points are scattered around a line indicating a correlation. A highlighted area on the graph comments on "epigenetic age acceleration".]
Prenatal and early life influences on epigenetic age in children: a study of mother–offspring pairs from two cohort studies

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<table>
<thead>
<tr>
<th>Clinical variables</th>
<th>Clinic for AA</th>
<th>Correlation (or F-statistic)</th>
<th>P-value</th>
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<tbody>
<tr>
<td>Sex (M = 0, F = 1)</td>
<td>Birth</td>
<td>-0.019</td>
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<td>Birth weight (kg)</td>
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Epi-AA in adolescent males
Epi-AA at birth in cesarean
Epi-AA at birth with maternal smoking
Walsh et al. (2019) *PNAS*
Preterm Birth and Maternal Stress

Walsh et al. (2019) *PNAS*
Elevated 2\textsuperscript{nd} Trimester PSS Score
“masculinizes” aromatase profile in females
Fetal Exposure to Testosterone

Percent of Infants with Testosterone Levels Exceeding the Median Value

- Low/High: 37.6%
- Low/Low: 46.8%
- High/High: 54.9%
- High/Low: 61.5%

Level of Maternal Testosterone/Level of Placental Aromatase

ASD RISK

Firestein et al. in preparation
Impact of prenatal exposures on the maternal brain
Conceptual model depicting hypothesized meditational pathways and moderators linking childhood maltreatment to risk for MCI and AD

APOE ε4

Documented Childhood Maltreatment (ages 0-11)

Physical Health Psychosocial Risk Factors
- Socio-economic Status
- Education
- Depression
- Social Support
- Attitudes Toward Aging

Biological Markers of Aging

Increased Risk for Mild Cognitive Impairment and Alzheimer’s Disease

Note: Mediation – solid lines; Moderation – dotted lines.
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