Why RESONANCE?

What makes a healthy brain? From conception and throughout childhood, our brains undergo remarkable change.

Early development underlies cognition and behavior, is responsive to diverse biological and environmental factors, and may be associated with differences in later outcomes.

The goal of RESONANCE is to determine how various factors modulate brain and child development.

Children in foster care and adopted children demonstrate a remarkable degree of resilience.

Limited information about the influences of the environment on their growth and neurodevelopmental trajectories.

This study will 1. Characterize trajectories of brain development from early childhood to pre-adolescence; 2. Determine how factors including the benefits of foster care and adoption (diet/nutrition, sleep, activity, etc.), influence cognition and behavior.

What is RESONANCE?

The first longitudinal brain & cognition study following children from early childhood to pre-adolescence.

An extensive suite of neurodevelopmental measures to examine functional trends & associations.

Unique sub-cohorts that include: Adoptees and foster children (STARK); Late and moderate pre-term children (PEBBLES); Full-term children exposed to environmental lead (PUMBA); Children born small for gestational age or with growth restriction (SIMBA); Previously enrolled, healthy full-term children (BAMBA).

Brain growth
- MRI (magnetic resonance imaging) scans
- non-sedated conditions (child is asleep or awake, watching a movie)
- brain morphology, white matter architecture, microstructure and functional connectivity.

Neurocognition
- Cognitive assessments
- Expressive/receptive language
- visuospatial/fine motor coordination
- attention and executive function
- academic learning
- social-emotional and behavioral function.

Growth & Environment

Environment
- child sleep quality, air quality, nutrition (ASA24) and eating/feeding habits
- child physical growth and body composition (PeaPod, BodPod)
- directed language (LENA).

Bringing together a suite of measures to examine functional trends & associations.

Biological sampling
- saliva, stool, urine (microbiome)
- shed deciduous teeth (pre- and post-natal heavy metal exposure)

Early preliminary findings suggest differential brain development associated with language development, phonological processing, emerging executive function, prematurity, lead exposure, home air quality, and genetic APOE status.

Differences in brain growth are mirrored by differences in cognitive development.

Key Findings

Early preliminary findings suggest differential brain development associated with language development, phonological processing, emerging executive function, prematurity, lead exposure, home air quality, and genetic APOE status.

Differences in brain growth are mirrored by differences in cognitive development.

Successes & Challenges

Primary successes of RESONANCE to date include:
- The acquisition of more than 2500 fetal, infant, and child MRI and cognitive datasets;
- Development of novel functional analysis methods that handle complex data;
- Utilization of measures of activity, sleep and air quality to gather data on some environmental influences.

Some of the challenges we anticipate include the identification of individual and cumulative effects of the multitude of factors that influence child health.

This study aims to acquire data on a valuable and often under-studied population of children with a focus on the factors that contribute to the emergence and expression of resilience.

FUNDING SOURCES

NIH UG3 OD023313, NIH MH087510, NIH UG3 OD023313, Bill & Melinda Gates Foundation OPP151325

KEY CONTACTS

S. Deoni sdeoni@mac.com
V. D’Sa viren_dsa@brown.edu