

Biomarker Validation in Motor System Physiology in Attention Deficit Hyperactivity Disorder

Status: RECRUITING

Eligibility Criteria

Sex: ALL

Age: 8 years to 12 years old

Healthy Volunteers: This study is also accepting healthy volunteers

Inclusion Criteria:

- Either gender, any race, ethnicity or socioeconomic status
- Currently between 8 years 0 months and 12 years, 11 months, 30 days
- Willing to answer questions about ADHD and related diagnoses
- For children with ADHD prescribed stimulant medications, willing to suspend taking medications as specified in the study procedures
- For children with ADHD, willing to participate in the single dose, randomized crossover study to probe acute effects of methylphenidate on biomarkers
- Right hand dominant (predominately right-handed)
- Able to participate in and sign an informed consent
- ADHD inclusion: The diagnosis of ADHD will be based on Diagnostic and Statistical Manual version 5 (DSM-5) criteria using standard rating scales and a structured diagnostic interview. Oppositional Defiant Disorder is permitted; Conduct disorder is excluded.
- Typically Developing (healthy control) inclusion: Free of ADHD or other developmental or psychiatric disorders based on DSM-5 criteria using standard rating scales and a structured diagnostic interview.

Exclusion Criteria:

- Known diagnosis of mental retardation, cerebral palsy, Autism Spectrum Disorder, traumatic brain injury, brain tumor, epilepsy, or other serious neurological disorder.
- Major Depression, Bipolar Disorder, Conduct Disorder, Adjustment Disorder, other Anxiety Disorders, or other developmental psychiatric diagnoses.
- For females, onset of menses, pregnancy.
- Current use of antidepressants, non-stimulant ADHD medications, dopamine blocking agents, mood stabilizers.
- Implanted brain stimulator, vagal nerve stimulator, ventriculo-peritoneal shunt, cardiac pacemaker, or implanted medication port.
- Diagnosis of a speech/language disorder or a Reading Disability (RD).

Conditions & Interventions

Interventions:

DRUG: Methylphenidate, DRUG: Placebo

Conditions:

Attention Deficit Hyperactivity Disorder Combined

More Information

Description:

Attention-Deficit/Hyperactivity Disorder (ADHD) is the most commonly diagnosed neurobehavioral disorder in childhood. Children with ADHD struggle in school due to problems with attention and high levels of impulsivity and hyperactivity. They are at substantially increased risk for long-term difficulties into adulthood, including academic underachievement, substance abuse, and criminal behavior. The diagnosis of ADHD, which is based on subjective ratings by parents and teachers, likely results from multiple different, overlapping differences in circuits of the brain responsible for attention and impulse control. However, we do not have any scientific or clinical tests that allow us to understand these circuits. In an effort to improve ADHD outcomes, we have used a technology called Transcranial Magnetic Stimulation (TMS) to identify highly reliable measurements of brain function. We have identified two very promising measures that are abnormal in children with ADHD and, importantly, also predict the severity of ADHD behaviors. The goal of this project is to determine if these two TMS measurements could be used to help better guide ADHD treatment. To do this, we will perform three investigations in 8 to 12 year old children to determine: 1) test-retest reliability; 2) pharmacologic responsiveness; and 3) correlations with two domains of function relevant to ADHD: "Cognitive Control" and "Emotional Valence." Through these investigations, we aim to determine whether these two TMS brain measures are reliable and meaningful enough to be used to help improve precision of individually-targeted and effective ADHD treatments.

Contact(s): Karlee Migneault - karlee.migneault@cchmc.org

Principal Investigator:

Principal Investigator ID:

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