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NEWS

RSNA Press Release

Functional Brain Pathways Disrupted in Children with ADHD

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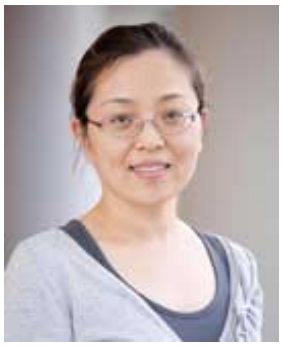
At A Glance

- Children with ADHD use different pathways to process visual attention information.
- Previous studies have focused on the impulsivity component of the disorder.
- ADHD affects five to eight percent of school-aged children.

CHICAGO—Using functional magnetic resonance imaging (fMRI), researchers have identified abnormalities in the brains of children with attention deficit/hyperactivity disorder (ADHD) that may serve as a biomarker for the disorder, according to a study presented today at the annual meeting of the Radiological Society of North America (RSNA).

ADHD is one of the most common childhood disorders, affecting an estimated five to eight percent of school-aged children. Symptoms, which may continue into adulthood, include inattention, hyperactivity and impulsivity behaviors that are out of the normal range for a child's age and development.



Xiaobo Li, Ph.D.

According to the National Institute of Mental Health, there is no single test capable of diagnosing a child with the disorder. As a result, difficult children are often incorrectly labeled with ADHD while other children with the disorder remain undiagnosed.

"Diagnosing ADHD is very difficult because of its wide variety of behavioral symptoms," said lead researcher Xiaobo Li, Ph.D., assistant professor of radiology at the Albert Einstein College of Medicine in New York. "Establishing a reliable imaging biomarker of ADHD would be a major contribution to the field."

For the study, Dr. Li and colleagues performed fMRI on 18 typically developing children and 18 children diagnosed with ADHD (age range 9 to 15 years). While undergoing fMRI, the children engaged in a test of sustained attention in which they were shown a set of three numbers and then asked whether subsequent groups of numbers matched the original set. For each participant, fMRI produced a brain activation map that revealed which regions of

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the brain became activated while the child performed the task. The researchers then compared the brain activation maps of the two groups.

Compared to the normal control group, the children with ADHD showed abnormal functional activity in several regions of the brain involved in the processing of visual attention information. The researchers also found that communication among the brain regions within this visual attention-processing pathway was disrupted in the children with ADHD.

"What this tells us is that children with ADHD are using partially different functional brain pathways to process this information, which may be caused by impaired white matter pathways involved in visual attention information processing," Dr. Li said.

Dr. Li said much of the research conducted on ADHD has focused on the impulsivity component of the disorder.

"Inattention is an equally important component of this disorder," she said, "and our findings contribute to understanding the pathology of inattentiveness in ADHD."

Coauthors are Shugao Xia, Ariane Kimball and Craig Branch, Ph.D.

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