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## Brain regions do not communicate efficiently in adults with autism

ATLANTA – A novel look at the brains of adults with autism has provided new evidence that various brain regions of people with the developmental disorder may not communicate with each other as efficiently as they do in other people.

Researchers from the University of Washington's Autism Center will report today at the annual meeting of the Society for Neuroscience on the first study that measures neural activity by using high-resolution electroencephalography (EEG) to examine connections in the cerebral cortex, the part of the brain that deals with higher cognitive processes.

Compared to normally developing individuals, the scientists found patterns of abnormal connectivity between brain regions in people with autism. These abnormalities showed both over and under connectivity between neurons in different parts of the cortex, according to Michael Murias, a postdoctoral researcher who headed the study.

"Our findings indicate adults with autism show differences coordinated neural activity," said Murias, "which implies poor internal communication between the parts of the brain."

The UW researchers analyzed EEGs from 36 adults, ranging in age from 19 to 38. Half the adults had autism and all had IQs of at least 80. The EEGs, which measure the activity of hundreds of millions of brain cells, were collected with an array of 124 electrodes while the people were seated and relaxed with their eyes closed for two minutes.

The researchers found patterns of higher than normal neural connectivity in the left hemisphere, particularly in the temporal lobe of the persons with autism within two different frequencies of brain waves, the delta and theta bands. This part of the brain is associated with language, which is impaired in many people with autism.

A global pattern of decreased neural connectivity between the frontal lobes and the rest of autistic brain showed up on the alpha wave band. These findings support several other studies using functional magnetic resonance imaging and positron emission tomography, both of which gauge brain activity by measuring blood flow. Post-mortem studies also suggest impairments in communication at the level of individual brain cells.

This over and under abundance of neural connections suggests inefficient and inconsistent communication inside the brains of people with autism and may explain some of the deficits shown by people who have the disorder.

The research has practical applications. Murias believes the abnormal patterns of brain activity are a potential biological marker of autism and may help to define the phenotype, or major characteristics, of autism. UW colleagues think EEG techniques can be used on young children to help in the early detection of autism, which is critical in providing interventions for the disorder.

Other members of the research team are from the UW's Autism Center and include Geraldine Dawson, center director and a professor of psychology; Sara Webb, assistant professor of psychiatry and behavioral sciences; Jessica Greenson, research scientist; and Kristen Merkle, research study assistant. The National Institute of Mental Health's Studies to Advance Autism Research and Treatment and the Perry Research Fellowship Endowment funded the research.

Autism, a spectrum of developmental disorders, is the most common developmental disorder in the United States. It is estimated to affect one in every 166 children. Autism is characterized by an inability to communicate and interact with other people, and those afflicted typically have a restricted range of activities and interests

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