Researchers study the idling brain

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Oregon Health & Science University researchers, along with scientists at Washington University in St. Louis, are uncovering new information about the mind by studying the brain while it is at rest. It is believed this research will one day provide new tools for diagnosing mental health disorders and monitoring the progress of treatments. The researchers' latest findings are published in the journal the *Public Library of Science Computational Biology*.

"For years, the vast majority of scientists studying human functional brain organization have focused on how activity changes when engaged in specific tasks," explained Damien Fair, Ph.D., a postdoctoral research scientist in psychiatry, OHSU School of Medicine. "However now we know there are several regions in the brain that continue to interact while a person is supposedly at rest - sort of like a car that idles at a stoplight. Our lab is studying these interactions, or spontaneous brain activity, while the brain is at rest. We think that this approach will eventually help us distinguish typical function from atypical function and therefore help more rapidly diagnose and appropriately treat mental disorders."

To observe brain function in humans, the researchers use a form of magnetic resonance imaging (MRI) called functional connectivity MRI. Functional connectivity MRI allows the researchers to witness real-time brain activity as it occurs in study subjects. By studying a large group of subjects, the researchers were able to identify regions of the brain that spontaneously activate together while the subjects were at rest. These regions operate in tandem with one another, and group into regional networks.

"After observing a large group of study subjects between the ages of 7 and 31, we witnessed an interesting phenomenon," added Fair. "Communications between brain regions seem to be localized in children, but over time, regional communication becomes distributed across the whole brain. Despite these differences, children's brains are still very efficient. As with the adults, the brains in the children were still organized like a 'small world.'"

The next phase of this research is to begin comparing functional connectivity MRI images taken from typically developing human subjects with images taken from human subjects with mental disorders. The scientists believe doing so will allow them to pinpoint distinct functional differences that may one day assist physicians in diagnosing certain disorders.

"One of our key interest areas is ADHD," said Fair. "ADHD is one of the most widely diagnosed mental disorders in children, yet diagnosing it can be very difficult because diagnosis is based on patient and parent interviews and observational studies. Having a more tangible form of diagnosis - such as an MRI screening tool would be tremendously valuable to patients and physicians."

Source: Oregon Health & Science University (news : web)