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Manipulating the Brain Network Could Improve IQ

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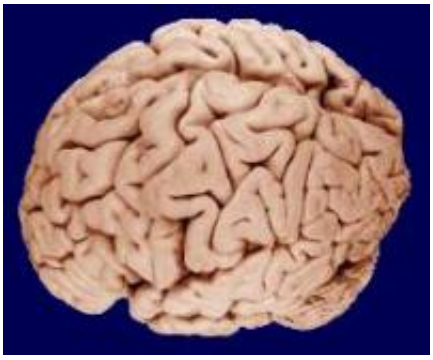

Credit: University of Wisconsin and Michigan State Comparative Mammalian Brain Collections and the National Museum of Health and Medicine

In an attempt to investigate why some brains are more intelligent than others, researchers have found that efficient wiring between different brain regions is associated with a higher IQ. This understanding could potentially lead to the development of drugs that could improve IQ by improving the brain's network efficiency.

Martijn van den Heuvel, a neuroscientist at Utrecht University Medical Center who led the new study, explained that the concept of a networked brain is similar to a transportation grid, with the brain using its network to send information from one region to another.

In their study, the scientists scanned the brains of 19 subjects at rest

using functional magnetic resonance imaging (fMRI). Because the brains were at rest, the brain activity revealed the "default" underlying connectivity between brain regions. Brain connectivity reflects how many steps are required to send information between different regions of the brain.

When comparing the connectivity networks, the researchers found a link between connectivity efficiency and the subject's IQ, with connectivity explaining about 30% of the difference between subjects. However, the researchers did not find a link between the total number of connections in the brain and IQ. "We show that more intelligent people don't have more connections, but they have more efficiently placed connections," van den Heuvel said.

In the future, the scientists hope to investigate the possibilities of manipulating the brain's connectivity efficiency in order to create more efficient brain networks, and possibly boost IQ. Previous research has found a genetic component to white matter in the brain, which is also related to intelligence. By understanding how these genes work, scientists may be able to figure out how to manipulate the genes, leading to improved intelligence.

More information: Journal of Neuroscience (DOI: 10.1523/JNEUROSCI.1442-09.2009)

Via: New Scientist