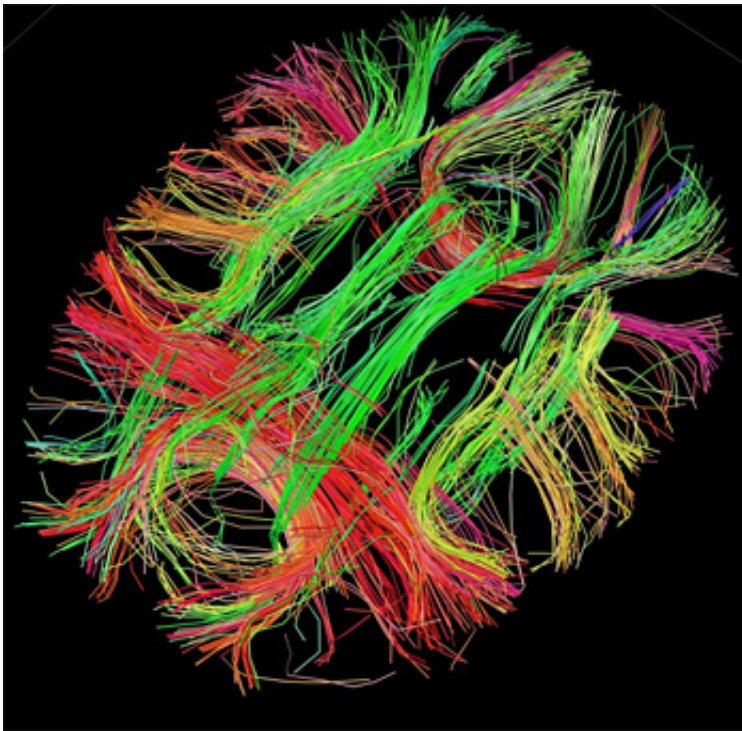


Study identifies cause of disruption in brain linked to psychiatric disorder

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White matter fiber architecture of the brain. Credit: Human Connectome Project.

New research has identified the mechanisms that trigger disruption in the brain's communication channels linked to symptoms in psychiatric disorders including schizophrenia. The University of Bristol study, published today [17 Aug] in the *Proceedings of National Academy of Sciences*, could have important implications for treating symptoms of

brain disorders.

Many of our everyday cognitive functions such as learning and memory rely on normal communication between the two regions of the brain - the hippocampus and prefrontal cortex. While previous studies have identified disruption to communication channels in these two areas of the brain contribute to symptoms in [psychiatric disorders](#), the mechanisms that lead to these disturbances have been largely unknown, until now.

In this study, led by Professor Zafar Bashir from Bristol's School of Physiology and Pharmacology, the researchers studied neurotransmitters, called glutamate and dopamine, which work together in controlling normal transmission between these [brain regions](#) by communicating chemical information throughout our brain and are disrupted in schizophrenics.

The team found that subtle changes in the interplay of these transmitters completely altered the flow of information from the hippocampus to prefrontal cortex. Over-activation of the D2 class of [dopamine receptors](#) led to suppression of the function of NMDA receptors, which are activated by the neurotransmitter glutamate, at the synaptic connection between hippocampus and [prefrontal cortex](#). This in turn leads to a marked disruption of communication between these brain regions.

Dr Paul Banks, one of the researchers, said: "Our findings demonstrate a mechanism for how dopamine neurotransmission can influence NMDA receptor function at a connection in the brain needed for complex mental tasks which are disrupted in [schizophrenic patients](#). It has been known for some time that dopamine and NMDA receptor function are altered in schizophrenic patients - our data mirror the direction of these changes and therefore might give insight into how these changes come about mechanistically."

More information: 'Disruption of hippocampal–prefrontal cortex activity by dopamine D2R-dependent LTD of NMDAR transmission' by Paul James Banks et al in *Proceedings of the National Academy of Sciences*, www.pnas.org/cgi/doi/10.1073/pnas.1512064112

Provided by University of Bristol

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