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Key neurotransmitter receptor may be a potential target for individualised Autism Spectrum Disorder treatment

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Scientists from the Florida campus of The Scripps Research Institute (TSRI) have uncovered a significant—and potentially treatable—relationship between a chemical that helps transmit signals in the brain and genetic mutations present in a subset of individuals with autism spectrum disorder.

The new research findings, which were published recently in the journal *PLoS One*, focus on the role that the neurotransmitter serotonin plays in the development of social behavior. Serotonin, together with the serotonin receptors it activates in the brain, plays a significant role in neurological processes, including mood, anxiety, aggression and memory.

The study made use of an animal model of mutations in the gene *Pten*, a risk factor present in a subgroup of individuals with autism. Treatment of this model with a drug that suppresses the activity of a particular serotonin receptor, 5-HT2cR, can have a dramatic effect.

Julien Séjourné, the first author of the new study, said:

> Our research shows that targeting one specific serotonin receptor can reverse social deficits in a mouse model of the autism risk gene *Pten.* This discovery is important for understanding the role of this specific subtype of serotonin receptor in autism-relevant behaviors and could lead to new therapeutic strategies."

TSRI Assistant Professor Damon Page, who led the study, added:

> We found a striking contrast between the effects of dialing down the activity of the receptor using a drug, which improved social deficits in the *Pten* model, versus removing the receptor completely by mutation, which actually impaired social behavior. Important issues will be uncovering the mechanism by which modulating serotonin receptor activity can influence autism-relevant symptoms and identifying the time window and dose range where targeting serotonin receptors is most effective."

Damon Page is a biologist at the Florida campus of The Scripps Research Institute.

Page was recently awarded a $2.4 million, five-year grant from the National Institute of Mental Health of The National Institutes of Health (NIH) to further study the relationship between abnormal patterns of brain growth,

neurotransmitter signaling and the behavioral and cognitive symptoms in individuals with autism spectrum disorder.

"The new grant will let us expand our research into the relationship between specific risk factors, altered brain development and key neurotransmitter systems, with the ultimate goal of moving toward individualized treatments for particular subgroups of individuals with autism spectrum disorder," he said.

In addition to Page and Séjourné, other authors of the study, "Social Behavioral Deficits Coincide with the Onset of Seizure Susceptibility in Mice Lacking Serotonin Receptor 2c," are Danielle Llaneza of TSRI and Orsolya J. Kuti of The Massachusetts Institute of Technology. See http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0136494

Source:
TSRI