

Antibodies to strep throat bacteria linked to obsessive compulsive disorder in mice

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A new study by researchers at Columbia University Mailman School of Public Health's Center for Infection and Immunity indicates that pediatric obsessive-compulsive disorder (OCD), Tourette syndrome and/or tic disorder may develop from an inappropriate immune response to the bacteria causing common throat infections.

The mouse model findings, published online by Nature Publishing Group in this week's *Molecular Psychiatry*, support the view that this condition is a distinct disorder, and represent a key advance in tracing the path leading from an ordinary infection in childhood to the surfacing of a psychiatric syndrome. The research provides new insights into identifying children at risk for autoimmune [brain disorders](#) and suggests potential avenues for treatment.

OCD and tic disorders affect a significant portion of the population. More than 25% of adults and over 3% of children manifest some features of these disorders. Until now, scientists have been unable to convincingly document the association between the appearance of antibodies directed against Group A beta-hemolytic streptococcus (GABHS) in peripheral blood and the onset of the behavioral and motor aspects of the disorder. As a result, treatment strategies were restricted to targeting symptoms rather than causes.

Strep throat bacteria, or GABHS, are known to cause [autoimmune disorders](#) such as Sydenham chorea, with symptoms such as fever and uncontrolled tics of the face or extremities in susceptible individuals,

prompting some scientists to suspect that GABHS could play a role in a syndrome known as Pediatric Autoimmune Neuropsychiatric Disorders Associated with Streptococcal infections (PANDAS), a rapid-onset and episodic form of OCD and tic disorders observed in some children. The latest study by CII researchers supports the hypothesis that some neuropsychiatric syndromes may be triggered by direct action of GABHS-associated antibodies on the brain. Whether environmental factors other than GABHS can lead to similar effects is as yet unknown.

Using a mouse model of PANDAS, Mady Hornig, MD, associate professor of epidemiology at Columbia University Mailman School of Public Health, and colleagues demonstrate this suspected link between GABHS antibodies and the psychiatric symptoms of the disorder. Immunizing mice with an inactivated form of the bacteria, CII researchers found that the mice exhibited repetitive behaviors reminiscent of children with PANDAS. Injection of antibodies from the immunized mice into the bloodstream of non-immunized mice replicated these behaviors.

"These findings illustrate that antibodies alone are sufficient to trigger this behavioral syndrome," said Dr. Hornig. "Our findings in this animal model support and may explain results of Swedo and colleagues in treating children with PANDAS using plasmapheresis or intravenous immunoglobulin (IVIg). They may also have implications for understanding, preventing or treating other disorders potentially linked to autoimmunity, including autism spectrum, mood, attentional, learning, and eating disorders."

"This work provides strong corroboration for a link between exposure to [infection](#), development of an autoimmune response, and the onset of repetitive behaviors and deficits in attention, learning, and social interaction," says CII Director W. Ian Lipkin, MD, John Snow Professor of Epidemiology, and professor of Neurology and Pathology at

Columbia University. "Further investigations in this strep-triggered, autoimmune mouse model of PANDAS will promote the discovery of more effective interventions for these disabling disorders and guide the development of robust prevention strategies."

Dr. Susan Swedo, a senior investigator at NIMH who has been a leader in research into PANDAS, provides commentary on the work in this issue of *Molecular Psychiatry*, where the authors' work is also featured on the journal's cover.

Source: Columbia University's Mailman School of Public Health ([news : web](#))

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