

Novel Discovery Of 'DCDC2' Gene Associated With Dyslexia

ScienceDaily (Oct. 28, 2005) — Pediatric researchers at Yale School of Medicine have identified a gene on human chromosome 6 called DCDC2, which is linked to dyslexia, a reading disability affecting millions of children and adults.

The researchers also found that a genetic alteration in DCDC2 leads to a disruption in the formation of brain circuits that make it possible to read. This genetic alteration is transmitted within families.

"These promising results now have the potential to lead to improved diagnostic methods to identify dyslexia and deepens understanding of how the reading process works on a molecular level," said lead author Jeffrey R. Gruen, M.D., associate professor in the Pediatrics Department at Yale School of Medicine.

The study will be published in a special issue of Proceedings of the National Academy of Sciences on October 28. Gruen and first author Haiying Meng will also present the findings that same day at the American Society of Human Genetics (ASHG) meeting in Salt Lake City, Utah.

Gruen and co-authors used a statistical approach to study and compare specific DNA markers in 153 dyslexic families. "We now have strong statistical evidence that a large number of dyslexic cases--perhaps as many as 20 percent--are due to the DCDC2 gene," said Gruen. "The genetic alteration on this chromosome is a large deletion of a regulatory region. The gene itself is expressed in reading centers of the brain where it modulates migration of neurons. This very architecture of the brain circuitry is necessary for normal reading."

To facilitate reading, brain circuits need to communicate with each other. In reading disabilities, these circuits are disrupted. In people with dyslexia, compensatory brain circuits are inefficient and they have a hard time learning to read.

Locating this gene provided researchers with part of the reason why dyslexia occurs. Gruen said discovery of the gene and its function will lead to early and more accurate diagnoses and more effective educational programs to address the unique needs and special talents of people with dyslexia.

"We can't continue the cookie cutter, one-size-fits-all schooling anymore," said Gruen. "People with dyslexia are not less intelligent than others, they just learn in different ways. Tailoring programs to fit the needs of these children will enhance their success in school and be more cost effective."

Other authors on the study were Shelley D. Smith, Karl Hager, Matthew Held, Jonathan Liu, Richard K. Olson, Bruce F. Pennington, John C. DeFries, Joel Gelernter, Thomas O'Reilly-Pol, Stefan Somlo, Pawel Skudlarski, Sally E. Shaywitz, Bennett A. Shaywitz, Karen Marchione, Yu Wang, Murugan Parmasivam, Joseph J. LoTurco and Grier P. Page.

Adapted from materials provided by [Yale University](#).

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