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Rutgers Research Tackles Childhood Epilepsy

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EDITOR'S NOTE: Professor D'Arcangelo may be contacted at 732-445-2839 or darcangelo@dls.rutgers.edu.

NEW BRUNSWICK, N.J. – Rutgers researchers have discovered a potential new way to treat childhood epilepsy using a widely available therapeutic drug.

Rutgers neuroscientist [Gabriella D'Arcangelo](#) and her colleagues have published their research findings in the journal [Disease Models and Mechanisms](#) (in press) and the paper has just appeared online.

In their quest for new therapeutic approaches, the researchers are investigating the molecular basis of the disease. The article describes the first use of a mouse model of [cortical dysplasia](#), a malformation of the brain that is most often the cause of childhood epilepsy. Introducing the drug [rapamycin](#), originally used to prevent rejection in organ transplants, suppressed epileptic seizures in the mice.



Rutgers Professor Gabriella D'Arcangelo

Epilepsy is the third most common neurological disorder in the United States after Alzheimer's disease and stroke. It currently affects more than 326,000 children under age 15. More than 90,000 of them have severe seizures that cannot be adequately treated. The children often go on to develop cognitive problems due to recurrent and uncontrolled seizures and the combined effects of heavy medication. They may also suffer consequences from having parts of their brains removed during surgery.



According to the [International League Against Epilepsy](#) (ILAE), approximately 45 percent of the pediatric epilepsy surgery cases (patients under age 18) are due to cortical dysplasia. A staggering 75 percent of surgery patients under age 2 have the condition.

“The surgery is not without risks, and while it may help control the seizures, it does not work in all cases,” said D’Arcangelo, an associate professor in the [Department of Cell Biology and Neuroscience](#) at [Rutgers](#), The State University of New Jersey. “Clearly there is a pressing need to come up with new strategies for treatment.”

D’Arcangelo’s mutant mice lack a gene ([Pten](#)) that suppresses cell growth in some neurons, resulting in these mutants displaying molecular, cellular and physiological traits of cortical dysplasia. The researchers treated the mice with rapamycin. It had already shown promise in a different mouse model for treating [tuberous sclerosis complex](#) (TSC), a subtype of cortical dysplasia.

“We demonstrated that rapamycin is a novel and effective anti-epileptic agent that suppresses seizures in our mice, as well as in the TSC model, and this has raised some hope for the future,” said D’Arcangelo. “This drug is being tested on human patients of tuberous sclerosis in a multicenter study involving six TSC clinics throughout the United States. I hope it will soon be tested for all cortical dysplasia patients.”

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Contact: Joseph Blumberg
732-932-7084, ext. 652
E-mail: blumberg@ur.rutgers.edu