A Novel Animal Model for Investigating the Neural Basis of Focal Dystonia

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PUBLIC ABSTRACT

Benign essential blepharospasm is a focal dystonia that causes involuntary spasms of lid closure lasting a few seconds to minutes. During these spasms, individuals are functionally blind, unable to participate in day-to-day aspects of life such as driving, watching TV, or reading a book. Blepharospasm develops when an individual experiences eye irritation such as dry eye in the presence of a "predisposing condition." The "predisposing condition" converts the normally compensatory changes in blinking with dry eye into spasms of lid closure. Understanding the neural bases for the "predisposing condition" is essential to developing new treatments for blepharospasm or blocking the growth of spasms of lid closure in response to eye irritation. The studies proposed in this application seek to identify the neural bases of the "predisposing condition."

We hypothesize that the "predisposing condition" occurs when the activity of neurons in the basal ganglia region of the brain synchronizes to produce low frequency bursts (< 10 times per second) of activity. This oscillating pattern of activity ripples through the rest of the brain and alters neural processing. In blepharospasm, we propose that this oscillating pattern exaggerates motor learning such that normal adaptations of blinking to...