PRESS RELEASE

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Contact: Rhiannon Bugno, Editorial Office
+214 648 0880
Biol.Psych@utsouthwestern.edu

National Study of Deep Brain Stimulation for Depression Fails to Demonstrate Efficacy

According to new report in Biological Psychiatry

Philadelphia, PA, July 28, 2015 – Depression is a leading cause of disability worldwide, and treatment-resistant symptoms of depression have a terrible personal and societal cost. They can devastate lives, careers, and families. Some severely ill patients may be unable to attend to even the basic elements of self-care, while others attempt or complete suicide.

Because of the clinical urgency, deep brain stimulation (DBS) treatments for depression have been developed over the past 15 years. These treatments require surgery to make a small hole in the skull through which an electrode is passed into a specific brain region. Once positioned, a standard electrical stimulation procedure is initiated, which is modeled after highly effective DBS treatments that are used for Parkinson's disease, essential tremor, and other neurologic conditions.

DBS does not damage healthy brain tissue. It works by using electrical pulses to 'block' neural signals from the targeted brain area that is the known or suspected source of the symptoms.

A large number of relatively small open-label studies have supported the effectiveness of various forms of DBS for both depression and obsessive-compulsive disorder.

In the current issue of *Biological Psychiatry*, Dr. Darin Dougherty and his colleagues report the results of the first large-scale, randomized, sham-controlled trial of deep brain stimulation treatment for treatment-resistant symptoms of depression. Thirty patients received active DBS or sham 'placebo' stimulation for 16 weeks, targeted at the ventral capsule and ventral striatum, brain regions implicated in reward and motivation. A two-year open-label continuation phase followed.

This study, conducted at five medical centers across the U.S. that collaborated on the project, failed to find that DBS reduced depression symptoms better than sham stimulation.

"While initial open-label trials of DBS at the ventral capsule/ventral striatum target were promising, the results of this first controlled trial were negative," explained Dougherty, Director of Neurotherapeutics at Massachusetts General Hospital and Associate Professor at Harvard Medical School.

Dr. Thomas Schlaepfer, an expert on DBS treatment unaffiliated with this study, from Johns Hopkins University and University Hospital Bonn in Germany, wrote a companion piece to this article and commented, "On first sight, this might be seen as a crisis for the whole field of neurostimulation therapies for depression… [but we] believe that these are examples of failed *studies* and not failed *treatments*."

"This study raises serious questions about the advisability of continuing to stimulate these reward regions in the manner employed in this study," said Dr. John Krystal, Editor of *Biological Psychiatry*. "It is critical to understand that this study is not a universal indictment of DBS as a strategy for depression. It may turn out that stimulating other brain regions or stimulating these regions in different ways could provide important benefit."

"Given the degree of response that we have seen in some of the most treatment refractory patients, we agree with Dr. Schlaepfer and Dr. Krystal. Alternative study designs will have to be considered as we conduct future clinical trials in this critical area," concluded Dougherty.

The article is "A Randomized Sham-Controlled Trial of Deep Brain Stimulation of the Ventral Capsule/Ventral Striatum for Chronic Treatment-Resistant Depression" by Darin D. Dougherty, Ali R. Rezai, Linda L. Carpenter, Robert H. Howland, Mahendra T. Bhati, John P. O'Reardon, Emad N.

Eskandar, Gordon H. Baltuch, Andre D. Machado, Douglas Kondziolka, Cristina Cusin, Karleyton C. Evans, Lawrence H. Price, Karen Jacobs, Mayur Pandya, Timothey Denko, Audrey R. Tyrka, Tim Brelje, Thilo Deckersbach, Cynthia Kubu, and Donald A. Malone Jr. (doi: 10.1016/j.biopsych.2014.11.023). The article appears in *Biological Psychiatry*, Volume 78, Issue 4 (August 15, 2015), published by Elsevier.

Notes for editors
Full text of the article is available to credentialed journalists upon request; contact Rhiannon Bugno at +1 214 648 0880 or Biol.Psych@utsouthwestern.edu. Journalists wishing to interview the authors may contact Darin Dougherty at +1 617 724 6300 or ddougherty@partners.org.

The authors' affiliations, and disclosures of financial and conflicts of interests are available in the article.

John H. Krystal, M.D., is Chairman of the Department of Psychiatry at the Yale University School of Medicine, Chief of Psychiatry at Yale-New Haven Hospital, and a research psychiatrist at the VA Connecticut Healthcare System. His disclosures of financial and conflicts of interests are available here.

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The journal publishes novel results of original research which represent an important new lead or significant impact on the field, particularly those addressing genetic and environmental risk factors, neural circuitry and neurochemistry, and important new therapeutic approaches. Reviews and commentaries that focus on topics of current research and interest are also encouraged.

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Media Contact
Rhiannon Bugno
Editorial Office
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