



UCLA Researchers Check Brain Waves to Predict Effectiveness of Antidepressants

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A new UCLA Neuropsychiatric Institute study shows for the first time that measurable changes in the front of the brain can predict the effectiveness of an antidepressant within days of treatment — weeks before a patient begins to feel better.

Using quantitative EEG, a non-invasive computerized measurement of brain wave patterns, the researchers discovered that specific changes in brain-wave activity precede clinical changes brought on by medication. The new findings, published in the July edition of the peer-reviewed journal *Neuropsychopharmacology*, could lead to treatment programs that help depression patients feel better faster by cutting evaluation periods from weeks to days. The findings also could aid in the development of new medications.

"Up to 40 percent of depressed patients do not respond to the first medication they try. Since it takes several weeks for an effective treatment to produce clear improvement, doctors often wait six to 12 weeks to decide that a particular medication just isn't right for that patient and move on to another treatment," said Dr. Ian A. Cook, a researcher at the institute's Quantitative EEG Laboratory and lead author of the study.

"By comparing EEG measurements before treatment with those soon after treatment begins, doctors may be able to evaluate the usefulness of an antidepressant within days rather than having to wait weeks to months," Cook said. "This technique also could slash the time and costs needed to develop and research new antidepressants."

The study examined 51 adult patients diagnosed with acute depression. Each participated in one of two, double-blind, randomized treatment trials. One group received the antidepressant fluoxetine or placebo. The other received the antidepressant venlafaxine or placebo. (A placebo is an inactive substance, such as a sugar pill.) Each subject received a quantitative EEG prior to treatment, 48 hours after treatment and one week after treatment.

Thirteen of 25 subjects responded to medication, or 52 percent. Ten of 26 subjects responded to placebo, or 38 percent. Subjects who responded to medication uniquely showed significant decreases in cordance, a measure of brain-wave activity, at 48 hours and one week. Clinical changes did not begin to emerge until after four weeks. Subjects with the greatest changes in cordance had the most complete response to the medication after eight weeks.

"Other researchers have compared brain scans of depressed people before and after treatment and found differences between those who recovered and those who did not respond. Those findings, however, do not allow prediction of whether a particular patient is likely to get well," said Cook, who also is an assistant professor in the Department of Psychiatry and Biobehavioral Sciences at the David Geffen School of Medicine at UCLA. "This is the first study to detect specific changes in brain wave activity that precede the clinical changes in a way that can usefully predict response."

Cook's group is continuing this work to determine whether this same pattern holds for other antidepressant medications. They are also working to simplify

the EEG method to make it easier for doctors to use this approach in patient care.

EEG measurements are performed by placing recording electrodes on the scalp. The electrodes connect to the body through conductive paste or gel, which is easily rinsed from a person's hair after the test is complete. It does not hurt and involves no radioactivity. The electrodes are connected to a computer, which measures the signals coming from the brain and processes them into colorful patterns.

The study was conducted with funding from the National Alliance for Research in Schizophrenia and Depression, the National Institute of Mental Health, Eli Lilly Co. Inc. and Wyeth-Ayerst Laboratories Inc.

Other UCLA investigators involved in the study include Dr. Andrew F. Leuchter, Melinda Morgan, Elise Witte, Dr. William F. Stubbeman, Michelle Abrams, Susan Rosenberg and Sebastian H.J. Uijtdehaage, all from the UCLA Neuropsychiatric Institute's Quantitative EEG laboratory.

The UCLA Neuropsychiatric Institute is an interdisciplinary research and education institute devoted to the understanding of complex human behavior, including the genetic, biological, behavioral and sociocultural underpinnings of normal behavior, and the causes and consequences of neuropsychiatric disorders. In addition to conducting fundamental research, the institute faculty seeks to develop effective treatments for neurological and psychiatric disorders, improve access to mental health services, and shape national health policy regarding neuropsychiatric disorders.

Neuropsychopharmacology is published by the American College of Neuropsychopharmacology.

Online resources

UCLA Neuropsychiatric Institute: www.npi.ucla.edu/

Quantitative EEG Laboratory: www.qeeg.npi.ucla.edu

Depression Research Projects at UCLA: www.depression.ucla.edu

American College of Neuropsychopharmacology: www.acnp.org/

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