Researchers develop biomarker for rapid relief of major depression

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(PhysOrg.com) -- It is a long, slow slog to treat major depression. Many antidepressant medications are available, but no single biomarker or diagnostic test exists to predict which one is right for an individual. As a result, for more than half of all patients, the first drug prescribed doesn't work, and it can take months to figure out what does.

Now, based on the final results of a nationwide study led by UCLA, clinicians may be able to accurately predict within a week whether a particular drug will be effective by using a non-invasive test that takes less than 15 minutes to administer. The test will allow physicians to quickly switch patients to a more effective treatment, if necessary.

The study, called the Biomarkers for Rapid Identification of Treatment Effectiveness in Major Depression, or BRITE-MD, measured changes in brain-wave patterns using quantitative electroencephalography (QEEG), a non-invasive, computerized measurement that recognizes specific alterations in brain-wave activity. These changes precede improvement in mood by many weeks and appear to serve as a biomarker that accurately predicts how effective a given medication will be. The study results appear in two articles published in the September issue of the journal *Psychiatry Research*.

Nine sites around the country collaborated on the study, which enrolled a total of 375 people who had been diagnosed with major depressive disorder (MDD). Each individual was given a baseline QEEG at the beginning of the trial and then prescribed the antidepressant

escitalopram, commonly known as Lexapro, one of a class of drugs known as selective serotonin re-uptake inhibitors that are commonly prescribed for depression. After one week, a second QEEG was taken. The researchers examined a biomarker called the antidepressant treatment response (ATR) index — a specific change in brain-wave patterns from the baseline QEEG.

Subjects were then randomly assigned to continue with escitalopram or were given a different drug. A total of 73 patients who remained on escitalopram were tracked for 49 days to see if their results matched the prediction of the ATR biomarker. The ATR predicted both response and remission with an accuracy rate of 74 percent, much higher than any other method available. The researchers also found that they could predict whether subjects were more likely to respond to a different antidepressant, bupropion, also known as Wellbutrin XL.

"Until now, other than waiting, there has been no reliable method for predicting whether a medication would lead to a good response or remission," said Dr. Andrew Leuchter, professor of psychiatry at the Semel Institute for Neuroscience and Human Behavior at UCLA and lead author of the study. "And that wait can be as long as 14 weeks. So these are very exciting findings for the patient suffering from depression. The BRITE results are a milestone in our efforts to develop clinically useful biomarkers for predicting treatment response in MDD."

Major depressive disorder is a leading cause of disability, costing society in excess of $80 billion annually; approximately two-thirds of these costs reflect the enormous disability associated with the disorder. An estimated 15 million people in the United States experience a depressive episode each year, and nearly 17 percent of adults will experience major depression in their lifetime.

"BRITE study results suggest that the ATR biomarker could potentially

provide the greatest clinical benefit for those patients who might be receiving a medication that is unlikely to help them," Leuchter said. "Our results suggest that it may be possible to switch these patients to a more effective treatment quickly. This would help patients and their physicians avoid the frustration, risk and expense of long and ineffective medication trials."

Leuchter noted that research has shown that depression patients who do not get better with a first treatment experience prolonged suffering, are more likely to abandon treatment altogether and may become more resistant to treatment over time.

"So the benefits to the individual and to society are enormous," he said.

An added benefit of the biomarker test, according to Leuchter, is that it is non-invasive, painless and fast — about 15 minutes — and only involves the placement of six electrodes around the forehead and on the earlobes.

Source: University of California - Los Angeles