AI may help guide patients to most effective antidepressant

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Choosing the right antidepressant for someone who is depressed can be

hit or miss. But a new study shows that artificial intelligence (AI) technology may be able to help.

Researchers input information from electrical signals in the brain into a computer program that learns as it goes. Based on brain activity, the AI technology helped predict whether or not an antidepressant will help treat a particular person's depression.

So far, the new technology has only been tested on one type of antidepressant—sertraline (Zoloft). But the researchers think it will be useful for other antidepressants. They also hope it can predict how well other types of depression treatments might work, such as transcranial magnetic stimulation.

"Right now in psychiatry, when we see a patient with depression, we have very little idea of what the most effective treatment will be. Then we start treatment in a trial-and-error fashion, which can lead to a lot of frustration," explained senior study author Dr. Amit Etkin, a psychiatry professor at Stanford University in California. He's currently on leave from Stanford to work on developing this technology as CEO of a company called Alto Neuroscience.

"It's not that antidepressants don't work well. Some work extremely well. An objective test could help bridge the gap in knowing which treatments are effective and for whom they will be effective," Etkin said.

While depression is generally considered a single disease, health professionals are increasingly recognizing that there are different types of depression. And, much like a drug that treats one type of breast cancer doesn't work well on another, Etkin said that people "shouldn't think of antidepressants as one-size-fits-all."

The new technology uses a readily available, low-cost test called the

electroencephalogram (EEG). During an EEG, electrodes are placed all over the head. Those electrodes measure electrical activity in the brain. For the patient, it's similar to having the electrical activity of the heart measured with an electrocardiogram (EKG).

The researchers said that over the past two decades, research has suggested that an EEG can be used to predict differences in depression. They combined the EEG findings with a sophisticated computer program that learns how each type of depression responds to a particular medication.

The current study included more than 300 patients with depression. They were randomly selected to receive either sertraline or a placebo. All of the participants had an EEG before starting the drug or placebo.

Etkin said the "AI tool was quite effective" at predicting which patients would do well on the medications.

He said the next steps from here are to see how the AI tool does with other antidepressants and with other types of depression treatments.

Etkin added that having an objective medical test may help destigmatize depression.

The findings were published Feb. 10 in the journal *Nature Biotechnology*.

Dr. Shawna Newman is director of child and adolescent psychiatry at Lenox Hill Hospital in New York City, and was not part of the research. "The goal of the study is to illustrate a 'biology-based' and objective approach to treatment for an illness that affects millions of people the world over," she said.

"The ability to direct treatment of depression in a consistent and

effective manner with predictable outcomes could profoundly change not only the trajectory of an illness, but also potentially alter the perception we have of the illness itself," Newman noted.

Psychiatrist Dr. Scott Krakower, from Zucker Hillside Hospital in Glen Oaks, N.Y., also reviewed the study. "While there are limitations to the current study, what is clear is that this is a one more step toward integrating biotechnology into the field of psychiatry," he said.

Krakower said patients with depression often have to try multiple treatments before they have any relief from their depression. "An EEG is a simple and relatively cost-efficient strategy that could prove to be highly beneficial in the long run," he said.

More information: Learn more about the types of antidepressants from the Mayo Clinic.

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