

Artificial intelligence helps predict whether antidepressants will work in patients

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In patients with major depression disorder, it is now possible to predict within a week whether an antidepressant will work thanks to the use of artificial intelligence (AI). With the help of an AI algorithm, a brain scan and an individual's clinical information, researchers from Amsterdam UMC and Radboudumc could see up to 8 weeks faster whether or not the medication would work. The results of this study are published today in the *American Journal of Psychiatry*.

"This is important news for patients. Normally, it takes 6 to 8 weeks before it is known whether an antidepressant will work," says Professor of Neuroradiology at Amsterdam UMC, Liesbeth Reneman.

The research team analyzed whether they could predict the effect of the antidepressant sertraline, one of the most commonly prescribed drugs in the United States and Europe. In a previous study conducted in the United States, MRI scans and clinical data were administered to 229 patients with [major depression](#) before and after a week of treatment with sertraline or placebo. The Amsterdam researchers then developed and applied an algorithm to this data to investigate whether they could predict the treatment response to sertraline.

This analysis showed that 1/3 of patients would respond to the drug and in 2/3 not. "With this method, we can already prevent 2/3 of the number of 'erroneous' prescriptions of sertraline and thus offer better quality of care for the patient. Because the drug also has side effects," says Reneman.

The right drug, much faster

"The algorithm suggested that [blood flow](#) in the [anterior cingulate cortex](#), the area of brain involved in emotion regulation, would be predictive of the efficacy of the drug. And at the second measurement, a week after the start, the severity of their symptoms turned out to be additionally predictive" says Eric Ruhé, psychiatrist at Radboudumc.

In the future, this new method may help to better tailor [sertraline](#) treatment to the individual patient. Currently, there is no exact prediction tool. The patient is given the medication and after 6 to 8 weeks—in practice often up to several months—it is checked whether the medication works.

If the symptoms do not subside, the patient is given another antidepressant, and this process can repeat itself several times. This standard method often takes weeks, if not months. It also saves society costs, because as long as the patient continues to suffer from serious depressive symptoms, he or she cannot fully participate in society.

In one in three [depressed patients](#), there is still no improvement in the symptoms after several treatment steps. Therefore, there is an urgent need for a solution that allows a faster determination of the effectiveness of antidepressants in severe depression. In the coming period, the researchers will improve the algorithm by adding extra information.

More information: Treatment Response Prediction in Major Depressive Disorder Using Multimodal MRI and Clinical Data: Secondary Analysis of a Randomized Clinical Trial, *American Journal of Psychiatry* (2024).

Provided by Amsterdam University Medical Center

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