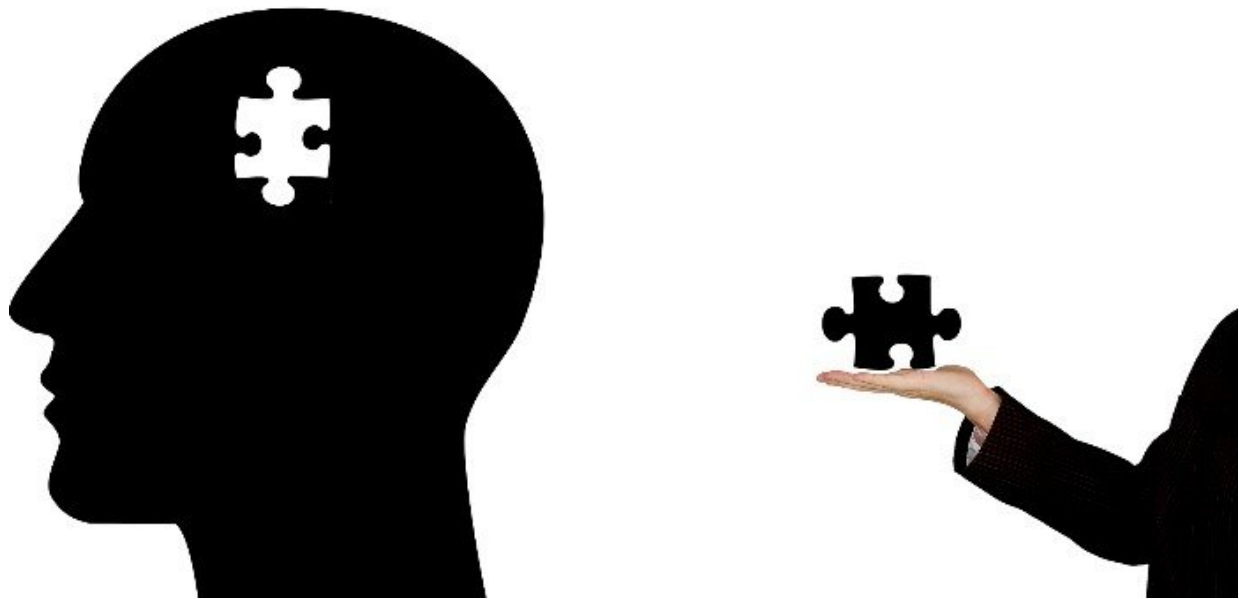# Getting the right treatment: Predicting treatment response in depression

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Antidepressants are not a one-size-fits-all pill. Credit: Tumisu, Pixabay

New evidence from mice suggests why an antidepressant treatment can alleviate depression in one person but not another. The study, publishing December 28 in the open access journal *PLOS Biology*, was led by Marianne Müller and an international team at the University Medical Center Mainz and the Max Planck Institute of Psychiatry. The researchers developed a mouse model that allowed them to identify

blood signatures associated with response to antidepressant treatment and could show the importance of the stress-related glucocorticoid receptor in recovery from depression.

Major depression is the leading cause of disability according to the World Health Organization, affecting an estimated 350 million people worldwide, but only one-third of patients bene?t from the ?rst antidepressant prescribed. Although the currently available treatments are safe, there is significant variability in the outcome of antidepressant treatment. So far there are no clinical assessments that can predict with a high degree of certainty whether a particular patient will respond to a particular antidepressant. Finding the most effective antidepressant medication for each patient depends on trial and error, underlining the urgent need to establish conceptually novel strategies for the identification of biomarkers associated with a positive response.

To tackle this challenge, scientists established a novel experimental approach in animals focusing on extreme phenotypes in response to antidepressant treatment. This model simulated the clinical situation, by identifying good and poor responders to antidepressant treatment. The researchers hypothesized that conditions in the mouse model would facilitate the identification of valid peripheral biomarkers for antidepressant treatment response and could potentially apply to humans.

"We were able to identify a cluster of antidepressant response-associated genes in the mouse model that we then validated in a cohort of depressed patients from our collaborators from Emory University, Atlanta", explains Tania Carrillo-Roa from the Max Planck Institute of Psychiatry. This suggests that molecular signatures associated with antidepressant response in the mouse could in fact predict the outcome of antidepressant treatment in the patient cohort. Additional analyses indicated that the glucocorticoid receptor, which is one of the most important players in fine-tuning the stress hormone system, shapes the

response to antidepressant treatment.

Ultimately, identification of biomarkers predictive of individual responses to treatment would dramatically improve the quality of care/treatment for depressed patients by taking the trial and error out of prescribing antidepressants. In the future, this cross-species approach might serve as a template for the discovery of improved and tailored treatment for patients who suffer from depression.