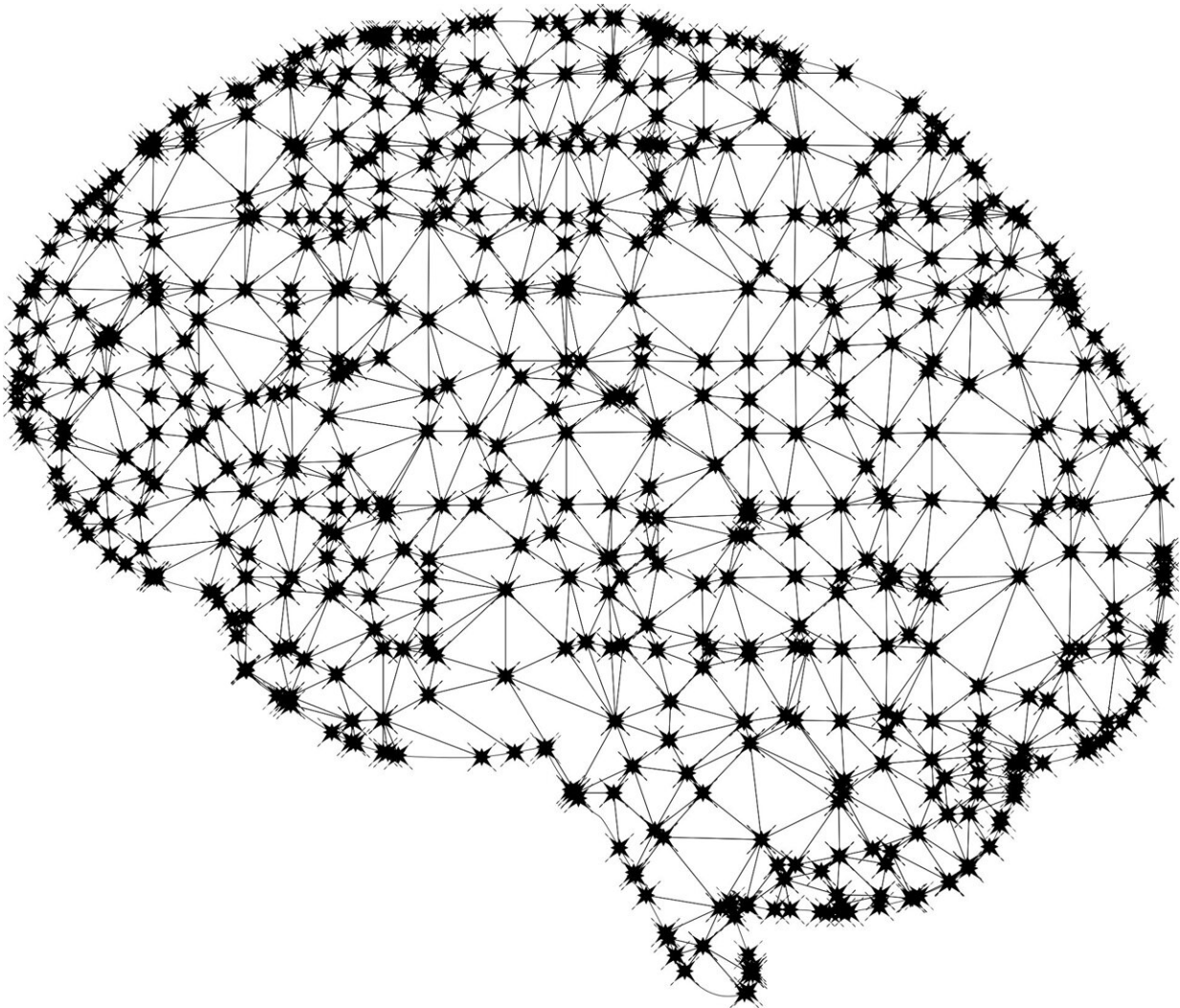


Researchers use AI, biomarkers to personalize rheumatoid arthritis treatment

December 17 2021, by Emily Blahnik



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Treatment options for rheumatoid arthritis have often relied on trial and error. Now Mayo Clinic researchers are exploring the use of artificial intelligence (AI) and pharmacogenomics to predict how patients will respond to treatments, and to personalize care. Findings were published in *Arthritis Care & Research*.

The study focused on predicting the response to methotrexate, one of the most common [rheumatoid arthritis](#) medications. Applying patient data that included genomic, clinical and demographic information, researchers used AI to determine an initial response to methotrexate in patients with early-stage rheumatoid arthritis. Data used in the study came from a collaboration between Mayo Clinic and the Pharmacogenetics of Methotrexate in Rheumatoid Arthritis (PAMERA) consortium, that led to early genome-wide association studies.

This work evolved from the union of AI and pharmacogenomics co-led by Liewei Wang; M.D., Ph.D., Arjun Athreya, Ph.D. and Richard Weinshilboum, M.D. "This approach began by developing tools to predict drug treatment outcomes in [major depressive disorder](#), but we are delighted to see that it can potentially be applied widely, in this case to the drug therapy of rheumatoid arthritis," says pharmacogenomics leaders Drs. Wang and Weinshilboum.

"In my everyday practice, patients frequently ask, 'What medication will be most effective for me' or 'What is the chance this medication will help?' This is a study that seeks to address these questions," says Elena Myasoedova, M.D., Ph.D., a Mayo Clinic rheumatologist and lead author. By predicting a response to methotrexate, researchers identified which patients are most likely to benefit from this medication in the first three months of treatment.

More research is needed to understand how these findings can be used in practice. The study, which is part of a series looking at the roles of AI

and pharmacogenomics in treating rheumatoid arthritis, was performed in collaboration with Mayo Clinic's Center for Individualized Medicine.

"Predicting a response to rheumatoid arthritis medication can be challenging, but this approach is very promising and is an exciting development in treating the disease," Dr. Myasoedova says.

More information: Elena Myasoedova et al, Towards Individualized Prediction of Response to Methotrexate in Early Rheumatoid Arthritis: a Pharmacogenomics-driven Machine Learning Approach, *Arthritis Care & Research* (2021). [DOI: 10.1002/acr.24834](https://doi.org/10.1002/acr.24834)

Provided by Mayo Clinic

Citation: Researchers use AI, biomarkers to personalize rheumatoid arthritis treatment (2021, December 17) retrieved 20 February 2023 from <https://medicalxpress.com/news/2021-12-ai-biomarkers-personalize-rheumatoid-arthritis.html>

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