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Personalized treatment for chronic pain closer to reality

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Researchers at the Yale School of Medicine and the VA Connecticut Healthcare System have successfully tailored a personalized treatment approach for chronic pain in a severe pain syndrome known as inherited erythromelalgia.

Inherited erythromelalgia occurs when genetic mutations cause the body's pain-sensing system to go into high gear, leading to flare-ups of pain and burning sensations in response to seemingly benign triggers, such as warm temperature and mild exercise.

The researchers applied molecular modeling and multi-electrode array technology to find the most effective drug treatment plan for two patients, guided by the exact location of the mutation in each patient's genome. The researchers then conducted a double-blind, placebo-controlled study in which they assessed the effect of a placebo or the drug carbamazepine on the patients' pain perception and neural activity.

The findings of the study appear in the April 18 issue of *JAMA Neurology*.

"While these results apply in the strictest sense only to the small number of patients carrying the S241T inherited erythromelalgia mutation, they demonstrate very clearly that it is possible to use genomics and molecular modeling to guide pain treatment," said senior author Stephen Waxman, the Bridget Marie Flaherty Professor of Neurology and professor of neurobiology and of pharmacology at Yale.

"It was fascinating to see that reduction in pain, following treatment with carbamazepine, was paralleled by a shift in brain activity from areas involved in emotional processing to areas encoding accurate sensation," said lead co-author Paul Geha, assistant professor of psychiatry at Yale.

Chronic pain affects an estimated 100 million people in the United States. Current treatments often involve a long and frustrating trial-and-error approach with drugs, including prescription opioids that carry the risk of abuse and addiction.

"I am hopeful that, some years from now, pain treatment will be

transformed from trial-and-error to a precision medicine, first-time-around approach guided by the DNA of each individual patient," Waxman said.

Provided by Yale University

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