MedicalXpress

Biomedical engineer looks at new applications for novel lupus drug

July 24 2014

Expanding on his work with a new drug that successfully treated lupus in mice, a biomedical engineer at the University of Houston has received a $250,000 grant to expand his research to a new version of the drug in an effort to treat a wider range of autoimmune diseases.

Chandra Mohan, Hugh Roy and Lillie Cranz Cullen Endowed Professor of biomedical Engineering at UH, previously published a study in *Arthritis Research & Therapy* outlining the use of a new drug that successfully treated lupus in mice and reduced the number of cases of lupus-related kidney disease.

He now has received a $250,000, two-year grant from Pharmacyclics, a biopharmaceutical company, to expand the research to a new version of the drug, using mice with several other autoimmune diseases.

The drug that Mohan and his Pharmacyclics collaborators are focused on targets B cells, key cells in the immune system that lead to the development of lupus. Lupus is an autoimmune disease that develops when a patient's immune B cells begin producing antibodies which mistakenly attack the body's own cells. Although why this happens remains a mystery, Mohan believes that by targeting and silencing these B cells, we may be able to stop or significantly delay the development of lupus in patients who have the disease.

And judging by the results of Mohan's first attempt to study this drug in mouse models, there's good reason to believe he might be on to

something. "We found that this drug worked as an inhibitor to a key signaling molecule within B cells," he said. "In mouse models of lupus, we found it to be very effective – the mice had less antibodies and less kidney disease."

But misbehaving B cells aren't responsible only for the development of lupus; B cells have been shown to play a role in nearly all autoimmune diseases, from rheumatoid arthritis to celiac disease. Based on the encouraging results from Mohan's first attempt to study this drug in mice models, Mohan said he and his Pharmacyclics collaborators will now expand the research to look at whether the drug can be used as an effective treatment for other systemic autoimmune diseases.

Many patients suffering from autoimmune diseases are treated with steroids, a class of immunosuppressive drugs that delay the development and progression of autoimmune diseases by suppressing the patient's immune system. However, suppressing the immune system increases a patient's risk for infections and other side effects.

In the past 50 years, only one drug has been approved for the treatment of lupus. Mohan said the fact that the new drug he is researching targets B cells selectively is an exciting step forward in the treatment of lupus.

"The idea is that the more selective the drug is in targeting the causes of lupus, the fewer side effects there will be," he said.

Although the drug primarily targets B cells, that does not necessarily mean that the drug doesn't suppress the immune system. If Mohan and his collaborators find that the drug is effective in mouse models of various autoimmune diseases, the next step will be to test whether, and how much, it suppresses the immune system.

The hope, Mohan said, is that even if this new drug is found to be

immunosuppressive, it may carry fewer side effects than steroids, and therefore could be an alternative for lupus patients.

Mohan said he remains cautiously optimistic about what the future holds for the treatment of lupus and other autoimmune diseases, explaining that his research is "only the tip of the iceberg" in terms of introducing new targeted therapies for the treatment of these diseases.

"One of the things that is happening in the study of autoimmune diseases is the concerted effort to subset patients into different groups, as there are many different kinds of lupus," said Mohan, who works in UH's Cullen College of Engineering. "The idea is that if we can subset lupus patients according to the specific phenotypes they manifest or the specific molecules they possess, we can target therapeutics to that particular pathway."

"In the next five years, there will be a much richer database of molecular information, and hopefully there will be 10, 20, even 30 different targets for therapeutics so treatments can be tailored to each patient," he said.

Provided by University of Houston