

# Study shows marijuana's potential for treating autoimmune disorders

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A new study from researchers at the University of South Carolina provides evidence that THC (tetrahydrocannabinol), a principal ingredient in marijuana, may be beneficial in treating those with autoimmune disorders.

The study, published in the *Journal of Biological Chemistry*, is the first to explore how tiny, yet powerful molecules called microRNAs are influenced by THC. MicroRNAs are a recently discovered class of non-coding RNAs that play a pivotal role in the regulation of [gene expression](#). The ability to alter microRNA expression could hold the key to successful treatments for a whole host of autoimmune diseases, including arthritis, multiple sclerosis and type 1 diabetes.

The study was performed by researchers from USC's School of Medicine by injecting laboratory mice with THC and analyzing 609 microRNAs. The researchers identified 13 unique microRNAs that were highly altered by THC.

MicroRNAs have profound effects on the immune system, acting as 'brakes' that target more than 60 percent of all gene expression. Since microRNAs normally suppress the expression of genes, when a microRNA is overexpressed, the affected gene gets silenced. But when microRNA is turned off, the affected gene is expressed at an elevated level.

The authors also studied how a specific microRNA—miRNA-690—that

was highly overexpressed in response to THC functionally targets an important protein called C/EBP $\alpha$ . This molecule in turn triggers unique cells known as MDSC that suppress inflammation. When the researchers successfully knocked down miRNA-690, the effect of THC was reversed.

Lead authors Drs. Prakash and Mitzi Nagarkatti have studied how [marijuana](#) can alter immune functions and inflammation for over a decade. They were the first to show that marijuana components trigger MDSC to suppress inflammation. The current study performed by Dr.

Venkatesh Hegde along with others from their team suggested that marijuana can act as a double-edged sword—on one hand suppressing inflammation and thereby increasing susceptibility to certain diseases, while on the other serving as effective treatment modalities against inflammatory and [autoimmune diseases](#).

Dr. Mitzi Nagarkatti, chair of the Department of Pathology, Microbiology and Immunology at USC's School of Medicine, said the latest study demonstrates that understanding how to control microRNA expression holds tremendous potential for new medical breakthroughs.

"MicroRNA therapeutics is an important, rapidly growing area with major pharmaceutical companies getting into this discovery and development," Nagarkatti said. "While our study identifies the molecular mechanism of immune-altering effects of marijuana, select microRNA identified here could serve as important molecular targets to manipulate MDSC activity in cancer and inflammatory diseases."

Provided by University of South Carolina

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