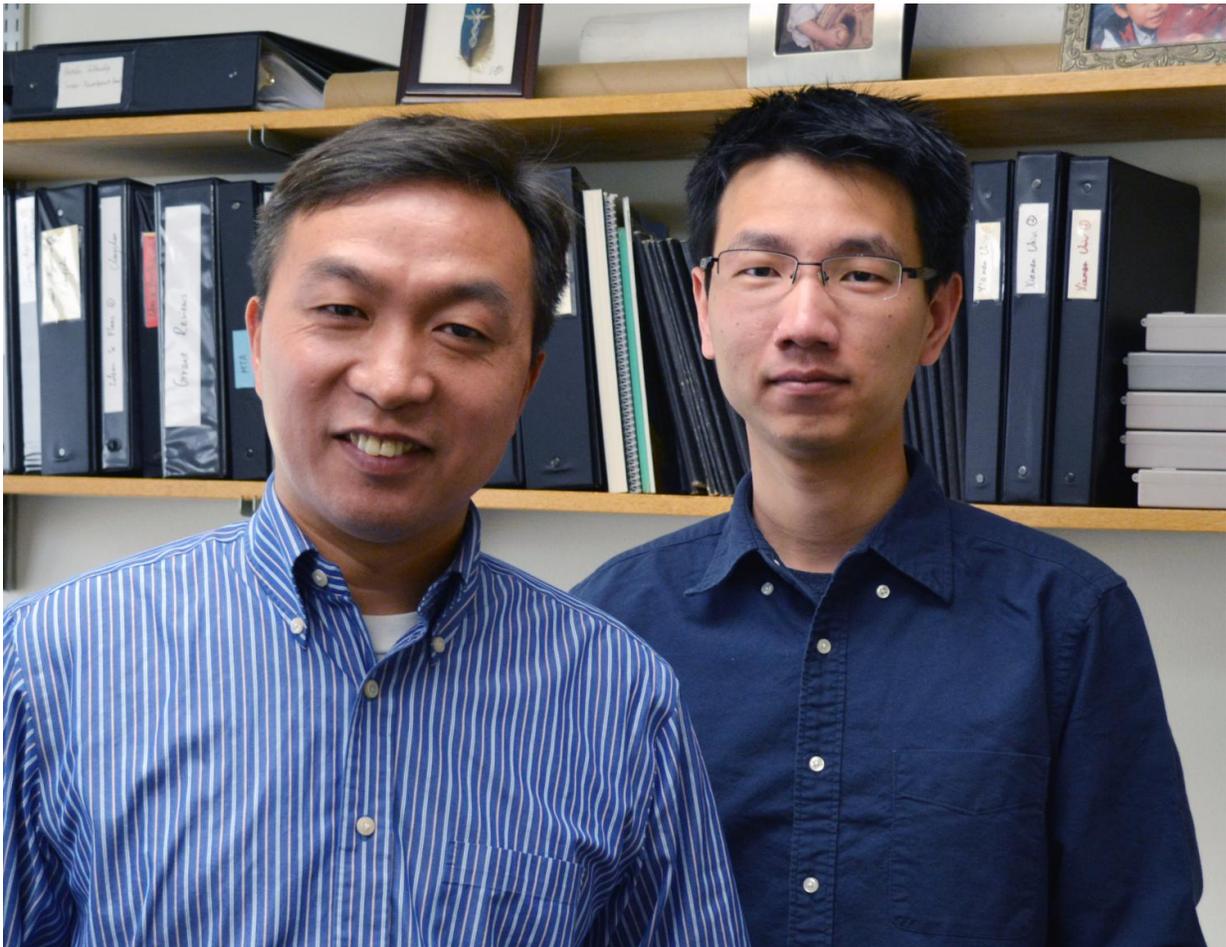


A potential new way to sway the immune system found

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Associate Professor Chanchun Xiao (left) and Research Associate Zhe Huang of The Scripps Research Institute were key authors of the new study. Credit: Photo courtesy of The Scripps Research Institute.

August 1, 2016 - A new international collaboration involving scientists at The Scripps Research Institute (TSRI) opens a door to influencing the immune system, which would be useful to boost the effectiveness of vaccines or to counter autoimmune diseases such as lupus and rheumatoid arthritis.

The research, published August 1, 2016, in *The Journal of Experimental Medicine*, focused on a molecule called microRNA-155 (miR-155), a key player in the immune system's production of disease-fighting antibodies.

"It's very exciting to see exactly how this molecule works in the body," said TSRI Associate Professor Changchun Xiao, who co-led the study with Professor Wen-Hsien Liu of Xiamen University in Fujian province, China.

An Immune System Tango

Our cells rely on molecules called microRNAs (miRNAs) as a sort of "dimmer switches" to carefully regulate protein levels and combat disease.

"People know miRNAs are involved in [immune response](#), but they don't know which miRNAs and how exactly," explained TSRI Research Associate Zhe Huang, study co-first author with Liu and Seung Goo Kang of TSRI and Kangwon National University.

In the new study, the researchers focused on the roles of miRNAs during the critical period when the [immune system](#) first detects "invaders" such as viruses or bacteria. At this time, cells called T follicular helpers proliferate and migrate to a different area of the lymph organs to interact with B cells.

"They do a sort of tango," said Xiao.

This interaction prompts B cells to mature and produce effective antibodies, eventually offering long-term protection against infection.

"The next time you encounter that virus, for example, the body can respond quickly," said Xiao.

Identifying a Dancer

Using a technique called deep sequencing, the team identified miR-155 as a potential part of this process. Studies in mouse models suggested that miR-155 works by repressing a protein called Peli1. This leaves a molecule called c-Rel free to jump in and promote normal T [cell proliferation](#).

This finding could help scientists improve current vaccines. While vaccines are life-saving, some vaccines wear off after a decade or only cover around 80 percent of those vaccinated.

"If you could increase T cell proliferation using a molecule that mimics miR-155, maybe you could boost that to 90 to 95 percent," said Xiao. He also sees potential for using miR-155 to help in creating longer-lasting vaccines.

The research may also apply to treating [autoimmune diseases](#), which occur when antibodies mistakenly attack the body's own tissues. Xiao and his colleagues think an mRNA inhibitor could dial back miR-155's response when T cell proliferation and antibody production is in overdrive.

For the next stage of this research, Xiao plans to collaborate with scientists on the Florida campus of TSRI to test possible miRNA

inhibitors against autoimmune disease.

More information: Wen-Hsien Liu et al, A miR-155–Peli1–c-Rel pathway controls the generation and function of T follicular helper cells, *The Journal of Experimental Medicine* (2016). [DOI: 10.1084/jem.20160204](https://doi.org/10.1084/jem.20160204)

Provided by The Scripps Research Institute

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