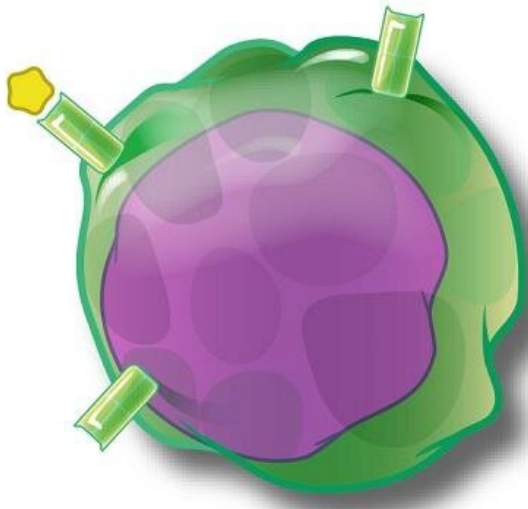


Researchers identify important factors for regulating the body's immune response

29 June 2022, by Christina Griffiths



An artist's depiction of a T cell. Credit: NIAID

Researchers at Indiana University School of Medicine are learning more about how special regulatory T cells can impact the immune system's response and how those cells could be manipulated for potential treatments for food allergies and autoimmune diseases.

In a study recently published in *Science Immunology*, researchers focused on regulatory T cells, or Treg cells, that regulate immune responses in the body and keep the immune system in order while fighting pathogens. In some cases, the immune system becomes overly responsive, leading to [autoimmune diseases](#), such as Type 1 diabetes or lupus, food allergies or other issues. Researchers were able to identify the differences in [isoforms](#) that control Treg cells and how that affects the body's immune function.

"There is a particular gene that controls this regulatory group of T cells, which controls immune response," said Baohua Zhou, Ph.D., lead author of the study and associate professor of pediatrics

for IU School of Medicine Department of Pediatrics. "Treg cells can help maintain the right balance to help the immune system not respond too strongly or too weakly."

The human gene FOXP3 produces two major isoforms through alternative splicing—a longer isoform and a shorter isoform. The two isoforms are naturally expressed in humans, but their differences in controlling regulatory T cell phenotype and functionality has been unclear. In this study, researchers showed patients expressing only the shorter isoform fail to maintain self-tolerance and develop issues like immunodeficiency, polyendocrinopathy and enteropathy X-linked (IPEX) syndrome. They uncovered different functions of the FOXP3 isoforms to regulate Treg cells and immune homeostasis.

"Now that we know the different functions of the isoforms, we hope to study how to change them, which could lead to new treatments for autoimmune diseases and allergies," Zhou said. "We could also potentially manipulate them to keep the body from responding improperly to diseases like cancer. If Treg cells are suppressing the antitumor response, can we change that?"

More information: Jianguang Du et al, FOXP3 exon 2 controls T reg stability and autoimmunity, *Science Immunology* (2022). [DOI: 10.1126/sciimmunol.abo5407](#)

Provided by Indiana University School of Medicine

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