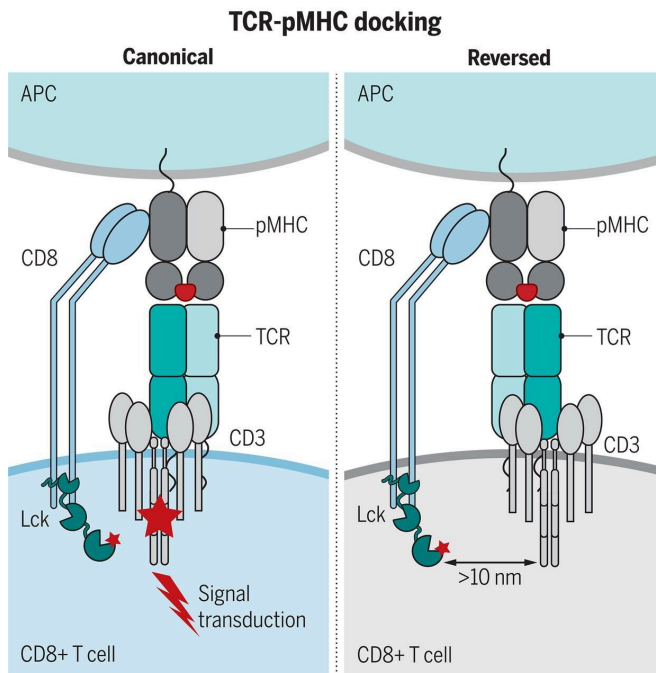


Fundamental advance in understanding T cell immunity

4 June 2021



The canonical polarity of TCR-pMHC docking is essential for colocalization of CD3 and coreceptor-associated Lck and for productive TCR signaling. Schematic shows how canonical TCR-pMHC recognition colocalizes Lck and CD3, driving TCR-mediated signaling. By contrast, a reversed TCR-pMHC recognition polarity mislocalizes Lck and CD3, impeding signaling. Credit: *Science* (2021). DOI: 10.1126/science.abe9124

Monash University researchers have provided a fundamental advance regarding how T cells become activated when encountering pathogens such as viruses.

The recent study, published in *Science*, co-led by Professor Nicole La Gruta, Professor Jamie Rossjohn and Professor Stephanie Gras with first author Dr. Pirooz Zareie from the Monash Biomedicine Discovery Institute, have found that T Cells need to recognize pathogens in a particular

orientation in order to receive a strong activating signal.

T cells play a key role in the immune system by eliminating invading pathogens, such as viruses, and it is crucial to understand the factors that determine how and why T cells become activated after recognizing these pathogens.

T cells express on their surface a T cell receptor (TCR) that recognizes and binds to virus fragments (antigens) presented by infected cells. This recognition event can lead to T cell activation and killing of infected cells.

"The central issue is that there are millions of different T cell receptors (TCRs) in the human body, and a vast array of viruses, making it difficult to understand the rules around how T cell receptor recognition of a virus drives T cell activation. Indeed, it is a problem that has remained contentious for over 25 years," says Professor La Gruta.

"Our study has shown that the orientation in which the T cell receptor binds is a primary factor determining whether the T cell receives an activating signal," Professor La Gruta said.

"This is an advance in our fundamental understanding of how a T cell needs to 'see' pathogenic antigens in order to be activated," she said. "It has clarified a critical mechanism essential for effective T cell immunity. It is also relevant to the ongoing development of immunotherapies that aim to boost the activation of T cells."

Dr. Pirooz Zareie stated: "a combination of technologies, including super-resolution microscopy, X-ray crystallography at the Australian Synchrotron, biochemical assays and using in vitro and in vivo experimental models from a variety of labs led to the findings."

More information: Pirooz Zareie et al, Canonical T cell receptor docking on peptide–MHC is essential for T cell signaling, *Science* (2021). [DOI: 10.1126/science.abe9124](https://doi.org/10.1126/science.abe9124)

Provided by Monash University

APA citation: Fundamental advance in understanding T cell immunity (2021, June 4) retrieved 5 June 2021 from <https://medicalxpress.com/news/2021-06-fundamental-advance-cell-immunity.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.