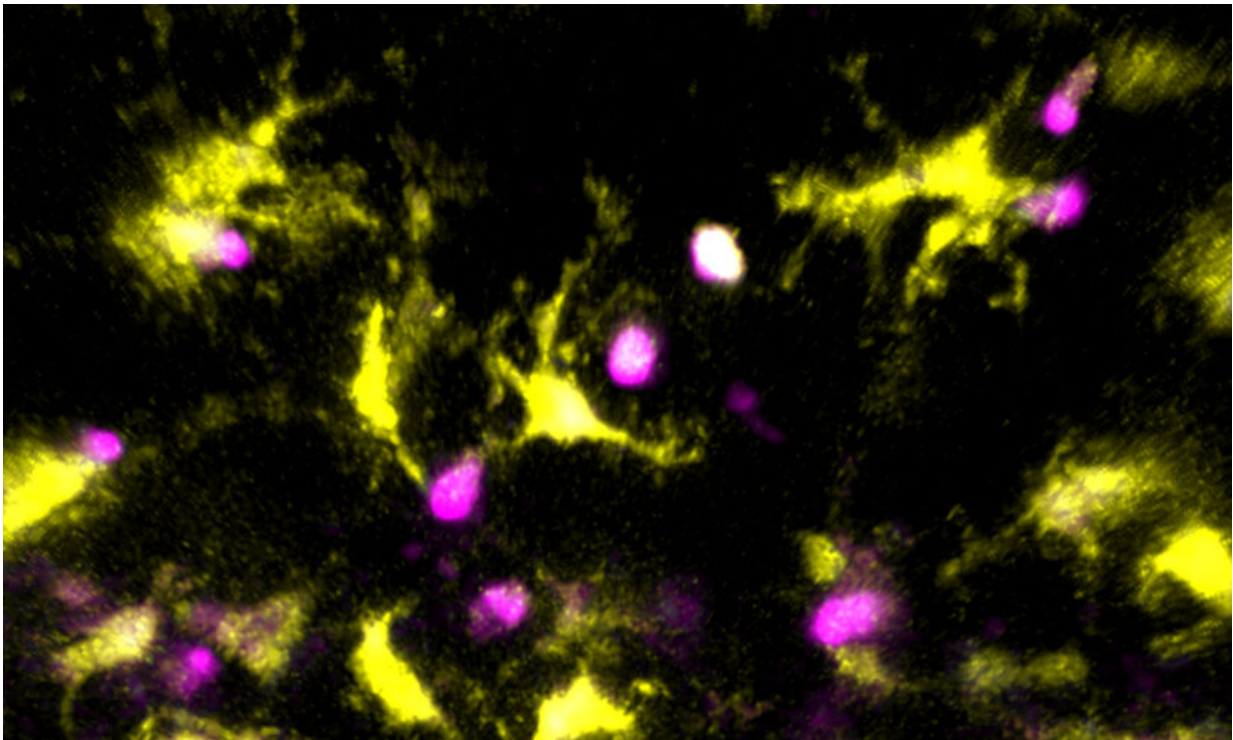


Scientists capture first-ever video of body's safety test for T-cells

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For the first time ever, UT Austin researchers captured the process in which developing killer T-cells (purple and white) are tested by dendritic cells (yellow), and others, to see if they react to normal proteins from the body. This safety check insures that the T-cells don't harm normal cells in the body and cause autoimmune disorders. Credit: University of Texas at Austin

For the first time, immunologists from The University of Texas at

Austin have captured on video what happens when T-cells—the contract killers of the immune system, responsible for wiping out bacteria and viruses—undergo a type of assassin-training program before they get unleashed in the body. A new imaging technique that allowed for the videos, described today in the journal *Nature Communications*, holds promise for the fight against autoimmune disorders such as Type 1 diabetes.

One of the [human body](#)'s most potent weapons against many diseases is the T-cell, but in people with [autoimmune disorders](#), T-cells also wreak havoc by mistaking [normal cells](#) for invaders and attacking healthy parts of the body.

"T-cells have the daunting task of recognizing and fighting off all of the diverse pathogens that we encounter throughout our lives, while avoiding attacking our own healthy tissue," said associate professor Lauren Ehrlich, one of the authors of the study. "These cells mature in the thymus, an organ just above the heart, where they 'get educated' to not attack the body."

Ehrlich and postdoctoral researcher Jessica Lancaster captured video of this educational process in a mouse thymus. Using a pair of powerful lasers that fire in short pulses and scan through a slice of live tissue every 15 seconds to reconstruct the positions, movements and intracellular signaling of cells, they observed that as T-cells develop, other cells in the thymus help them to encounter all sorts of ordinary human proteins that, later on, the T-cells will need to ignore in order to avoid attacking other parts of the body. The researchers learned more about how different types of cells work together in the thymus to perform the safety tests and, in the event a T-cell fails, trigger it to self-destruct.

Ehrlich says studying T-cells with this new imaging technique holds promise for improvements for [human health](#) that will depend on a better

understanding of what's happening in the thymus. For example, patients who received bone-marrow transplants endure weeks or months with suppressed immune systems and a higher risk for developing autoimmune disorders, and people with Type 1 diabetes have T-cells that often attack the cells in the pancreas that produce insulin.

More information: J. N. Lancaster et al, Live-cell imaging reveals the relative contributions of antigen-presenting cell subsets to thymic central tolerance, *Nature Communications* (2019). [DOI: 10.1038/s41467-019-09727-4](https://doi.org/10.1038/s41467-019-09727-4)

Provided by University of Texas at Austin

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