

Discovery could change the way doctors treat patients with cancer and autoimmune diseases

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Researchers in the Faculty of Medicine & Dentistry at the University of Alberta have made an important discovery that provides a new understanding of how our immune system "learns" not to attack our own body, and this could affect the way doctors treat patients with autoimmune diseases and cancer.

When patients undergo chemotherapy for cancer or as part of experimental therapies to treat autoimmune diseases such as diabetes and lupus, the treatment kills the patients' white blood [cells](#). What can be done afterwards, is to give these patients blood stem cells through transplantation. Stem cells are taken from patients then injected back into them – with the theory being that the patients' immune system won't attack their own cells, and the [stem cells](#) can get to work healing their bodies.

But U of A medical researchers Govindarajan Thangavelu, Colin Anderson and their collaborators discovered that if a particular molecule is not working properly in T-cells, the body will attack itself. This is significant for stem-cell transplantation treatment because it means the immune systems of the patients could consider their own cells "foreign" and initiate an attack.

"So your own cells would be killing you," says Thangavelu, a PhD student specializing in immunology, who was the first author in the

research study, which was recently published in the peer-reviewed *Journal of Autoimmunity*. "What we found is if this molecule is absent in T-cells, if the pathway isn't intact, it will cause severe autoimmunity to the subject's own body. In essence, subjects become allergic to their own cells."

Anderson, an associate professor with the Alberta Diabetes Institute and Principal Investigator added: "The ability of our immune system to attack dangerous microbes while not attacking our own cells or tissues is a delicate balance. Restarting the immune system after wiping it out in patients with autoimmune diseases or cancer requires re-establishing this appropriate balance. We discovered that a particular immune system molecule is critical to prevent the immune system from attacking our own cells or tissues when the immune system is restarted. If that molecule is missing, the [immune system](#) will wreak havoc on the body."

T-cells are supposed to protect people and animals from things invading their bodies. But this research demonstrates if these cells become unregulated because they are missing a molecule, it can lead to autoimmunity – particularly dangerous in scenarios where patients have lost white blood cells when they are being treated for [autoimmune diseases](#) or cancer.

Thangavelu has won awards for this research. He was invited to present his work at an international conference of immunology in Japan last year. He has also travelled to the United Kingdom to talk about his findings with the medical community.

Provided by University of Alberta

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