

Researchers closer to understanding how proteins regulate immune system

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Researchers in the biological sciences department in the Faculty of Science at the University of Calgary have revealed how white blood cells move to infection or inflammation in the body; findings which could help lead to developing drug therapies for immune system disorders. The research is published this month in the *Journal of Biological Chemistry*.

It's long been known that two human proteins—L-selectin and calmodulin—are involved in moving white blood cells to the site of inflammation or infection in the body. L-selectin is embedded in the cellular membrane of the white [blood cells](#) and acts like Velcro, tethering the white blood cell to the sticky surface on the wall of the blood vessel.

When the white blood cell reaches a site of infection or inflammation, it 'sheds' the L-selectin protein, which lets it leave the blood stream and enter the damaged tissue. This shedding process is controlled inside of the white blood cell by the protein calmodulin.

"Cell biologists had figured out in 1998 that calmodulin was negatively regulating the shedding process of L-selectin," says Jessica Gifford, a PhD student supervised by Hans Vogel. "They knew calmodulin did it, but they didn't know how."

Using powerful magnets and a technique called nuclear magnetic resonance (NMR) spectroscopy, Gifford and Vogel determined the molecular structure of the interaction between the two proteins,

providing important insight at the molecular level into how calmodulin controls the shedding of L-selectin.

"Understanding the molecular details of these processes will help us understand how our bodies respond to [inflammation](#)," says Gifford, "and if we can understand that, that's the first step of producing drug therapies to manipulate your [immune system](#), to either turn it on, or turn it off."

There is a growing interest in [drug therapies](#) to help regulate the immune system, say Gifford. "So many problems that people have are due to overactive immune systems," she says. "By understanding how your [white blood cells](#) get around, then maybe we can stop them from getting there when they don't need to be."

More information: The paper, entitled "Structural Insights into Calmodulin-Regulated L-Selectin Shedding" is available as a Paper in Press on the *Journal of Biological Chemistry* [website](#).

Provided by University of Calgary

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