

Immune cell death safeguards against autoimmune disease

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Dr Daniel Gray and colleagues have discovered that immune cell death is an important safeguard against autoimmune diseases. Credit: The Walter and Eliza Hall Institute, Australia

Researchers at the Walter and Eliza Hall Institute have discovered that a pair of molecules work together to kill so-called 'self-reactive' immune cells that are programmed to attack the body's own organs. The finding is helping to explain how autoimmune diseases develop.

Dr Daniel Gray and colleagues from the institute's Molecular Genetics of Cancer division and the University of Ballarat discovered that the absence of two related proteins, called Puma and Bim, led to self-reactive [immune cells](#) accumulating and attacking many different body organs, causing illness. The research is published online today in the journal *Immunity*.

[Autoimmune diseases](#), such as type 1 diabetes, [rheumatoid arthritis](#), [inflammatory bowel disease](#) and multiple sclerosis, develop when immune cells launch an attack on the body's own cells, destroying important body organs or structures. Around one in 20 Australians is affected by autoimmune conditions, most of which are [chronic illnesses](#) with no cure.

Puma and Bim are so-called 'BH3-only' proteins that make cells die by a process called apoptosis. Defects in apoptosis proteins have been linked to many human diseases, including cancer and neurodegenerative disorders.

Dr Gray said one way the body protects against autoimmune disease is by forcing most self-reactive immune cells to die during their development. "If any self-reactive cells manage to reach maturity, the body normally has a second safeguard of switching these potentially dangerous cells into an inactive state, preventing them from causing autoimmune disease," he said.

"Until now, there has been debate about how important the death of self-reactive cells is as a protection against autoimmune diseases. Our research has identified two molecules that are needed for this process. We were able to use this discovery to show that the death of self-reactive immune cells is indeed an important protection against autoimmune disease development."

Dr Gray is now collaborating with researchers who have identified human gene defects linked to the development of autoimmune conditions. "We now know that self-reactive cell death is an important protection against autoimmunity," Dr Gray said. "The next stage of our work is to discover whether defects in the cell death process cooperate with other factors to cause human autoimmune disease."

Provided by Walter and Eliza Hall Institute

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