

Surprising role for suppressive cytokine in antiviral immune responses

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(Medical Xpress) -- A molecule normally implicated in restraining immune responses is also capable of stimulating defences against virus infection, according to new research, by promoting the survival of a population of immune cells known as natural killer cells. The finding has important implications for the design of vaccine strategies and immune therapies to combat viral pathogens.

Cytokines are molecules produced by cells of the immune system to orchestrate the inflammatory response. The cytokine IL-10 is generally regarded as having a suppressive effect, largely because it dampens the activity of another population of [immune cells](#) known as T cells that act during the later stages of infection. This is important because excessive T-cell responses can result in damage to healthy tissues.

Natural killer (NK) cells are the body's first line of defence against viruses and are essential for keeping virus-infected cells in check while [T cells](#) prepare to attack. The new study at Cardiff University has found that rather than suppressing the NK cell response, IL-10 has the opposite effect. In a mouse model of acute viral infection, the team showed that IL-10 promotes NK [cell survival](#).

Wellcome Trust Career Development Fellow Dr Ian Humphreys, who led the study, explains: "We were surprised to see that IL-10 had a positive effect on NK cell survival. Our results suggest that IL-10 prevents a suicide mechanism known as activation-induced cell death. Therefore, not only does IL-10 limit bystander damage during [acute](#)

[infections](#), it can actually help the early antiviral NK cell response."

Activation-induced cell death is the process by which cells of the immune system commit suicide if they are activated for too long. It provides a feedback mechanism to prevent the continued expansion of a [cell population](#) and is important for the resolution of an immune response.

When the team blocked the ability of NK cells to respond to IL-10, they found that large numbers of cells committed suicide - even in the presence of other cytokines that are known to promote NK cell proliferation.

"The findings reveal a dimension of the antiviral immune responses that had not previously been appreciated. Cytokines and their inhibitors are increasingly being exploited clinically to manage inflammatory disease. How this fits into the bigger picture is not yet clear, but it implies that manipulating IL-10 may be useful in the treatment of acute viral infections in terms of controlling the virus and limiting infection-induced pathology," added Dr Humphreys.

"We are now investigating the effect that IL-10 has on human NK cell responses to the pathogenic human herpesvirus cytomegalovirus."

The findings are published this week in the *Journal of Immunology*.

More information: Stacey MA et al. IL-10 restricts activation-induced death of NK cells during acute murine cytomegalovirus infection. *J Immunol* 2011;187:2944-52.

Provided by Wellcome Trust

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