Putting a block on inflammation

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Credit: AI-generated image (disclaimer)

Increasing the proportion of an anti inflammatory immune cell subtype can reduce damage to joints in mice infected with Chikungunya virus, research by A*STAR reveals. These findings are significant for the potential treatment of people infected by the virus, and have implications for related conditions.

The Chikungunya virus is transmitted to humans by mosquitoes, and

causes crippling joint pain and fever. The number of people infected by this virus has grown rapidly worldwide over recent years, in both tropical and temperate regions.

When humans are infected by viral pathogens such as Chikungunya, the immune system activates to clear the infection. However, uncontrolled inflammation can result in tissue damage, leading to the painful symptoms experienced by patients. Identifying methods to reduce inflammation could help with the development of new therapies against these pathogens.

Previous studies by Lisa Ng and colleagues from the Singapore Immunology Network had shown that during infection by Chikungunya virus a type of immune cell, called a CD4+ T cells, migrates to the joint and causes injury. However, the researchers also noticed that removal of this subset reduces joint damage which indicates that controlling CD4+ T cells could be a promising approach to treat humans infected with Chikungunya virus.

T regulatory cells (Tregs) are a subset of immune cells that blunt responses of CD4+ T cells. The numbers of Tregs in mice can be increased by treatment with a particular cytokine complexed with an antibody to which it binds. Ng's team used this method to increase the number of Tregs in mice, and then infected them with Chikungunya virus.

Joint injury caused by the virus was found to be less severe in mice which have more Tregs. Further investigation showed that increasing the number of Tregs helped prevent the appearance of CD4+ T cells at the joint. As CD4+ T cells are the ones that cause damage, joint injury is considerably reduced when these cells are absent.

When the researchers repeated this approach in mice without Tregs, this

cytokine-antibody complex was unable to inhibit joint inflammation. This indicates that Tregs plays a key role in the protective effect of the cytokine-antibody complex.

Methods to increase Treg numbers in chikungunya-infected patients could represent novel therapeutic approaches to fight joint inflammation and damage caused by these pathogens.

Chikungunya virus belongs to the arbovirus family of viruses. "Involvement of these same immune pathways that we identified could be relevant for other arboviruses that induce joint inflammation", explains Ng.

More information: Wendy W. L. Lee et al. Expanding Regulatory T Cells Alleviates Chikungunya Virus-Induced Pathology in Mice, *Journal of Virology* (2015). DOI: 10.1128/JVI.00998-15

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