Vaccine blackjack: IL-21 critical to fight against viral infections

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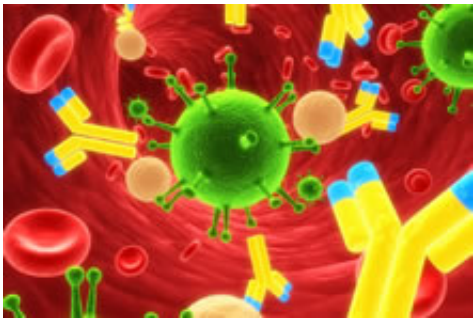

A main objective of vaccination is to make the recipient's immune system develop antibodies that can neutralize infecting viruses.

(Medical Xpress)—Scientists at Emory Vaccine Center have shown that an immune regulatory molecule called IL-21 is needed for long-lasting antibody responses in mice against viral infections.

The results are published in the *Journal of Virology*.

"Our findings highlight how IL-21 could be important in the development of antiviral vaccines," says research associate Ata Ur Rasheed Mohammed, PhD, the first author of the paper. The senior author is Rafi Ahmed, PhD, director of the Emory Vaccine Center and a Georgia Research Alliance Eminent Scholar.

The findings could lead scientists designing future vaccines to

incorporate IL-21 directly or to use the ability to stimulate IL-21 as a gauge of vaccine activity. IL-21 was discovered in 2000. Its effects have also been studied in the area of immune responses against HIV, and it has been in clinical trials for skin cancer and kidney cancer and auto-immune disorders.

A main objective of vaccination is to make the recipient's immune system develop antibodies that can neutralize infecting viruses. Signals from IL-21 appear to be necessary for generating long-lived plasma cells , which reside in the bone marrow and secrete antibodies.

Rasheed and his colleagues probed mice that were unable to respond to IL-21, because the mice were engineered to lack the gene for the IL-21 receptor. They examined the altered mice in the context of three different types of viral infections: LCMV (lymphocytic choriomeningitis virus), VSV (vesicular stomatitis virus), and influenza.

When infected with each of the three viruses separately, the altered mice did start to produce antibodies, but antibody levels faded out over the course of around two months. The mice "exhibited a profound defect in generating long-lived plasma cells and in sustaining antibody levels over time," the authors write.

Rasheed's team demonstrated that IL-21 is playing a role in germinal centers, structures in the lymph nodes and spleen where cells that produce high-affinity antibodies are selected. In the IL-21 receptor deficient mice, germinal centers form but are not sustained. IL-21 signals are important both for the antibody-producing cells and for T helper cells that support them, the researchers showed.

More information: Mohammed, A. et al. IL-21 is a critical cytokine for the generation of virus-specific long-lived plasma cells, *J. Virol* (2013). jvi.asm.org/content/early/2013 … VI.00063-13.abstract