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Ancient gene found to control potent antibody response to retroviruses

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A researcher at MIT's Koch Institute for Integrative Cancer research has identified a gene that controls the process by which antibodies gain their ability to combat retroviruses. Edward Browne shows that the gene TLR7 allows the antibody generating B cells to detect the presence of a retrovirus and promotes a process by which antibodies gain strength and potency, called a germinal center reaction. The findings are published in the Open Access journal *PLoS Pathogens* on October 6th.

TLR7 is a member of an ancient family of genes whose distant ancestors can also be found as far back as insects and worms, but these results show that the immune system has co-opted these genes for a new purpose – the generation of antibodies.

Antibodies are a key feature of our ability to fight off disease causing viruses, but for some viruses such as HIV, this response goes horribly wrong. People infected with HIV generate large amounts of apparently useless antibodies that lack to power to hurt the virus. Why this happens during HIV infection, and how to fix the problem is one of the biggest challenges facing researchers in the HIV field.

During the germinal center reaction, antibodies become mutated and undergo selection to allow the strongest antibodies to dominate. Dr. Browne notes that "these results identify TLR7 as an important gene that could be targeted to improve antibody responses in HIV patients. It's possible that in HIV patients this process could be enhanced or accelerated to speed up the formation of high affinity broadly

neutralizing antibodies".

Provided by Public Library of Science

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