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New study has implications for treating and preventing cancers caused by viruses

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New research from the Trudeau Institute addresses how the human body controls gamma-herpesviruses, a class of viruses thought to cause a variety of cancers. The study, carried out in the laboratory of Dr. Marcia Blackman, awaits publication in The *Journal of Immunology*. Led by postdoctoral fellow Mike Freeman, with assistance from other laboratory colleagues, the study describes the role of white blood cells in controlling gamma-herpesvirus infections and has implications for the treatment and prevention of certain cancers.

One of the many factors that can contribute to the development of cancer is infection with cancer-causing viruses, among them gamma-herpesviruses like the Epstein Barr virus and Kaposi's sarcoma-associated herpesvirus. With more than 95 percent of the human population infected with one or both of these viruses, it is important to understand their infection cycles and how immune responses keep them in check in the majority of individuals.

Gamma-herpesvirus infections are characterized by two distinct phases. In the initial, active phase, the immune system responds by attacking the virus. The virus, however, has developed a clever mechanism for "sneaking" past the immune response to conceal itself within the body, a process researchers refer to as latent infection. While in hiding, the virus persists in a quiet, inactive state. Occasionally, it can start to reactivate and begin to multiply again, increasing the risk of cancer development.

The chance that cancer will develop is greatly increased if the immune

system is weakened, such as with immunosuppression following transplantation or as a consequence of other diseases, such as AIDS.

Researchers around the globe are asking important questions about the nature of these viruses and working in their labs to answer them. Among those questions: How do the viruses escape the immune response to establish lifelong latency? What triggers their reactivation in some people? Can we develop therapies to control reactivation and prevent the development of cancer?

The key finding of the Blackman study is that the mechanism by which a type of white blood cell, called a CD8 T cell, controls the virus differs between the initial active phase of infection and long-term latent infection. These novel findings will accelerate efforts to develop therapies to control gamma-herpesvirus infections and prevent the development of virus-associated cancers.

Provided by Trudeau Institute