

Scientists Develop First-of-Its-Kind Antibody to Block Epstein-Barr Virus

EBV prevention can preserve graft function and improve patient outcomes in transplant medicine.

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SEATTLE – February 17, 2026 – Fred Hutch Cancer Center scientists reached a crucial milestone in blocking Epstein-Barr virus (EBV), a pathogen estimated to infect 95% of the global population that is linked to multiple types of cancer, neurodegenerative diseases and other chronic health conditions.

Using mice with human antibody genes, the research team developed new genetically human monoclonal antibodies that prevent two key antigens on the surface of the virus from binding to and entering human immune cells. Published in *Cell Reports Medicine*, the study highlights one of the newly identified monoclonal antibodies that successfully blocked infection in mice with human immune systems when they were challenged with EBV.

“Finding human antibodies that block Epstein-Barr virus from infecting our immune cells has been particularly challenging because, unlike other viruses, EBV finds a way to bind to nearly every one of our B cells,” explained [Andrew McGuire, PhD](#), a biochemist and cellular biologist in the Vaccine and Infectious Disease Division at Fred Hutch. “We decided to use new technologies to try to fill this knowledge gap and we ended up taking a critical step toward blocking one of the world’s most common viruses.”

A new scientific approach yields answers to a puzzling challenge

A key challenge in the study was to pursue human monoclonal antibodies that could successfully halt EBV infection without triggering an anti-drug response to the antibodies themselves, a common response among patients treated with antibodies raised in other animals. The researchers targeted two antigens, gp350, which helps EBV bind to cell receptors, and gp42, which allows EBV to enter and infect human cells through a process called fusion. Using an innovative mouse model carrying human antibody genes, the effort yielded two monoclonal antibodies against gp350 and eight against gp42.

“Not only did we identify important antibodies against Epstein-Barr virus, but we also validated an innovative a new approach for discovering protective antibodies against other pathogens,” noted [Crystal Chhan](#), a pathobiology PhD student in the [McGuire Lab](#). “As an early-career scientist, it was an exciting finding and has helped me appreciate how science often leads to unexpected discoveries.”

With help from Fred Hutch’s Antibody Tech Core, further analysis found sites of vulnerability that could be useful in future vaccine development. In the final step of the study, the research team discovered that one of the monoclonal antibodies against gp42 successfully prevented infection of EBV. Another monoclonal antibody against gp350 provided partial protection.

Hope for patients at the highest risk of Epstein-Barr virus

More than 128,000 people in the U.S. undergo solid organ and bone marrow transplant annually. However, there are no specific therapies to prevent EBV from infecting or reactivating in patients undergoing immunosuppression for transplant procedures. Post-transplant lymphoproliferative disorders (PTLD) are an aggressive and sometimes life-threatening lymphoma that can develop after immune suppression and is most often caused by unchecked EBV infection.

“Post-transplant lymphoproliferative disorders (PTLD), most of which are EBV-associated lymphomas, are a frequent cause of morbidity and mortality after organ transplantation,” noted [Rachel Bender Ignacio, MD, MPH](#), an associate professor and infectious disease physician at Fred Hutch and University of Washington School of Medicine. “Preventing EBV viremia has strong potential to reduce the incidence of PTLD and limit the need to reduce immunosuppression, thereby helping preserve graft function while improving overall patient outcomes. Effective prevention of EBV viremia remains a significant unmet need in transplant medicine.”

Transplant recipients may experience infection if their donor was exposed to EBV and passed on latent virus through the donor cells, or for transplant patients who already have had EBV infection, immunosuppression may cause latent virus in their bodies to replicate unchecked. Children undergoing immunosuppression for transplant could especially benefit from a specific therapy to prevent EBV, as a higher proportion of children have not yet been exposed to EBV.

The next mile

The scientists envision a future therapy in which an infusion of these monoclonal antibodies could prevent PTLD by blocking EBV infection and activation in the patient populations who face the highest risk of EBV-related complications.

Fred Hutch has filed for intellectual property rights covering monoclonal antibodies identified in the study, and McGuire and Chhan are working with scientific collaborators and an industry partner to advance a potential therapy for immunocompromised patients. A potential therapy could be tested for safety in healthy adult volunteers and, if acceptable, proceed to clinical trials in the relevant patient population.

“There’s momentum to advance our discovery to a therapy that would make a huge difference for patients undergoing transplant,” said McGuire. “After many years of searching for a viable way to protect against Epstein-Barr virus, this is a significant stride for the scientific community and the people at the highest risk of complications from this virus.”

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