Medical Xpress

Preventing the spread of HIV/AIDS with humanized BLT mice

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The more than 2.7 million new HIV infections recorded per year leave little doubt that the HIV/AIDS epidemic continues to spread globally. That's why there's the need for safe, inexpensive and effective drugs to successfully block HIV transmission.

A new study from the University of North Carolina at Chapel Hill School of Medicine further validates the use of humanized BLT mice in the fight to block HIV transmission. The "BLT" name is derived from the fact that these designer mice are created one at a time by introducing human bone marrow, liver and thymus tissues into animals without an immune system of their own. Humanized BLT mice have a fully functioning human immune system and can be infected with HIV in the same manner as humans.

The pioneering developers of the humanized BLT mouse model are Paul Denton, PhD, instructor of medicine and J. Victor Garcia-Martinez, PhD, professor of medicine in the UNC Center for Infectious Diseases and the UNC Center for AIDS Research.

In the study published online Wednesday, May 18 in the Journal of Virology, Denton and colleagues provide data that validates humanized BLT mice as a preclinical experimental system that potentially can be used to develop and test the effectiveness of experimental HIV prevention approaches and topical microbicides.

The animal study reproduced the design and methods of a recent double-

blind clinical study in 889 women of the topical microbicide tenofovir. That study, the CAPRISA 004 trial, tested topical pre-exposure prophylaxis (PrEP) with 1 percent tenofovir which participants were instructed to apply vaginally twice daily. The 2.5 year trial resulted in an overall 39 percent reduction in instances of vaginal HIV transmission. Among women who self-reported as strongly adhered to the recommended instructions the protection figure climbed to 54 percent.

The new topical PrEP study by Denton and coauthors in humanized BLT mice reproduced the CAPRISA experimental design with tenofovir. The researchers say they "observed "88 percent protection of vaginal HIV-1 transmission," which was further confirmed by lack of detectable virus anywhere in the animals.

The researchers then tested six additional microbicide drug candidates for their ability to prevent vaginal HIV transmission. These experimental compounds, not yet tested in people, interfere with the virus' ability to reproduce. Partial or complete protection was shown by all but one of these drug candidates. Based on these positive results, Denton said these inhibitor drugs warrant serious consideration for future testing in people.

"This animal model has great potential value for testing and predicting the HIV preventive benefits of the second generation of microbicide candidates that are aimed at preventing viral replication," Garcia said. "The results of these studies will help provide important information for current and future clinical trials."

Provided by University of North Carolina