RESEARCHERS IDENTIFY COMPOUND THAT COULD PREVENT HIV TRANSMISSION

When applied vaginally, glycerol monolaurate blocked infection of a primate version of HIV

MINNEAPOLIS/ST. PAUL (March 4, 2009) – Researchers at the University of Minnesota have identified a compound that, applied vaginally, can prevent transmission of a primate version of HIV, called SIV.

The research is published in the March 4, 2009 online edition of Nature.

Ashley Haase, M.D., head of the University of Minnesota Medical School Department of Microbiology, principal investigator of the study, and Pat Schlievert, Ph.D., professor in the Department of Microbiology, and-co-investigator, researched Glycerol Monolaurate (GML), a naturally occurring compound that the FDA recognizes as safe. It is widely used as an antimicrobial and anti-inflammatory agent in food and cosmetics.

“After 25 years, an effective vaccine for HIV is still on the distant horizon, so not only vaccines, but all research into ways to prevent the continued spread of this lethal virus remains critically important,” Haase said. “If GML as a topical microbicide can help prevent infection, it could contribute to saving millions of lives.”

After vaginal exposure to SIV, the researchers found that the body’s natural defense system is activated, rushing immune cells (T-cells) to the scene of the infection. The virus uses these T-cells as fuel to expand infection locally and spread it throughout the body.
“So even though it sounds counter-intuitive, halting the body’s natural defense system might actually prevent transmission and rapid spread of the infection,” Haase said. “That’s where GML comes in.”

They examined GML because in 1992 Schlievert began using it to combat toxic shock syndrome – a potentially lethal bacterial infection. In recent years, research has shown GML is active against a variety of toxins and microbes and inhibits cytokines and chemokines, molecules that immune system cells use to trigger the body’s defense systems. Since these were the processes they wanted to inhibit, it made sense to see if GML might prevent transmission, Haase said.

Before testing their theory, the researchers tested GML’s safety by daily vaginal application of two types of a GML gel-based topical solution. A group of nine primates received warming gel with GML added; the other group of three primates received warming gel alone as a control.

“GML is recognized as safe, and is already approved for acute human use, but we were now able to show that GML could be safely applied every day for months,” Schlievert said.

The researchers then vaginally challenged five GML-treated and five control animals with large doses of the SIV virus to see if GML could prevent infection.

An hour after applying GML the two groups of primates were vaginally exposed to the virus. Four hours later, they were again treated with GML and then given a second dose of virus.

The researchers monitored the animals for two weeks for evidence of infection. Infected animals would typically have hundreds of millions of viruses circulating in the blood stream. If there was no evidence of infection, the treatments and viral challenges were repeated. Four of five of the control group contracted SIV, while none of the five GML-treated group showed any evidence of infection after receiving as many as four large doses of virus.

Researchers believe GML has potential to be a novel and effective way to prevent vaginal transmission of HIV in humans, which is how a majority of new cases are acquired around the globe. Of the more than 33 million people infected with HIV
or diagnosed with AIDS, 67 percent live in the sub-Saharan region of Africa, and women represent close to 60 percent of new infections in this epicenter of the pandemic.

But Haase cautions that there is still a lot of work to be done before planning clinical trials in humans, including additional testing in animals and developing a dosing and a delivery method that will make it more likely that women will use GML to prevent HIV, and longer term follow up studies into infections that weren’t apparent in the acute stage of infection, but are manifest months later.

“GML is exceptionally inexpensive, is widely used in foods and cosmetics, and is easy to formulate in many ways for vaginal use,” Schlievert said. “The compound has been demonstrated in vitro to inhibit the growth of nearly all sexually-transmitted disease microorganisms and other causes of vaginal infections, without affecting normal bacteria. Its use by women may significantly improve overall vaginal health.”

The research was funded by the National Institutes of Health. Collaborators include the University of Minnesota Medical School, School of Public Health and College of Pharmacy, the Wisconsin National Primate Research Center at the University of Wisconsin-Madison, and SAIC Frederick, Inc. at the National Cancer Institute in Frederick, MD.

*Dedicated to excellence, diversity and service, the University of Minnesota Medical School educates the next generation of physicians, advances patient care, and discovers breakthroughs in biomedical research that enhance health in Minnesota and beyond. Its commitment to transform medical education, Rural Physician Associate Program, and success in training Native American physicians are well-known. More than 1,500 Medical School physicians and scientists provide world-class care and carry out nearly $200 million in research, which informs the treatments and care that patients receive. For more information, go to [www.med.umn.edu](http://www.med.umn.edu).*

*The Academic Health Center is home to the University of Minnesota’s six health professional schools and colleges as well as several health-related centers and institutes. Founded in 1851, the University is one of the oldest and largest land grant institutions in the country. The AHC prepares the new health professionals who improve the health of communities, discover and deliver new treatments and cures, and strengthen the health economy.*

—end—