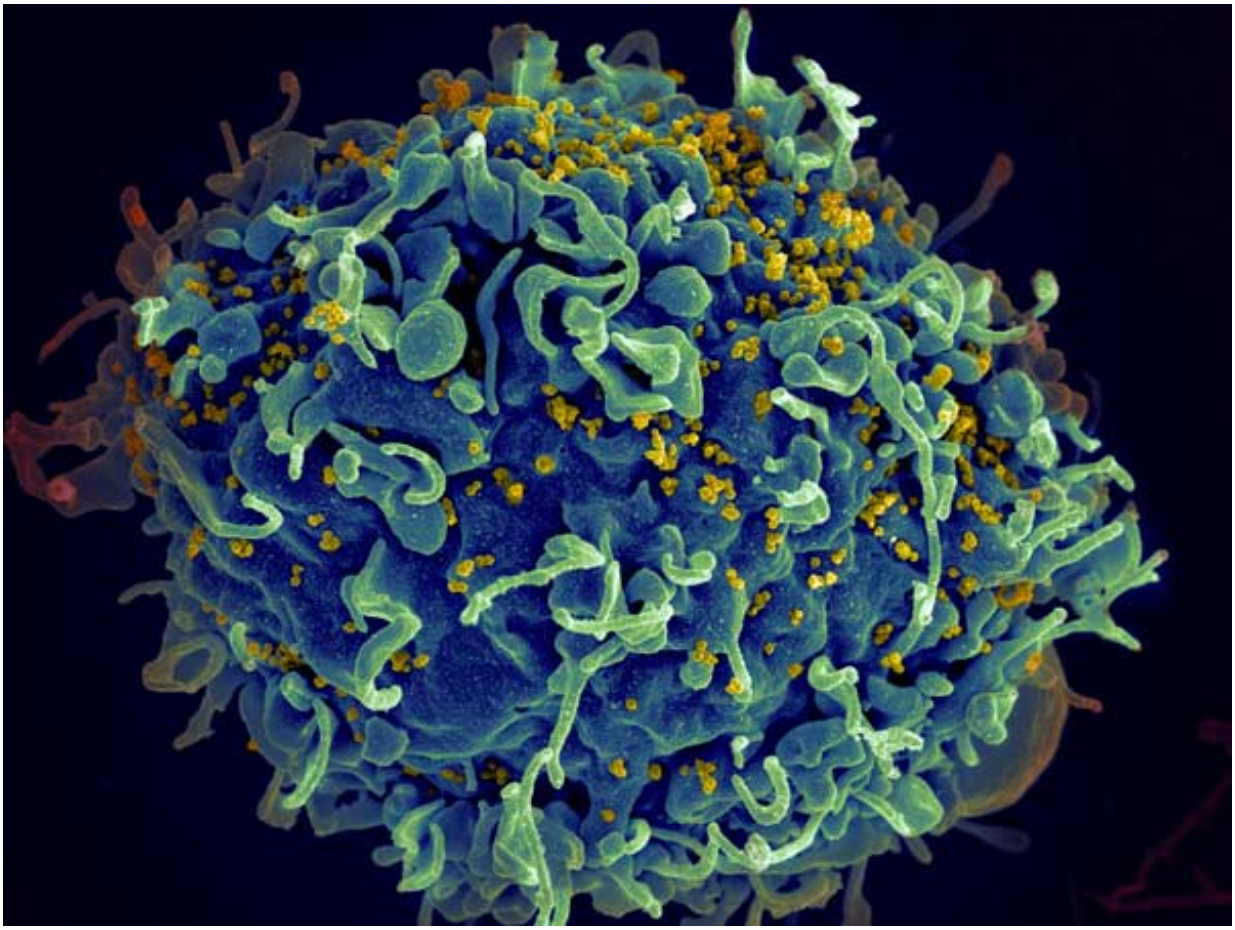
Tick saliva may be a secret ingredient to help HIV patients

September 7 2017, by Jill Daly, Pittsburgh Post-Gazette



HIV infecting a human cell. Credit: NIH

The black-legged tick -loaded with bacteria causing Lyme disease - may

have some good qualities: its spit.

Tick saliva - the same fluid that sets the stage for feeding on their hosts by blocking blood coagulation - is now part of experiments examining ways to reduce heart disease in people living with HIV. Their risk of heart attack and stroke is nearly double that of the general population, according to a study last year. That risk was found even in people whose virus is undetectable in their blood because of antiretroviral drugs.

Chronic inflammation is suspected as the cause of the cardiovascular disease, and researchers in the HIV field are trying to find out what causes it, according to Ivona Pandrea, professor of pathology in the Center for Vaccine Research at the University of Pittsburgh.

Although HIV patients are treated with antiretroviral drugs and the virus is well controlled, Pandrea said, "Patients develop other issues, comorbidities that affect organs and systems that reduce longevity. They develop health problems that old people have. The aging process is accelerated in HIV patients. The main cause is inflammation."

Pandrea is co-senior author of recently published research that says the increased heart disease risk can be linked to an overabundance of a type of immune cell in people with HIV.

Irini Sereti, of the National Institute of Allergy and Infectious Diseases, was also co-senior author, and her team found that in human blood samples, people with HIV share an elevated number of the immune cells called monocytes that continue to express a protein that triggers blood clotting and inflammation even if the HIV virus is under control.

Pandrea found the same cells in monkeys that progress to AIDS after infection with SIV, the primate form of HIV. The cells taken from a different species of monkey, which usually doesn't develop heart disease

when infected with SIV, didn't express the protein involved with clotting and inflammation.

As reported in *Science Translational Medicine* last week, the human blood samples were exposed to Ixolaris, a synthetic version of the small molecule found in the saliva of the tick (scientific name: Ixodes scapularis), and the team found the protein activity was blocked. Then a small group of lab monkeys, including the two different species and both with an early infection of SIV, were treated with the drug.

"Both models replicated very well the virus," Pandrea said, "but one did not have hypercoagulation; the other had high coagulation and high cardiovascular disease." The levels of the inflammatory proteins in the high-coagulation species were lowered with the Ixolaris treatment.

The study concluded that "targeting the coagulation pathway in HIV-infected patients may be effective in reducing the immune activation and inflammation that are linked to cardiovascular comorbidities in HIV infection." It may also help as therapy in other inflammatory diseases, the study said.

NIH holds the patent for Ixolaris, which in the past was tested to treat blood clots in animals. More work needs to be done to confirm the research findings and study the effectiveness and safety of treatment with Ixolaris, Pandrea said.

The study is a step forward. She said, "It's about a new cause of inflammation in the HIV patient: hypercoagulation. It establishes a clear connection with hypercoagulation and inflammation."

Tick saliva alone won't do the trick, however:

"I wouldn't recommend people getting bitten by ticks. They'll still get

Lyme disease."