Researchers find immune cells may play previously unrecognized role in inflammation in HIV/AIDS

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(Medical Xpress)—Depleted numbers of a specific type of white blood cell in the immune systems of people infected with HIV/AIDS appear to be associated with increased levels of unchecked and often damaging inflammation in the body, University of Pittsburgh researchers have discovered.

The low numbers of white blood cells, known as CD4+CD73+ T cells – named for the expression of certain proteins and enzymes on their surface, persist even when HIV is well-controlled with medications. The results of the National Institutes of Health-funded study, now available online, will be reported in an upcoming issue of the journal *AIDS*.

"People with well-controlled HIV have been shown to have higher rates of chronic, non-AIDS-related diseases, such as cardiovascular disease. This is believed to be related to the persistent immune activation and inflammation associated with chronic HIV-1 infection," said corresponding author Bernard J.C. Macatangay, M.D., Division of Infectious Diseases/HIV/AIDS Program, Pitt School of Medicine. "We believe that the depleted CD4+CD73+ T cells may play an important role in this inflammation."

The study included men from the Pittsburgh Multicenter AIDS Cohort Study, an investigation of the natural history of HIV infection in gay and bisexual men. Blood samples were analyzed from 36 men positive for

HIV, some who had consistently taken a medication regimen to suppress the virus and some who had not, along with 10 HIV-negative controls.

The body has ways to decrease and control inflammation through different regulatory mechanisms. One of these is through the production of adenosine, a biochemical compound that may have anti-inflammatory properties. CD73 is an enzyme that is important in the production of adenosine. In the HIV-positive men, the study found that the CD4+CD73+ T cells are depleted and, despite treatment, do not increase to levels seen in uninfected individuals. The Pitt researchers found an association between the low levels of CD4+CD73+ T cells and higher levels of immune activation and inflammation in the study participants.

"This inflammation issue is similar to that seen in cancer patients," said co-author Theresa Whiteside, Ph.D., professor of pathology, immunology and otolaryngology at Pitt's School of Medicine and a member of Pitt's Cancer Institute. "The suppression pathways we explore in this study have similarities to those that we have recently linked to immune suppression in cancer."

Scientists are not sure why this pathway remains disrupted in people with very well-controlled HIV. One hypothesis is that HIV-positive patients do not completely recover from damage done during the first few weeks of infection in their gut lining, which hosts the body's largest population of immune cells.

"Significant damage occurs very early in infection, while they are still asymptomatic and do not even know they have the virus," said Dr. Macatangay. "This is why it is important that we continue to examine the role of CD4+CD73+ T cells and adenosine in increased inflammation among HIV/AIDS patients and look for ways to repair the damage to the natural pathways by which these cells act."