MedicalXpress

SIV's natural hosts reveal how humans might better manage HIV infection

March 8 2012

Some monkeys can survive infection by SIV, a relative of HIV, and not develop AIDS. Their immune systems appear to display a pattern of "peaceful coexistence" rather than the all-out conflict provoked by HIV when it infects humans.

SIV's natural hosts are non-human primates found in central Africa, including sooty mangabeys and African green monkeys – both species whose SIV infections have been studied in captivity -- as well as other species such as mandrills, drills and suntailed monkeys.

Since SIV's natural hosts have adapted to manage infection rather than fight and lose, we have much to learn from them, a team of scientists from Yerkes National Primate Research Center propose in an article published this week in *Science*.

Studying how SIV and its natural hosts co-exist could show medical researchers how to improve long-term care for people infected with HIV and reduce mother-to-infant transmission, as well as guide the development of an AIDS vaccine, the researchers write.

The authors include Ann Chahroudi, Steven Bosinger, Thomas Vanderford, Mirko Paiardini and Guido Silvestri. Silvestri is chief of microbiology and immunology at Yerkes and a Georgia Research Alliance Eminent Scholar.

Together with NIH researcher Nichole Klatt, Silvestri is also author of a

recent Perspective piece in *Science Translational Medicine* about the role of CD4+ T cells in HIV infection.

In their review, the scientists call SIV's natural hosts "the door through which HIV came to humans." Genetic analysis has shown that HIV infection of humans arose through multiple cross-species transmissions of SIV from non-human primates.

Distinctive features of SIV natural host infection include a low level of immune activation and a low rate of mother-to-infant transmission, compared to humans. This reflects evolutionary history during the last several thousand years, the authors propose.

"In this view, the genetic features of natural SIV hosts that underlie two key mechanisms of AIDS resistance (i.e. low immune activation and target cell restriction) may at least partially reflect evolutionary selection to protect from mother-to-infant transmission," they write.

Researchers have observed that a small number of HIV-infected people exhibit a "natural host-like" phenotype, where low levels of immune activation are seen. In most humans, HIV infection leads to chronic immune activation, which causes health problems even in people who receive long-term antiretroviral treatment.

During infection, SIV's natural hosts also manage to preserve particular types of immune cells including Th17 cells, which help maintain the intestines, and central memory T cells, important for keeping the immune system's ability to respond to previously encountered bacteria or viruses.

Understanding how SIV's natural hosts avoid chronic immune activation and preserve immune function could help improve medical care for people living with HIV infection, the authors conclude.

Provided by Emory University