Tulane University Researchers Find Ancient Roots for SIV

September 16, 2010 12:00 PM Keith Brannon
kbrannon@tulane.edu
504-862-8789

The HIV-like virus that infects monkeys is thousands of years older than previously thought, according to a new study led by researchers from Tulane University.

Simian immunodeficiency virus (SIV), which is the ancestor to the human immunodeficiency virus (HIV), is between 32,000 and 75,000 years old and may even be more than a million years old, according to genetic analysis of unique SIV strains found in monkeys on Bioko, an island off the coast of Africa.

The research, which appears in the Sept. 17 issue of the journal *Science*, calls into question previous DNA sequencing data that estimated the virus" age at only a few hundred years.

"The biology and geography of SIV is such that it goes from the Atlantic Ocean to the Indian Ocean all the way to the tip of Africa. It would take many, many thousands of years to spread that far and couldn"t have happened in a couple of hundred years," said virologist Preston Marx of the Tulane National Primate Research Center who led the study in conjunction with Michael Worobey, evolutionary biologist at the University of Arizona.

Marx tested his theory that SIV had ancient origins by seeking out DNA samples from monkey populations that had been isolated for thousands of years. His team collected bush meat samples from monkeys on Bioko, a former peninsula that separated from mainland Africa after the Ice Age more than 10,000 years ago.

Researchers found four different strains of SIV that were highly genetically divergent from those found on the mainland. They compared DNA sequences of the viruses with the assumption that they were tracking how both evolved over 10,000 years. The computer modeling showed the rate of mutation to be much slower than previously thought, indicating that virus is between 32,000 and 75,000 years old to

have evolved to its current state. These dates set a new minimum age for SIV, although it is likely to be even older, Marx says.

The research has implications for HIV. Simian immunodeficiency virus, unlike HIV, does not cause AIDS in most of its primate hosts. If it took thousands of years for SIV to evolve into a primarily non-lethal state, it would likely take a very long time for HIV to naturally follow the same trajectory, Marx says.

The study also raises a question about the origin of HIV. If humans have been exposed to SIV-infected monkeys for thousands of years, why did the HIV epidemic only begin in the 20th century?

"Something happened in the 20th century to change this relatively benign monkey virus into something that was much more potent and could start the epidemic. We don"t know what that flashpoint was, but there had to be one," Marx says.

A copy of the full article is available upon request. Other Tulane co-authors of the study include Meredith Hunter, lab manager at Tulane National Primate Research Center, Clint Coleman, post-doctoral fellow at the Tulane Cancer Center, and researchers Paul Telfer, Michael J. Metzger and Patricia Reed.

EDITOR"S NOTE: High-resolution images of Bioko drills and high-resolution interview clips of Preston Marx are available by request.