Oldest Complete HIV Genome Found in 1966 Sample From Central Africa

The sample, from the Democratic Republic of the Congo, backs up previous estimates that HIV passed to humans around 1900.

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Researchers have discovered a complete HIV genome in a tissue sample taken in 1966 in the Democratic Republic of the Congo (DRC) in Central Africa, making it the oldest such sample of the virus ever found.

The investigators, who published their findings in the Proceedings of the National Academy of Sciences, believe the sample backs up previous estimates that HIV passed from chimpanzees to humans around 1900. This study's estimated range for the crossover—an event that scientists think might have occurred multiple times—was 1881 to 1918.

The study called such previous estimates "remarkably reliable."

Scientists make such estimates by essentially reverse-engineering a family tree for HIV. They accomplish this by conducting genetic analyses of viral genomes drawn from different times and using mathematical modeling to estimate how the overall viral population evolved over time.

HIV samples have been recovered from points earlier than 1966, but they did not represent the whole viral genome. Thus, they are less useful as a reference point when studying how the virus evolved during its first decades in the human population.

The first cases of what came to be known as AIDS were identified in medical literature in a 1981 Centers for Disease Control and Prevention report. HIV was discovered to be the cause of AIDS in 1983.

To date, an estimated 75 million people have contracted HIV, and 32 million have died of AIDS-related complications, according to the World Health Organization.

During the 70 to 100 years prior to human awareness of HIV and AIDS, the virus had been gradually, and stealthily, spreading through Central Africa, eventually propagating around the world. The virus was likely able to gain an enduring foothold in the human population because of a complex intersection of factors. These include political, societal, medical and technological

shifts—such as colonialism, decolonialism, urbanization, public health campaigns that used unsterile equipment to provide treatments or vaccines, and the advent of global air travel.

To find the new genome, the investigators used a very sensitive test for the presence of HIV's genetic material. They screened 1,645 tissue samples taken in Central Africa between 1958 and 1966. These samples had been well preserved in the chemical formalin and embedded in paraffin wax.

The researchers found just one HIV genome, in a specimen taken in Kinshasa, DRC, in 1966. The virus belonged to the HIV-1 subtype C strain.

"In conclusion, this unique archival HIV-1 sequence provides direct genomic insight into HIV-1 in 1960s DRC, and, as an ancient-DNA calibrator, it validates our understanding of HIV-1 evolutionary history," the study authors concluded.

To read the study abstract, click here.

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