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ENDEMIC INFECTION OF CENTRAL CHIMPANZEES (*PAN TROGLODYTES TROGLODYTES*) BY SIMIAN IMMUNODEFICIENCY VIRUS

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BACKGROUND: Simian immunodeficiency virus (SIV)_{cpz}, infects chimpanzees in west central Africa (*Pan troglodytes troglodytes*), are the closest relatives of all groups of HIV-1 (M, N, and O) and have thus been implicated as the source of the human infection. However, despite testing of more than 2000 apes in captivity, a natural SIV_{cpz} reservoir has never been identified. Here, we report the first molecular epidemiological study of wild chimpanzees in southern Cameroon using non-invasive (fecal-based) virus-specific antibody and virion RNA detection methods as well as host genetic (microsatellite) analyses.

METHODS: Ape fecal samples ($n=615$) were collected at forest sites ($n=11$) throughout southern Cameroon and preserved in RNA later. Fecal immunoglobulin was isolated and tested for the presence of HIV-1 cross-reactive antibodies by enhanced chemiluminescence Western blot analysis. Partial (*pol* and *gp41*) and full length SIV_{cpz} sequences were amplified from fecal RNA by real-time polymerase chain reaction (RT-PCR). Mitochondrial (D loop) and microsatellite loci (D18S536, D4S243, D10S676, and D9S922) were amplified from fecal DNA for subspecies and individual identification.

RESULTS: Of 429 *P. t. troglodytes* samples, 36 were SIV_{cpz} antibody or virion RNA positive, but none of 32 *P. t. vellerosus* samples were. Virus-positive samples were identified at 5 collection sites, indicating a range of SIV_{cpz} prevalences from 0% to 35%. Phylogenetic analysis of newly derived partial (*pol* and *env*, $n=33$) and full-length SIV_{cpz} sequences ($n=4$) confirmed infection with divergent SIV_{cpzPtt}, but also revealed strict geographic clustering of locally circulating strains. From southeastern and south

Cameroon, respectively, 2 lineages comprising SIV_{cpz} formed sister clades immediately proximal to HIV-1 groups M and N.

CONCLUSIONS: SIV_{cpz} is widely, but unevenly distributed among wild *P. t. troglodytes* (but not *P. t. vellerosus*) apes in southern Cameroon, indicating an existing chimpanzee reservoir. Circulating SIV_{cpz} strains exhibit extensive genetic diversity, but form geographically defined lineages, likely reflecting *P. t. troglodytes* populations with non-overlapping habitats. Two of these endemically infected populations gave rise HIV-1 groups M and N, and may still serve as a source of human infection. The geographic origin of group O remains to be identified.

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35

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