

Identification of HIV-1 Non-B Subtypes and Antiretroviral Drug Resistant Strains in Blood Donors in the United States (S15-030D)

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Background: From 1999-2005, HIV-1 NAT identified 26 recently infected donors defined as RNA positive, antibody negative (RNA+/Ab-) in one US blood system (yield of 1:1.71 million). This yield increased significantly over time with 16 of 26 (62%) identified in 2004-2005 ($p=0.003$). Over the same period, the frequency of RNA+/Ab+ donors was stable at 1:33,000. The HIV genetic subtype and the drug resistance profile of a sampling of these donors were determined.

Methods: Donors were screened for HIV Ab by an HIV-1/2 EIA (Abbott), Ab reactivity was confirmed by western blot (Calypte). HIV-1 RNA was detected in pools of 16 by NAT (Gen-Probe/Chiron) and RNA reactivity confirmed in Ab- donors by PCR (National Genetics Institute). HIV genetic subtype was determined by phylogenetic analysis of viral sequences amplified by RT-PCR. The drug resistance profile of the protease and RT genes was determined using the ViroSeq HIV-1 Genotyping System (v2.6, Celera Diagnostics).

Results: Of the 26 RNA+/Ab- donors, 46% were first-time donors and 81% male with a median age of 31 years old. The majority (60%) of RNA+/Ab- yield donors were from the southeast US. Of the 36 RNA+/Ab+ donors studied, 81% were first-time donors, but similarly, 86% male with a median age of 33 years old. However, only 36% were from the southeast US. Nineteen of the 26 RNA+/Ab- specimens were available for further study; all 19 were HIV-1 group M subtype B strains. Drug resistance profiles were obtained for 17 of the 19; 2 had mutations that confer resistance to antiretroviral drugs. One strain contained mutation L90M in protease that is associated with resistance to protease inhibitors and confers resistance to Nelfinavir. Another strain contained mutation Y188H in RT that is associated with resistance to nonnucleoside RT inhibitors and confers resistance to Nevirapine. Genetic subtype was determined for 32 of 36 RNA+/Ab+ specimens. Three were due to circulating recombinant forms (CRF) of HIV-1; 2 CRF01_AE and 1 CRF02_AG. The remaining 29 infections were subtype B strains.

Conclusions: The data show that antiretroviral drug resistant HIV strains are being transmitted in the US among recently infected donors (2 of 17, or 12% of the RNA+/Ab-group). HIV-1 non-B subtypes accounted for 6% (3 of 51) of the HIV infections in RNA+ (Ab- and Ab+) donors. This indicates that while HIV-1 subtype B is still the predominant strain in the US, non-B strains are increasing. Transmission of drug resistant HIV and genetically divergent non-B strains could have important implications for both diagnosis and treatment of HIV infections.