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Biological and molecular characterization of HIV-1 isolates from Cuban patients at two moments of their natural history

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Background: Variation in viral characteristics, host defense responses (likely explained by variation in host genetics) and environmental factors may all contribute to the variation in the natural course of HIV infection.

Aim: In this work, we aimed to correlate the genotypic and phenotypic characteristics of strains of HIV-1 isolated from Cuban patients with the natural history of the infection.

Methods: 16 patients without antiretroviral therapy (ART) were included. The first sample was taken in the eight months after the diagnostic and the second sample two years later. Peripheral blood with anticoagulant was used for biological and molecular characterization. The viral subtype was determined by phylogenetic analysis of the protease-RT region and the V3 loop of HIV-1. Viral isolation and biological characterization (syncytium induction, SI) was performed using the standardized technique of the WHO (2002) and the prediction of the use of co-receptors through the genotypic analysis of the V3 loop (rule 11/25).

Results: The viral subtypes identified were B (5 patients); CRF19_cpx (5); CRF 20, 23, 24_BG (4) and CRF18_cpx (2). At the beginning of the study eleven patients were in clinical stage A1 and A2, the average CD4 count was 389.3 cells/mL (range 53-1260), the average viral load was 5.29 log, the virus was isolated from ten patients (3 SI) and strains R5 predominated (8 patients). In the second sample, patients had evolved clinically; eight in clinical stages A3 to C3 and ten had started antiretroviral treatment, with an increase in the CD4 count at 443.5 cells/mL (range 205-792) and a decrease in viral load to 4.34 log. The virus was isolated from 10 patients (4 SI) and strains X4 and R5X4 predominated (12 patients). The patients with ART were related to the viral variant CRF19_cpx (5 patients); under mean CD4 cell count in the first sample versus in the naives and strains X4 and R5X4 predominated. The patients without ART had not evolved clinically, all at the beginning of the study had strains R5 and only in two had the virus been isolated. Of these, in the second sample, the virus was isolated from five patients; but only one was SI and strains R5 or R5X4 predominated.

Conclusion: The natural history of HIV infection in these Cuban patients was marked by immunological damage at the time of their serological diagnosis and the emergence of strains X4 and R5X4 that provide insight for the development of therapeutic or preventive intervention strategies.