

Characteristics of Gp120 Envelope and Predicted Coreceptor Usage of HIV-1 Subtype CRF01_AE Infected Individuals with Different Rates of Disease Progression in the North of Thailand

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Abstract

Background: Understanding sequence characteristics of gp120 envelope and coreceptor usage of HIV-1 infected individuals with different rate of disease progression are important in facilitating the development of AIDS vaccine and treatment. This study analyzed envelope gene and predicted coreceptor usage of HIV-1 subtype CRF01_AE infected individuals with different rates of disease progression in the North of Thailand.

Methods: The sequences of the V1-V5 region of the HIV-1 envelope gene from forty four HIV-1 subtype CRF01_AE infected Thais were analyzed. Twenty four are progressors (PRs; symptomatic or AIDS within 5 years and CD4+ < 200/mm³) and twenty are slower progressors (SPs; asymptomatic more than 5 years and CD4+ >350/mm³). The V1-V5 regions were DNA amplified by nested PCR and sequenced directly from the whole blood of HIV-1 infected individuals. Coreceptor usage was predicted using online tool HIV-1 PhenoPred.

Results: The median CD4+ counts of PRs and SPs are 66 and 510/mm³, respectively. The Envelope sequence analysis showed that V3 motif of SPs were dramatically dominated by GPGQ (16/20) but by GPGQ (14/24) and GPGR (11/24) in PRs. Interestingly, an extra disulfide bridge in the V4 region was found in 38.6% (17/44) of HIV-1 subtype CRF01_AE infected individuals. No significant of V4 loop lengths between PRs and SPs was found. The predicted coreceptor usage demonstrated, 14 viruses used CCR5 (58.3%), 8 used CXCR4 (33.3%) and 2 used both CCR5 and CXCR4 (8.3%) among the 24 PRs. In 20 SPs, 15 viruses used CCR5 (75%), 1 used CXCR4 (5%), and 4 used both CCR5 and CXCR4 (20%).

Conclusions: These findings show that most of V3 motif of HIV-1 CRF01_AE in SPs are GPGQ and the predicted coreceptor usage is CCR5. However, most viruses in PRs were R5 and X4. Thus, our results may provide valuable information on CCR5 antagonists therapy and AIDS vaccine development.

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