Humans with chimpanzee-like major histocompatibility complex-specificities control HIV-1 infection

Background: Major histocompatibility complex (MHC) class I molecules allow immune surveillance by presenting a snapshot of the intracellular state of a cell to circulating cytotoxic T lymphocytes. The MHC class I alleles of an HIV-1 infected individual strongly influence the level of viremia and the progression rate to AIDS. Chimpanzees control HIV-1 viral replication and develop a chronic infection without progressing to AIDS. A similar course of disease is observed in human long-term non-progressors. Objective: To investigate if long-term non-progressors and chimpanzees have functional similarities in their MHC class I repertoire. Methods: We compared the specificity of groups of human MHC molecules associated with different levels of viremia in HIV-1 infected individuals with those of chimpanzee. Results and conclusion: We demonstrate that human MHC with control of HIV-1 viral load share binding motifs with chimpanzee MHC. Moreover, we find that chimpanzee and human MHC associated with low viral load are predicted to elicit broader Gag-specific immune responses than human MHC associated with high viral load, thus supporting earlier findings that Gag-specific immune responses are essential for HIV-1 control.

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