Characterization of HIV-1 Gag and Nef T cell Responses in an HIV-1 infected Kenyan Population

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Background: The development of an efficacious vaccine against HIV-1 is one of the most pressing challenges facing modern medicine. The identification of the optimal and dominant HIV-1 specific responses is important for defining immunogenicity in HIV-1 vaccine trials. We aimed to characterize and quantitate nature of HIV-1 specific T cell responses to the Gag and Nef proteins in a Kenyan population, where the dominant circulating virus is subtype A.

Methods: The immunodominant T cell responses in 50 HIV-1 infected individuals were screened by IFN-g ELISpot assay using Group M consensus Gag and Nef peptides (15 mer overlapping 11 aa) arranged in protein-specific and matrix pools and confirmed at the single peptide level. The CD4 counts ranged from 350-1461cells/µl, with a median of 522 cells/ µl in antiretroviral treatment naive HIV-1 infected Kenyan population.

Results: PBMCS from 80% and 58% of the study population had responses to Gag and Nef antigens, respectively. The Gag p24 subunit dominated the magnitude and breadth of T cell immune responses, followed by the p17 subunit.There was a wide range in the magnitude of responses observed among the responders for HIV-1 Group M consensus Gag (100-2050 SFC/10^6cells) and Nef proteins (100-1720 SFC/10^6cells).

Conclusion: The identification of Gag and Nef-specific T cell responses targeting epitopes from multiple immunodominant regions in an HIV-1-infected Kenyan population may provide useful insights into the design of new immunotherapies and vaccines for effective control of HIV-1 infection.