Immunological characterization of HIV-1 Recent and Long-term Infections in Cameroon

Service Site: FDA, White Oak

Sai Keerthana Cherukuri
saikc@umd.terpmail.edu
Science and Global Chnage
Neurobiology and Physiology

Research Objective

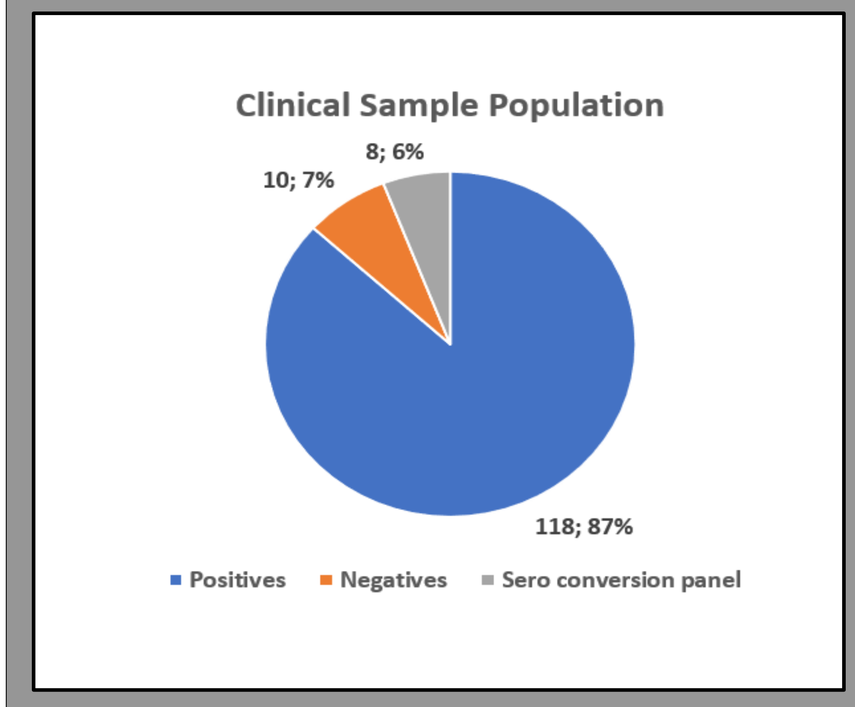
The objective of this study is to measure whether the infection is recent or long term for a cohort of clinical samples from Cameroon.

Experience

Working the the FDA was very rewarding. All the concepts that I was learning in my classes such as Genetics and the skills that I acquired in Organic Chemistry Lab, I was able to apply them in my work at the FDA. While I was working there, I had the opportunity to be exposed to other disciplines such as bioinformatics. This sort of exposure helped me broaden my interests towards statistics and helped me appreciate them more. I am now able to understand in specifics the interdisciplinary relationships between the various subjects.

I also got a very clear idea on how many stages there are to researching drugs for treatment and how they get on the market. Overall, I got a better understanding on how research works and more insight into careers in research.

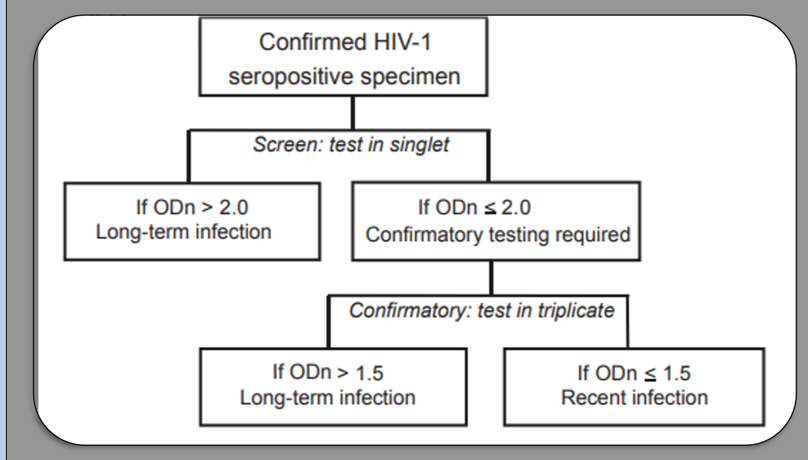
I found the lab work/lab procedures very enjoyable; this prompted me to take classes such a microbiology at college. And I am now considering research as one of my career options.

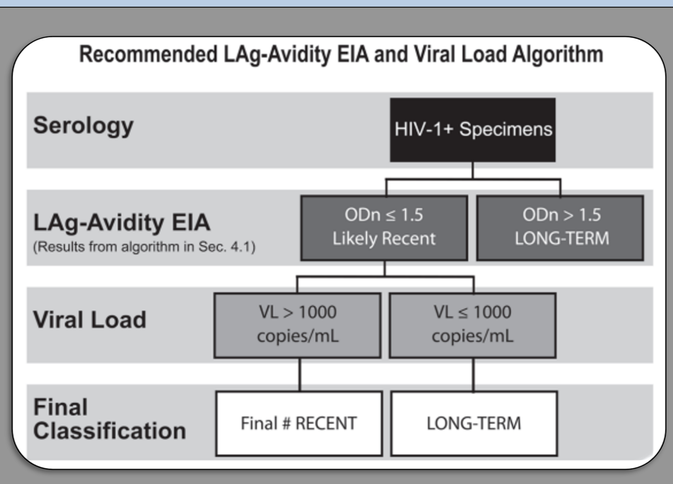


Methods

We analyzed (n=136) HIV-positive individuals plasma samples from Cameroon. Plasma viral load was determined using the Abbott Real-Time HIV-1 Assay Kit (0.6 ml HIV-1 RNA US). The HIV RNA isolation was done using the m2000sp system and amplified by the m2000rt (Abbott Molecular, Inc., Des Plains, IL). All samples were tested using the LAg-Avidity assay (Sedia Biosciences Corporation, Portland, OR) per manufacturer's recommendations. Briefly, using Sedia HIV-1 Lag-Avidity EIA kit, we measured the HIV-1 antibody avidity which classifies the samples as being recent or long-term infection by comparing the EIA result with an established calibrator. The calibrators and controls are set with specific numerical values which help classify the timing of infection. The normalized OD values less than 1.5 are labeled as recent infection and the samples with greater than 1.5 are labeled as a chronic or long-term infection. The proportion of individuals who were misclassified as recent were determined using a predetermined algorithm of a LAg Avidity score of <1.5 normalized optical density units (ODn) and presence of an HIV viral load >1000 copies/ml.

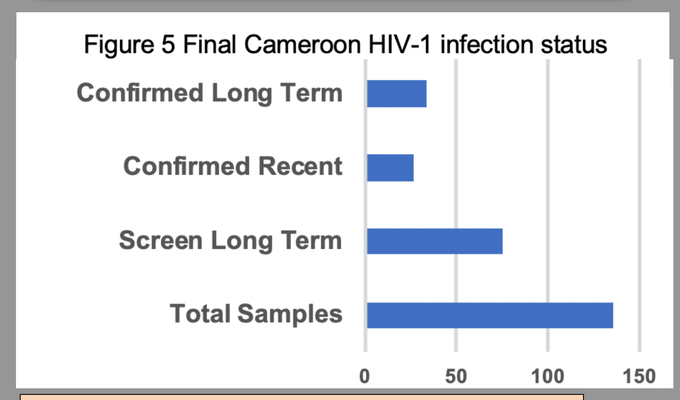
For ongoing genomic characterization HIV-1 env coding regions, including V1-C5 of gp120 and the gp41 ectodomain of HIV-1 consisting of ~1.4kb, were successfully amplified and sequenced by next generation sequencing (NGS) using the Illumina MiSeq platform.





Results

- Of the 136 samples analyzed, HIV-1 viral load was determined to be in the range of 47-210620 copies/mL.
- All recent infections were re-tested in duplicates. When tested with the LAg avidity assay screen, 44.8% of samples were recently infected and 55.2% samples were classified as long term infections. No further testing was performed for long term infection category of samples.
- Rates for confirmatory testing. Of 61 samples re-tested, 44.2% were confirmed to be recently infected while 55.8% did not meet the acceptance criteria of normalized OD of ≤1.5 therefore classified as long-term infection.



Conclusions

We demonstrated that the mean duration of recency in our sample set was 130 days for 27 samples and considered to be recent infection. The anti-viral therapy information is a limiting factor in determining accurate recency status in this cohort. By confirming recency or by the criteria of viral load of less than 1000 copies/ml, 109 samples were determined to be long term infection.

Acknowledgments

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References

1. Single Well Avidity Immunoassay Detection of Recent HIV-1 Infection Using Serum or Plasma Specimens Only. Cat. No. 1002 Sedia Biosciences.
2. Smoleń-Dzirba J, Wąsik TJ. Current and future assays for identifying recent HIV infections at the population level. Med Sci Monit. 2011 May;17(5):RA124-33. Review.
3. Moyo S, Wilkinson E, Novitsky V, Vandormael A, Gaseitsiwe S, Essex M, Engelbrecht S, de Oliveira T. Identifying Recent HIV Infections: From Serological Assays to Genomics. Viruses. 2015 Oct