

Characterizing a Multi-Modal Cohort of Adults Living with and without HIV: Neurocognition, Inflammation, Cellular Phenotyping, and Brain Volumetrics in the Suppressive ART Era

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Background: Despite effective antiretroviral therapy (ART), people with HIV (PWH) continue to show neurocognitive deficits and systemic inflammation. However, these effects are difficult to characterize without extensive data in the same individuals. While few existing cohorts provide this depth, the combination of the CHAMPS and FIRN datasets directly addresses this gap. **Methods:** The combined dataset includes 184 PWH and 205 people without HIV (PWoH) (N=389) across multiple sites. All PWH were virologically suppressed (VL < 62 copies/mL) on stable ART. All participants completed neuropsychological testing across five domains: learning, delayed recall, executive function, prospective memory, and language. Subsets with available data completed plasma biomarker, a flow cytometry panel characterizing T cell, B cell, NK cell, and monocyte subsets, subcortical MRI volumetrics, cannabis use assessments, and prescription and recreational drug inventories. Sample sizes varied by modality and are reported per analysis. **Results:** Relative to PWoH, PWH showed deficits in prospective memory and executive function and had higher plasma sCD163 and Lp-PLA2, indicating persistent macrophage activation despite viral suppression. Subcortical brain volumes were reduced in PWH, consistent with prior neuroimaging literature. Multiple cellular immune markers showed significance between cohorts. Higher recent cannabis use was associated with worse learning performance across both groups. **Conclusion:** Overall, data from this cohort highlight ongoing inflammation and associated neurocognitive impairment in memory and language. Several subgroup analyses were underpowered given subsample sizes; effect sizes are reported throughout to support future study design. Supported by NJ ACTS CREST Program funded by NIH R25TR004777 and R01 DA054009 (Ances, Burdo).

