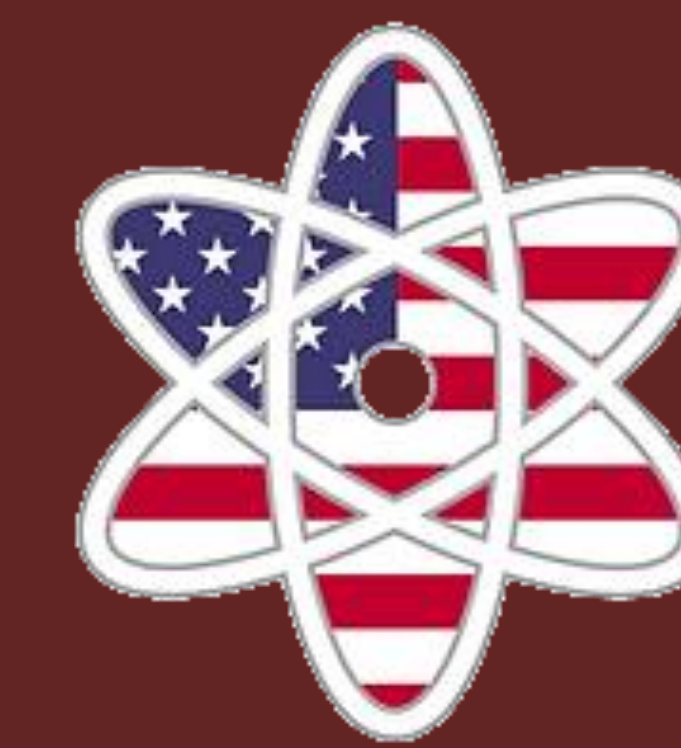




# Data Analysis on HIV Synaptic Density Participants

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## Abstract

Early studies revealed that HIV causes neurological damage. Although antiretroviral therapy (ART) was expected to halt this damage, neurological issues persist in people living with HIV (PLWH) despite ART. This ongoing damage may be linked to synapse density loss and brain atrophy. This study aims to analyze synaptic density over time in PLWH compared to HIV-negative individuals.

## Introduction

- PET – Positron Emission Tomography – Brain-imaging technique that uses a radioactive molecule that binds to certain areas in the body.
- Synaptic density degeneration is seen through PET

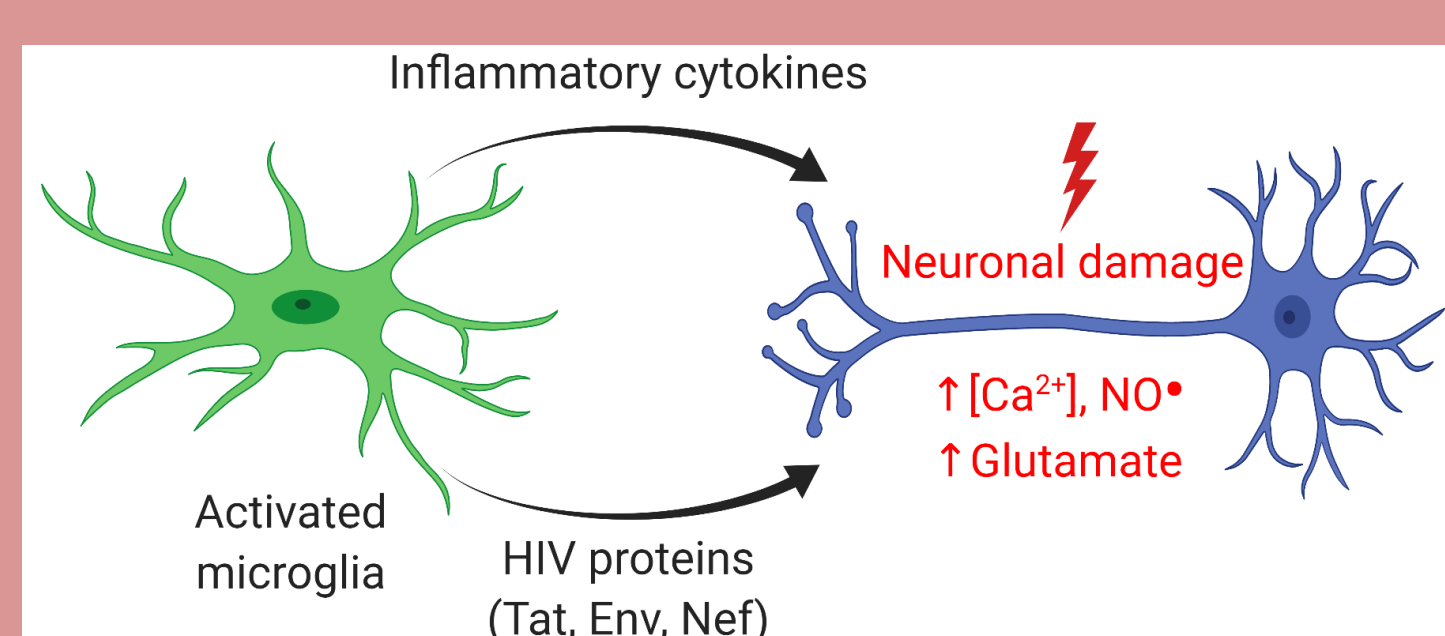


Figure 1: Neuronal damage cause from inflammation due to neuroinfectious diseases

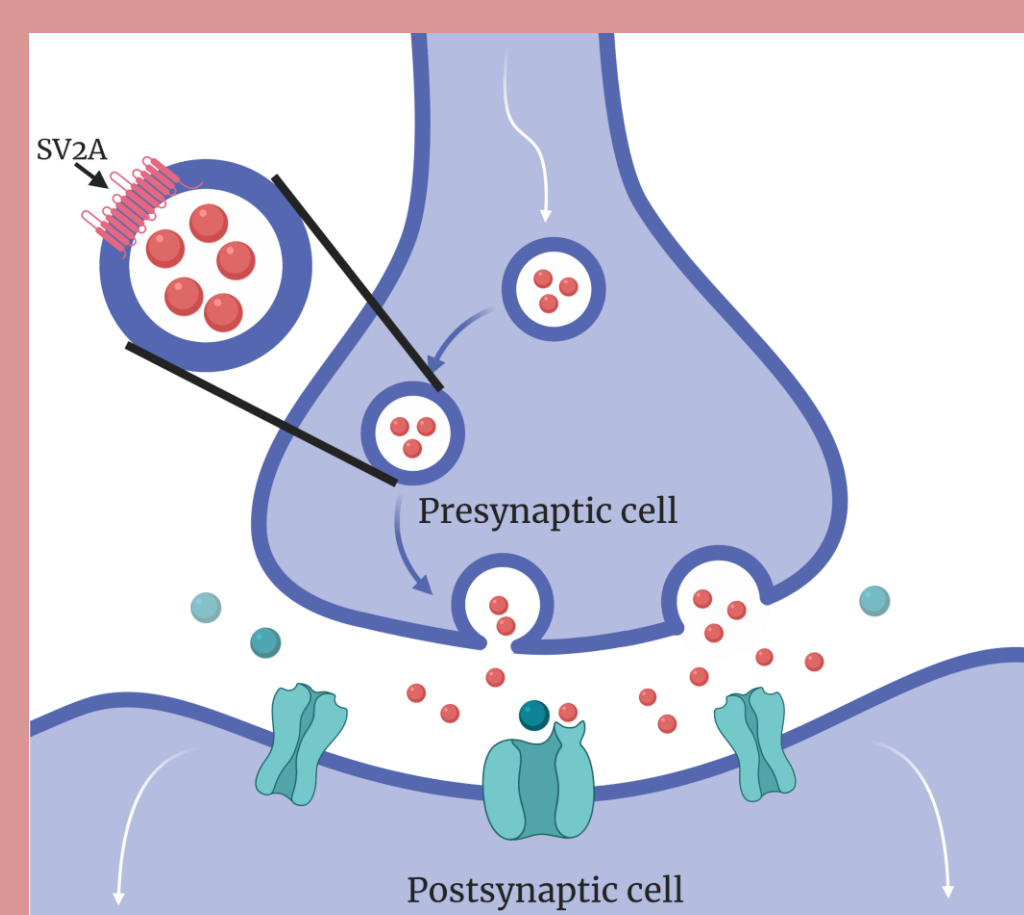


Figure 2: Synapse with SV2A (Synaptic Vesicle Glycoprotein 2) which reflects the presence of a synapse.

## Methods & Results

- Study design: Measure synaptic density in a longitudinal study over 24 months between PLWH and HIV-negative controls.
- Procedures/Tests: PET, MRI, Blood samples, LP, and medical/mental health history and diagnostic screening.
- Scans acquired: Baseline and 2 years
- Demographics, Lifestyle, and Cell Counts were analyzed and compared between PLWH and HIV-negative controls.
- Demographic and lifestyle analysis is important to look at to ensure that the groups being studied are equally correlated with each other.

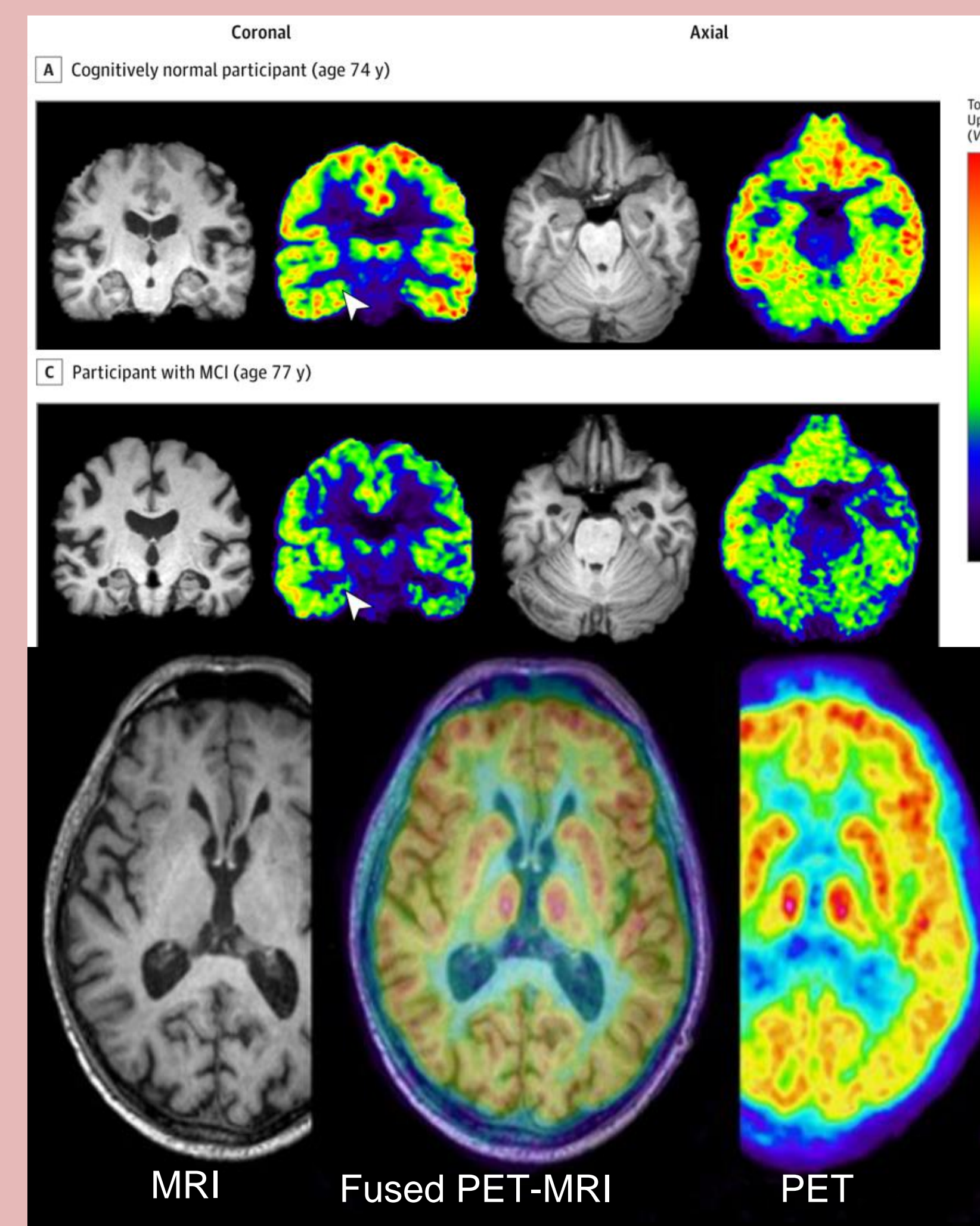


Figure 3: Top figures (A and C) are PET and MRI images of the brain of a PLWH and a HIV-negative control individual. Bottom figures show MRI and PET images overlaid to show structure and high activity areas.

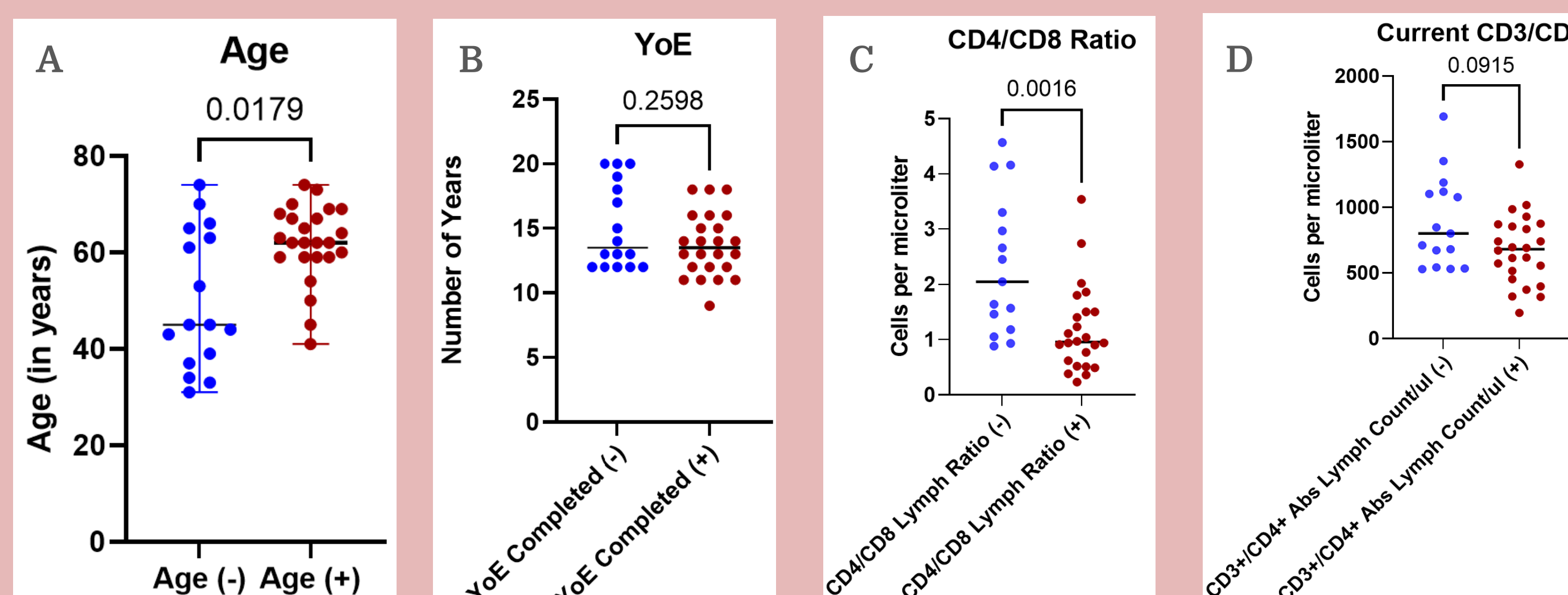


Figure 4 A-D: Data attained from current PET scan study participants.

Figure A-D: Difference in data between HIV-negative controls (blue) and PLWH (red). Each graph shows the individual groupings and median for each data set.

Table 1: Individual data sets analyzed for each group, PLWH and HIV-negative controls. Characteristics with values less than 0.05 appear to have some significant difference between the groups which could show a great enough difference to impact the current research data obtained.

	PLWH (n=24)	HIV-negative Individuals (n=16)	P value
<b>Demographic Characteristics</b>			
Male sex, no. (%)	20 (83.33%)	6 (37.5%)	0.003
Age, mean (SD), y	62 (41-74)	45 (31-74)	0.018
Non-White race, no. (%)	16 (66.67%)	6 (37.5%)	0.088
Hispanic, no. (%)	4 (16.67%)	1 (6.25%)	0.329
Years of Education, mean (SD), y	13.5 (9-18)	13.5 (12-20)	0.26
History of SUD, no. (%)	13 (54.17%)	0 (0%)	0.0003
History of AUD, no. (%)	8 (33.33%)	3 (18.75%)	0.312
Smoking			0.446
Current, no. (%)	9 (37.5%)	8 (50%)	N/A
Former, no. (%)	9 (37.5%)	3 (18.75%)	N/A
<b>HIV-specific Characteristics</b>			
Years Since Diagnosis, median (IQR)	28 (11,39)		
Years Since Start of Treatment, median (IQR)	26 (8,35)		
Current CD4 T cells, median (IQR), cells/ $\mu$ L	681.07(195,1327)		
Nadir CD4 T cells, median (IQR), cells/ $\mu$ L	280 (6,900)		
CD4/CD8, median (IQR), cells/ $\mu$ L	0.955 (0.23,3.54)	2.05 (0.88, 4.57)	0.0016
% Viral Load , median (IQR), cells/ $\mu$ L	95.80%		

Table 1: Demographic, lifestyle, and cell count data for current PET scan study participants (40 total).

## Conclusion

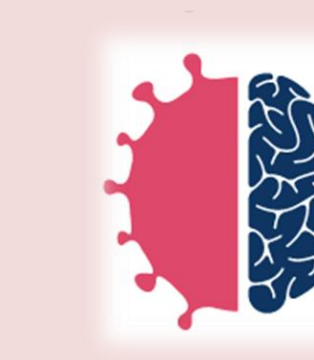
- Synapse density loss is linked to neurological function decline. The study will enhance understanding of HIV's impact on the brain.
- The study will clarify synapse density degeneration and explore prevention and support strategies for individuals with HIV.
- The study is ongoing and needs more participants for robust data.

## Future Implications

- Cohorts may not be equally matched.
- Limitations: small pool of willing participants
- Implications: Redirect outreach to find better matched participants

## Acknowledgements

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## References

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