

GFAP in the Context of Amyloid Positivity Status at the Community Level

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BACKGROUND

- The recent expansion of the Alzheimer's Disease (AD) framework to include inflammatory factors highlights the biological complexity of the disease
- Glial Fibrillary Acidic Protein (GFAP), a marker of astrocytosis, was highlighted specifically within the updated A/T(N) framework as a non-specific biomarker related to AD pathophysiology along the lines of neuroinflammation
- At the community level, the association and link between GFAP and amyloid, considered to be the hallmark pathological feature of AD, has not been thoroughly explored at the community level
- This study aims to fill this gap and examine this in the context of demographic factors and *APOE e4* carrier status

METHODS

- Data were analyzed on n=4,134 participants (n=354 amyloid positive; n=1,634 amyloid negative) from the Health and Aging Brain Study- Health Disparities (HABS-HD)
- Plasma samples were assayed for GFAP using Quanterix kits and run on an HD-X imager
- Amyloid and tau positivity was determined based on a clinical read by a neuroradiologist of PET Amyloid (FBB) and Tau (PI2620) scans
- Neurodegeneration was determined through Meta-ROI cut-off
- ANOVAs were conducted to examine differences in GFAP across select demographic factors
- Violin plots were also generated for GFAP stratified by race/ethnic group, A/T(N) status, and *APOE e4* status
- Statistical significance was set at p<0.05

Table 1. Demographic Characteristics

	Overall N = 4,134	AA N = 1,213	Hispanic N = 1,495	NHW N = 1,426
Age	65.09 (8.66)	63.24 (7.82) ^b	63.16 (8.09) ^c	68.67 (8.77) ^{b, c}
Sex, Female, N(%)	2,542 (61%)	747 (62%) ^{a,b}	982 (66%) ^{a,c}	813 (57%) ^{b, c}
Education, Mean (SD)	13.39 (4.19)	14.64 (2.64) ^{a,b}	10.33 (4.64) ^{a,c}	15.54 (2.58) ^{b, c}
APOE4 Positivity				
Yes, N(%)	1,082 (29%)	404 (40%) ^{a,b}	278 (20%) ^{a,c}	400 (30%) ^{b,c}
GFAP pg/mL, Mean (SD)	206.35 (180.10)	186.15 (173.07) ^b	189.94 (160.48) ^c	248.32 (201.60) ^{b,c}
Amyloid Global SUVR Positivity				
Yes, N(%)	354 (18%)	147 (15%)	64 (13%)	143 (30%)
No, N(%)	1,634 (82%)	863 (85%)	436 (87%)	335 (70%)
Cognitive Diagnosis, N (%)		^{a,b}	^{a,c}	^{b,c}
Cognitively Unimpaired	3,009 (73%)	794 (65%)	1,077 (72%)	1,138 (80%)
Dementia	243 (5.9%)	68 (5.6%)	91 (6.1%)	84 (5.9%)
Mild Cognitive Impairment	866 (21%)	342 (28%)	321 (21%)	203 (14%)

Note: p<0.05; AA: African American/Non-Hispanic Black; NHW: Non-Hispanic White;
^aAA vs Hispanic; ^bAA vs NHW; ^cHispanic vs NHW

RESULTS

Figure 1. Violin plot of GFAP Concentrations by Race and Ethnic Group

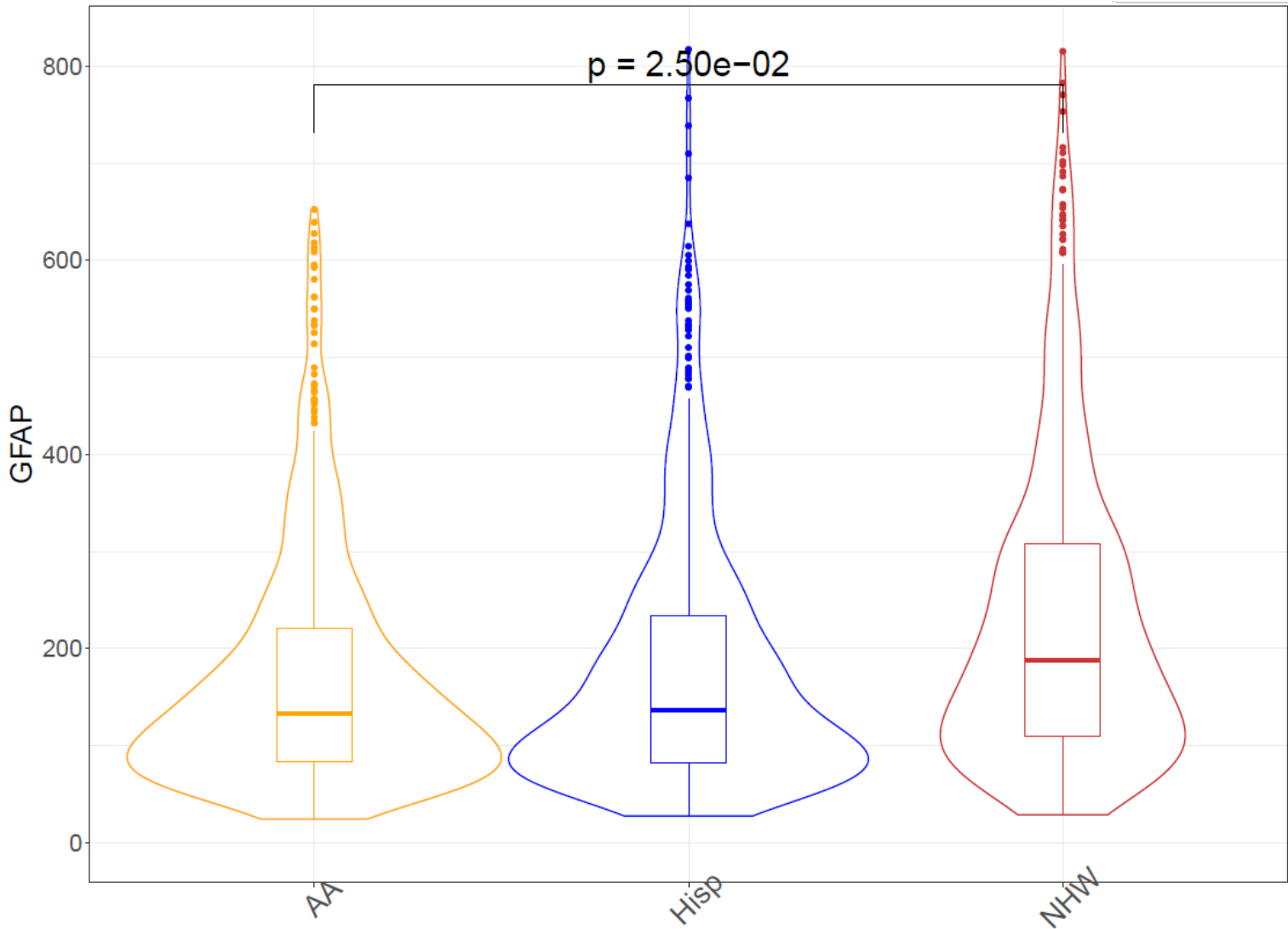


Figure 2. Violin plot of GFAP Concentrations by Race/Ethnic Group and Amyloid Negative Status

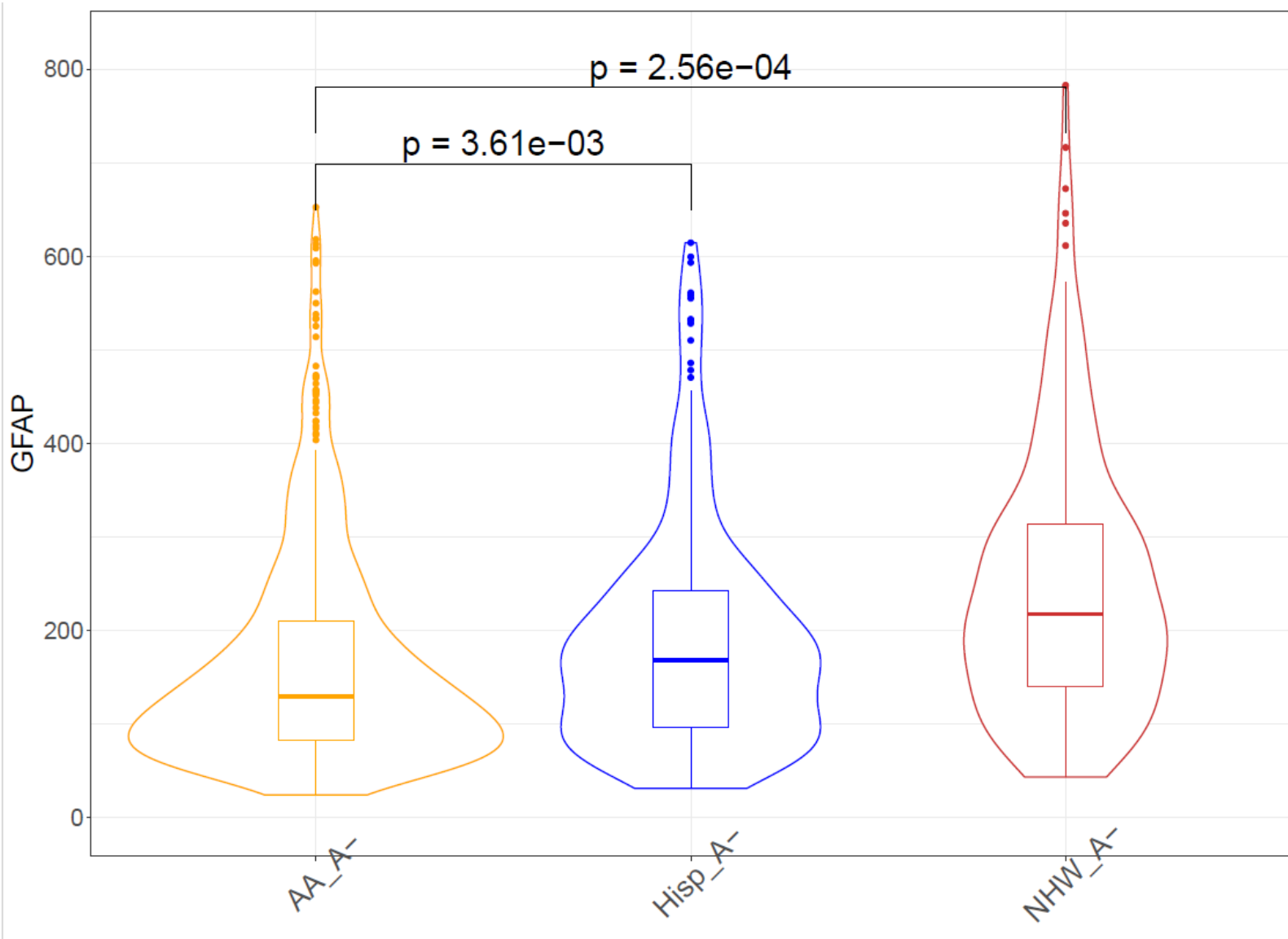
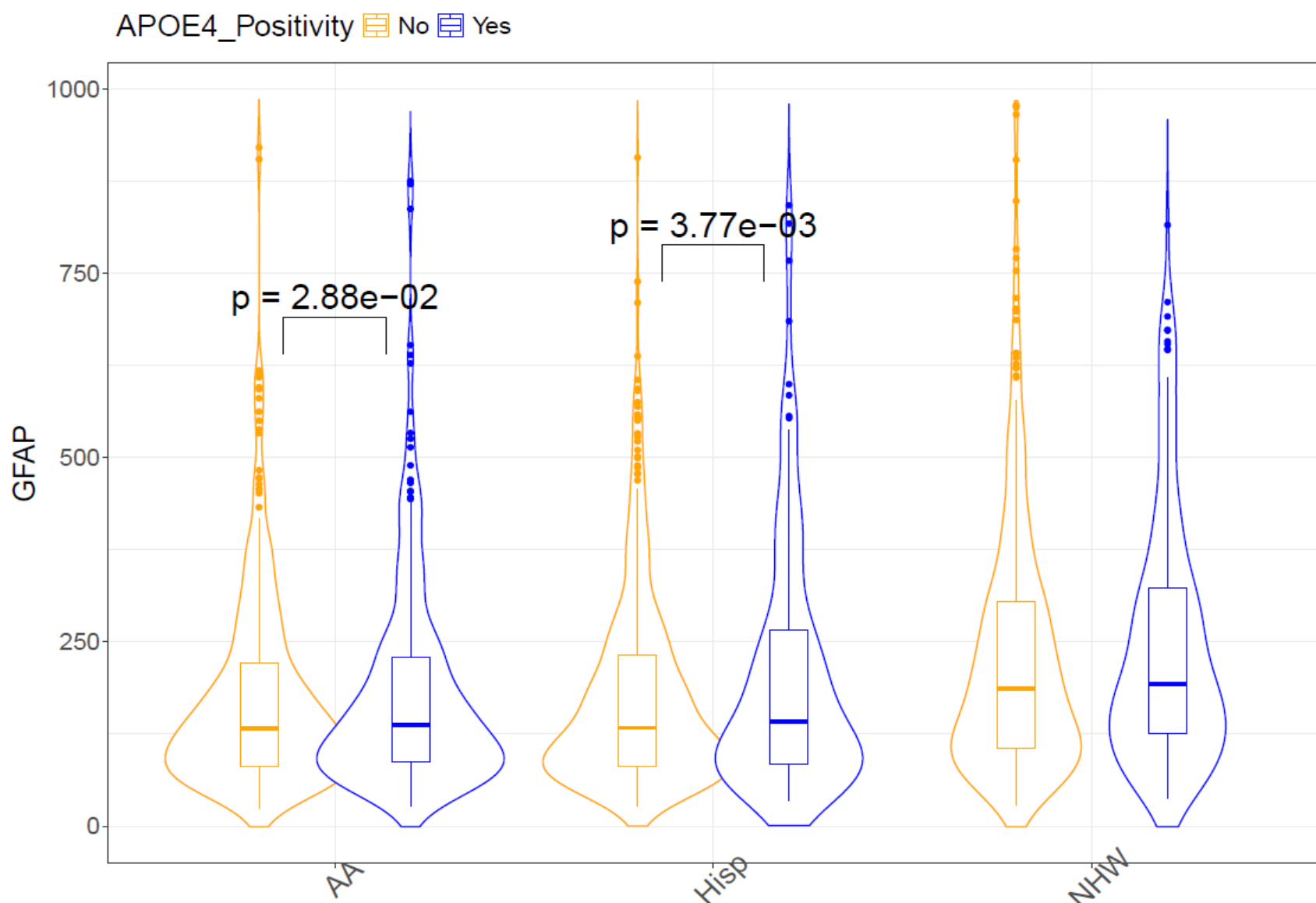
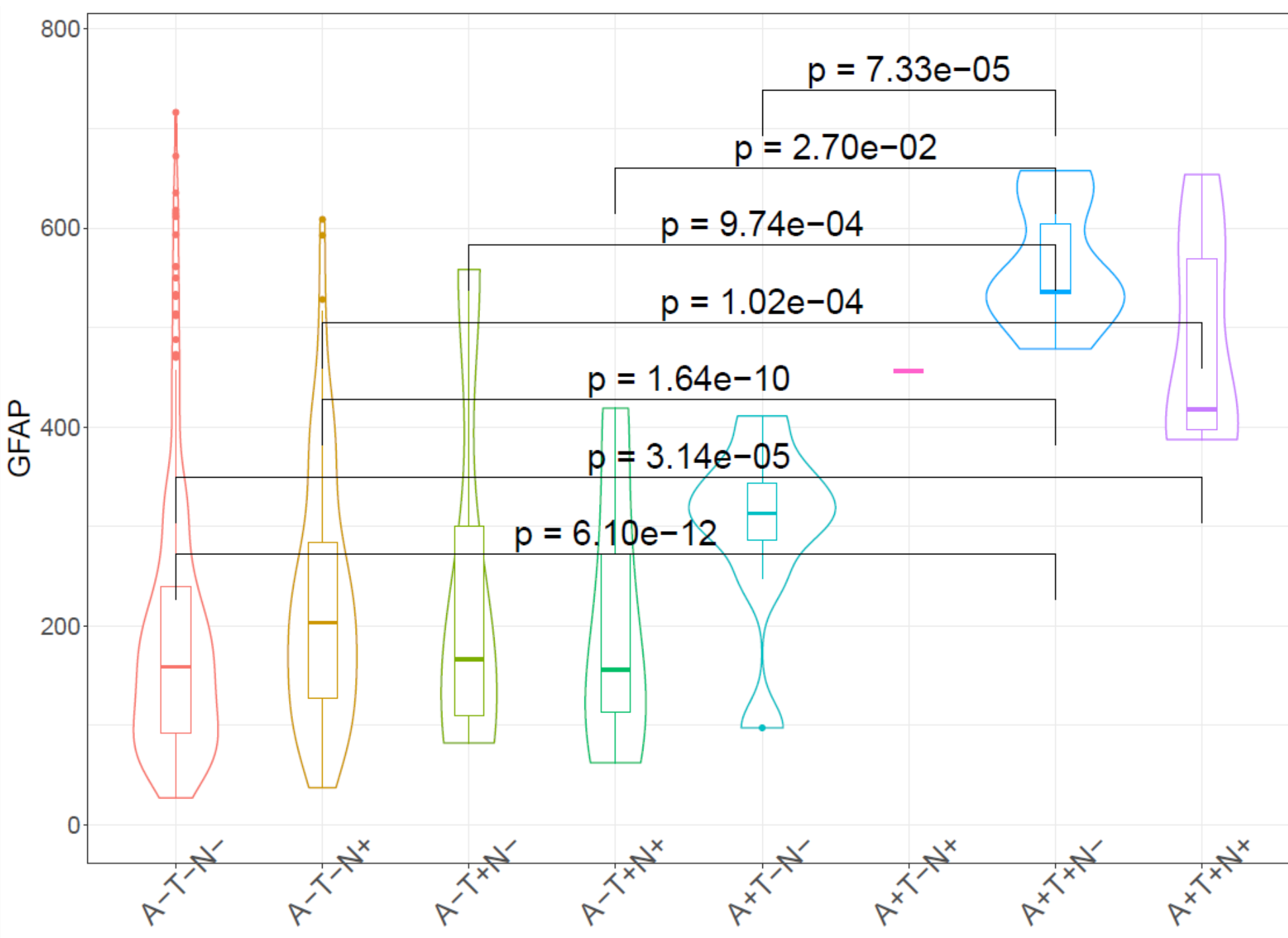


Figure 3. Violin plot of GFAP Concentrations by Race/Ethnic Group and APOE e4 Carrier Status



RESULTS

Figure 4. Violin plot of GFAP Concentrations by A/T(N) Status



- GFAP levels were found to differ across race/ethnic groups with NHWs presenting with higher levels as compared to NHBs
- While no difference was observed across race/ethnic groups in GFAP who were A+, there was a difference in GFAP levels among A- cases with lower levels found for NHBs as compared to either Hispanics or NHWs
- Stratified by *APOE e4* carrier status, higher GFAP levels were found for both *APOE e4* carriers among NHB and Hispanics compared to non-carriers, while this was not found to be the case for NHWs
- In the combined community cohort sample when stratified by A/T(N) status, violin plots revealed higher levels of GFAP among amyloid positive (A+) cases (regardless of T or N positivity) as compared to amyloid negative (A-)

CONCLUSION

- At the community level, GFAP was shown to differ within the context of A/T(N) status across demographic factors
- APOE e4* carrier status was shown to impact levels but for those other than NHWs highlighting differing risk

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