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Author

Garcia, David, PhD

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Machine Learning Quantification of Amyloid-β deposits in three brain regions of over 250 Hispanic and Non-Hispanic White Decedents with Alzheimer Disease

David Garcia*, Shivam Rajendra Rai Sharma[2], Naomi Saito[3], Laurel Beckett[3], Charles S. DeCarli[4], David Gutman[5], Juan Vizcarra[5], David G. Coughlin[6], Andrew F. Teich[7], Lorena Garcia[3], Dan M. Mungas[6], Chen-Nee Chuah[2], Brittany N. Dugger[1]

[1] Department of Pathology and Laboratory Medicine, University of California Davis School of Medicine
[2] Department of Electrical and Computer Engineering, University of California, Davis
[3] Department of Public Health Sciences, University of California Davis School of Medicine
[4] Department of Neurology, University of California Davis School of Medicine
[5] Departments of Neurology, Psychiatry, and Biomedical Informatics, Emory University School of Medicine
[6] Department of Neurology, University of California San Diego
[7] Departments of Neurology, Pathology, and Cell Biology, Columbia University Medical Center
*Corresponding author: drdgarcia@ucdavis.edu

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Abstract: Historically, there have been limited autopsy-based studies on persons of Hispanic descent in the realm of Alzheimer Disease (AD). Evaluating more diverse cohorts with ML tools can aid in providing deeper phenotyping on the heterogeneity of the neuropathologic landscape in AD. Our objective was to evaluate densities of amyloid beta (Aβ) deposits in non-Hispanic White decedents (n = 185) and Hispanic decedents (n = 92). Three brain regions were evaluated: frontal, temporal, and parietal cortices. We utilized a previously published ML pipeline to evaluate grey matter and white matter densities (#/um^2) for cerebral amyloid angiopathy, cored and diffuse Aβ plaques and their relation to select pathological, clinical, and demographic variables. Log-transformed linear models of neuroanatomic specific quantification of Aβ deposits revealed 1.71-fold higher CAA density in the temporal lobe GM (95% CI 1.17, 2.51), and lower cored plaque density in the frontal and parietal lobes WM of HD compared to NHWD (0.72-fold (0.56, 0.93) and 0.69-fold (0.52, 0.91) respectively). This study further validates a prior published pipeline and reveals similarities and differences in Aβ densities in a diverse cohort, demonstrating the need for more generalizable results to aid in precision medicine approaches for AD.

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