Microglia heterogeneity in the hippocampus of Alzheimer's disease, dementia with Lewy bodies, and hippocampal sclerosis of aging

Adam Bachstetter, PhD[1] • Linda Van Eldik, PhD[2] • Eseosa Ighodaro[2] • Erin Abner, PhD[2] • Peter Nelson, MD, PhD[2]

13b

[1]Spinal Cord and Brain Injury Research Center, University of Kentucky • [2]Sanders-Brown Center on Aging, University of Kentucky

Background: There is an increasing support for the hypothesis that microglia participate in Alzheimer's disease (AD) pathogenesis.

Purpose: Despite the extensive neuropathological, genetic, and biochemical characterization of microglia in AD little is known about microglial morphology in other common forms of age-related dementia: particularly, dementia with Lewy bodies (DLB) and hippocampal sclerosis of aging (HS- Aging).

Methods: Here we studied cases with pathologically-confirmed AD (n=7), HS-Aging (n=7), AD + HS-aging (n=4), DLB (n=12), and normal (cognitively intact) controls (NC) (n=9) from the University of Kentucky Alzheimer's Disease Center autopsy cohort. The Aperio ScanScope digital neuropathological tool was used along with two well-known microglial markers: IBA1 (a marker for both resting and activated microglia) and CD68 (a lysosomal marker in macrophages/microglia associated with phagocytic cells).

Results: We describe variation in microglial characteristics that show some degree of disease specificity, including, (1) increased microglia density and number in HS-aging and AD + HS-aging;

(2) low microglia density in DLB; (3) increased number of dystrophic microglia in HS-aging; and (4) increased proportion of dystrophic to all microglia in DLB.

Conclusions: Variations in morphologies among microglial cells, and cells of macrophage lineage, can help guide future work connecting neuroinflammatory mechanisms with specific neurodegenerative disease subtypes.