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MEETING ABSTRACTS

BUTYRYLCHOLINESTERASE GENETIC POLYMORPHISM AND NEUROIMAGING BIOMARKERS IN ALZHEIMER'S DISEASE

DeBay, Drew R.[1]; Maxwell, Selena[1]; Luke, David[1]; Fisk John D.[2]; Burrell, Steve[3]; Bowen Chris V.[3]; Song, Xiaowei; Black, Sandra E[5].; Darvesh, Sultan[1,6]

[1] Dalhousie University Departments of Medical Neuroscience, Halifax NS, Canada
[2] Dalhousie University Departments of Psychiatry, Halifax NS, Canada
[3] Dalhousie University Departments of Radiology, Halifax NS, Canada
[4] ImageTech Laboratory, Surrey Memorial Hospital, Health Science and Innovation, Fraser Health Authority, Surrey, BC, Canada
[5] University of Toronto & Sunnybrook Health Sciences Centre Department of Medicine (Neurology), Toronto, Ont., Canada
[6] Dalhousie University Departments of Medicine (Neurology), Halifax NS, Canada

Objective: The influence of butyrylcholinesterase (BChE) genetic polymorphism in Alzheimer's (AD) remains controversial. *BCHE*-K and *BCHE*-A genetic variants cause reduction of BChE, an enzyme implicated in AD. Some studies have reported a protective effect of *BCHE*-K, others suggest increased AD risk, particularly when associated with *APOE4*. We utilized a candidate gene-driven analyses to determine the effects of *BCHE*-K and *BCHE*-A on AD biomarkers using ADNI data (http://adni.loni.ucla.edu/).

Methods: Participants were genotyped for *BCHE*-K (615) and *BCHE*-A (785), each stratified into control (C), MCI or AD groups. MRI, ^{18}F-FDG and amyloid-PET were assessed. ANCOVA compared main effects of i)diagnosis, ii)^{BCHE}-K, iii)*BCHE*-A and iv)*APOE4* status on each biomarker with age, education and sex as covariates.

Results: The allelic frequency was 20.8%, 4.6% and 26.5% for *BCHE*-K, *BCHE*-A and *APOE4*. For MRI, main effects for diagnosis were significant ($p<0.0001$), with reduction in whole-brain and selected regional volumes (7-27%, $p\leq6x10^{-6}$) in AD vs. C. For 18FDG-PET, the main effect for diagnosis was significant (p=5x10-9), with 14% decrease in metabolism in AD vs. C ($p=7x10^{-10}$). For amyloid-PET, the main effects for diagnosis and *APOE4* status were significant (p=0.034; $p=3x10^{-6}$), with 12% increase in retention in AD vs. C (p=0.023) and 16% increase among carriers of at least one *APOE4* allele vs. non-carriers ($p=8x10^{-6}$). No significant effects of these biomarkers were observed due to *BCHE*-K or *BCHE*-A status ($p\geq0.209$).

Conclusions: These data suggest *BCHE*-K or *BCHE*-A may not significantly effect structural, metabolic or molecular AD biomarkers. Further ROI/voxel-wise analyses are warranted to uncover potential regional changes among AD *BCHE* variants.

Keywords: Alzheimer's disease; butyrylcholinesterase genetic variants; neuroimaging; amyloid-PET; FDG-PET