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66 Omega-3 Fatty Acids, Cognition, and Brain Volume in Healthy Elderly Adults

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Objective: One common concern amongst the aging population is that of worsening memory. Speed of processing and executive functions are also areas of age-related decline that affect daily living. Lifestyle modifications such as diet, exercise, and sleep have garnered intense interest as potential methods to prevent or delay cognitive decline. Among dietary factors, omega-3 fatty acids (FAs) have been documented as containing a myriad of health benefits, including neuroprotective effects. The aim of this study is to examine the associations between omega-3 FAs, cognitive function, and neuroanatomical regions of interest in a healthy aging population.
Participants and Methods: Adults aged 65 and older (n=40, 48.9% Female) were recruited for the Loma Linda University Adventist Health Study-2 Cognitive and Neuroimaging Substudy. Participants had a mean age of 76.25 years (SD=8.29), 16.78 years of education (SD=2.53), and were predominantly White (85.0%). Participants received a two-hour neurocognitive battery, including measures of immediate and delayed memory (Rey Auditory Verbal Learning Test, RAVLT; WMS-IV Logical Memory, LM), processing speed (Stroop), and executive functions (Stroop Color/Word). Participants underwent brain imaging on a 3T Siemens MRI, including a 3D T1-weighted MPRAGE sequence. Cortical reconstruction and volumetric segmentation were performed using FreeSurfer software. Blood samples were collected for fatty acid analysis. Individual FAs were expressed as a percent of total FAs. An omega-3 index was constructed as the sum of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) FAs. Correlational analyses, controlling for age, sex, and education, investigated relationships between omega-3 levels (individual and index) and (a) cognitive function (immediate and delayed memory, processing speed, executive functions), and (b) brain volumes in specific regions of interest (hippocampus, entorhinal cortex, frontal pole, white matter).
Results: EPA was significantly positively correlated with Stroop Color (r=.34, p=.048). Although not statistically significant, trends were observed between the omega-3 index and Stroop Color (r=.30, p=.08), and between both DHA and the omega-3 index with RAVLT – delayed recall (r=.29, p=.095; r=.30, p=.08, respectively). With regards to regional brain volumes, EPA and the omega-3 index were both significantly positively correlated with the entorhinal cortex (r=.34, p=.041; r=.41, p=.01, respectively) and white matter volume (r=.36, p=.028; r=.34, p=.038, respectively). DHA was significantly positively correlated with white matter volume (r=.34, p=.044).
Conclusions: Blood levels of EPA were positively correlated with a measure of processing speed, and trends were observed between DHA, the omega-3 index and[GN1] verbal memory, and between the omega-3 index and processing speed. We also found that omega-3 FA values were associated with greater brain volume in the entorhinal cortex and white matter in our sample of healthy older adults. Atrophy of the entorhinal cortex has been associated with pathological processes. Additionally, white matter is known to effect processing speed. These findings may offer support for the idea that omega-3 FAs exert their neuroprotective effects by fortifying areas of the brain, specifically the entorhinal cortex and white matter, that promote maintenance of cognitive function in late life.

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67 Cognitive Reserve, Depressive Symptoms, and Functional Ability in Older Adults

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