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Prospective Relations between Red Blood Cell ω -6 and ω -3 Fatty Acid Composition and Cognitive Function among Older Puerto Rican Adults

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Objectives: To examine the association between red blood cell (RBC) ω -6 and ω -3 fatty acid (FA) composition and cognitive function over 2-y follow-up among older U.S. mainland Puerto Ricans.

Methods: Data are from the Boston Puerto Rican Health Study (74% female; 57 \pm 8 y). RBC membrane FA status was ascertained at baseline. Individual FA were expressed as a percentage of total FA identified. Cognitive function was measured at baseline and at 2-y using the Mini-Mental State Exam (MMSE), where a higher score ranging from 0-30 indicates better function. Cognitive impairment was defined as MMSE scores \leq 21, \leq 23, and \leq 24 for those with less than a 9th grade education, a 9th to 12th grade education, and some college education or higher, respectively. Relations between FA and MMSE scores were examined in 946 participants and incidence of cognitive impairment among those considered to be cognitively normal at baseline (n=639).

Results: In multivariate models additionally adjusted for baseline MMSE, total ω -6 FA (quartiles) were associated with lower MMSE score at 2-y (P-trend=0.003). Total ω -3 FA were positively (P-trend=0.04) and the ω -6: ω -3 ratio inversely (P-trend=0.007) related to 2-y MMSE, but these relationships attenuated with adjustment for baseline score. The incidence of cognitive impairment at follow-up was 22%. In multivariate models, a 1% increase in total ω -6 FA related to a 9% greater incidence of cognitive impairment [RR=1.09 (95% CI: 1.00, 1.18), P=0.04]. Total ω -3 FA were inversely related to incident cognitive impairment [RR=0.92 (0.81 to 1.05), P=0.21], whereas the ω -6: ω -3 ratio was positively associated [RR=1.12 (95% CI: 0.98, 1.26), P=0.08].

Conclusions: An objective biomarker of ω -6 FA consumption was associated with poorer cognitive function and incidence of cognitive impairment over 2-y follow-up, suggesting that greater intakes of food sources of ω -6 FA may play a role in cognitive decline among older U.S. mainland Puerto Ricans.