Abstract Title: Fish, Fatty Acid Biosynthesis Genes, and Multiple Sclerosis Susceptibility

Press Release Title: Eating Fish May Be Tied to a Reduced Risk of MS: Study Recommends Just How Much Fish May Be Beneficial

Objective: To determine whether higher fish intake is associated with a reduced risk of multiple sclerosis (MS) and, if so, whether single nucleotide polymorphisms (SNPs) in fatty acid biosynthesis genes are also associated with MS risk.

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Background: Marine diet is the best source of omega-3 polyunsaturated fatty acids (PUFAs). High fish intake has been associated with a lower risk of MS but whether this is due to PUFAs or other nutrients is unclear. SNPs in the fatty acid desaturase (FADS) gene cluster that modulate fatty acid levels have been associated with cognition, cardiovascular disease and inflammation. Whether they are associated with MS is unknown.

Design/Methods: We examined the association of fish consumption, 13 tag SNPs in FADS1, FADS2 and ELOV2 with risk of MS in 1,153 individuals from the MS Sunshine Study, a multi-ethnic matched case-control study of incident MS or its precursor, clinically isolated syndrome (CIS), recruited from Kaiser Permanente Southern California. High fish intake was defined as consuming fish ≥1/week or 1-3 servings/month + fish oil supplements. Logistic regression models were utilized and adjusted for age, sex, smoking, genetic ancestry and HLADRB1*15:01.

Results: High fish intake was associated with a 45% reduced risk of MS/CIS (adjusted OR=0.55; 95%CI 0.40-0.75; p=0.0002) compared with consuming fish <1/month and no supplements. Two tag SNPs, rs174611 and rs174618, in FADS2 were independently associated with a lower risk of MS even after accounting for high fish intake (adjusted ORs 0.66, 0.64, p=0.007, 0.016, respectively).

Conclusions: These analyses support a protective role of fish consumption and PUFA biosynthesis on MS risk. These findings suggest that omega-3 fatty acids may play an important role in reducing MS risk. Future studies to replicate our findings and determine whether this is mediated by the anti-inflammatory, metabolic and/or neurological functions of PUFAs are needed.

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