Exploration of the perceived and actual benefits of omega-3 fatty acids and the impact of FADS1 and FADS2 genetic information on dietary intake and blood levels of EPA and DHA

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ABSTRACT

From a global health perspective, increased intake of omega-3 fatty acids (FAs), in particular eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), are beneficial for human health. However, the consumption of EPA- and DHA-rich foods such as fatty fish is low in the Western diet. Therefore, finding new ways to motivate people to increase their consumption of omega-3 FAs is essential. In order to find effective ways to motivate individuals, understanding people's awareness of omega-3 FAs and how they obtain their knowledge about nutrition and health is critical. Consequently, we developed an online survey to assess awareness and self-reported intake of omega-3 FAs and supplements in young adults.

EPA and DHA are also produced endogenously to a limited extent through a pathway regulated by fatty acid desaturase 1 and 2 (FADS1 and FADS2) genes. Of relevance, single nucleotide polymorphisms (SNPs) in the FADS genes influence levels of omega-3 FAs, where minor allele carriers have lower levels compared to major allele carriers. Accordingly, we conducted a

clinical trial to investigate FA levels in response to dietary EPA and DHA supplementation in young adults stratified by SNPs in FADS1 and FADS2.

The level of reported awareness of omega-3 terminology varied depending on an individual's field of study and thus providing all participants with the same set of nutrition information could be an effective tool to increase knowledge and motivate behavior change. Additionally, the variation in FA levels in accordance to SNPs in FADS1 and FADS2 could be used to create tailored nutritional recommendations which may improve lifestyle habits. The results discovered in the first two studies regarding awareness of omega-3 FAs and genetic variation were subsequently used to design a nutrigenetics intervention in young adults. Individuals who received their FADS1 genetic information were more aware of different omega-3 FAs and reported fewer barriers to their consumption by the end of the study, compared to those who did not receive their personal genetic information. All participants increased their intake of EPA and DHA, which was reflected in blood RBC levels.

Overall, this thesis demonstrates the power of combining nutritional and genetic information as motivators to increase omega-3 consumption.

Current Assignment: Currently completing a 2-year post-doctoral fellowship at Weight Watchers International. Joined the Science team and will work closely with the Science Manager and Chief Scientific Officer. Will evaluate scientific literature for the purposes of business development; complete literature review and content analysis for product and innovation teams; conduct research on Weight Watchers member data.