**PRESENTATION TIME: 4:00 PM – 4:10 PM**

**PRESENTER: Frank Qian**

**CIRCULATING OMEGA-3 POLYUNSATURATED FATTY ACIDS AND INCIDENT TYPE 2 DIABETES MELLITUS: RESULTS FROM TWO PROSPECTIVE COHORTS OF US MEN AND WOMEN AND AN UPDATED META-ANALYSIS OF PROSPECTIVE STUDIES**

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**BACKGROUND:**In prospective studies, relationship of self-reported consumption of fish and circulating levels of omega-3 fatty acids and incident type 2 diabetes (T2D) have found inconsistent results. We tested the hypothesis that circulating fatty acid biomarkers of omega-3 fatty acids, ALA, EPA, DPA, and DHA are associated with lower incident diabetes in two prospective cohorts of women and men.

**MATERIALS AND METHODS:**Among 2,998 adults aged 30-75 years and free of prevalent diabetes at baseline, total plasma and erythrocyte fatty acids were measured in blood collected in 1989-90 (Nurses’ Health Study) and 1993-94 (Health Professionals Follow-Up Study). Incident diabetes through 2010 was confirmed by validated supplementary questionnaire based on symptoms, diagnostic tests, and medications. Risk was assessed using Cox proportional hazards, with cohort findings combined by fixed-effects meta-analysis.

**RESULTS:**During a mean follow-up of 15.2 years, 258 new cases of diabetes were diagnosed. In pooled multivariate analyses adjusting for demographics, lifestyle, diet, and other circulating fatty acids, individuals with higher plasma DPA had a 29% lower risk (Q4 vs. Q1 – HR: 0.71, 95% CI: 0.47 - 1.06, *Ptrend* = 0.03); DHA had a 46% lower risk (HR: 0.54, 95% CI: 0.35 - 0.83, *Ptrend* < 0.001); and EPA + DPA + DHA had a 33% lower risk (HR: 0.67, 95% CI: 0.43 - 1.03, *Ptrend* = 0.01). Findings were similar for erythrocyte fatty acids, though with wider confidence intervals, with DPA and EPA + DPA + DHA achieving statistical significance. We found a stronger inverse association for DPA among men. Meta-analysis showed an inverse association with higher levels of DPA and DHA and incident T2D, though there was considerable heterogeneity.

**CONCLUSIONS:**In two prospective cohorts and in an updated meta-analysis of prospective studies, higher plasma omega-3 fatty acid concentrations were associated with lower incident diabetes. Our findings highlight need to better understand potential mechanisms through which these fatty acids affect the pathogenesis of T2D.

**CONTENT CATEGORY:** Epidemiology

**KEYWORDS:***Diabetes, Type 2; Biomarkers; Diet and nutrition; Omega-3 PUFA; Nutritional epidemiology*