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Dietary Fish and ω-3 Fatty Acid Consumption and Heart Rate Variability in US Adults

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***Background*—** Fish and ω-3 fatty acid consumption reduce risk of cardiac death, but mechanisms are not well established. Heart rate variability (HRV) predicts cardiac death and reflects specific electrophysiological pathways and influences. We hypothesized that habitual consumption of fish and marine ω-3 fatty acids would be associated with more favorable HRV, elucidating electrophysiological influences and supporting effects on clinical risk.

***Methods and Results*—** In a population-based cohort of older US adults, we evaluated cross-sectional associations of usual dietary fish and ω-3 consumption during the prior year and ECG-derived (n=4263) and 24-hour Holter monitor–derived (n=1152) HRV. After multivariable adjustment, consumption of tuna or other broiled/baked fish was associated with specific HRV components, including indices suggesting greater vagal predominance and moderated baroreceptor responses (eg, higher root mean square successive differences of normal-to-normal intervals [*P*=0.001]; higher normalized high-frequency power [*P*=0.008]; and lower low-frequency/high-frequency ratio [*P*=0.03]) and less erratic sinoatrial node firing (eg, lower Poincaré ratio [*P*=0.02] and higher short-term fractal scaling exponent [*P*=0.005]) but not measures of circadian fluctuations (eg, 24-hour standard deviation of normal-to-normal intervals). Findings were similar for estimated dietary consumption of marine ω-3 fatty acids. For magnitudes of observed differences in HRV comparing the highest to lowest category of fish intake, differences in relative risk of cardiac death during 10.8 years of follow-up ranged from 1.1% (for difference in standard deviation of normal-to-normal intervals) to 5.9% and 8.4% (for differences in Poincaré ratio and short-term fractal scaling exponent) lower risk.

***Conclusions*—** Habitual tuna/other fish and marine ω-3 consumption are associated with specific HRV components in older adults, particularly indices of vagal activity, baroreceptor responses, and sinoatrial node function. Cellular mechanisms and implications for clinical risk deserve further investigation.