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LEHTOVIRTA, MIIA: Effect of Infancy-onset Dietary Intervention On a Comprehensive Metabolic Profile from Childhood to Early Adulthood. The Special Turku Coronary Risk Factor Intervention Project (STRIP).

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Dietary choices may delay or prevent atherosclerosis. Effects of dietary saturated fat replacement on circulating concentrations of metabolic biomarkers remain unknown. We studied the effects of repeated, infancy-onset dietary counseling on a detailed metabolic profile.

The Special Turku Coronary Risk Factor Intervention Project (STRIP) study is a longitudinal, randomized atherosclerosis prevention trial in which repeated dietary counseling aimed at reducing the proportion of saturated fat intake. Nuclear magnetic resonance metabolomics quantified circulating metabolites from serum samples assessed at age 9 (n=554), 11 (n=553), 13 (n=508), 15 (n=517), 17 (n=457) and 19 (n=417). Intervention reduced dietary intake of saturated fat (mean difference in daily percentage of total energy intake: -2.1 [95% confidence interval: -1.9, -2.3]) and increased intake of polyunsaturated fat (0.6 [0.5, 0.7]). The intervention led to higher proportions of polyunsaturated fat ($P < 0.001$), with higher proportions of omega-3 ($P = 0.02$) and omega-6 ($P < 0.001$) fatty acids. The proportion of saturated fatty acids in serum was lowered for both sexes ($P < 0.001$). The proportion of monounsaturated fat was lower for intervention boys ($P < 0.001$). The intervention reduced intermediate-density-lipoprotein and low-density-lipoprotein lipid concentrations ($P < 0.01$). Very-low-density lipoprotein lipid concentrations and particle size were reduced for the intervention boys. Effects on non-lipid biomarkers were minor.

Repeated dietary counseling from infancy to early adulthood yielded favorable effects on multiple circulating fatty acids and lipoprotein subclass lipids, particularly in boys. These molecular effects substantiate the beneficial role of saturated fat replacement on the metabolic risk profile.

Key Words: diet, fatty acids, metabolomics, primordial prevention