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Comparison of the fatty acid composition of the serum phospholipids of controls, prediabetics and adults with type 2 diabetes

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ABSTRACT

Objective: Although abnormalities in the fatty acid composition of serum and red cell membrane phospholipids of patients with type 2 diabetes are well-documented, lacking are studies of this issue in prediabetic individuals. Materials/Methods: For this cross-sectional study, we recruited 180 subjects (30 - 80 years), 56 of whom were normal with regard to glucose control (HbA1c, <5.7%), 61 who had prediabetes (HbA1c, 5.7% - 6.4%) and 59 who had type 2 diabetes (HbA1c, >6.5%). Serum phospholipids were isolated and analyzed for fatty acids. Results: Most importantly, the fatty acid compositions of the controls and prediabetic subjects were not different for 19 fatty acids. However, the fatty acid profile of the phospholipids of the patients with diabetes differed from the other two groups; the 14 to 18-carbon saturated fatty acids were decreased by 12% - 26% whereas the unsaturated fatty acids 16:1n-7, 18:1n-9, 18:2n-6, 20:3n-6 and 20:4n-6 were increased by 45% - 64%. Of note, the docosahexaenoic acid (DHA) status of individuals in all three study groups was remarkably low compared with international values, as indicated by DHA proportions in the 1.62% - 2.07% range, and there were no differences between groups. The mean melting point of the phospholipid fatty acids of the diabetic patients (32.2℃) was significantly lower ($p < 0.001$) than that of the prediabetic subjects (38.1℃) and the controls (39.9℃) which were not different from each other. Conclusion: These observations indicate that the fatty acid changes associated with type 2 diabetes follow the onset of the disease as opposed to being a causative factor of poor glucose control and insulin insensitivity.

KEYWORDS

Pre-Diabetes; Type 2 Diabetes; Fatty Acids; Phospholipids; Fluidity

Cite this paper

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