

# Abstract

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## **Fatty acids measured in plasma and erythrocyte-membrane phospholipids and derived by food-frequency questionnaire and the risk of new-onset type 2 diabetes: a pilot study in the European Prospective Investigation into Cancer and Nutrition (EPIC)-Norfolk cohort.**

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**BACKGROUND:** Epidemiologic evidence for the association between types of fatty acid and risk of type 2 diabetes is inconsistent. This may in part be due to the limitations of fatty acid measurement methods.

**OBJECTIVE:** The objective was to use 3 different measures of fatty acid to estimate the prospective association between fatty acid composition and development of incident diabetes.

**DESIGN:** We analyzed 199 cases of clinically incident diabetes and 184 noncases aged 40-79 y at baseline in the EPIC (European Prospective Investigation into Cancer and Nutrition)-Norfolk study. Fatty acids were derived from a food-frequency questionnaire (FFQ) and measured in plasma phospholipid (P-FA) and erythrocyte-membrane phospholipid (Ery-FA) fractions by gas chromatography.

**RESULTS:** There were stronger associations with diabetes risk with the use of objectively measured fatty acids (P-FA and Ery-FA) than with the FFQ in analyses adjusted for age, sex, and potential confounders. Positive associations with diabetes were greater in magnitude with the use of P-FA than with Ery-FA (highest:lowest tertiles): for example, the palmitic acid odds ratios (ORs) were 2.47 (95% CI: 1.37, 4.46) and 1.96 (95% CI: 1.10, 3.49), respectively. Inverse associations with diabetes were also stronger with the use of P-FA than with Ery-FA: for example, the OR for linoleic acid was 0.50 (95% CI: 0.28, 0.91) compared with 0.77 (95% CI: 0.43, 1.37), respectively.

**CONCLUSIONS:** The objective measurement of fatty acids with the use of either P-FA or Ery-FA identifies important associations with diabetes incidence that may be missed when assessed by FFQ. Fatty acids measured in P-FA appear to be more strongly associated with diabetes incidence. These findings endorse the use of objective measurement of fatty acids for nutritional-epidemiologic studies, and the apparently stronger findings for the plasma fraction should be confirmed in larger studies and in different populations.

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