

# Different types of PUFAs are associated with differential risks for type 2 diabetes

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Different types of circulating polyunsaturated fatty acids (PUFAs) are associated with differing future risk of type 2 diabetes, according to a large European study authored by Nita Forouhi of the MRC Epidemiology Unit at the University of Cambridge, United Kingdom and colleagues, and published as part of the *PLOS Medicine* Special Issue on Diabetes Prevention.

Most dietary guidelines recommend the consumption of polyunsaturated [fatty acids](#) for cardiovascular health, but it is unclear whether or how the individual types of [omega-3](#) and omega-6 polyunsaturated fatty acids are related to type 2 diabetes. In particular, there is ongoing controversy on the health effects of linoleic acid, the most abundant omega-6 fatty acid.

The researchers measured circulating PUFAs in the blood samples of individuals from eight countries in Europe, who were part of EPIC-Interact, the world's largest study of new-onset type 2 diabetes. They compared baseline levels of 11 different PUFAs (4 long-chain omega-3 PUFAs and 7 omega-6 PUFAs) between 12,132 individuals who subsequently developed type 2 diabetes over a follow-up period of approximately 10 years (n=12,132) and 15,919 individuals in a sub-cohort representative of the whole EPIC study population.

After adjusting for a number of factors that might influence risk of type 2 diabetes (e.g. age, sex, body mass index, physical activity, socioeconomic status, smoking, alcohol, diet and pre-existing health conditions), they found that higher levels of omega-6 linoleic acid, which originates from diverse food sources including vegetable oils, were associated with a lower risk of future type 2 diabetes. In contrast, higher levels of four other minor individual [omega-6 fatty acids](#) were associated with higher type 2 diabetes risk, while omega-3 fatty acids typically derived from fish or seafood sources were not associated with future

diabetes, and alpha linolenic acid, a plant-origin [omega-3 fatty acid](#) was associated with a lower diabetes risk.

The authors acknowledge limitations of their research including their inability to distinguish between dietary and metabolic influences on circulating blood PUFAs, the possible residual role of other factors that they accounted for in the analyses, and the observational nature of their research, but their use of blood biomarker fatty acids helps to reduce issues of measurement error that arise from using dietary self-report that relies on questionnaires. This research does not support any adverse association of the major omega-6 PUFA on the development of type 2 [diabetes](#). By combining large-scale population data with advanced laboratory analysis, their research highlights a case to look more closely at the contribution of individual types of circulating polyunsaturated fatty acids rather than placing emphasis on the entire class of polyunsaturated fatty acids.

**More information:** Forouhi NG, Imamura F, Sharp SJ, Koulman A, Schulze MB, Zheng J, et al. (2016) Association of Plasma Phospholipid n-3 and n-6 Polyunsaturated Fatty Acids with Type 2 Diabetes: The EPIC-InterAct Case-Cohort Study. *PLoS Med* 13(7): e1002094. DOI: [10.1371/journal.pmed.1002094](https://doi.org/10.1371/journal.pmed.1002094)

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