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## Abstract

# Potential of Plasma Oxylipin Signature to Better Understand the Relationships between Diet, Fatty Acids and Oxylipins in Healthy Individuals: New Insights from Two Independent Cohort Studies <sup>†</sup>

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**Abstract:** Eicosanoids and other oxylipins represent a superfamily of bioactive lipids involved in the regulation of crucial biological processes such as inflammation, blood clotting or endothelial reactivity. Oxylipins are generated from polyunsaturated fatty acids (PUFAs) through various enzymatic and free-radical-mediated reactions. Interestingly, each metabolic step (PUFA availability, enzyme activity and oxidative stress) can be influenced by diet. Oxylipins could therefore be important mediators of the effects of diet on human health. To provide new insights into the relationships between oxylipins, fatty acids (FAs) and diet, we conducted two independent cohort studies nested in the Polish branch of the PURE international cohort and in the French Nutrinet-Santé cohort, respectively. The selected participants (n = 318) were healthy and fully characterized for their dietary intake. Our first objective was to determine if a healthy diet was associated with a specific oxylipin signature. Our secondary objective was to comprehensively investigate the relationships between diet, FAs and oxylipins. Participants were distributed into two groups according to the quality of their diet (based on the Alternative Healthy Eating Index (AHEI)). Targeted lipidomics was performed to comprehensively quantify plasma oxylipins and FAs. The association between oxylipins, FAs and the quality of the diet was modeled using conditional logistic regression. The relationships between oxylipins, FAs and diet were investigated using an unsupervised multiblock analysis (Multiblock Factorial Analysis (MFA)). We generated a unique database revealing unsuspected associations between diet, FAs and oxylipins. Validation studies are now required to further explore the potential of oxylipins to monitor the health effects of diet.

**Keywords:** lipid mediators; lipidomic; oxylipins; diet; health

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