Oleuropein, a component of extra virgin olive oil, lowers glycaemia in healthy subjects

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Summary
The Mediterranean diet with the consumption extra-virgin olive oil, has been linked with a lower risk of cardiovascular disease and has been associated with beneficial effects for numerous diseases, including metabolic disorders, and diabetes (2, 3). Indeed, it has been previously shown that consumption of extra-virgin olive oil reduces post-prandial glycaemia, by downregulation DPP4 (an enzyme that destroys incretin, which enables the production of more insulin) and thereby, allowing GLP1-mediated insulin secretion (4, 5). Overall, the effect of extra-virgin olive oil was attributed to its antioxidant capacity (4). Therefore, as an extension to those studies, in this work the authors used the major olive secoiridoid, oleuropein. The basis of their selection is the well-known antioxidant properties oleuropein (6-8).

Key points and implications
This study represents a cross over human volunteer trial. Briefly, following a ten day washout period, 20 healthy volunteers (mean age = 33.9 years, equal males and females), received 20 mg oleuropein or 20 mg placebo immediately before a carefully planned relatively high carbohydrate meal (lunch). Assessment was performed two hours following the meal (T120), and compared to baseline measurements (T0). Measurements included a glycaemic profile (glucose, insulin, DPP4, and GLP-1), and analysis of oxidative stress (Nox2-dp and 8-iso-PGF2α). The findings indicated that oleuropein improved all of the glycaemia-associated parameters. Similarly, oleuropein resulted in decreased parameters of Nox-2 mediated oxidative stress; decreases in Nox2-dp and 8-iso-PGF2α were observed. As an extension, an in vitro experiment was performed in which citrated blood samples were collected from healthy volunteers after fasting for at least 12 hours. This allowed isolation of platelet-rich plasma, which was treated with various concentrations (0.25-1 µg/mL hydroxytyrosol) for 20 minutes followed by treatment with 0.5 mM arachidonic acid, for analysis of p47phox phosphorylation and isoprostanes; hydroxytyrosol was chosen as it is a major metabolite of...
oleuropein and was measured at analogous in plasma from people receiving 20 mg oleuropein in the trial. The findings indicated dose-dependent decrease in the phosphorylation of p47phox and 8-iso-PGF2α, which corroborated with the findings of the oleuropein trial. Overall, these findings highlight that oleuropein can lower post-prandial glycaemia by a mechanism involving antioxidant activity and reduction of Nox2-mediated oxidative stress. This is a very important study as it not only demonstrates efficacy of oleuropein in human volunteers, but also provides insights into molecular mechanisms of action. Further studies, in the context of human disease are needed and highly anticipated.

Related publications
5. L. Bozzetto et al., Extra-Virgin Olive Oil Reduces Glycemic Response to a High-Glycemic Index Meal in Patients With Type 1 Diabetes: A Randomized Controlled Trial. Diabetes care 39, 518-524 (2016).