



The stomach as a “Bioreactor”: When red meat meets red wine

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- There is abundant data suggesting that Western-style diets, characterized by high intake of high-fat, red meat, processed meat, and processed and fried foods - but low intake of fruits and vegetables- tend to increase the risk of atherosclerosis and several kinds of cancer. One of the culprits seems to be the accumulation of lipid peroxidation products in the stomach, which later enter the blood. *Malondialdehyde* (MDA) is one of these peroxidation products, identified by several international laboratories as a potential biomarker of “biological oxidative stress”. *Lipid hydroperoxide* (LOOH) is another such marker, whose levels increase after eating a fatty meal.

- The current authors hypothesize that the stomach might act as a “bioreactor” where fatty partially-oxidized foods get further oxidized, resulting in the accumulation of harmful lipid peroxidation products. Additionally, they hypothesize that the inclusion in the diet of antioxidants –such as red wine- could reverse this peroxidation process and actually trigger an anti-oxidation process.

- To prove or disprove this theory, the researchers fed ground, red turkey meat (shaped as small cutlets and cooked until “well done”) to one population of rats; and the same meat plus a red wine concentrate to another rat population. By emptying the rat’s stomach contents 90 minutes after the meal, they were able to monitor the MDA and LOOH levels. In order to prevent these “markers of oxidative stress” from potentially moving out into the intestine, and using yet another population of rats, the researchers also emptied the rat’s stomachs at various intervals after the meal (by means of a syringe attached to their pylorus, the connection between stomach and intestine).

• Results.

- 1) When the stomachs of the rats were “closed” at the intestinal end, and the rats were force-fed a red meat meal, both LOOH and MDA levels increased approximately 2-fold. These proved that **lipid peroxidation takes place in the rat’s stomachs during food digestion**.

- 2) Following the “meat meal”, there was a reduction in hydroperoxide concentration – the marker associated with oxidation products -, but following the “meat + wine meal” this reduction was 3 times larger. In other words, **the presence of the red wine polyphenols** (not its alcohol, as the wine had been dealcoholized) **reduced lipid oxidation**. The same trend was observed with the MDA marker.

- 3) Ninety minutes after the consumption of the red meat meal, the MDA levels in plasma increased 50%, whereas the consumption of the same “meat + wine” not only prevented the MDA elevation in plasma, but reduced it by 34%.

In conclusion, the consumption of partially-oxidized food – red turkey cutlets- enhanced the lipid peroxidation process in the stomach, as well as their absorption into the blood. In contrast, the addition to the meal of antioxidants –red wine concentrate- reduced the formation of these cytotoxic compounds. Bottom line: diets high in fat and red meat constitute a health risk factor, whereas consumption of polyphenol-rich fruits and vegetables -and their derived beverages-, seem to reduce this risk factor and provide protective health benefits – at least in lab rats!

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