Reviewer's report

Title: New insights into the health effects of dietary saturated and omega-6 and omega-3 polyunsaturated fatty acids

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Reviewer: Veronique Chajes

Reviewer's report:

The authors reviewed animal and epidemiological data regarding the association between dietary saturated fatty acids (SFA), omega-6 polyunsaturated (PUFA) and omega-3 PUFA and health outcomes, particularly cardiovascular diseases and cancer risks. They concluded that the optimal dietary fat pattern recommended to reduce the risk of both cardiovascular diseases and most cancers should contain a low intake of SFA and omega-6 PUFA along with a moderate intake of omega-3 PUFA, which is characteristic of the Mediterranean diet model but far to be consumed at present in many populations.

This (mini)review is succinct, well-written, and well presented. The references are relevant and updated.

I have some major comments:

- Regarding the association with (breast) cancer risk, the authors reviewed data mostly on omega-6 PUFA. I would suggest to review also data on the association between saturated fatty acids, omega-3 fatty acids, monounsaturated fatty acids (cis and trans) and cancer risk, fatty acids which are all mentioned in the "introduction" section.

- In the "summary and prospects" section, the authors indicated that "regarding the intake of monounsaturated fatty acids…., it is critical to differentiate their food sources, since the health effects of oleic acid obtained from meat of from olive oil are obviously different. I would move (and develop) this sentence to the appropriate section (CVD and/or cancer) and add some references. Some recent studies reported an increased risk of cancer (including breast cancer) associated with increasing blood levels of oleic acid, a major fatty acid of the Mediterranean diet. The authors might add and comment these data in their review.

Minor comments:

- In the "dietary fat and cancer" section, the obesity status has been shown to affect the association between omega-3 long-chain PUFA and breast cancer risk, and not the association with omega-6 PUFA (reference 28).

- In the following sentence: “at the same time, omega-3 PUFA were shown to have chemopreventive properties against various cancers, including colon and breast cancer risk (references 33 and 34)”: for breast cancer, an association has been reported between omega-3 fatty acids and reduced risk of some breast
cancer events after diagnosis and all cause mortality, and not with breast cancer risk.

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

I declare that I have no competing interest' below.