Reviewer’s report

Title: Concurrent validity of skin carotenoid status as a concentration biomarker of vegetable and fruit intake compared to multiple 24-hour recalls and plasma carotenoid concentrations across one year: a cohort study

Version: 0 Date: 15 Sep 2019

Reviewer: Torsten Bohn

Reviewer's report:

General remarks

The authors present a manuscript on the correlation between measurements related to fruit and vegetable intake, as assessed via analyzing carotenoid concentrations. More specifically, fruit and vegetable intake (VF multiple 24 h recalls) are compared with carotenoid concentrations in plasma and by skin carotenoid status (SCS) as measured via either RAMAN (RRS) or reflection spectroscopy (RS), as measured during a 1 year period in a longitudinal study on 40-60 year old women.

It is found that RS and RRS strongly correlated, and RS correlated well with carotenoids at baseline and reasonably over the year. VF intake did not or only weakly correlate well with RRS and RS.

The study appears well-conducted, even though it was not originally designed to have SCS as the primary outcome. It is well presented, and results are of much interest, as it is important to find good proxy markers for VF intake, due to the associated health benefits. Specific suggestions are made below.

Specific points

1. Line 10 - unclear how many 24 h recalls were carried out per group ?
2. Line 22 - perhaps "SCS as measured by RS and RRS is…"
3. Line 38 - which tools are these - perhaps give a few examples.
4. Line 42 - what is meant by "the substance" ?
5. Line 96 - "all equally to this frequency…" - can you add a reference here ?
6. Lin 88ff - which instrument was used in this study ?
7. Line 113 - which food-database is used here - the USDA one ?
8. Line 125 - it is unclear which carotenoids were measured finally?

9. Line 125 - which were qualifying, which quantifier-ions measured? Which mode of the instrument was used - please give more information here. This is important, in order to understand better the obtained correlation results. For example, were colorless carotenoids such as phytoene and phytofluene also measured?

10. Line 185 - was it attempted to stratify for BMI - or taking this into account via creating regression models - also perhaps checking on other personal parameters?


12. Line 245 - add animal foods as an important source also.

13. Table 1, total plasma carotenoids: This is geometric mean plus minus SEM then?

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Please indicate how interesting you found the manuscript:

An article of importance in its field

**Quality of written English**
Please indicate the quality of language in the manuscript:

Acceptable

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