Reviewer's report

Title: Effects of acute ingestion of different fats on oxidative stress and inflammation in overweight and obese adults.

Version: 1 Date: 24 August 2011

Reviewer: Chris Fahs

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The manuscript by Peairs et al investigated the impact of different fats on post-prandial oxidative stress and inflammation in overweight and obese adults. The study was well conducted and the manuscript is well written. However, there are some areas in which the manuscript may be improved.

Major Compulsory Revisions

1) Table 1 presents average fasting levels of inflammatory, oxidative stress, and metabolic variables – is this the average of all three baseline values? If so, please make this clear in the methods.

2) The data were analyzed with RM ANOVA using the baseline values as a covariate; were there baseline differences between trials detected with a 1-way ANOVA? Please indicate.

3) The methods indicate that post hoc tests were only used to examine differences between treatments – was an adjustment made (Bonferroni) for multiple comparisons (alpha = 0.05/3 = 0.0167)? No mention of post hoc comparisons across time is mentioned. Figures 1 and 2 indicate that there were differences between specific time points for CRP, TNF-a, and 8-epi – was a correction made for multiple comparisons between time points? In line with this, only main effects of time and treatment are indicated in Table 2. It would be helpful to indicate any pairwise differences between treatments or between time points.

4) The authors speculate that the acute increase in NF-kB following omega-3 fatty acid consumption may be due to the lack of habitual dietary intake of omega-3 fatty acids. Was this assessed? Anti-oxidants were excluded for 2 weeks before the trial, did this include omega-3 fatty acids?

5) The authors state in the discussion that their study supports the increase in ICAM-1 following acute saturate fat ingestion by lean individuals(3rd paragraph on page 11) and SFA relative to MFA negatively impacted ICAM-1 (2nd main conclusion). From the data (Figure 1d) this reviewer does not understand the basis for this conclusion as the change in ICAM-1 was similar for both the omega-3 fatty acid meal and the saturated fat meal. The variability trial to trial (baseline values) for this measure appears to as great, if not greater than, the effect of any individual treatment. Please either remove or clarify this point.

6) The small sample size is an acknowledged limitation of the study. Although previous studies (as mentioned) have used similar sample sizes, it may be prudent for future studies to utilize larger sample sizes in order to detect
significant effects. Was an a priori power analysis performed for this study? Please include. If not, what was the observed power for the current study? This would be pertinent for future studies undertaking similar investigations.

Minor Essential Revisions

1) It is unclear why one data was missing for one subject, please include.
2) Regarding the two subjects unable to finish the milkshake on the first day, how much was actually consumed? Did this affect their individual responses relative to the group?
3) Was the omega-3 fatty acid supplement added to the milkshake or taken separately in pill form? Please clarify.
4) With 6 of the 10 subjects being female, were any of the subjects on birth control? Was the impact of menstrual cycle considered?
5) Subjects were instructed to follow the same pattern of eating for 3 days prior to each test day. How was this assessed? In the results, physical activity level is reported as not different between trials; how was this assessed?
6) Please acknowledge as a limitation that these results may only be applicable to overweight and obese individuals.

Discretionary Revisions

1) Please be consistent when referring to omega 3 fatty acids. In some places it is ‘n3FA’ and other places ‘omega 3 fats’.
2) Many of the references do not include the title of the Journal.

**Level of interest:** An article of importance in its field

**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 interests.