Reviewer's report

Title: No effect of a whole grain diet on the antioxidant capacity of humans

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Reviewer: Penny Kris-Etherton

Reviewer's report:

The authors evaluated the effect of a whole grain versus refined grain diet intervention on antioxidant capacity in free living subjects. Twenty healthy subjects participated in a randomized crossover study and consumed either a refined grain or whole grain diet for 14 days followed by the other diet for 14 days. Several measures of antioxidant status were measured including ORAC in blood and TBARS and isoprostanes in urine. The authors report no significant differences in any antioxidant measures in subjects between the refined and whole grain diets. The authors present several reasons why they did not observe benefits of whole grains on antioxidant status in the discussion section of the paper. It also is possible that antioxidant status differs in the postprandial state and not in the fasted state after which time antioxidants are cleared from the circulation. It could be argued that the urinary measurements of antioxidant status would address any effects of whole grain antioxidants in the postprandial period, however.

The results reported by the authors are somewhat surprising and go against current thinking that whole grains are higher in antioxidants than refined grains and should confer physiologic benefits (see the paper by Jang et al., Arter Thromb Vasc Biol 2001 21:2065-2071). Might the results reported reflect limitations with the experimental design (see below) or are there really no differences in antioxidant effects of whole grains versus refined grains. The authors need to address the following comments:

1. Please provide greater detail about the whole grain and refined grain foods that were given to subjects in the study. Did the whole grain foods provide 51% whole grains/product? The exact amount of whole grains eaten by each subject, as well as the type of whole grain would be interesting.

2. Was the WG “feeding” period long enough? That there was no wash out between diet periods raises the question about whether a wash out period was needed. Were there diet and treatment interactions (statistically) which indicate carry over effects of the treatments?

3. Was it appropriate to pool urine samples on days 13, 14, 27 and 28? Could the early samples cause a dilution of isoprostanes and TBARS that made treatment differences undetectable?

4. The ORAC data and urinary isoprostane data are suggestive of a possible WG treatment effect. Perhaps a greater WG intake or more subjects would resolve
this question. The authors should address this.

5. Please check line 338 – reference #21 appears twice.

In conclusion, strengths of this study are the multiple antioxidant assays employed and the free living study design which simulates real world practices. This reviewer is left with the question about whether WGs do affect antioxidant status in vivo and whether a different experimental design (see points above) might have yielded positive results.

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Acceptable

**Statistical review:** Yes, and I have assessed the statistics in my report.

**Declaration of competing interests:**

I declare that I have no competing interests