



Associations between food groups and biomarkers of inflammation: Are some foods groups more protective than others?

C. English¹, M. Jones², A. Lohning¹, H. Mayr¹, H. MacLaughlin³ and D. Reidlinger¹

¹Bond University, Faculty of Health Sciences and Medicine, Bond University; Robina, Queensland Australia

²Institute of Evidence-Based Healthcare, Faculty of Health Sciences and Medicine, Bond University; Robina, Queensland Australia

³Queensland University of Technology, School of Exercise and Nutrition Sciences, Faculty of Health, Brisbane, Australia

The consumption of healthy foods such as whole grains, vegetables, fruits, nuts, legumes, dairy, and fish is associated with decreased risk of cardiovascular disease (CVD). CVD is an inflammatory disease caused by atherosclerosis. Inflammation is measured clinically using hsCRP, however hsCRP is not specific to CVD. Novel pro-inflammatory markers, such as platelet-activating factor (PAF) and lipoprotein-associated phospholipase A2 (Lp-PLA₂), have garnered attention due to their specific roles in endothelial dysfunction and CVD risk. During the COVID 19 outbreak research highlighted a potential interaction between PAF and Lp-PLA₂ and the SARS COVID 19 virus⁽¹⁻³⁾ and related adenovirus-vector and mRNA vaccines.⁴ This cross-sectional study investigated the association between PAF, Lp-PLA₂, hsCRP, and intake of healthy food groups including fruit, cruciferous and other vegetables, grains, meat and poultry, fish and seafood, nuts and legumes, and dairy in 100 adults (49 ± 13 years, 31% male) with variable CVD risk. Data were collected across four groups during May and July 2021 (Groups 1 and 2 - CVD risk factors) and January and April 2022 (Groups 3 and 4 - no CVD risk factors). Fasting PAF, Lp-PLA₂ and hsCRP and usual dietary intake (food frequency questionnaire) were measured. Food intake was converted into serves and classified into food groups. Correlations and multiple regressions were performed. Contrary to expectations, mean PAF was lower for groups 1 and 2 (n = 46, mean PAF 3.31 ± 1.66 ng/mL) compared to groups 3 and 4 (n = 54, mean PAF 19.82 ± 12.95 ng/mL) p < 0.001 with a large effect size (eta squared 0.665). Cruciferous vegetables were associated with lower levels of PAF (β = -.27, CI [-0.41, -0.14], p < .001) with a one serve increase in cruciferous vegetables per day associated with a 24% reduction in PAF. Nuts and legumes were associated with lower levels of hsCRP (β = -.51, CI [-0.81, -0.22], p < .001) with an increase of one serve per day associated with a 40% reduction in hsCRP. There were small inverse associations between cheese and both PAF (β = -.15, CI [-0.27, -0.03], p = .017) and Lp-PLA₂ (β = -.26, CI [-0.47, -0.04], p = .024), however these were not significant at the Bonferroni-adjusted P < .005 level. In conclusion, cruciferous vegetables and nut and legume consumption were associated with lower levels of inflammation. The lack of associations between PAF and Lp-PLA₂ and other healthy foods may be due to confounding by COVID-19 infection and vaccination programs which prevents any firm conclusion on the relationship between PAF, Lp-PLA₂ and food groups. Future research should aim to examine the relationship with these novel markers and healthy food groups in a non-pandemic setting.

Keywords: inflammation; cardiovascular diseases; diet, biomarker

Ethics Declaration

Yes

Financial Support

This research received no external funding.

References

1. Antonopoulou S, Petsini F, Detopoulou M *et al.* (2022) *Biofactors* 1–13.
2. Dua P, Mishra A & Reeta KH (2022) *Biomark Med* 16(10), 821–32.
3. English CJ, Lohning AE, Mayr HL *et al.* (2023) *Biofactors* 49(2), 457–471.
4. Ostrowski SR, Søgaard OS, Tolstrup M *et al.* (2021) *Front Immunol* 12, 779453.