

Replacing Saturated Fat With Unsaturated Fat or Carbohydrate Does Not Affect Lp(a): A Secondary Data Analysis of Two Randomized Controlled Trials

Philip Sapp,¹ Penny Kris-Etherton,¹ and Kristina Petersen²

¹The Pennsylvania State University and ²Texas Tech University

Objectives: Lipoprotein(a) [Lp(a)] is an independent risk factor for atherosclerotic cardiovascular disease (ASCVD). Lp(a) is primarily genetically regulated and current evidence suggests lifestyle interventions have minimal impact on circulating levels. However, some studies have shown increased Lp(a) following diets low in saturated fatty acids (SFA). The aim of this analysis was to assess the individual, and pooled, effects of replacing SFA with monounsaturated (MUFA), polyunsaturated fatty acids (PUFA), or carbohydrate (CHO) on Lp(a).

Methods: Data from two, three-period, randomized, crossover, trials in adults at risk for ASCVD were used. Both trials had a 2-wk run-in diet [Fat: 34% (SFA: 12-13%; MUFA: 12%; PUFA: 7%); CHO: 50-51%; Protein: 16%] followed by three diets (5-6-wks) where 5-6% of SFA was displaced with proportionate increases in MUFA, PUFA, or CHO; protein remained constant. In total, 6 SFA displacement scenarios were assessed (3 MUFA, 2 PUFA, and 1 CHO). Lp(a) was

assessed using ELISA. Data were non-normally distributed and log-transformation was performed. Paired-sample t-tests and a random effects meta-analysis were used to assess between-diet differences. Data are presented as log mean differences and 95% CI unless otherwise stated.

Results: The analytic sample included 62 adults [63% male; 43 ± 12y; BMI 29.2 ± 3.8 kg/m²; Lp(a) median (IRQ) 9.20 (16.91) mg/dL]. Between-diet comparisons showed no effect of SFA reduction when the replacement nutrient was MUFA (MD: 0.01 mg/dL; 95% CI: -0.08, 0.09, MD: -0.02; 95% CI: -0.06, 0.02, and MD: 0.00; 95% CI: -0.04, 0.04), PUFA (MD: 0.00 mg/dL; 95% CI: -0.07, 0.08, and MD: 0.00; 95% CI: -0.07, 0.07) or CHO (MD: 0.00 mg/dL; 95% CI: -0.06, 0.06). In the pooled analysis, replacing SFA with MUFA, PUFA, or CHO did not affect Lp(a) (MD: 0.04 mg/dL; 95% CI: -0.16, 0.25; p = 0.662).

Conclusions: Replacing 5-6% of SFA with MUFA, PUFA, or CHO did not affect Lp(a) after 5-6-wks in adults at risk of ASCVD with low baseline Lp(a). These findings do not align with the previously observed increases in Lp(a) with low SFA diets. Future evaluation of these cohorts is needed to understand the discrepant results.

Funding Sources: Texas Tech University; Nutritional Sciences Graduate Educational Enrichment Endowment; National Center for Advancing Translational Sciences, NIH, UL1 TR002014.