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Blood pressure is associated with markers of endogenous fat metabolism

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Concurrent Session 1: Dietary Fats and Oils

Blood pressure is associated with markers of endogenous fat metabolism

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Background: The type of fat consumed is one of many dietary determinants of blood pressure (BP). The mechanism of action is unknown but may relate to the role of desaturase activities. Stearoyl-CoA desaturase (SCD) and delta6-desaturase (D6D) catalyse the endogenous synthesis of long chain unsaturated fatty acids into 16:1 n7 and 20:3 n6 fatty acids. In epidemiological studies these fatty acids have been shown to be associated with high CVD risk. Red blood cell (RBC) fatty acid ratios may be used as surrogate measures of desaturase activities, bearing in mind that fatty acid levels are influenced by both dietary fat and endogenous metabolism of fatty acids. Identifying associations between these factors and blood pressure may be informative.

Objective: To assess the association between RBC fatty acids, including SCD ratio (16:1 n7/16:0) and D6D ratio (18:3 n6/18:2 n6), and blood pressure and heart rate.

Design - Baseline data from n=112 overweight adults in a 12 month trial [ACTRN12608000425392] were available for the analysis. Office BP 24-hour ambulatory systolic and diastolic BP, awake and asleep BP, heart rate, and mean arterial pressure (MAP) (n = 75) were measured. Readings were taken every 30 minutes during awake time (06h00-22h00) and every 60 minutes during asleep time (22h00-06h00). RBC fatty acids were measured in a quality assured laboratory (Analytical Reference Laboratories Pathology, Melbourne) and Spearman's correlation was investigated.

Outcomes: The SCD ratio correlated positively and significantly ($P < 0.05$) with office diastolic BP ($r = 0.266$) and with 24h systolic BP ($r = 0.288$), diastolic BP ($r = 0.237$), MAP ($r = 0.300$), day-time systolic BP ($r = 0.266$) and night-time MAP ($r = 0.250$), while no association with D6D was found. The RBC fatty acids, 16:1 n7 and 20:3 n6 (both formed endogenously, by SCD and D6D) were associated with increased BP.

Conclusion: The fatty acids 16:1 n7 and 20:3 n6, as well as the SCD ratio, were significantly and positively associated with BP measurements. This suggests that dietary fat intake, as well as endogenous fat metabolism, may play a role in blood pressure regulation. These findings require further study.

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