

# Abstract

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## **Fasting and postprandial remnant-like particle cholesterol concentrations in obese participants are associated with plasma triglycerides, insulin resistance, and body fat distribution.**

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**BACKGROUND:** Elevated plasma concentrations of remnant-like particle cholesterol (RLP-C) are atherogenic. However, factors that determine RLP-C are not fully understood.

**OBJECTIVE AND METHODS:** This study evaluates which factors affect RLP-C in the fasting and postprandial state, using multiple regression analyses in a large cohort of lean and obese participants. All participants (n = 740) underwent a test meal challenge containing 95 energy % (en%) fat (energy content 50% of predicted daily resting metabolic rate). Fasting and postprandial concentrations of circulating metabolites were measured over a 3-h period. Obese participants (n = 613) also participated in a 10-wk weight loss program (-2510 kJ/d), being randomized to either a low-fat or a high-fat diet (20-25 vs. 40-45en% fat).

**RESULTS:** Postprandial RLP-C was associated with fasting RLP-C, waist:hip ratio (WHR), HOMA(IR) (homeostasis model assessment index for insulin resistance) ( $P < 0.001$ ), and age, independently of BMI and gender [adjusted R(2) (adj. R(2)) = 0.70]. These factors were also related to fasting RLP-C ( $P < 0.010$ ), along with gender and physical activity (adj. R(2) = 0.23). The dietary intervention resulted in significantly lower fasting RLP-C concentrations, independently mediated by weight loss, improvements in HOMA(IR), and the fat content of the prescribed diet. However, after inclusion of plasma triglyceride (TG), HDL-cholesterol, and FFA concentrations in the models, HOMA(IR) and WHR no longer significantly predicted fasting RLP-C, although WHR remained a predictor of postprandial RLP-C ( $P = 0.002$ ). Plasma TG was strongly associated with both fasting and postprandial RLP-C ( $P < 0.001$ ).

**CONCLUSION:** In conclusion, plasma RLP-C concentrations are mainly associated with plasma TG concentrations. Interestingly, the high-fat diet was more effective at decreasing fasting RLP-C concentrations in obese participants than the low-fat diet.

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