Postprandial triglyceride-rich lipoproteins from type 2 diabetic women activate platelets

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Increased concentrations of fasting and post-prandial (PP) triglycerides (TG), carried out in the circulation by triglyceride-rich lipoproteins (TGRL), are a risk factor for atherothrombosis in patients with type 2 diabetes (T2D). The objective of our clinical study was to determine the effects of fasting and PP TGRL from T2D patients on platelet activation while assessing the fatty acid (FA) and sphingolipid (SL) composition of TGRL. Thirty women with T2D were randomly assigned a breakfast containing 20 g lipids from a hazelnut-cocoa spread rich in palm oil (Palm Nut) *versus* butter. Both breakfasts were rich in palmitic acid, and the Palm Nut breakfast also contained 45% oleic acid. Blood samples were collected at fasting and 4h after the breakfast, and TGRL were isolated from the plasma by ultra-centrifugation at a density equivalent to that of chylomicrons (d<1.000). TGRL FA and SL composition were analyzed by gas chromatography and tandem mass spectrometry, respectively. Both breakfasts similarly increased plasma apoB-48 (Palm Nut: +78%, butter: +67%), plasma TG (Palm Nut: +33%, butter: +30%) and TGRL TG concentrations (Palm Nut: 200% and butter: 71%). TGRL mean diameter (146 ± 5 nm) increased after both breakfasts and was greater after the butter breakfast. The ingestion of the Palm Nut breakfast mainly resulted in increased proportions of oleic acid in TGRL while butter led to increased proportions of palmitic acid. Compared to fasting TGRL, the ingestion of the meals enriched in saturated FA led to increased TGRL total ceramide concentrations, especially C16:0, C24:1 and C24:0 molecular species. Pre-incubation of platelets from healthy donors

with fasting and PP TGRL increased collagen-stimulated aggregation. Fasting and PP TGRL similarly increased agonist-induced thromboxane B_2 concentrations. In conclusion, PP TGRL from T2D women after a palm-oil spread or butter-based mixed meal induced similar acute *in vitro* platelet activation.