

A comparison of postprandial lipid and glucose responses of Chinese and Caucasian adults at risk for type 2 diabetes mellitus: an acute crossover trial

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People of Chinese ethnicity develop type 2 diabetes mellitus (T2DM) at a lower body mass index (BMI) and younger age than Caucasians. Physiological differences in postprandial lipid and glucose metabolism have been proposed as possible contributing factors to the increased risk of T2DM observed in Chinese populations.^(1,2) The objective of this study was to compare the postprandial lipid and glucose responses between Caucasian and Chinese adults at risk of T2DM after consuming meals high in fat and high in carbohydrate. In a nonrandomised acute crossover trial, 15 adults ($n = 8$ Chinese and $n = 7$ Caucasian) aged ≥ 18 and ≤ 65 years who were at risk of T2DM based on a score greater than 12 on the AUSDRISK tool (median = 14.0, IQR = 3.0), completed two isocaloric (3.6 MJ) meal challenges, on separated days. Meal challenges were designed as either high fat (46% energy from fat, 46% energy from carbohydrates) (consumed by $n = 8$ Chinese and $n = 7$ Caucasian) or high carbohydrate (74% energy from carbohydrates, 17.5% energy from fat) (consumed by $n = 6$ Chinese and $n = 5$ Caucasian) after overnight fasting. Blood samples were collected via cannula at baseline (fasting), and over a 6-hour period after the meal (11 samples) and analysed for lipid profile and glycaemia. Additionally, plasma chylomicron particle number (Apolipoprotein (apo) B48) was assessed at three time points (fasting, 180 and 360 min postprandially) via ELISA. Data were analysed using a mixed between-within-subject analysis of variance. Median age of participants was 56.0 (IQR = 18.0) years and mean \pm SD waist circumference and BMI was significantly lower ($p = 0.003$ and $p = 0.004$) for Chinese participants (85.3 ± 12.9 cm, 23.4 ± 5.0 kg/m²) compared to Caucasian (105.29 ± 6.7 cm, 31.8 ± 4.3 kg/m²). There were no differences in fasting lipids, glucose or insulin between groups. Postprandial serum triglyceride mean \pm SD incremental areas under the curve (iAUC) were significantly different ($p = 0.006$) between Chinese (440.65 ± 158.27 mmol/l/6 h) and Caucasian (189.21 ± 140.1 mmol/l/6 h) participants after the high fat meal only. Mean apoB48 responses were not significantly different between Chinese and Caucasian participants after either meal. Serum insulin, glucose and cholesterol mean iAUC were not significantly different between the Chinese and Caucasian participants for either test meal. Despite a lower mean BMI and waist circumference than the Caucasian group, Chinese participants demonstrated significantly higher postprandial triglyceride concentrations following a high fat meal challenge. Postprandial responses to the high carbohydrate meal were not significantly different between Caucasian and Chinese participants. The high intra and inter variability of postprandial metabolic responses for other lipid and glucose biomarkers indicate the need for larger sample sizes to compare response between Caucasian and Chinese participants.

References

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2. Mackey R, Mora S, Bertoni A, *et al.* (2015) *Diabetes Care* **38** (4), 628–636.