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Aims: To identify the expression profiles of targeted plasma microRNAs (miRNAs) and their association with insulin resistance

Methods: In 154 baseline plasma samples from the CAMERA trial (participants had previous coronary heart disease and high waist circumference but no diabetes), total RNA was extracted and the expressions of circulating mir-221, 222, 144, 155, 192 and 193b were measured using real-time PCR. The selected miRNAs were normalized to spiked cel-mir-39 and expressed as delta CT (dCT). The studied population was classified as insulin sensitive (IS, n=59) or insulin resistance (IR, n=95) based on HOMA-IR. Multivariable linear regression was performed.

Results: Mir-144, but not other miRNAs, was 26.3% higher in IR group compared to IS group ($p=0.04$). Mir-144 showed the strongest association with markers of insulin sensitivity. In models adjusting for age and sex, for every unit increase in HOMA-IR, mir-144 was 10% (95% CI 2% - 16%, $p<0.05$) elevated. In models additionally adjusting for body fat, for every unit increase in HOMA-IR, mir-144 was 10.2% (95% CI 2.5% - 17.2%, $p<0.05$) elevated and for a 1mmol/L increase in fasting plasma glucose (FPG), mir-144 was 34.9% (95% CI 15.1%-50%, $p<0.01$) elevated. Other miRNAs showed variable associations with markers of insulin resistance and glycaemia, but no miRNA was associated with adiposity measurements.

Conclusion: Among the six targeted miRNAs, mir-144 displayed a strong positive association with glucose, HOMA-IR, and insulin thus highlighting the potential role of mir-144 as a key player in insulin resistance, not mediated by body weight. Further studies are required to investigate causality.