

Expired $^{13}\text{CO}_2$ and Metabolic Fuel Mix in Young New Zealand Polynesian and Caucasian Women

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ABSTRACT Polynesian New Zealanders have a high predisposition to obesity which may reflect an evolutionary development of more efficient fat deposition. The researchers hypothesized that NZ Polynesian women would oxidize relatively more carbohydrate than their Caucasian counterparts both at rest and during exercise. Study subjects were 39 Polynesian and 40 Caucasian healthy female volunteers aged between 18 and 27 years with a wide range of fatness. Metabolic fuel mix was assessed from the respiratory exchange ratio (RER) and the proportion of ^{13}C in expired breath $^{13}\text{CO}_2/^{12}\text{CO}_2$ at rest and during three levels of exercise. Seven-day diet diaries were used to assess dietary intake of carbohydrate, fat and ^{13}C enriched sugars. Resting $^{13}\text{CO}_2/^{12}\text{CO}_2$ was significantly correlated with the proportion of enriched sugar in the dietary carbohydrate ($r = 0.34$, $P = 0.003$). Resting $^{13}\text{CO}_2/^{12}\text{CO}_2$ adjusted for enriched sugar intake was significantly correlated with RER ($R = 0.45$, $p = 0.001$). Ethnicity was not a significant predictor of adjusted $^{13}\text{CO}_2/^{12}\text{CO}_2$ at rest or during exercise, whereas degree of central adiposity, measured as the subscapular-to-triceps skinfolds ratio, and percentage body fat were significant. Differences in metabolic fuel mix were accounted for by differences in the diet, body fat and distribution of the body fat.