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### Saturated fat (16:0) position in dietary triglyceride affects adipose tissue fat deposition and LDL-r gene expression in a pig model of young children

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**Background** – Dietary fatty acid present in triglycerides plays a role in the development of obesity, diabetes and hyperlipidemia. Polyunsaturated fats down-regulate genes that control fatty acid synthesis, eg fatty acid synthase. However, little is known about the effect of saturated fats bound in the triglyceride molecule on expression of genes associated with fat accretion in the body.

**Objective** – To investigate the effect of palmitic acid distributed at Sn-1, -2 & -3 positions in palm oil on LDL-receptor (LDL-r) gene expression and adipose tissue saturated fat deposition in piglets as a model for children.

**Design** – Forty weaner piglets (6.4 kg initial weight) were allocated to one of four wheat based diets containing : 1) pork lard (LRD); 2) natural palm olein (NPO); 3) chemically inter-esterified PO (CPO) or 4) enzymatically inter-esterified PO (EPO) as the fat source. After 12 weeks of feeding, animals were sacrificed and subcutaneous adipose and liver tissue samples obtained for fatty acid composition and LDL-r gene expression analyses, respectively.

**Outcomes** – The NPO diet was associated with lower saturated fat levels in subcutaneous adipose tissue than the CPO and EPO diets which in turn were lower than the lard diet (P = 0.009). For each diet, increased LDL-r gene expression was associated with a greater saturated fat deposition (P = 0.013).

**Conclusion** – Results suggest that positional distribution of 16:0 in palm oil, compared to lard influences LDL-r gene expression and saturated fat deposition and may have a role in preventing obesity.

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### HOMA IR increases with increasing dietary glycaemic load amongst pre-pubertal girls

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**Background** – Insulin resistance (IR) is instrumental in the metabolic syndrome, which is becoming common in children. Low glycaemic index (GI) or glycaemic load (GL) foods are beneficial in treating IR. However, studies of relationships between dietary GI or GL and existing IR in children are lacking.

**Objective** – To investigate relationships between dietary GI and GL and IR in a paediatric population.

**Design** – Participants were 80, pre-pubertal girls in Brisbane, Australia, aged 5 – 11 years. Insulin and glucose were measured from a fasting blood sample. Homeostasis model assessment for IR (HOMA IR) and beta cell function (HOMA  $\beta\%$ ) were calculated. Measures of adiposity were percentage body fat (%BF) using body volume from BodPod, and standard deviation scores for body mass index (BMI SD score) and waist circumference (WC SD score). Dietary intake, including GI and GL, was assessed via parental assisted 4-day weighed food diary. Dietary variables were adjusted for energy intake residuals. Physical activity assessed via parental assisted 4-day diary and pedometers. Correlations calculated for dietary GI and GL with HOMA IR and HOMA  $\beta\%$ . Potential confounders were examined via regression.

**Outcomes** – Non-significant trends emerged for dietary GI with HOMA IR ( $r=0.19$ ;  $p=0.09$ ) and HOMA  $\beta\%$  ( $r=0.19$ ;  $p=0.10$ ), and dietary GL and HOMA IR ( $r=0.22$ ;  $p=0.06$ ). Dietary GL and HOMA IR ( $\beta$  coefficient=0.003;  $p=0.04$ ) were statistically significantly related after adjusting for WC SD score, sedentary activity and fasting triglycerides. No further significant relationships emerged with regressions.

**Conclusion** – Our study revealed a statistically significant association between dietary GL and HOMA IR in free-living pre-pubertal girls, corroborating findings from intervention studies in children where slowly digested and absorbed carbohydrates reduce IR. Future studies should investigate whether specific types of foods or snacks could be successfully targeted in prevention strategies to reduce dietary GL amongst children.