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The association of maternal characteristics and macronutrient intake in pregnancy with neonatal body composition

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The in utero environment is known to affect fetal development from cognitive development to development of the fetal organs to growth and fat deposition^(1,2) however many of the mechanisms by which this occurs remain unknown. The aim of this study was to examine the association between maternal dietary macronutrient intake and lifestyle throughout pregnancy and neonatal body composition.

This was an analysis of 542 mother and infant pairs from the ROLO study (Randomised cOntrol trial of LOw glycaemic index diet versus no dietary intervention to prevent recurrence of fetalmacrosomia). Food diaries as well as food frequency and lifestyle and physical activity questionnaires were completed during pregnancy. Maternal anthropometry was measured throughout pregnancy and neonatal anthropometry was measured at birth.

Multiple linear regression analysis revealed the main maternal factor associated with increased birth weight was greater gestational weight gain R_{adj}^2 23.3% ($F = 11.547$, $p < 0.001$). The main maternal factor associated with increased birth length was non-smoking status R_{adj}^2 27.8% ($F = 6.193$, $p < 0.001$). Neonatal central adiposity (determined using waist:height ratio) was negatively associated with maternal age and positively associated with the following parameters: smoking status, maternal pre-pregnancy arm circumference, percentage energy from saturated fat in late pregnancy, postprandial glucose at 28 weeks gestation and membership of the control group with a positive trend towards association with trimester 2 glycaemic load R_{adj}^2 38.1% ($F = 8.000$, $p < 0.001$).

In conclusion, several maternal diet and lifestyle factors were associated with neonatal body composition. Low glycaemic index dietary intervention in pregnancy was found to have a beneficial effect on neonatal central adiposity. Additionally, central adiposity was positively associated with maternal dietary fat intake and postprandial glucose highlighting the important role of healthy diet in pregnancy in promoting normal neonatal adiposity.

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2. Wu G, Bazer FW, Cudd TA *et al.* (2004) *J Nutr* **134**, 2169–2172.