

REPRODUCTIVE ENDOCRINOLOGY

Sex-specific early life effects on metabolism

Female-specific effects of fetal programming on individuals' later risk of developing obesity or type 2 diabetes mellitus (T2DM) have been revealed in two studies.

In the first study, Regnault *et al.* investigated the effects of maternal glycemia at 24–28 weeks of pregnancy and levels of insulin in cord blood of neonates on birth weight and length as well as on postnatal growth in their first year, as low weight gain during this period of life might be linked to an increased susceptibility to later development of T2DM. Levels of C-peptide (as a proxy for fetal insulin) and insulin-like growth factor 1 were measured in cord blood samples from 342 neonates. The researchers found that maternal glycemia affects birth weight in both sexes via a fetal insulin–insulin-like growth factor 1 axis. However, high insulin levels at birth were associated with a slow rate of growth in the first year of life in girls but not in boys.

In the second study, Labayan *et al.* tested the hypothesis that low birth weight, as

an indicator of an adverse intrauterine environment, might be associated with high serum leptin levels in adolescents. The researchers measured weight, height, BMI and fasting serum leptin levels in 757 adolescents who had been born at term. A negative relationship between birth weight and serum leptin levels was found in female but not in male adolescents, independent of a number of confounders.

“In women, adiposity and reproduction are intimately linked through leptin,” explains lead researcher Idoia Labayan. “The observed relationship between birth weight and leptin in females could reflect the biological importance of early reproductive capacity in females, particularly when the fetus has been exposed to an adverse intrauterine environment. ‘Fatter’ girls may have reproductive benefits in terms of earlier age at menarche and increased reproductive life span.”

Labayan and co-workers now plan to investigate to what extent increased



physical activity of adolescents can attenuate the effects of low birth weight on leptin resistance.

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Original articles Regnault, N. *et al.* Higher cord C-peptide concentrations are associated with slower growth rate in the 1st year of life in girls but not in boys. *Diabetes* doi:10.2337/db10-1189 | Labayan, I. *et al.* Sexual dimorphism in the early life programming of serum leptin levels in European adolescents: The HELENA Study. *J. Clin. Endocrinol. Metab* doi:10.1210/jc.2011-1036