Introduction

Individuals born small-for-gestational age (SGA), especially those who experience postnatal catch-up growth, are at increased risk for developing endocrine-metabolic abnormalities before puberty. In adults, brown adipose tissue (BAT) has been associated with protection against metabolic disorders, such as obesity, type 2 diabetes and dyslipidaemia.

Subjects and Methods

The study population consisted of 86 prepubertal children [41 AGA and 45 SGA; age (mean ± SEM), 8.5 ± 0.1 yr], recruited into two prospective longitudinal studies. The temperature at the supraclavicular region (SCR) before and after a cold stimulus was measured by infrared thermal imaging, and the area of thermally active SCR (increase after cold challenge, ΔArea_{SCR}) was calculated as a surrogate index of BAT activation. The results were correlated with clinical, endocrine-metabolic and inflammation variables, and with visceral and hepatic adiposity (assessed by Magnetic Resonance Imaging).

Results

Change in the surface area of the thermally active supraclavicular region (ΔArea_{SCR})

- Cold-induced increase in ΔArea_{SCR} did not differ significantly between AGA and SGA children.
- After cold induction, AGA girls significantly increased the ΔArea_{SCR} as compared to AGA boys; this response was not observed in SGA girls vs SGA boys.

Association between ΔArea_{SCR} and clinical, endocrine-metabolic and abdominal fat results

- Cold-induced ΔArea_{SCR} negatively correlated with HOMA-IR, us-CRP, liver volume and liver fat.

Conclusions

- BAT activity is similar in prepubertal AGA and SGA children.
- As compared to SGA girls, prepubertal girls born AGA appear to have a surplus of BAT vs their gender counterparts, that is inversely related to central (ectopic) adiposity.