

## **Supplementary Information**

### **Brown adipose tissue estimated by the magnetic resonance imaging fat fraction is associated with glucose metabolism in adolescents**

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### **Handling and Analyses of Blood Samples**

In Uppsala, the blood glucose concentration was analyzed with an Architect c8000 instrument (Abbott Diagnostics, Solna, Sweden) and in Salzburg, with a Gluco-quant Glucose-Kit (Roche Diagnostics, Mannheim, Germany). Selected samples were used for cross-validation between Uppsala and Salzburg. From both sites, frozen blood samples were sent to a central laboratory for analysis of the blood insulin concentration, performed with single-plex enzyme-linked immunosorbent assay kits (Merckodia AB, Uppsala, Sweden). Interplate variability was controlled using standardized control samples (Merckodia AB).

## **Biochemical Parameters and Growth Spurt for Assessment of Pubertal Status**

The biochemical thresholds indicated onset of puberty and an ended growth spurt indicated the end of puberty. The biochemical thresholds for puberty were as follows: for boys luteinizing hormone (LH) > 0.6 [IU/l] and testosterone > 2 [nmol/l]; for girls LH > 0.3 [IU/l], follicular stimulating hormone > 2 [IU/l] and estradiol > 100 [pmol/l](1,2).

## **Statistics**

In conjunction with group comparisons, the data for each group were tested for normality and differences in variance using Levene's test, probability plots, and histogram analyses. Prior to linear regression, scatter plots of each pair of dependent variable (sBAT FF or T<sub>2</sub><sup>\*</sup>) and explanatory variable (sex, age, adiposity or glucose metabolism parameters) were visually assessed for homoscedasticity and linear relationship. The probability plots and residual predicted plots were used to visually assess the goodness of fit of the model. To avoid possible multicollinearity between explanatory variables, correlation between the different measurements of adiposity was evaluated. The variance inflation factor (VIF) was always below 3.4.

## **References**

1. McCartney CR, Blank SK, Prendergast KA, *et al.* Obesity and sex steroid changes across puberty: evidence for marked hyperandrogenemia in pre- and early pubertal obese girls. *J Clin Endocrinol Metab* 2007; 92: 430-436.
2. Vandewalle S, Taes Y, Fiers T, *et al.* Sex steroids in relation to sexual and skeletal maturation in obese male adolescents. *J Clin Endocrinol Metab* 2014; 99: 2977-2985.