

Body mass index increase before 3 years-of-age augments the degree of insulin resistance corresponding to body mass index in adolescent girls

In a recent study of insulin resistance (IR), insulin deficiency and their relationship with obesity in children using homeostasis model assessment (HOMA) values in a population-based setting, Nishimura *et al.*¹ showed that increased body mass index (BMI) was significantly correlated with increased IR in boys, but not in girls. The authors concluded that increases in BMI could have far more diverse implications for girls than for boys, and suggested that it should be assumed that there are girls in whom IR can easily increase without an apparent increase in obesity.

We have recently observed similar findings with regard to a sex difference in the development of IR from a different perspective. An association between BMI increase in early childhood (adiposity rebound) and future cardiometabolic risk is of increasing interest, as identifying growth patterns harmful to cardiometabolic health might provide opportunities for early interventions^{2,3}. Therefore, to examine the effect of early growth patterns on IR corresponding to adiposity, we examined the relationship between the HOMA of insulin resistance (HOMA-R) and BMI in children aged 12 years in groups based on an increase or decrease in BMI from age 1.5–3 years (101 boys and 91 girls in a birth cohort)⁴. Routine health checks of children are carried out at 1.5 and 3 years by the Ministry of Health, Labor and

Welfare in Japan, and data from these health checks were used to evaluate growth.

In statistical analysis, the augmented degree of log-transformed HOMA-R per log-transformed BMI was significantly higher in girls who had a BMI increase from 1.5 to 3 years compared with those who showed a decrease in BMI or stable BMI (Z-score for BMI increase within 0.5 standard deviation). This means that girls with an increase of BMI from 1.5 to 3 years showed a greater increase of HOMA-IR per BMI increase at 12 years old, compared to those with a decrease of BMI from 1.5 to 3 years⁴.

These results suggest that girls who show an increase of BMI from 1.5 to 3 years, a period normally characterized by a decreased BMI, are more prone to developing insulin resistance at 12 years-of-age. In general, females are slightly more insulin resistant and have a higher body fat percentage than males from early childhood through to old age. Therefore, changes of body composition (increase in adiposity) during early growth periods might be of long-term relevance for altered insulin sensitivity to adiposity, particularly in girls. The present data might provide one possible explanation of the observation made by Nishimura *et al.*¹

DISCLOSURE

The authors declare no conflict of interest.

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