

ASSOCIATION BETWEEN GUT MICROBIOTA COMPOSITION AND BODY HEIGHT IN CHILDREN BORN SMALL FOR GESTATIONAL AGE IN THE SECOND YEAR OF LIFE

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Background: Early-life gut microbiota development plays an important role in child growth and metabolic health. Children born small for gestational age (SGA) often show altered growth trajectories compared with those born appropriate for gestational age (AGA). However, the relationship between gut microbiota maturation and linear growth in these groups remains insufficiently understood.

Objective: The aim was to investigate the association between gut microbiota diversity and body height in SGA children in the 2nd year of life, compared with children born AGA.

Subjects and methods: Fecal samples were collected from 39 children (15 SGA and 24 AGA). DNA was isolated and the bacterial 16S rRNA gene was sequenced using Oxford Nanopore Technologies (MinION platform). Bioinformatic and statistical analyses were performed using MetaG pipeline, as well as MicrobiomeAnalyst and Python tools. Gut microbiota alpha diversity was estimated using the Shannon diversity index. Body height was standardized to height-for-age z-scores according to World Health Organization growth standards. Spearman correlation analysis was used to assess the relationship between height z-score and gut microbiota alpha diversity.

Results: No significant correlation between height z-score and gut microbiota alpha diversity was observed in the SGA group. In contrast, a significant positive correlation was found in the AGA group ($p < 0.05$). As alpha diversity is considered a marker of gut microbiota maturation, these results suggest that in AGA children linear growth occurs in parallel with microbiota succession. In SGA children, microbiota development appears to be uncoupled from linear growth.

Conclusions: A positive association between gut microbiota diversity and height was observed in AGA children but not in SGA children.

Keywords: Small for gestational age; Body height; Gut microbiota.

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