

Birth method, gestation duration may alter infants' gut microbiota

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Environmental factors like mode of delivery and duration of gestation may affect how infants' gut bacteria mature, and that rate could help predict later body fat, international researchers from the EpiGen consortium have found in collaboration with scientists at Nestlé Research Center in Switzerland. The work is published this week in *mBio*, the online open-access journal of the American Society for Microbiology.

Among a group of 75 [infants](#), those who were vaginally delivered and had a longer gestation before birth tended to more quickly develop a more mature [gut microbiota](#), and had typical [body fat](#) at 18 months. By contrast, babies who were delivered via Caesarean section and had shorter gestations took longer to acquire a more mature [gut](#) microbiota and had lower body fat at 18 months.

"It seems like the early environment, for instance mode of delivery, mode of feeding, the duration of gestation and living environment may be influencing the rate at which babies acquire their gut microbiota," said senior study author Joanna Holbrook, a senior principal investigator at the Singapore Institute for Clinical Sciences, "and that in turn has an association with how babies grow and put on body fat."

At birth, human infants start accumulating intestinal microbiota until a relatively stable state is reached, Holbrook said. The rate at which babies acquire gut microbiota is believed to have a considerable impact on later health outcomes.

For the study, Holbrook and colleagues used a laboratory technique called 16s rRNA sequencing to analyze stool samples that had been collected from 75 infants participating in the GUSTO (Growing Up in Singapore Toward Healthy Outcomes) study, which includes members of the three main ethnic groups in Singapore: Chinese, Indian and Malay. The samples were taken when the infants were three days old, three weeks old, three months old and six months old. GUSTO, which aims to evaluate the role of developmental factors in the early pathways to metabolic disease, is Singapore's largest birth cohort study to date. All babies in the study were born at term.

Researchers investigated the effect of [environmental factors](#) including delivery mode and duration of gestation on trajectories of microbial development, along with the associative relationships with later body fat.

Their work found that the samples could be classified into three distinct clusters based on when infants' gut microbiota matured. Of 17 infants who had a more mature, six month-like microbiota profile high in the bacteria *Bifidobacterium* and *Collinsella* by day three, 16 were delivered vaginally. Other [babies](#) took up to six months to reach that stage.

Most infants acquired a similar microbiota by the age of six months. Infants that acquired a profile high in *Bifidobacterium* and *Collinsella* at an earlier age had typical body fat at age 18 [months](#), while those that acquired this profile later had relatively low body fat.

Provided by American Society for Microbiology

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