

Neonatal antibiotic use associated with reduced growth in boys

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Exposure to antibiotics in the first days of life is thought to affect physiological aspects of neonatal development. A new study, led by Bar-Ilan University's Azrieli Faculty of Medicine, reveals that antibiotic treatment within 14 days of birth is associated with reduced weight and height in boys—but not girls—up to the age of six.

By contrast, the study showed significantly higher body mass index (BMI) in both boys and girls following [antibiotic use](#) after the neonatal period, and within the first six years of life.

The findings, published in the journal *Nature Communications* on January 26, 2021, may be the result of changes in the development of the gut microbiome.

The impact of neonatal antibiotic exposure was investigated in a cohort of 12,422 children born between 2008-2010 at the Turku University Hospital in Turku, Finland. The babies had no genetic abnormalities or significant chronic disorders affecting growth and did not need long-term [antibiotic treatment](#). Antibiotics had been

administered within the first 14 days of life to 1,151 (9.3%) of the neonates in the study.

The authors found that boys exposed to antibiotic treatment exhibited significantly [lower weight](#) as compared to non-exposed children throughout the first six years. They also exhibited significantly lower height and BMI between the ages of two and six. This observation was replicated in a German cohort.

Further, antibiotic exposure during the first days of life was found to be associated with disturbances in the gut microbiome up until the age of two. Infants exposed to neonatal [antibiotics](#) exhibited significantly lower gut microbiome richness as compared to non-exposed infants at the age of one month. Interestingly, at the age of six months, the infants treated with antibiotics reached the bacterial richness level of a control group of infants, and at the ages of 12 and 24 months, the antibiotic-treated subjects gained significantly higher levels of bacterial richness as compared to the control subjects.

In additional experiments led by Ph.D. student Atara Uzan, the researchers demonstrated that germ-free male mice who were given the gut microbiome of antibiotic-exposed infants also displayed growth failure. These findings suggest a potential link between neonatal antibiotic exposure and impaired childhood growth, which may be a result of alterations caused by antibiotics in the composition of the gut microbiome.

"Antibiotics are vitally important and life-saving medications in newborn [infants](#). Our results suggest that their use may also have unwanted long-term consequences which need to be considered," said Prof. Omry Koren, of the Azrieli Faculty of Medicine of Bar-Ilan University, who led the study together with Prof. Samuli Rautava, of the University of Turku and University of Helsinki.

Follow-up research will aim to investigate other potential adverse outcomes related to neonatal antibiotic exposure.

More information: Neonatal antibiotic exposure impairs child growth during the first six years of life by perturbing intestinal microbial colonization, *Nature Communications* (2021). DOI: [10.1038/s41467-020-20495-4](https://doi.org/10.1038/s41467-020-20495-4) , www.nature.com/articles/s41467-020-20495-4

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