News Release Embargoed until Monday, September 17, 2018, 12:01 a.m. ET

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Household cleaning products may contribute to kids' overweight by altering their gut microbiota

Commonly used household cleaners could be making children overweight by altering their gut microbiota, suggests a Canadian study published in *CMAJ (Canadian Medical Association Journal)*.

The study analyzed the gut flora of 757 infants from the general population at age 3–4 months and weight at ages 1 and 3 years, looking at exposure to disinfectants, detergents and eco-friendly products used in the home.

Researchers from across Canada looked at data from the Canadian Healthy Infant Longitudinal Development (CHILD) birth cohort on microbes in infant fecal matter. They used World Health Organization growth charts for body mass index (BMI) scores.

Associations with altered gut flora in babies 3–4 months old were strongest for frequent use of household disinfectants such as multisurface cleaners, which showed lower levels of *Haemophilus* and *Clostridium* bacteria but higher levels of *Lachnospiraceae*. The researchers also observed an increase in *Lachnospiraceae* bacteria with more frequent cleaning with disinfectants. They did not find the same association with detergents or eco-friendly cleaners. Studies of piglets have found similar changes in the gut microbiome when exposed to aerosol disinfectants.

"We found that infants living in households with disinfectants being used at least weekly were twice as likely to have higher levels of the gut microbes *Lachnospiraceae* at age 3–4 months; when they were 3 years old, their body mass index was higher than children not exposed to heavy home use of disinfectants as an infant," said Anita Kozyrskyj, a University of Alberta pediatrics professor, and principal investigator on the SyMBIOTA project, an investigation into how alteration of the infant gut microbiome impacts health.

Babies living in households that used eco-friendly cleaners had different microbiota and were less likely to be overweight as toddlers.

"Those infants growing up in households with heavy use of eco cleaners had much lower levels of the gut microbes *Enterobacteriaceae*. However, we found no evidence that these gut microbiome changes caused the reduced obesity risk," she said.

She suggests that the use of eco-friendly products may be linked to healthier overall maternal lifestyles and eating habits, contributing in turn to the healthier gut microbiomes and weight of their infants.

"Antibacterial cleaning products have the capacity to change the environmental microbiome and alter risk for child overweight," write the authors. "Our study provides novel information regarding the impact of these products on infant gut microbial composition and outcomes of overweight in the same population."

A related commentary provides perspective on the interesting findings.

"There is biologic plausibility to the finding that early-life exposure to disinfectants may increase risk of childhood obesity through the alterations in bacteria within the *Lachnospiraceae* family," write epidemiologists Dr. Noel Mueller and Moira Differding, Johns Hopkins Bloomberg School of Public Health, in a related commentary.

They call for further studies "to explore the intriguing possibility that use of household disinfectants might contribute to the complex causes of obesity through microbially mediated mechanisms."

Dr. Kozyrskyj agrees and points to the need for studies that classify cleaning products by their actual ingredients. "The inability to do this was a limitation of our study."

The research study was funded by the Canadian Institutes of Health Research (CIHR) with funding from the Allergy, Genes and Environment (AllerGen) Network of Centres of Excellence for the CHILD study.

"Postnatal exposure to household disinfectants, infant gut microbiota and subsequent risk of overweight in children" is published September 17, 2018.

MEDIA NOTE: Please use the following public links after the embargo lift:

Research: http://www.cmaj.ca/lookup/doi/10.1503/cmaj.170809

Commentary: http://www.cmaj.ca/lookup/doi/10.1503/cmaj.181134

Podcast permanent link: https://soundcloud.com/cmajpodcasts/170809-res

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