Our microbiome begins developing at birth [1] and stays with us for life. Many events can alter our microbiome, such as a change in diet, weight loss or weight gain, being born via a cesarian section and undergoing antibiotic therapy. Human genetics also significantly shape our microbiome. [2]

The consequences that these microorganisms have on our overall health are currently being examined at a much higher rate than at any other time. Now a new study [3] claims that if there's an imbalance to this ecosystem, that change can increase a child's risk for asthma.

However, for a variety of reasons, this contention falls flats.

The study focuses on how microbiome dysbiosis (caused for example by antibiotic therapy) can create an unhealthy immune system and lead to such inflammatory diseases as asthma and juvenile arthritis. This relationship has been shown quite elegantly in murine models, but a conclusive translation to humans has been elusive [4]. This study, by researchers working at the University of British Columbia, claims to have found that a reduction (or complete absence) of four genera of bacteria puts children at high risk for developing asthma.

The data, which was published in Science Translational Medicine, does follow a strong correlation. The study enrolled 319 children from Canada, 74 of which were controls and were not a risk for asthma. The rest were assigned a group for asthma risk based on two pre-clinical symptoms: atopy (skin prick test) and wheezing.

Of these subjects, 22 were at high risk for asthma, based on being positive for both risk factors. These high-risk kids were all found to either have none, or significantly reduced levels, at three months of age, of the following bacterial genera: Lachnospira, Veillonella, Faecalibacterium and Rothia. In comparison, healthy controls all had an abundance of these bacteria.
Researchers then infected murine asthma models with a cocktail of these four genera, or a placebo. Subjects who received the four genera in a probiotic had significantly less severe asthma signs than those that received the placebo. Based on this, the university is filing for a patent on these four genera, and the team now wants to begin developing a probiotic to help prevent asthma for high-risk individuals.

Before this product gets to market, there are some glaring weaknesses that need to be addressed. First, their sample sizes are small. The study only used four mice, two that received the cocktail and two that did not. Researchers also created the cocktail with feces from just one child. Of their 22 children at high risk for asthma, only eight had been diagnosed with asthma by follow up at age three, so it's unclear that their criteria for high risk translates to actual asthma. Also, the differences in the amounts of the bacteria between controls and high-risk children observed at three months disappeared by age one.

More importantly, though, the 22 children who were said to be at high risk for asthma did not fit the profile of the hypothesis. The team based its study on the idea that early-life gut microbiome disruption leads to asthma. However, their own data show that events that disrupt the microbiome, like c-sections and antibiotic therapy, are not associated with asthma risk.

Furthermore, none of the kids tested had received any antibiotics in their first year of life. So the event (if there was one) that disrupted the gut microbiome to alter these levels is not clear. It is equally plausible that those kids naturally have lower levels of these four.

Overall, this study was small, and the researchers acknowledged as much. In fact, they are looking to add to their sample size for a follow-up. They also admit limited knowledge in this area, specifically relating to the maternal levels of these bacteria, or how the absence of these bacteria could biologically cause asthma.

This study is very rough and very preliminary, and should not influence any decision making by parents or physicians. Life saving practices like cesarians, and appropriate prescribing of antibiotics, should continue.

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