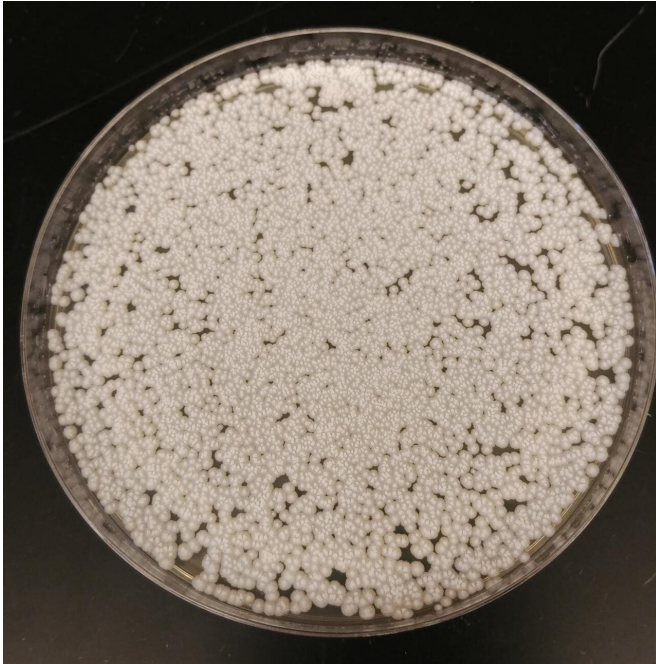


Overgrowth of gut yeast in newborns may increase asthma risk

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An image of the gut yeast *Pichia kudriavzevii* in a petri dish. Credit: Rozlyn Boutin (CC BY 4.0)

An overgrowth of yeast in the gut within the first few months of life may cause changes to the immune system that increase the risk of asthma later on, shows a study published today in *eLife*.

Asthma is a common and sometimes difficult-to-manage, life-long lung condition that affects one in 10 children in developed countries. The findings explain a possible cause of asthma and may help scientists develop new strategies to prevent or treat the condition.

The period just after birth is a critical window for the development of a healthy [immune system](#) and [gut microbiome](#). Disruptions to gut bacteria that produce anti-inflammatory compounds called short-chain fatty acids (SCFAs) early in life have previously been linked to asthma.

"We recently showed that overgrowth of a type of gut yeast called *Pichia kudriavzevii* in newborns in Ecuador is associated with an increased risk of asthma," says first author Rozlyn Boutin, an MD/Ph.D. student in the Department of Microbiology and Immunology at the University of British Columbia, Vancouver, Canada. "In this study, we wanted to see if we could replicate these findings in children from an industrialized setting and identify how fungi of the gut microbiota affect the development of the immune system."

Boutin and colleagues began with a study of 123 newborns in Canada, who are part of the CHILD Cohort Study. They again found that an overgrowth of *Pichia kudriavzevii* in the stools of the newborns during the first three months of life was associated with a higher risk of asthma.

To understand how this yeast overgrowth might contribute to asthma later in life, the team applied *Pichia kudriavzevii* to newborn mice with immature gut microbiota communities. In this mouse model of asthma, the team found that the newborns exposed to the yeast experienced more lung inflammation than those who were unexposed. Applying *Pichia kudriavzevii* to an adolescent mouse model, however, did not cause this excess inflammation.

"Our findings show that there is a critical window in [early life](#) where disruptions in the gut microbiota caused by *Pichia kudriavzevii* affect the development of the immune system and increase the risk and severity of asthma later in life," Boutin says.

Previous studies have shown that bacterial SCFAs have beneficial effects on immune development that protect against asthma. In this study, the team also showed that anti-inflammatory SCFAs produced by gut bacteria inhibit the growth of *Pichia kudriavzevii*.

"Immune responses to gut microbe disruptions

early in life have long-term consequences for diseases of the immune system later in life," concludes senior author Brett Finlay, Professor at the Michael Smith Laboratories and the Departments of Biochemistry and Molecular Biology, and Microbiology and Immunology, University of British Columbia. "Our study adds to our understanding of microbiota-associated [asthma](#) and suggests that inhibiting yeast overgrowth with SCFAs in early life could be an effective approach to preventing this condition."

More information: Rozlyn CT Boutin et al, Bacterial-fungal interactions in the neonatal gut influence asthma outcomes later in life, *eLife* (2021). [DOI: 10.7554/eLife.67740](https://doi.org/10.7554/eLife.67740)

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