

How the microbiome affects the immune system

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The building blocks of life-long health are the subject of a cutting-edge review examining how a newborn's lung microbiome affects the immune system for years to come.

An interdisciplinary team brings together pediatricians, immunologists and experts in microbiota and [systems biology](#) to review and discuss how [early life](#) colonization and community changes in the lung correlate with immune development and health and disease throughout infancy, childhood, and [adult life](#).

Their analysis, published recently in the journal *Science Translational Medicine*, looks at how the colonization of the lungs in newborns can impact the development of the growing [immune system](#) and therefore the future health of the individual.

"Colonization of the lungs" refers to the process during birth and in the earliest days of life when microorganisms from the outside environment make their way into the baby's airways.

Considering immune system and microbiome together

Professors Claudia and Marcel Nold from Hudson Institute of Medical Research, Monash University's Department of Pediatrics and Monash Health believe it's an important first step in an increasingly relevant field of medical study.

"Interactions between the developing [microbiome](#) and maturing immune system in early life are critical for establishing conditions that are beneficial to both the individual and the microbiota that inhabit each of us," they said.

"We know that preterm babies and those born by cesarean section often have higher levels of certain health conditions later in life, so anything we can do to minimize that gap in the days after birth could have enormous short- and long-term benefits."

"We would love to determine whether there are patterns of microbiome

colonization that correlate with future health or diseases," they said.

First step toward new therapies

Associate Professor Sam Forster from Hudson Institute claims this research could be the first step toward finding new microbiome-based therapies.

"We now have access to technologies that allow us to investigate interactions between the respiratory microbiome and host immune system," A/Prof Forster said. "This could unlock the potential for microbiome-based therapeutics, offering hope of avoiding a range of problems later in life."

Lead author, Sara Di Simone, and co-author Dr. Ina Rudloff said this field of research opens the door to exciting possibilities. "For example, [preterm babies](#) already receive probiotics in the days after birth; what we've shown here is that there is scope for potential new and better interventions with enormous long-term benefits."

More information: Sara K. Di Simone et al, Understanding respiratory microbiome–immune system interactions in health and disease, *Science Translational Medicine* (2023). [DOI: 10.1126/scitranslmed.abq5126](#)

Provided by Hudson Institute of Medical Research

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