

# Breast milk – immune insights



In a recent breakthrough, researchers have shown the key role of an [immune component found in breast milk](#), known as the complement system, in shaping the gut environment of infant mice. Their findings highlight how this phenomenon renders the [young mice](#) less susceptible to certain disease-causing bacteria.

The researchers observed distinct differences in the gut microbe populations of mouse pups nursed by lactating mice whose breast milk lacked a crucial complement protein, compared to those fed standard mouse breast milk. This variation in gut microbiota left the former highly vulnerable to *Citrobacter rodentium*, a bacterium known to infect the guts of mice.

*Citrobacter rodentium* bears similarities to certain strains of diarrhea-causing *E. coli* that affect humans but not mice. The study's results suggest that the complement components present in mouse breast milk play a vital role in bolstering infant health by directly targeting and eliminating specific gut-dwelling bacteria.

The scientists genetically modified mice to remove critical complement genes. They observed that [offspring nursed](#) by female mice lacking these genes, even those with normal complement genes themselves, became highly vulnerable to colitis, a dangerous condition triggered by *Citrobacter rodentium* infections, by the time they were several weeks old. Conversely, pups that consumed regular milk containing

complement proteins showed only minimal and temporary indications of gut infection.

These complement proteins serve to eliminate specific gut bacterial species, thereby establishing an overall gut environment in which harmful inflammation is significantly reduced in the presence of *Citrobacter rodentium*.

**Journal article: Dongqing Xu, D., et al. 2024. [Complement in breast milk modifies offspring gut microbiota to promote infant health](#). *Cell*.**

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