

# Breastfeeding is associated with a healthy infant gut

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Early colonization of the gut by microbes in infants is critical for development of their intestinal tract and in immune development. A new study, published in BioMed Central's open access journal *Genome Biology*, shows that differences in bacterial colonization of formula-fed and breast-fed babies leads to changes in the infant's expression of genes involved in the immune system, and in defense against pathogens.

The health of individuals can be influenced by the diversity of [microbes](#) colonizing the gut, and microbial colonization can be especially important in regulating both intestinal and immune development in infants. However, little is known about the potential interactions between the host's health at a molecular level, their gut microbes, and diet.

The human intestine is lined by epithelial cells that process nutrients and provide the first line of defense against food antigens and pathogens. Approximately one-sixth of [intestinal epithelial cells](#) are shed every day into feces, providing a non-invasive picture of what is going on inside the gut.

In this study, the authors used transcriptome analysis to compare the intestines of three month old exclusively breast-fed or formula-fed infants, and relate this to their gut microbes. Transcriptome analysis looks at the small percentage of the genetic code that is transcribed into [RNA molecules](#) and is a measure of what genes are actively making proteins. Concurrently the microbes (microbiome) were identified by [genetic analysis](#).

The results showed that the breast-fed babies had a wider range of microbes in their gut than the formula-fed infants but that their immune systems had developed to cope.

Robert Chapkin from the Texas A&M University, who led this multi-centre study, explained, "While we found that the microbiome of breast-fed infants is significantly enriched in genes associated with 'virulence', including resistance to antibiotics and toxic compounds, we also found a correlation between bacterial pathogenicity and the expression of host genes associated with immune and defense mechanisms."

He continued, "Our findings suggest that human milk promotes the beneficial crosstalk between the immune system and microbe population in the gut, and maintains intestinal stability."

Provided by BioMed Central

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