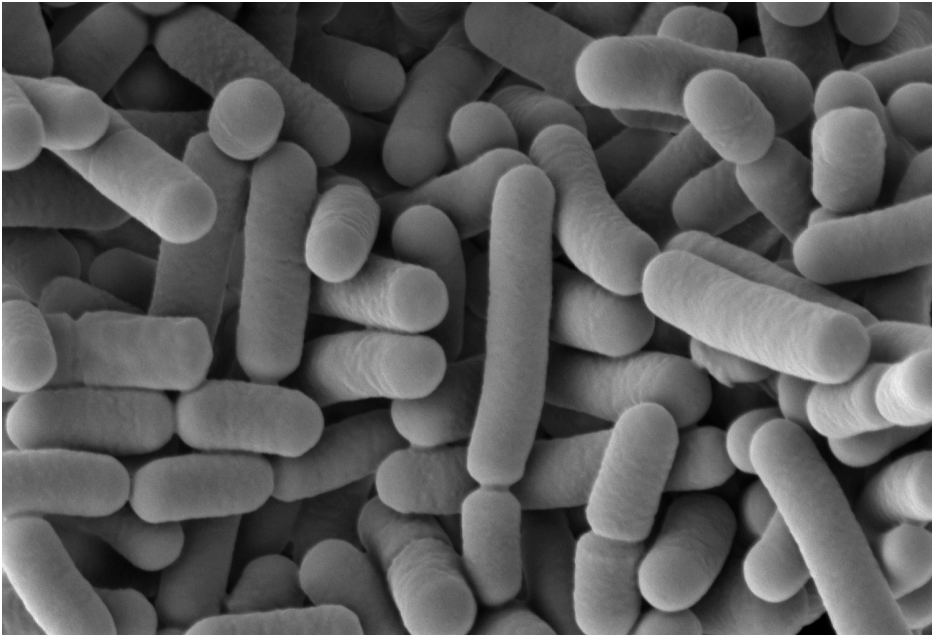


# science **in action**



Probiotics are live, [non-pathogenic] bacteria which when consumed in adequate amounts, confer a health benefit to the host. – FAO/WHO

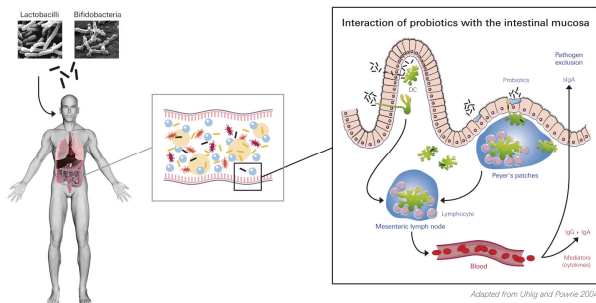
## Protection

### Focus On: Probiotics

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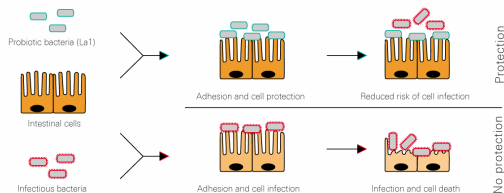
Probiotics help naturally boost the body's immune defense system. A key component of the immune system is the intestinal barrier. The intestinal microbiota is composed of more than 400 species of bacteria, both beneficial and potentially harmful.

Microbiota composition and/or metabolic activity can be regulated through nutrition and probiotics, to increase the number of beneficial bacteria, which contributes to boosting immunity and improving overall health.



**Fig 1: Action of probiotics in the intestinal mucosa**

The microbiota is involved in local immunity and prevents colonization of the gut by pathogens. Probiotics compete with pathogenic bacteria for essential nutrients and receptor sites. They also provide protection by aggregating pathogenic microorganisms and producing antimicrobial metabolites.



**Fig 2: Competitive inhibition of pathogenic bacteria by probiotics**

## NRC Research Initiatives

A pioneer in the field of probiotics, NRC was one of the first research centers in the world to look at the molecular interaction of probiotic bacteria with intestinal cells. As a result, NRC has successfully sequenced several probiotic genomes to better characterize specific probiotic strains and to understand their mechanisms of action.

### Naturally Boosting and Educating the Immune System

Normal development of the immune system is affected by the gut-bacteria interactions at the start of life.

In a collaborative study, NRC researchers found that bacteria from the mother's intestine are transferred, via breast milk, to her infant's intestine. The translocated bacteria help influence colonization of the infant's intestine and contribute to the education of the neonatal immune system.

For various reasons, some infants can't be breast fed. Research has proven that probiotics added to infant formula can provide babies an intestinal flora similar to that of breast fed infants. Probiotics in early life help to reduce infections, reduce the risk of allergy and improve immune defenses.

### Reducing Inflammation and Acute Diarrhea

External research groups and NRC scientists examine the effects of specific probiotic strains on the incidence and severity of diarrhea in infants and adults.

Studies demonstrated that *Lactobacillus GG* antagonizes rotavirus diarrhea, but was less effective against bacterial diarrhea. In contrast, a randomized, double blind, placebo-controlled trials showed that *Lactobacillus paracasei* strain ST11 had a clinically significant benefit in the management of bacterial diarrhea but was ineffective against rotavirus diarrhea. Probiotics may be a useful intervention to help lessen the incidence and severity of viral and bacterial diarrhea.

### Safety and Efficacy

The safety and efficacy of specific probiotic strains have been thoroughly investigated in pre-clinical and clinical trials by Nestlé scientists. Each potential probiotic is carefully studied *in vitro* using modern molecular technologies and pre-clinical trials. Additional data from the genome sequencing of most probiotic strains further contributes to probiotic characterization. Once safety, efficacy and stability have been established, probiotics can be used in food products to confer health benefits.

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