

A new strain of a well-known probiotic might offer help for infants' intestinal problems

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Lacticaseibacillus rhamnosus GG, or LGG, is the most studied probiotic bacterium in the world. However, its features are not perfect, as it is unable to utilize the milk carbohydrate lactose or break down the milk protein casein. This is why the bacterium grows poorly in milk and why it has to be separately added to probiotic dairy products.

In fact, attempts have been made to make *L. rhamnosus* GG better adjust to milk through [genetic engineering](#). However, strict restrictions have prevented the use of such modified bacteria in human food.

Thanks to a recent breakthrough made at the University of Helsinki, Finland, with researchers from the National Institute for Biotechnology and Genetic Engineering, Pakistan, features have now been successfully added to the LGG probiotic without gene editing, making it thrive and grow in milk.

The method used is known as conjugation, which is a technique utilized by certain bacterial groups to transfer their traits to other bacteria. In the process, a [bacterium](#) produces a copy of its plasmid, a ring-shaped piece of DNA in the bacterium. Next, the bacterium transfers the plasmid to an adjacent bacterium. The spread of plasmids, which carry traits useful for bacteria, can be rapid among bacterial communities.

In the case of *Lacticaseibacillus rhamnosus* GG, the plasmid that provided the ability to make use of lactose and casein originated in a specific *Lactococcus lactis* [bacterial strain](#) grown in the same place.

"The new LGG strain is not genetically modified, which makes it possible to consume it and any products containing it without any permit procedures," says the project leader, Professor of Microbiology Per Saris from the Faculty of Agriculture and Forestry, University of Helsinki.

The new strain can be used as a starting point in the development of new dairy products where the probiotic concentration increases already in the production stage. In other words, the [probiotic](#) need not be separately added to the final product.

Furthermore, the new LGG strain can potentially be better equipped to grow, for example, in the infant gut where it would be able to utilize the lactose and casein found in breastmilk, producing more [lactic acid](#) than the original strain.

"Lactic acid lowers the pH of the surface of the intestine, reducing the viability of many gram-negative pathogenic bacteria, such as E. coli, Salmonella and Shigella, which threaten the health of infants. Moreover, in [larger numbers](#) the new LGG strain can potentially be more effective at protecting infants than the old strain. After all, LGG has previously been shown to alleviate infantile atopic dermatitis and boost the recovery of the gut microbiota after antibiotic therapies."

More information: Nazar Hussain et al. Generation of Lactose- and Protease-Positive Probiotic Lacticaseibacillus rhamnosus GG by Conjugation with Lactococcus lactis NCDO 712, *Applied and Environmental Microbiology* (2021). [DOI: 10.1128/AEM.02957-20](https://doi.org/10.1128/AEM.02957-20)

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