Yakult

Science for Health

1495 UNIVERSITY OF ABERDEEN

The Rowett Institute

TAXONOMY NAME CHANGE

SERIES ONE: IDENTIFYING BACTERIA

WHY WERE BACTERIA IN THE GENUS *LACTOBACILLUS* RENAMED?

The advent of genome sequencing and other modern methods to discriminate bacteria have meant that some bacterial classifications have had to be revised, resulting in taxonomic changes that required the description also of new groups of organisms, new taxa.

Scientists realised that the genus *Lactobacillus* contained >260 species that were not very similar to each other, either functionally or genetically, and that the genus should be split up into new groups that were more closely related, possessing similar gene families, and functional and physiological characteristics. They based their conclusions on the whole genome sequences of these bacteria.

These new groupings will help scientists to detect and better understand common mechanisms by which these bacteria interact with the human host.

Bacteria in the genus *Lactobacillus* were reassigned into 25 separate genera, always retaining the species name for consistency.

Many bacteria that were in the *Lactobacillus* genus are important probiotic bacteria, and the new genera for these bacteria still almost all start with 'L', meaning that the abbreviated bacterial names are unchanged and easy to recognise.[1]

AN EXAMPLE OF *LACTOBACILLUS* RECLASSIFICATION

The bacterial species *Lactobacillus casei* was reclassified as *Lacticaseibacillus casei*.

WHAT ARE THE MAIN PHENOTYPIC PROPERTIES OF *LACTICASEIBACILLUS*?

In common with other *Lactobacillus* species, *Lacticaseibacillus* are rod-shaped ("bacillus"), and linked with milk ("lac") and cheese ("casei"). Being homofermenters, they mainly produce lactic acid as they ferment sugars during growth. This lowers the pH in the environment and means they themselves must be acid tolerant.

Lacticaseibacillus casei and *Lacticaseibacillus paracasei* are often used as a starter culture in food production (fermenting milk).

Some specific strains, like *Lacticaseibacillus paracasei* Shirota are well-researched with hundreds of peer-reviewed publications.

WHAT DOES THIS NAME CHANGE MEAN FOR:

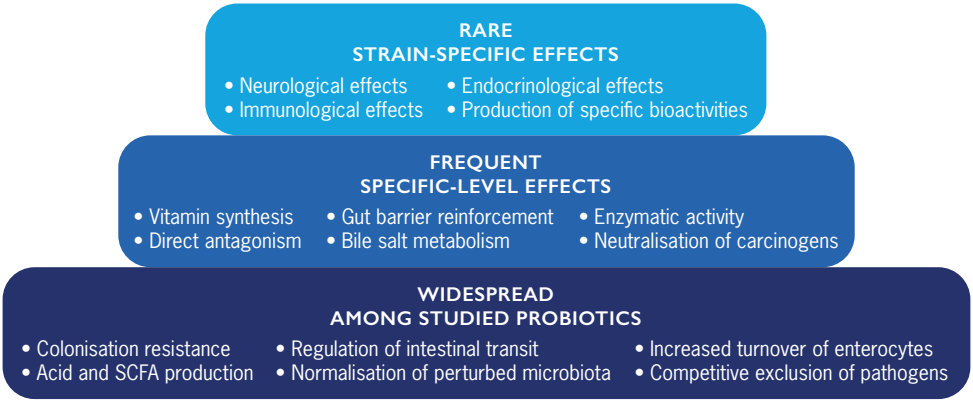
Health care professionals - Nothing. The science supporting the use of specific strains for specific health benefits is the same, irrespective of the name change. However, HCPs should be aware that the names have changed, and why.

Probiotic research - a lot. The more robust phylogenetic grouping of *Lactobacillus* strains into genetically and functionally related genera means that important functions can be extrapolated from other members of the group, which will target research and help important characteristics to benefit health to be quickly identified and confirmed mechanistically.

Communication to consumers - Nothing. The prefix "*L.*" has been retained in the new names for all important probiotic *Lactobacillus* species, meaning that the product labels will still look the same, and the content will still be the same.

IS STRAIN SPECIFICITY IMPORTANT?

Yes - not all probiotics are the same. Not all bacterial species or even strains are the same. This is why it is really important that any product label specifies exactly which bacterium is present, to the strain level (see Part II). Phylogenetic markers, such as substrate utilisation and surface proteins, differ widely between strains. These features affect the way in which bacteria interact with host cells and the immune system. Thus, it matters if a product contains *Lactiplantibacillus plantarum* ABC or *Lactiplantibacillus plantarum* XYZ.



Modified from Hill et al., 2014[2], with permission

[1] Zheng J *et al.* (2020). Int J Syst Evol Microbiol

[2] Hill C *et al.* (2014). Nat Rev Gastroenterol & Hepatol

[3] More information is available on the ISAPP website https://isappscience.org/for-consumers/infographics/