morinaga

heat-killed *Lacticaseibacillus paracasei* MCC1849

LAC-Shield™

Uncovering the innovative opportunities of postbiotics in the immunity market

LAC-Shield™ Immune health

The emerging field of postbiotics

Prebiotics, probiotics, and now postbiotics! The link between the gut microbiome and human health is a growing field of research. It brought different ways to modulate the gut microbiome to improve health along it, including probiotics, which introduce more beneficial live microorganisms into the body, and prebiotics, which feed helpful bacteria in the gut. Now postbiotics are emerging as an option.

Postbiotics stand out in the expanding biotics market. In mid-2021, the International Scientific Association for Probiotics and Prebiotics (ISAPP) published a consensus statement on the definition and scope of postbiotics [1]. According to the interpretation, postbiotics consist of inanimate microorganisms and/or their cellular components and metabolites.

Postbiotics are increasingly in the spotlight, owning to their exciting market potential. Today's consumers are more proactively looking for new products to improve their health. For this reason, the number of postbiotic products launched is increasing across all markets, including supplements, functional foods, and beverages. Postbiotics broaden the formulating options, making it more achievable for certain delivery formats and manufacturing conditions that might be more challenging for live probiotics to thrive. Hence, the postbiotic market continues to grow amid infinite possibilities.

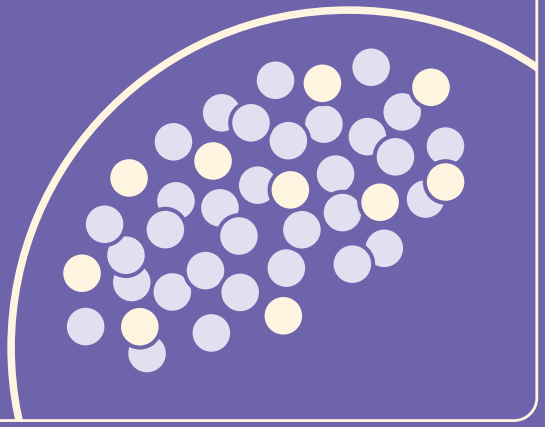
According to the Nutrition Focus Report from Innova Market Insights [2], there is a steep increase in new product launches with postbiotics, with an average annual growth of **over 85%** from 2018 to 2021.

Defining postbiotics

Postbiotics literally means the afterlife. Postbiotics are "a preparation of inanimate microorganisms and/or their components that confer a health benefit on the host" [1].
In other words, postbiotics are non-viable microbes (whole cell or cell components) with or without microbial metabolites that may contribute to the desired health effect.

Prebiotics

Substrates that are selectively utilized by host microorganisms conferring a health benefit.

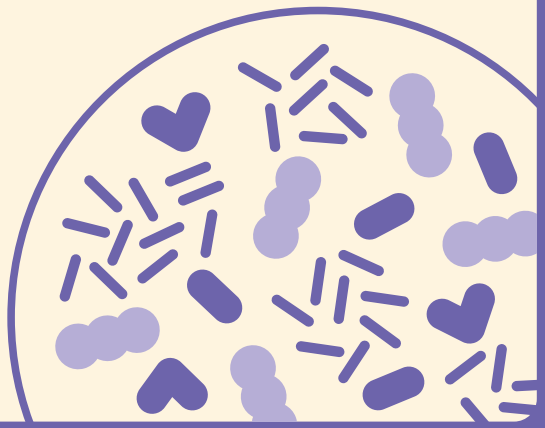


Probiotics

Live microorganism that when administered in an adequate amount confer a health benefit on the host.

Postbiotics

Preparation of **inanimate microorganisms and/or their components** that confer a health benefit on the host.



The biotics family

LAC Shield®

An opportunity to differentiate in the immune health market

Consumers prioritize immune health

Immunity has been a particular focus among consumers for years, even before the pandemic. COVID-19 further emphasized the importance of immunity to consumers. The need for immune-supporting functional food and beverage products is clear.

Today's consumers are looking for products that support their immune health and fit well with their lifestyles. The question for manufacturers is how to meet demand. Certain ingredients have traditionally dominated the immunity category, such as vitamins D, C, and B, and minerals like zinc. Still, consumers are looking for new ingredients with clinically proven efficacy in innovative formats, particularly in these trying times. For this reason, there is a shift to more biotic solutions such as prebiotics, probiotics, and postbiotics for immune support. In postbiotics, the food and beverage industry has a clinically validated, easy-to-work-with solution for product innovation.

COVID-19 IMPACT

64%

of global consumers are more conscious of immunity [3]

IMMUNITY IS TOP OF MIND

68%

global consumers have changed their diets to address their immune health [4]

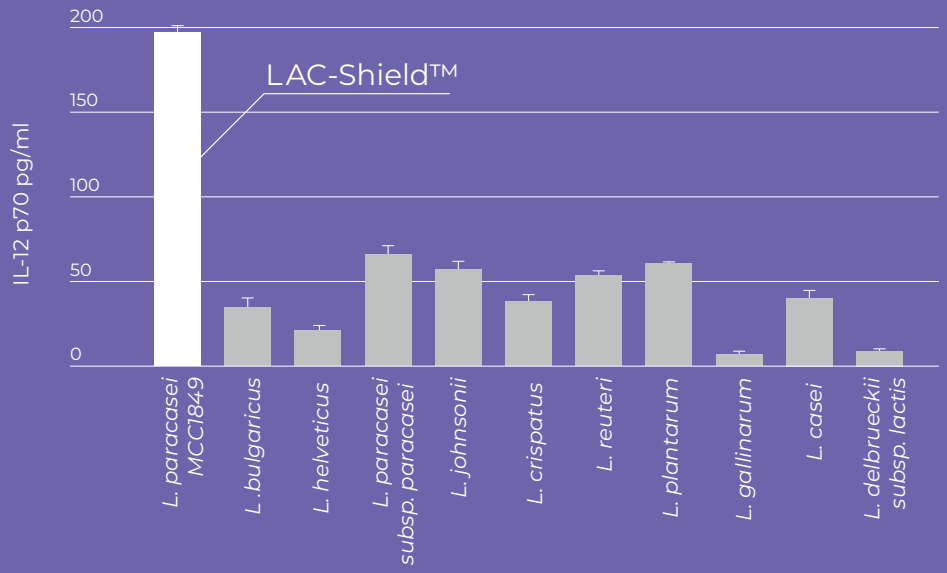
One study found that **64%** of global consumers became more conscious about their immune health because of COVID-19 [3]. Increased awareness of the importance of immune health is translating into action. More than two-thirds of global consumers have changed their diets to address their immune health [4].
A similar proportion of consumers are interested in food and drink products that promote immune health and will buy them even if they do not have specific health problems.

An innovative postbiotic for immune health

LAC-Shield™ (heat-killed *Lacticaseibacillus paracasei* MCC1849) is a clinically proven heat-killed probiotic strain with excellent immune-enhancing activity. LAC-Shield™ was named for its unique immunological function, which serves as a “shield” to protect the human body against invading enemies.

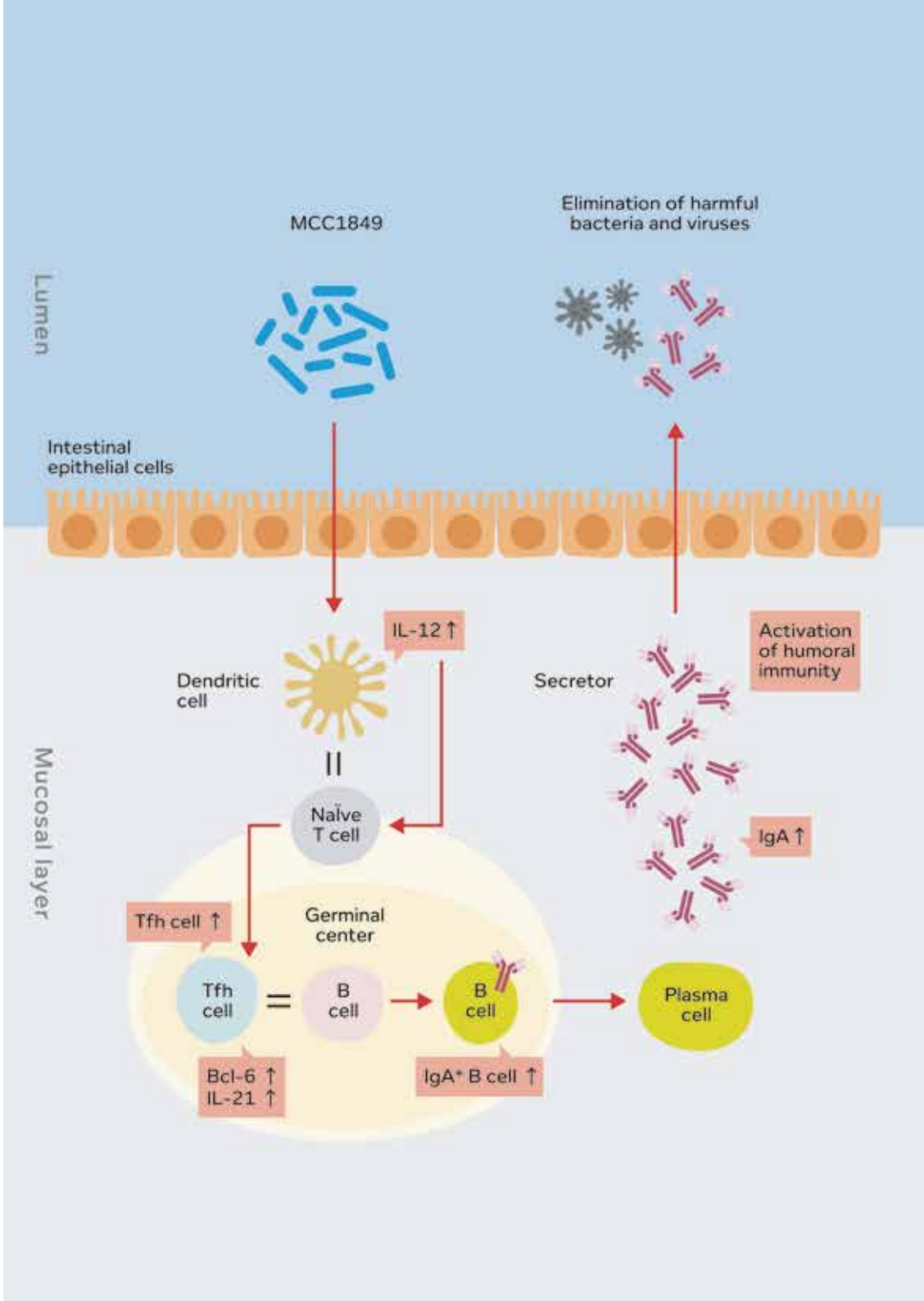
LAC-Shield™ was selected from the several thousand bacterial strains stocked by Morinaga Milk Industry Co., Ltd. It stands out from the crowds with its highest capacity to induce the production of interleukin-12 (IL-12) – a potent activator of innate and adaptive immunity [5].

LAC-Shield™ has high ability to induce IL-12 in immune cells



In action

One potential mechanism of action of LAC-Shield™ is its ability to strengthen the natural defence system through IgA production [5,6]. Mechanistic study suggests that orally administered heat-killed *L. paracasei* MCC1849 is recognized by antigen-presenting cells, such as dendritic cells, in Peyer's patches and induces IL-12 production. In a subsequent cascade reaction, in addition to an increased expression of IL-12, the expression of Bcl-6 and IL-21 induces the formation of follicular helper T (Tfh) cells from naïve T cells. Consequently, it facilitates the differentiation of B cells into IgA-positive B cells in Peyer's patches. As a result, it promotes antigen-specific IgA production in intestinal tissue and activates the humoral immunity.



SCIENCE-BACKED EFFICACY

LAC-Shield™ protects against the common cold

LAC Shield®

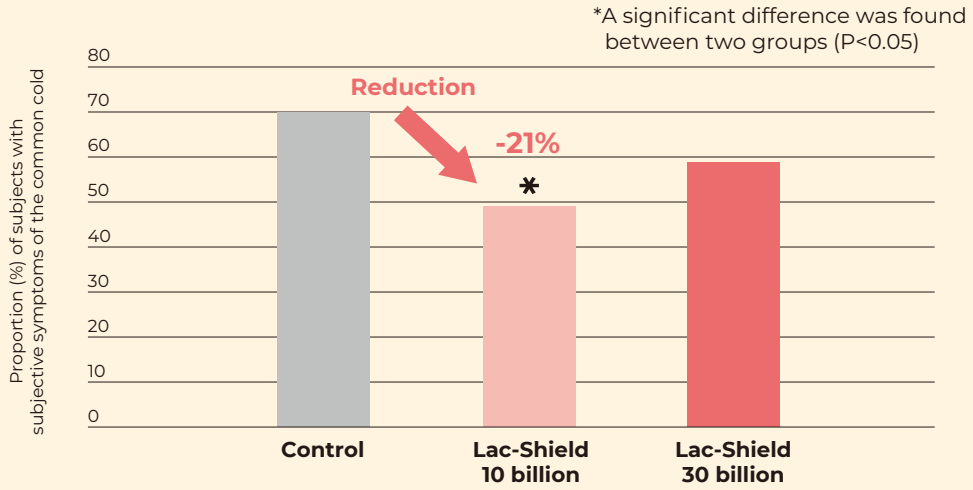
Protects against the common cold

A randomized, placebo-controlled, double-blind comparison study, including healthy young adults, reported that heat-killed *L. paracasei* MCC1849 could help prevent common cold [7].

The study involved 241 healthy women over 18 years old, who were randomized to receive either heat-killed *L. paracasei* MCC1849 (10 billion or 30 billion cells) or placebo (dextrin) powder daily for 12 weeks.

Subgroup analysis of individuals susceptible to the common cold in the previous year shows that those who consumed heat-killed *L. paracasei* MCC1849 (10 billion cells/day) had significantly reduced incidence of common cold, total duration, and severity of symptoms after 12 weeks.

Analysis of data from a population of individuals who experienced the common cold during the last year



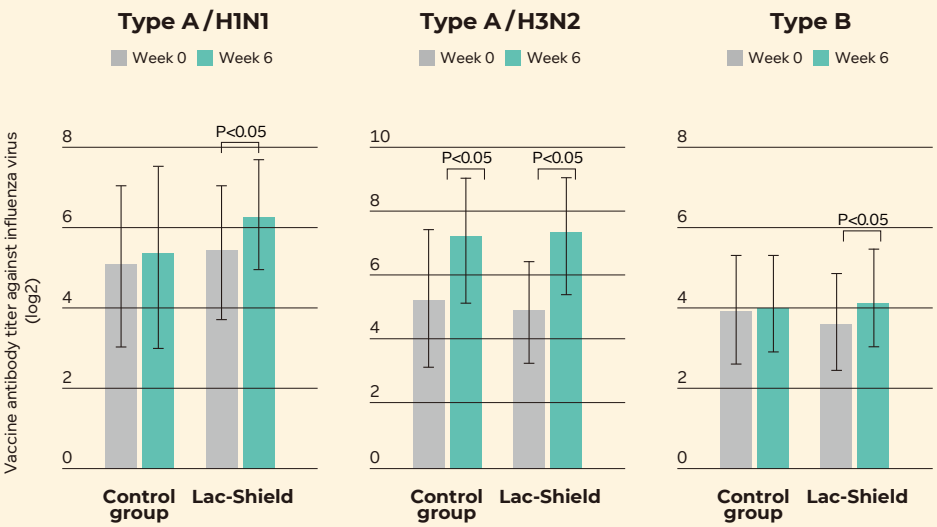
Murata et al. Beneficial Microbes. (2018).

LAC Shield®

SCIENCE-BACKED EFFICACY

LAC-Shield™ improves influenza vaccine response

Comparisons of influenza vaccine antibody production between elderly subjects (≥85 years) who consumed heat-killed MCC1849 (10 billion CFU) and those who did not.



Maruyama et al., Int J Food Sci Nutr. (2016)

LAC Shield®

Improves influenza vaccine response

In a randomized, double-blind, placebo-controlled trial, intake of heat-killed *L. paracasei* MCC1849-containing jelly improved responsiveness of vaccinations in the elderly compared with the placebo group [8].

The study involved 45 elderly subjects aged 65 years or older who consumed either a jelly containing 10 billion heat-killed *L. paracasei* MCC1849 cells or a placebo jelly once a day for six weeks from autumn to winter. All participants received influenza vaccination midway at week three.

The efficacy of vaccination tends to decrease in elderly populations because of the waning immunity associated with aging. Yet, subgroup analysis of super-elderly subjects (aged 85 and above) shows that elderly who consumed heat-killed *L. paracasei* MCC1849 had higher number of blood vaccine antigens and improved antibody responses to the A/H1N1 and B antigens as compared to the placebo. As a result, heat-killed *L. paracasei* MCC1849 intake may affect the immune responsiveness to vaccinations, particularly in populations with reduced immunity.

Build resilience

FOR YOU

LAC-Shield™ helps you counter threats to your body.
This heat-killed bacterium aids in the production of antibodies that keep your body in balance so you can bounce back.

INPRODUCT

LAC-Shield™ retains its functionality even in the harshest food processing and storage conditions because it is heat-killed.

Market success in JAPAN

LAC-Shield™ is used by

450+

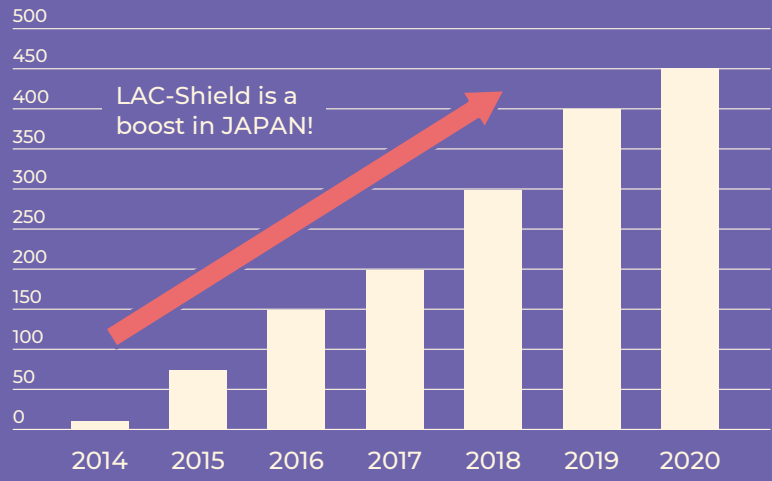
companies

in

1,000+

types of product in Japan

Product application of LAC-Shield in JAPAN



A big hit in JAPAN

2014 — **NOW** — **THEN**

LAC-Shield™ has been a big hit in the BtoB market in Japan ever since its first launch in 2014. Ease of use is one of the rationales for manufacturers to choose LAC-Shield™. As a potent postbiotic, LAC-Shield™ does not pose stability issues of traditional probiotics, as it is an inactivated probiotic strain. LAC-Shield™ is heat tolerant and highly stable to pH and other conditions, making it easy to work with and incorporate into dietary supplements and even a wide range of foods and beverages.

The resilience and proven efficacy of LAC-Shield™ have supported the strong uptake of LAC-Shield™ in Japan. LAC-Shield ™ has gained prominent recognition and popularity in Japan. After multiple years of growth, LAC-Shield™ has now been incorporated in more than **1,000** products by more than **450** companies in Japan.

Many domestic food and beverage manufacturers, restaurants, and retailers in Japan incorporate LAC-Shield™ in over a thousand types of food, beverages, and supplement products. The products include foods such as nutritional bars, cereals, baked goods, and confectionery, as well as beverages including bottled waters, energy drinks, juices, and powdered drinks such as cocoa. Manufacturers in other parts of Asia Pacific also incorporate LAC-Shield™ in their products.

The next wave in biotics

With ever-increasing possibilities, LAC-Shield™ could be the next wave in biotics, promising to emerge in different categories globally. For instance, LAC-Shield™ can stand up to the heat or the pressures of food and beverage processing, allowing it to remain stable during the manufacturing of food and drinks as well as supplement formats such as gummies.

Increasingly, the stability of an ingredient and its shelf life are criteria that become more important on the market. Indeed, manufacturers need products that are incorporated with stable ingredients for the manufacturing process and transportation and have a longer shelf life. This is where LAC-Shield™ shows a distinct advantage, as it is inactivated and therefore with great versatility.

Leverage your functional food and beverage

The global supplement product, as well as the functional food and beverage industry, are constantly innovating. Scientific substantiation and consumer trends are the major drivers for product innovation that pique the interest of health-conscious consumers. Boasting immune health benefits, LAC-Shield™ is paving the way for the next big hit of postbiotic products globally in the coming years.

Nutritional bar

Cereal

Baked goods

Confectionery

Bottled water

Energy drink

Juice

Powdered drinks

Morinaga Milk as your trusted NPD partner

Since the 1960s, Morinaga Milk Industry Co., Ltd. has been researching the safety, functional health benefits, and mechanisms of action of probiotic bifidobacteria and lactobacilli to better understand their role in maintaining human health.

With its unique probiotic and postbiotic portfolio and practical knowledge of applications, Morinaga Milk is ready to assist food companies with the new product development of different types of foods, including dietary supplements, functional foods, and infant nutrition.

Start your journey today by contacting us to find out how Morinaga Milk's HRB probiotics and its postbiotic strain LAC-Shield™ can help you appeal to smarter consumers.

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LinkedIn

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