NEWS RELEASE

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Continued Intake of Dairy Products Containing *L. paracasei* strain Shirota Improves Gut Microbiota and Gut Environment of Residents and Staff of Elderly Houses in Indonesia

TOKYO, April 11, 2025 - Yakult Honsha Co., Ltd. (President: Hiroshi Narita) announced that the company and Gadjah Mada University (Yogyakarta, Indonesia) conducted a study on the effects of consumption of a dairy product containing *Lacticaseibacillus paracasei* strain Shirota* (hereinafter, "*L. paracasei* strain Shirota") on the residents and staff of elderly houses located in Bali, Indonesia. The study revealed the following two findings.

1. **Significant increases were observed in the composition and number of intestinal bifidobacteria at the three-month mark among the group that continued to consume a dairy drink containing *L. paracasei* Shirota (hereinafter, the "*L. paracasei* strain Shirota Group") compared with the group that consumed a placebo drink without *L. paracasei* strain Shirota (hereinafter, the "Placebo Group").**
2. **Significant increase was seen in intestinal butyrate concentration in the *L. paracasei* strain Shirota Group in the sixth month compared with the Placebo Group.**

These findings suggest that the continued consumption of dairy products containing *L. paracasei* strain Shirota improves the gut microbiota and gut environment of residents and staff of elderly houses in Indonesia. These effects are expected to contribute to comprehensive maintenance of health and increase of quality of life of people living in or involved with elderly houses.

The study was published in the academic journal *World Journal of Gastroenterology* (March 28, 2025).

*Formerly classified as *Lactobacillus casei* strain Shirota

1. Background

With average life expectancy increasing worldwide, the aging of society is accelerating. In Indonesia, which has the world's fourth largest population, the elderly population is increasing at an annual rate of about 5%, exceeding the general population increase of 3%. At the same time, socioeconomic development has resulted in increasing numbers of elderly people relocating to rural areas and living alone. Under these shifts, the roles of elderly houses are becoming more important than ever.

It has been reported that as people age, beneficial bacteria, such as bifidobacteria, decrease while opportunistic and pathogenic bacteria increase. These changes may result in an imbalance in the metabolism of gut microbiota, which in turn results in a decline in the production of organic acids beneficial for humans, such as acetate and butyrate, ultimately leading to a decline in health conditions, including weakened immune function. In addition, transmission of pathogenic bacteria and antibiotic-resistant bacteria between individuals often raise issues at elderly houses. It is therefore important, from the perspective of health management at these facilities, to appropriately manage the gut microbiota and gut environment not only of the residents, but also of the staff members who take care of the residents on a daily basis.

While the effects of *L. paracasei* strain Shirota on improving gut microbiota and gut environment have been reported in several countries including Japan, verification of its effects had not been conducted in elderly houses in Indonesia. In this research, Yakult Honsha Co., Ltd. and Gadjah Mada University studied the effects of continued use of a dairy product containing *L. paracasei* strain Shirota on the gut microbiota and gut environment of residents and staff of elderly houses in Indonesia.

2. Study Details

(1) Study method

The study was conducted on a total of 112 people, 67 healthy residents and 45 staff members, at three elderly houses in Bali, Indonesia. The participants were randomly assigned to two groups: a group taking a dairy drink (65 ml) containing 6.5 billion colony-forming units of *L. paracasei* strain Shirota (the "*L. paracasei* strain Shirota Group," 56 participants) and a group taking a placebo drink without *L. paracasei* strain Shirota (the "Placebo Group," 56 participants). Each participant in both groups consumed one bottle of the respective drink daily for six months (randomized double-blind placebo-controlled study*). Stool samples of the participants were collected immediately before the start of the study, three months from the

start, and six months from the start, and their gut microbiotas were analyzed. Levels of organic acid and other metabolites in the stool were measured to investigate impacts on the gut environment.

* In randomized double-blind placebo-controlled studies, participants are randomly assigned to groups, and neither the participants nor the researchers involved in the administration and evaluation of the experiment, nor, in this case, the facility staff who practice the treatment, know who is receiving the test beverage or the placebo. A placebo (a placebo drink, in this case), which resembles the test beverage in color and taste but has no active ingredients is used as the control. Results of a properly conducted randomized double-blind placebo-controlled study are considered scientifically reliable.

(2) Study results

(i) Changes in gut microbiota

Compared with the Placebo Group, the occupancy rate of intestinal bifidobacteria in the *L. paracasei* strain Shirota Group significantly increased in the third month (Figure A). The bifidobacteria count also increased significantly in the *L. paracasei* strain Shirota Group compared with the Placebo Group.

When the effects were compared between the residents and facility staff members, the increase in bifidobacteria after continued consumption of the dairy drink containing *L. paracasei* strain Shirota was larger among the residents than the staff members. Additionally, it was found that the suppression effect on the genus *Enterococcus*, which many studies have indicated includes antibiotic-resistant bacteria species/strains, was remarkable among the staff.

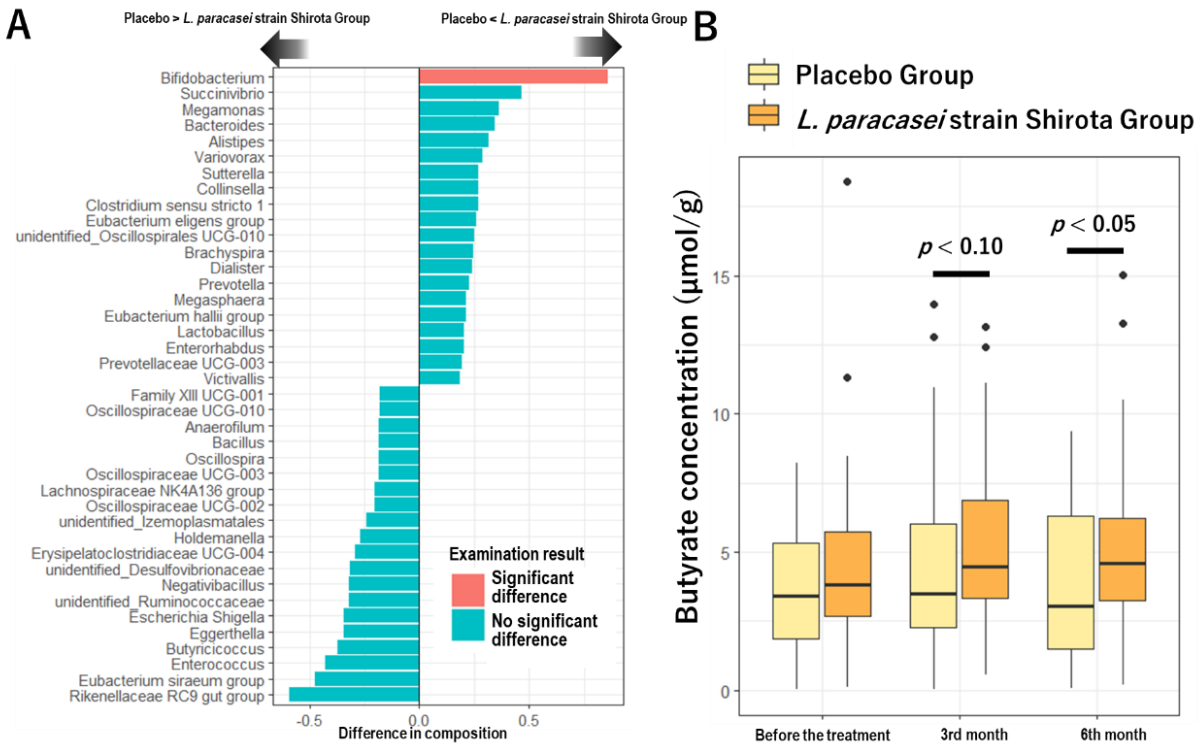
(ii) Changes in gut environment

Compared with the Placebo Group, butyrate concentration significantly increased in the *L. paracasei* strain Shirota Group at six months (Figure B). A similar trend was also observed at the three-month mark after the participants began consuming the drink.

Examination of differences in results between the residents and staff confirmed similar trends among the two populations.

Figure: Evaluation Results of Gut Microbiota and Gut Environment

A. Composition of gut microbiota* **B. Intestinal butyrate concentration**



*The results of comparison between the two groups in the third month using the Analysis of Composition of Microbiomes (ANCOM), a statistical method for analyzing compositional differences in microbiota.

3. Observations

The study showed that continuous intake of the dairy product containing *L. paracasei* strain Shirota by the residents and staff members of elderly houses in Indonesia significantly increased the occupancy rate and number of bifidobacteria in the intestine at the three-month mark, and significantly increased butyrate, a beneficial substance to humans, at the six-month mark. Bifidobacteria are known to metabolize food-derived substances that reach the digestive tract and produce acetate. Further, it has been reported that the acetate produced by bifidobacteria is converted to butyrate in secondary metabolization with other intestinal bacteria, a process known as cross-feeding. The results of this study suggest that the increase of bifidobacteria recorded at the three-month mark caused the changes in the gut environment and activated cross-feeding, resulting in the increase in butyrate recorded at the six-month mark. In addition to being a critical energy source, butyrate is reported to have various physiological functions including controlling inflammation, adjusting immune function, and maintaining intestinal barrier function.

The study results also suggested that continued use of the dairy product containing *L. paracasei* strain Shirota suppresses the genus *Enterococcus*, which includes many antibiotic-resistant strains, particularly among the staff at elderly houses. There is the risk of antibiotic-resistant bacteria transmitting through contact among residents and staff members or through contaminated equipment. The observed decline in *Enterococcus* suggests that *L. paracasei* strain Shirota may serve as a preventative measure to suppress horizontal transmission of antibiotic-resistant *Enterococcus* strains and their antibiotic-resistant genes in elderly houses.

4. Significance and Prospects of the Study

These findings suggest that the continued consumption of dairy products containing *L. paracasei* strain Shirota improves the gut microbiota and gut environment of residents and staff of elderly houses in Indonesia. These effects are expected to contribute to the comprehensive maintenance of health and improve the quality of life of people living in or involved with elderly houses. Yakult Honsha Co., Ltd. will further pursue verification of long-term effects of the changes in gut microbiota and gut environment on the health of people living in or involved with elderly houses from a clinical perspective.

5. Publication Information

Name of the journal: *World Journal of Gastroenterology*
(https://dx.doi.org/10.3748/wjg.v31.i12.104081)

Title: Randomized study of *Lacticaseibacillus* fermented milk in Indonesian elderly houses: Impact on gut microbiota and gut environment

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