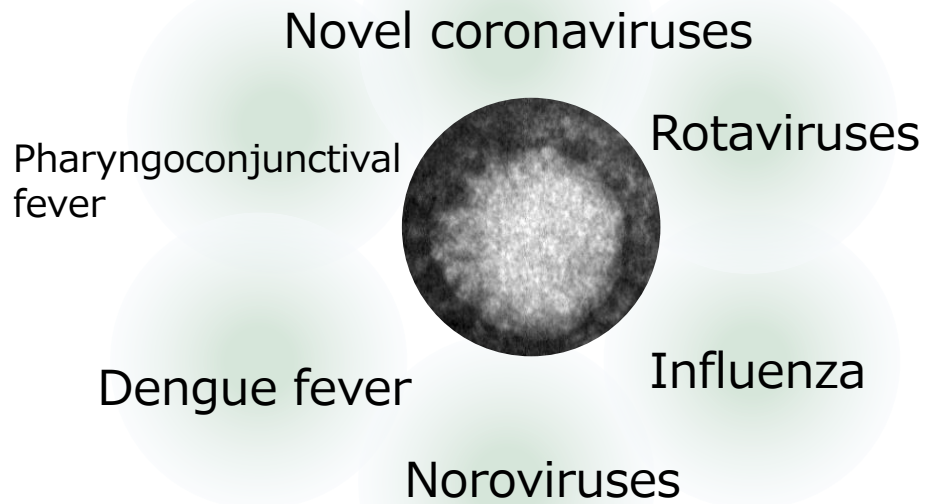


What can be expected from this technology

Control infectious disease risk and solve the problem of infectious disease in areas with poor sanitary conditions

Threat of viruses throughout the year  
Risk of new viruses emerging



Pandemics caused by the movement of people and goods



Limitations of medical treatment and vaccines



It is increasingly important to strengthen **the body's natural immunity** to fight viruses in the course of daily life.

## What is immunity?

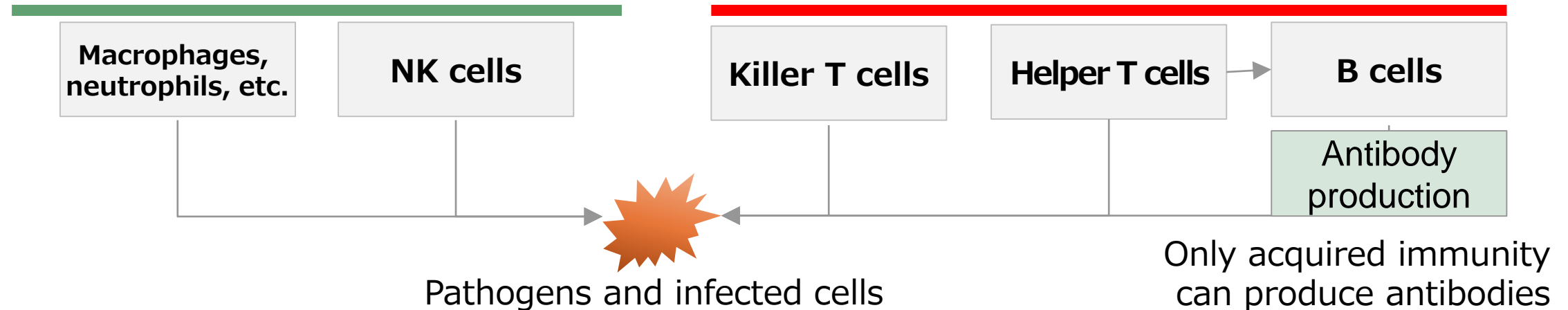
A mechanism for eliminating viruses, bacteria and other pathogens through both innate and acquired immunity

### First type of immunity: **innate immunity**

- An immune response mechanism that people are born with
- Relays information on the enemy to acquired immune cells
- Its offensive power is weak, but its response is immediate (several hours)
- The innate immune system does not retain any memory of its targets, and simply attacks the enemy at hand

### Second type of immunity: **acquired immunity**

- Acquired immune response
- Attacks enemies that breach innate immunity
- Is powerful but takes a few days to kick in
- Retains memory of the target (response is immediate from the second time onwards)

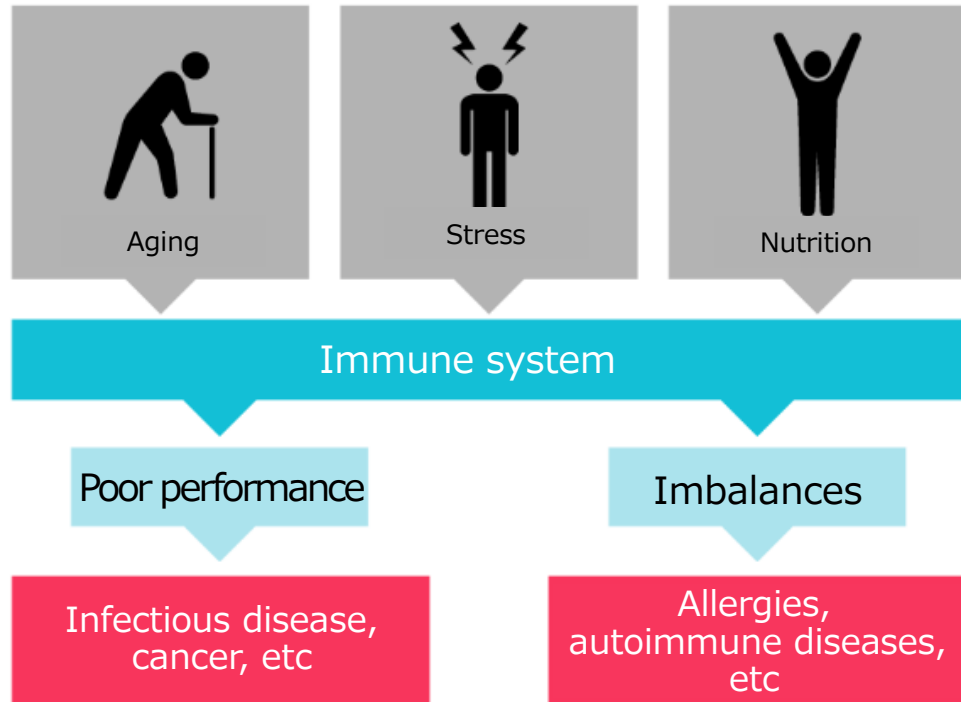


## Immunity and food

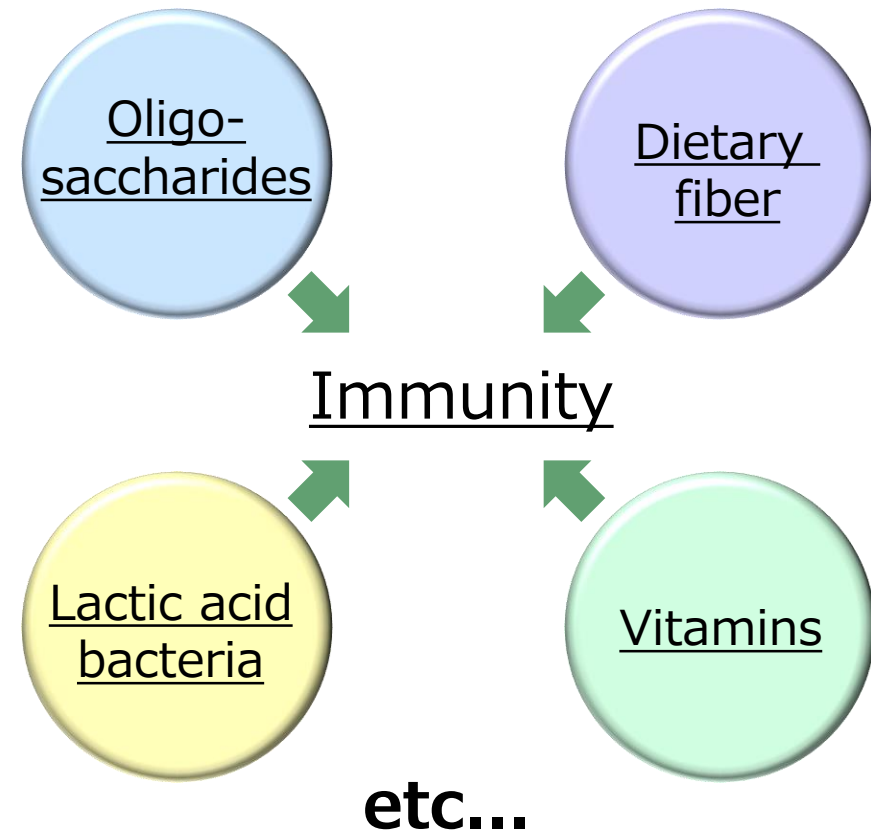
Dietary habits greatly affect immunity

Lactic acid bacteria are known to be closely linked to immunity

### Relationship between immunity and daily life



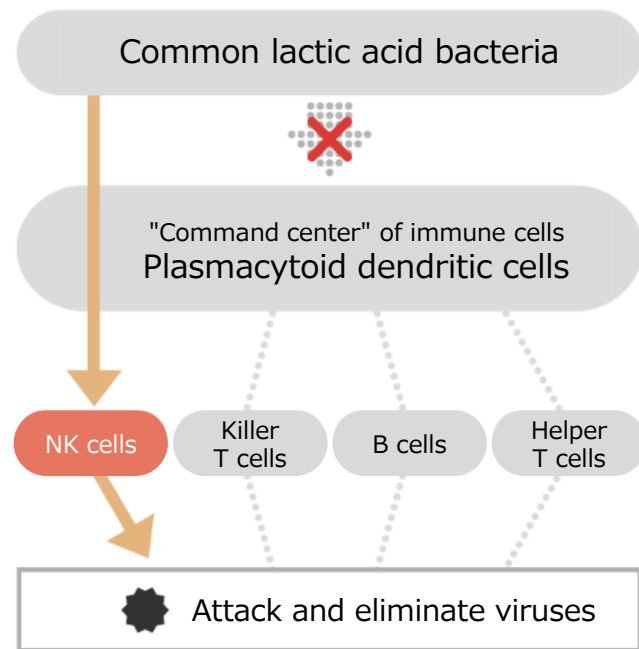
### Food ingredients known to be associated with immunity



## Background of this technique

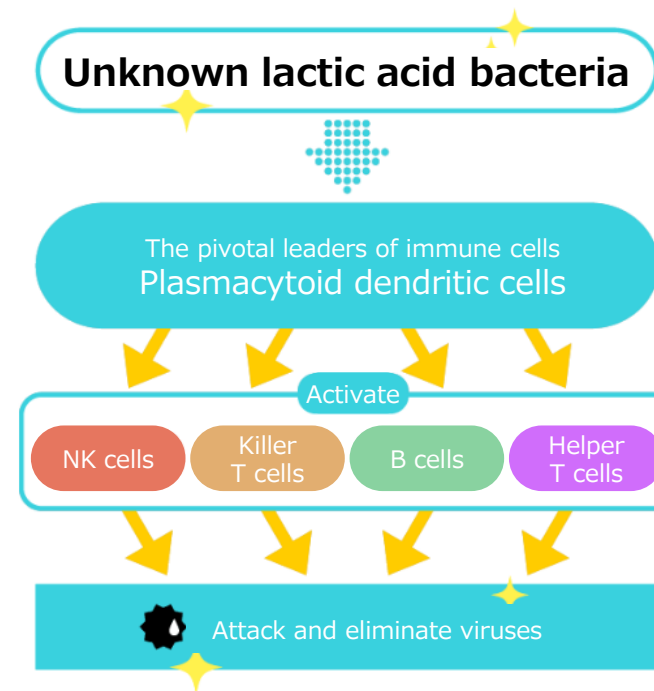
In the past, the accepted knowledge in immunology was that lactic acid bacteria activate only some immune cells (NK cells).

### Accepted knowledge in immunology



**Activate only some cells**

### Kirin's idea



**Activates all immune cells**

Is it possible that there may be lactic acid bacteria capable of activating the control tower?

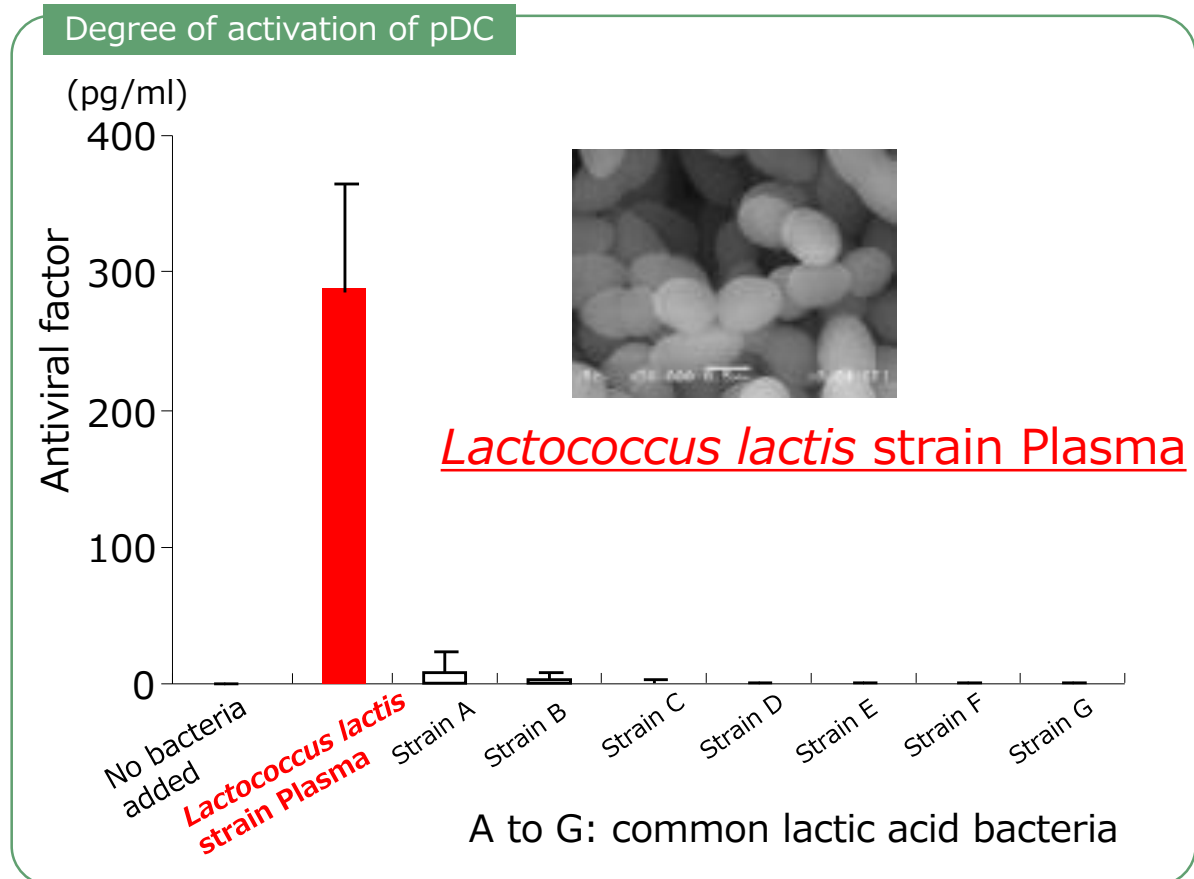
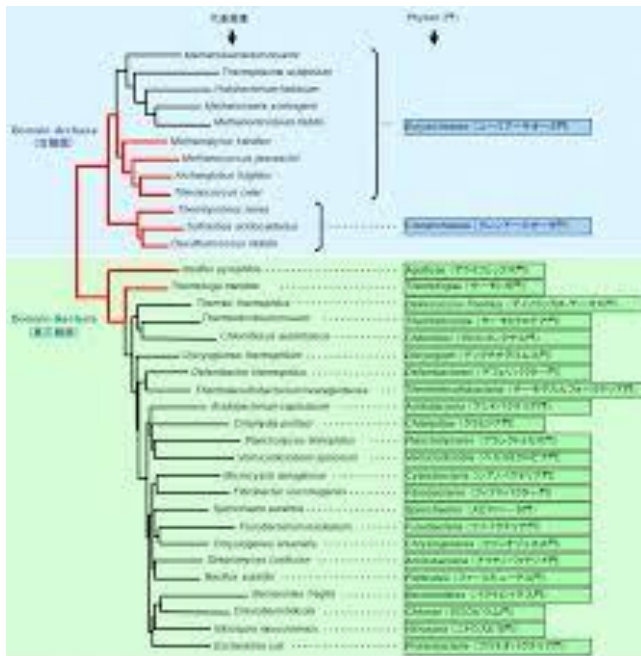


\*Blood 2009;113:4232-4239. Human plasmacytoid dendritic cells are unresponsive to bacterial stimulation and require a novel type of cooperation with myeloid dendritic cells for maturation

## About this technology

By questioning accepted knowledge and studying large numbers of lactic acid bacteria, we discovered "*Lactococcus lactis* strain Plasma" — a type of bacteria that activates the control tower

### Studied large numbers of lactic acid bacteria in the microbial strain bank



\*Presentation: The 48th Annual Meeting of the Japanese Society for Pediatric Infectious Diseases

About this technology

# Ingestion of "*Lactococcus lactis* strain Plasma " reduced the risk of influenza and colds

We asked 200 people to consume either a milk-based drink containing "*Lactococcus lactis* strain Plasma" or a milk-based drink without "*Lactococcus lactis* strain Plasma" every day for 10 weeks, and investigated the effects on their physical condition.



Volunteers

**200 people**

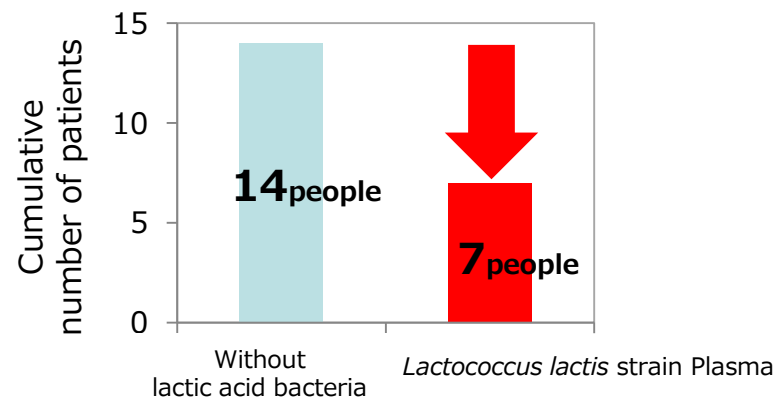
**100 people**

Milk-based drink  
containing *Lactococcus*  
*lactis* strain Plasma

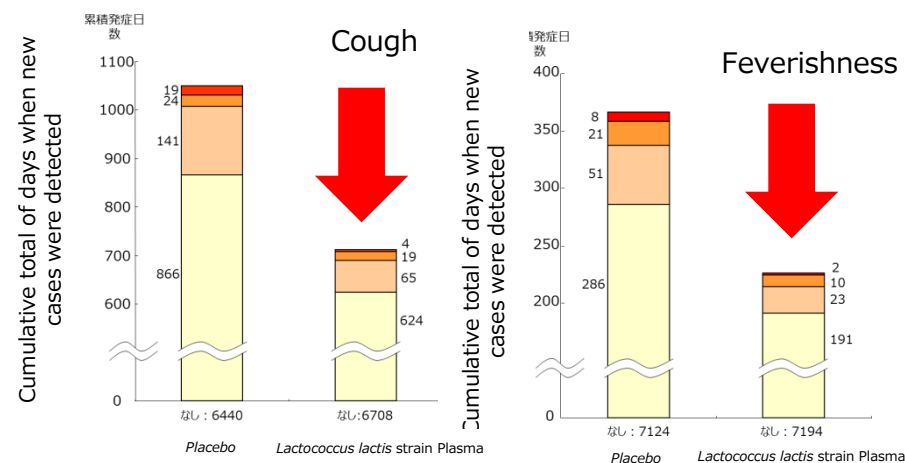
**100 people**

Milk-based drink that does  
not contain *Lactococcus*  
*lactis* strain Plasma

Number of people suffering from influenza/cold

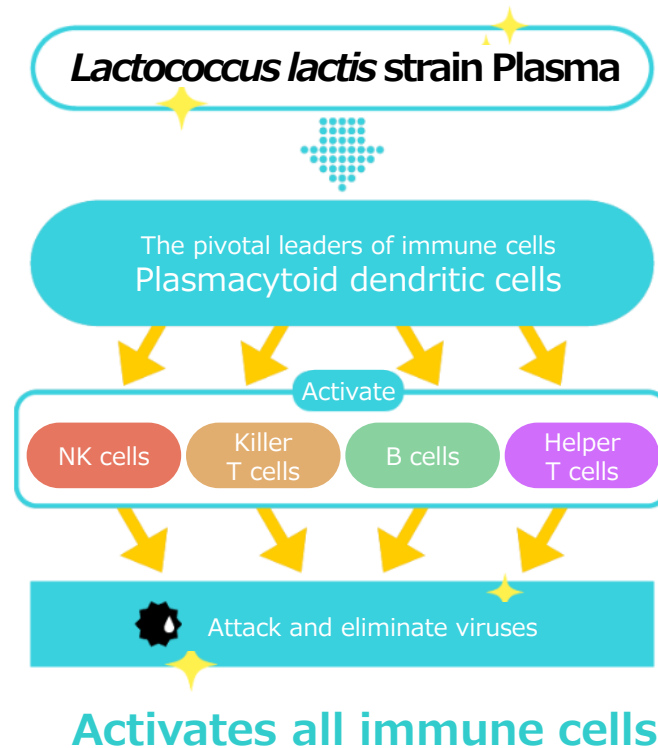
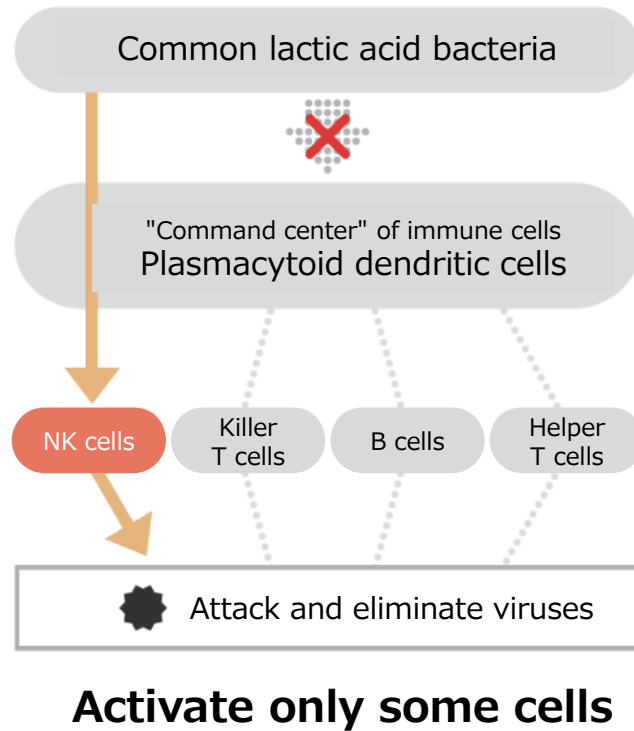


Influenza-like subjective symptoms



## Uniqueness of this technique

*Lactococcus lactis* strain Plasma are highly rated by experts for their unique ability to activate the "control tower," with numerous scientific papers published

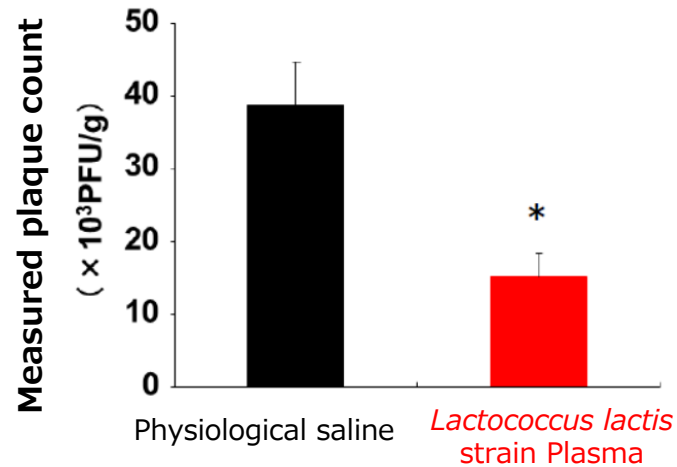


**32**  
papers  
published  
in total!

## Future potential

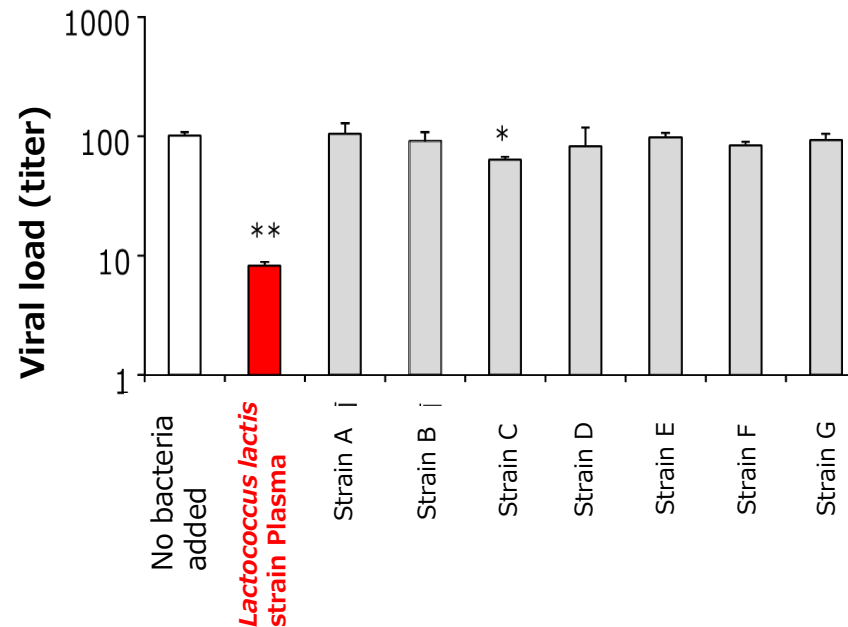
Since *Lactococcus lactis* strain Plasma activate the "control tower," they can be expected to be effective against various viruses

Effect on rotavirus (non-clinical study)



A model of rotavirus infection was used to evaluate the effects of *Lactococcus lactis* strain Plasma. Compared to the physiological saline group, the *Lactococcus lactis* strain Plasma group showed an improvement in fecal rotavirus levels

Effect on rotavirus (non-clinical study)



Dendritic cell supernatant stimulated with *Lactococcus lactis* strain Plasma was added to cultured cells infected with dengue virus. This was found to limit virus growth

If you would like to find out more:

