

## The Next Generation of Immune Health

### A POSTBIOTIC WITH REAL CLINICAL RESEARCH

Patented | GRAS | Vegetarian | Allergen Free | Clinically Studied | Non-GMO

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### WHAT ARE POSTBIOTICS? IMMUSE™

<p style="text-align: center; font-weight: bold; font-size: small;">PREBIOTICS</p> <p style="font-size: x-small;">Non-digestible food ingredients that were beneficial to the host through their selective stimulation of specific bacteria within the colon.</p>	+	<p style="text-align: center; font-weight: bold; font-size: small;">PROBIOTICS</p> <p style="font-size: x-small;">Live microorganisms which when administered in adequate amounts confer a health benefit on the host.</p>	=	<p style="text-align: center; font-weight: bold; font-size: small;">SYNBIOTICS</p> <p style="font-size: x-small;">Mixture of Probiotics and Prebiotics</p>
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POSTBIOTICS

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

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### ISSAP POSTBIOTIC DEFINITION IMMUSE™

The International Scientific Association of Probiotics and Prebiotics (ISAPP) consensus statement on the definition and scope of postbiotics:

(Published May 2021)

*"The term postbiotic was chosen by the panel as a composite of 'biotic,' defined as 'relating to or resulting from living organisms,' and 'post,' a prefix meaning 'after.' Together these terms suggest 'after life'; that is, non-living organisms.*

**We propose that a postbiotic is a preparation of inanimate microorganisms and/or their components that confers a health benefit on the host."**

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**IMMUSE™ OVERVIEW** IMMUSE™

Material name: *Lactococcus lactis* strain Plasma (LC-PLASMA) (IMMUSE™)


IMMUSE™ is the branded name of the material

IMMUSE™ is a heat-treated bacterial strain

Classified as a Postbiotic

**Activates** pDC's, A leader of the immune system

The **latest breakthrough** approach in immunity




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**IMMUSE™ OVERVIEW** IMMUSE™

- Light brown powder, easy to use  
Supplement (capsule, powder, tablet, chewable, gummy, sachet) and food (bar, cereal, dairy)
- No strong taste
- Stable in room temperature
- Dose is 50 mg/day
- 3 years' shelf life as an ingredient
- Self-affirmed GRAS status




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**IMMUNE SUPPORT INGREDIENTS IN MARKET** IMMUSE™

**DEFENSIVE**

Necessary nutrient for immune cells  
Glutamine, vitamin B/C/D, zinc, etc.

Keep immune cells healthy  
Antioxidant (vitamin C, elderberry)  
Glutathione



**RESPONSIVE**

Activate immune cells  
More comprehensive immune support

**IMMUSE™**

Partial immune support  
Conventional lactic acid bacteria (probiotics), D-glucan, mushroom extract

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## MECHANISM OF ACTION

IMMUSE activates pDC, a leader of the immune system.

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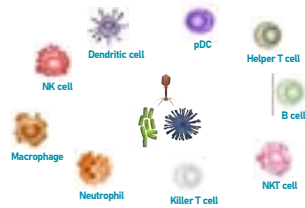
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## ABOUT IMMUNE SYSTEM

- Our immune system rejects harmful invaders (viruses, bacteria, parasites).
- The immune system is composed of various immune cell types, each one has its own role.
- Immune cells need to work as a system to efficiently fight against invaders



This slide is for discussion with customers only and is not intended to be used in consumer communication.

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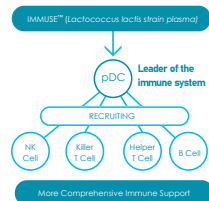
## pDC, A LEADER OF THE IMMUNE SYSTEM

Plasmacytoid dendritic cells (pDCs) are an important leader of the immune system.

### The roles of pDCs:

- Detect harmful invaders (especially, viruses)
- Present antigen to immune cells
- Secret IFN- $\alpha$ , an important signal molecule to activate other immune cells

↓  
More comprehensive immune response



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## STRATEGY TO FIND THE NOVEL INGREDIENT iMMUSE™

- Current ingredients to activate the immune system mainly target NK cells. (ex. generic probiotics or β-glucan)
- Researchers at Kirin decided to find a novel food ingredient that can activate pDCs, which are the immune cells to that provide more comprehensive immune support at a cellular level.

Generic probiotics, β-glucan, mushroom extracts

Partial Immune Support

iMMUSE™ (Lactococcus lactis strain plasma)

More Comprehensive Immune Support

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## DISCOVERY OF iMMUSE™ (C-PLASMA) iMMUSE™

**KIRIN'S DISCOVERY IN 2012**

iMMUSE™ (Lactococcus lactis strain plasma)

Kirin found a special strain after testing more than a hundred strains in the microbial bank.

Strain	IFN-α (pg/ml)
CONTROL	~0
iMMUSE™	~320
A	~20
B	~10
C	~5
D	~2
E	~1
F	~1

Conventional LAB cannot activate pDC. Only iMMUSE™ can.

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## SUGGESTED MECHANISM OF ACTION iMMUSE™

Peyer's Patch

CONTROL LACTIC ACID BACTERIA

iMMUSE™

- Orally administered iMMUSE™ will go to the small intestine where pDC's reside
- iMMUSE™ is easily taken by pDCs (in vitro study)

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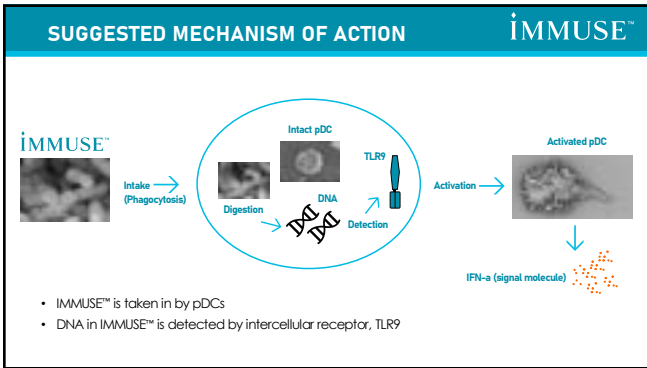
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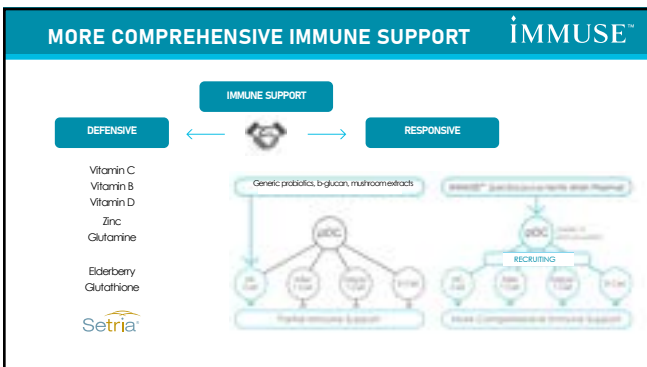
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### IMMUSE™ SUPPORTING SCIENCE

**15** published human trials

**2** safety efficiency studies

**13** for immune health

**2** in special situation

- Condition improvement in sports situation
- Improvement of productivity in office space

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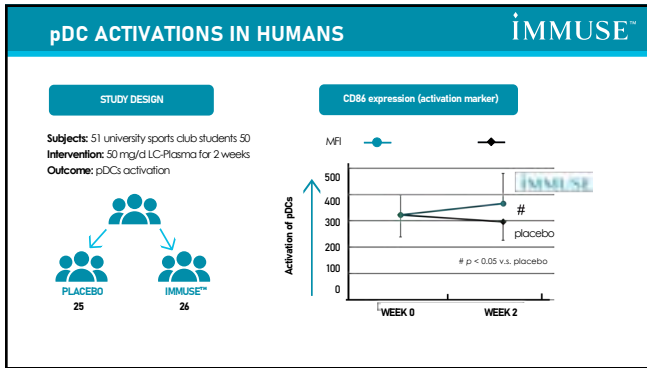
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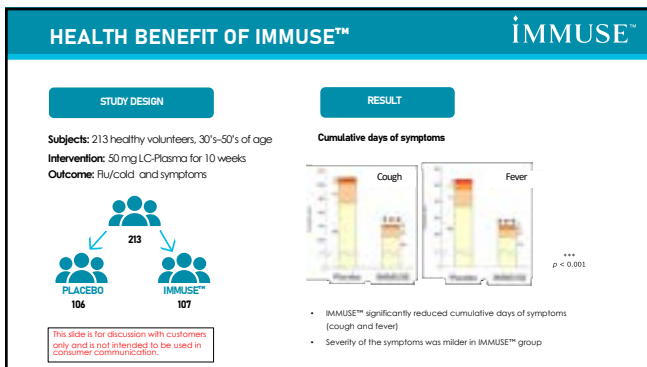
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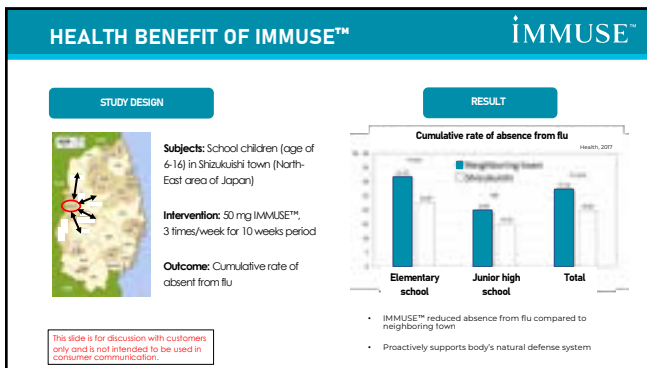
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## HEALTH BENEFIT OF IMMUSE™

### STUDY DESIGN

- University sports club students.
- Take IMMUSE for 2 weeks.
- Fatigue, body conditioning was evaluated.

### RESULT

**Cumulative days of symptoms**

**Physical Condition**

**Fatigue**

- IMMUSE significantly reduced sneeze or runny nose symptom. (not shown in this slide)
- IMMUSE significantly improved physical condition.
- IMMUSE significantly reduced cumulative fatigue positive days.

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## SUPPORTING CLAIMS

### IMMUNE SUPPORT

- IMMUSE™ provides clinically researched immune support
- IMMUSE™ activates pDC
- IMMUSE™ proactively supports the immune system
- Immune support for year-round health
- Immune activator
- Proactive immune support
- More comprehensive immune support
- Your immune advantage
- Probiotic for immune support

### RESULT

- Immune support for exercise (high intensity training)
- Get your immune system ready for training
- Supports exercise performance by activating immune system
- Activates your body's natural defense system
- Immune resilience for a busy lifestyle

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## FROST & SULLIVAN NEW PRODUCT INNOVATION AWARD

"IMMUSE™ is a clinically backed, patent-protected, non-GMO, allergen-free, GRAS, and heat-stable probiotic. It is a broad-range immune support ingredient used in various finished products, providing formulation ease to supplement and functional food manufacturers. Studies show that it activates pDCs, which activate other immune cell types involved in innate and adaptive immunity. The comprehensive immune support offered by IMMUSE™ makes it stand out among other immune health ingredients."

#### AWARD CRITERIA

New Product Attributes	Customer Impact
Match to Needs	Risk/Performance Value
Reliability	Customer Purchase Experience
Quality	Customer Ownership Experience
Packaging	Customer Service Experience
Design	Brand Equity

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