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To all members of the press

オリーザ油化株式会社


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## Elucidation of the Immune-Boosting Mechanism of Oryza Ceramide® in Dendritic Cells –Publication of Joint Industry–Academia Research between Oryza Oil & Fat Chemical and Kindai University–

Oryza Oil & Fat Chemical Co., Ltd. (Headquarters: Ichinomiya City, Aichi Prefecture; President: Hiromichi Murai; hereinafter “Oryza Oil & Fat Chemical”), in its research on the rice-derived ceramide material Oryza Ceramide®, has clarified the functionality and mechanism of glucosylceramides on dendritic cells—which play the most critical role in immune response—through industry–academia collaboration with the Kindai University Institute of Advanced Technology (Higashiosaka City, Osaka). Consequently, **a scientific paper regarding this research has been published in the Journal of Natural Medicines**, an affiliated journal of The Japanese Society of Pharmacognosy.

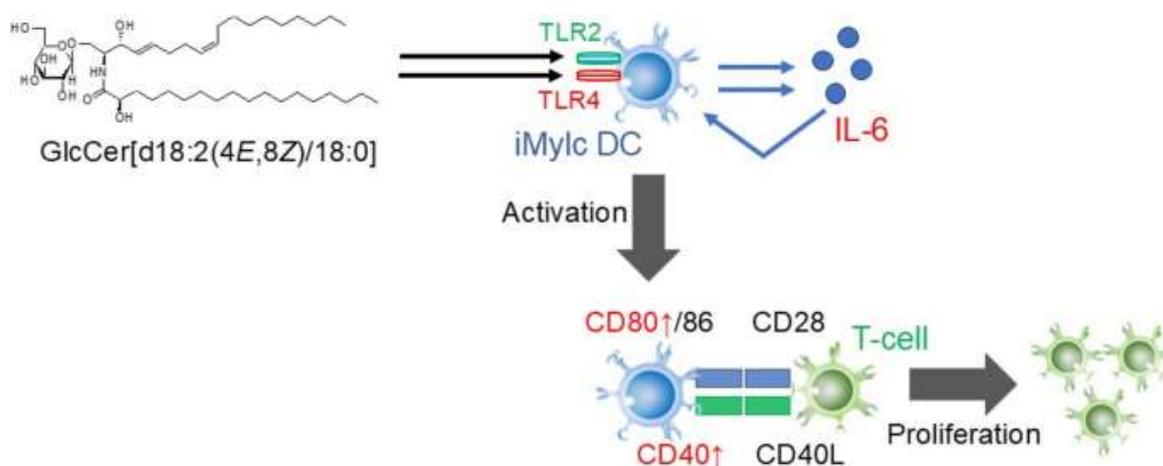


Figure 1. Overview of the published paper: Immune-boosting effects of GlcCer contained in Oryza Ceramide® and its mechanism.

### 【Paper Publication】

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**Title:** Rice-derived glucosylceramides activate innate immune responses in myeloid lineage differentiated dendritic cells via toll-like receptors 2 and 4

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**DOI:** 10.1007/s11418-025-01951-1

## ■ Details of the Matter

### 【Background】

As a pioneer of “edible rice-derived ceramide,” Oryza Oil & Fat Chemical launched “Oryza Ceramide®” in 1999. Previous research on Oryza Ceramide® has clarified the structure-activity relationship of glucosylceramide (the standardized component) regarding its moisturizing and whitening effects, as well as its efficacy in external clinical trials. Furthermore, research data on its immune-boosting effects has been established, with clinical trials demonstrating its ability to improve cold symptoms.

### 【Contents of this Case】

The content of the paper published this time is **research results evaluating the immune-boosting effects of glucosylceramide [production of interleukin-6 (IL-6\*) and antigen-presenting ability] using dendritic cells, which are the cornerstone of the immune response.**

Dendritic cells act as “sentinels” that find “enemies” such as viruses and bacteria entering the body and pass that information to T-cells, which act as the attackers of the immune system (this information sharing is called “antigen presentation”). During this process, CD28, CD40, and CD80 on the surface of dendritic cells bind like a “handshake” with CD28 and CD40L on the surface of T-cells, triggering a signal that activates T-cells and advances the immune response. Furthermore, dendritic cells are known to release a substance called IL-6 to strengthen immune function (Refer to Figure 1).

As a result of the experiments, the following new findings were obtained:

- ✓ Among the 13 types of glucosylceramides contained in Oryza Ceramide®, **GlcCer[d18:2(4E,8Z)/18:0] was found to have the strongest IL-6 release promotion effect.**
- ✓ It was discovered that this glucosylceramide **binds to Toll-like receptors (TLR) 2 and 4\*3 on dendritic cells to release IL-6.**
- ✓ **Activation of antigen-presenting ability (proliferation of T-cells)** was observed in glucosylceramide.
- ✓ **An effect of increasing CD40 and CD80 on dendritic cells,** which are involved in the activation of antigen-presenting ability, was observed.

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Based on these results, it has become clear that glucosylceramide contained in Oryza Ceramide® mediates the binding of TLR2 and 4 on dendritic cells, increases the release of IL-6 and the expression of CD40 and CD80 on the cell surface, and enhances antigen-presenting ability; **this research has been published as a result of industry-academia collaboration with the Kindai University Institute of Advanced Technology.**

Additionally, **the patent application for this research content has already been completed.**

## 【Future Outlook】

Oryza Ceramide® is the flagship product of Oryza Oil & Fat Chemical Co., Ltd. Since its launch over 20 years ago, research has continued to reveal not only its beauty effects like moisturizing and whitening but also its life-extending effects in influenza-infected model mice and clinical results for improving cold symptoms. Regarding future outlooks, we are working on obtaining evidence data so that Oryza Ceramide® can be used as a “Food with Function Claims” material focusing on immunity. Specifically, in addition to cell testing, animal and human clinical trials are currently underway.

## 【Research Support】

This research was conducted through industry-academia collaboration between Oryza Oil & Fat Chemical Co., Ltd. and Kindai University Institute of Advanced Technology, with support from the FY2023 Go-Tech Project (Growth-oriented Small and Medium-sized Enterprise Research and Development Support Project) (JPJ005698).

## 【Terminology】

### \*1 IL-6:

A type of inflammatory cytokine released from dendritic cells and macrophages. **It activates immune cells and promotes the action of eliminating foreign substances such as bacteria and viruses that have invaded the body.**

### \*2 CD::

The formal name is Cluster of Differentiation, which are cell surface molecules expressed on immune system cells. Hundreds of types of CD have been identified; they act as antennas for communication between immune cells and are indispensable factors in the immune response. Regarding CD40, CD80, and CD86, they are triggers for antigen-presenting ability, and their increase enhances that ability.

### \*3 TLR2, 4:

Receptors existing on the surface of immune cells; when factors bind to these receptors, inflammatory

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cytokines are released and immunity is enhanced. **Lipopolysaccharide (LPS), known as the “immune vitamin,” is known to bind to TLR4 and possess immune-boosting effects.**

## ■ About the Subject Product

Oryza Ceramide® was launched in 1999 as the “industry’s first edible rice-derived ceramide material”.



Oryza Oil & Fat Chemical’s “Oryza Ceramide®” has a track record of being accepted as a “Food with Function Claims” with “Rice-derived Glucosylceramide” as the functional ingredient. By consuming 0.6, 1.2, or 1.8 mg of rice-derived glucosylceramide per day, it is possible to display health claims such as “functions to increase moisture and alleviate dryness of the skin (lips, arms) for those concerned about dry skin,” and **this health claim can only be displayed for Oryza Ceramide®**. We can also provide SR (Systematic Review) data, so please feel free to consult us.

In addition to the cold symptom relief effect based on the mechanism of dendritic cell activation, “Oryza Ceramide®” has a wealth of clear scientific evidence demonstrated through cell to clinical trials, including moisturizing effects (which led to the “Food with Function Claims” status) and whitening/brightening effects based on the inhibition of melanin production.

Detailed information can be viewed in the members-only content on the Oryza Oil & Fat Chemical Co., Ltd. website, or please feel free to contact the Sales Department of Oryza Oil & Fat Chemical Co., Ltd.

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