

Development of a Functional Food with Isoliquiritigenin (ILG)-Rich Licorice Extract Powder

An Industry-Government-Academia Collaborative Project Originating from Toyama

Yoshinori Nagai

Hiroe Honda, Yukihiro Goda

Jinwei Yang, Takeru Ichihashi

Yutaka Nomura

Toyama Prefectural University, Faculty of Engineering,
Department of Pharmaceutical Engineering

Toyama Prefectural Institute for
Pharmaceutical Research

TOKIWA Phytochemical Co., Ltd.

TOA Pharmaceutical Co., Ltd.

Open for
Industry Partnerships

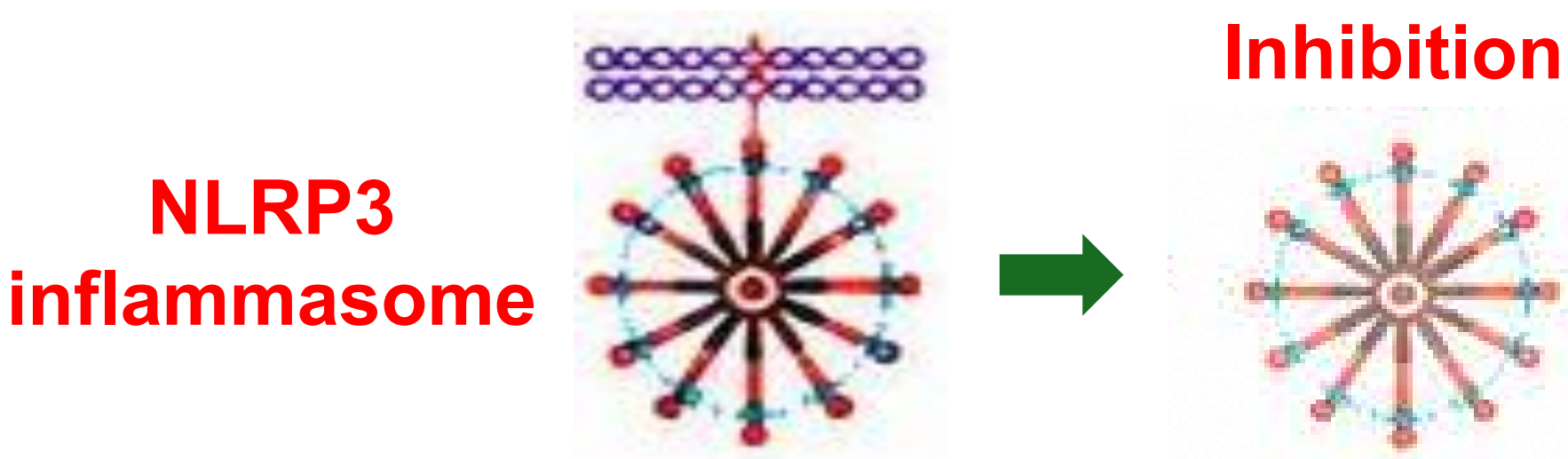
Upcycling Unused Resources
to Support the SDGs



1. Mechanistic Studies

Comprehensive Elucidation of
Biological Activities of ILG

Potent Inhibition of NLRP3 Inflammasome



High-fat Diet-Induced Obesity Mouse Model

- Body weight gain ↓
- Visceral fat accumulation ↓
- Adipose tissue inflammation ↓
- Glucose metabolism ↓

Gut Microbiota Modulation



Mechanistic basis for
anti-obesity effects of ILG

2. Intellectual Property

Securing Uniqueness and
Creating Value

Granted Patent (ILG)



Japanese Patent No.
6036193
“Inflammasome Modulator”

Patent Application
(Extract)



Japanese Patent
Application
No. 2021-178401

- Composition and manufacturing method of licorice extract
- Modulates gut microbiota, strengthens intestinal barrier, anti-obesity, anti-diabetes, and inhibits NLRP3 inflammasome

Protecting originality and creating
value for future commercialization

3. Ingredient Development & Quality Assurance

Joint Research with
TOKIWA Phytochemical Co., Ltd.

Co-development of ILG-Rich Licorice Extract



Licorice
(Glycyrrhiza spp.)



ILG-Rich
Licorice Extract

*Upcycling the residue after glycyrrhizin
extraction for effective utilization

- ✓ High ILG content
- ✓ Stable manufacturing process
- ✓ Quality standards & analytical methods
- ✓ Stable supply & quality assurance system

- ✓ Anti-obesity & anti-diabetic effects confirmed
- ✓ Confirm safety in rat studies

Reliable, high-quality functional ingredient
for healthy food products

4. Human Safety Study (Completed)

Safety Confirmation in Humans

Study Overview

- Subjects: Healthy Japanese men and women
- Dose: 9.2 mg ILG/day
- Duration: 4 weeks
- Design: Randomized, double-blind, placebo-controlled trial

Main Results

- No clinically significant adverse changes observed.
- Safety was confirmed.



Exploratory Analysis (Subgroup)

In subjects with BMI ≥ 23 kg/m²,
ILG tended to suppress increase
in leg fat mass vs. placebo.

Scientific basis for safety
established

5. Human Efficacy Study (under planning)

Obtaining Human Evidence for Body Fat Reduction

Study Design (Planned Study)

- Subjects: Adults with high visceral fat
- Design: Randomized, double-blind, placebo-controlled trial
- Duration: 12 weeks
- Dose: 9.2 mg ILG/day

Primary Endpoint

Change in visceral fat area
by abdominal CT



Secondary Endpoints

- Body composition
- Anthropometrics
- Blood biomarkers
- Safety



Acquire human evidence for
body fat reduction

6. Commercialization

Aiming for social implementation of
new healthcare products

Development and Notification
of a Food with Function Claims



Contribution to a Healthy Society

- Prevent & improve lifestyle-related diseases based on obesity
- Contribute to healthy life expectancy and better QOL



Expansion to Global Markets
Deliver high-quality Japanese
functional ingredients to
the world



From research to society and
global markets

Significance and Strengths



Elucidates ILG mechanisms
through basic research.



Provides scientific
evidence for body fat
reduction and health
support.



Contributing to the Extension of
Healthy Life Expectancy and
Improvement of QOL

Contact

Toyama Pharmaceutical Valley
Development Consortium Staff Office

1-7 Shinsogawa, Toyama City, Toyama 930-8501, Japan
Phone: +81-76-444-3943 (direct line) E-mail: ml-kusuri-toyama@pref.toyama.lg.jp