●Starting Stage

(Fiscal Year 2004-2006)

Hirosaki Area

Proteoglycan Application Research Project

Hirosaki University
1 Bunkyo-cho, Hirosaki City,Aomori 036-8560 Japan
Tel: +81-172-39-3911

Life Sciences
IT
Environment
Nanotech Materials
Others

Project Promotion

Project Director and Chief Scientist… …Yoji Kato
(Vice President, Hirosaki University)
Science and Technology Coordinators…Kaoru Kojima
Yoshio Kiyosue

Core Research Organization

Hirosaki University

Major Participating Research Organizations

Industry…Otsuka Chemical Co., Ltd., KAKUHIRO Co., Ltd., Kanesyou Co., Inc .,
Kyoei Co., Ltd., KOSE Corporation, Shibata Irika Co., Ltd., takasagofoods Co., Inc .,
TOHOKU CHEMICAL Co., Ltd., NAMIKI PRECISION JEWEL Co., Ltd .,
NICHIRO CORPORATION., Nippon Suisan Kaisha, Ltd., FANCL CORPORATION ,
AJINOMOTO HEALTHY SUPPLY, INC., Sunny Health Co., Ltd., Glyco Japan Co., Ltd .,
Origin Biochemical Laboratory Inc., Nisshin Kyorin Pharmaceutical Co.,Ltd .,
Wako Pure Chemical Industries, Ltd .
Academia…Hirosaki University
Government…Aomori Industrial Research Center

Aim of research and development

This project was to develop the world first technology(*2) to refine large quantities of highly pure proteoglycan(*1) at low cost from salmon nasal cartilage by Hirosaki University School of Medicine and Kakuhiro Co., Ltd.

The current research builds on the knowledge gained from the traditional glycoscience researches by Hirosaki University to develop new businesses utilizing the unique properties of proteoglycan in the fields such as medicine, cosmetics, health, and welfare.

The Hirosaki University Proteoglycan Network is a cross-disciplinary research organization that coordinates industry-academia-government research and development aiming to the practical application of proteoglycan products through seeds and needs investigation, possibility examination, research exchange meetings, and joint research projects.

※1 The complex carbohydrate by which the protein and the sugar chain(Glycosaminoglycan) covalently uniting, a principal ingredient of animal's cartilage as well as collagen and the hyaluronic acid.
※2 JPN-U.S.-Russ patents has been obtained.

Contents of research

1. Custom-made of Proteoglycan (PG)
- Manufacturing development of PG product with many kinds of grade corresponding to usage
- A valuable of "Artificial Proteoglycan(Super-Proteoglycan)" is developed by modifying native PG in gly coengineering .
- Development of the medium material for the medical application material and cell culture that makes the extracellular matrix component
- Development of the early biomarker that that assumed PG as index of the bone metabolism disorder .

2.Development for application of proteoglycan(PG) to functional food field
- Utility evaluation of PG as the functional food or material
1) Development of PG content functional food with inflammatory bowel disease
2) The application development as a food based on the immunomodulatory effects of PG
3) The research on the application of PG as the nutrition function food to supplement, for evaluation of PG as the functional food or material .
- Development of low-priced PG for the purposes of food

The main study results

1. Custom-made of salmon nasal cartilage proteoglycan

It is known that proteoglycan (PG) and glycosaminoglycan(GAG) have many Physiologic activities, and are expected for use in a wide range such as medicines and functional food. We developed a method to al ready coordinate with low-cost in large quantities. In addition, we tried a preparation method of PG (Agrican and Decorin, etc.) and GAG, that has physiologic activity. Although the production method was improved for some extent, the target material have successfully obtained. Therefore, we aim at a preparation in large quantities in the future .

2. Application of proteoglycan to inflammatory bowel disease

Ulcerative colitis and Crohn disease are unidentified intractable inflammation enteropathies to cause chronic inflammation to the bowels. Treatment is not yet established. Although patients tend to increase, the cause of the occurrence has not yet been identified .

It was found that Proteoglycan would be effective for down regulation of inflammation when it was provided orally to colitis and the Crohn's disease of disease model animals .

We will aim at medicine or application as functional foods in the future .