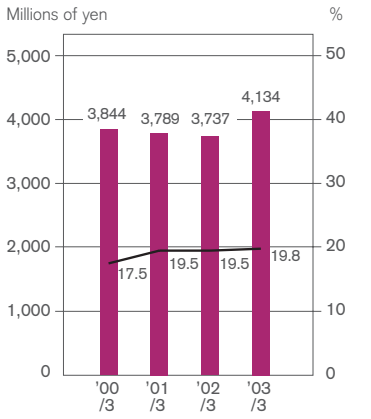
R&D Activities



R&D Cost and % of Total Net Sales

A Coherent System of Earnings-driven Product Development

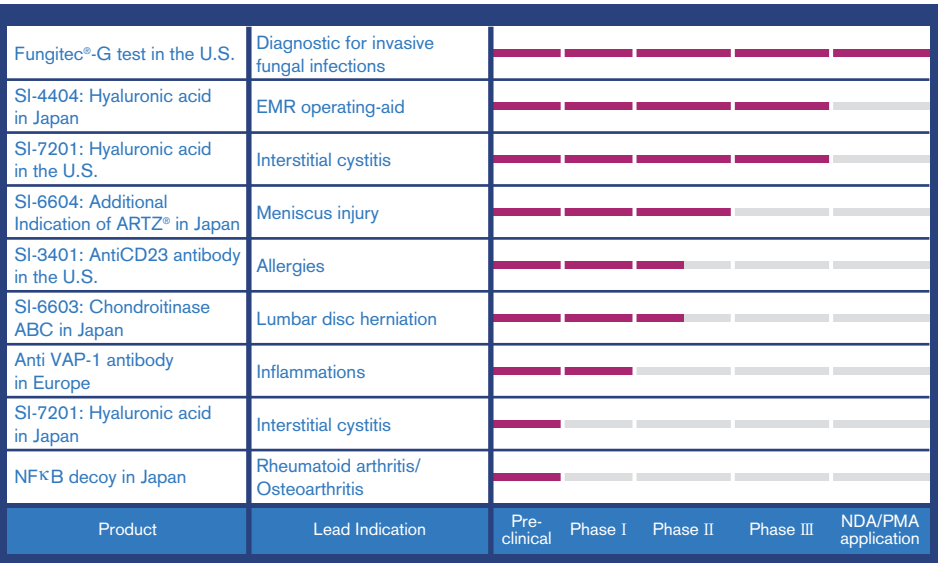
The recent flood of research in the area of genetics and the mechanisms through which genes act is throwing new light on the many roles of glycoconjugates–hybrid macromolecules comprising carbohydrates in conjunction with other molecules, such as proteins and lipids. Recent findings point to the potential application of glycoconjugates, which are centrally involved in cell regulation, as the basis for designing novel therapeutic breakthroughs. As a specialist and leader in glycoconjugate research, a field we pioneered in the early 1950's, Seikagaku is fortuitously positioned to leverage its laboratory and manufacturing expertise in the search for new classes of glycoconjugate-based drugs with unique applications in human health.

Based on what we perceive as its high medical and commercial potential, Seikagaku has identified Glycosaminoglycan (GAG) as its main focus of research and development among the glycoconjugates. At the same time, based on our extensive experience with ARTZ®, we plan also to continue to develop new products for joint diseases. We will thus focus our resources on these two research themes (see chart).

Increased R&D Spending

In the past, we have typically invested 20% of our sales results in R&D costs and approximately one-third of our employees are part of our research and development staff. In order to accelerate the development of new drugs and market them at the earliest possible stage, we will strengthen our R&D resources by increasing the current R&D staff by 10% and stepping up the base level for R&D costs from ¥4 billion to ¥5 billion.

We are strongly aware that development and marketing of new drugs is essential for future growth and improvement of profitability, and the above measures are designated as a high-priority investment.



Seikagaku's Pipeline

Research Tie-ups

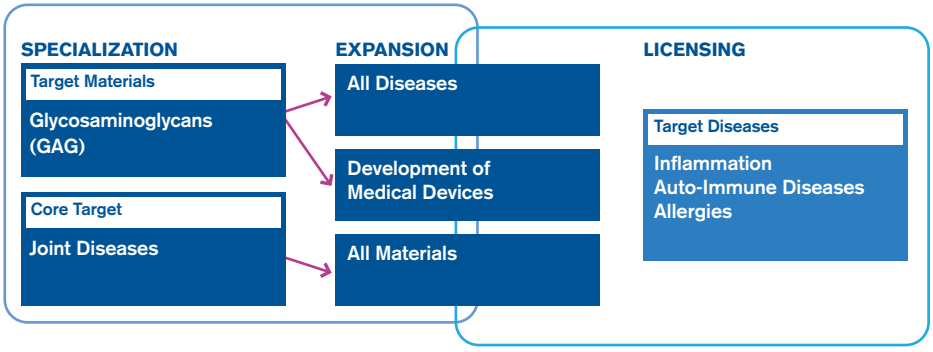
Our Central Research Laboratories work closely with the glycoconjugate and glycogene researchers in universities, corporations and other organizations. As a pioneer in the field, Seikagaku has encouraged and supported glycoconjugate research since its establishment in 1947 in the belief that these collaborations are integral to our long-term success. Key tie-ups include assistance to Aichi Medical University's Institute for Molecular Science of Medicine, as well as important collaborations with the Compound Glycoscience Research Circle and the Glycoengineering Joint Research Project.

Japanese scientists lead the field in research into genes relating to the enzymes that attach sugars to proteins, or remove or cut them, part of the estimated 200 genes that process sugar chains. Seikagaku is heavily involved in national projects that are already under way, such as the New Energy and Industrial Technology Development Organization (NEDO) push to build a national infrastructure for carbohydrate research. Seikagaku plays a defining role in many of these initiatives and in the glycogene library project of the National Institute of Advanced Science and Technology (AIST).

In July 2003, we concluded a lead finding collaboration agreement with the Swiss affiliate of Discovery Partners International, Inc. (DPI). DPI will support our discovery team in the critical area of assay development and lead compound identification to adapt our novel assay to DPI's screening capabilities as a first step in leading to drug candidates.

The Glycoforum was established as a project to mark the 50th anniversary of Seikagaku's establishment. It has been developed as an information site dedicated to carbohydrate research, and it has achieved considerable success in that role.
http://www.glycoforum.gr.jp/

R&D Basic Policy and Structure



Six development projects are currently under clinical development and proceeding in a smoothly staggered fashion. Most important now are clinical studies for SI-7201, a medical device for the treatment of interstitial cystitis, which is also under clinical study in the U.S. Studies will be completed by December 2003, and we plan to file a PMA application with the FDA in 2004. Also, in Japan, clinical studies for SI-4404 are leading to the development of a new indication for sodium hyaluronate, as an aid for endoscopic mucosal resection. Studies for this potential surgical aid will be completed before the close of 2003. We are also working to expand the indications for ARTZ®, such as SI-6604, a treatment for the class of meniscus injuries that afflict younger patients.

Clinical development of SI-6603, an enzyme preparation that specifically digests chondroitin sulfate is targeting the treatment of herniated lumbar discs. This is progressing well and further clinical studies with larger numbers of patients are being planned.

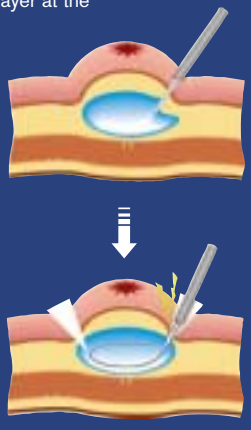
In addition to our internal research projects,

SI-7201 Device for Treatment of Interstitial Cystitis (IC)

Through intra-vesical injection, SI-7201 coats the deficient GAG layer on the bladder surface to protect it from irritants in urine. This will be the first HA medical device for treatment of IC in the U.S. A joint development agreement was concluded in Japan with Nippon Shinyaku Co., Ltd. in August 2002.

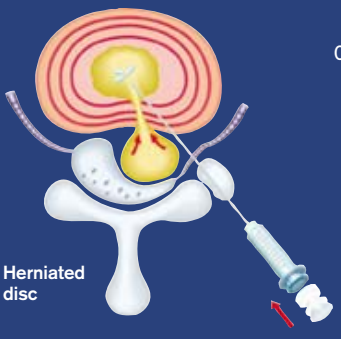
SI-4404 Aid for Endoscopic Mucosal Resection

By injecting SI-4404 as an operating aid into the sub-mucosal layer at the lesion of tumors and/or polyps in the gastro-intestinal tract, the lesion rises to form a dome that can be more easily and safely removed by endoscopic mucosal resection.



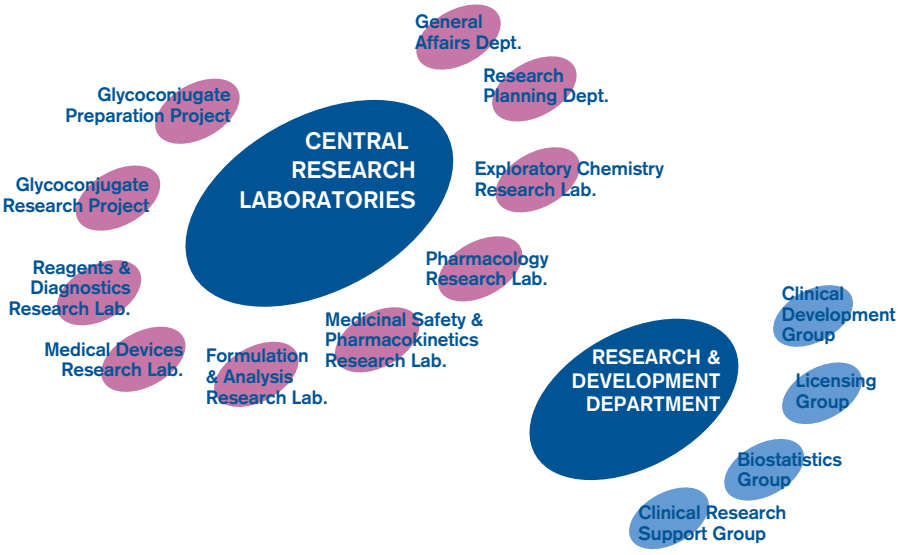
SI-6603 Treatment for Lumbar Disc Herniation

Chondroitinase ABC is a specific GAG degradation enzyme originated from bacteria. It dissolves/degrades chondroitin sulfate, which is the main component of nucleus pulposus in the disc. The same effect as surgical operation can be expected by one injection into the lumbar disc.



Research at Our Core

The research and development structure created by Seikagaku Corporation is based on close integration of all processes from upstream drug development to downstream activities. Seikagaku Corporation's drug discovery and development activities revolve around the Central Research Laboratories, which are equipped with the latest facilities. The laboratories conduct basic and developmental research, either alone or in collaboration with other corporate or private laboratories around the world. Findings from this research indicate the optimal format for the production of each new drug in readiness for the clinical development stage. In planning the facilities, Seikagaku sought to create the optimal environment that would stimulate and support the creativity of research personnel.



we are also actively promoting research collaboration and licensing agreements that broaden and fill out our product pipeline with novel drugs that have bright outlooks for immediate development.

Some examples of new collaborations include a contract concluded in August last year with AnGes MG for co-development of the treatment for rheumatoid arthritis and osteoarthritis using synthetic NFκB decoy oligonucleotides, and also a license agreement signed with BioTie Therapies Corp. of Finland in April 2003 for the development of anti-inflammatory drugs using anti-VAP-1 monoclonal antibodies.

Highlights of Research in Fiscal 2002

Aggressive Licensing Expands Product Pipeline

Increased pursuit of licensing opportunities resulted in collaborative agreements with AnGes MG, Nippon Shinyaku and BioTie, with the aim of accelerating the clinical development of existing drugs in the pipeline.

We concluded a collaborative agreement with Nippon Shinyaku for the domestic development of SI-7201, which is currently undergoing clinical studies in the U.S. by Seikagaku.

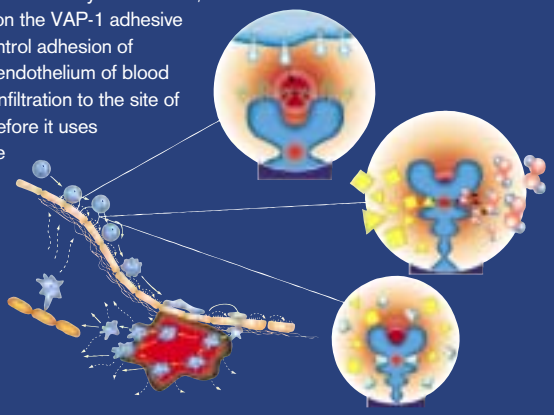
In the future, Seikagaku plans to continue pursuing licensing activities that are in line with its R&D targets.

Steady Progress in the Area of Original Themes

We began clinical studies for expanding indications of SI-6604, which is used in the treatment of meniscus injuries. In addition, we began new clinical studies on SI-4404, an adjunctive surgical aid to be used during endoscopic mucosal resection of gastric or colon cancers or possibly polyps. Also, in Japan, the phase I/II clinical study for SI-6603, a drug for the treatment of lumbar disc herniation, entered its final stages.

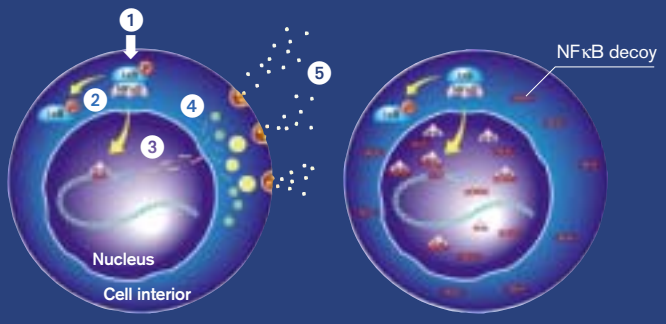
▮ Novel Anti-inflammatory Treatment using Anti-VAP-1 Antibodies: License from BioTie Therapies Corp.

As part of the license agreement, Seikagaku is carrying out the development of this drug. Conventional anti-inflammatory drugs suppress generation of proinflammatory substances, but this product acts on the VAP-1 adhesive molecules that control adhesion of leukocytes to the endothelium of blood vessels and their infiltration to the site of inflammation, therefore it uses a novel and unique target for suppression of inflammation.



▮ NFκB Decoy: License and Joint Research with AnGes MG, Inc.

NFκB is a transcription factor, which relates to excessive generation of cytokines and adhesion molecules. NFκB decoy captures NFκB and prevents it from binding to DNA. As a result of this action, efficacy in alleviating inflammation is expected.



❶ Stimulate cell ❷ Binding to DNA ❸ Transactivation
❹ Promoting production of inflammation-initiating factor ❺ Discharge

Central Research Laboratories