



**Probi AB**

**A biotechnology company  
in probiotics**



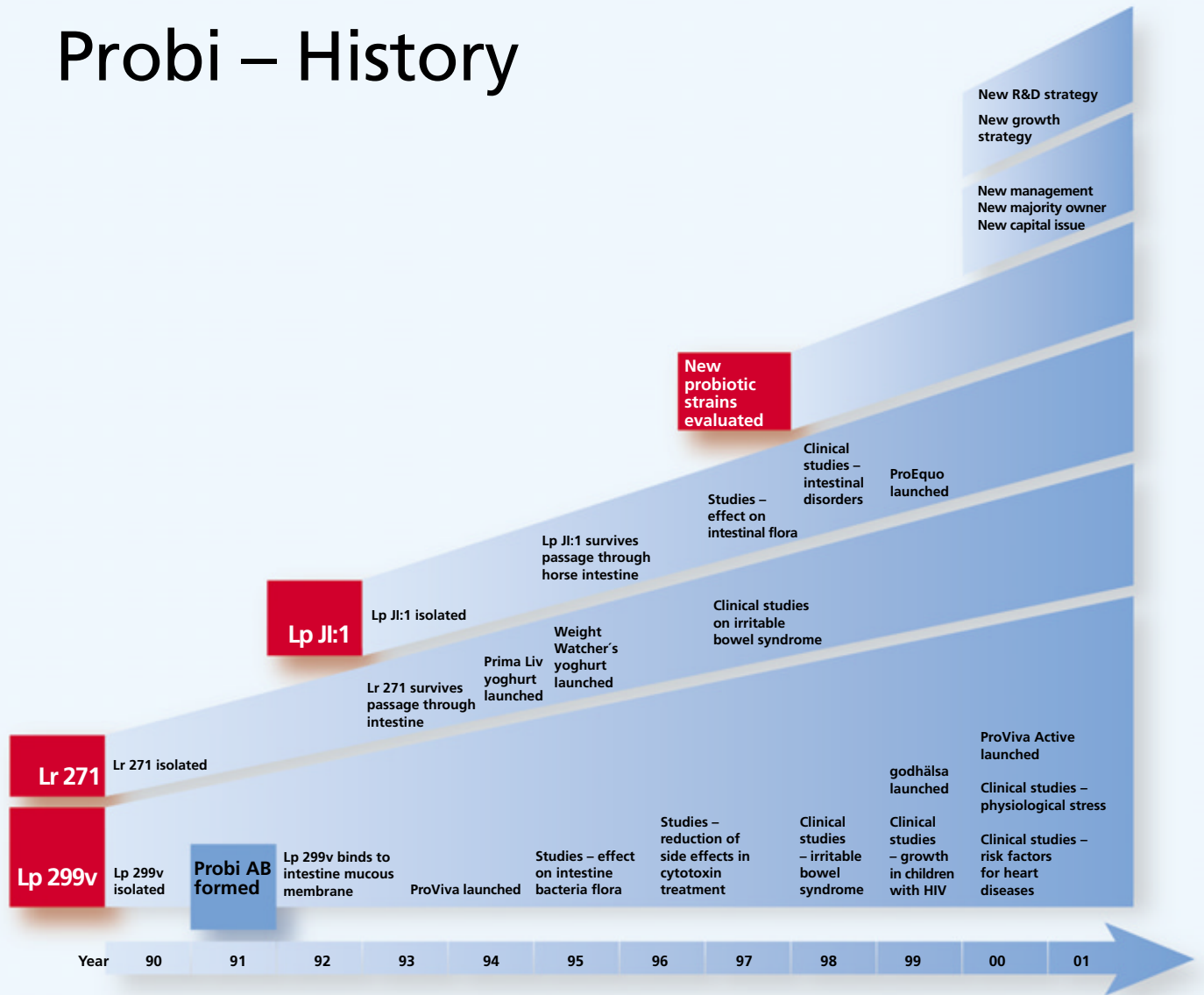
Probi AB

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# Probi – History



**Probi AB** was founded in 1991, springing out of a research project which had been in progress at Lund University since 1986. The project purpose was to develop an entirely new kind of nutritional product based on oats and fermented with a special lactic acid bacterium. Various lactoba-

cilli, including *Lactobacillus acidophilus* and *Lactobacillus reuteri* were evaluated as starter cultures, although the bacterium *Lactobacillus plantarum* 299v was found to be the most suitable. At the same time a search was begun for a co-operative partner within the food industry. The first partner was

Skane Dairy, who launched the ProViva health drink in 1994 and which has become a success. Probi has been listed on the stock exchange since 1998 and is now listed on Nordic Growth Market.

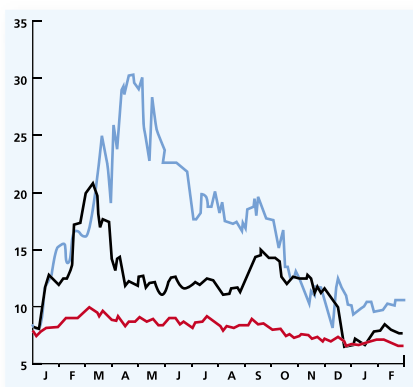


## Probi in brief

### Important events 2000

- ProViva Active®, recovery drink for hard working or very physically active people and people suffering from stress and strain. The beverage has been used for quite some time by top Swedish athletes and was during the last quarter launched to the general public.
- In England, the Skane Dairy partner, co-operating with Food Brokers, has established a strong presence with good distribution of ProViva® products.
- Probi introduced new management and strengthened the company’s capital with a new issue of SEK 78 million. Through this issue H & B Capital became the largest Probi owner.
- New and tangible research and development strategy has been adopted with the focus on four prioritised areas.
- A clinical study, carried out in the USA and published in the American Journal of Gastroenterology, shows that an intake of *Lactobacillus plantarum* 299v improves the growth of children with HIV infections.
- A Swedish clinical study showing that intake of ProViva® alleviates symptoms in people suffering from irritable bowel syndrome was published in the American Journal of Gastroenterology.
- A clinical study of hard working people showed that intake of ProViva Active® increases the total anti-oxidising capacity of the blood, which is a measurement of the body’s ability to counteract physiological stress.
- During the autumn, Probi drew up a new expansion strategy in co-operation with McKinsey & Company.

### Share development 2000



— Probi B  
 — Affärsvärlden general index – price index  
 — Affärsvärlden biotechnology – price index

After the bull market last spring in the biotechnology area, Probi shares have recovered well, both in relation to the biotechnology index and the general index. (Source: Affärsvärlden general index and the biotechnology index.)

Probi AB is a biotechnology company which, through its own research, development and manufacture, offers unique products which contain healthy bacteria, known as probiotics\*.

The range includes foodstuff, sports and health beverages and animal feed. *Lactobacillus plantarum* 299v, which has very good effects on amongst other things the intestine’s mucous membrane and the immune system, is included in the ProViva® health drink and in the recovery drink, ProViva Active®.

Lp 299v is one of four patented bacteria strains developed by Probi. The company, which has a large network of Swedish and international researchers, owns some 50 patents within 13 patent areas.

\*Probiotics = Living micro-organisms with scientifically documented positive health effects in people or animals.



## Message from the CEO

Awareness that it is possible to eat our way to health has never been greater. Moreover, the trend is for more and more people to become interested in the importance of food. If we look at the studies made, we find that eating habits and life style have a direct affect on the risks of us falling ill from our most common national diseases, such as cancer, cardiovascular, obesity and diabetes. The new Probi research strategy reflects the health problems of today. We stand well equipped to meet an increasingly health conscious consumer demand.

Well documented research results and clinical studies are the basis of Probi successes and shall be used to the full, by present and future licensees, to market different products on each separate market. By selecting partners with strong market anchorage and the willingness to invest

on respective markets, we ensure optimum Probi income from royalties. We regard both foodstuff companies and pharmaceuticals companies as potential licensees.

The world market for “functional foods” and “functional feed”, is now worth SEK 500 billion. Market analysts predict continued strong development, keeping pace with the rate at which humans continue to care more about what they eat and drink. The global market for probiotic products, which are included in “functional foods”, is very much on the march. This is now worth SEK 25-30 billion with an annual growth rate of about 20 percent. It is on this market that Probi is going to expand.

One of the first steps in our global expansion strategy has been to regain the rights for Lp 299v in Continental Europe

from our partner, Skane Dairy. They are now focusing their marketing on the Nordic countries and England. The new agreement means that Skane Dairy are investing the purchase money of SEK 40 million on the English market this year and next year. Further, the agreement includes a contract for continued collaboration. In future Skane Dairy will receive reimbursement in the form of royalties, while providing Probi with production expertise and product development.

The products we develop will continue to be designed to meet a well defined consumer demand and will be clearly positioned. ProViva® has become known as a product for the digestion, while ProViva Active® is a recovery beverage for consumption after hard work and physical activity.

We shall increase our R&D operations in order to cover new areas such as risk factors for cardiovascular disease and positive effects on the immune system. These areas are strategically important to Probi since there are a large number of people who have much to gain from the health improving effects in these areas.

In future we will be focusing on these four research and development areas:

- Gastrointestinal disorders
- Physiological stress and recovery
- Risk factors for cardiovascular disease
- Positive effects on the immune system

I am looking forward to a very exciting year during which we shall be presenting new research findings, several more products and laying the foundations for an international partnership structure. This will build up the value of Probi holdings for our present and future shareholders in the long term.

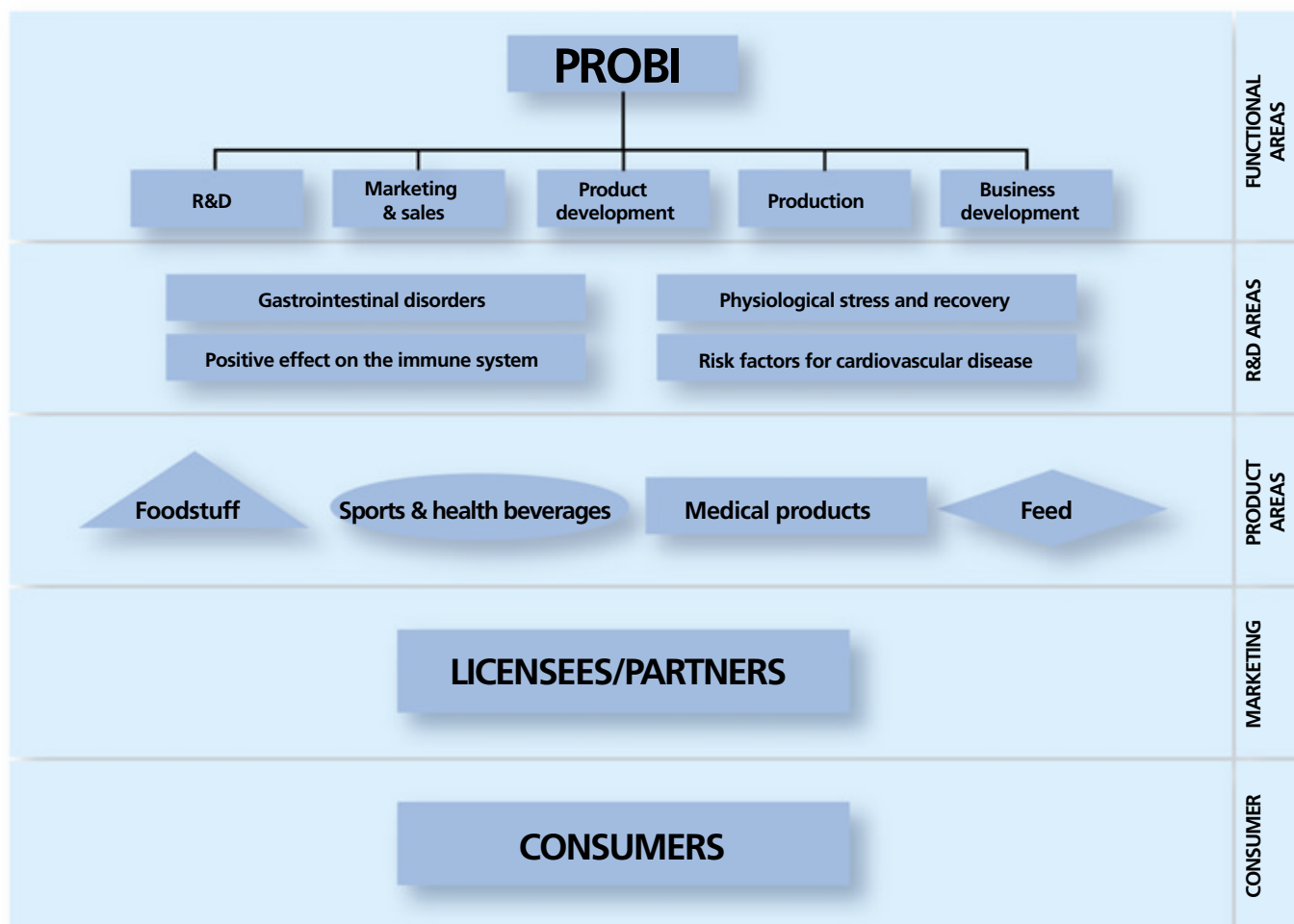
Monica Waller,  
CEO

# The Probi business model

Probi, a biotechnology company focusing on research and development, works out product concepts with sound market anchorage. The primary orientation of the company is to reach the consumer market through working together with partners/licensees. Operations within research and development are focused on four prioritized

areas. The product portfolio is divided into foodstuff, sports and health beverages, medical products and feed additives. Probi manufacture bacteria cultures and a fermented oatbase with a high content of probiotic bacteria for their partners who then develop the Probi product concept into completed consumer products for their

respective markets. Probi is thereby focused on activities at an early stage in the value chain. Most of our turnover will be made up of income from royalties. Feed additives however, represent an exception from the rest of our business model in that Probi operates the entire chain, from manufacture to sales and distribution.



**VISION**  
 Probi shall be recognised as a top tier global biotechnology company in the area of probiotics.

**MISSION**  
 To help humans and animals stay healthy, feel better and enjoy longer lives.

**BUSINESS IDEA**  
 Probi shall research and develop probiotic products meeting special health needs. Probi shall support our international partners, in their commercialization of these products, with our professional skills.

# Probiotics – How do they work?

The human gastrointestinal tract contains hundreds of thousands of billions of micro-organisms, primarily bacteria, living inside a complicated ecological system. The number of these micro-organisms increases the further down into the intestines we go, and the bacteria flora is made up of both harmless micro-organisms and organisms harbouring the potential to cause problems if allowed to multiply out of control.

In the large intestine, the micro-organisms' main job is to take care of and break down the part of our food intake that our bodies cannot in themselves break down in the upper parts of the intestines. This breaking down process results first and foremost in the formation of a short-chain fatty acid, which in turn functions as a source of energy for the cells of the intestinal mucous membrane.

The micro-organisms normally present in the intestine, together with the intestinal immune system and the intestinal mucous membrane, build up the barrier function which helps to protect us against foreign micro-organisms and elements. Research into the interplay between the intestinal flora and the immune system has awakened a great deal of interest in recent years. A grand total of 80% of our immune system is concentrated within the gastrointestinal tract.

The idea that the combination of micro-organisms in our intestines is significant to our state of well being, had occurred as early as the beginning of the twentieth century to such scientists as Nobel Prize winner Elie Metchnikoff (1845 – 1916). He suggested that the adding of “friendly” bacteria, such as lactic acid bacteria, could help to counteract the “evil” bacteria and in this way could reduce the risk of the occurrence of diseases. Metchnikoff's ideas provided

the impetus for the consumption of yoghurt spreading all over the world at the beginning of the last century.

The *Lactobacillus* genus, which includes more than 70 different species, is the largest group in what are called lactic acid bacteria, the name of which stems from these primarily forming lactic acid during their metabolism. Lactobacilli have been used all over the world for thousands of years for the lactic acid fermentation of foodstuff such as yoghurt, cheese, sausage, cereals and vegetables. Initially foodstuff were spontaneously fermented by the lactobacilli naturally present in the raw material, but today we frequently use starter cultures (the required culture in the required amount) for the industrial

production of lactic acid fermented foods. Additionally, lactobacilli are present in the gastrointestinal tract in human beings and animals. Scientific studies show that the addition of certain *Lactobacillus* strains have a positive effect on health. “Probiotics”, i.e. living micro-organisms, that have been scientifically documented to show positive health effects on human or animals, have become a recognized concept.





## Research & Development

*Probi AB conduct research and development with the purpose of developing probiotics for both people and animals. The objectives are:*

- *to isolate and characterize bacteria strains with probiotic potential*
- *to develop the probiotic product concept*
- *to document the health effects in laboratory experiments and clinical studies*
- *to investigate the operative mechanisms lying behind the effects*
- *to document the safety of the bacteria strains*
- *to patent bacteria and product concepts*

Probi was formed out of a research project that had been running at Lund University since 1986. The research project, which was a co-operation between microbiologists, surgeons and food technologists, was aimed at developing an entirely new type of nutritional product for patients who needed to be tube fed or who needed nutritional additives. The product was to be based on oats, which have a high natural nutritional content, and fermented with a special lactobacilli which would pass through the gastrointestinal tract and adhere to the intestinal mucous membrane where it would exert its positive effects. A large number of lactobacilli from the normal intestinal mucous membrane flora of human beings were isolated and characterised. The bacteria *Lactobacillus plantarum* 299v (Lp 299v) was found to possess the characteristics that were being looked for and was selected as a fermentation culture. In addition, Probi has isolated and characterized four other probiotic bacteria cultures, of which two are on the market:

*Lactobacillus rhamnosus* 271 (Lr 271) and *Lactobacillus plantarum* JI:1 (Lp JI:1), the latter which has been isolated from the intestinal mucous membrane of a horse. Probi bacteria cultures have been shown to exert very positive effects within several areas when the intestinal flora composition is of significance. In comparison with other probiotics companies, Probi has a much broader research platform from which to assist in solving many of the health problems of today. The company's R&D activities are run in the interests of clinically documenting the effects within the four prioritised areas: gastrointestinal disorders, physiological stress and recovery, risk factors for cardiovascular disease and positive effects on the immune system.

Probi has built up a comprehensive co-operation within basic research and clinical trials with some 20 research groups in Sweden and abroad. This provides Probi with access to cutting edge professional skills within such key areas as microbiology, immunology, surgery, foodstuff technology, nutrition



physiology, medicine and veterinary medicine. During 2001 Probi will be starting up an international scientific council in order to continue to retain the company's internationally powerful position within probiotics research.

### Basic research

Probi conduct basic research in order to identify new and interesting bacteria strains and to explain underlying mechanism action of present and future strains. The effects of the bacteria have revealed themselves to be complicated and are probably a combination of different mechanisms. Bacteria affect other bacteria and the body's own cells such as immune defence cells and mucous forming cells in the intestinal mucous membrane. Probi document how the activity of the bacteria can affect the body physiologically and in this connection, the importance of the bacteria's ability to bind to the cells of the intestinal mucous membrane.

### Clinical research

Probi document the effects of finished consumer products by random, placebo-controlled, double blind studies. This ensures products consumed by the consumers really do provide the promised effects. Probi work actively with quality assurance, and operations are conducted in accordance with international ethics guidelines for clinical research. The results are used as a basis for the future registration of products. At present Probi is running about 20 research projects and 12 clinical studies.

### Patents

The present patent portfolio contains 13 different patent areas and some 50 registered patents. Probi work actively in the interests of strengthening patent protection for the bacteria strains produced and their applications, and for the unique product concepts thereby developed. Patent applications for four new patent families were made during 2000.





## The market

The global market for functional foods and functional feed is now worth at least SEK 500 billion\*. Most people predict a very strong development keeping pace with the increasing interest of the consumer. American assessors frequently describe this area as the next expansion business. Probiotics occupy a unique position in the market, because they can be included in a large quantity of products with a very broad range. Probiotics cover an area from functional foods/feed to medicinal products, all with scientifically documented positive effects. Almost 50% of the

population in the West are overweight with the consequent associated risk of cardiovascular problems. 10% suffer from diabetes and up to 40% of the adult population have intermittent indigestion problems. Doctors are generally exhibiting an increase in reliance on probiotic products.

The market for probiotic products is undergoing very rapid growth. Internationally, the maturity and acceptance of probiotic products vary.

“FUNCTIONAL FOODS” =  
Foodstuff with scientifically documented effects on health and well-being

“FUNCTIONAL FEED” =  
Feed with scientifically documented effects on health and well-being

\*Source: Datamonitor. IMS: Food for thoughts. Arthur D. Little, press cutting.



Countries with high market penetration (for example, Japan and Sweden), act as a gauge for the global market, which is estimated to amount to between SEK 25-30 billion\* with an annual growth rate of 20%. Markets having a very large short term expansion potential are USA, western Europe and northern Europe. The probiotic market is now highly oriented towards milk based products. Probi is unique in this market as the company is focused on non-milk based probiotic products and product concepts, which are supported by clinical studies. Up to 50% of the population in southern Europe and up to 90% in Asia have milk-sugar (lactose) intolerance. International consumer tests of our product concept exhibit overall high purchasing interest in our product range. Important factors to our future partners are the performance and documentation of probiotic bacteria and how well the company's product concept attracts the consumer in such things as flavour. Probi occupies a very strong position within these areas.

### Sales

Turnover for 2000 increased to SEK 18.5 million, a rise of 26%. Probi turnover reflects sales in the consumer area of more than SEK 200 million. Sales are now concentrated in Sweden and ProViva®. In other words, the company has excellent opportunities of achieving success in new and larger markets with existing and new product concepts.

### Brand names

The company is very determined to profile Probi on the consumer packaging used by our partners. By building up a brand name around Probi as an internationally recognised biotechnology company, we create added value for

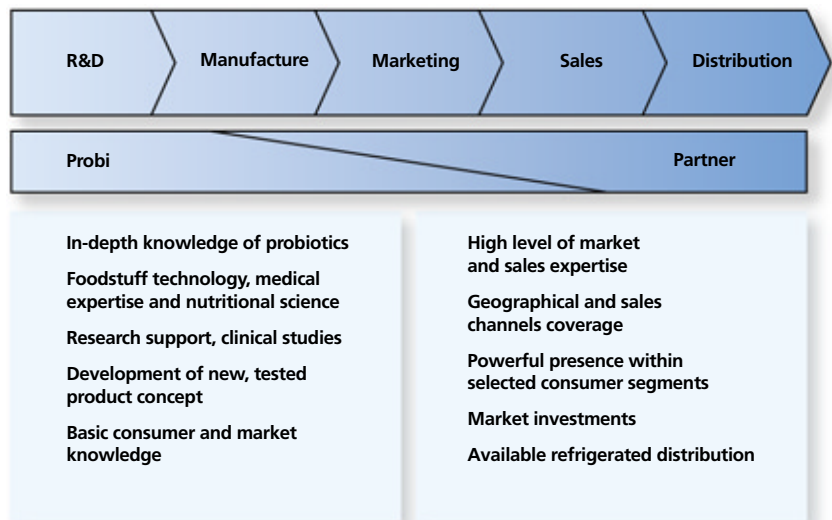
both the consumer and our partners. Furthermore, Probi has registered a number of brand names for products within the company's area of operations. These brand names are accessible to our partners.



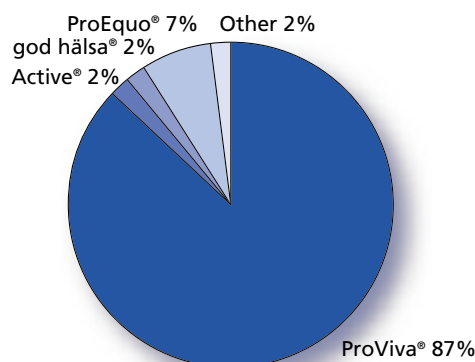
### Partnership strategy

Probi focuses on activities situated at an early stage in the value chain, and one of the main criteria when choosing a partner is regional strength in marketing, sales and distribution.

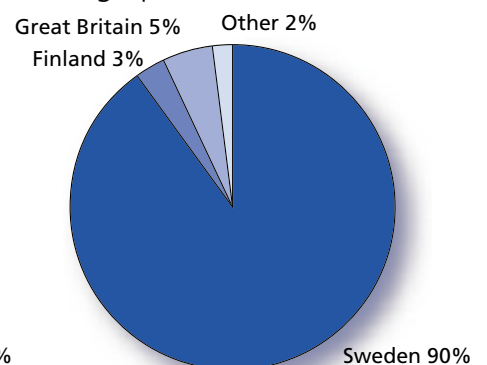
We are dependent on our licensees reaching their selected consumer segments effectively and will in the first instance be looking for partners within the pharmaceuticals and foodstuff branches. Our ambition is to maintain a unified partner strategy in accordance with the Probi business model. However, we understand that some markets have unique distribution patterns. This of course has a major influence on our choice of partner.



Product distribution %



Geographical distribution %



# Products

Probi now has several starter cultures included in the product range. These are primarily the probiotic bacteria Lp 299v (present in such products as ProViva® fruit drinks, the recovery drink ProViva Active® and godhålsa® ice-cream), Lr 271 (present in several yoghurt products such as PRIMALIV® and Weight Watcher's®) and Lp JI:1 (contained in feed additive ProEquo® for horses).

## ProViva®

By far the most important products containing Lp 299v are the ProViva® fruit drinks developed together with Skane Dairy. There are five different flavours at present; rose hip, blueberry, strawberry, black currant and exotic. These beverages have been on the Swedish market since 1994 and sales have exhibited an ongoing and very positive development (+28% during 2000). ProViva® is one of the few foodstuff products to have such strong growth on the Swedish market.

## ProViva Active®

The most recently launched product, ProViva Active®, is quite different from the other ProViva® beverages. Apart from its fermented oatbase, which contains the bacteria Lp 299v, this recovery drink contains three more important components. These are a blend of fast and slow carbohydrates, whey protein and nine carefully selected minerals and vitamins functioning for the most part as anti-oxidants.

An important part of



the development work has been the close contact with over 130 top flight athletes who have tested the recovery drink very thoroughly and carefully under Probi direction. During the Olympics in Sydney some 35 of the Swedish participants used this product. Of these we can mention the Swedish handball team, the Swedish table tennis team, Magnus Norman and Kajsa Bergqvist. The Swedish national skiing team headed up by Per Eloffson, has been using the drink since the summer of 1999. However, the recovery drink is not just designed for top athletes. Research has revealed that this drink is suitable for hard working people in their daily lives, i.e. people who need help with a recuperation and a means to hold stress and strain at bay.

## godhålsa® and Havrebas (oatbase)

Two other products containing Lp 299v are godhålsa® ice-cream manufactured by Sia Glass and Havrebas (oatbase) which is a concentrated product primarily intended for medicinal purposes.

## ProEquo®

This horse feed product has been on the market just over a year. Many top stables have, during the year, noticed an improved performance in horses fed on ProEquo®. The national Swedish equestrian team used ProEquo® during the Olympic Games in Sydney. Development work and documentation of ProEquo® have taken place in close collaboration with veterinary surgeons. The regional animal hospital in Helsingborg, Sweden and the veterinary clinic of Rossdale & Partners in Newmarket, England are important co-operative partners.





# Production



Probi AB produce some of their most important base products for company operations themselves. At the Probi cultivation plant in the Ideon research village in Lund, Sweden the company produces its patented bacteria. When manufacturing bacteria with probiotic properties, it is extremely important that these properties do not change during the manufacturing process. To make sure of this, Probi have built up an accredited laboratory, where a unique control program has been developed. This guarantees that the bacteria retain their properties year after year.

The company objective is to develop and optimise manufacture of the different bacteria, covering everything from the initial cultivation stage to the formation of the end products. This work too, is carried out on Probi premises in Lund.

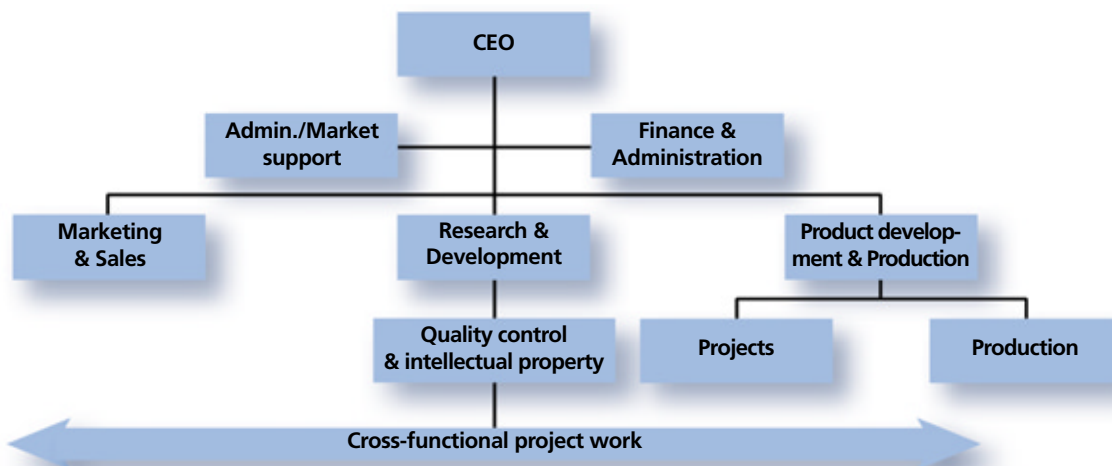
The fermented oatbase for godhälsa® ice-cream and the ProEquo® feed additive for horses are manufactured at the production plant in Sösdala, just outside Lund. In addition, most probiotic products tested in various clinical studies are produced here.

Working together with the AromPak company, Probi has developed a unique mixing and dosage system, called FDU 3000. The system, which has a very high standard of hygiene, enables new customers to quickly, and without any major investments, begin to produce liquid foodstuff containing a determined quantity of fermented oatbase. The manufactured oatbase is packed in 1000 litre sacks which are then dispatched to customers all over the world. The FDU system and production plant play a central part in the company's international strategy.

# Organization

During the latter part of 2000, Probi initiated a new organization structure and complementation of the organization has begun. The organization is functional, although work will be car-

ried out largely in cross-functional fashion. During 2001 the organization will be reinforced. One of the important criteria for selection when recruiting is an international profile.



# The board and management executives

## The board

- The chairman of the board
- Sören Gyll, Stockholm (b. 1940)  
Director. On the board since 2001.  
Other board duties with Skanska, SKF, SCA and others.
- Rolf Bjerndell, Malmö (b. 1951)  
MD for Skane Dairy. On the board since 1996. Other board duties with Sykon AB and Ellco AB.
- Bengt Jeppsson, Lund (b. 1946)  
Professor of surgery. On the board since 2001. Other board duties with Svensk Näringslivsforskning and others.
- Berthold Lindqvist, Malmö (b 1938)  
M.D.hc, director on the board since 1998. Other board duties with Munters AB, Pharmacia Inc., Securitas AB, Trelleborg AB and others.
- Kåre Larsson, Bjärred (b. 1937)  
Professor of food technology. On the board since 1991. Other board duties with GS Development AB, Camurus AB, Heptahelix AB, Ordio AB and others.
- Göran Molin, Lund (b.1949)  
Professor of food hygiene. On the board since 1998.

## The management group

- Monica Wallter  
CEO.
- Niklas Bjärum,  
Director Marketing & Sales.
- Per-Ola Forsberg,  
Director Finance & Administration.
- Marie-Louise Johansson,  
PhD, Director Research & Development.
- Clas Lönner,  
PhD, Director Production & Product development.

## Key group figures

	<i>Definition</i>	<i>2000</i>	<i>1999</i>	<i>1998</i>	<i>1997</i>
<b>GROWTH</b>					
Turnover	1)	18 466 690	14 605 681	12 040 799	10 981 441
Increase in turnover (%)		26	21	10	65
Number of employees		15	13	10	9
Assets		111 457 327	36 716 951	37 744 386	11 811 712
<b>Operating capital</b>	2)	77 985 498	12 761 475	19 461 849	3 381 037
<b>FINANCIAL BALANCE</b>					
Quick asset ratio (%)	3)	2 158	553	663	146
Equity ratio (%)	4)	97	94	92	68
Debt ratio (%)	5)	0	0	0	7
<b>PROFITABILITY</b>					
Return on total assets (%)	6)	-7	0	1	15
Return on equity (%)	7)	-7	-1	1	14
Operating margin (%)	8)	-37	-2	-1	14
Profit margin (%)	9)	-29	-1	2	14

### Definitions

- 1) Net turnover including other operating income
- 2) Current assets minus current liabilities
- 3) Current assets minus stock inventory as a percentage of current liabilities
- 4) Equity as a percentage of total asset
- 5) Interest carrying liabilities as a percentage of equity
- 6) Operating result plus interest income as a percentage of average total assets
- 7) Result before taxes as a percentage of average equity
- 8) Operating result as a percentage of turnover
- 9) Result before taxes as a percentage of turnover



Probi AB

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