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in North Germany



The Life Science Nord partners are companies and institutions from medical technology, biotechnology and the pharmaceutical industry in Hamburg and Schleswig-Holstein. Thanks to their active support the Life Science region North Germany can be strengthened effectively.

#### ENABLING TECHNOLOGIES

- 05 **EPPENDORF**  
Understanding the cell
- 06 **ISIT/EBIOCHIP SYSTEMS**  
A passionate affair with the biochip

#### MOLECULAR DIAGNOSTICS

- 07 **INDIVUMED**  
Customized therapy

#### NEW DRUGS

- 08 **ASTRAZENECA**  
Oncology specialists from Wedel
- 09 **EVOTEC**  
Joint success for the nervous system
- 09 **ALTONABIOTEC**  
New star in the biotech firmament

#### NANOBIOMEDICINE

- 11 **CAN – CENTER FOR APPLIED NANOTECHNOLOGY**  
Minute fluorescent particles have a huge impact

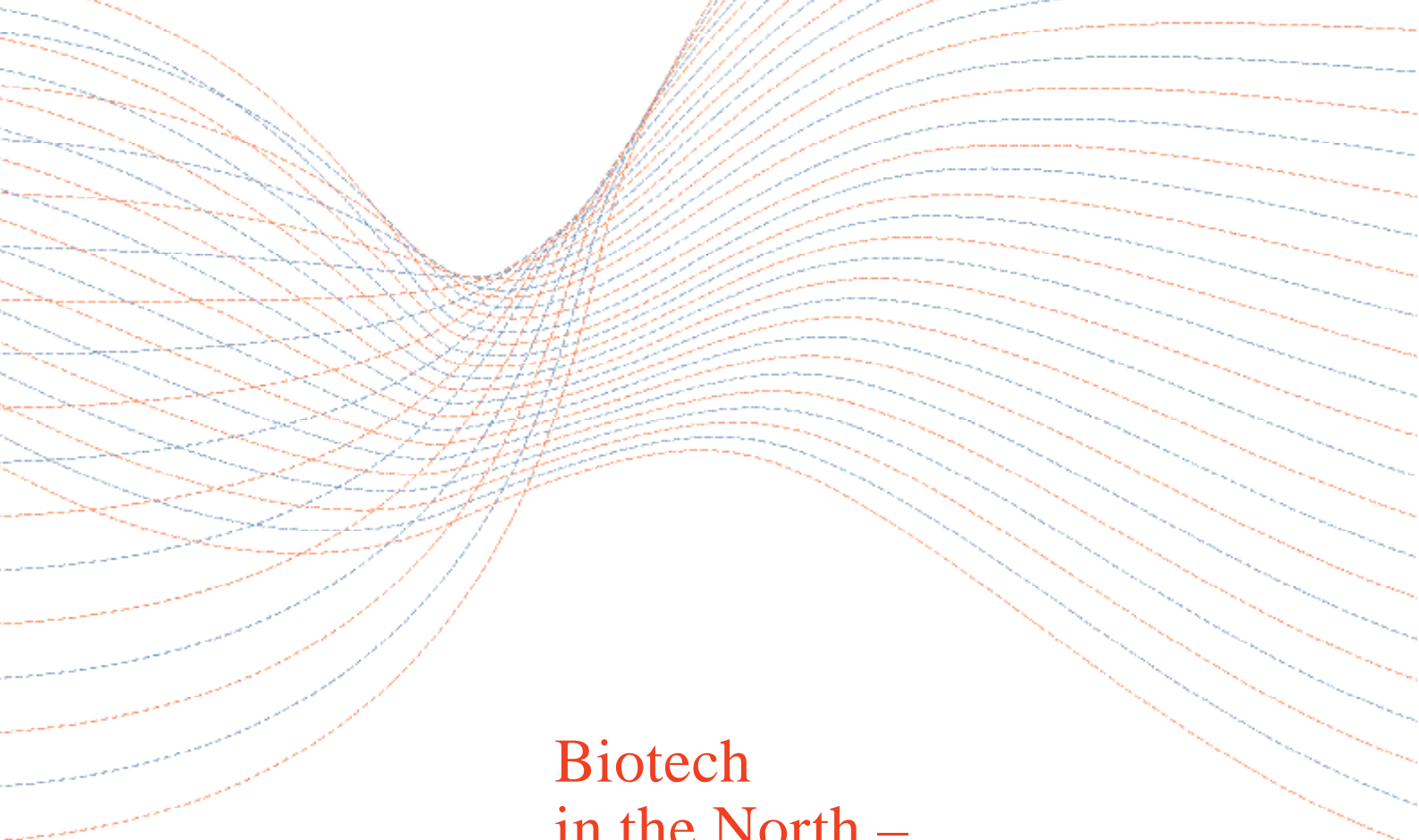
#### RESEARCH

- 12 **INFLAMMATION AT INTERFACES**  
Jointly to the surface
- 13 **MOLECULAR IMAGING NORTH**  
Looking into the deepest interior

#### NETWORK

- 15 **SCANBALT**  
Europe's first metaregion for life science and biotechnology





# Biotech in the North – strong growth combined with diversity and areas of expertise

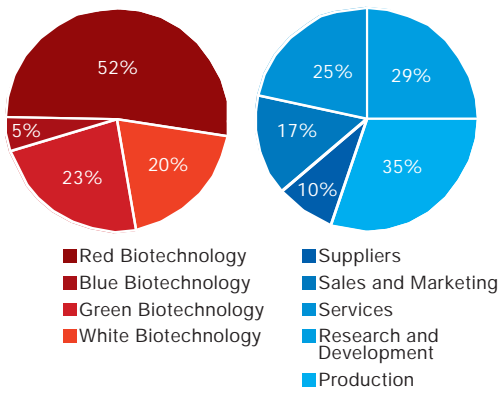
## North German Biotechnology

### Principal applications in the medical (red) biotechnology field

- Drug Discovery
- Molecular Diagnostics
- Transplantation
- Oncology
- Inflammation
- Enabling Technologies
- Biobanks

### Broad applications

### Commercial activities



**In recent years**, the biotechnology sector in North Germany has grown strongly – not least thanks to the cooperation between the two states of Schleswig-Holstein and Hamburg, which is reflected in the foundation of Norgenta - the North German Life Science Agency. Numerous cooperation agreements between industry and the scientific community have been concluded and entrepreneurs with good ideas have dared to establish their own businesses. In the meantime, there is now a diverse network of traditional and high-tech companies, highly regarded research institutes and universities, whose aim is to translate innovative ideas and technologies into marketable products. And they are doing so with success. The commercial side has also developed well in the North. In the two states, there are some 160 companies with about 9,500 employees engaged in production, research and services for biotechnology.

The biotechnology sector in North Germany is highly diverse. In some fields, there is considerable expertise. This includes drug research, molecular diagnostics and enabling technologies in the about 90 companies which can be assigned to the field of red biotechnology. Both well-known international companies as well as small start-ups and spin-offs from scientific research institutes operate in these areas. Accompany us on a journey through the diverse biotechnology landscape in the North over the following pages.

## Strength in cross-sectional technologies

North Germany is home to a broad range of researchers and companies concentrating on tools and methods that are indispensable to biotechnology

**Emerging technologies (ET)** are important tools and are essential in biomedical research and development. They are as important to scientists at universities and research-based industrial companies as dustpans are for gold diggers. The term covers technical methods, for example, for the simple, safe and rapid handling of small and minute quantities of liquid (liquid handling) or equipment used to analyze substances and mixtures (analytical technologies). Such equipment and technologies may either be very large such as the XFEL (X-ray free-electron laser) at DESY or very small thanks to the use of microtechnology or even nanotechnology.

Enabling technologies are also described as cross-sectional technologies, because microsystems technology, biological, biochemical or physical principles and often data processing and handling in the form of bioinformatics are applied to give researchers in biotechnology and biomedicine ideal technical conditions. Besides this hardware for biotechnology, analytical systems on an enzyme or cell basis also fall under the term enabling technologies. For example, harmful substan-

ces are tested or certain validations of biomolecules carried out or the suitability of a drug candidate as a medicine is examined in preclinical development.

Further significant fields of enabling technologies are optical and imaging methods, in other words microscopic technologies and their connection to various light sources or other contrast agents (sputtering or fluorescent dyes).

### Best known R&D tools

North Germany has much to offer in all these fields both on the research and industrial side. However, one of the world's best-known R&D tools in biotechnology and biomedicine and other sciences is undoubtedly the Eppendorf tube, which originates from Hamburg, and the pipette of the same name. High-throughput systems with appropriate miniaturization are also at home in the North. Evotec in Hamburg stands for this technology. Semiconductor technology and biological detection principles are also closely linked in the Itzehoe-based company eBio-Chip Systems.



EPPENDORF

## Understanding the cell

Eppendorf AG focuses on microarrays – one of the most modern molecular biology examination methods.

**The Hamburg-based** Eppendorf AG has come a long way. From a small repair business for medical equipment, which was founded over 60 years ago in Hamburg, to a leading worldwide supplier of systems and research tools for biotechnology. The inventor of the piston pipette or legendary “Eppendorf tube” is focusing strongly on microarrays – a molecular biology examination system, which enables several thousand individual samples in a small quantity of biological material to be analyzed simultaneously. These systems are also referred to as biochips because they replicate as many functions as possible of the living cell in a tiny space with molecular-biological reactions. The sample spots deposited as grids on the biochip react with a substance to be tested so that many questions can be answered simultaneously and reproducible results attained.

The use of microarrays saves a lot of time and keeps error interpretation to a minimum. Eppendorf has developed various specific biochips which have a large number of genes and can be used, for example, to classify different types of breast cancer or to detect complex aging processes in the human body. However, besides its own microarrays, Eppendorf also offers a complete system of peripheral equipment. These include a special thermomixer for hybridization as well as a scanner and special evaluation software. The aim of the system is to show the functions and mechanisms of the three-dimensional cells as a two-dimensional model and so understand the functions. As in other fields, Eppendorf also plans to collaborate with the University Medical Center Eppendorf from 2007 to develop biochips further.



## ISIT/EBIOCHIP SYSTEMS



## A passionate affair with the biochip

At the Fraunhofer Institute for Silicon Technology (ISIT) in Itzehoe the team lead by Dr. Hintsche has developed a pioneering technology – the electrical biochip.

**Dr. Rainer Hintsche** has shown plenty of stamina in developing electrical biochip technology. The first targeted attempts to exploit electrical principles for biological tests began around 1980 in Germany, Japan and the US. Hintsche himself undertook the first tests in this direction in 1983. “I recall that we were derided when we used the word ‘biochip’. At that time, this term was very futuristic and exotic.” However, Hintsche refused to be deterred and continued to believe in this technology. The electrical biochip, which he and his team now stand for, is based partly on knowledge that other researchers have gained over the years. However, Hintsche is responsible for having developed the first correct electrical biochip with many measuring positions.

The ISIT electrical biochip technology is suitable for a wide range of applications –

whether as quick tests in doctors’ practices to determine viral infections or as lactate sensors in sports medicine. “We invite all firms and institutes to use this technology and develop new products from it”, says Dr. Rainer Hintsche, who, as head of the Biotechnical Microsystems department at ISIT played the lead role in designing the electrical biochips. Potential partners are companies, university clinics and other research institutions which require the bio-sensor system as well as firms which produce sensor components or systems and wish to expand their product portfolios. The Fraunhofer ISIT supplies the platform which companies develop further in collaboration with the institute and adapt to their specific field of application. Small hand-held devices are conceivable as are test systems that can be transported in a case. The special feature of electrical

biochips is the link between active biocomponents and silicon technology. Various biomolecules which bind other molecules according to the key-lock principle are anchored onto the chip. If a molecule is bound to its counterpart, the catcher molecule, an electrical signal is emitted and registered and evaluated by the integrated measurement electronic system. This gives rise to a highly sensitive sensor system for nucleic acids or proteins. This technology has already received several awards. For example, Dr. Hintsche received the German Future Prize in 2004 and the European Grand Prix of Innovation in 2005. Fraunhofer Institute’s spin off eBiochip Systems GmbH commercializes the electrical biochips as a technology platform with specific biological coating, e.g. the announced “Quicklab” of Siemens AG is based on this principles.

## Driving the development of new diagnostics

In Hamburg and Schleswig-Holstein, companies are using the latest knowledge from molecular medicine to develop new diagnostics.



INDIVUMED

### Customized therapy

The Indivumed cancer research center focuses on individualizing cancer therapies using a new database.

The scientific and technical knowledge gained in recent years has provided sustained impetus to the development of molecular medicine. Examples are the decoding of the human genome, the development of chip-based and mass spectrometry technologies and new methods in cell biology. The results of basic research have improved the understanding of the underlying processes and led to a host of tools. In the field of basic research in molecular medicine, Germany has sufficient critical mass and also achieves internationally competitive results. In Hamburg and Schleswig-Holstein, there are a number of companies that exploit this know-how on the biology of illnesses in order, like Qiagen for example, to develop corresponding specific diagnostic products. In this connection, both diagnostics in certain indication areas and the application of state-of-the-art technologies play a role in individual patient analysis.

**Founded** as a cancer research center, Indivumed GmbH combines clinic care, biobanking and research to create a unique structure aimed at accelerating cancer research in Germany. The center is based on campus of the Israelitic Hospital in Hamburg and sees its role as a bridge between clinics and cancer research. To improve cancer therapies, Indivumed has now developed an integrated, analytical platform designed for individual cancer treatment and diagnostics. On the basis of a biodatabase combined with clinical data and research results, the individual molecular characteristics of tumors are examined and characterized in order to develop individualized cancer treatment for patients.

While it has been usual in the past to offer all cancer patients standardized therapies, the new analytical method is designed to do away with this approach. In addition, Indivumed works with leading research institutes from the academic and scientific communities as well as biopharmaceutical companies, allows others to access its resources and is able to carry out a broad range of molecular biological and biochemical analyses and tests for its customers. Hartmut Juhl, managing director of Indivumed GmbH, which was formed in 2002, has been awarded numerous prizes and nominations for his innovative services in the battle against cancer.

## Upsurge in drug development

Companies now generate two-thirds of their sales with biopharmaceuticals. R&D work in the North also focuses strongly on this field.

**Modern drugs** are high-tech products. And modern, forward-looking technology is also required in order to research and manufacture new drugs and medicines. State-of-the-art analytical and synthesis technology, genetic laboratories, powerful computers and robotic systems and much more besides form the necessary basis for the development of new and improved drugs. Researchers and their staff must be highly qualified to enable them to pave the way for the medicines of tomorrow with their experience, supported by the latest biomedical results and technologies.

### Emphasis on biopharmaceuticals

The demographic factor alone is driving the pharmaceutical sector forward. The number of people is growing worldwide as is the desire for improved quality of life. This is increasing the demand for medicines. In addition, many illnesses to this day cannot be treated and the search for new drugs is therefore continuing unabated. The contribution of the research-based pharmaceutical companies to the

German biotechnology sector is immense. In 2005, the 20 largest companies engaged in medical biotechnology achieved more than two-thirds of their revenues with biopharmaceuticals, which also shows how important biotechnological and medical research and development are for the future. North Germany, with its research-based pharmaceutical manufacturers and biopharmaceutical companies, plays a crucial role in improving therapies for serious diseases.

Some of the largest international pharmaceutical companies maintain research and production facilities in North Germany. AstraZeneca, GlaxoSmithKline and the internationally operating Ferring Group develop and market innovative biopharmaceutical products in and from Schleswig-Holstein and Hamburg. Besides the major pharma groups, small start-ups and innovative biotechnology companies research into new drugs and potential therapies.

The pharmaceutical manufacturers in North Germany focus, among other things, on neurology, allergology, oncology and dermatology.

ASTRAZENECA



### Oncology specialists from Wedel

AstraZeneca carries out a great deal of research at its Schleswig-Holstein site to develop new oncology therapeutics.

**AstraZeneca PLC**, the Anglo-Swedish, London-headquartered company, is the fifth-largest research-based pharmaceutical company in the world. AstraZeneca GmbH, the German subsidiary of the Anglo-Swedish group, ranks number two among the research-based pharmaceutical companies in Germany with revenues of 1.22 billion dollars in 2005. The sites in Wedel in Schleswig-Holstein (German headquarters) and Plankstadt in Baden-Württemberg perform important corporate functions such as drug development and approval, production, sales and marketing. AstraZeneca is one of the foremost companies in the treatment of cardiovascular diseases, respiratory diseases, gastrointestinal diseases and cancer. The group's research in Germany focuses mainly on oncology with various new compounds for the treatment of many types of cancer as well as therapeutics for heart attacks and innovations to treat strokes and psychiatric disorders.





ALTONABIOTEC



## New star in the biotech firmament

The structural change in the pharmaceutical industry offers the Hamburg biotech start-up an outstanding platform to develop its own business.

**In recent years**, most newly approved drugs have been recombinant products. At the same time, the first recombinant compounds have lost patent protection. This opens the way for the development of biogenerics. These trends are extremely positive for Altona-biotec. The company develops its own compounds, improves existing ones on the basis of recombinant proteins and carries out contract development work for other companies especially in proteins, cell lines and assays. In addition, Altonabiotech plans to market selected endocrinology products.

The company maintains its laboratory in the Center for Innovative Medicine in Hamburg, in the vicinity of the University Medical Center Hamburg-Eppendorf. The proximity to doctors and researchers enables Altonabiotech to develop new innovative and improved drugs much faster and on a much more patient-oriented basis than other companies. This makes the company one of the few European start-ups with a good initial platform from which it can market some products itself. Development contract work for third parties has also got off to a good start. Although Altonabiotech was only founded in June 2006, the company has already successfully produced the first cell lines and proteins for the R&D units of third-party clients.

Finally, Altonabiotech is also well placed in endocrinology. Its proximity to a network of endocrinologists enables Altonabiotech to build up sales and marketing activities for products in this field rapidly and cost-effectively and so withstand the cost pressures in this segment.

EVOTEC



## Joint success in CNS

Evotec AG is increasingly focusing its business on developing its own drugs for the treatment of CNS diseases.

**Therapies** to treat Alzheimer's disease and sleep disorders are rapidly growing market segments with huge unmet medical need. All currently available compounds – especially for the treatment of Alzheimer's – are of limited effectiveness only. The Hamburg based biotechnology company has a number of promising products in clinical development. All of them have the potential to improve the treatment of these diseases. In addition, the listed company plans to strengthen its CNS portfolio through in-licensing of further selected compounds or company acquisitions.

In both, its own product development and in research partnerships with pharmaceutical and biotech companies, Evotec benefits from its proprietary research and development platform. This platform is one of the most productive and efficient on the market for the identification and the development of small molecule drug candidates. It covers the entire process – from

the development of assays and screening through lead optimization and the development and scale-up of processes to the production of large quantities of drugs for clinical studies, and later marketing.

Evotec has applied such skills and expertise in partnerships with more than 150 customers so far. Going forward, the company is increasingly engaging in results-based collaborations, in which it has the potential to participate in the success of such projects through milestones and royalties. As a result, the clear separation between research services for other companies and its own drug development is gradually disappearing.

For example, the company has recently expanded its collaboration with the Swiss pharma giant Roche beyond the provision of discovery services and the in-licensing of CNS compounds. Building on activities started at Evotec, the two partners decided to bring CNS compounds jointly to clinical development. Evotec believes that the alliance with Roche offers benefits in that the complementary skills of both companies in drug research are an ideal fit and the project is funded jointly. In this business, partnerships which are marked by performance and mutual trust are crucially important. They are the key to Evotec's success.

## Tiny particles with growth potential

Nanobiomedicine research is well established in Hamburg and Schleswig-Holstein. The North wants to continue playing a leading role.

**In the last few years**, the overall field of nanotechnology has evolved rapidly. Worldwide, the market is growing at an annual rate of 16%. Experts prophesy that medicine will be the first area to be revolutionized by new nanotechnology. Nano-based methods will soon start to be used in diagnostics and therapy. This segment of the nanotechnology market is also predicted to grow extremely quickly. For example, in 2005 the global market for nanoparticles in diagnostics applications rose by 28% to \$67 million. In North Germany, both research institutes and companies are engaged in the promising area of nanobiomedicine. Substantial research is undertaken especially in nanobiotechnology – the interface between nanotechnology and medicine – and in the field of nanoparticles.

Prof. Dr. Weller from the Institute for Physical Chemistry at the University of Hamburg is considered a leading expert in the field of nanoparticles. He carries out research in the field of functional nanoparticles for X-ray contrast agents and biomedical materials. A great future is predicted for nanoparticles in fluorescence marking and *in vitro* diagnostics. Through changes in the color spectrum, nanotechnology markers offer a much stronger contrast on the image in molecular imaging, which enables doctors to make more precise diagnoses.

The development of fluorescent nanoparticles with marking function is the product of a collaboration between Prof. Weller's team and the Center for Applied Nanotechnologies GmbH in Hamburg (CAN). The innovative technology will be incorporated into a concrete product by a pharmaceutical company which is interested in using fluorescent nanoparticles as biolabels.

### Tailored drugs

Prof. Dr. Förster, also based at the University of Hamburg, is researching into the use of nanoparticles in the development of drugs. Drug delivery is understood to mean the targeted release of pharmaceutical compounds. In the long term, experts expect that "individualized pills" will be developed. In other words, patients will be administered genetic compounds tailored to a special clinical picture. Companies such as Drägerwerk in Lübeck and Beiersdorf and Philips Medizin Systeme in Hamburg are already showing interest in developing drug delivery systems.

EMBL (European Molecular Biology Laboratory) and its facility in Hamburg are also working on improving drugs. Using synchrotron radiation at DESY (Deutsches Elektronen Synchrotron) the Hamburg laboratory is examining the nanostructure of crystallized proteins and receptors. In this way,

functionalities can be analyzed and drugs optimized. DESY is currently engaged in a further nano project. The X-ray laser XFEL, which is in the planning stage, is a joint project involving Hamburg and Schleswig-Holstein. The technology enables examinations to be carried out in the nano range. In particular the X-ray laser should help explain the linkage process between hormones and receptors.

The Research Center Borstel – Leibniz Center for Medicine and Biosciences in Schleswig-Holstein also carries out research in nanobiomedicine. It examines and develops diagnostic methods for chronic and allergic reactions of the lung that are triggered by nanoparticles.

At the Fraunhofer Institute for Silicon Technology (ISIT) in Itzehoe, Prof. Heuberger is engaged in the development of biochips on the basis of nanotechnology. Numerous different biomolecules are attached to these biochips using nano-precision structuring methods. They enable samples (e.g. cell extracts) to interact and be analyzed. The biochip permits the state of a person's metabolism to be examined or a hereditary predisposition to be analyzed. The biochip market has already grown considerably. In 2005, worldwide revenues totalled \$4.4 billion at an annual growth rate of 46%.



CAN - CENTER FOR APPLIED  
NANOTECHNOLOGY

## Minute fluorescent particles have a huge impact

CAN operates as a public-private partnership and focuses on using new nanotechnology know-how – the latest success is the development of fluorescent nanoparticles.

**The structure** of the partnership behind the Center for Applied Nanotechnology GmbH reflects that it is one of Hamburg's most modern scientific establishments. CAN was founded in 2005 jointly by the City of Hamburg, the University of Hamburg and highly regarded industrial partners that joined forces to fund the center. CAN's main function is to offer contract research and development services in the field of nanotechnology to companies and research institutions. Its goal is to make new findings in nanotechnology and nanoparticle analysis usable. CAN acts as a kind of transmission belt. It assists in evaluating what know-how from university research is of value for industry and what know-how can be translated into concrete research projects that are worth funding.

Recently, CAN has focused its efforts on assigning special characteristics to nanoparticles and has achieved a great deal of success in this field. For example, CAN has succeeded in developing nanoparticles with luminescent properties. These can be adjusted so that the particles radiate at a certain wave length when stimulated, enabling them to be used as biological and medical markers. CAN is also focusing on healthcare and special polymers, for example in the production of numerous materials in the form of nanoparticles and nanocomposites as well as drug encapsulation.

## Combining strengths

Hamburg and Schleswig-Holstein are home to several highly regarded and internationally renowned research institutes which have forged close links with industry in order to translate their innovative research into practice.

**North Germany** offers a diverse range of research activities in life sciences. Besides six universities with life science courses and numerous institutes, there are a number of highly regarded research establishments in Hamburg and Schleswig-Holstein that are known beyond the borders. At the Christian-Albrechts University in Kiel and the University in Lübeck areas of supraregional significance have become established in biosciences harboring Colla-

borative Research Centers, graduate colleges and projects of the National Genome Research Network (NGFN). The universities and institutes in Hamburg also have several outstanding areas in biomedical research. For example, the Center for Molecular Neurobiology (ZMNH) at the University of Hamburg is one of the leading institutes in its area of expertise in Germany. Many of the researchers, working groups and institutes in North Germany are pursuing an

important goal. By creating close links between the private sector and researchers, they are aiming to speed up the development of innovative projects and the transfer of technology and research results into practice. The focus is again on combining activities and thus successful thematic networks focusing on selected areas such as e.g. molecular imaging and inflammation research have developed with enormous potential in the North.

### INFLAMMATION AT INTERFACES

#### Jointly to the surface

Chronic inflammation diseases are increasing worldwide. In a unique research alliance, renowned scientists from Schleswig-Holstein are for the first time tackling the area jointly.

**It is a phenomenon** of modern civilization. Since the middle of the 20th century, allergies and autoimmune diseases that were previously hardly known have been increasing worldwide both in quantitative and qualitative terms. Inflammatory disorders can affect nearly all human organs. A worldwide unique group of researchers has come together to tackle this phenomenon. More than 100 scientists from the Universities of Kiel and Lübeck as well as the Research Center Borstel are working together in the Schleswig-Holstein Network in Inflammation Research, which was set up in 2004. The researchers in this network are able to build on the highly successful preliminary work carried out in Schleswig-Holstein. Both the National Genome Research Network and the Competence Network for Bowel Diseases have been coordinated in the past by the University Medical Center Schleswig-Holstein and have carried out in-depth research on inflammatory diseases in the past.

The special features of the Schleswig-Holstein Network in Inflammation Research are the joint research agenda, which all those involved have agreed to, and the way in which inflammatory diseases are being considered as a whole. In the past, doctors largely considered the various inflammatory diseases in isolation as individual clinical pictures. The Schleswig-Holstein research alliance is focusing on identifying the common features of the various diseases and finding new therapeutic and prevention methods to treat a recurring and increasingly dramatic disease process.

The scientists in the network are concentrating above all on inflammations at the especially susceptible surfaces of the human body – skin, mouth, lung or bowels. For example, the researchers are interested in the way in which microorganisms at the body surfaces react with certain receptors on the host side. This can explain why cells release messengers neutralizing the pathogens. In principle, the acute course of an inflammation is an entirely healthy mechanism – a part of the body's own defense against external and internal enemies. Inflammation turns into a disease only when the inflammatory process damages tissue – which happens in cases of chronic inflammation. The scientists in the network are therefore attempting to ascertain which cells determine

the duration and extent of an inflammatory reaction and what the molecular and genetic causes of the recurring inflammation are. Prof. Stefan Schreiber, head of the Schleswig-Holstein Network in Inflammation Research, which is funded by the Schleswig-Holstein state government, is convinced that “in the medium term, this knowledge gained from focused inflammation research will enable us to provide therapies which can be tailored more closely to individual needs and which will thus be more effective.”

Various cooperation agreements with industrial companies complement the unique infrastructure in inflammation research in Schleswig-Holstein. For example, AstraZeneca, in conjunction with the University Medical Center Schleswig-Holstein, is searching for disease genes for Crohn's disease, an inflammatory bowel disease, and is developing novel compounds for immunosuppression. The biotech company Conaris, a spin-off from university research, is an especially successful example of the strong public-private partnership. From a novel anti-inflammatory agent developed at the University Medical Center Schleswig-Holstein, it produces a drug for the treatment of Crohn's disease which leaves the desired, acute response of the body's immune system intact and only fights the chronic course of the inflammation.



## MOLECULAR IMAGING NORTH

### Looking into the deepest interior

Hamburg and Schleswig-Holstein have started a unique project to promote molecular imaging in Germany.

**In this regional project**, the University Medical Centers of Schleswig-Holstein (UK S-H) and Hamburg-Eppendorf (UKE) are cooperating with the technology partner Philips to improve diagnosis of serious diseases such as cancer and Alzheimer's. The medical fields of tumor and vascular disease, transplantsations, neurodegeneration and the imaging facilities of the two university clinics are combined under MOIN – an acronym for Molecular Imaging North.

Methods ranging from the improvement of molecular imaging techniques to the development of new contrast agents and marker compounds are combined for diagnostic purposes. The project aims to develop a technology platform for molecular imaging ba-

sed on magnetic resonance imaging (MRI), fluorescence imaging and nuclear medical methods (PET and SPECT).

Finally, preclinical and clinical studies are to be carried out to evaluate the newly developed imaging methods and contrast agents. By selectively aligning existing activities of the individual partners, MOIN enables both clinics to use each other's human resources, know-how and technological capabilities. In this way, MOIN is creating a collaborative structure which is unique in Germany. Prof. Gerhard Adam (Clinic for Diagnostic and Interventional Radiology at the University Medical Center Hamburg-Eppendorf) and Prof. Claus-C. Glüer (Clinic for Diagnostic Radiology at the University Medical Center

Schleswig-Holstein, Campus Kiel) are joint heads of this major project.

Work is currently underway to establish a Molecular Imaging Center (MIC) directly connected to the MOIN project partners. MIC will act as a service provider for the pharmaceutical industry and medical device manufacturer to support drug, contrast agent and medical device development with cutting-edge molecular imaging technologies.

Even at this very early stage, pharmaceutical drug developers are already showing huge interest in the services offered by MIC. Manufacturers want sufficient data at a very early stage of their own development programs from *in vivo* studies using modern imaging methods. Molecular imaging methods will provide early information of drug efficacy and will help the pharmaceutical industry to focus on the most promising development candidates.

# Europe's first metaregion for life science and biotechnology

ScanBalt BioRegion was founded with the aim of ensuring that Northern European life science and biotechnology realizes its potential for global competitiveness.

**The ScanBalt BioRegion** encompasses Denmark, Estonia, Finland, Iceland, Latvia, Lithuania, Norway, Poland, Sweden, North Germany and North Western Russia. This metaregion provides a structure for the acceleration of the academic, commercial and entrepreneurial activities necessary to compete successfully with the United States and Asia.

There are many relevant cultural, historical and political ties in the ScanBalt BioRegion and more than 60 universities and 870 biotechnology and life science companies are located in the region. In the ScanBalt BioRegion, there are a number of regional networks encompassing universities, industry, hospitals, public institutions and other important actors within the life science arena. The region therefore constitutes an excellent foundation for the promotion of closer interregional and cross-national cooperation. The aims of these regional networks are the basis of ScanBalt.

ScanBalt is a mediating and coordinating non-profit association that derives its strength from the networks and organizations it represents. ScanBalt brings together regional and national expertise into one coherent, transnational organization. The secretariat is located in Copenhagen.

Since its formation in 2004, Hamburg and Schleswig-Holstein have also been engaged in

this network. As a member, Norgenta (North German Life Science Agency) represents the region and is strongly involved in ScanBalt's projects and strategies. For both states, these activities represent an important step in boosting the internationalization of the North German life science region especially in Scandinavia.

There are various metaregional infrastructure projects in the Scanbalt Initiative. These include the following:

## ScanBalt Network of Networks in Biotechnology

The "Scanbalt Network of Networks in Biotechnology" project focuses on the development of the ScanBalt organization, the involvement of key players from ScanBalt BioRegion, and the increased promotion of human and financial mobility. The project was initiated in December 2002 and co-funded by the Nordic Innovation Center.

## ScanBalt Competence Region

It is the objective of ScanBalt Competence Region to provide an extensive and structured mapping of the ScanBalt BioRegion's Life Science and Biotech players, competencies, framework conditions and other relevant factors on a globally comparable basis. This will

increase transparency within the ScanBalt BioRegion and assist in the integration of the new EU-members.

## Boosting Baltic FP 6

Boosting Baltic FP6 aims to increase National Contact Point (NCP) competencies in FP6, and related programs. The project works with the NCPs, and their customers, through the promotion of advanced partnerships and the development of entrepreneurial and competitive skills. The project has two target groups, the NCP's of four newly associated countries (Estonia, Latvia, Lithuania and Poland) and their life science research community, as a model for effective technology transfer.

## ScanBalt Campus

ScanBalt Campus (SBC) is an R&D and education network between universities, companies, hospitals/university hospitals and other actors – all sharing life sciences and biotechnology as a common base. The SBC will improve regional coordination and mobility, and increase collaboration between sectors. SBC will deliver a framework, acting as an umbrella and/or as a platform, in the whole field of knowledge formation from idea to market.



### ScanBalt Campus Knowledge Networks

As part of the ScanBalt Campus project, transnational collaborations in education and research are being established. They result from open tender procedures for members of ScanBalt. This bottom up approach is a strong and unique characteristic, which improves metaregional coordination and visibility. The following Knowledge Networks are currently being established:

#### Environmental Biotechnology

This network has its node at the Center for Environment and Sustainability (GMV) at Chalmers University of Technology and Gothenburg University. It is coordinated by Professor Oliver Lindqvist at GMV. The scientific focus is renewable energy, chemicals and new products from forestry and agriculture. One aim is the production of biofuel for the transport sector based on residues (or products) from forestry and agriculture.

Three areas of specific interest are the extraction of lignin from black liquor (kraft paper pulp process), ethanol production (separation of lignin from process streams) and the gasification of biomaterial.

#### Process Analytical Technology (PAT)

PAT is a system for designing, analyzing and controlling pharmaceutical manufacturing through measurements of quality and the performance properties of materials and processes. The goal is to maximize final product quality. The intended results of the PAT framework are a reduction of production cycle time with more advanced measurement and control methods. In addition, it will enable more automation and savings of energy and material.

#### Molecular Diagnostics

The Molecular Diagnostics Network is coordinated by the Intercollegiate Faculty of Biotechnology, University of Gdansk and Medical University of Gdansk. These act as a hub together with the Technical University of Gdansk. This hub is in collaboration with the University Medical Center Hamburg-Eppendorf and the University of Hamburg, Germany, and the Institute of Tumor Biology at the Norwegian Radium Hospital, Oslo. The networks focus is on the extension of existing expertise in molecular diagnostics to highly specialized fields enabling the development of new commercial diagnostic tools and strategies as well as the improvement of standards in experimental research on cancer. There is also a focus on the development of new diagnostic tools for the

detection and identification of plant pathogens and animal diseases.

#### Regenerative Medicine

ScanBalt Regenerative Medicine Knowledge Network is coordinated by the University of Rostock, and BioConValley. The aim is to bundle existing high-level research activities in the fields of regenerative medicine, biomaterials, stem cell research and ethics to form a virtual center representing a Northern European knowledge region in regenerative medicine. The aim is to position the center as an international competitive regional cluster and to obtain national funding.

#### Informational Biology

Informational biology reflects the current changes in biosciences in which a multidisciplinary approach is required in order to fully exploit available data, and involves biochemistry, biophysics, structural biology, bioinformatics, computational chemistry, cell biology, computer sciences and mathematics, among others. The Knowledge Center will have clear links to industry, particularly related to biotechnology, medicine and pharmaceutical development. Graduate students will receive a high-quality, multidisciplinary education and research training experience.



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