

MAGAZINE

LIFE
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MEDTECH, BIOTECH & PHARMA
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Hamburg, Schleswig-Holstein

THE ZIKA CHALLENGE

Virus researchers on the heels of a complex
mosquito-transmitted disease

A SERIAL INVENTOR

Philips researcher Bernhard Gleich
advances the Magnetic Particle
Imaging from the lab to the
market

CLINICAL HYGIENE

Clinicians and hygiene experts
from the North develop new
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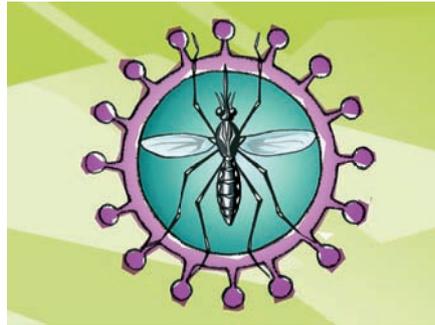
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SPECIAL

THE ZIKA CHALLENGE

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Stefan Niemann from the Leibniz Research Center Borstel has received the main prize awarded by the German Society for Hygiene and Microbiology for his excellent work in tuberculosis research.

NETWORKING IN THE NORTH

HOW LIFE SCIENCE RESEARCH HELPS COMBATE ZIKA & CO



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Dr Hinrich Habeck,
 Managing Director
 Life Science Nord Management GmbH

Dear Readers, among the greatest challenges in recent years has been the global spread of infectious diseases. One of the most recent examples is Zika – a virus that just recently appeared in the Americas and still is making its way around the globe. Its danger was not only discussed in the course of the Olympic Games in Brazil this year, but because of globalization, Zika could also develop as a threat in our part of the globe. A wide range of researchers, some of them from our region, are working at full speed to gain a better understanding of how to combat the virus effectively. In our cover story, you will learn how they aim to control and contain the virus.

Additionally, we explore the Brazilian health market. In recent years, it has established as a growing business area in the pharma and medtech field. We asked Christian Decker, foreign trade con-

sultant, who works as a Brazil expert with the WTSH about his experiences and his tips for companies who want to start business activities abroad.

In our Know-How column, we discuss the topic of infectious disease from the perspective of hygiene. Bärbel Christiansen, Head of Internal Hospital Hygiene at the University Medical Center Schleswig-Holstein and Chairperson of the Commission for Hospital Hygiene and Infection Prevention at the Robert Koch Institute, explains new strategies to help advance disinfection strategies to combat the spread of multi-resistant bacteria. Klaus Ruhnau, Managing Director at hygiene specialist Bode Chemie, gives us insights into the further development of disinfection products and underlines the growing importance of digital support.

With the portrait of the physicist Bernhard Gleich from Philips Research Hamburg, who was awarded “Inventor of the year” by the European Patent Office in June together with Jürgen Weizenecker, we plunge into the world of Magnetic Particle Imaging and learn more about the inventor and the potential of this new technology.

Enjoy reading this issue packed with further exciting news from companies and researchers from the Life Science Nord Cluster.

Hinrich Habeck

BIOTECHNOLOGY CONFERENCE

A GLIMPSE INTO THE FUTURE OF HEALTH

3D printing, digital health, plasma technology – around 60 biotech experts from science, clinics and industry came together in Mecklenburg-West Pomerania to discuss how regional stakeholders aim at changing this leading health region in the future.



Every four years, the Northern biotech community discusses the current state of the biotech sector. One session was dedicated to approaches of "Biotechnology 4.0".

To put a face on northern excellence in biotechnology across all application fields as well as connecting science and business – that's the driving force behind the "IHK North Biotechnology Conference", which is organized every four years by the Northern Regional Chamber of Industry and Commerce (IHK Neubrandenburg/IHK Nord) in cooperation with BioCon Valley and the WTSH in Mecklenburg-West Pomerania. "Our aim is to showcase the diversity of regional biotech activities and to find possible intersections for industrial applications in this health region and beyond," said Wolfgang Blank, President of IHK Neubrandenburg. "In addition, the event demonstrates the importance of the sector from an economical and political perspective," Blank stresses.

The two-days event from 22 to 23 September entered in its fourth year. Discussing various topics such as financing trends, industrial biotechnology solutions, health-related innovations and the role of Big Data

for the development of new treatments, the conference highlighted the current state of the biotech sector. Northern companies such as Centogene, Altona Diagnostics and Euroimmun shed light on their business strategies. Start-ups like Topas Therapeutics shared their experiences on how to attract investors. Insights into the biologization of industry and the use of marine resources were given by representatives from Hamburg Technical University, among others. The potential of emerging technologies such as 3D printing and plasma research for the health sector was also presented.

The session "Biotechnology 4.0" gave a glimpse into future therapeutic developments. Jens Fiehler, a neuroradiologist at the University Clinic Eppendorf (UKE), a medical professor at Hamburg University and also a CEO of Hamburg-based Eppdata GmbH, talked about how new statistical methods could optimize clinical trials. "Based on predictive algorithms developed from other sectors, we

would like to facilitate clinical studies in a way that doctors can see the difference between two treatment strategies by analyzing the data of 20 patients instead of 100," Fiehler explained. According to him, the use of image-data-related tools could speed up therapeutic development in the pharma and biotech industry. The advantage: the success or the failure of an approach could be estimated much earlier in the R&D process than with methods currently available. "We are still at the beginning, but our first results with stroke patients are encouraging," said Fiehler.

Hinrich Habeck from Life Science Nord gave insights into the current state of the Bonebank consortium that was started in 2015 to establish a German-Danish biobank with stem cells gained from bone marrow. (see p. 12) SW

Further information:
www.ihk-nord.de
www.neubrandenburg.ihk.de

FUSE-AI

SMART HELPERS IN DIAGNOSTICS

A new IT startup aims at putting Hamburg on the map for developers of artificial intelligence applications in the healthcare sector. The firm named FUSE-AI was founded in May 2016.

Matthias Steffen, who is on the team of four FUSE-AI founders, explains the core business of the new venture: "We are developing algorithms that can act as smart assistants to physicians during their diagnosis. The software is an analytical tool for pattern recognition in big data sets."

The software developed by FUSE-AI is based on an approach known as "deep learning". As co-founder Maximilian Waschka discovered whilst touring the Silicon Valley and other IT hot spots around the world in recent years, this is one of the most vibrant fields driving the digitalization of industries. "At the core of the system is a self-learning algorithm, that is able to learn quickly through neural networks," Steffen explains. Smart solutions poised for digital diagnostics are conquering in particular those fields

of medicine that handle big data and image analytics. That is why the first algorithm of the Hamburg-based startup is a tool for analyzing imaging data in mamma carcinoma diagnostics.

The algorithm has been developed by Heurolabs, FUSE-AI's business partner. All the program needs in the beginning is some training by an experienced eye, Steffen says. Physicians, such as radiologists, serve as coaches for the program. "Our algorithms understand and describe what they see." Self-learning algorithms can shorten processes in clinics and therefore reduce costs. Not only this: the quality of the diagnosis increases. The team has plans to expand the spectrum to other cancer indications, such as pancreas, as well as to applications for drug discovery and pathological diagnosis. Whilst the first financiers are already on board, FUSE-AI is now seeking further investors. **pg**

Further information:
www.fuse-ai.de

ATTO-LAB

MAGNETIC WAND FOR THE LAB

Lübeck-based firm Atto-Lab GmbH has specialized in constructing analyzers that can detect traces of biomolecules at ultra-high sensitivity. Some of their analyzers' sensitivities are able to exceed current protein diagnostics procedures by a factor of 100,000. The bioanalytics company has now developed a new system that provides lab workers with a helping hand for the important steps taken just before measurement, i.e. the preparation of samples.

"As sample volumina in bioanalytic set-ups get smaller and smaller, it becomes harder to concentrate viruses, bacteria or toxins into several microliters," says Constantin Odefey, CEO of Atto-Lab. "Usually people use ultracentrifugation as a concentration step for substances, but that is costly and laborious." The patented solution now on offer from the Lübeck-based company is the so-called magnetic separation and transfer method (MST). The tool is like a magic wand for the lab that allows for recovering magnetic beads out of

liquids in an easy way. The system consists of magnetic nano-beads that can be coated with antibodies, generating a capture device specific for proteins, viruses, bacteria, toxins or other contaminants. The key instrument for collection and extraction of the nano-beads is a hollow rod with a sliding magnet inside. "With our approach, it is now very easy to catch the coated nano-beads in sample A and transfer them to a desirable small volume in sample B," says Odefey. According to Atto-Lab, the preparation method is easy, quick and allows for highly precise measurements – without the need for electrical components. That's why the system has the potential for routine use in clinical labs and might be suitable for point-of-care-diagnostics. Odefey underlines, however, that the system also provides solutions for environmental and industrial testing applications. **pg**

Further information:
www.atto-lab.com

FUNDING FOR TRIOPTICS

The Wedel-based company Trioptics GmbH aims at optimizing the characterization of optical properties with regard to newly produced complex lenses such as object lenses, spectacle glasses, endoscope lenses and contact lenses. The further development of these measurement methods is planned with the help of innovative micro systems. Totalling 239,000 euros, the "WaveScan" project has now received funding by the Federal state government of Schleswig Holstein. The Minister of Economy Reinhard Meyer officially handed over the grant in August. Trioptics is an expert in optical measurement technology for the active alignment and assembly of lenses and camera modules that are used for ophthalmology applications, among others.

Further information: www.trioptics.com

#PROTEOMICS

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euros have been granted by the German Federal Research Ministry to investigate structural protein dynamics using free-electron laser European XFEL.

HYGIENE PRIZE 2018

In February 2018, the Rudolf Schülke Foundation will offer the Hygiene Prize. It is awarded globally to scientists who have solved specific problems in the area of hygiene, microbiology and preventative medicine. The prize is endowed with 15,000 euros. Applicants are requested to submit their original papers published in a scientific journal by email no later than 15 February 2017 to andrea.rodewald@schuelke.com. The Rudolf Schülke Foundation is named after the cofounder of the German company Schülke & Mayr GmbH based in Norderstedt.

Further information:
www.rudolf-schuelke-stiftung.de

CLINICAL HYGIENE

HOW TO ENCOURAGE HIGH COMPLIANCE



Nurses and physicians have to disinfect their hands more than 130 times a day. Digital support systems are being developed to help increase individual compliance.

With the rise of multidrug-resistant microbes, clinical hygiene changed from being an underrepresented topic to a high priority issue. Hygiene experts in the North developed different strategies to deal with the challenge of compliance.

“Being successful in the hygienic field means that you see nothing.” That’s how Bärbel Christiansen shortly summarizes her daily work as Chairperson of Hospital Hygiene at the University Medical Center Schleswig-Holstein (UKSH). “Our aim is to recognize transferable diseases as early as possible and to prevent their transmission with the help of standardized precautions,” Christiansen explains.

Since 2011, she leads the central facility of internal hospital hygiene in which the tasks of her team of 14 colleagues are concentrated. Their main focus: to coordinate assistance, training and monitoring so that basic standards of hygiene at the UKSH with its more than 12,000 staff remain at a high level. “This work does not get done by itself,” she stresses. A full-service hospital with dozens of

departments and institutes also means that there are different issues relevant to each specific unit. Poster campaigns throughout the majority of the hospital remind the personnel of regular hand hygiene. In addition, the hygiene experts have installed types of internal knowledge centers. “In every unit, we built up hygiene groups and established a top-down system of learning and handing over. But the high turnover among medical staff is a challenge,” says Christiansen.

Hygiene forerunners

Klaus Ruhnau also focuses on the task of improving hygiene, but from another perspective. The Managing Director of Bode Chemie GmbH, a Hamburg-based hygiene specialist company that belongs to the Hartmann Group, profits from the high attention, the topic cur-

rently gains from the clinical side. The product Sterillium, invented over 50 years ago in cooperation with physicians at the University Medical Center Eppendorf and with a proven track record of 50 scientific publications, the Germans are the forerunners of alcohol-based hand disinfection. “Our hands are the main organ to transfer dangerous bacteria or viruses. Proper disinfection can eliminate 99% of transmission,” explains Ruhnau. His company follows a dual strategy. On the one hand, the product itself is continuously improved. “If you have to disinfect your hands more than 130 times a day with alcohol it should be effective and sensitive,” he underlines the importance of a combined pharmaco-cosmetic research approach.

On the other hand, Ruhnau aims at addressing the compliance problems in hospitals. For this reason, nowadays, his company offers an additional module-based system that works as a hygiene guide for health personnel. It includes aspects such as the right time and the optimal procedure for hand disinfection, the right place for disinfection measures and the best disinfection process for medical in-

struments, but also issues such as efficient training methods for an intuitive handling of the required measures and positive control mechanisms. With regard to the documentation of monitoring these processes, the use of digital devices is another up-coming trend. "All processes are developed in such a way that hardcopies are no longer essential," Ruhнау stresses. To optimize the whole process, more than ten researchers at the Bode Science Center are involved. According to Ruhнау app-based technologies are currently evaluated also. These could be efficient tools in helping to identify the main obstacles in the clinical daily routine preventing staff from applying disinfection strategies.

How to deal with sudden outbreaks?

In Germany, according to the Robert Koch Institute (RKI), an estimated 400,000 to 600,000 patients suffer from hospital-acquired infections each year. The weak, the critically ill, children and the elderly are the people most at risk. No antibiotics are able to treat them when they are multidrug-resistant. That's why the UKSH hygiene experts working with Christiansen keep an extra eye on the most sensitive hospital areas such as the intensive care unit and the operating rooms. "People of whom we know they are at risk are screened immediately when they arrive at the hospital and isolated until we know the result," she explains. Most of the problems start when an outbreak occurs all of a sudden. "Nowadays, with the rising amount of refugees and people traveling around the globe, we are increasingly dealing with diseases and infections that are usually not common any more because of the good vaccination status," she says. For her team, it means quickly finding out if all relevant personnel are immune or not.

Less MRSA-infected patients

However, Christiansen, who has worked at UKSH as a hygiene expert since 1988 and has lead the RKI-Commission for Hospital Hygiene and Infection Prevention since 2011, knows that "at a full-service hospital such as ours, we regularly have critical and complex

cases to get along with." At least the number of patients who carried *Methicillin-Resistant Staphylococcus aureus* (MRSA) bacteria was lower in 2015 than in 2014. In addition, there have been technical improvements – in particular regarding the automatic purification and cleaning procedures of surgical and medical instruments. "Meanwhile, every equipment producer offers machines that allow the purification of several differently-sized instruments at the same time." According to Christiansen, this is particularly important in the endoscopy field as physicians are working, for instance, with endoscopes of different sizes ranging from 30cm (bronchoscopes) to two meters (duodenoscope). "Finally, the washer-disinfector machine should work for all of them," she says.

Another hygiene issue relates to the improvement of diagnostic instruments. "We are researching to find fast and simple tools that perfectly correspond to our challenges. However, not every system brings the success we hoped for," the UKSH-expert says and adds: "Diagnostic developers have to take into account that in a large hospital, we cannot analyze each sample immediately.

In particular, when it comes to costly high-throughput equipment." Usually, the clinical labs collect sufficient samples from across the hospital departments until it is worth starting the process of analysis. Christiansen: "If you have methods that only offer little time of optimization, then it's not necessarily useful in our clinical routine processes."

Other research projects in which the UKSH is involved in deal with behavioral support systems. "We just finished a one year pilot project with an electronic measurement system that helped us to increase individual compliance rates," Christiansen explains. Developed by Frankfurt-based company Hyhelp AG, the sensor not only automatically measures the level of alcohol in the air, but also counts every positive hand washing process. According to Christiansen, these electronic supporters could offer high advantages for the staff, but for now, it remains open as to how they could be integrated in a regular manner in the current hospital system. "Data protection is a highly-discussed issue in Germany," reports Ruhнау. But from his perspective, "digital supporters are without an alternative".

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LSN STARTED THE HIHEAL PROJECT

Officially started in April 2016, the project "Hygiene, Infection & Health" (HIHeal) aims at connecting all relevant players from the Life Science Nord Cluster and the Agency for Healthcare Industry Hamburg (Gesundheitswirtschaft Hamburg) to bring in their expertise and advance innovation in the fields of hygiene and infectious diseases along the value chain. The five-years-project is supported by the European Regional Development Fund and the City of Hamburg. "Currently, we are looking for topics for which stakeholders in our region see the highest demand for networking and potential for cooperation," says Julia Brilling, one of the project manager responsible at Life Science Nord. According to her colleague Friederike Saathoff, issues such as cleaning validation, emerging diseases as well as process innovation to fight against antibiotic resistance will be high on the agenda. "Everyone interested is invited to come up with ideas," she states.

Further information:

www.lifesciencenord.de/aktivitaeten/projekte/hiheal

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INFECTIOUS DISEASES

FIRST MOVERS CLOSE IN ON ZIKA

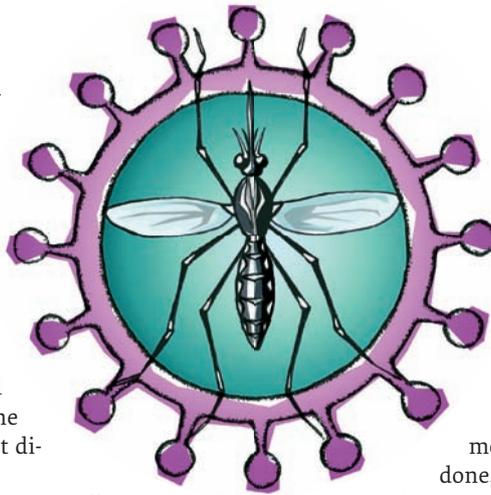
The appearance of Zika in the Americas was shocking and the enigmatic mosquito-borne virus is still making its way around the globe. Researchers and life science companies from Northern Germany operate at the forefront of the response to the epidemic; they deliver tools for detecting and understanding the complex virus and study how different mosquito species can spread the disease.

Timing is everything when trying to respond to an exploding infectious disease. Lübeck-based diagnostics company Euroimmun has seen many outbreaks popping up worldwide in its almost 30-year history. But in the case of the Zika epidemic in South America, the timing was close to perfect. When the shocking pictures of babies with birth defects as a possible consequence of their mothers' Zika infection during pregnancy reached us from Brazil, Euroimmun was one of the first movers worldwide providing efficient diagnostic tools.

"We made our Zika antibody tests commercially available at the end of January," says Konstanze Stiba, a product manager at Euroimmun. On February 1, the World Health Organization (WHO) declared the Zika virus infection and its associated congenital and other neurological disorders a Public Health Emergency of International Concern. "We delivered at a time when everybody wanted to have a test," remembers Stiba. The production site at Dassow, a 30-minute drive away from the headquarters in Lübeck, was running at peak levels – even at weekends – to satisfy the strong demand. By springtime, the Zika ELISA and the indirect immunofluorescence assays systems had turned into top-sellers.

Easy access to blood samples from patients

This success story is due to several favorable circumstances: the virology department had Zika virus isolates from earlier outbreaks already in its virus collection. And thanks to close cooperation with Jonas Schmidt-Chanasit and his team at the Bernhard Nocht Institute for Tropical Medicine in Hamburg the R&D team had easy access to pre-characterized blood samples from Zika patients. "That is why we could validate our tests super-fast," says Stiba. Their detection system proved to be highly specific and showed no cross-reactivity with other antibodies from related viruses such as dengue, yellow fever or West Nile virus. High specificity is important to be able to differentiate between infections that exist in the same geographical regions. "Our tests are now sold in 55 countries worldwide, particularly in

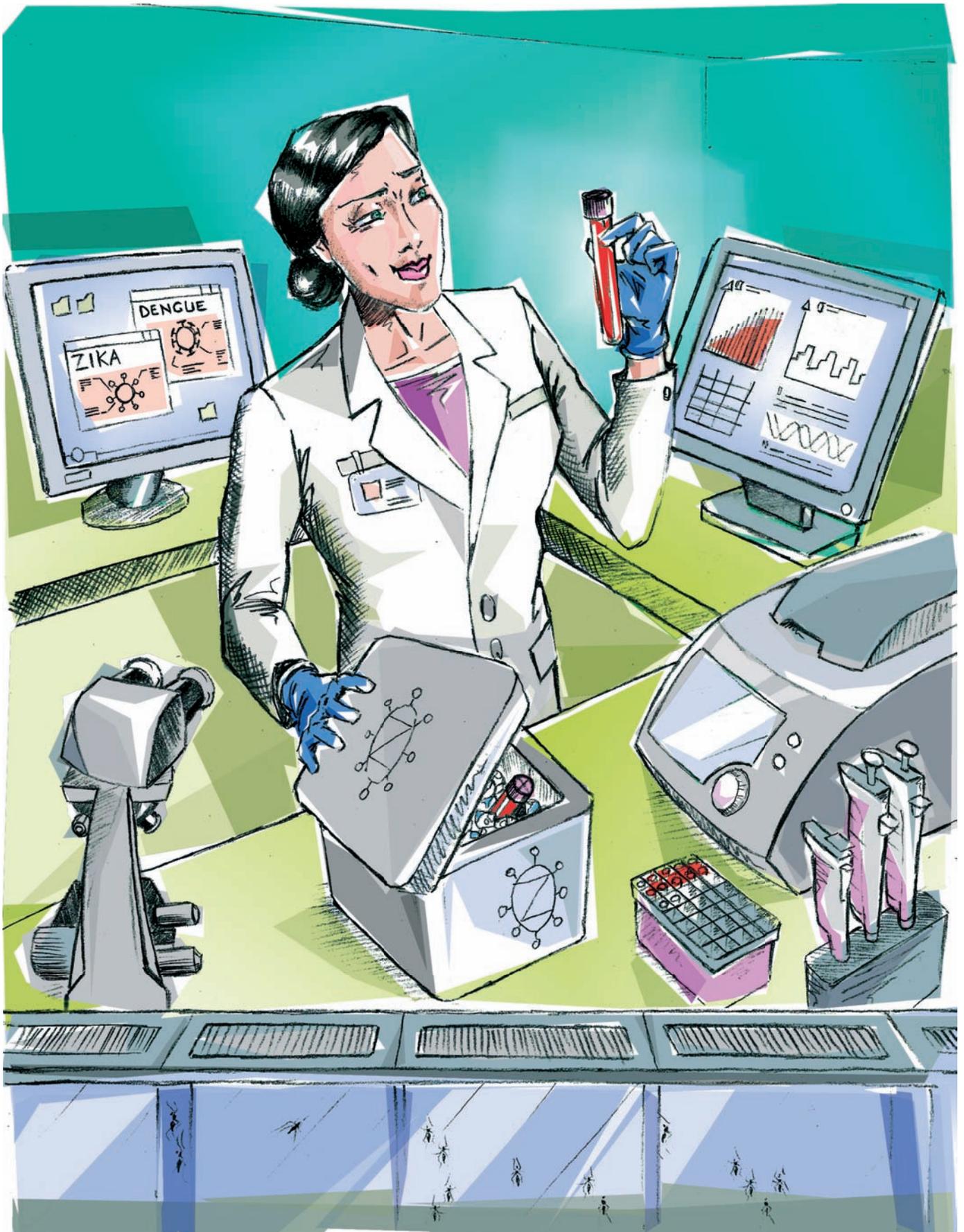


Europe and the Americas," says Stiba, "and the test systems are registered in nearly all endemic countries". The WHO has put the test on its list of applicants for its Emergency Use Assessment and Listing (EUAL) procedure. This mechanism has been installed since the Ebola outbreak to accelerate the availability of in-vitro diagnostics. Getting this new WHO label certifies commercial kits eligible for WHO procurement, i.e. they are accepted to be purchased by the WHO or health authorities in its member states. After the external evaluation is done, Euroimmun is pending a positive response from Geneva. "The listing should be a matter of days or weeks," Stiba says.

Another test tops the WHO list

Another infectious diseases diagnostics specialist from North Germany, Altona Diagnostics, is even one small step ahead of Euroimmun when it comes to the WHO listing for emergency use of its Zika test. In mid-August, the Hamburg-based company received the official green light from Geneva, thus becoming the first supplier worldwide with a real-time PCR test for the Zika virus. "The WHO emergency use label is important for us as it means a highly acknowledged external validation of quality," says Hans Kuhn, responsible for finance and administration at Altona Diagnostics. "And it's a door opener to new markets." National health organizations and public health laboratories can now use the test without waiting until national registration procedures are complete, for example. As Kuhn reports, Altona Diagnostics is already in contact with the Pan American Health Organization, the international public health agency for the Americas. "It's really a great opportunity for us to strengthen the presence of our products in South America."

In recent weeks, the infection rate was on the decrease in the Southern hemisphere due to the winter season and lower activity of the transmitting insects – primarily mosquitoes of the species *Aedes aegypti*. It is very likely that infection numbers will rise again when the mosquitoes return. In Hamburg, the specialists for infec-



tious disease diagnostics want to be prepared and are now figuring out how their production capacities could be adapted.

Universal testing procedures needed

What is challenging about Zika is that the genetic material of the virus disappears from the blood within several days after infection. “The low virus RNA concentration in the blood makes it very hard to detect the virus by routine PCR methods,” says Christian Drosten, a virologist at the University of Bonn. To be safe for infection diagnostics, testers have to turn to alternative samples from the same patient, for example saliva or urine. And a serological test that looks for the presence of Zika antibodies is mandatory as an important cross-check, says Drosten.

His team in Bonn have checked many PCR tests on Zika virus including the one Altona Diagnostics is selling. “This one and other commercial test kits from specialized biotech companies are of high quality in technical terms,” says Drosten. “But these ready-made tests are not our issue when it comes to public health.” Many labs worldwide have started to establish their own home-brew Zika assays. “There are many different tests out there. You just can’t compare the results,” Drosten says, “what we need is to establish a common diagnostic algorithm.” That is why his team compared all existing methods and analyzed to what extent they deviate from each other. “In the end, we were able to provide a correction factor to make studies on Zika comparable,” Drosten says. And as part of an EU infrastructural project, his team produced a so-called “universal calibrator”. It is a synthetic RNA molecule that mimics the Zika genome. With this control RNA in hand, it enables researchers to calculate virus concentration more precisely. “We distribute it and it is heavily requested across the globe,” Drosten, who is also an expert on the corona virus MERS, reports.

Congress highlights emerging viral diseases

MERS, Ebola, Zika – these and other threatening infectious diseases will come under the spotlight at the European Congress of Virology. The event taking place in Hamburg in October is considered to be the most important gathering for virus researchers in Europe. “Emerging viral diseases make up one of the three main topics of the congress,” says Joachim Hauber, a virologist at the Heinrich Pette Institute (HPI) in Hamburg and President of the conference. Just how influential the appearance of Zika has been for the field is mirrored by its list of speakers: at least seven lectures from renowned experts and a satellite symposium on “Emerging Zoonoses” will deal with the flavivirus that appeared in Brazil in 2015. Other main topics covered at the congress include basic research and translational applications.

Cell culture imaging tools designed in Hamburg

Zika is still a mysterious and complex virus in many aspects. Modern 3D tissue culture methods and stem cell technologies have demonstrated their potential to crack some of the virus’ secrets. Amongst others, the Brazilian stem cell biologist Stevens Rehen has used human induced pluripotent stem cells (iPS cells) to generate neural cells and cerebral organoids – mini-brains in a dish – to understand how the virus attacks the developing brain of fetuses. With the help of these 3D cell systems, they were able to show that the Brazilian Zika

strain is an aggressive killer – it attacks neural stem cells in particular – precursors of neurons and other brain cells. The Zika researchers from Rio de Janeiro have relied on powerful imaging systems for their analysis of the cell culture experiments. “The results are based on technology developed in Hamburg,” says Jacob Tesdorpf, Director Cellular Imaging & Detection at PerkinElmer. The technology company designs its automated high-throughput microscopy imaging systems at its Hamburg site, where about 100 employees are based. “As our systems collect and analyze multicolor image sets from up to 100,000 data samples per day, this concept is known as



high-content imaging,” he says. A combination of powerful hardware and analytical software, the machines transform imaging data from cell culture experiments into quantitative information. “3D cell cultures and organoid technology are now the main drivers of the market,” says Tesdorpf. “We have adapted the new generation of our systems particularly to this trend.” Based on novel microscope objectives and high-performing algorithms, analysis could be accelerated enormously, Tesdorpf says.

Antivirals: Zooming in on the Zika protease

In Northern Germany, research and development activities on Zika virus are not only at the forefront when it comes to diagnostics. The lack of a vaccine or antiviral drugs to combat the Zika virus has scientists scrambling to identify and better characterize potential

drug targets. Rolf Hilgenfeld, a structural biologist at the University of Lübeck is one of these specialists who has put great energy into finding weak spots in the architecture of the virus.

At the end of January, Hilgenfeld put together a small task force of three colleagues in a hunt for the three-dimensional structure of the Zika virus enzyme N2B/NS3 protease at the atomic level. “We decided to enter the race, as we had worked on the 3D structure of closely related proteases from dengue and West Nile viruses before,” says Hilgenfeld. The team worked day and night in February and March to grow protein crystals of the Zika protease from the Brazilian out-

gists from Lübeck also hypothesize that the Zika protease is able to inactivate the innate immune response of the patient more efficiently than other flaviviruses. The Zika protease is a promising target molecule for an antiviral drug. “With the 3D structure in hand, it is now possible to design highly specific substances that block virus reproduction,” says Hilgenfeld. But he is convinced that attacking only Zika will not be enough. In an ideal world, a single drug would also combat dengue and yellow fever at the same time. “That is why we aim for broad spectrum antivirals, which fight all members of the flavivirus family,” says Hilgenfeld.

Mosquito research: Controlled biting in the lab

Rio de Janeiro, Miami or Singapore: Zika is just one of the most recent example of a world-travelling pathogen that is transmitted by mosquitoes. As a result of intensified globalization of international trade and of substantial travel activities, mosquito-borne exotic pathogens are becoming an increasing threat for Europe. In Germany some 50 different mosquito species are known. Can some of them serve as transmitter for exotic pathogens?

“We want to find out whether both indigenous and invasive mosquito species are able to transmit these tropical viruses,” says Egbert Tannich, senior parasitologist at the Bernhard Nocht Institute for Tropical Medicine in Hamburg. His team are breeding a wide spectrum of mosquito species in a room located just under the roof of the institute. The researchers are especially proud of their “Biosafety-level-3-insectary”. In this hermetically sealed laboratory the flying insects are kept in cages made of gauze mesh. To study whether the mosquitoes can transmit tropical diseases the researchers offer them virus-infected blood meals on cotton sticks. Or they prepare special membranes, on which the mosquitoes can have a bite. “We can apply different climatic conditions, so we are able to simulate different geographical environments,” says Tannich. The tricky part is proving whether a mosquito can really act as a vector for a disease. Can the virus replicate and is it detectable in the saliva? Can the infected mosquitoes infect mice?

As for the West Nile virus, a flavivirus that is already circulating in Southern parts of Europe, Tannich and his team found that the most abundant German mosquitoes (of the *Culex* genus) are indeed capable of transmitting the virus. Infection experiments with Zika are underway. As *Culex* mosquitoes prefer sucking on the blood of birds, the finding is not alarming, says Tannich. He is also convinced that the potential risk of a Zika epidemic circulating in Germany is extremely low. “You need a critical mass of mosquitoes that prefer human blood to kick-start an outbreak,” Tannich says. An invasive species to Germany called *Aedes albopictus*, the Asian tiger mosquito, is his main suspect. Pioneering populations in Southern Germany are under tight surveillance. To what extent the Asian tiger mosquito is helping to spread Zika remains unclear though.

What is clear is that Zika has drawn attention to the need for research on mosquitoes as transmitters of diseases. “Medical entomologists are becoming sought-after experts in health research,” says Tannich. The German government has recently injected several million Euro into mosquito research. “It’s good to be prepared. Zika was just one of the most recent wake-up calls.”



break strain. They knew competition from other international labs was tough, but they managed to be the first to cross the finish line. Thanks to some biochemical tricks, they were able to produce crystals that represent the enzyme in its “active” 3D version. The crystals were X-rayed at the German Electron Synchrotron DESY in Hamburg and the crystallographic data were put together using powerful mathematic modeling. This great effort paid off: In July, Hilgenfeld’s team published their findings in the top journal SCIENCE. Their work was mainly supported by the publicly-funded German Center for Infection Research (DZIF).

The protease is a key enzyme as it drives the reproduction of the virus. “Zooming in on the structure, we learned why the Zika protease is much more active than the one of dengue and West Nile,” says Hilgenfeld. From early results, the molecular biolo-

BIOBANK

PERSONALIZED MEDICINE READY TO TAKE OFF

The Interdisciplinary Center for Biobanking Lübeck has reached an important milestone. More than 19,000 patients have given consent to their clinical data being used for research purposes. This helps to advance strategies for personalized medicine.



The established hospital-integrated biobank is a central infrastructure of the University of Lübeck in cooperation with the University Medical Center of Schleswig-Holstein (UKSH).

Since its newly adapted informed consent procedure starting in July 2015, the Interdisciplinary Center for Biobanking Lübeck (ICB-L), an integrated project of the University of Lübeck and the University Medical Center of Schleswig-Holstein (UKSH), has advanced significantly. To date, more than 19,000 patients have agreed that their data from clinical routines may be used for research purposes. "Our biobank heavily contributes to our clinically orientated cutting-edge research," says Detlef Zillikens, Vice President of Research at the University of Lübeck and Director of the UKSH-Department of Dermatology, Allergology and Venerology.

ICB-L, a hospital-integrated biobank, helps to translate valuable research results into clinical routine practice. In the long run, physicians will be able to individually plan a patient's treatment also based on research data facilitated by the biobank. It stores and efficiently maps more than 1,500 relevant

parameters in a harmonized, largely automatic way. Since 2014, the principles used for the collection of biomaterial and medical data are certified by a quality management system and data security of individuals is of high priority. In addition, the preparation of the biomaterial follows to strict standards. "It can only be successfully implemented within an interdisciplinary team of IT-experts, physicians, ethicists, researchers and data protection specialists," emphasizes Jens Habermann, Head of ICB-L.

The establishment of the ICB-L also helps to advance stem cell research in Lübeck as the biobank provides the basic infrastructure for the Bonebank project. This German-Danish collaboration between the UKSH, the University of Lübeck, the Odense University Hospital, Life Science Nord and Stryker, among others, also commenced in 2015 and aims at establishing standardized procedures to obtain stem cells from bone marrow dur-

ing clinical routine operations and to store them as a basis for further therapeutic research. First results were presented to the partners during the latest project meeting in Odense at the end of September. "We already received 19 bone marrow samples that we and our partners are now analyzing according to their level of mesenchymal stem cells," reported Arndt-Peter Schulz, senior physician at the UKSH-Department of Orthopedics and Trauma Surgery. Furthermore, the researchers try to establish an optimal work flow – starting with the samples taken from the operating room to biobank transport and later returning in the same manner when a patient needs a stem cell transplantation. "Currently, we are optimistic of solving the logistical hurdles," Schulz said. **SW**

Further information:
www.uni-luebeck.de
www.uksh.de

MATERIALS SCIENCE

TINY USEFUL PARTICLES

Nanoparticles with special properties could pave the way for more hygienic medical products. As they are not only biorepellant, but also biocompatible, biodegradable and recyclable, Nandatec's new tiny products could lead to innovative surface materials for different applications.

Some people would simply call it rust, but the superparamagnetic iron oxide nanoparticles produced by the young startup Nandatec based in Itzehoe just north of Hamburg could give raise to an innovative surface material. In summer, Torsten Albig, Prime Minister of Germany's northernmost Federal state Schleswig-Holstein, visited Nandatec's lab premises in the Innovationszentrum Itzehoe (IZET) when Nandatec's Managing Director Dagmar Schneider unveiled her company's latest product. The so-called NANDATEC

CLEANS¹ particles are both biorepellant and biocompatible. Modifying surfaces with this nanotechnology will result in less bacteria or algae living on them. Schneider explained some of the positive effects the nanoparticles could have on the surface: medical technology products such as stethoscopes could become more hygienic and nasal sprays could be sold without biocidal additives. She also emphasizes, on the other hand, that the encrustation of fouling matter on ships could also be prevented in a much more sustainable way. In comparison to common toxic anti-foulings, Nandatec's particles disintegrate into environmentally compatible substances. According to Schneider, the sophisticated rust is also easy to produce and easy to store. The biochemist,



who has experience researching nanomaterials since 2008, established the company in 2013. The groundbreaking scientific work was undertaken by Schneider and others at the University of Lübeck. Nandatec's staff of eight – both in Lübeck and Itzehoe – also work on other applications as modifications of the basic layout result in different properties. Hence, they could also be used as biosensors to detect pollutants. Schneider believes, however, that the biocompatibility is the most interesting property. “We are already talking with potential customers and bulk production could start within a couple of months,” she adds. ml

Further information: www.nandatec.com

CANCER DATABASE

DRAFT, COLLECT, ANALYZE: INDIVUMED ENTERS NEW STRATEGIC PARTNERSHIP

Biorepository specialist Indivumed GmbH from Hamburg has been enlarging its cancer database and biobank for years. The Pacific Northwest Research Institut from Seattle is the latest partner to join in the effort to tailor treatments for individual cancer patients.

Based on an elaborate method to retain a human sample's unique patterns of biomolecules such as RNA, DNA, and proteins, to date Indivumed's network comprises 17 research institutions in Europe and the US. With more than 600,000 discrete tumor, blood and urine samples obtained from more than 25,000 cancer patients, the company has now shifted gears to unlock the power of its database for precision medicine. As Indivumed announced in August, the Pacific Northwest Research Institute (PNRI) is now a further US-Partner in its international network. The

institute's computational biology expert David Galas is the key person in this strategic collaboration. “Accessing Indivumed's global cancer database provides a great opportunity for us to better understand how all the pieces of a cancer patient's biology fit together by detecting complex dependencies in this extensive data set,” Galas said.

With more than 4.5 million biological data points the data set is complex indeed. PNRI will apply its proprietary computational method for deciphering the biological complexity of human development and disease. The method has been successfully used to analyze RNA profiles in patients with illnesses such as autoimmune disease. As part of this collaboration they will now start with the first application of the method to cancer. Hartmut Juhl, CEO of Indivumed, values the PNRI's analytical platform as “extremely innovative”. It will enable better understanding

of the complexity of cancer and help to translate their specific targets and biomarkers in the clinical context. “Overall, we hope to get closer to the development of a true precision medicine for cancer patients,” Juhl added.

In July, Indivumed also teamed up with Munich-based Definiens AG. This strategic partnership combines Indivumed's tissue-based R&D knowledge with Definiens' image analysis and datamining capabilities. Researchers and clinicians in oncology – and in the long run also cancer patients – could benefit from this partnership that promises to identify and verify relevant cancer biomarkers faster than ever. Diagnostic tests based on newly discovered biomarkers could help distinguish subgroups of cancer patients which require different treatments. ml

Further information: www.indivumed.com

LIFE SCIENCES IN BRAZIL

EMERGING HEALTH MARKET



Data & Facts

Stakeholder life sciences industry :

Abimo (medical devices manufacturers), Sindusfarma (pharmaceutical industry)

Revenues pharma market (2015):

€ 17.4 bn (IMS Health)

Revenues medical devices (2013):

€ 5.07 bn (Abimo)

Emphasis:

Medical devices, vaccines, generics, diagnostics, cosmetics, nutraceuticals

Most important trade fair:

Hospitalar

Regulatory body:

National Health Surveillance Agency (ANVISA)

Further information:

www.sindusfarma.org.br

www.brazilianhealthdevices.com

The Brazilian health market is one of the largest in South America with production hubs in the pharma and generics field. In addition, there has been a high demand for medical devices, which offers excellent opportunities to German companies. Biosimilars, cosmetics and nutraceuticals have also come to the forefront of the life sciences sector.

With a population of 206 million and free health care at the point of delivery – the largest such public system in the world – the healthcare market in Brazil is a global heavyweight that is attractive to multinational companies. Over the past years, however, the country was shaken by the economic and political crisis (see interview p.15).

Nevertheless, the medical devices industry has been growing at an above-average

rate in recent years. According to Abimo, the association of national manufacturers of medical devices, the revenues in 2013 were at € 5.08 bn. An ageing society, rising purchasing power and an ever larger proportion of people with private health insurance keep the demand for medical devices growing, bringing great opportunities for exporting companies in Germany. There is, for example, strong demand for imaging technologies

for clinical diagnostics. The in-vitro diagnostics market is another big field in Brazil: Estimates see revenues at above € 0.89bn.

Pharma sector: record year for generics

Brazil is the largest pharmaceutical market in Latin America and the 10th largest in the world. Overall, the country represents 2% of the global pharmaceuticals market. According to analyst IMS Health, revenues in the pharma sector have grown to € 17.4bn.

If you consider discounts granted, the amount of revenue sums up to € 12.3bn. The Brazilian government is an important purchaser. It has strongly supported the local industry – in particular companies producing generics of small molecule drugs. 2015 was a

record year for the generics industry, with 35 new products approved.

Emerging biosimilar industry

As the government has shifted to cost-containment in the healthcare system, it has identified biologicals as one target for savings. More than 50% of the Ministry of Health's total expenses on medicines are for biologicals, despite representing only 12% of the drugs purchased. In the hope to reduce expenses, the Government wants to shift biologics production to domestic pharma companies.

The Ministry of Health has organized a "Productive Partnerships for Development" initiative. The logic behind it: National pharma companies are to form partnerships with international biosimilar companies, to register and commercialize products in Brazil and agree a transfer of technology to enable manufacturing facilities to be established in the country. Observers see in the initiative a strong incentive for the foundation of the emerging biotechnology sector.

Meanwhile, existing biotech companies were successful in pushing their pipeline based on their own R&D: In 2015, Brazil's health agency, the Brazilian Health Surveillance Agency (ANVISA), approved the first biosimilar, a monoclonal antibody that was developed by a domestic company.

A Brazilian pharma company based in Itapira, São Paulo, made another debut last year: It obtained the very first biodiversity-based registration of a biological active pharmaceutical ingredient (API). The product is an enzyme called collagenase that is used in ointments to treat wounds, burns and necrotic tissue. Cosmetics and nutraceuticals – bioactive ingredients for functional food – also make up dynamic fields in the Brazilian healthcare sector.

Improving the regulatory landscape

Difficult and often uncertain intellectual property protections may be a key barrier to the development of a stronger innovative pharma sector in Brazil, but new efforts from government, industry and academia may be smoothing the way. By and large, ANVISA has a solid reputation as a national regulator, but the procedures have been known to be slow and bureaucratic due to a complex regulatory framework. Last year, the government introduced new regulations and efforts to speed up regulatory review timelines. Many experts in the field see the move as an important trigger to boost clinical research in Brazil. pg



LIFE SCIENCES IN BRAZIL

“GAINING MOMENTUM AGAIN”

Christian Decker covers foreign trade at WTSH – the Business Development and Technology Transfer Corporation of Schleswig-Holstein in Kiel. He lived in Brazil for one year and his wife is Brazilian. Decker draws an optimistic image of the economic development there in the near future and explains how his public organization can help companies that seek presence on the emerging health market.

How would you characterize the current economic situation in Brazil?

Decker: I reckon the economic crisis in Brazil has reached the bottom and it will be overcome. It is important that political uncertainty has come to an end after interim president Michel Temer has been confirmed as the country's leader. His government is considered as business-friendly, so observers are pretty optimistic that the economy will pick up in 2017 – with the pharma, biotech and medical devices sector benefiting from this turnaround.

Where do you see trends and opportunities in the life sciences sector?

Decker: Despite the economic recession, the medical devices sector is experiencing above-average growth. The need for innovative high-tech instruments is growing, which means excellent opportunities for exporting companies from Germany. In addition, Brazil is the largest pharmaceutical market in Latin America and the 10th largest in the world. The government has mainly been supportive of the indigenous industry, especially the manufacturers of small molecule drugs and generics. Biologicals are considered as a target for savings by the Brazilian government. That is why biosimilars are recognized and supported as an emerging field. Major Brazilian pharmaceutical companies have set up partnerships with international biosimilar companies to enable local production. Other topics of major importance for the Brazilian healthcare industry are cosmetics, nutraceuticals and last but not least, digital health.

Whom should companies seeking to enter the Brazilian market contact?

Decker: We at WTSH can function as a starting point and a first contact platform for companies from the North that want to gain a foothold in the Brazilian market. Our Schleswig-Holstein Business Center is located in the economic metropolis São Paulo. Here, our on-site partner is the Deutsch-Brasilianische Industrie- und Handelskammer. Expert Ricardo Castanho can build on a strong network and plots developments of different sectors day by day. We help with networking and look for interesting companies that could be potential partners. Here in Germany, we offer "Consultation Days", for which Ricardo Castanho flies in from São Paulo. Companies interested in opportunities in Brazil can get firsthand information face-to-face.

Further information:

www.ahkbrasil.com
www.wtsh.de

BERNHARD GLEICH

A SERIAL INVENTOR

He doesn't like travelling, small talk and all the vanities of academic science. But being blessed to work for industry heavyweight Philips, physicist Bernhard Gleich can keep these little discomforts to a minimum. The fervent inventor has an astonishing record of publications and patents under his belts. Currently, his ideas for the magnetic particle imaging have caught fire in both academia and industry.



80 patents and counting – serial inventor Bernhard Gleich bubbles over with ideas. “I have far more plans than I can follow up in my lifetime. So if someone is interested in my work, feel free to ask for a project!”

FACTS & FIGURES

Research focus: magnetic particles for medical applications

Place of work: Philips GmbH Innovative Technologies, Hamburg

Career path: born 1969 in Augsburg, diploma in physics from the University of Ulm in 1996, scientist at Philips in Hamburg since 2002, PhD from Lübeck University in 2014

Seminal publication: B. Gleich & J. Weizenecker “Tomographic imaging using the non-linear response of magnetic particles” NATURE 435, 1214-1217 (2005)

Further information about Philips Research Hamburg:

www.philips.com/a-w/research/locations/hamburg.html

“Strictly speaking, every pupil interested in science should have the knowledge to invent MPI by the time they have completed secondary school,” says Bernhard Gleich. The physicist is a modest, down-to-earth guy who repeatedly emphasizes that his inventions are rooted in the work of others. But as Gleich is a master of understatement, he is fluent in coquetry, too: “The concept is so simple. I was totally certain someone had tried it before.” But as it turned out, no one had. And Gleich and his physicist companion Jürgen Weizenecker are now reckoned as the inventors of magnetic particle imaging (MPI).

At the beginning of their careers, Gleich and Weizenecker worked in southern Germany at the Universities of Ulm and Karlsruhe, respectively. In 2000, both joined the Hamburg research laboratory of Dutch medical devices producer Royal Philips. While Gleich has remained there ever since and prides himself on being “a one-third generation Hamburger”, Weizenecker moved back to Karlsruhe in 2008 to become a professor of Electrical Engineering and Information Technology.

In Philips' premises, Gleich started off working on advancing a by now widespread imaging technique called magnetic resonance (MR) imaging. “But that turned out to be a bit boring,” he remembers. Digging into the science behind this method, the aspiring researcher came to ask himself why MR imaging is based on nuclear diamagnetism, a relatively weak form of magnetism. “Stronger forces of magnetism do exist, namely ferromagnetism of elements like iron, nickel



and cobalt,” the owner of more than 80 patents to date says. Indeed, scientists had been trying to image living matter with iron oxide nanoparticles before. Injecting or swallowing them is completely harmless for the body. But the problem was a technical one: An oscillating magnetic field outside the iron-containing body – the drive field – always influences numerous particles simultaneously. Hence, a machine would detect all of them at once resulting in a bad resolution of the image. And here’s the trick in high-resolution MPI: field-free points. Gleich and Weizenecker added a second magnetic field, the so-called selection field. All of the iron oxide particles in the selection field are “magnetically frozen”. But at the very center of this magnetic field, there is a small area with no magnetic forces. The few particles at this field-free point in the middle remain mobile, react to the drive field and are recorded as a signal. Moving the field-free point across the sample, one can detect where the injected ferromagnetic nanoparticles are located.

When the two German physicists published the method behind MPI in *NATURE* in 2005, many people considered it to be a promising new method for detecting vascular diseases and cancers. MPI is much faster than MR im-

aging and involves no harmful radiation. But as other methods for imaging human tissue like MR imaging and X-ray-based computer tomography are firmly established, MPI faces some market entry barriers there. The situation is different when it comes to the preclinical market where some companies already offer MPI devices for R&D purposes. US device maker Bruker installed the first ever commercial MPI product at the University Medical Center Hamburg-Eppendorf (UKE), Germany, in 2014. This year, another US company, startup Magnetic Insight, started to sell their first MPI scanner model. These devices allow high-resolution in vivo imaging of little animals up to small rats. However, Magnetic Insight seems to be devoted to developing a scanner large enough for human beings.

Diagnostic or therapeutic breakthrough?

“It is still not quite clear where MPI has the most-promising commercial potential,” inventor Gleich reasons. Magnetic Insight’s device is optimized for stem cell tracking. Currently, loading stem cells with ferromagnetic particles and following their way through the body after delivery works exceptionally well. If one day human stem cell therapies take off, MPI for humans could prove a valuable

diagnostic tool. Gleich, however, would back another horse: “Right now I’d bet more on a therapeutic application than on imaging.” Of course, Gleich has his own therapeutic approach in his lucky bag of inventions. “It’s a combination of our field-free point and radioactive seeds used in cancer brachytherapy,” he begins to explain. Using the MPI system to remotely move screws out of and into a shell, Gleich choreographs a ballet of dancing screws: “I can switch a seed’s radiation on and off. Either it is kept within the gold-covered shell or – in the extended state – it kills neighboring cells.”

This innovation could have a huge impact in the field of cancer. Compared with external radiation, internal radiation (brachytherapy) is less aggressive. But it is rather difficult to place the radioactive seeds in close proximity to cancer cells without harming healthy cells. By only switching on correctly located magnetically activated seeds, an MPI-based approach could simplify the application process. “It is totally conceivable to develop very small seeds that can be applied through injections into the artery,” Gleich insists. Avoiding the unpleasant side effects of radiotherapy, “that would be an extremely cool application,” he beams with delight. **ml**

EUROPEAN INVENTOR AWARD

MAGNETIC INNOVATOR DUO ATTRACT PRIZES

An innovation “made in Hamburg” took center stage at the 2016 European Inventor Awards ceremony in Lisbon, Portugal: German physicists Bernhard Gleich and Jürgen Weizenecker were recognized by the European Patent Office (EPO) for paving the way for a new magnet-based imaging method dubbed magnetic particle imaging (MPI).

MPI holds the promise of diagnostic imaging to be performed in real time with some unique features, the jury explained. Gleich and Weizenecker invented MPI while working in the Hamburg lab of Dutch company Philips. At the ceremony in Lisbon in June, they were selected out of three finalists in the category “Industry”. The jury had to boil down 400 suggestions to 15 finalists (three in each of the five categories).

Launched in 2006, the EPO rates the proposals for singling out inventors in terms of their contribution towards technical progress, social development, and wealth and job cre-



Bernhard Gleich (right) – together with co-inventor Jürgen Weizenecker – at the 2016 European Inventor Award: “The ceremony was one of the most solemn moments that I have ever experienced. But still – it’s not my world.”

ation in Europe. Having being invented just about ten years ago, the decision came as a bit as surprise for Bernhard Gleich: “Our idea has not yet led to the creation of many jobs, but MPI surely shows some momentum. On a global scale, at least two companies and ten academic research teams develop applications

based on MPI.” Over the years, the two inventors have been granted 18 joint patent families from the EPO for improving MPI. **ml**

Further information:

www.epo.org/learning-events/european-inventor.html

LIFE SCIENCES STUDENT CONFERENCE

STUDENTS INTO SPOTLIGHT

Kiel University sets the stage for the Life Sciences Student Conference in November. Life Science Nord and Kiel Life Science are co-organizing this successful full-day event which is entering its fifth year. Local PhD and master students are invited to present their research projects.

As in previous years, the Kiel Science Centre will transform into a showcase of young academics talent, demonstrating how these youngsters are advancing current knowledge in the field of life sciences. On Wednesday, November 30th, the Life Sciences Student Conference will provide an excellent opportunity to local bachelor, master or PhD students to present their research – in front of an audience that consists mostly of their peers.

Apart from selected talks, there will be a poster session with 50 or so students participating. An expert jury will award outstanding contributions at the end of the conference. The scientific organizer of the event is developmental biologist Thomas Bosch. The

professor of zoology is also spokesman for Kiel Life Science (KLS), the interdisciplinary applied research centre at Kiel University.

Unique early-career platform

According to Bosch, the format of the student conference is unique among academic life science institutions in the northern Germany. “It provides a much needed platform for our young research colleagues to present their work – be it their bachelor’s, master’s or doctoral thesis”, says Bosch.

For those interested in participating in the event at the Kiel Science Centre: there are no registration fees and the catering is for free. “The conference languages are English and

German”, says Bosch, “and we aim for a lively atmosphere of discussion in which not only established colleagues may ask questions but the students can exchange their views and problems among themselves.” The student conference will also provide possibilities for getting in touch with players in the life science industry – there will be a small exhibition at the Kiel Science Centre attended by various companies from the region.

As the conference represents part of career development at Kiel University, two guest speakers will tell the young audience how they have made their way into the life sciences. Amongst them is biotech insider Enno Spillner, Chief Financial Officer at Evotec AG. Bosch adds: “Such role models are extremely important as they illustrate how manifold career paths in the life sciences can be.” **pg**

Further information:

www.lifesciencenord.de
www.kls.uni-kiel.de

MR ALTFELD, WHAT'S YOUR RESEARCH ALL ABOUT?



Prof. Marcus Altfeld is an immunologist leading the research unit “Virus Immunology” at the Heinrich Pette Institute in Hamburg since 2013. In collaboration with his colleagues, he focuses on the characterization of protective immune responses against human pathogenic viruses, particularly HIV-1, hepatitis C and influenza viruses. In July, his group published new results in *NATURE IMMUNOLOGY*.

“My laboratory investigates the mechanisms by which the human immune system recognizes and kills cells infected by viruses. We use new technologies, including CRISPR-Cas9, and data from genetic studies to identify those molecules that are expressed on virus-infected cells and detected by the receptors of immune cells. A recent example of this work represents the identification of HLA-F as a ligand of the receptor KIR3DS1. This receptor is involved in the outcome of many infectious, autoimmune and tumor diseases, but until recently the ligand recognized by KIR3DS1 was unknown. HLA-F is a highly conserved molecule that is normally retained within the cell and only comes to the cell surface under conditions of cellular stress or infections. We demonstrated that HLA-F is recognized by KIR3DS1 and upregulated on HIV-1-infected cells, and that HLA-F-upregulation can lead to the killing of HIV-1-infected cells. This new data might allow us to harness these KIR3DS1/HLA-F interactions therapeutically to eliminate virus-infected or malignantly-transformed cells.”



BG HOSPITAL HAMBURG

NEW OPERATIVE CLINIC HEAD

From 1st October, Sylvia Langer (46) is to take over the position of Managing Director at the BG Hospital Hamburg from Dr. jur. Hubert Erhard who emphasizes his strategic activities as Head of the Executive Board in the future. With this change in the board, Sylvia Langer will be responsible for the operative clinic business. The native of Thuringia boasts extensive industry experience. She has worked in the public health and health management sector for more than 15 years with companies such as MediClin, a private clinic organization that operates across Germany. Prior to joining the BG Hospital Hamburg, Langer was a member

of the Executive Board of the University of Greifswald, where she was responsible for commerce. In 2013, Sylvia Langer successfully completed an MBA in Health Care Management. She previously studied sports science and health management.

Since 1959, the BG Hospital Hamburg has operated as a supra-regional trauma treatment center with nine departments in northern Germany. It specializes in acute care, initial rehabilitation and outpatient treatment.

SW

Further information: www.bg-kliniken.de



DGHM

MAIN PRIZE FOR TUBERCULOSIS EXPERT

Stefan Niemann (52) has received the main prize awarded by the German Society for Hygiene and Microbiology (Deutsche Gesellschaft für Hygiene und Mikrobiologie, DGHM) as a recognition of his outstanding work in the field of tuberculosis research. The prize is endowed with 5,000 euros and was awarded during the DGHM general assembly in mid-September in Ulm.

Since 2006, the population geneticist and molecular epidemiologist leads the research group "Molecular and Experimental Mycobacteriology" at the Leibniz Research Center Borstel. Within his research, Niemann focuses on a better understanding of the epidemiology of tuberculosis in low and high inci-

dence settings, on the analysis of the global population structure as well as on genomic diversity, pathobiology and virulence of *Mycobacterium tuberculosis* complex strains.

Niemann received a doctor's degree from the University of Bielefeld and was habilitated at the University of Lübeck in 2004. Under the umbrella of the renowned German National Research Center for Infectious Diseases (DZIF), he has held a W3 professorship for molecular and experimental mycobacteriology at the University of Lübeck since 2014.

SW

Further information: www.fz-borstel.de

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Are You a True Master?

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