BOEHRINGER INGELHEIM
2019

PIONEERS

Boehringer Ingelheim

BOEHRINGER INGELHEIM 2019 AT A GLANCE

Boehringer Ingelheim is one of the world's 20 leading pharmaceutical companies.

FOUNDED IN

1885

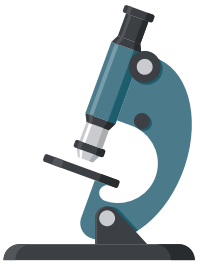
IN INGELHEIM
AND FAMILY-OWNED
TO THIS DAY

51,015

EMPLOYEES
WORLDWIDE

19.0

BILLION EUR
TOTAL NET SALES



3.5

BILLION EUR
EXPENDITURE IN RESEARCH
AND DEVELOPMENT

≙

18.2%

OF TOTAL NET SALES

NET SALES

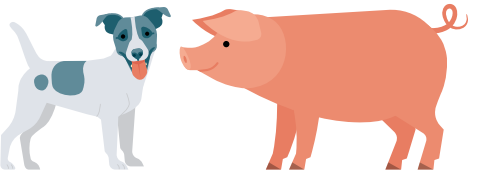
14.0

BILLION EUR

HUMAN PHARMA

4.0

BILLION EUR



ANIMAL HEALTH

786

MILLION EUR

BIOPHARMACEUTICAL
CONTRACT
MANUFACTURING

WHY INNOVATION IS SO IMPORTANT TO US

We want to improve human and animal health; this is what drives us. In pursuit of this goal, Boehringer Ingelheim has worked to develop innovative medications and therapies for patients for over 130 years.

Innovators are a valuable resource to our company, since they make our success with products and innovations possible. We foster a diverse, collaborative and open environment that attracts people who are leaders in their fields, and we create conditions for successful work.

We conduct research with a focus on areas of unmet medical needs. Every day, our scientists chart new territory, continuing our commitment to innovation that has created exceptional medicines that have already changed the lives of millions of patients. Our curiosity, creativity, and passion for science lead us to take the paths scientifically less traveled and give us the courage to deal with setbacks as we pursue our search for the next breakthrough that will transform the lives of patients now and in generations to come.

We choose to embrace the power of partnership and diversity of minds across the life-science community to realize even more scientific opportunities. By working together, we can learn more, do more, and achieve more. Together we can – and will – accelerate the delivery of the next first-in-class therapies to patients in need.

Patients matter. Science matters. Urgency matters. The more than 51,000 employees of Boehringer Ingelheim are success-oriented and approach their work with integrity. Our goal is clear: to provide more health and improve the lives of both humans and animals.

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Aspire

An investigative spirit is the foundation of the work we do at Boehringer Ingelheim. We are inventors. The pursuit of innovation is the core of our company philosophy.

This investigative spirit drives the people at Boehringer Ingelheim to give their best every day. We've stood for innovation and responsibility for more than 130 years. We develop innovative therapies by combining our vision with clear goals. At Boehringer Ingelheim, innovation means we improve the health and quality of life of both humans and animals.

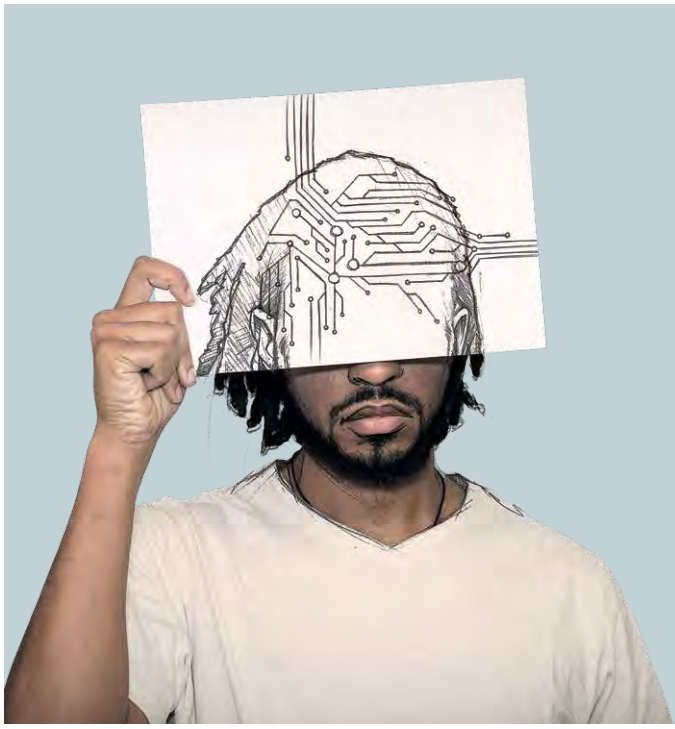
INVENTIVE GENIUS

Great inventions may start in small petri dishes: Generating value through innovation is an integral part of the DNA of Boehringer Ingelheim since 1885.

For over 130 years, pioneers at Boehringer Ingelheim have worked on delivering improvements to patients' health and quality of life. Whether they make their discoveries in Boehringer Ingelheim's laboratories, their ideas speed up the production process, or they are puzzling over new research methods at startups and universities, these pioneers all have one thing in common: They break new scientific ground every single day.

A diagnosis meant that Randye Kaye's world quite literally fell apart: Her teenage son Ben was suffering from paranoid schizophrenia. This was shocking news. And yet, step by step, this family from the US state of Connecticut has come back to life. Ben is now an adult and, thanks to modern medicines, at least has his illness under control. But that is no reason for Randye Kaye to take things easy. On the contrary, she continues to campaign in support of brain research and hopes that science will develop methods of treatment which can provide a permanent cure for illnesses such as Ben's. Randye Kaye is willfully supporting Boehringer Ingelheim because it is one of the few pharmaceutical companies that is stepping up its engagement in this area of research. "That gives me hope," says Kaye.

It is people like Randye Kaye and her son Ben who inspire the researchers and developers at Boehringer Ingelheim. They include Dr. Darryl McConnell, Research Site Head at the company's Vienna facility, who has resolved to crack the code behind the KRAS protein, which is considered the key to fighting many cancers. McConnell and his partner Dr. Stephen Fesik at Nashville's Vanderbilt University are among the few people committed to the difficult task of tackling the root causes of KRAS-related cancers. For many years now, they have been pursuing a new integrated therapeutic approach with great stamina. This was only possible because their project was not required to be immediately commercially viable. They had time for basic research: The importance of the KRAS protein as a



Instead of focusing on traditional disease classifications, researchers at Boehringer Ingelheim are investigating faulty brain circuits. These circuits are linked to major symptoms that are common to many brain disorders.

ALREADY
IN THE
1980s

THE IMPORTANCE OF THE KRAS PROTEIN AS A CANCER DRIVER WAS DISCOVERED

cancer driver was already discovered in the 1980s and had since been considered untreatable through medication (“undruggable”). Boehringer Ingelheim’s pioneers are currently changing that, however.

Many discoverers are based at Boehringer Ingelheim itself, but not only in the company’s laboratories. To take just one example, today Dr. Clive R. Wood is a manager. This physician leads the field of Discovery Research. With one of his current projects, he is taking Boehringer Ingelheim’s special inventive genius forward to the next level: a partnership with Tsinghua University in the People’s Republic of China. The company’s scientists have been collaborating with the university since 2018 on combating infectious diseases at a research center. Tsinghua University is a leader in this field, while Boehringer Ingelheim contributes its expertise in the areas of immuno-oncology and immune modulation. “This is a partnership with potential,” says Wood. “It may help us to discover entirely new approaches for the treatment of infectious diseases for which no treatment is currently available.”

Other Boehringer Ingelheim pioneers are working for the many well-known international research institutions with which the company closely collaborates. Others are at work in startups in which the company is an investor, such as through the Boehringer Ingelheim Venture Fund. Dr. Michael Papadakis, CEO of the UK startup Brainomix, is one such pioneer. The Boehringer Ingelheim Venture Fund invested in his company in early 2018. Its so-called e-ASPECTS software is already in use in clinics and stroke centers in many European countries. A self-learning algorithm evaluates computer tomography scans. The goal is for less experienced physicians to be able to decide just as rapidly as specialists whether or not a patient has actually suffered a stroke.

Boehringer Ingelheim and Tsinghua University signed a research partnership in Beijing.

50%

OF ALL ADOLESCENTS IN GERMANY ARE MYOPIC

Boehringer Ingelheim also invests in new areas of research. For instance, together with a Berlin-based startup, it has taken up the fight against myopia. Increasing numbers of children and adolescents are ruining their eyesight through the many hours they spend in front of their smartphone screens, and thus becoming nearsighted. The founders of Dopavision, Dr. Hamed Bahmani and Stefan Zundel, have developed a technology that combats this by means of a small light spot, invisible to the user, on a screen that stimulates certain regions of the retina. Boehringer Ingelheim is a lead investor.

Myopia as side effect: Frequent smartphone use may lead to nearsightedness.

> **“The faster we can heal patients for whom a cure is currently unavailable, the better.”**
>
> HUBERTUS VON BAUMBACH

“At Boehringer Ingelheim, we think in terms of generations,” remarks Hubertus von Baumbach, Chairman of the Board of Managing Directors. “We do not permit short-term capital market trends to distract us from ambitious research topics.” At the same time, von Baumbach notes, the company’s many pioneers, visionaries and trailblazers are highly impatient: “We really want to make progress. The faster we can heal patients for whom a cure is currently unavailable, the better.”

Dr. Michel Pairet

Member of the Board of Managing Directors Innovation

“We believe in the power of partnership. Together with strong partners, we can achieve better results than we can on our own. That is why we collaborate with well-known research institutions in universities or with innovative startups, wherever the opportunity presents itself.”

“Never before has science given us so many opportunities to discover new therapeutic options.

We are therefore responsible for developing genuine medical innovations for diseases that cannot be adequately treated today – providing better health for humans and animal.”

Hubertus von Baumbach

Chairman of the Board of Managing Directors

“People have always been at the heart of things for Boehringer Ingelheim. That was already key for our company’s first pioneer, our founder Albert Boehringer.

And the same principle continues to apply, right up to the present day. It is the focal point of our research and development activities in the field of human pharma.”

Dr. Carinne Brouillon

Member of the Board of Managing Directors
Human Pharma

Jean Scheftsik de Szolnok

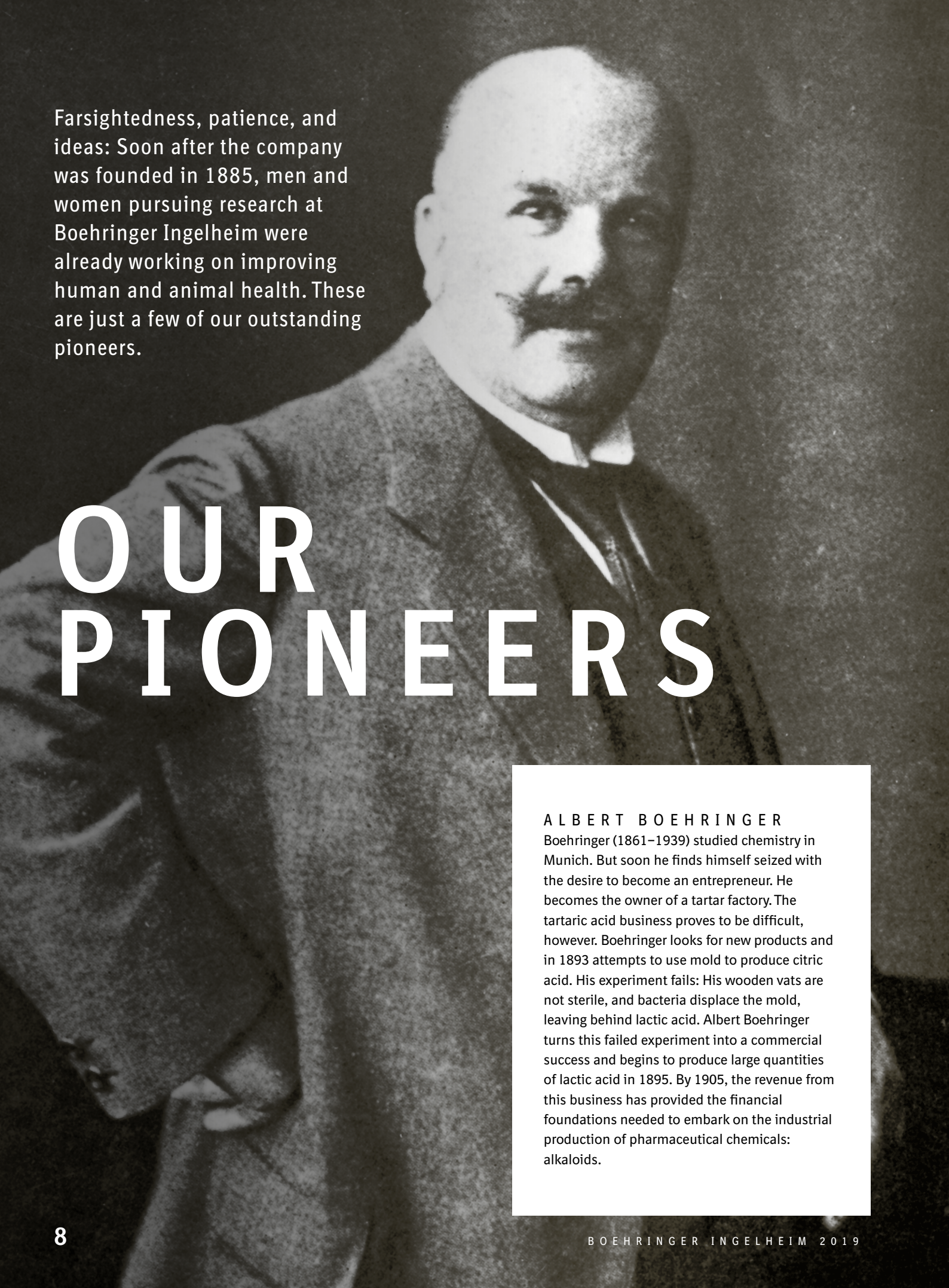
Member of the Board of Managing Directors
Animal Health

“The lives of humans and animals are intertwined in deep and complex ways. Humans cannot live without animals. That is true for companion animals, because they are so close to our families. And the same goes for livestock, since we require protein-rich animal products for the growing worldwide population. At Boehringer Ingelheim, progress means improved quality for humans and animals.”

“Boehringer Ingelheim remains a family-owned company. That makes us independent of the fluctuations on the capital market and, unlike other research-driven medicine manufacturers, enables us to take projects forward on a very long-term basis and to act as a pioneer and visionary.”

Michael Schmelmer

Member of the Board of Managing Directors
Finance & Group Functions

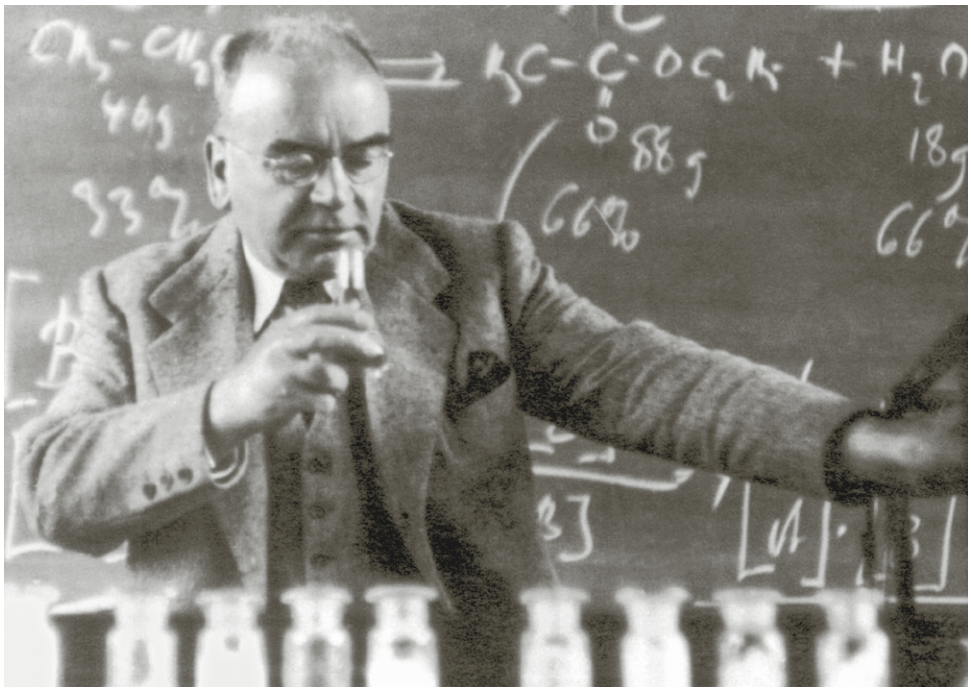


Farsightedness, patience, and ideas: Soon after the company was founded in 1885, men and women pursuing research at Boehringer Ingelheim were already working on improving human and animal health. These are just a few of our outstanding pioneers.

OUR PIONEERS

ALBERT BOEHRINGER

Boehringer (1861–1939) studied chemistry in Munich. But soon he finds himself seized with the desire to become an entrepreneur. He becomes the owner of a tartar factory. The tartaric acid business proves to be difficult, however. Boehringer looks for new products and in 1893 attempts to use mold to produce citric acid. His experiment fails: His wooden vats are not sterile, and bacteria displace the mold, leaving behind lactic acid. Albert Boehringer turns this failed experiment into a commercial success and begins to produce large quantities of lactic acid in 1895. By 1905, the revenue from this business has provided the financial foundations needed to embark on the industrial production of pharmaceutical chemicals: alkaloids.



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PROF. DR. HEINRICH WIELAND

Wieland (1877–1957), a biochemist, begins to work with his cousin Albert Boehringer in 1903. Thanks to Wieland, Albert Boehringer establishes the company's first science department in 1917. His work results in the development of the cardiovascular medicine CADECHOL® as well as LOBELIN®, an emergency treatment for respiratory arrest and other shock conditions. In 1927, Heinrich Wieland is awarded the Nobel Prize for his research into the composition of bile acid.

DR. JOANNE VAN RYN

The Canadian scientist joined Boehringer Ingelheim in 1992. Starting in 2008, she began thinking of ways to reverse the anticoagulant PRADAXA®, which helps to prevent dangerous thrombo-embolic events like stroke by reducing blood clotting. However, this may also lead to unnecessary bleeding during emergencies, such as a traffic accident. In just seven years, van Ryn and her team from mutiple disciplines were able to introduce the reversal agent PRAXBIND® to the market. Today, PRAXBIND® is available in many countries, bringing further value to patients.

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DR. GEORG SCHEUING

As head of Boehringer Ingelheim's Science Department, from 1924 Scheuing (1895–1949) not only improves the production of lactic acid but also achieves synthetic production of the alkaloids lobeline, theophylline and caffeine. Until then, it was necessary to extract them from plants. Mainz University's Georg Scheuing Foundation continues to support chemistry and pharmacy students every year, until today.

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DR. NORBERT HAUEL

The head of Boehringer Ingelheim's Medicinal Chemistry group worked at the company from 1979 to 2015. Together with his team, Hauel discovers an active substance that has a strong and very long-lasting reduction in blood pressure: telmisartan. The active substance is awarded its first marketing authorization in 1998 as MICARDIS®. Hauel also participates in molecule design in the field of anticoagulant research. This finally gives rise to PRADAXA®, which comes onto the market in 2008 as the first medicine in its active substance class.

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DR. KNUT ELBERS

The biologist led Boehringer Ingelheim's European Animal Health Vaccine Research organization for a period of nine years. He is now Managing Director of ViraTherapeutics, a Boehringer Ingelheim subsidiary in Innsbruck, Austria, and works on oncolytic virus therapies for humans. During his work for the corporation, Elbers was involved in several important development projects. These include the development of a live vaccine for cattle: BOVELA®. Since 2015, BOVELA® has helped to protect these animals against bovine virus diarrhea (BVD), a widespread condition.

DR. ROLF BANHOLZER

The doctor of chemistry joined the company's Science Department for Medicinal Chemistry at its Ingelheim site in 1960, as head of the laboratory. He works on the synthesis and properties of molecules such as atropine, seopotamine, ATROVENT®, OXIVENT® and flubron. One of his major discoveries is tiotropium bromide, which is approved as SPIRIVA® for the first time in 2002. This active substance becomes the gold standard for respiratory therapy for chronic obstructive pulmonary disease (COPD) and helps patients worldwide.

DR. OTTO THOMÄ

The chemist (1901–1993) develops the first highly effective asthma medicine ALUDRIN®, which was introduced in 1941. This is based on the active substance isoprenaline, an adrenalin derivative which is essential for life. By chance, Thomä also discovered a second indication for this active ingredient; he suffered from a fish allergy and used an isoprenaline talcum powder to powder his skin. He noticed that the active substance relieved his itchiness. In 1947, the resulting medicine INGELAN® was Boehringer Ingelheim's first product launch after the World War II.

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DR. JOHN PARK

When the cancer biologist embarks on respiratory research in 2001, his goal is clear: to combat idiopathic pulmonary fibrosis. This chronic, progressive pulmonary disease had received scant attention in medical research at that time. Park, who had joined Boehringer Ingelheim in 1994, drew upon his experience and close relationships with his colleagues in cancer research and applied this to pulmonary fibrosis. His team succeeded in developing the medicine OFEV®, based on the active ingredient nintedanib. OFEV® effectively slows progression of the disease; it was awarded FDA breakthrough status and soon thereafter its first market authorization in 2014.

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DR. TIMOTHY LEARD

Leard has worked for the Boehringer Ingelheim Group for 22 years; together with his team, the American developed, tested and licensed the first vaccine for the treatment of cancer in dogs, ONCEPT®, that has been approved since 2009. This antigen was originally designed for treating in humans. For Leard, who is now Head of Research and Development for immune therapies as well as Global Biologicals Project Leader in Boehringer Ingelheim's animal health business, this demonstrates how animal health can benefit from human pharmaceuticals research, and vice versa.

HANNS STROBEL

The trained pharmacist (1888–1954) realizes that it would be helpful for the development of medicines if pharmacists, chemists, physicians and businessmen talked to one another early on. Strobel joins Boehringer Ingelheim in 1922 and subsequently becomes head of its Pharmaceutical Specialties Department. He optimizes the company's product pipeline and introduces stringent scientific standards, thus laying the foundations for the modern pharmaceuticals business.

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DR. GERALD NABOZNY

In 2007, Nabozny and his teammates begin to search for an antibody against interleukin-23. Interleukin-23 triggers the inflammation in psoriasis. Their research pays off: risankizumab is the first therapeutic antibody developed by Boehringer Ingelheim. In 2016, Boehringer Ingelheim enters into a partnership with the pharmaceutical company AbbVie. In 2019, AbbVie obtains market authorization for this medicine, for the treatment of psoriasis.

DR. VINCENT J. MERLUZZI

Merluzzi joined Boehringer Ingelheim in the US in 1986. The researcher, who focuses on immunology and virology, began doing his research on AIDS at the end of the 1980s. This was followed by the discovery of nevirapine, an HIV inhibitor from a new class of substances that blocks the replication of HIV-1 viruses. Within only a short period of time, Merluzzi and his team succeeded in advancing the development of VIRAMUNE® (nevirapine). In 1996, the FDA granted VIRAMUNE® marketing approval in an accelerated approval procedure as a combination therapy with other antiretroviral drugs for the treatment of HIV-1 infections. This significantly improved the treatment of HIV-1 patients.

With the VIRAMUNE® donation program, which started in 2000, Boehringer Ingelheim provided assistance in developing countries for many years: By giving VIRAMUNE® to HIV-1-infected pregnant women during childbirth, thousands of children were saved from being born infected with AIDS.

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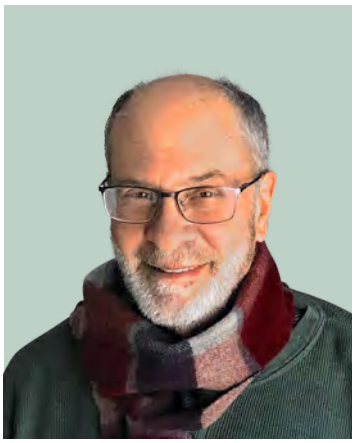

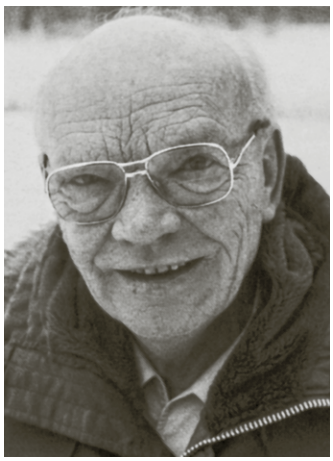

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DR. MARTIN WOLF

The active ingredient clonidine was originally intended for use as a cold remedy. But in its very first trials it also lowered the trial participants' blood pressure and slowed their heart rate. Wolf (1915–1997), a clinical research scientist, subsequently decided in 1962 to take a closer look at clonidine's blood pressure-reducing effect by testing it on himself. His successful research laid the foundations for the medicine CATAPRESAN®, which is still used today for the treatment of high blood pressure.

Discover

As a research-driven pharmaceutical company, we work on new patient therapies. Our focus is on humans and animals. We follow up on promising ideas – even though there are occasionally setbacks. We don't give up, and we have a long-term perspective.

Ideas are a powerful motivator. At Boehringer Ingelheim, scientists work to turn ideas into finished products. Recognizing a medical need and working on a highly complex scientific solution for years is what makes employees pioneers. By solving many small problems systematically, they get to the bottom of the big picture. That is their recipe for success.

DR. DARRYL MCCONNELL

Boehringer Ingelheim's Research Site Head in Austria is determined to win the fight against cancer once and for all.

A TWO-PRONGED ATTACK ON CANCER

Each year, millions of people are diagnosed with cancer. Researchers all over the world are searching for ways to win the fight against this disease. Boehringer Ingelheim is searching as well. The company's pioneers have defied the skeptics – and are now hoping for a breakthrough.

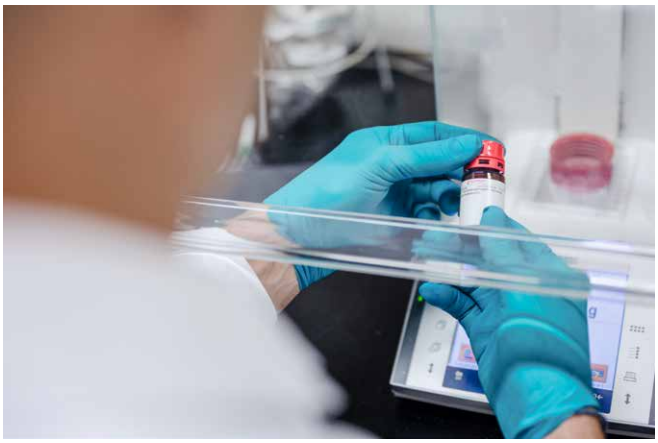
The advice was unanimous: Don't do it! Don't touch it! It's guaranteed to fail! Dr. Darryl McConnell, Boehringer Ingelheim's Research Site Head in Austria, sits in his office in Vienna recalling the reactions seven years ago, when he presented the idea to take on KRAS. This protein from the RAS family is responsible for nearly every type of pancreatic cancer and many forms of colon and lung cancer.

Researchers have been aware of the significance of KRAS for cancer since the early 1980s. To date, however, none have managed to beat this driver of cancer. McConnell wanted to hazard a new attempt – but people shook their heads. "They looked at me like I was crazy," remembers the Australian with a laugh. "But I wanted to. I said: We're doing it, we're going to drug KRAS." McConnell picks up a black pen and starts sketching the axes of a graph. "You can think of KRAS like a volume knob. The volume might normally be set at around 'two,' for example," he says, and marks a point. Then he picks up a red pen and draws a curve that shoots upward. "When cancer develops, the volume suddenly increases sharply. Then the cells grow far too quickly – tumors emerge." Now, however, there is hope. McConnell and his team discovered that if the activation of the KRAS protein was obstructed by the protein SOS1, cell division could be impeded (see info graphic on page 17). Intervening in this protein-protein interaction would – metaphorically – turn the volume in the cells back down; McConnell sketches a downward stroke and smiles.

ACUTE MEDICAL NEED

If this approach succeeds in clinical trials with humans, Boehringer Ingelheim could help millions of people. According to the Center for Cancer Registry Data at the Robert Koch Institute, Berlin, around a half-million people are diagnosed with cancer each year in Germany alone; the global figure is in the two-digit million range. RAS-driven varieties of cancer account for roughly 15 percent of all cancers. The tumors are typically treated with operations, radiation or chemotherapy, all of which have side effects that cause patients even more distress. This makes the work of visionaries like McConnell who do pioneering research at Boehringer Ingelheim all the more crucial. Roughly 500 researchers throughout the company are developing innovative therapies to give cancer patients new hope – and to win the fight against cancer once and for all.

KRAS is responsible for nearly every type of pancreatic cancer and many forms of lung cancer.



The family-owned company has shown a great deal of perseverance when it comes to developing new and innovative therapies for cancer. Its researchers pursue this through two approaches. In one, they attack cancer cells directly at their Achilles' heel, like McConnell and Dr. Norbert Kraut (Head of Global Cancer Research) and their teams of cancer researchers in Vienna. The second approach comes from immuno-oncology: Instead of relying on medicines that attack the cancer cells, medicines are used that direct the body's own immune system to find and destroy mutated cells. To this end, Boehringer Ingelheim established the global Cancer Immunology and Immune Modulation function three years ago, which is spread across locations in the US (Ridgefield, CT), Austria (Vienna, Innsbruck), Switzerland (Geneva) and Germany (Biberach). It is unique that a company pursues a dual approach of combining cancer cell-directed therapies and immunotherapies enabling combinations that stand to fundamentally improve the lives of patients. There are currently more than 50 projects in the oncology pipeline, accounting for roughly one-third of Boehringer Ingelheim's new developments. Of these, the findings of McConnell and the team in Vienna, who are working with an entire armada of KRAS inhibitors, are especially promising.

PATIENCE IS A MUST

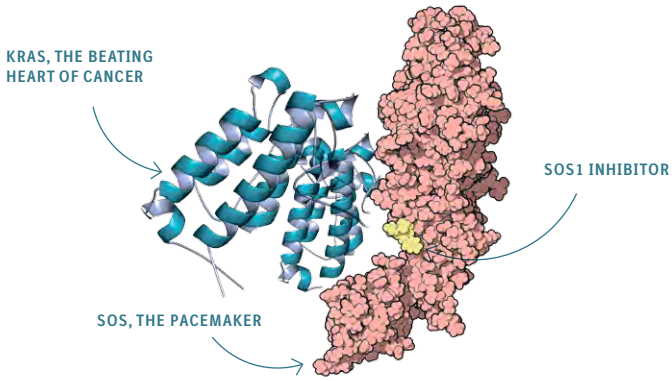
Years passed before McConnell found the first suitable KRAS inhibitor. A chemist, he first joined the cancer research team at Boehringer Ingelheim in 2002. For the first ten years, he researched cell cycle inhibitors in the hope of being able to slow the division of cancer cells. "We did manage to find a number of molecules that inhibit the cell cycle," he recalls. "Unfortunately, they didn't work in patients." After that, new ideas were needed – even in the face of skepticism. "I find it hard to listen when people say something is impossible. Showing what's possible is much more exciting than talking about what's not," says McConnell. It was in this spirit – against all advice – that he took on KRAS-mutated tumors, which were still considered untreatable in 2012. "When I'm facing a major goal, I never think about how long it might take to achieve it," McConnell says. "That would be demoralizing."

> **"Showing what's possible is much more exciting than talking about what's not."**
>
> DR. DARRYL MCCONNELL

Dr. McConnell decided in 2012 to focus on KRAS-mutated tumors. He faced a lot of skepticism.

DR. STEPHEN FESIK

A pioneer in KRAS reseach, Fesik has been working with Boehringer Ingelheim for seven years now to shut off KRAS entirely.



CLINICAL STUDY LAUNCHED

SOS is responsible for turning KRAS on and keeping the volume up. “If KRAS is the beating heart of cancer, then SOS is its pacemaker,” says McConnell. “KRAS can’t beat without SOS.” By combining SOS1 inhibitors with inhibitors of other key proteins in the RAS signaling pathway, it could be possible to turn down the KRAS volume – and keep it down.

At the end of October 2019, Boehringer Ingelheim started clinical trials of the first pan-KRAS inhibitors. The compound BI 1701963 is being tested, both alone and in combination with MEK inhibitors, in patients with different types of advanced, solid tumors with KRAS mutations. BI 1701963 inhibits KRAS by binding to the protein SOS1, which plays a central role in the activation of KRAS. Selective inhibition of SOS1 is a therapeutic concept that could facilitate a KRAS blockade regardless of the type of KRAS mutation, and thus has the potential to encompass all important KRAS mutations.

NEW OPPORTUNITIES THROUGH PARTNERSHIPS

Instead, McConnell looked for someone to team up with. US researcher Dr. Stephen Fesik from Vanderbilt University in Nashville fit the profile. Fesik had been researching KRAS there since 2009 and had developed a new technology: fragment-based drug discovery, an innovative approach that can find drugs for the toughest targets. Fesik had advanced this approach at the pharmaceutical company Abbott Laboratories (now AbbVie), where he had been working from 2000 to 2009 as the head of cancer research. He is considered a pioneer in his field; Fesik and colleagues at Abbott developed a medication, which is used to treat leukemia.

When McConnell called Fesik in 2013, he was unsurprised, because many pharmaceutical companies consulted him regularly. Fesik flew to Vienna for two days – and was met with a storm of questions from Boehringer Ingelheim’s researchers. “It was very clear to me that they truly wanted to change something.” What impressed him even more, was the fact that Boehringer Ingelheim was truly interested in a serious exchange. Other companies had invited Fesik to agree with their ways of doing things. In Vienna, the situation was different. “They wanted my opinion, and they have implemented my advice.”

> **“It was very clear to me that they truly wanted to change something.”**
>
> DR. STEPHEN FESIK

The initial consulting service turned into a formal cooperation between Boehringer Ingelheim and Vanderbilt University which is now entering its seventh year. Today, Fesik and McConnell are working together to shut off KRAS entirely. They pursue this by searching for structures to serve as "keys" that fit exactly into the "locks" on the surface of the KRAS protein. Thanks to highly sensitive biophysical measurement methods, they can precisely examine nearly every molecule that binds to the protein's surface. Using X-ray crystallography, they can view the "keys" and "locks" all the way down to the atomic level. Thanks to this cooperation with Fesik, Boehringer Ingelheim has discovered not just one but a number of such "keys" to KRAS and other cancer-causing proteins.

The two pioneers agree that they would never have made it so far on their own. While McConnell knew that he needed to blaze entirely new trails, Fesik needed Boehringer Ingelheim's manpower. Working together, the two of them realized that they needed to combine the KRAS inhibitors with other medications to achieve real options for treatment. In September 2019, Boehringer Ingelheim entered into a partnership with the Indian pharmaceutical company Lupin, which had developed what is known as a MEK inhibitor.

A CANCER VACCINE

Boehringer Ingelheim relies on collaboration with partners in science and industry around an incredibly diverse range of projects (see timeline on page 19). One major step was the acquisition of the Swiss biotech firm AMAL Therapeutics in July 2019, which strengthened the second key strand of cancer research at Boehringer Ingelheim: immuno-oncology.

At the head of AMAL stands Dr. Madiha Derouazi. When she founded the company in 2012, the Boehringer Ingelheim Venture Fund was one of its first seed investors. Her vision is no less ambitious than that of McConnell and Fesik: Derouazi wants to develop a cancer vaccine. In contrast to prophylactic vaccines, which aim to prevent the outbreak of an infection, a therapeutic vaccine such as this would serve to combat illnesses which have already emerged.

Like McConnell and Fesik, Derouazi has also had to overcome resistance. She responds to the question of whether her colleagues advised against her research with a laugh. "Everyone did." But it turns out pioneers don't give up so easily. The founder and CEO of AMAL has stayed true to her vision; she is working to develop a cancer vaccine that will carry antigens, i.e. parts of proteins, which are also found in tumors. Such a vaccine will serve to activate the immune system, particularly its "killer T cells," which will then attack and destroy the tumor.

She works toward this goal with a team of 15 researchers in a laboratory at the University of Geneva's medical campus. The AMAL team combines various components to develop an effective vaccine. The researchers

DR. MADIHA DEROUAZI

The founder of AMAL combines components to make an effective vaccine.

"Boehringer Ingelheim believed in my idea and supported me – which is what got the research going. That made a lasting impression on me."

DR. MADIHA DEROUAZI

STRONGER TOGETHER

Innovative solutions often first arise through partnerships; the same applies at Boehringer Ingelheim. In 2019, the company expanded its oncology portfolio in order to win the fight against cancer. Here, an overview:

MARCH

Boehringer Ingelheim acquires ICD Therapeutics, Germany, including the rights to its MacroDel biologics-delivery platform. The Ingelheim-based company hopes to develop new therapies together with NanoPET Pharma, a former ICD shareholder.

JULY

After the Boehringer Ingelheim Venture Fund initially invested in the Swiss biotech company AMAL Therapeutics in 2012, Boehringer Ingelheim now acquires all shares in AMAL. The company's cancer vaccine ATP128 is currently being tested on colon cancer in an initial study.

AUGUST

Boehringer Ingelheim expands its long-standing research partnership with the MD Anderson Cancer Center at the University of Texas, USA. The partnership seeks to jointly develop new cancer therapies. One focus of the cooperation is the development of KRAS inhibitors.

SEPTEMBER

Boehringer Ingelheim and the Indian pharmaceutical company Lupin conclude a licensing, development and marketing agreement. The objective is to combine the MEK inhibitor with one of Boehringer Ingelheim's KRAS inhibitors in order to develop new combined concepts for patients with forms of cancer that are hard to treat. The focus is on patients with gastrointestinal or lung cancers which are characterized by KRAS mutations.

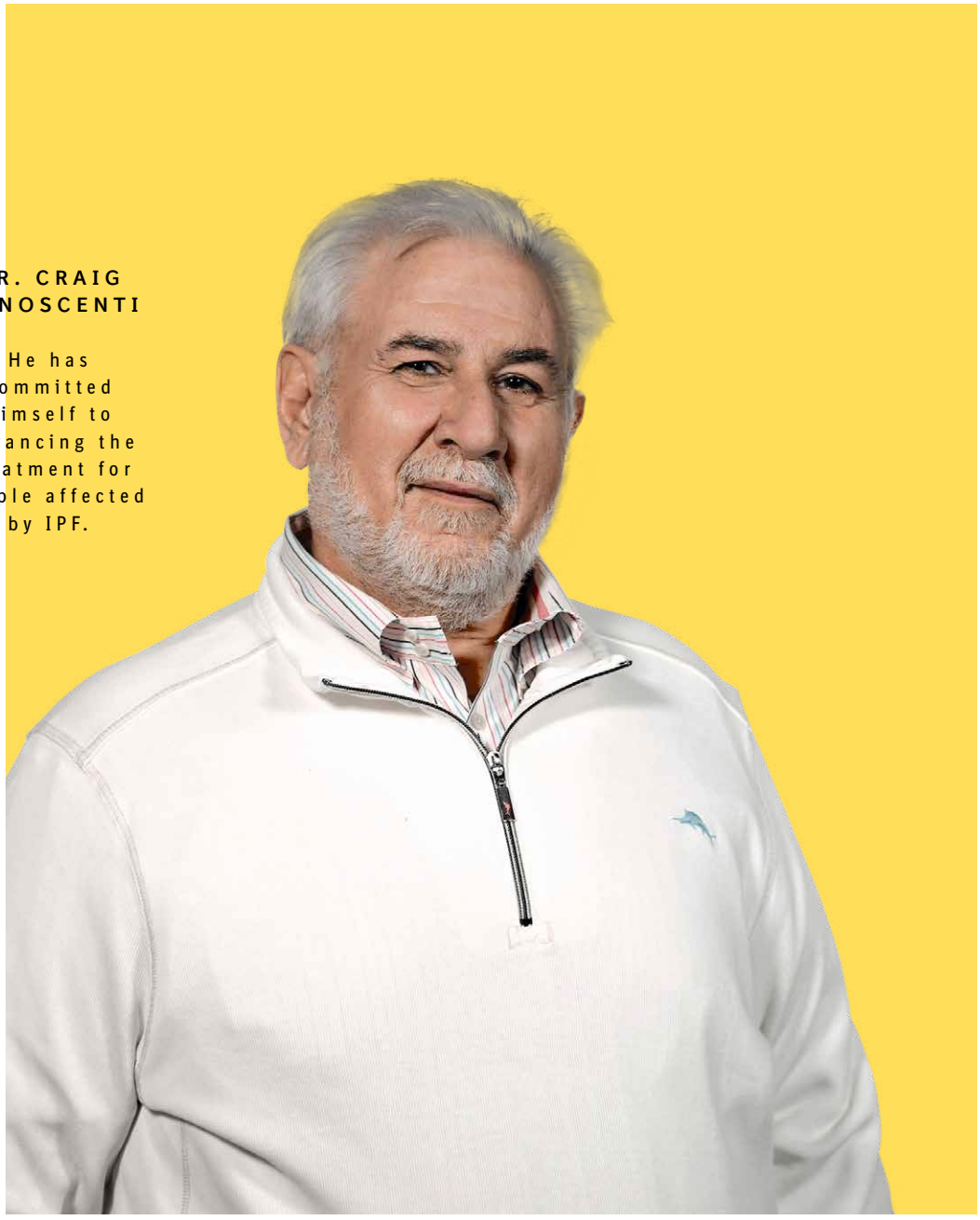
Boehringer Ingelheim also strengthens its engagement in China: Together with Shanghai East Hospital, Boehringer Ingelheim is researching the clinical development of anti-tumor medications for treating gastrointestinal cancer. This represents the first global clinical early phase program for Boehringer Ingelheim China.

carry out this process using AMAL's KISIMA technology platform. Patent certificates from all over the world hang alongside the file cabinet in Derouazi's office. With the help of KISIMA, Derouazi developed the protein vaccine ATP128, which she is now testing in a clinical trial on the treatment of a specific type of colon cancer. This would be impossible without Boehringer Ingelheim, she says.

"From the very beginning, the Boehringer Ingelheim Venture Fund supported me not only with financial assistance, but also with specialist support," Derouazi emphasizes. "Even then, Boehringer Ingelheim believed in my idea – which is what got the research going. That made a lasting impression on me." For the last three years, AMAL has also cooperated with Boehringer Ingelheim subsidiary Vira Therapeutics, a biopharmaceutical company from Innsbruck, Austria, that specializes in researching therapies with viruses that destroy cancer cells.

Cancer, however, is an extremely clever foe. Tumor cells conceal themselves from the immune system by constantly mutating and changing. They also multiply so quickly that the body's defenses can scarcely keep up. It is for this reason that Boehringer Ingelheim plans not only to deploy multiple immunotherapies in parallel, but to also combine them with additional tumor cell-specific therapies. And AMAL will play a crucial role in this as well, guided by the meaning of the company's name "Amal", the Arabic word for hope.

THE LONG BATTLE AGAINST PULMONARY FIBROSIS



DR. CRAIG CONOSCENTI

He has committed himself to advancing the treatment for people affected by IPF.

Boehringer Ingelheim has developed one of the first medicines for people with fibrotic pulmonary diseases, including idiopathic pulmonary fibrosis (IPF) and systemic sclerosis-associated interstitial lung disease (SSc-ILD). Their scientists adopted a unique research approach: They sought to identify commonalities across different groups of diseases. The goal was to develop a novel medicine that would be effective against a wide range of diseases.

The breakthrough is fresh in the mind of Dr. Craig Conoscenti. "We all looked at each other. It was an incredible feeling," he remembers. Conoscenti and his colleagues were not only excited because they had taken a step forward: There was something else in the air. "Suddenly," says Conoscenti, "there was hope." That was in 2007 and nintedanib, a drug in development for patients with idiopathic pulmonary fibrosis (IPF), had just passed the second phase of clinical testing. For Boehringer Ingelheim's research teams in Ingelheim, Germany, and Ridgefield, Connecticut, USA, one thing was now clear: A potential medicine for people with this rare, chronic lung disease might actually exist. Before this discovery, the disease had brought a swift death for those affected within a few years of diagnosis.

Very little was known about IPF in the early nineties. "There wasn't even a standardized name for the disease, let alone a standardized treatment," says Conoscenti. Having worked as a pulmonologist since 1985, he took an early interest in interstitial lung diseases early in his career. Patients living with IPF face progressive loss of lung function due to the formation of scar tissue in their lungs. The reason for this is unknown. "At the time, nothing could be done for these patients other than trying out various non-approved medicines, none of which helped over the long term." While he was already working as a pulmonologist, Conoscenti's father, who was one of the first registered respiratory therapists in the US, died of IPF. This was another reason for Conoscenti to push ahead and continue to work on IPF in a clinical setting and eventually join Boehringer Ingelheim to be part of the team to discover a treatment for this devastating disease.

> **"There wasn't even a standardized name for the disease, let alone a standardized treatment."**
>
> DR. CRAIG CONOSCENTI

A HOLISTIC THERAPEUTIC APPROACH

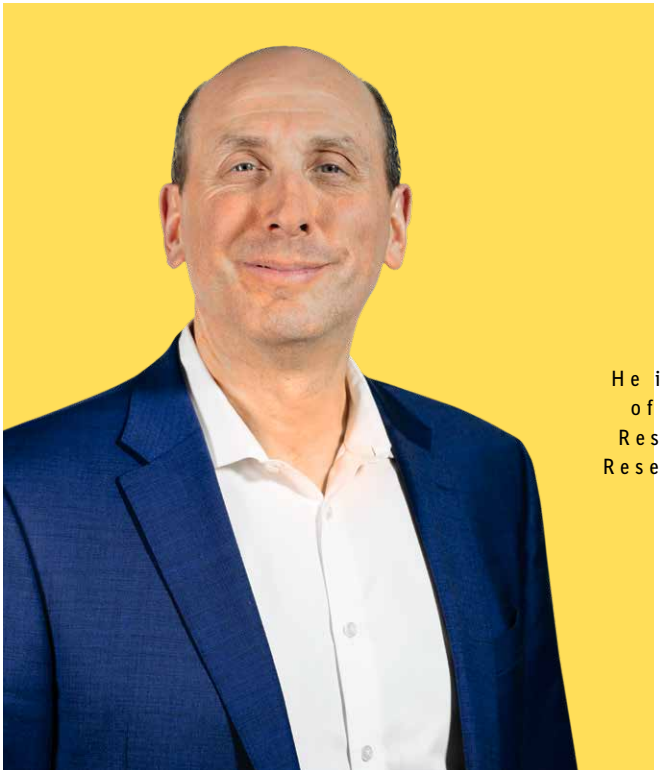
Boehringer Ingelheim had been working on the first therapeutic approaches even before the turn of the millennium. "This was remarkable," explains Conoscenti, "mainly because hardly anyone else was interested in this small group of patients." IPF is a rare, debilitating and fatal lung disease, which affects approximately three million people worldwide. Still, IPF is the most common form of pulmonary fibrosis. Early on, Boehringer Ingelheim noted the potential for a number of diseases beyond IPF – namely, whether it could aid in finding a therapy for the more than 200 other interstitial lung diseases.

"Boehringer Ingelheim has continuously expanded this holistic therapeutic approach over the years," says Dr. Jay Fine, Global Head of Immunology and Respiratory Diseases Research. Fine has been working on new lung disease treatments for more than a decade, including the last five years at Boehringer Ingelheim. "Our focus is always on how we can develop potential medicines for multiple diseases or populations and therefore help the most patients," says Fine. At first, it is often unclear how many diseases a novel medicine can treat. Nonetheless, Fine's team looks for common

pathways between individual diseases to uncover unique "disease clusters" for each new therapy. This increases the scope and value of an individual medicine enormously.

With this goal in mind, the research team around Conoscenti continued studies on IPF, pulmonary fibrosis, and other related interstitial lung diseases. There were setbacks along the way: An initially promising combination of medications did not work as they had hoped. But the working group ultimately developed nintedanib. This medicine inhibits processes that occur in fibrosis, thus slowing the formation of scar tissue and the progression of the disease. IPF remains incurable, but nintedanib reduces the degree of lung function lost each year by roughly half. After its breakthrough in the middle 2000s, nintedanib was approved as OFEV® for US patients for the first time in 2014. Since then it has been approved in more than 70 countries and has offered hope to many IPF patients.

> **"We focus on three principles: Target, Repair, and Prevent."**
>
> DR. JAY FINE



DR. JAY FINE

He is the Global Head of Immunology and Respiratory Diseases Research at Boehringer Ingelheim.

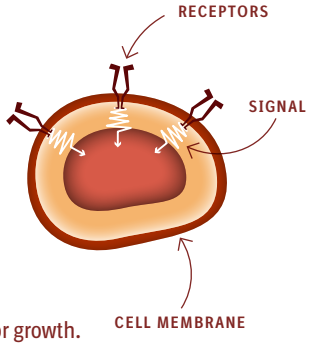
Fine is convinced: "Nintedanib serves as a foundation for our research on fibrosis." The research team has identified a number of parallels between IPF and other illnesses in its cluster, such as systemic sclerosis-associated interstitial lung disease (SSc-ILD), a rare, incurable autoimmune disease in which scar tissue forms in the skin and numerous internal organs including the lungs. The affected patients are typically younger than IPF patients and are often middle-aged women. The progression of the disease, however, is similar for both patient groups. Boehringer Ingelheim tested the effect of nintedanib on SSc-ILD patients in a large-scale clinical study. The study, called SENSCIS, found that the medicine was able to slow the loss of lung function by 44 percent within one year. In early September 2019, the FDA, the US regulatory authority, approved nintedanib as the first medication for treating SSc-ILD. Boehringer Ingelheim also received positive opinion by the Committee for Medicinal Products for Human Use of the European Medicines Agency (EMA) in SSc-ILD in February 2020. In March 2020, the FDA also approved nintedanib to treat people with a chronic (long lasting) interstitial lung disease in which lung fibrosis continues to worsen (progress).

"FIRST-IN-CLASS" MEDICINES

For Fine, "first-in-class" medicines like these give meaning to his team's research; they hope to discover new, unique mechanisms of action for treating disease. "Our vision is to transform the treatment of inflammatory and fibrotic diseases by pioneering a patient insight-driven translational approach," says Fine. His team pursues this vision on the basis of three principles: Target, Repair, and Prevent. Inflammatory illnesses are often triggered by an over-expressed immune system, which attacks the body's own tissues, leading to impaired function of the affected organs and a loss of quality of life. For this reason, Fine's team first targets

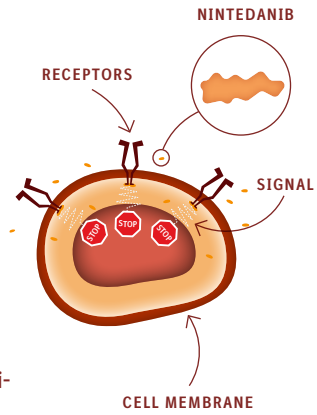
HOW CELLS CAN COMMUNICATE

The cell membrane is strewn with receptors: These molecules help cells to communicate with each other and to control the organism. If an outside signal reaches the receptors, they transmit the signal into the cell. This triggers different cellular effects, such as cell division or growth.



NINTEDANIB BLOCKS THE SIGNALS

This is how it works: Nintedanib is a potent inhibitor of specific cell communications and signaling cascades and interferes with processes active in fibrosis such as fibroblast proliferation and secretion of collagen. In addition, nintedanib has shown not only consistent anti-fibrotic, but also anti-inflammatory activity.



mechanisms that are central to driving tissue injury. They then investigate the best approaches to selectively block these responses or to repair the tissue itself. If the fibrotic process has already begun, the goal is to obstruct it as much as possible to prevent disease progression.

This holistic research approach has also proven itself with other forms of inflammatory and fibrotic disorders. For example, the research team has developed an investigational medicine called spesolimab which blocks a mechanism called the interleukin (IL)-36 receptor. Spesolimab is believed to have potential to target and prevent a range of inflammatory and fibrotic diseases, and has recently shown promise in patients with pustular psoriasis. “While still early in its development, spesolimab has the potential to improve the lives of many people affected by this cluster of diseases,” Fine explains. He knows how a research breakthrough feels – the moment it becomes clear: We did it; we helped people. “This,” says Fine, “is why we do this job.”

INNOVATION IS A GLOBAL MATTER

Collaborations with external partners play an essential role in helping us deliver an innovation-led portfolio. Partnerships complement our team’s efforts and focus on finding new treatments for diseases with high unmet medical need – such as fibrotic diseases.

Through a bigger and more diverse global community of innovation partners, more can be learned, and achieved. That is why Boehringer Ingelheim collaborates with leading pioneers from academic institutions and other companies around the world to identify new treatments for patients with high medical need.

One of the most recent partnerships is with Singaporean biotech company Enleofen Bio, which began in January 2020. The goal: leverage Enleofen’s preclinical interleukin-11 (IL-11) platform to develop first-in-class therapies across a broad range of fibrotic and inflammatory diseases. IL-11 is a cytokine, a protein certain cells of the body use to communicate, and plays a key role in fibrotic and inflammatory conditions. Blocking IL-11 action has been shown to inhibit disease across many organs (liver, lung, kidney, retina, bowel, heart and skin). The initial focus will be on novel therapies for patients with Nonalcoholic Steatohepatitis (NASH) and Interstitial Lung Diseases (ILDs), two of Boehringer Ingelheim’s core disease focus areas, with a potential to expand into further fibrotic and inflammatory conditions based on IL-11’s central role in disease.

Another collaboration started in 2016 with the Harvard Fibrosis Network of the Harvard Stem Cell Institute in Cambridge, USA. Since fibrotic diseases can affect many organs, the partners aim to find new therapies for diseases like IPF, Nonalcoholic Steatohepatitis (NASH) and Chronic Kidney Disease (CKD) – and to identify commonalities among them.

FROM THE EYES OF A MOTHER

Randye Kaye is mother of a son diagnosed with paranoid schizophrenia. She knows the difficulties in advance of a diagnosis and the trouble managing the disease. Boehringer Ingelheim knows these challenges too and uses the opportunity of digital technologies to break new ground.

Randye Kaye usually starts her key talks with these words: "Imagine you have a child. Think of how your little baby starts growing up, slowly becoming an adult." After a short break she continues: "And now imagine your child is in puberty and slightly starts to act weird, it retreats, is getting worse in school and starts losing friends."

In most cases, this is normal behavior, it is not unusual that children in puberty act a little bit strange. Usually this behavior changes after a few years – but sometimes it does not. Sometimes this behavior can be the first sign of a mental disease. Kaye experienced exactly that. She is the mother of Ben, who has been diagnosed with paranoid schizophrenia. Today she supports families with similar stories and experiences, because she knows how these families feel. "It is completely heartbreaking to see your child develop a mental illness. It's a tremendous challenge for everyone in the family. Even day-to-day things we barely notice can be extremely difficult for Ben."

Taking antipsychotic drugs can suppress the symptoms and enable a regulated everyday life. The earlier treatment begins in such cases, the better the chances of success. But exactly that can be a problem – the very first symptoms are non-specific. Patients seem apathetic or suffer from sleep disorders or listlessness. These symptoms are often misinterpreted as stemming from puberty. To tackle this issue, Boehringer Ingelheim follows a research approach that goes beyond the development of drugs. The goal is to offer support to physicians in the early-stage diagnosis of mental disorders.

USING THE MOMENTUM OF DIGITALIZATION

Dr. Cornelia Dorner-Ciossek from the Central Nervous System (CNS) Diseases research group at Boehringer Ingelheim plays a decisive role in this effort. She sees a huge opportunity in the field of neuro-research, especially by using digital technology: "The use of digital technology makes me feel optimistic about the future of brain research. Technological advancements have enabled smartphones to be commonplace and extremely sophisticated. Researchers are determining how we can best use this technology to both diagnose a mental illness and help people to manage it."

One approach from Boehringer Ingelheim to improve the early diagnosis focuses on digital speech analysis. The way people speak and express themselves is determined by their ability to think straight. Diseases such as schizophrenia but also Alzheimer's dementia and many other psychiatric diseases affect these, although in different ways. Especially people with advanced disease progression show many characteristic modifications in their speech. The software aims to analyze disease-typical telltale changes in sentence structure, rhythm, and intonation at an early stage when the changes are still imperceptible to the human ear. Kaye supports this, since she knows about the importance of an early diagnosis. It took several years, many visits to the physician and uncomfortable conversations with psychiatrists until her son got a diagnosis. Randye remembers the moment as follows: "Finding out that your child truly does have a mental illness is devastating, as nobody wants someone they love to come down with a diagnosis like that.

> **“It is completely heartbreaking to see your child develop a mental illness.”**
>
> RANDYE KAYE

RANDYE KAYE

She knows what challenges families face. For this reason, she shares her experiences with other affected families as a speaker and author.

Ben's disease was a challenge for the whole family. Together they cope with it.

However, after these years of uncertainty, learning what was going on was also a relief. We could now move forward to find treatment options and that was the hopeful part of it."

IMPROVING A PATIENT'S LIFE

In the future, digital technologies and smart devices could also be an option to help patients with schizophrenia manage their disease. Dr. Bernd Sommer, Head of Department CNS Diseases Research, sees a great opportunity through the advancing of big data. Research teams now have access to complex patient data sets collected under real world conditions – possible through the smartphone. "We are able to analyze the daily problems of patients with schizophrenia electronically. That means the psychiatric lab is becoming less and less an actual physical lab and space," explains Sommer.

"Knowing that we operate in a field that requires utmost diligence when assessing the potential effect of our new medications, we see two key elements to drive our clinical study design: we achieve precise measurement and accuracy through technology, but also include input from people personally involved in mental health situations and their insights," says Dr. Stephane Pollentier, Head of Medicine CNS, "With that, we try to capture what really matters to patients."

In concrete terms, the new possibilities could have an impact on how patients can tackle the symptoms of the disease. Because the symptoms of schizophrenia occur in recurrent attacks, the disease pattern is an interplay of ups and downs. By analyzing the mobility patterns and social behavior of patients via the smartphone, an algorithm could help to identify early signs of an upcoming relapse. Randye Kaye has been through these challenges herself. Managing the right timing can be difficult even for close family members. "These technologies could offer huge relief for the everyday life of people living with schizophrenia and the whole family. To know the course of the disease more precisely could help to intervene earlier. This gives people like my son the possibility to regain their independence," notes Kaye on the potential impact.

STAYING STRONGLY COMMITTED

Brain research is one of the most challenging and complex fields of science. The brain contains billions of nerve cells and nerve fibers that are linked by trillions of connections or synapses. Due to the very complicated nature of the brain, failure rates in clinical development are high. Setbacks are more frequent than breakthroughs. The delivery of treatment and services remain inadequate.

"I am always humbled by the fact that we have the privilege to work in an area with so many unmet medical needs," explains Dr. Michael Sand, who is responsible for several clinical programms. "Knowing of the importance of this work and seeing the promising steps we take keeps me motivated. At Boehringer Ingelheim, we stay strongly committed to the field of brain research." This gives Randye Kaye hope: "I have noticed that many pharmaceutical companies have withdrawn from the neuro-research field altogether. It therefore gives me so much hope to see that Boehringer Ingelheim remains committed to finding solutions for people living with mental illness."

Dr. Cornelia Dorner-Ciossek researches in the field of CNS.

> **"The use of digital technology makes me feel optimistic about the future of brain research."**
>
> DR. CORNELIA DORNER-CIOSSEK

A SENSE FOR INNOVATION

True pioneers stand out by blazing new trails and keeping their eyes open for innovation – just like the pioneers from the "Research Beyond Borders" team at Boehringer Ingelheim. Their daily work consists of research outside of the current therapy areas. "We like to think of ourselves as the 'scouts' of Boehringer Ingelheim," says Dr. Henri Doods, Head of the global Research Beyond Borders Team. "We look for highly promising ideas across the global scientific community and get in contact with researchers at external research institutions and universities."

Since its establishment in 2015, the team has grown considerably. Doods started with a handful of colleagues in Biberach, Germany, and Ridgefield, Connecticut, USA. Since then, additional sites have been opened in Boston, Massachusetts, USA; Beijing and Shanghai, China; Kobe, Japan; and Vienna, Austria. Here, about 20 employees are permanently searching for exciting and innovative academic approaches and technologies that could see increased interest from pharmaceutical companies in the future.

ABOUT

20

EMPLOYEES ARE PERMANENTLY SEARCHING FOR INNOVATIVE ACADEMIC APPROACHES AND TECHNOLOGIES

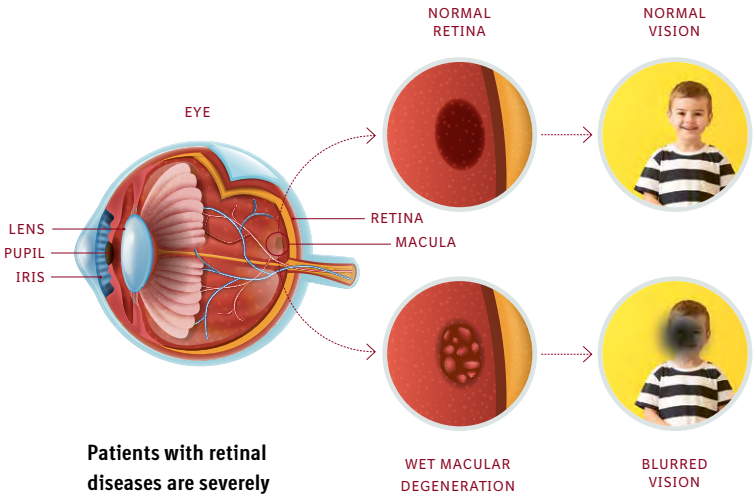
Should a project turn out to be particularly promising, Doods and his team connect the scientists in charge with the right project partner within Boehringer Ingelheim. The project partner will then be in constant communication with the scientists, identify needs and drive forward the research project with the help of skill sets and resources available in-house. The scouts always focus on indication fields with a high medical need. One example are new therapeutic concepts for antibiotic-resistant germs, such as tuberculosis pathogens. Together with the Tsinghua University, a leading university institution in China, a virtual center was established for this purpose. There, researchers systematically investigate Boehringer Ingelheim's active ingredients for their use in various infectious diseases.

DR. ULRIKE GRÄFE-MODY

She has the clear vision to tackle the high unmet medical need for effective and safe therapies in the field of Retinal Health.

A JOURNEY INTO UNCHARTED TERRITORIES

Developing innovative treatments for the recently established area of retinal diseases: Feeling like a pioneer at Boehringer Ingelheim.



Patients with retinal diseases are severely affected on their day to day life and may progress to legal blindness.

When you talk with Dr. Ulrike Gräfe-Mody about eyes, her passion for the subject quickly comes to light. "Did you know that the eyes give us approximately 80 percent of the information about what happens around us? Imagine what it's like for a person with a retinal disease to be impacted by visual impairment and blindness!" says the Head of Retinal Health. "It often threatens our ability to take care of ourselves and others."

In fact, there still is a high and yet unmet medical need for more effective and safe therapies. This motivated Boehringer Ingelheim to enter into the field of Retinal Health. "We first saw the potential to help people with eye diseases as a complication of diabetes. It started with research in diabetic macular edema and diabetic retinopathies. Going forward we identified new mechanisms and molecules with broader application beyond diabetic eye diseases," describes Dr. Remko Bakker, Director of the indication group Retinopathy.

> **"Our focus is on improving the lives of people with retinal diseases."**
>
> DR. ULRIKE GRÄFE-MODY

Since then, further progress has been made. Boehringer Ingelheim is building a comprehensive pipeline portfolio in Retinal Health with the first three assets already in clinical development. Dedicated scientists from the company are building on existing knowledge and expertise from other disease areas in Human Phama. Other key components of the company's innovation strategy are relationships with the retinal health community as well as external partnerships. The forward-looking collaboration with the US company Inflammasome Therapeutics in September 2019 is one example to reflect this. Their novel delivery technology using a long-acting degradable intravitreal implant complements Boehringer Ingelheim's pipeline. "Our focus is on improving the lives of people with retinal diseases," explains Gräfe-Mody. "We have the ambition to transform retinal health for them by pioneering treatments and technologies."

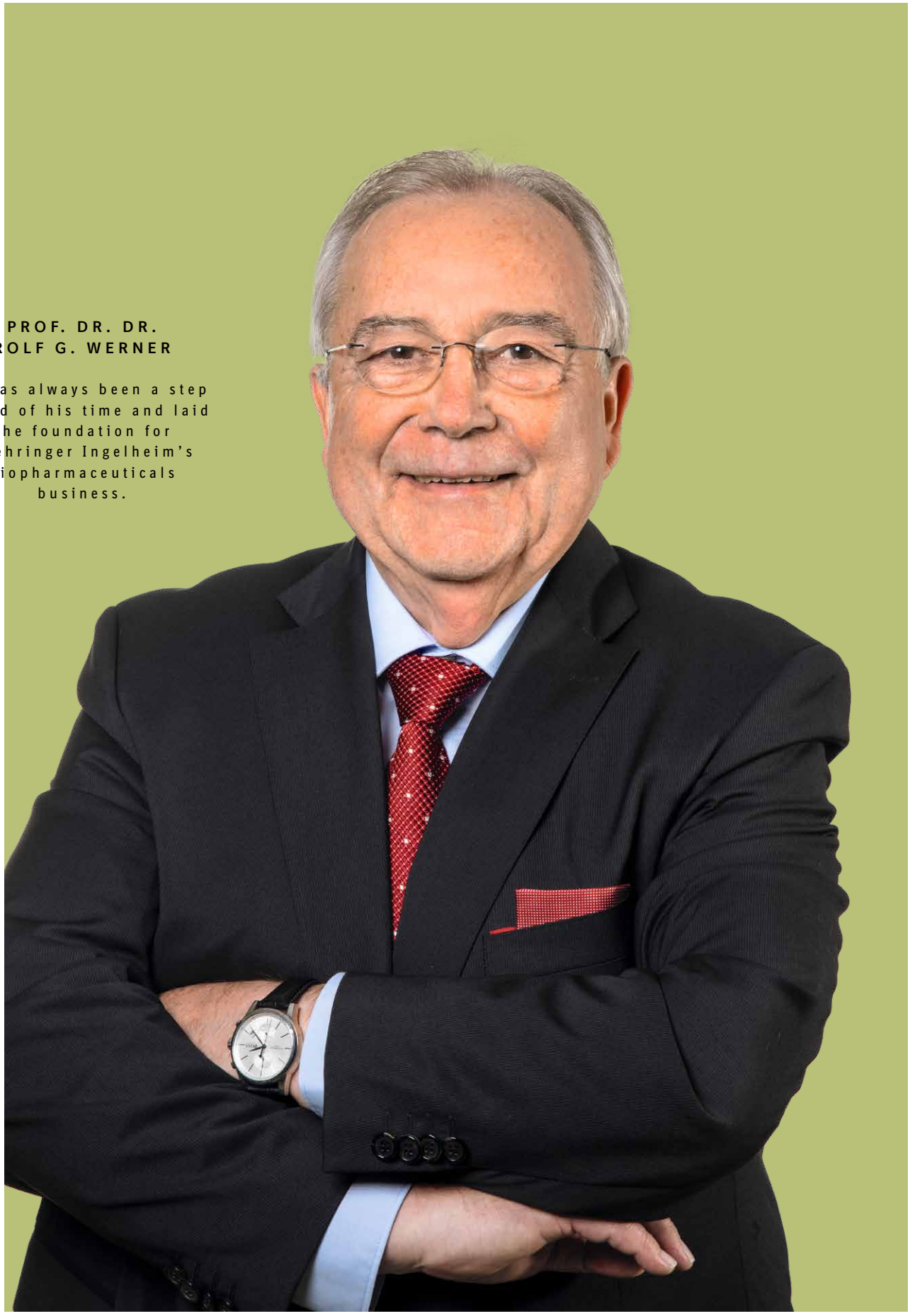
Deliver

The molecule has been found, the substance developed, but it's still a long way to its application. Together with our partners, we turn research projects into products that improve the lives of people and animals.

At Boehringer Ingelheim, new products must always achieve one thing: increased quality of life for patients. We are always concerned with achieving the greatest possible therapeutic benefit, which results when a new substance or treatment principle is developed to market maturity. Is the therapy efficient and gentle? Are we solving a problem with our approach? We recognize what the market needs. This helps us help people and animals.

PROF. DR. DR.
ROLF G. WERNER

He has always been a step ahead of his time and laid the foundation for Boehringer Ingelheim's biopharmaceuticals business.



A PIONEER TWICE OVER

Prof. Dr. Dr. Rolf G. Werner is a visionary and pioneer. He established the company's biopharma site in Biberach, Germany, in the early 1980s and paved the way for its Biopharmaceutical Contract Manufacturing in Europe, the US and China.

In 1983, Rolf G. Werner was trying to convince the company's management to invest in a pilot facility in Biberach for the manufacturing of biopharmaceuticals – the first of its kind in Europe and at Boehringer Ingelheim. The construction of what was then the world's newest and largest biotechnology facility cost the equivalent of around 77 million euros – a huge amount at the time. Werner frequently found himself standing at the construction site, worrying "Will it all work out?" The bioreactors represented a bet on the future: Biopharmaceutically produced medicines from cell cultures would provide a breakthrough for diseases that were difficult to treat. But such biopharmaceuticals had not yet been approved in Germany.

Werner acts cautiously and deliberately – he's a typical Swabian. But when he's convinced of something, he casts restraint aside. "When it comes to the development of medicines that are intended to eliminate the causes of a disease, genetic engineering is the next logical and rational step." Werner was convinced of that in the mid-1980s, when he was the project manager for Boehringer Ingelheim's partnership with Californian biopharmaceuticals company Genentech. In Biberach, Germans and Americans worked together on cell cultures to produce biopharmaceutical active substances. They were breaking new ground within the company. "Back then, Boehringer Ingelheim was a chemical and pharmaceutical company," says Werner. Things had changed for the company's chemists now that biotechnologists and genetic engineers also had a seat at the table.

In any case, the greatest resistance existed outside the plant. "For a long time, the public opposed genetically engineered medicines," Werner recalls. He visited adult education centers and patiently answered citizens' anxious questions, of which there were many. "My strongest argument was always the benefit of genetic research for patients," Werner explains.

Yet that was by no means the end of the difficulties: It was necessary to revise Germany's genetic engineering act to reflect biopharmaceutical progress. Together with the German chemical industry association (VCI), Werner and his team pushed forward with these changes. In 1990, Germany's Bundestag resolved a change in the law which created the right framework for biopharmaceuticals.

> **"When it comes to the development of medicines that are intended to eliminate the causes of a disease, genetic engineering is the next logical and rational step."**
>
> PROF. DR. DR. ROLF G. WERNER

They thus laid the foundations for a success story. The 300 team members in Biberach became a business area that has around 4,000 employees at four locations worldwide – and continues to grow. Boehringer Ingelheim has now produced more than 35 different biopharmaceutical medicinal products used by patients around the world.

Yet that is far from the end of Werner's story. Since the early 1990s, this biopharmaceutics pioneer has pushed forward in a different area: opening up Asia's markets. He recognized China's huge potential as a growing world market early on and began establishing relationships there. The former leaders of the federal state of Baden-Württemberg, Lothar Späth and Erwin Teufel, soon appointed him to their advisory boards for the business development activities of German companies in the People's Republic of China. He began to visit the Middle Kingdom even more frequently and advocated Boehringer Ingelheim's expansion of its biopharmaceuticals activities to include China.

China was very open-minded about new technologies right from the start, Werner remembers. Nonetheless, over time, Boehringer Ingelheim continuously undertook pioneering work in the areas of order development and production. Previously, a marketing authorization holder in China had not been able to commission a third party with the production of a biopharmaceutical medicine. Following a pilot phase, the relevant legislation was revised and contract manufacturing is now provided for by law in China. The first biopharmaceutical commissioned under this new legislation is produced through Boehringer Ingelheim's contract manufacturing operations in China. It was approved at the end of 2019. Boehringer Ingelheim is also enjoying rapid growth in other fields in China (see text box) and all of its business areas are present in the country.

In biopharmaceutical contract manufacturing, Boehringer Ingelheim is a step ahead of its competitors in China: It is the first international company to have a biopharmaceuticals site in Shanghai for commercial contract manufacturing based on global standards. Pioneer Werner has naturally already been there to visit the facility – even though he has officially been retired since 2012. Thus, the hard-working Swabian is just not inclined to take things easy.

BOEHRINGER INGELHEIM IN CHINA

Having entered the Chinese market in 1994, Boehringer Ingelheim now has around 4,100 employees at 17 different locations in all three of its business areas: Human Pharma, Animal Health and Biopharmaceutical Contract Manufacturing.

Boehringer Ingelheim aims to accelerate Research and Development, as well as the launch of new drugs in China and to provide patients with access to innovative treatment options. With its Consansas project, for instance, the company established its first stroke rehabilitation center based on advanced neurological rehabilitation care in Shanghai.

Boehringer Ingelheim's Animal Health business is also growing. Pets are increasingly important in Chinese society, but China is also the world's largest pork producer. You can find out more about the importance of animal health in China in the interview on page 33.

Boehriner Ingelheim's site in Shanghai produces biopharmaceuticals on global standards.

“WE MUST CONTINUALLY BREAK NEW GROUND”

Haifeng Jiang is responsible for the business development, corporate affairs and strategy of the business area Animal Health in China. He works to ensure that Boehringer Ingelheim can provide access to innovative medicines for as many animals in China as possible. In this interview, he explains why the company focuses on local value creation.

Mr. Jiang, Boehringer Ingelheim entered the Chinese market 25 years ago. A lot has happened since then – among other things, the Chinese pet population has grown strongly.

That’s right, the interest in pets has substantially increased in China in recent years along with the economic growth and the urbanization. Many Chinese people are now dog and cat owners.

What is the situation with livestock?

China is the largest market for pork worldwide. Pig farming is accordingly very important. However, various diseases are causing difficulties for farmers, such as African Swine Fever (ASF), and PRRS. ASF is a deadly disease for pigs and currently without vaccine or treatment available, an effective biosecurity protocol is the only way to reduce disease transmission. We have been helping Chinese farmers fight ASF in terms of providing comprehensive biosecurity knowledge as well as developing a digital tool to assess biosecurity risks on farms.

And what is PRRS?

PRRS stands for “Porcine Reproductive and Respiratory Syndrome”; it makes it hard for pigs to breathe and causes stillbirths. If one animal is sick, the entire stall often gets it. This is causing the supply of meat to shrink. The disease poses a serious danger to the pig farming industry and is a particular threat to the numerous small-scale farmers.

How can Boehringer Ingelheim help with this?

Boehringer Ingelheim has developed the product INGELVAC® PRRS MLV, an effective vaccine for the disease with which we have been able to make a name for ourselves in the world, including in China. Originally imported from a Boehringer Ingelheim site in the US, the PRRS vaccine has now been successfully transferred to our newly-opened manufacturing plant in Taizhou, Jiangsu Province.

HAIFENG JIANG

He enters new territories in order to root Boehringer Ingelheim in China.

Why was this step taken?

In order to get closer to our customers and the market. We localized the value chain of Research & Development as well as the manufacturing of vaccines in China. We can thus signifcantly shorten the interval between the plant and animal farms.

What is your role in the introduction of vaccines?

For my team and me, the work begins long before the actual introduction. Our major role is it to strive for a favorable business environment in China. Boehringer Ingelheim is the first multinational animal health company that brings the whole value chain from R&D, manufacturing, supply and health management to China. As you can imagine, we must continually do pioneering work and break new ground.

Breaking new ground is a good aspiration – what is your future vision?

The company is growing and investing in China. In the coming years, the Taizhou plant also expects to increase its production capacity, with which we aspire to move another step closer to achieving our ultimate goal of healthy animals in China.

MATTHIAS HAUSMANN

He is one of the people who developed the RESPIMAT®. He was responsible for the high-volume series production of the inhaler and cartridges.

OUT OF THE RUHR REGION AND INTO THE WORLD

Boehringer Ingelheim manufactures millions of inhalers for patients with respiratory diseases each year at its location in Dortmund, Germany. Matthias Hausmann is one of the people who developed the RESPIMAT®, which ranks among the most important elements in the Boehringer Ingelheim product portfolio.

Matthias Hausmann holds his hand out towards his visitors. He points to parts so small they almost disappear in the palm of his hand and names each of them: the support ring, the valve body – and the uniblock. These are three of the 26 individual parts that make up the RESPIMAT®, an inhaler for treating specific respiratory diseases.

The inhaler is manufactured at Boehringer Ingelheim microParts GmbH in Dortmund, under Hausmann's watchful eye. Hausmann is an engineer born in Berlin. 24 years ago, a colleague directed him from the nation's capital to the Ruhr region, where microParts has developed and produced micro-nozzles since 1990. Eleven years later, Boehringer Ingelheim picked up the technology and started preparing the RESPIMAT® for series production. Hausmann plays a decisive role in this endeavor, organizing, fine-tuning, and creating the necessary processes for high-volume series production of the inhaler and cartridges.

He looks down at his hand. The smallest component, the valve body, is as small as the head of a pin and weighs less than a snowflake. "Six of such delicate components are so special that they are only produced by us here on-site," he explains. In 2019, more than 36 million inhalers were delivered worldwide.

"Expertise and years of process experience are the decisive factors for success," says Hausmann. The core component of the inhaler is the uniblock, which releases the active substance as a fine mist. It does the same in the reusable version, which has been available

Six functional components are manufactured in Dortmund. With these components the inhaler is already sprayable.

MORE THAN

36

MILLION INHALERS WERE DELIVERED WORLDWIDE

in a number of European countries since April 2019. Thanks to its reusability for up to six cartridges – depending on the approval status in the respective country – the inhaler is now more environmentally friendly. Not just physician experience but patient feedback was especially considered in the course of developing new-generation products.

As the product manager, Hausmann continuously advances the development of the medical device and oversees the entire lifecycle of the product. Thanks to the varied nature of his work, Hausmann remains dedicated to microParts and the Ruhr region.

> **“There’s a solution for every problem, as long as it doesn’t violate the laws of physics.”**
>
> MATTHIAS HAUSMANN

As the product manager, Hausmann continuously advances the development of the medical device and oversees the entire lifecycle of the product.

In recent years, a sum in the high double-digit million euro range has been invested in developing the Dortmund location, where a new building wing was constructed and new machinery purchased.

The road has not always been smooth, however, and there have been setbacks over the years. In 1998, just before the RESPIMAT® entry into the global market, the US Food and Drug Administration (FDA) changed its requirements for inhalers. After several tests, it quickly became clear that the inhaler did not meet the new criteria. “From then on, it was either find a solution, or the project has failed,” Hausmann recalls. Persistence and drive paid off, and the team successfully modified the inhaler so that the market launch could take place as planned. Improving patients’ quality of life is the ultimate goal for Hausmann and his pioneering team. “This is a goal worth fighting for every day.”

Two factors were decisive in the successful development of the RESPIMAT®, says Hausmann: expertise in nozzle manufacturing and collaboration with an experienced team. As his personal motto states: “There’s a solution for every problem, as long as it doesn’t violate the laws of physics.”

THE REUSABLE RESPIMAT®

The new version has been available in a number of European countries since April 2019 and is more environmentally friendly thanks to its reusability.

“HORSES ALSO COUGH”

Boehringer Ingelheim expanded its product portfolio at the start of the year: The ASERVO® EQUIHALER® has been on the market in Europe since the spring of 2020. This is an inhaler for horses, which is based on RESPIMAT® technology from the field of human pharmaceuticals. The idea originated with Dr. Nicole Mohren and her colleagues in the Group’s German Animal Health business.

Mrs. Mohren, why do horses need an inhaler?

Horses also cough, which gradually reduces their performance over time. The cause for this may include antigens, for instance, which are inhaled together with the dust that is blown up out of the hay in the horse’s stable. Over time, this contamination can become a problem for horses. Before I joined Boehringer Ingelheim, I spent seven years working as a veterinarian in clinical practice. After joining Boehringer Ingelheim, I was asked what therapy horses would urgently require.

And you saw inhalation as the greatest area of need?

Exactly. Back then, there wasn’t any medicine available as an inhalation therapy for treatment of chronic respiratory diseases in horses that I was entirely convinced of. There was a real gap here.

What were your first steps in the development of the ASERVO® EQUIHALER®?

The original idea was to take the RESPIMAT® for humans, and to attach a connector to integrate a nostril adapter. But to ensure ease of use, the entire mechanism needed to be housed differently. And then the question as to the right substance came up.

Which criteria did the substance need to fulfill?

We needed an anti-inflammatory substance that offers a good safety profile for the horse and does not require administration forms such as tablets. The crucial point for the successful treatment of respiratory diseases is that the medication needs to be effective directly in the lung.

Does the ASERVO® EQUIHALER® achieve this?

Yes. We have achieved very strong availability of the substance at the site of action, in the lung. The fine and particularly slow spray mist the ASERVO® EQUIHALER® delivers plays a key role here. It enables fine particles to penetrate deep into the lung.

What additional strengths does the new inhaler offer?

It is easy to use, since the inhaler can be operated with one hand. For a long time, inhaled substances for horses have mainly been administered via masks. That is complicated and not very comfortable for the horse. Our ASERVO® EQUIHALER® provides significant added value here.

The inhaler is based on the key components of RESPIMAT®, which are produced in Dortmund. What was it like working with Boehringer Ingelheim microParts?

The know-how for these components has entirely resulted from the Group’s development activities in Dortmund. For that reason, we worked together intensively throughout the development cycle. Our colleagues there have unbelievable expertise thanks to their years of development work. The two fields – Human Pharmaceuticals and Animal Health – are linked by a common idea: to offer innovative solutions for our patients.

ABOUT THE INTERVIEWEE:

Dr. Nicole Mohren has been a global project manager in the field of Animal Health Pharmaceuticals since 2014. She is responsible for the entire development cycle for the ASERVO® EQUIHALER® and for life cycle management. The mother of three children took up equestrian sports back when she was a teenager. This originally sparked her interest in medical issues relating to horses.

“WE CAN MAKE A SIGNIFICANT DIFFERENCE”

PROF. DR. MARTINA BRÜCKMANN

She is conducting trials to extend heart failure patients’ lives with the diabetes medicine JARDIANCE®.

A cardiovascular safety trial for JARDIANCE® has revealed that this type 2 diabetes medicine is not only well-tolerated but even reduces the number of fatalities and also may have a positive impact in case of heart failure. But that was just the start of the work facing the physician Prof. Dr. Martina Brückmann. The pioneer in the clinical development of cardiovascular medicines is currently conducting trials with the goal of finding out more about the positive effects of JARDIANCE® in patients suffering from heart failure.

Mrs. Brückmann, you spent over ten years working as a cardiologist in a hospital. How does that experience help you in your day-to-day work at Boehringer Ingelheim?

In my time as a practicing physician, I saw many patients with heart failure and had a huge number of personal conversations with them. In a hospital, you see patients on good days, but more often on bad days. I know how urgently they need innovative medicines. I am able to contribute this experience at Boehringer Ingelheim in order to drive science forward and tailor our medicines to patients.

The clinical safety trial for the diabetes medicine JARDIANCE® has identified an unexpected additional benefit for diabetes patients suffering from heart failure and other pre-existing cardiovascular conditions. How did you initially react to this finding?

We were surprised – in fact, we were almost euphoric. As you mentioned, this review yielded the unexpected finding that JARDIANCE® can prevent the emergence of heart failure and also guard against complications in the case of hearts with pre-existing weaknesses. Patients taking JARDIANCE® were hospitalized less frequently due to heart problems, and there was even a decrease in the number of fatalities in comparison with the patients who took the placebo. We immediately realized that we needed to follow up on this finding – also in relation to heart failure where this is not associated with diabetes.

> **“I am spurred on by the prospect of heart failure patients living better lives.”**
>
> PROF. DR. MARTINA BRÜCKMANN

Boehringer Ingelheim has subsequently been pursuing research into making JARDIANCE® available to patients with heart failure. Can you tell us a bit more about that?

We now have over 10,000 patients in more than 20 countries participating in the indication expansion trials for this medicine. There is a very high hurdle for marketing authorization. Patient safety is always of paramount concern, together with the need for a high level of efficacy. Accordingly, the operational team implementing, coordinating and supervising this trial is very large. We expect to see our first, hopefully positive, results soon.

What would a positive result mean in concrete terms?

Despite the considerable medical progress achieved over the past few years, heart failure patients still suffer an unacceptably high rate of complications such as recurrent hospitalization. Medicines are already available, but many of them have side effects. The overall situation for patients is simply not yet good enough. Moreover, life expectancy for heart failure is in some cases lower than for some cancers: Roughly half of all patients with heart failure will die within the first five years following diagnosis. JARDIANCE® offers a very good opportunity to really make an impact and improve things for these patients.

Does this opportunity also motivate you in your work?

I am spurred on by the prospect of heart failure patients living better lives, with fewer fatalities. That would be fantastic! For a heart failure patient, the mortality rate and the frequency of complications are currently still high. Our goal is to extend patients' lives. This is where we can make a significant difference.

Our Human Pharma Research and Development Pipeline

Boehringer Ingelheim is clear about its goals. We want to deliver a portfolio of breakthrough medicines that will improve the lives of patients around the world. This starts with innovation. With a pipeline of around 100 clinical and pre-clinical projects, with the potential to deliver up to 15 new medicines by 2025, we continue our track record of long-term innovation-led performance.

THE THREE PHASES OF A CLINICAL STUDY

PHASE 1

Here, a prospective active ingredient previously tested only on animals is tested for the first time on healthy human test subjects. The main goal of this is the evaluation of pharmacokinetics, tolerability and safety of the medicine.

PHASE 2

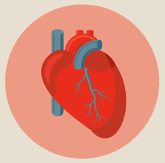
Phase 2 is a clinical study during which the prospective active ingredient is first used to treat patients suffering from one of the targeted diseases.

PHASE 3

The medicine is now tested on a larger group of patients in order to evaluate whether safety and efficacy can be confirmed among many different patients.

Research and Development Pipeline Human Pharma

SIX THERAPEUTIC FOCUS AREAS IN RESEARCH AND DEVELOPMENT



CARDIOMETABOLIC DISEASES

Building on our legacy of innovative treatments for a range of cardiovascular and metabolic conditions, our R&D strategy takes a holistic view of the needs of diabetes patients who often have multiple, related conditions. We are pursuing the next wave of innovative medicines for obesity, kidney and liver diseases – including non-alcoholic steatohepatitis (NASH).

IMMUNOLOGY

Our R&D strategy is inspired by the courage of patients living with debilitating, life-limiting autoimmune conditions. We are taking bold steps to deliver scientific breakthroughs that target, repair, and prevent these diseases. Specific areas of focus include inflammatory skin diseases and inflammatory bowel diseases such as Crohn's Disease and Ulcerative Colitis.

ONCOLOGY

Our primary focus is in lung and gastrointestinal cancers, with the goal of delivering breakthrough, first-in-class treatments for cancer. Our commitment to innovation has resulted in pioneering treatments for lung cancer and we are advancing a unique pipeline of cancer cell-directed agents, immune oncology therapies and intelligent combination approaches to help combat many types of cancer.

CENTRAL NERVOUS SYSTEM DISEASES

Schizophrenia, Alzheimer's Disease and treatment-resistant Depression are key areas for R&D. Our approach focuses on understanding maladaptive brain circuitry to target the mechanisms directly responsible for major untreated symptom domains in neuropsychiatric diseases including cognitive impairment.

RESPIRATORY DISEASES

We are building on a heritage of nearly a century in respiratory diseases, with treatments in asthma, chronic obstructive pulmonary disease, and idiopathic pulmonary fibrosis (IPF). Our R&D approach leverages our extensive expertise in respiratory medicine, inflammation, and fibrosis to target a broad range of interstitial lung diseases such as IPF and systemic sclerosis associated interstitial lung disease (SSc-ILD), as well as serious lung diseases with unmet patient needs such as cystic fibrosis and severe asthma.

RETINAL DISEASES

The ambition to prevent vision loss in people at risk, and preserve or restore vision in those with retinal diseases, is at the core of our R&D activities. Our extensive knowledge and insights from other therapeutic areas enable us to tackle the multifactorial pathophysiology of retinal diseases. Areas of focus include wet age-related macular degeneration, diabetic retinopathy, and geographic atrophy.

PHASE 1

CARDIOMETABOLIC DISEASES

- GLP1R/GCGR agonist*
- Amylin analog*
- Hemodynamic modulator
- Appetite modulator
- EmpaLinaMet XR***

ONCOLOGY

- mRNA vaccine*
- LAG 3 antibody
- BET inhibitor
- MDM2-p53 antagonist*
- PD-1 antibody
- VEGF/Ang-2 antibody*
- SMAC-mimetic
- MEK Inhibitor*
- LRP 5/6 inhibitor*
- SIRP1α Inhibitor*
- SOS1::KRAS inhibitor
- Recombinant vaccine*

RESPIRATORY DISEASES

- Cysteine protease inhibitor*
- Phosphodiesterase inhibitor
- Non-receptor tyrosine kinase inhibitor*
- Leukocyte protease inhibitor
- Autotaxin inhibitor*

PHASE 3

CARDIOMETABOLIC DISEASES

- Empagliflozin/New indication**
  SGLT2 inhibitor | T1DM
- Empagliflozin/New indication
  SGLT2 inhibitor | CHF
- Empagliflozin/New indication
  SGLT2 inhibitor | CKD

ONCOLOGY

- Xentuzumab (BI 836845)*
  IGF1/2 antibody | mBC

RESPIRATORY DISEASES

- BI 1265162
  ENaC Inhibitor | CF
- Nintedanib/New indication**, ****
  Triple angiokinase inhibitor | SSc-ILD
- Nintedanib/New indication**
  Triple angiokinase inhibitor | PF-ILD

* Partnered projects or acquired assets.
** Study complete, submissions ongoing.
*** Approved in the USA for type 2 diabetes
**** Approved in the USA for SSc-ILD

IMMUNOLOGY

Epithelial barrier stress modulator

Receptor saerine/threonine kinase inhibitor

CENTRAL NERVOUS SYSTEM DISEASES

TRPC 4/5 inhibitor*

Phosphodiesterase inhibitor*

RETINAL DISEASES

VEGF/Ang-2 antibody*

Neuronal damage modulator

PHASE 2

IMMUNOLOGY

Spesolimab (BI 655130)
IL36R antibody | GPP

Spesolimab (BI 655130)
IL36R antibody | Ulcerative colitis

Spesolimab (BI 655130)
IL36R antibody | PPP

Spesolimab (BI 655130)
IL36R antibody | AtD

Spesolimab (BI 655130)
IL36R antibody | CD

BI 730357
Nuclear receptor antagonist | Psoriasis

CENTRAL NERVOUS SYSTEM DISEASES

BI 409306*
PDE 9 inhibitor | REX

BI 409306*
PDE 9 inhibitor | FEP

BI 425809
GlyT1 inhibitor | CIAS

RETINAL DISEASES

BI 1467335*
AOC3 inhibitor | Diabetic retinopathy

IMMUNOLOGY

CENTRAL NERVOUS SYSTEM DISEASES

RETINAL DISEASES

Indication abbreviations:

AtD	Atopic dermatitis
CD	Crohn's Disease
CF	Cystic fibrosis
CHF	Congestive heart failure
CIAS	Cognitive impairment associated with schizophrenia
CKD	Chronic kidney disease
FEP	First episode psychosis
GPP	Generalized pustular psoriasis
mBC	Metastatic breast cancer
PF-ILD	Progressive fibrosing interstitial lung disease
PPP	Palmoplantar pustulosis
REX	Reduction of relapse in schizophrenia
SSc-ILD	Systemic sclerosis associated interstitial lung disease
T1DM	Type 1 diabetes mellitus

KEY PIPELINE FACTS

>60

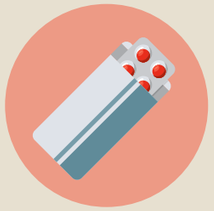
NEW MOLECULAR ENTITIES ANCHOR AN INNOVATION-LED PORTFOLIO

~100

CLINICAL AND PRE-CLINICAL PIPELINE PROJECTS

>40

PRE-CLINICAL DEVELOPMENT PROJECTS EXPECTED TO DELIVER...



15

... NEW MEDICINES TO BE POTENTIALLY APPROVED BY 2025*

>15

NEW PHASE 1 STARTS IN THE NEXT 12–18 MONTHS

50%

OF PIPELINE ANCHORED IN EXTERNAL COLLABORATIONS**

* Probability-adjusted.

** Across research, pre-clinical and clinical portfolios.

DR. JAN SPAAS

The 34-year-old Belgian invented six patents concerning stem cell cultivation techniques in mammals.

NEW WAYS TO TREAT LAMENESS

Inspired by an experience from his previous career in show jumping, Dr. Jan Spaas has developed an innovative method for the treatment of lameness in horses. As the founder of Global Stem cell Technology NV (GST), he has worked together with Boehringer Ingelheim to develop and launch the medication Arti-Cell® Forte. This is the first-ever registered stem cell-based veterinary medicine for animal health.

Vets x-ray a horse's fetlock

Jan Spaas, a passionate horse rider and former show jumper, grew up in a family where horses have always been of major importance. "My father was a professional horse breeder, keeping an eye on the health of horses was an essential part of his work. I learned from him that the health of a horse comes first, and relaxation and recovery were as important as training. However, I noticed that there were always some horses rehabilitating from joint or tendon injuries," explains Jan. "I simply could not believe there was no possibility of treating recurring lameness which he saw in some of his horses." Following his ongoing experience with his horses suffering from lameness and not being able to do anything, he ended his career as a show jumper – in order to become a veterinarian. The subject of his doctoral thesis: the development of biological treatment methods for lameness in horses.

Not only equine athletes but nearly every horse suffers from lameness at some point in its life. The causes vary widely – but in 60 percent of cases, the lameness is associated with osteoarthritis (joint inflammation and changes that result in a degradation of cartilage). This leads to pain and swelling, and the affected horse can no longer perform. "When I was competing and even when I became a veterinarian, there were very few options for treating osteoarthritis in horses. So, I decided to look for a regenerative medicine to treat recurrent lameness that would improve the health and quality of life of horses," says Spaas. "Most therapeutic approaches addressed only the symptoms, not the cause. Recurring flare-ups were inevitable."

> **“Most therapeutic approaches addressed only the symptoms, not the cause. Recurring flare-ups were inevitable.”**
>
> DR. JAN SPAAS

The Belgian veterinarian wanted to find a way for animals affected by lameness to feel better, to improve recovery over the long term, and to return the horses to their previous level of performance wherever possible. He wanted to tackle the evil of osteoarthritis at the source. In his doctoral thesis, he sought to cultivate new cartilage tissue from the stem cells of healthy horses in test tubes with this goal in mind. “The most important finding was that stem cells are able to influence the production of cartilage tissue when programmed accordingly, and can thus aid in the regeneration of damaged cartilage.”

Arti-Cell® Forte was specifically designed for horses to provide a convenient and long-term solution for recurrent lameness.

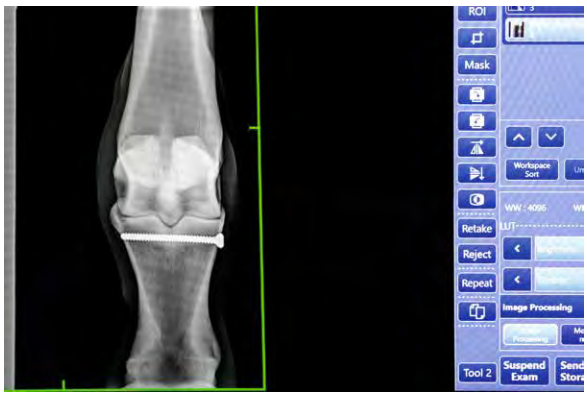
PUBLISHED STUDIES SHOW:

60%

OF ALL EQUINE LAMENESS CASES ARE RELATED TO OSTEOARTHRITIS

He founded a company, GST, in order to develop his innovative therapeutic approach into a marketable medication that not only addresses the causes of lameness, but also does so without chemical additives. The principle behind the therapy is that afflicted horses are injected with blood stem cells from donor animals. These stem cells are “programmed” in the lab to send out specific signals that cause cartilage tissue to generate “matrix proteins”. “This allows the cartilage to regenerate and become more robust,” explains Spaas.

In autumn 2019, Spaas opened an equine hospital in Bree, Belgium.



X-ray of a horse's knee.

GST has tested the new stem cell therapy on horses from various equestrian disciplines through extensive experimentation. The majority of animals responded to the therapy. "Even in acute cases, swelling and lameness subside within two weeks after starting the treatment," says Spaas. He and his team invest a significant amount of time in finding suitable stem cell donors. "At present, we use stem cells from four healthy donor horses. We carried out extensive examinations on roughly 40 horses in order to find them." The effort paid off, because the therapeutic approach is highly efficient.

GST has cooperated with Boehringer Ingelheim since 2018, and the innovative stem cell therapy for horses entered the market under the name Arti-Cell® Forte in April 2019. "For us, Boehringer Ingelheim is the perfect partner for establishing Arti-Cell® Forte internationally," says the founder. "We share the goal of researching therapies to treat conditions that still lack satisfactory options for treatment."

Most horses have 205 bones in their skeleton, but this can vary across some breeds.

PREVENTIVE CARE IS KEY TO SUCCESS

The global Research & Development (R&D) team of Boehringer Ingelheim delivers advanced, preventive animal healthcare that helps veterinarians, pet and livestock owners, and public health officials around the world improve animal health.

We work collaboratively with our internal colleagues in human pharma and with many external partners to leverage new technologies and science and develop targeted, comprehensive, long-term solutions for animal health. Our broad portfolio of veterinary vaccines, parasiticides and therapeutics reflects Boehringer Ingelheim's strong commitment to research and development. R&D continues to drive a diverse portfolio across our six core business segments (Pet Vet*, Swine, Horses, Poultry, Cattle/Ruminant, and Veterinary Public Health), while maintaining support for other key areas, such as Pet Health Care, Live Biotherapeutics, and Diagnostics. We have a broad pipeline across species, balanced between research, development projects, and lifecycle management of our products, and that includes both incremental and breakthrough innovations. Our commitment to innovation means that we focus on ensuring excellence in efficacy and safety for new products and delivery systems as well as extending the benefits of our existing products by adding new species or claims. We work across geographies and species to deliver a robust innovative pipeline of products for companion and lifestock animals.

* Pet products for the veterinary channel

THE RESEARCH PROCESS

A key part of R&D's mission is to discover or identify new compounds, vaccines, technologies, disease processes, and infectious agents. To do this we employ a mix of sophisticated tools, technical capabilities, and expertise – both at our global R&D research sites and externally, working with our partners – to launch new veterinary medicines and vaccines that meet the needs of our customers.

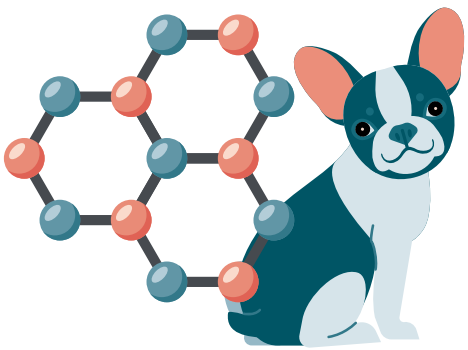
We study diseases, biological processes, and the changes associated with normal aging in order to create products that prevent disease and improve animal health. Our research efforts often lead to the creation of intellectual property: Our many patents are a hallmark of our innovation and a resource essential to our future.

During the development phase, we conduct extensive studies to assess the effectiveness and safety of our products and determine the appropriate dosage, formulation, and method of delivery. Finally, we must gain approval for our products from appropriate regulatory agencies and monitor them, once launched.

205

NEW PRODUCTS IN ANIMAL HEALTH

impacting 99 countries in 2019.



400+

STUDIES

initiated by clinical R&D supporting the progression of the R&D pipeline and the generation of pivotal data to support regulatory submissions

PARTNERSHIPS

Within R&D, collaborations and partnerships are crucial in driving future innovation in animal health. Some of our most successful products have been the result of collaborations – including NEXGARD®, VAXXITEK®, and many others.

We constantly monitor the world of science for opportunities – not just for new molecules but also for new technologies, diagnostic tools, delivery devices, and combinations of approaches. Partnering is a key component of our strategy and one of the foundations of our success. We have an active business development and in-licensing program, and we work with universities, external research organizations, biotechnology and agri-pharma companies, public-private partnerships, and others.

We are also committed to leveraging the human health expertise within Boehringer Ingelheim to identify new molecules and new processes with the potential to accelerate the translation of innovation into effective treatments for animals.

Mobilize

Inventive genius requires freedom. Unconventional thinkers need support. Boehringer Ingelheim works hard to create an inspirational company culture so our pioneers can be themselves.

The company culture provides the basis for an organization to remain innovative. Boehringer Ingelheim pursues many initiatives to mobilize the creative power and investigative spirit of its employees. We are adopting an increasing number of agile work approaches and emphasize diversity in our teams. We encourage employees to dare to try new things and give them room to develop. This is how we remain on the move.

DR. TAKUMA KATAYAMA

He is already spending his second stay abroad in Biberach, Germany. The Global Mobility Program is an important part of his development process.

INNOVATIVE SPIRIT MEETS EXPERIENCE ABROAD

The Global Mobility Program sends employees packing: Researchers and managers temporarily leave their usual workplaces so they can share knowledge with other teams and drive innovation. When they return from their assignment abroad, they bring valuable new perspectives back with them.

For the next period of time, Swabian "spätzle" noodles will frequently take the place of traditional Japanese ramen in Takuma Katayama's diet. Katayama, who holds a PhD in chemistry, actually works in Kobe, Japan, where he leads a team in the area of medication development. Now he will spend three years as the project manager of research and development teams at the German location in Biberach. In January 2019, Katayama relocated to Germany with his little daughter and his wife, who was then expecting their second child.

Though it was a real adventure for the young family, it wasn't a step into the unknown for the Katayamas: "We were looking forward to seeing our friends and colleagues here again," says the chemist. Starting back in 2011, he had already spent three years as a scientific assistant in Biberach. "The first time I came here, my main priority was gaining a better understanding of the development team's processes in Biberach," Katayama recalls. The objective of his time overseas was to bring the technical collaboration of the teams even closer together.

After returning to Japan, Katayama took on a role in the global research and development team. "As next step, it made sense for me to return to Biberach and work there as the head of several research and development projects. So, I could get to know my colleagues and understand the superordinate team structure." When Katayama goes back to Kobe again in 2021, it will be his job to see that the German-Japanese development teams are even more effectively integrated for optimal collaboration.

Already during his first stay in Biberach, Katayama knew he could count on the support from the Global Mobility Program during his time abroad. From its headquarters in Ingelheim, the Global Mobility Team acts as a Center of Excellence for the international deployment of employees. In 2019, about 120 employees changed their places of work for up to six months as part of an "extended business trip". In addition,

> **"We were looking forward to seeing our friends and colleagues here again."**
>
> DR. TAKUMA KATAYAMA

approximately 400 employees were sent abroad for a longer period of time. “No one is left to rely on themselves,” explains Annette Späth, Head of the Global Mobility Center of Excellence. Among other things, the company takes care of the move as well as visa and tax questions, and helps find good schools for its employees’ children.

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EMPLOYEES PARTICIPATED IN THE GLOBAL MOBILITY PROGRAM IN 2019

The Global Mobility Program is currently undergoing a transformative phase. “We want global mobility to become easier and more natural for employees,” says Späth. In the future, Boehringer Ingelheim will offer even more tailored deployment approaches to support the business, drive innovation and develop a global workforce. This is an important step in Boehringer Ingelheim’s development. In recent years, it has become increasingly clear that the family business has grown into a global player. “This is also changing everyday working life. Employees are collaborating with their international colleagues more than ever,” explains Späth.

DR. INGEBORG JOST

For two years, she leaves her home in Biberach and supports setting up the quality control for the new production unit.

“The change has been enriching for me, both professionally and culturally.”

DR. INGEBORG JOST

The production site in Sant Cugat gets a new line for inhalation products.

Dr. Ingeborg Jost is currently having this experience. She traded the timbered houses of Biberach for Sant Cugat, a Catalan city north of Barcelona. In Germany, she led a laboratory team for inhalation products in Biberach. Now she is responsible for the quality control at the new RESPIMAT® production unit in Spain. "The production site in Sant Cugat has started construction on a new line for inhalation products as well," Jost explains. With her experience from the development of the RESPIMAT®, she can provide the Spanish team with optimal support in setting up quality control for the new production unit.

Because Jost will work with the team in Spain for two years, she moved there with her family. Her two daughters attend a local German school. "The change has been enriching for me, both professionally and culturally," says Jost. She quickly realized, for example, that agility is particularly in focus in the Spanish teams. "I certainly expect to bring back a few ideas and experiences that could also help our team in Germany."

The colleagues in Spain benefit from her experience and vice versa.

INTRODUCING: THINKING OUTSIDE THE BOX

The Making More Health (MMH) initiative is committed to improving healthcare worldwide. MMH builds social and business collaborations and accelerates social entrepreneurial solutions.

Miguel Neiva is one of those social entrepreneurs. He developed a code that turns colors into symbols to simplify the daily lives of millions of color-blind people. The code is used, for example, for school materials, textiles, or public transport to ensure the adoption by a large section of the color-blind public. Another field of application is the healthcare sector: The code finds use on drug and pharmaceutical packaging that are usually color-coded to guide procedures. Neiva's development helps to prevent errors caused by poor reading.

CHANGE OF PERSPECTIVE

Making More Health has created an innovative program for the management development, called "Executives in Residence". It gives talented managers an opportunity to break out of traditional ways of thinking. Participants work on innovative ideas for improving local health with social startups in developing countries. "We want to spark the managers' pioneering potential by confronting them with new perspectives and working methods on-site in these countries," explains Verena Metzler, Head of the "Executives in Residence" program.

CHRISTOPH BRABANDT

"Good ideas are the key to our competitiveness," says Brabandt. He has dedicated himself entirely to innovation for years.

THE INNOVATION DRIVER

Submitting ideas, testing new things, and sharing the results: This is the core idea of Accelerate. Under the leadership of Christoph Brabandt, this initiative by Boehringer Ingelheim has helped more than 80 applicants to put their innovative ideas into practice.

Service robots and drones, chatbots, virtual reality glasses and creative spaces: Christoph Brabandt deals with an incredible range of subjects, all thanks to the employees of Boehringer Ingelheim. They have submitted over 130 proposals to Accelerate from 13 countries. The initiative promotes innovation – and is led by Brabandt. "It's incredible how much creativity there is in this company," he says. The business information specialist became involved with Accelerate rather accidentally. Over three years ago, a group of visionaries including Brabandt got together and asked themselves how Boehringer Ingelheim could generate ideas and innovations. Their main focus was on ways employees could learn new technologies through playful means. Before long, the idea of creating a platform with minimal barriers where people could easily share ideas and request support was born: Accelerate.

The proposals land on Brabandt's desk. He reviews the formalities, connects the idea creators with experts who may have already submitted similar concepts, or provides valuable tips for reworking the proposals. Then comes a second stage where the proposals are submitted to the steering committee. "Our main focus is on promoting really new, disruptive ideas," Brabandt says. When a project is approved, the creators normally receive a budget of up to 50,000 euros to bring their ideas to life. Input is provided by external partners as well as an active community that has formed on Accelerate's portal, where participants discuss proposals and experiences.

Brabandt is also a passionate contributor to the discussions. After all, he has dedicated himself entirely to innovation for years. He supports digitalization campaigns like "Fast Forward", helps idea creators refine their ideas in the "ideation" process, and has received training as a Design Thinking Business Coach and as a Scrum Master, a moderator for agile development teams. His goal in all this is to provide employees with the inspiration to innovate. "Good ideas are the key to our competitiveness," he says. In this context, the ideas – particularly at Accelerate – do not necessarily need to be thoughtfully prepared business models. "The first step is to try things out and gain new knowledge," says Brabandt. This can also mean that certain ideas or processes fail to achieve the desired success and need to be reworked.

> **"It's incredible how much creativity there is in this company."**
>
> CHRISTOPH BRABANDT

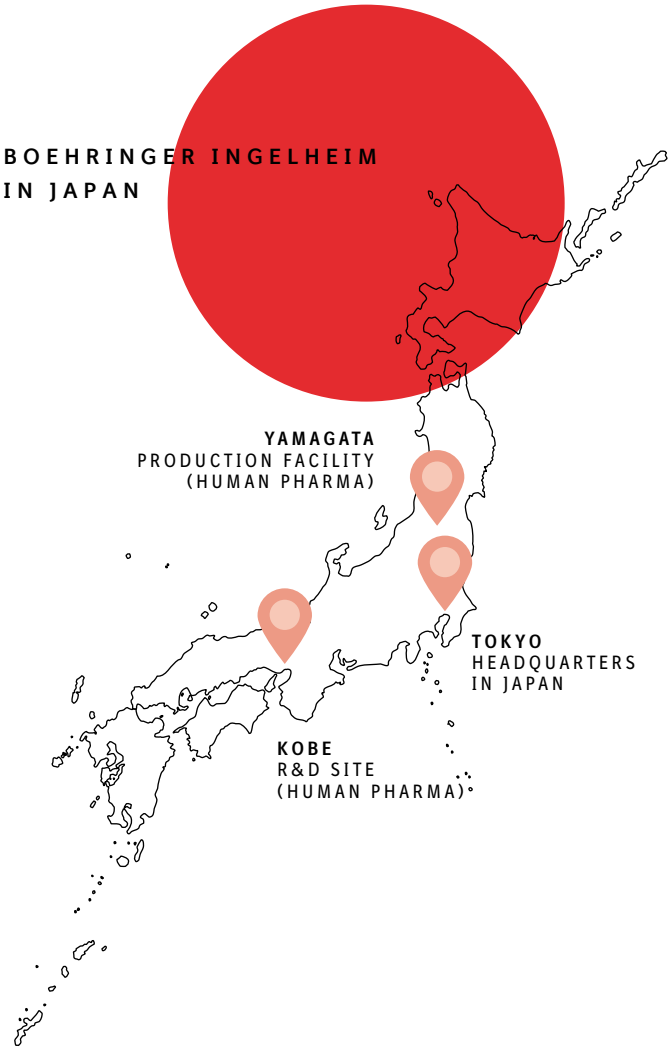
Thanks to Accelerate, a project team from Biberach was able to procure a drone and acquire the proper licenses for flying unmanned aerial vehicles, with an eye on transporting lab materials by drone in the future. In another project, a smartphone game was programmed to motivate overweight children and teenagers to pursue a healthier lifestyle through play. And in Dubai, a service robot now greets visitors to Boehringer Ingelheim and leads them to their event or meeting rooms.

MAKING WORK MORE FLEXIBLE

AKIKO MARUNO

The biologist has been with Boehringer Ingelheim since 1998.

Telework is uncommon in Japan. Boehringer Ingelheim helps to modernize the country's work environment – for the benefit of the company, and above all, its employees.



Japan is an economic powerhouse and often ranked as one of the most innovative countries globally. Its advanced technological infrastructure and strong electronics good industry accelerate digital transformation in almost all areas of life such as mobility, school, and work. And yet there are still areas in life in which the benefits of technological advance fall short of their true potential.

Telework or telecommuting, as some call it, is one of the most surprising examples: Compared to the United States and Europe, where working from outside the office is a common practice for many employees, only one out of six companies in Japan offered their employees to work from outside the office in 2017. The numbers are slowly increasing and the Japanese government is actively promoting working-style innovation, but for most of the Japanese employees, telework is still no common practice.

Boehringer Ingelheim Japan is one of the pioneers when it comes to telework. Already in October 2017, Boehringer Ingelheim Japan introduced telework as part of their work style reform, using "Design Your Day!" as the keyword. This is to have the employees design their day by themselves in order to enhance the quality of time spent both at work and in life.

"Telework is a great benefit and makes life much easier."

AKIKO MARUNO

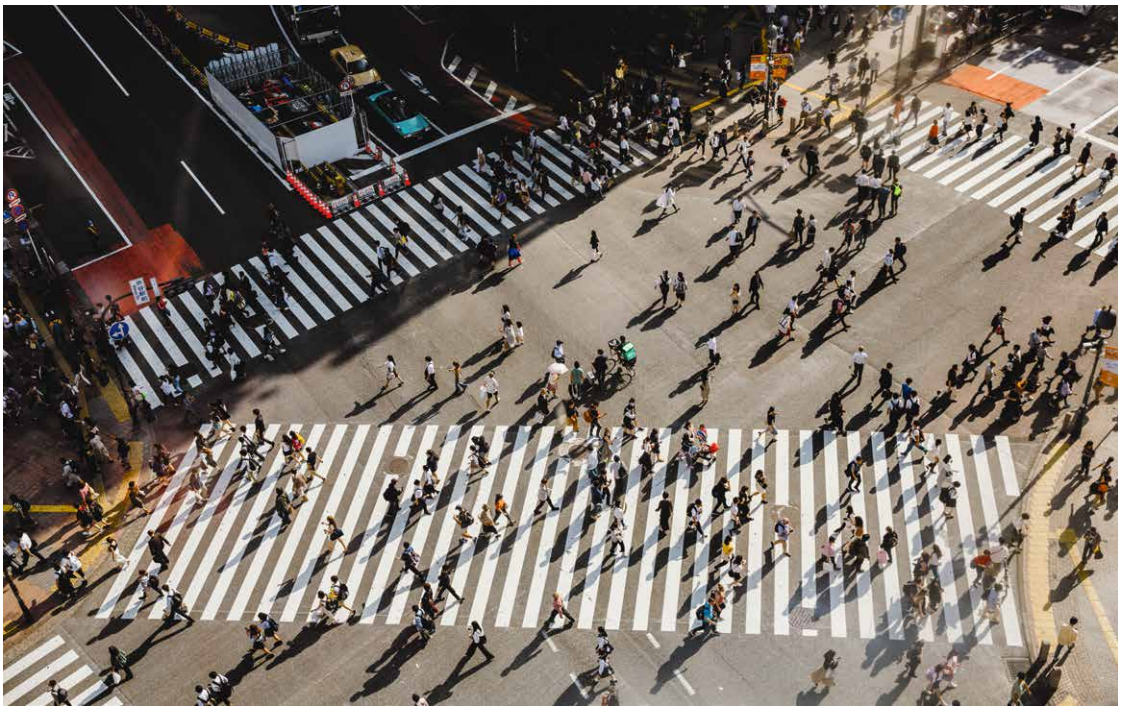
“We started the project with ‘Maximum Freedom to simplify’, allowing to challenge many restrictions in terms of working location, hours, and frequency for its office-work employees,” says Thorsten Poehl, Country Managing Director, Boehringer Ingelheim Japan. “Respecting the employees’ diverse ways of working and living becomes a plus not only for the employees but also for the company. This is because each employee’s perspective and diverse views are important and at a time where the future is less clearly visible we need engaged and empowered employees everywhere. I am convinced that the work style transformation at Boehringer Ingelheim Japan will offer new value to the company and contribute to the growth of sustainable business.”

Akiko Maruno is one of the employees who regularly use telework. The biologist who has been with the company since 1998 is working in the field of Regulatory Information Management. “The introduction of telework has had a significant impact on my professional and personal life. It gives me the freedom and the flexibility to work from outside the office if that is the best option for me. This is a great benefit and makes life much easier.”

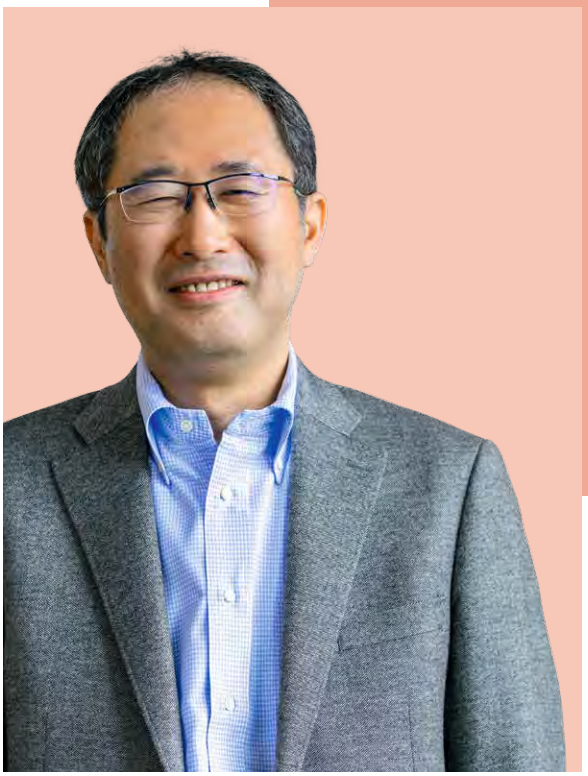
“The introduction of telework has had a significant impact on my professional and personal life.”

AKIKO MARUNO

The Pharma Research Institute of Boehringer Ingelheim in Kobe, Japan.



In Tokyo rush hours are most extreme. But commuting can also be pretty heavy in Japan’s other major cities.



YASUHIRO WAKUI

Lives in the Tokyo area. It takes almost four hours for him to get to the office and back home.

As a mother of two, Akiko Maruno is living with her family in the suburbs of Kobe, the seventh-largest city in Japan and the capital city of Hyōgo Prefecture. Kobe has a population of 1.5 million and the weekday rush hours are as intense and heavy as in the island's other major cities. Maruno spends almost two hours commuting to work every day. If she works from home, she can save this time, play with her daughters and be socially committed. Maruno volunteers as a crossing guard once a month and guides pupils back from school to home. "That takes only half an hour, but as a full-time employee without the option of telework, it would be quite difficult," says Maruno. "I am really proud that I can also contribute to society."

"WITH TELEWORK, WE ALSO SEEK TO ATTRACT TALENTS"

The benefits of telework for employers and employees are hard to refute: Teleworkers seem to be more productive than their counterparts on-site, it enhances the employee's morale and increases the retention rates. "With telework, we also seek to attract talents, especially those who want to combine family, childcare, and their career," adds Kazuhito Kawahara, who is now leading the telework project for Boehringer Ingelheim Japan. "As a research-driven pharmaceutical company, we are dependent on highly-skilled professionals and telework is one of the things that can set us apart from other companies."

Yasuhiro Wakui is another employee of Boehringer Ingelheim Japan who enjoys the flexibility of telework. He joined Boehringer Ingelheim in 2017 after almost two decades in the animal health industry. "It is the first time I can use telework and it significantly improves my recovery from work." Wakui lives with his wife in the Tokyo area. It takes almost four hours for him to get to the office and back home. "I save a lot of time if I work from home, and I can spend much more time to communicate with my family in a non-tired condition. My wife and I are currently planning our new home and I am really energized by the private time we gain."

The telework initiative of Boehringer Ingelheim Japan has also been recognized by other companies and politicians. The company won the "Flexible Commuting Promotion Award" from the Tokyo Metropolitan Office in October 2017 and the "Top Hundred Telework Pioneers" from the Ministry of Internal Affairs and Communication in November 2018.

"I save a lot of time if I work from home."

YASUHIRO WAKUI

PIONEERING BEYOND BUSINESS

An innovative medicine alone does not make people healthy. Rather, a functioning healthcare system is a task that the economy and society can only successfully manage together. This calls for well-trained doctors, competent government agencies, a fair health insurance system, informed patients, and much more. Across sectors, it is also the pioneers who can make a difference. They experience Boehringer Ingelheim as a reliable partner.

DR. ISABELLE BUSCHULTE & DR. DR. FREDRIK GRÜNENFELDER
Global Rabies Initiative

"Rabies is a fatal zoonotic viral disease transmitted from animals to humans. The World Health Organization (WHO) lists rabies as one of the world's most deadly infectious diseases. Worldwide, one person every 10 minutes dies because of rabies, 40% of whom are children. Most of the affected live in low income countries."

With vaccination in dogs serving as the best available defense against its spread, Isabelle Buschulte and Fredrik Grünenfelder from Boehringer Ingelheim started a rabies vaccination project in Nepal in 2019. Through this, they are doing an important part in reaching the WHO's goal of eliminating all human rabies cases by 2030.

MUKUL BHOLA
Defeat-NCD Partnership

The Defeat-NCD Partnership, a public-private partnership anchored in the United Nations, is a bold response to the United Nations Sustainable Development Goals: By 2030, reduce by one third premature mortality from non-communicable diseases (NCDs) through prevention and treatment and promote mental health and well-being.

"I am humbled and excited by the opportunity to lead the Defeat-NCD Partnership as its CEO and work together with committed partners like Boehringer Ingelheim. We tackle NCDs – the biggest killer of our age. Furthermore we improve access and affordability to quality healthcare across our 90 plus priority low-resource countries, so that all people with NCDs have the chance to lead a healthy and productive life."

GERMANO GARRIDO
Semear Institute, "Young Seeds" Initiative

"With only 15 percent of Brazilians graduating with a higher educational degree, offering access to education is a major need in Brazil. Non-graduates are far more likely to be caught in the poverty trap: low income, child labor, poor education, low productivity, and repeat."

To help young people break out of this cycle, Germano and the Semear Institute are partnering with Boehringer Ingelheim to find, support, and recruit some of the best students from the poorer areas of Brazil. Boehringer Ingelheim helps nurture "Young Seeds" through scholarship, mentoring, and networking, so they can grow and become a permanent positive influence on their community.

ISADORE DAY
"Bimaadzwin"

"In Canada and around the world, indigenous populations face unique challenges when it comes to battling non-communicable diseases. Ineffective or culturally inappropriate healthcare solutions were being enforced in the past. An outcome-driven action plan has to work with local specificities, providing services 'Beyond the Pill,' and establishing sustainable partnerships with indigenous healthcare experts."

Boehringer Ingelheim has engaged with "Bimaadzwin", a Canadian indigenous organization that brings First Nation communities and governments together to build an indigenous health policy framework.

FEMKE SMEETS
"Tiba Yako": integrated disease service model through mobile phone

The "Tiba Yako" app enhances access to healthcare for low-income people in Kenya. The mobile-based technology allows patients to monitor their blood pressure and blood glucose levels at home, digitally send the results to their doctor, get treatment advice, medication prescription, and receive and pay money for medical treatment through a mobile health wallet. In 2019, the app was launched by Boehringer Ingelheim and PharmAccess, a non-profit organization that works to improve access to quality healthcare in Africa. The integrated disease service model offers benefits to patients, healthcare providers, and payers alike.

DR JEREMIAH LAKTABAI
"Ampath"

"Helping people means so much more than medical treatment. It's only when we combine care with nutrition and family support, education, counseling, health insurance, food and income security, and self-sufficiency, that we truly change lives for the better."

Chronic disease is a fast-growing problem in sub-Saharan Africa. "Ampath" healthcare workers in Kenya educate group members on health behaviors and conduct screenings for diabetes and hypertension – helping them prioritize and afford the care they need. As of end of 2019, 70,000 people have been screened in Western Kenya. Boehringer Ingelheim has been partnering with "Ampath" since January 2019.

IF YOU HAVE ANY QUERIES OR COMMENTS, PLEASE DO NOT HESITATE TO CONTACT US.

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BOEHRINGER INGELHEIM
ANNUAL REPORT

2019

Value through Innovation

Boehringer Ingelheim

FINANCIAL HIGHLIGHTS

Amounts in millions of EUR, unless otherwise indicated	2019	2018	Change
Net sales	**18,997**	**17,498**	**+9%**
by region			
Americas	46%	46%	
Europe	30%	30%	
Asia/Australia/Africa (AAA)	24%	24%	
by business			
Human Pharma	74%	72%	
Animal Health	21%	23%	
Biopharmaceutical Contract Manufacturing	4%	4%	
Discontinued Operations	1%	1%	
Research and development expenses	3,462	3,164	+9%
Personnel expenses	5,367	5,276	+2%
Average number of employees	51,015	50,333	+1%
Operating income	3,782	3,472	+9%
Operating income as % of net sales	19.9%	19.8%	
Group profit	2,721	2,075	+31%
as % of net sales	14.3%	11.9%	
Group equity	14,681	12,334	+19%
Return on Group equity	22.1%	19.5%	
Investments in tangible assets	1,073	950	+13%
Depreciation of tangible assets	585	552	+6%

SUMMARY REPORT

SUMMARY REPORT

2019

Boehringer Ingelheim

Top 4 products – Human Pharma

Net Sales 2019	in million EUR	Change
JARDIANCE®	2,152	+47%
SPIRIVA®	2,058	–15%
TRAJENTA® / JENTADUETO®	1,559	+12%
PRADAXA®	1,529	+3%

Top 4 products – Animal Health

Net sales 2019	in million EUR	Change
NEXGARD®	740	+21%
FRONTLINE®	379	–5%
HEARTGARD®	318	+6%
INGELVAC CIRCOFLEX® / FLEXCOMBO®	238	–22%

OVERVIEW

THE CORE OF OUR LEITBILD

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OUR COMPANY

Making new and better medicines for humans and animals is at the heart of what we do. Our mission is to create breakthrough therapies that change lives. Independent and family-owned, Boehringer Ingelheim has the freedom to pursue its long-term vision, looking ahead to identify the health challenges of the future and targeting those areas of need where we can do the most good.

As a world-leading, research-driven pharmaceutical company, more than 51,000 employees create value through innovation daily for our three business areas: Human Pharma, Animal Health, and Biopharmaceutical Contract Manufacturing. In 2019, Boehringer Ingelheim achieved net sales of 19 billion euros. Our significant investment of almost 3.5 billion euros in R&D drives innovation, enabling the next generation of medicines that save lives and improve quality of life.

We realize more scientific opportunities by embracing the power of partnership and diversity of experts across the life-science community. By working together, we accelerate the delivery of the next medical breakthrough that will transform the lives of patients now, and in generations to come.

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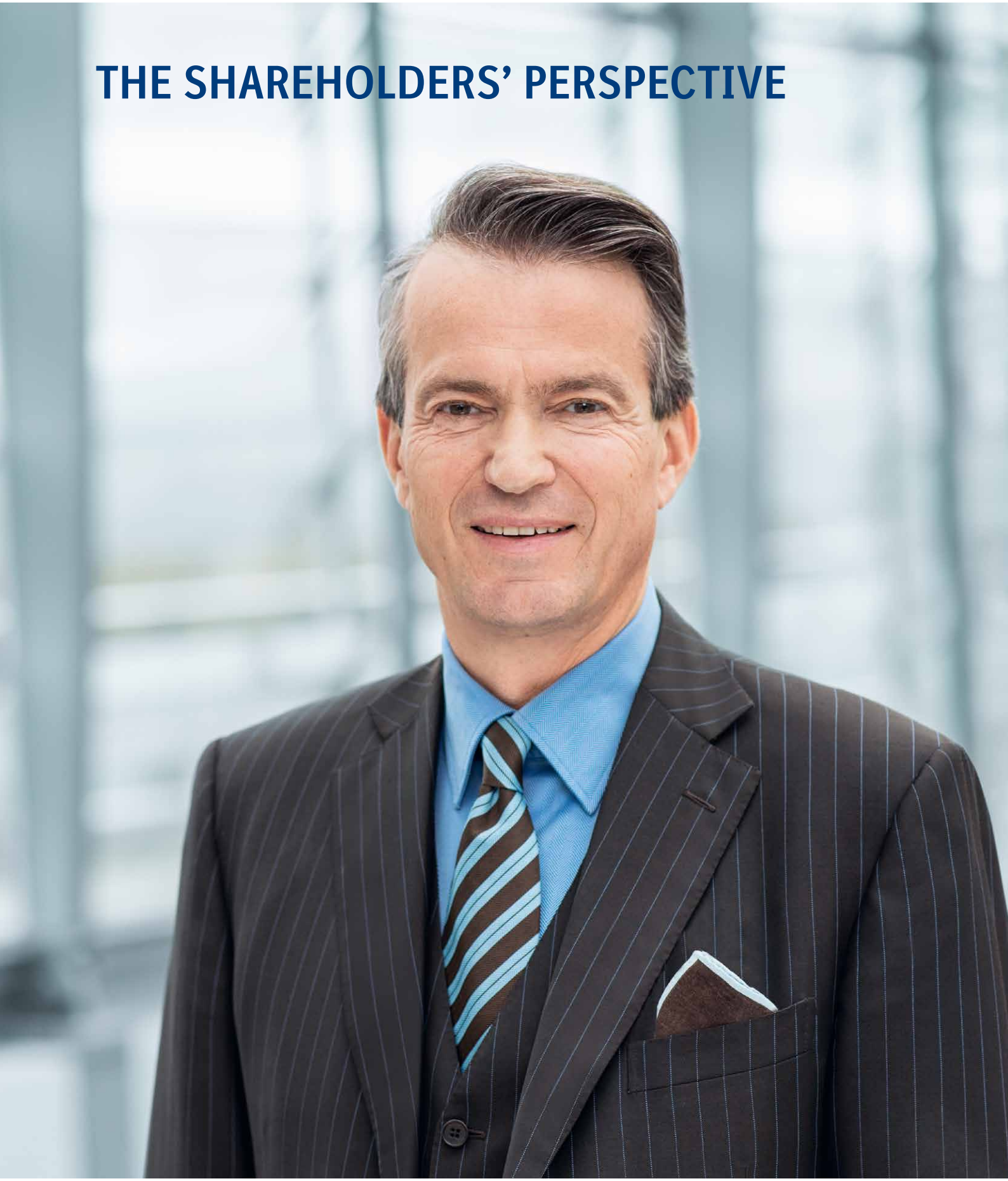

Dear Reader,

We look back on a successful financial year 2019, in which Boehringer Ingelheim made another important contribution to human and animal health. Our medicines have improved the quality of life and given patients more years to live.

This is possible because we have relied on the power of innovation for many decades. We invest sustainably, continuously, and to an increasing extent. Our innovative strength is the basis of our company's independence. To reach patients, we need to have a competitive offer. We need to fulfil our promise of quality and convince with the value of our contribution. Over the past few years, we have done this well.

2020 is a special year – for the shareholders as well as the company – and especially for the many colleagues who are involved in our Making More Health (MMH) initiative. MMH is celebrating its tenth anniversary this year. Since its foundation, MMH is making an important contribution to improving healthcare for people worldwide. Currently, more than 100 social entrepreneurs are active in the MMH network in around 40 countries. An impressive record for a young initiative with a timeless mission.

Our sincere thanks go to all our employees who, together and with great personal commitment, contributed to the development of Boehringer Ingelheim this past year. They have laid the foundation for a successful future.

signed by
Christian Boehringer
Chairman of the Shareholders' Committee

THE BOARD OF MANAGING DIRECTORS

Michel Pairet

Carinne Brouillon

Hubertus von Baumbach *Michael Schmelmer* *Jean Scheftsik de Szolnok*

Dear Reader,

We all learn every day in our personal environment and from the media how great the need for innovative medicines is. New therapies are urgently needed, whether for common diseases or for those that are rare and affect the lives or health of only few.

At Boehringer Ingelheim, we have set ourselves the goal of making a decisive contribution to improving human and animal health. This task inspires and drives us every day.

We focus on diseases for which there is a great medical need due to the lack of therapeutic options. The outbreaks of African swine fever and COVID-19 remind us that pharmaceutical progress in human and veterinary medicine continues to be highly important to society. We take advantage of advances in science that offer new approaches and rely on the strengths we have developed in the more than 130 years of our company history. In the Human Pharma business, we are working on over 100 clinical and preclinical research and development projects involving 60 new active ingredients. Last year, ten active ingredients were tested in the clinical environment for the first time. More than 30 percent of the active ingredients in our pipeline come from collaboration with external researchers.

Bridging the gap between industry and science is essential for us. In research, we collaborate on more than 150 projects with around 120 academic institutions on three continents. For example, since 1993 we have funded basic biomedical research at the Research Institute of Molecular Pathology (IMP) in Vienna. The IMP has enjoyed an excellent reputation for decades.

Our drugs help save human lives. For example, it can be assumed that from its launch in 2014, JARDIANCE® will extend the lives of type 2 diabetes patients treated with it by more than 1.5 million patient-years, if they continue treatment. Also, ACTILYSE® remains a vital and irreplaceable medicine for millions of stroke patients worldwide, more than 30 years since its market launch.

Besides the development of innovative active ingredients, the topic of sustainability plays an increasingly important role in drug development. Last year we launched the reusable RESPIMAT® inhaler for our respiratory products SPIRIVA® and SPIOLTO®. The reusable RESPIMAT® should eliminate 776 metric tons of plastic waste and 14,300 metric tons of CO_2 emissions by 2025.

In the area of animal health, the consequences of African swine fever hit our customers in China particularly hard. Unfortunately, this is a very insidious virus and the development of a vaccine is challenging and takes a long time. We are facing this challenge together with our partners in China and Europe. On the way to new products, we initiated over 400 clinical trials worldwide last year and received over 200 product approvals, including for Arti-Cell® Forte in Europe, the first stem cell-based veterinary therapy for the treatment of lameness in horses.

Boehringer Ingelheim has a strong, yet flexible production network. Within this network, the production of medicines in Europe also continues to play an important role. In order to remain competitive in the long term, our current investment program for the expansion of European production facilities has a volume of more than one billion euros. This year we will inaugurate a new production facility for biopharmaceutical products in Vienna. This is the single largest capital investment ever made by our company. We plan to use the facility both for the production of our own portfolio and for third party contract manufacturing. An important milestone for our Biopharmaceutical Contract Manufacturing was also the first market approval of a biologic produced by Boehringer Ingelheim in Shanghai for the Chinese market.

2019 was a very successful year in terms of our performance. This enabled us to further strengthen the basis of our independence and allowed for investments in innovation and R&D for urgently needed drugs, as well as for capital investments.

We would like to thank our customers for their trust and our partners for their support. Our special thanks go to our employees. They laid the foundation for our success this past year and for the future – often as “pioneers” in their respective fields. Together, we share the goal to make a contribution to human and animal health.

signed by
Hubertus von Baumbach

signed by
Carinne Brouillon

signed by
Michel Pairet

signed by
Jean Scheftsik de Szolnok

signed by
Michael Schmelmer

CORPORATE BODIES

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Chairman of the Shareholders' Committee

Christoph Boehringer

Erich von Baumbach jr.

Isabel Boehringer

Dr. Mathias Boehringer

Prof. Dr. Dr. Andreas Barner

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Trustee, Martin Hilti Family Trust
President, Hilti Foundation

Dr. Nikolaus von Bomhard
Chairman of the Advisory Board (from 01.01.2020)
Chairman of the Supervisory Board
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Former member of the Board of Executive Directors
and Research Executive Director BASF SE

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Heraeus Holding GmbH

Board of Managing Directors

Hubertus von Baumbach
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Human Pharma

Dr. Joachim Hasenmaier (until 31.12.2019)
Member of the Board of Managing Directors,
Animal Health

Allan Hillgrove (until 31.12.2019)
Member of the Board of Managing Directors,
Human Pharma

Dr. Andreas Neumann (until 30.09.2019)
Member of the Board of Managing Directors,
Human Resources

Dr. Michel Pairet
Member of the Board of Managing Directors,
Innovation

Jean Scheftsik de Szolnok (from 01.01.2020)
Member of the Board of Managing Directors,
Animal Health

Michael Schmelmer
Member of the Board of Managing Directors,
Finance (until 30.09.2019)
Finance & Group Functions (from 01.10.2019)

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GROUP MANAGEMENT REPORT

INFORMATION ABOUT THE GROUP

The Group's business model

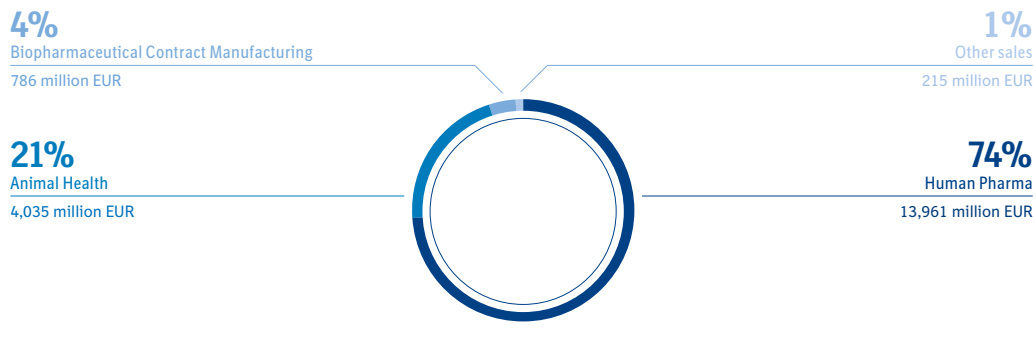
From its foundation 135 years ago, Boehringer Ingelheim has developed into a research-based pharmaceutical company. Headquartered in Ingelheim am Rhein, Germany, the company has been family-owned since its founding in 1885 and is among the world's 20 leading pharmaceutical companies. The aim of its business activities is to sustainably improve the health and quality of life of humans and animals. As one of Germany's most research-intensive companies, Boehringer Ingelheim concentrates on researching medicines and offering therapies for diseases for which satisfactory treatment options are currently unavailable. It provides the entire value chain, from research and development (R&D) through production and commercialization of its products. At a global level, every day more than 51,000 employees create value through innovation for the company's three businesses: Human Pharma, Animal Health and Biopharmaceutical Contract Manufacturing. In 2019, Boehringer Ingelheim generated net sales of 19 billion EUR in these businesses.

With a 74% share of overall sales, the Human Pharma business is the core focus of Boehringer Ingelheim's activities. Numerous of the company's own products are already standard treatments in medicine.

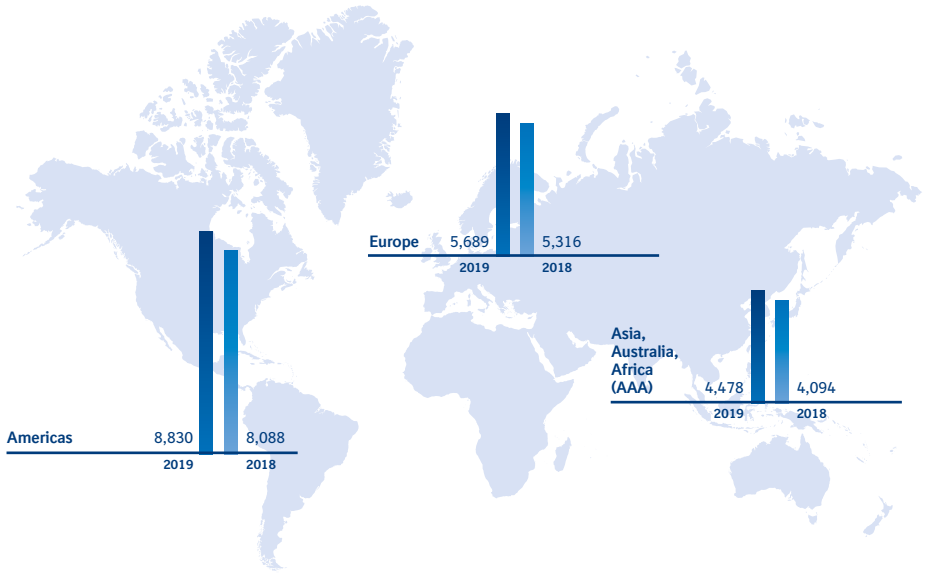
JARDIANCE® strongest revenue contributor for the first time

The Human Pharma business developed positively in the 2019 financial year. For the first time, the strongest revenue contributor in this segment was JARDIANCE®, a medicine for treatment of type 2 diabetes which also reduces the risk of cardiovascular diseases for type 2 diabetics with pre-existing cardiovascular conditions. The following medicines also played a significant role in Boehringer Ingelheim's success: SPIRIVA®, for the treatment of chronic obstructive pulmonary disease (COPD) as well as

NET SALES BY BUSINESS — **Group: 18,997 million EUR**



NET SALES BY REGION (IN MILLION EUR)



asthma, PRADAXA®, which is used to prevent strokes in patients with atrial fibrillation and for the prevention and treatment of thromboembolic disorders and TRAJENTA®, which is used for the treatment of type 2 diabetes. OFEV®, which is used for the treatment of the rare, fatal respiratory disease idiopathic pulmonary fibrosis (IPF) and increasingly also in a further indication – systemic sclerosis with interstitial lung disease (SSc-ILD) – likewise provided a significant contribution to the company's growth.

Boehringer Ingelheim's Animal Health business is one of the biggest providers of veterinary vaccines and medicines and has a strong presence in the livestock and pets segments. Mergers on the world market resulted in further consolidation on the animal health market in 2019. Boehringer Ingelheim is the market leader in Germany and the second-largest provider at a global level. While net sales increased in the pets segment, sales plunged in the swine segment in 2019 due to the outbreak of African swine fever, especially in China. The most significant products in terms of net sales include the antiparasitics NEXGARD®, HEARTGARD®, FRONTLINE® and the established swine vaccine INGELVAC CIRCOFLEX®, which is used to treat porcine circovirus type 2.

Biopharmaceutical Contract Manufacturing is another important growth area for Boehringer Ingelheim. Boehringer Ingelheim's biopharmaceutical activities comprise the manufacture of own-brand marketable products (such as ACTILYSE®, METALYSE® and PRAXBIND®) and – as one of the world's leading providers – process development and commercial production of biopharmaceuticals for third-party industrial customers.

Other sales mainly comprise discontinued operations.

In the 2019 financial year, Boehringer Ingelheim once again achieved the majority of its sales in the Americas (46%) and Europe (30%) regions. The region of Asia/Australia/Africa (AAA) with countries such as China, which reported a currency-adjusted sales growth of +21% for the Human Pharma business, is of strategic significance for the Group's future development, making up 24% of its sales.

Research & Development

In line with its mission statement, Boehringer Ingelheim's goal is to research and develop innovative medicines and therapies for the treatment of diseases for which there are as yet no satisfactory treatments available. Its major emphasis is on the development of medicines as well as new approaches and therapies to prevent, detect and treat chronic diseases. In areas where the need for treatment is high, we want to make a major contribution in the human pharma business as well as in the field of animal health.

We have a global research network of 12 countries, with major facilities in Germany (Biberach, Hanover and Ingelheim), the USA (Ridgefield, Connecticut; Duluth, Georgia and St. Joseph, Missouri), Austria (Vienna), Japan (Kobe) and France (Lyon). Boehringer Ingelheim continues to explore opportunities for expanding its existing product portfolio through organic growth, including in cooperation with external partners.

R&D expenses increased to 18.2% of net sales

We build on cooperation with academic institutions, biotech companies, public research institutions and a global research network comprising our own facilities. Moreover, our research activities in the field of development projects and technologies are supplemented by important cooperation and license agreements. A key component of Boehringer Ingelheim's innovation strategy is the supplementation of our own broad R&D portfolio with partnerships especially in the scientific area, where we collaborate over 150 active projects with more than 120 academic institutes spanning three continents, so as to strengthen the Group's innovative prowess. In Human Pharma we are aiming for at least 30% of all new molecules in our pipeline to come from external innovation.

Research and development

	2019	2018	2017	2016	2015
Expenses in million EUR	3,462	3,164	3,078	3,112	3,004
– as % of net sales	18.2	18.1	17.0	19.6	20.3
Human Pharma expenses in million EUR	3,042	2,780	2,714	2,870	2,780
– as % of Human Pharma net sales	21.8	22.1	21.5	23.9	24.8
Animal Health expenses in million EUR	419	384	357	180	164
– as % of Animal Health net sales	10.4	9.7	9.2	12.3	12.0
Average number of employees	9,154	8,552	8,589	8,055	7,895
Investments in tangible assets (without investments in infrastructure) in million EUR	183	136	71	92	77

Research network expanded

In 2019, Boehringer Ingelheim expanded its research network through its purchase of all shares in the Swiss biotech company Amal Therapeutics SA, which concentrates on cancer immunotherapy and develops innovative therapeutic cancer vaccines. This acquisition is an important step in strengthening Boehringer Ingelheim's position in research into immuno-oncological cancer therapies. Boehringer Ingelheim also agreed to collaborate with the South Korean pharmaceutical company Yuhan Corporation in treating non-alcoholic steatohepatitis (NASH). The cooperation and license agreement focuses on therapy for the three main causes of these diseases: steatosis, inflammation and scarring.

R&D SITES

AMERICAS

Brazil
1. Paulínia (AH)

Mexico
2. Guadalajara / Tateposco (AH)

USA
3. Ames (AH)
4. Athens / Colbert (AH)
5. Duluth (AH)
6. Fulton (AH)
7. Gainesville (AH)
8. North Brunswick (AH)
9. Ridgefield (HP)
10. Saint Joseph (AH)
11. Sioux Center (AH)

EUROPE

Germany
12. Biberach (HP)
13. Hanover (AH)
14. Ingelheim am Rhein (AH)
15. Katharinenhof-Rohrdorf (AH)

France
16. Lyon (AH)
17. Saint-Vulbas (AH)

The Netherlands
18. Lelystad (AH)

Austria
19. Innsbruck (HP)
20. Vienna (HP)

Switzerland
21. Geneva (HP)

ASIA / OCEANIA

Australia
22. Sydney (AH)

China
23. Beijing (AH)
24. Shanghai (AH)
25. Taizhou (AH)

Japan
26. Kobe (HP)
27. Tokyo (AH)

New Zealand
28. Auckland (AH)

BI X, Boehringer Ingelheim's digital laboratory, grew to 51 employees in 2019. In the past year, its agile development teams transferred several innovative digital products to the company's businesses. Examples are the "FARMERA" platform, which helps swine farmers keep their livestock healthy and thus enhances their productivity, and "SMART", which employs self-learning algorithms to increase efficiency on biopharmaceutical production lines.

Since 2010, the Boehringer Ingelheim Venture Fund drives innovation through its strategic investments in early-stage science and technology. The Venture Fund invests in biotech and start-up companies with innovative concepts and technologies that have the potential to provide ground-breaking therapeutic platforms. The Venture Fund also creates companies when it identifies promising research projects in universities and academic institutions.

At the biomedical research institute IMP in Vienna (Austria), which is largely funded by Boehringer Ingelheim, more than 200 scientists from 40 countries carry out research on molecular and cellular mechanisms, which form the basis of complex biological phenomena.

Boehringer Ingelheim's R&D activities are the basis for the company's sustainable success. Our innovative capability has played a key role in the Group's positive business development over the past years. In-house R&D – supplemented by external cooperation and partnerships – will also continue to be a top priority in the future.

In the 2019 financial year, we employed an average of 9,154 people at our R&D facilities. A total of almost 3.5 billion EUR was invested in the research and development of new medicines. This is above the level in 2018 and corresponds to around 18.2% of the Group's net sales in 2019.

More than 60 new substances in our Human Pharma portfolio

Human Pharma

For more than a century, we have been committed to improving the lives of patients. The focus of Human Pharma R&D lies on cardiovascular and metabolic diseases, oncology, respiratory diseases, immunology, diseases of the central nervous system (CNS) and retinal health.

By the end of 2019, more than 60 new substances were included in our Human Pharma development portfolio, and in around 100 clinical and preclinical projects we are working on their development and registration.

A selection of important research and development projects is shown hereinafter.

DEVELOPMENT PIPELINE END OF 2019	PHASE
CARDIOVASCULAR AND METABOLIC DISEASES	
GLP1R / GCGR agonist*	Phase I
Amylin analog*	Phase I
Hemodynamic modulator	Phase I
EmpaLinaMet XR (combination of empaglifozin, linagliptin und metformin)**	registration/ approval
Appetite modulator	Phase I
Empagliflozin / New indication** SGLT2 inhibitor	T1DM	Phase III
Empagliflozin / New indication SGLT2 inhibitor	CKD	Phase III
Empagliflozin / New indication SGLT2 inhibitor	CHF	Phase III

DEVELOPMENT PIPELINE END OF 2019	PHASE
ONCOLOGY	
PD-1 antibody	Phase I
mRNA vaccine*	Phase I
VEGF/Ang-2 antibody *	Phase I
LAG 3 antibody	Phase I
SMAC-mimetic	Phase I
BET inhibitor	Phase I
LRP 5/6 inhibitor*	Phase I
MDM2-p53 antagonist*	Phase I
SIRP1α antagonist*	Phase I
SOS1::KRAS inhibitor	Phase I
MEK inhibitor *	Phase I
Recombinant vaccine*	Phase I
Xentuzumab (BI 836845)* IGF1/2 antibody | mBC	Phase II
RESPIRATORY DISEASES	
Autotaxin inhibitor*	Phase I
Non-receptor tyrosine kinase inhibitor*	Phase I
Cysteine protease inhibitor*	Phase I
Leukocyte protease inhibitor	Phase I
Phosphodiesterase inhibitor	Phase I
BI 1265162> ENaC inhibitor | CF	Phase II
Nintedanib / new indication**> Triple angiokinase inhibitor | PF-ILD	registration/ approval
Nintedanib / new indication**>> Triple angiokinase inhibitor | SSc-ILD	registration/ approval
IMMUNOLOGY	
Nuclear receptor antagonist	Phase I
Epithelial barrier stress modulator	Phase I
Receptor serine/threonine kinase inhibitor	Phase I
Spesolimab (BI 655130) IL36R antibody | GPP	Phase II
Spesolimab (BI 655130) IL36R antibody | PPP	Phase II
Spesolimab (BI 655130) IL36R antibody | AtD	Phase II
Spesolimab (BI 655130) IL36R antibody | Ulcerative colitis	Phase II
Spesolimab (BI 655130)> IL36R antibody | CD (Crohn's disease)	Phase II
BI 730357 Nuclear receptor antagonist | Psoriasis	Phase II

DEVELOPMENT PIPELINE END OF 2019	PHASE
CENTRAL NERVOUS SYSTEM DISEASES	
TRPC 4/5 inhibitor*	Phase I
BI 409306* PDE 9 inhibitor | FEP	Phase II
BI 409306* PDE 9 inhibitor | REX	Phase II
BI 425809 GlyT1 inhibitor | CIAS	Phase II
BI 425809 GlyT1 inhibitor | AD	Phase II
RETINAL HEALTH	
Neuronal damage modulator	Phase I
VEGF / Ang-2 antibody*	Phase I
BI 1467335* AOC3 inhibitor | Diabetic retinopathy	Phase II

Indication abbreviations:

AD: Alzheimer's disease
AtD: Atopic dermatitis
CD: Crohn's disease
CF: Cystic fibrosis
CHF: Congestive heart failure
CIAS: Cognitive impairment in schizophrenia
CKD: Chronic kidney disease
FEP: First episode psychosis
GPP: Generalized pustular psoriasis
mBC: Metastatic breast cancer
PF-ILD: Progressive fibrosing interstitial lung disease
PPP: Palmoplantar pustulosis
REX: Reduction of relapse in schizophrenia
SSc-ILD: Systemic sclerosis-associated interstitial lung disease
T1DM: Type 1 diabetes mellitus

* Partnered projects or acquired assets.
** Study complete, submissions ongoing.
> Key pipeline advances (April–December 2019).
>> Now approved in the US for systemic sclerosis-associated ILD.

Boehringer Ingelheim's therapeutic area of cardiovascular and metabolic diseases contains some of the company's core products. Within the diabetes portfolio and the alliance with Eli Lilly important research data were published in 2019.

Heart failure is a progressive, debilitating and potentially fatal condition and the leading cause of hospitalization in Europe and the US. About half of people with heart failure are expected to die within five years of diagnosis. In 2019, the Boehringer Ingelheim and Eli Lilly Alliance announced the initiation of EMPULSE, the sixth phase III study in the empagliflozin heart failure program, which also consists of the EMPEROR-Reduced and EMPEROR-Preserved, EMPERIAL-Preserved and EMPA-VISION studies. These studies are investigating the effects of empagliflozin on heart failure-related outcomes and functional capacity in more than 9,500 patients with heart failure, including those with and without type 2 diabetes. Building on our legacy of innovative treatments for a range of cardiovascular and metabolic conditions, our R&D strategy takes a holistic view of the needs of cardio metabolic disease patients who often have multiple, related conditions. We are pursuing the next wave of innovative medicines for obesity, kidney and liver diseases – including non-alcoholic steatohepatitis (NASH).

Our focus in oncology research is to take cancer on by developing novel therapeutic approaches that address unmet needs in lung and gastrointestinal cancers. We are advancing a very broad pipeline of cancer cell-directed agents, immune oncology therapies and combinations of these approaches. In 2019, we have successfully advanced a range of research programs in this area. Ten new development projects have been tested in people for the first time.

The scientific research for new therapeutic concepts to help patients with respiratory diseases continues to be of high importance for Boehringer Ingelheim. In 2019, our focus areas leveraged our extensive expertise in respiratory medicine, inflammation and fibrosis to target a broad range of interstitial lung diseases (including indications such as IPF and systemic sclerosis-associated interstitial lung disease (SSc-ILD)), as well as serious lung diseases with high unmet need, such as cystic fibrosis and severe asthma. Data readouts from two phase III data sets for nintedanib in SSc-ILD (SENCSIS® trial) and in progressive fibrosing interstitial lung diseases (PF-ILD, INBUILD® trial) occurred in 2019. Based upon these data, filings for regulatory approvals in the respective indications were submitted and first approvals for OFEV® to slow the rate of decline in pulmonary function in patients with SSc-ILD have been granted in the US, Japan and other countries in 2019. The new RESPIMAT® reusable was launched in the first countries in 2019.

Boehringer Ingelheim has been continuously developing its immunology R&D activities for some years now and is ramping up its capacities for a series of dermatological and gastroenterological indications. Last year, risankizumab, originally discovered through our research activities and partnered with AbbVie, received marketing approval and is now commercialized by AbbVie in major geographies.

Some of the most important neuropsychiatric diseases, such as schizophrenia or depression, continue to be the center of Boehringer Ingelheim's research in central nervous system diseases. Whilst the medical need is high and the number of patients is increasing, the scientific challenges are extremely high. Boehringer Ingelheim takes in this challenge and remains optimistic that we can develop effective therapies for the treatment of neuropsychiatric diseases. The clinical investigation program also encompasses the aspect of early treatment options at a point, when symptoms and physical disorders are disturbing, but not yet pronounced, so that they could potentially be detected (e.g. by voice analysis). This could favorably impact and avoid a more dramatic development.

Boehringer Ingelheim extends research spectrum by retinal health

Boehringer Ingelheim has also expanded the global research and development activities to tackle eye diseases, specifically those affecting the back of the eye. Science and innovation are at the core of the comprehensive pipeline portfolio the company has built in retinal health, with the first assets already in clinical development with the aim to prevent visual impairment and blindness as effective as possible.

In addition to building on our strengths in core therapeutic areas, we capture synergies by focusing on research platforms, OFEV® being a good example for this. In areas such as immune modulation and fibrosis we are working on combining the new approaches. The focus on common pathophysiological mechanisms enables us to discover new approaches and to accelerate the development of new medicines.

The following table shows the relevant changes in current clinical studies (Phase III):

CLINICAL TRIAL	PHASE	CHANGES IN 2019
SENSCIS® (NCT02597933) was a double blind, randomized, placebo-controlled trial evaluating efficacy and safety of oral nintedanib treatment for at least 52 weeks in patients with systemic sclerosis-associated interstitial lung disease (SSc-ILD).	Phase III	Study completed and met primary endpoint. Published in *New England Journal of Medicine.* *In the Phase III SENSCIS® trial nintedanib slowed the loss of pulmonary function in patients with SSc-ILD compared to placebo. Patients taking nintedanib showed a 44% reduction in the rate of decline of their lung function, measured in FVC assessed over 52 weeks.*
INBUILD® (NCT02999178) was a double blind, randomized, placebo-controlled trial evaluating the efficacy and safety of Nintedanib over 52 weeks in patients with progressive fibrosing interstitial lung disease (PF-ILD).	Phase III	Study completed and met primary endpoint. Published in *New England Journal of Medicine.* *In the Phase III INBUILD® trial, nintedanib slowed lung function decline significantly by 57% across the overall study population, as assessed by the annual rate of decline in forced vital capacity (FVC) over 52 weeks in patients with fibrosing interstitial lung disease (ILDs) with signs of progression.*
An open-label, long-term extension study to assess the safety and efficacy of BI 655130 (spesolimab) treatment in patients with generalized pustular psoriasis (GPP) who took part in previous studies with BI 655130.	PHASE III	First patient included.
EMPA-KIDNEY (NCT 03594110) is a multinational randomized, double-blind, placebo-controlled clinical trial, designed to evaluate the effect of empagliflozin on kidney disease progression and cardiovascular mortality risk in people with pre-existing chronic kidney disease with and without type 2 diabetes.	Phase III	First patient included.
CAROLINA (NCT 01243424) is a multinational, randomized, double-blind, placebo-controlled clinical trial designed to assess the effect of linagliptin compared to glimepiride on cardiovascular (CV) safety in adults with relatively early type 2 diabetes and increased CV risk or established CV disease.	Phase III	Study completed and met primary endpoint. Published in *Journal of the American Medical Association.*

Animal Health

In its R&D activities in the field of animal health, Boehringer Ingelheim concentrates on innovative vaccines and antiparasitics for the protection of livestock and pets, as well as pharmaceutical products for the treatment of chronic diseases. Our goal is to strengthen animal health by means of innovative, preventive solutions and medicines.

At our globally oriented research and development facilities, we focus on research into new substances and the development of future therapeutic solutions. Since many vaccines are based on local pathogens and pathogen variants, it is imperative that we are present in all key market regions with local R&D and production facilities.

In the past year, we created a comprehensive database of pet and livestock diseases which will serve as the basis for focusing our research and development activities. Over 2,000 diseases and clinical symptoms which have been entered in this database can be evaluated based on various key criteria such as pathogens or affected organ systems.

Launch of ARTI-CELL® Forte

In addition, we brought ARTI-CELL® Forte, the first stem cell-based animal health product, onto the European market. This is used to treat lameness in horses. We also continue to work on highly promising innovative, digitally integrated diagnostics solutions.

In 2019, we initiated more than 400 clinical studies worldwide and received more than 200 product authorizations. In addition to our internal research and development, we analyze external projects or products and integrate them in our portfolio where appropriate. Obtaining approvals and expanding the geographical distribution of existing products are other important aspects of our R&D activities.

PRODUCTION FACILITIES

AMERICAS

Brazil
1. Itapecerica (HP)
2. Paulínia (AH)

Mexico
3. Guadalajara (AH)
4. Xochimilco (HP)

Puerto Rico
5. Barceloneta (AH)

USA
6. Athens (AH)
7. Fremont (Bio)
8. Gainesville (AH)
9. St. Joseph (AH)
10. Worthington (AH)

EUROPE

Denmark
11. Kalundborg (AH)

Germany
12. Biberach (Bio)
13. Dortmund (HP)
14. Ingelheim am Rhein (HP)

France
15. Lyon (AH)
16. Toulouse (AH)

Greece
17. Koropi (HP)

Italy
18. Fornovo (HP)
19. Noventa (AH)

The Netherlands
20. Lelystad (AH)

Austria
21. Vienna (Bio)

Spain
22. Sant Cugat (HP)

United Kingdom
23. Pirbright (AH)

ASIA / OCEANIA

China
24. Nanchang (AH)
25. Shanghai (HP, Bio)
26. Taizhou (AH)

Indonesia
27. Bogor (HP)

Japan
28. Yamagata (HP)

New Zealand
29. Auckland (AH)

Production

Human Pharma

In the Human Pharma business, production is responsible for the reliable supply of innovative, top-quality medicines at competitive prices for patients and customers. The ongoing development of the company's internal production facilities and our strategic cooperation with external manufacturers have established a modern, flexible market supply network which encompasses the entire value chain, from suppliers of starting materials to worldwide logistics and the distribution of finished pharmaceutical products. Boehringer Ingelheim's production facilities concentrate on products that are strategically important for the company, as well as on state-of-the-art and in some cases unique manufacturing technologies. Partnerships with external manufacturers expand production capacities, particularly for products which are already far advanced in terms of their life cycle.

In the 2019 financial year, this global network included Boehringer Ingelheim's own plants in nine countries. The Group has four biopharmaceuticals facilities. It also has two facilities for the manufacture of pharmaceutical active substances, one that produces medical devices, and eight that manufacture finished pharmaceutical products. In 2019, the Group's network was optimized further and the facility in Malgrat (Spain) was sold. By assigning important steps and technologies within the production processes to more than one facility, Boehringer Ingelheim was always able to ensure the patient care in 2019.

Delivery capacity and patient care are a high priority for Boehringer Ingelheim. The company consistently makes important investments in the development and transformation of its production capacities, in both its internal and external network. At its Ingelheim headquarters, Boehringer Ingelheim made significant progress with the implementation of a key investment in the industrialization of newly developed innovative medicines and an initial supply of them to the market. The construction of a plant at the Group's Sant Cugat facility in Spain was completed on schedule and the company's markets were additionally supplied with RESPIMAT® technology-based inhalation medicines. The extension of our biopharmaceutical site in Vienna (Austria) also creates additional in-house capacities to cover the increasing demands for ACTILYSE® and PRAXBIND®.

The ongoing implementation of the Group's supply chain strategy is optimizing value chain management significantly, from the supplier to the customer ("end-to-end"). The use of modern digital and automated processes and technologies facilitates the transparent and efficient management of an integrated, flexible supply chain that is based on a global production network.

Animal Health

In 2019, Animal Health products were manufactured for worldwide sale in a network of 16 Animal Health production facilities in eleven countries. In addition to Boehringer Ingelheim's internal facilities, the company used around 170 contract manufacturers to manufacture products for Boehringer Ingelheim. The company's product portfolio is essentially unchanged and is well balanced between vaccines, pharmaceutical products and nutraceuticals. These traditional products are supplemented with diagnostics products as well as monitoring solutions, including digital applications which are used for livestock monitoring or which link livestock owners with veterinarians. Optimization of the company's production network continues and remains a priority, with the goal of ensuring a robust, efficient supply of all its products. The company sold its facility in Saint-Herblon (France) and reduced the number of its contract manufacturers in 2019.

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Animal Health production facilities in eleven countries

In 2019, investments were made in capacity expansion for the strongest revenue contributor, NEXGARD®, at the Barceloneta (Puerto Rico) facility; in the expansion of small animal vaccine production at the company's facility in Athens, Georgia (USA) and of cattle vaccine production in St. Joseph, Missouri (USA); and in capacity expansion for foot-and-mouth disease vaccines in Lyon (France). Additional investments were made in the development of innovative technologies for the manufacture of our products.

Biopharmaceutical Contract Manufacturing

Boehringer Ingelheim pursues its biopharmaceutical activities at its facilities in Biberach (Germany), Vienna (Austria), Fremont, California (USA) and Shanghai (China). They comprise the manufacture of own-brand marketable products (such as ACTILYSE®, METALYSE® and PRAXBIND®), the manufacture of biopharmaceuticals for clinical testing and – as one of the world's leading companies – process development, launch preparation and commercial production of biopharmaceuticals for third-party industrial customers. 70% of the top 20 pharmaceutical companies and innovative biotech firms are clients

One of the leading providers for industrial customers

of Boehringer Ingelheim's Biopharmaceutical Contract Manufacturing business. Boehringer Ingelheim covers the entire biopharmaceutical value chain, from genetic development of the production cell, followed by manufacturing the active substance and filling the finished pharmaceutical product, down to the product launch and the global market supply.

2019 saw an overall increase to the full use of capacity at its network of industrial-scale production facilities. Besides many other products, the Biberach facility fulfilled the increasing market demand for ACTILYSE®. At the company's facility in Fremont, California (USA), the approval process for a customer's market product was successfully completed in 2019. It will thus be possible to meet rising product demand within the network from both Biberach and Fremont. Moreover, at our large-scale cell culture plant in Biberach and our large-scale microbial plant in Vienna, three further customer products were successfully approved by the international authorities. One of these products is plasmid DNA, which is used as a gene therapy. At its Vienna facility, Boehringer Ingelheim is actively examining new therapy options.

The expansion project for a new industrial-scale biopharmaceutical production facility at Boehringer Ingelheim's facility in Vienna reached a further milestone in 2019, when two key functions went into operation. The strategic relevance of our biotechnological production capacities is rising in the context of the increasing importance of NBEs (new biological entities) in our pipeline.

In 2019, the production and delivery of everything from hospital products to finished pharmaceutical products began as scheduled in Shanghai (China), for both the local market and countries outside China. In addition, an application for approval of a customer product by the Chinese authorities was successfully completed. This will be the first biopharmaceutical product to be approved in line with the new regulatory requirements for contract manufacturing in China. Approval is the final milestone in a pilot project between Boehringer Ingelheim and the Chinese regulatory authorities. The principles of cooperation between a marketing authorization holder and a contract manufacturer were evaluated and successfully applied, and our facility in Shanghai will be recognized as a contract manufacturer (CMO) by the Chinese authorities.

Sustainability, occupational safety and environmental protection

The protection of employees and the environment, as well as the sustainable use of natural resources and the promotion of environmental awareness, are major components of our company's mission statement and are of prime importance to Boehringer Ingelheim. Compliance with social and environmental aspects has been firmly anchored in our corporate philosophy for many years now to ensure that we can achieve sustainability for future generations.

Group-wide, our company has developed binding standards in terms of environmental protection and health and safety at work. These internal guidelines reflect the respective country-specific requirements. In many cases, they go far beyond the standards prescribed by law. In particular, we follow international standards and guidance documents and work in close cooperation with the relevant associations. Within Boehringer Ingelheim, the corporate department Environment, Health, Safety & Sustainability (EHS&S) is responsible for this strategic focus.

In 2011, we started our "BE GREEN – Future by Choice" program, which was developed further in 2019, setting new strategic global goals for 2030, while taking our business growth into account. With this program, we optimize "green" activities at all our facilities and business areas worldwide, while factoring in the value chain. The program considers many different environmental aspects: building up facilities close to nature to provide habitats for a variety of plants and animals, encouraging "green" behavior of our employees, adopting measures to avoid water and air pollution, using renewable energy, reducing waste and creating environmentally friendly products as well as implementing certified systems for environmental protection and energy management.

We are continuously working on CO_2-reducing measures at our facilities, and we are aiming to lower our absolute CO_2 emission by 30% until 2030. We focus on the sustainability of our major projects, we are spending additional 10 million EUR per year to invest into a green future, and we foster environment-friendly and energy-saving investments.

By means of digitalized solutions, we work on implementing globally efficient processes with standardized software solutions. Global digitalization projects such as the collection of environmental data for the Group-wide "BE GREEN" program and electronic signature solutions for EH&S audit systems were successfully supported, tested and implemented. This digitalization approach enables us to rationalize our activities throughout the world and to reduce our expenditure without suffering quality or performance losses.

Boehringer Ingelheim is aware of the need for active water management programs. Access to sufficiently clean water has an impact on social and cultural justice, ecological sustainability and commercial benefits. We are therefore introducing water management programs at all facilities that are prone to water risk and are reducing the volume of medicines left in production wastewater; we require our suppliers to do the same. This year in October, our Promeco production facility in Xochimilco (Mexico) was awarded Alliance Water Stewardship (AWS) certification. Boehringer Ingelheim is the first pharmaceutical company worldwide to be certified to this globally recognized standard.

Antimicrobial resistance (AMR) poses an increasingly serious threat to global public health and requires action at every level of government as well as by businesses and society at large. For this reason, in 2019 Boehringer Ingelheim joined the AMR Industry Alliance – one of the largest private coalitions established to offer sustainable solutions for combating antimicrobial resistance.

Boehringer Ingelheim supports the objectives of the Nagoya Protocol and is concerned with the aspects of biodiversity which are relevant for its activities in the pharmaceutical sector. We are committed to upholding the obligations which result from acceptance of the Nagoya Protocol, by pursuing research and development in a responsible manner.

10 years "BE SAFE - Zero by Choice"

In 2019, the "BE SAFE – Zero by Choice" program, which aims to further reduce the number of workplace accidents, celebrated its tenth anniversary in Germany. In addition, the "High Five for Safety" initiative, which is intended to promote occupational safety, was introduced in 2019.

Employee reporting

Growing number of employees

In 2019, Boehringer Ingelheim employed 51,015 people on average worldwide. This represents an increase of + 1.4% over the previous year. The number of staff increased in all of its regions.

Average number of employees by region

	2019	2018*
Americas	13,113	13,023
Europe	26,884	26,691
Asia / Australia / Africa (AAA)	11,018	10,619
	51,015	50,333

*The methodology used to calculate the average number of employees was revised for the 2019 consolidated financial statements. The calculated average, which was originally based on the four previous end-of-quarter figures, has been changed to an assessment based on 12 month-end figures.The figures for 2018 have been adjusted in line with the new methodology.

A major success factor for the positive growth of the Group is its engaged and motivated staff. Accordingly, we are particularly committed to actively developing and supporting our employees. In order to be best prepared for the challenges ahead and as part of a comprehensive training system, we emphasize the acquisition of technical expertise and also promote social skills.

With the integration of various experiences, cultural backgrounds and personalities, Boehringer Ingelheim creates an openness to different approaches and opinions, living up to its corporate vision “Value through Innovation”. As a global company, it is important to us that the diversity of our customers is reflected in our workforce. Creating a working environment that embraces diversity and differences is one of the pillars of Boehringer Ingelheim's corporate culture and is a contributing factor to the company’s success.

In addition to competitive salaries, Boehringer Ingelheim offers other benefits to its employees. These benefits include a range of company pension plans, flexible and home-based work options and numerous health-related benefits. As a significant segment of our corporate strategy, it is part of our human resources department’s scope to ensure the employability of our staff, promote a wide range of opportunities for innovation at work, and support our employees to nurture their own talents and develop as individuals.

Vocational training has always been of major importance to Boehringer Ingelheim. As part of its understanding of social responsibility, the company offers career opportunities to a great number of young people. At the same time, we also tie a talented and well-qualified workforce of young professionals to the company against a backdrop of demographic change. In 2019, 194 young professionals started their careers with Boehringer Ingelheim in Germany in over 25 different scientific, technical and commercial fields, in training and dual-study courses. On average, 704 young people were enrolled in our vocational training program in 2019.

One of the company's aims is to strengthen the appeal of Boehringer Ingelheim as a top employer for our current and future employees. In 2019, Boehringer Ingelheim received a Top Employer award in this area from the auditors of the international, independent "Top Employers Institute". In addition to Germany, Boehringer Ingelheim also received this award in Argentina, Brazil, China, Italy, Indonesia, Colombia, Malaysia, Austria, the Philippines, Poland, Romania, Russia, Singapore, Spain, South Korea, Thailand and Vietnam.

Social responsibility

At Boehringer Ingelheim we are powered by our people. We therefore actively promote a diverse, cooperative and open working environment where our employees' differences are valued and respected. Diversity makes for the right mix, but it is inclusion which brings out the best results from this mix. Since we concentrate on encouraging a respectful environment, we have a comprehensive diversity and inclusion action plan in place to promote diversity and the parameters necessary for it. Core issues in 2019 included many activities of our diversity networks and our new recommendations for respectful communication. Boehringer Ingelheim has been an official member of the "Diversity Charter" since early 2016 and a PROUTEMPLOYER acknowledged by the PROUT AT WORK foundation since 2017.

Taking social responsibility is an important aspect of our corporate culture. Our commitment to the well-being of our patients and employees as well as their families is the focus of a wide range of projects. It is important for us to become involved into social interaction within the regions where we are active as a company, with the main focus of our social engagement or support of people in need for help being centered on the human person. All of Boehringer Ingelheim's activities also focus on protecting and maintaining the environment.

A major pillar of our social commitment is our Making More Health (MMH) initiative. Since its start in 2010, it has continuously developed as a social entrepreneurship movement, both within our company and externally. Socially entrepreneurial and sustainable activities are not limited to individual projects relating to various regions and issues. Instead, this initiative focuses on creatively connecting with local and international partners from different sectors. Networking across all traditional visible and invisible borders is a central element of a successful social movement, in order to identify, promote and implement innovative solutions for far-reaching and complex challenges in the healthcare sector. Co-creation as a bridge between social and commercial entrepreneurship brings together social entrepreneurs and non-profit organizations from the health care sector with Boehringer Ingelheim employees and their resources. To date, within the MMH network, Boehringer Ingelheim and Ashoka – one of the world's largest non-profit organizations – have together helped around 100 social entrepreneurs to reach approximately 9 million people worldwide in the area of health care.

The MMH initiative also aims to promote employees' commitment to social entrepreneurship in order to advance health care projects in many different countries, by working with local, external partners as well as colleagues from throughout Boehringer Ingelheim. MMH leadership programs in rural southern India (Insights India) as well as Kenya (Insights Kenya), participation in social intrapreneurship online courses, opportunities to collaborate with social entrepreneurs in our MMH network as "Executives in Residence", and an internal competition promoting employees' own projects have honed our staff's social entrepreneurial thinking and activities. We have also strengthened our networking philosophy through partnerships with non-profit organizations and social enterprises in the health care sector. A large number of local projects have taken shape in which our employees are actively involved. Above all, improving health means understanding people's environment and their everyday challenges and offering solutions where they are needed. Health awareness, affordability, accessibility of health services and acceptance play a key role here. MMH plays a role in the university sector, with the goal of helping students and lecturers to learn more about socially entrepreneurial thinking and practical activities through the development of health care-related projects.

To optimize stroke care in Europe and emerging markets, Boehringer Ingelheim established the "Angels Initiative" together with the European Stroke Organisation (ESO), the World Stroke Organization (WSO), the Stroke Alliance for Europe (SAFE) and many other national stroke associations and companies. In 2019, this initiative achieved its goal of developing a network of 1,500 clinics in Europe which ensure that stroke patients are treated in line with defined standards. Worldwide, there are already more than 2,700 clinics in more than 95 countries.

Support of COVID-19 medication development

Boehringer Ingelheim supports the German Center for Infection Research (DZIF) in a project to develop a therapy for the new coronavirus (SARS-CoV-2) with the development of monoclonal antiviral bodies, aiming to complete molecule discovery efforts within six months.

In 2019, Boehringer Ingelheim continued to pursue its LastMile program with support from the Global Alliance for Livestock Veterinary Medicines (GALVmed) and funding from the Bill & Melinda Gates Foundation. This integrated, solution-oriented initiative aims to respond to critical challenges in the field of animal health by ensuring the consistent availability of medical resources for animals in hard-to-access areas of sub-Saharan Africa. Through this project, Boehringer Ingelheim helps small farmers to gain access to veterinary medicines at a local level. Also newly approved medicines and new employment opportunities in technical and regulatory fields had a positive effect on the well-being of animals and people in the "LastMile" countries in 2019. This underlines Boehringer Ingelheim's strong social commitment: We aim to have a positive impact on human and animal lives in areas where there is a particularly vital need for this.

Beyond that, our employees are getting involved in a large variety of local initiatives together with the company in order to help people in need in case of environmental catastrophes or just in everyday situations, by providing technical support and their time or by providing medical or nursing care.

REPORT ON ECONOMIC POSITION

Macroeconomic environment

The world economy suffered a noticeable loss of momentum in the past year. A world economic growth rate of almost 3% was recorded for 2019, the lowest level since the 2008/2009 financial and economic crisis. The trade policy tensions between the US and China, the United Kingdom's Brexit negotiations with the EU, and growing global uncertainty about domestic and international political measures prompted uncertainty among investors and resulted in a strong decrease in investment activity. The growth slowdown affected the advanced economies and the emerging economies in equal measure, although its significance for individual countries varied depending on the nature of their trading activities. These overall conditions have a more direct and stronger impact in cyclical industries. The pharmaceutical markets are characterized rather by the performance capability of national economies and, in particular, by the demographic development of societies.

Global pharmaceutical market continues to grow

The global pharmaceuticals market registered a growth rate of 6% in the 2019 financial year (source: IQVIA). This trend was driven by rising demand in the industrialized countries for innovative medicines. Due to the aging population in the industrialized nations and the better access to medical care, the industry's growth remained positive and surpassed the figure for the previous year 2018 of 5%.

The growth of healthcare costs as a percentage of gross domestic product in many countries means that governments and payors are under pressure to control and regulate healthcare expenditures even more strongly than in the past. Along with sustained public and political pressure to contain the prices for pharmaceuticals, many cost-cutting measures have been imposed by governments and other payors. These include government-imposed industry-wide price reductions, mandatory reference price systems, payors limiting access to treatments based on strict cost-benefit analyses, imports of medicines from lower-cost countries to more expensive ones, a shift of the burden of payment to patients through higher co-payment programs and mandatory substitution of generics for the patented equivalent. Furthermore, the protection of our intellectual property (patents, etc.) is under increasing pressure.

The animal health industry, which focusses on livestock and pets, is on a growth path in particular in the emerging markets, due to population growth and improving living standards for many people. The animal health market is characterized by rising demands for animal proteins and increasing popularity of pets. On the other hand there are challenges as well. Strategic growth requires constant research and development and innovations to be brought to market. In addition, a consolidation through mergers of suppliers as well as on customer side currently leads to increasing competition.

Boehringer Ingelheim responded to this environment with boldness and innovative spirit and remains determined to improve human and animal health even in difficult times.

In 2020, the International Monetary Fund and the OECD expect the world economy to register a growth rate similar to that in 2019. The continued loose monetary policy of the leading central banks and a preliminary partial agreement in the trade conflict between the US and China point to stabilization. The United Kingdom's expected orderly withdrawal from the EU should also have a positive impact. However, there are also many risks which, if realized, could lead to weaker growth. They include in particular the recently emerged viral disease COVID-19 (coronavirus), which could have drastic consequences for people and the world economy, a repeated escalation in the trade dispute, a worsening of geopolitical tensions, a spillover of the industrial sector's weakness into the overall economy and weather-related natural disasters.

Due to its global activities, Boehringer Ingelheim is depending on currency developments, in particular regarding the USD and the Japanese Yen. In addition, the Chinese renminbi increases in importance. All currencies with major significance for Boehringer Ingelheim had a positive impact on the sales in the past year. Significant currency risks are hedged through suitable financial instruments.

Currency development

Average rate - basis: EUR 1	2019	2018	Effect on net sales (in million EUR)
US dollar	1.12	1.18	377
Japanese yen	122.06	130.41	89
Chinese renminbi	7.73	7.81	7

Earnings position

Our guiding principle of "Value through Innovation" and our long-term corporate strategy are intended to secure the company's independence. Improving human and animal health based on new, future-oriented therapies in areas with high medical need are at the core of Boehringer Ingelheim's strategic focus. This requires a stable earnings position and a solid financing base in the near term.

19
billion EUR in sales

Boehringer Ingelheim recorded net sales of 18,997 million EUR in the 2019 financial year, which corresponds to an increase of +8.6% compared with the previous year's level of 17,498 million EUR. The exchange rate development on the foreign exchange markets and the associated exchange rate effects had a positive impact on the sales trend. Adjusted for these effects, the Group grew by +5.7%.

With sales of 8,830 million EUR and a share of around 46% of overall sales, the Americas region remains Boehringer Ingelheim's key sales market. For the Americas region, sales increased by +9.2% year-over-year (currency-adjusted +4.7%). Sales in the Europe region rose by +7.0% to 5,689 million EUR (currency-adjusted +6.9%). The Group thus achieved 30% of its sales in this region. This growth was driven by the markets in Germany, Spain and Great Britain, as well as Russia and Poland, while the French market was unable to match the previous year's sales volume. The Asia/Australia/Africa (AAA) region also realized strong growth of +9.4% (currency-adjusted +6.4%). Revenues of 4,478 million EUR were generated in this region, corresponding to a 24% share of the Group's total revenues. The strategically important Chinese market provided 5.2% of the company's overall sales volume, which represents a currency-adjusted increase of +5.1% year-over-year. The growth in the Animal Health business in China was negatively affected by the outbreak of African swine fever.

Net sales by region (in million EUR)

	2019	2018	Change	currency adjusted
Americas	8,830	8,088	+9.2%	+4.7%
Europe	5,689	5,316	+7.0%	+6.9%
Asia/Australia/Africa (AAA)	4,478	4,094	+9.4%	+6.4%

Growth in all regions

Supported by good results from clinical trials as well as by cooperations with our external partners, we placed new products on the market and successfully pushed ahead with well-established products in our Human Pharma business. On the other hand the results of our Animal Health business were negatively affected by the outbreak of African swine fever in Asia in particular, but also increasing consolidation in the animal health industry.

Key figures (in million EUR)	2019	2018	Change
Net sales	18,997	17,498	+8.6%
Operating income	3,782	3,472	+8.9%
Return on net sales	+19.9%	+19.8%	
Income before taxes	3,496	3,176	+10.1%
Income after taxes	2,721	2,075	+31.1%

The materials ratio (taking into consideration the change in inventory) rose slightly to 14.2% (2018: 13.5%). This was mainly attributable to increased destruction costs due to African swine fever. The personnel expenses rose at a disproportionately slower rate than revenues, which was also related to high extraordinary effects in the previous year. The company's workforce once again increased in 2019, particularly at its strategic facilities.

Amortization and depreciation increased in comparison to 2018. In the past financial year, this item included adjustments to intangible fixed assets in the Human Pharma and Animal Health businesses as well as impairments losses on tangible fixed assets. Other operating expenses rose disproportionately due to increased investment in research and development, services purchased for other projects and higher currency losses (also from hedging) year-over-year.

The operating income in 2019 included extraordinary effects resulting from impairment losses on intangible fixed assets, restructuring measures and integration costs as well as reversals of provisions, amounting to a total of −163 million EUR (2018: −420 million EUR). The previous year's operating income was surpassed, thanks primarily to the positive operating trend in our Human Pharma business. Boehringer Ingelheim recorded an operating income of 3,782 million EUR, corresponding to a return on sales of 19.9% (2018: 19.8%).

Income before taxes increased, due to higher operating income and financial income. The financial income remains strongly adversely affected due to the further decline in the discount rate for pensions and similar obligations and amounts to −369 million EUR. The financial income improved overall due to gains from plan assets to cover pensions and similar obligations.

Income after taxes was significantly higher (+31.1%) than in the previous year and reflected the favorable course of business. It should be pointed out that the previous year was particularly burdened by strong aperiodic tax expenses.

It must be noted in this regard that, under the provisions of German commercial law, shareholders' personal taxes arising from Group business activities may not be recognized as tax expenses. Instead, these taxes are presented as part of withdrawals from Group equity. Taking this specificity into account, the actual tax ratio is markedly higher than the figure shown in the profit and loss statement.

2,721
million EUR
Group profit

Despite challenging market conditions in some business areas, the Boehringer Ingelheim Group registered a positive performance in the 2019 financial year. Following a Group profit of 2,075 million EUR in the previous year, in 2019 this figure increased considerably and amounted to 2,721 million EUR.

Development of the businesses

In the past financial year, Boehringer Ingelheim's activities were divided into the Human Pharma, Animal Health and Biopharmaceutical Contract Manufacturing businesses.

Net sales by businesses (in million EUR)

	2019	2018	Change	currency adjusted
Human Pharma	13,961	12,559	+11.2%	+8.0%
Animal Health	4,035	3,960	+1.9%	−0.7%
Biopharmaceutical Contract Manufacturing	786	734	+7.1%	+7.1%
Other sales	41	40	+2.5%	+3.4%
Discontinued Operations	174	205	−15.1%	−14.6%

Human Pharma

Human Pharma grows in all regions

With around 74% of total Group revenue, Human Pharma was the main pillar of Boehringer Ingelheim's business activities. Human Pharma sales amounted to 13,961 million EUR in 2019. This is equivalent to growth of +11.2% (currency-adjusted +8.0%) compared with the previous year. This positive sales trend resulted from the solid market position of established medicines, yet was driven as well by the products in the JARDIANCE®-family and OFEV®. The company achieved growth year-over-year in all regions. Despite the price pressure – particularly for established medicines – Boehringer Ingelheim successfully held its own and continued to pursue the reorganization of its Human Pharma product portfolio as planned.

In 2019, the type 2 diabetes medicine JARDIANCE® was the company's biggest revenue contributor for the first time. We achieved sales of 2,152 million EUR with JARDIANCE® in the reporting period, which corresponds to an increase of +47.3% compared with the previous year's 1,461 million EUR.

Boehringer Ingelheim's second-strongest product in terms of sales in the past year was SPIRIVA®, which is used to treat chronic obstructive pulmonary disease (COPD). This generated a sales volume of 2,058 million EUR, which was lower than the previous year's level (2,412 million EUR) as expected in view of the product's life cycle.

TRAJENTA® and JENTADUETO®, for the treatment of type 2 diabetes, registered a sales volume of 1,559 million EUR, a growth rate of +11.6%.

In the 2019 financial year, the anticoagulant PRADAXA® achieved a +2.9% increase on the previous year's figure of 1,486 million EUR. With a sales volume of 1,529 million EUR, this medicine remains one of Boehringer Ingelheim's biggest revenue contributors.

OFEV® registered a growth rate of +31.6% and contributed 1,491 million EUR to the company's successful sales result. The product is used for the treatment of idiopathic pulmonary fibrosis and to an increasing extend also for SSc-ILD.

MICARDIS®, which is used for treatment of high blood pressure, recorded further growth despite increasing generic competition. The product family achieved sales of 734 million EUR (2018: 689 million EUR).

For ACTILYSE® we were able to increase sales by 67 million EUR to 448 million EUR. Since having been launched in 1987 more than 7,500,000 patients were benefiting from the medication. Despite having lost its patent protection more than a decade ago, the biopharmaceutical remains the only available option for immediate treatment in cases of ischaemic stroke worldwide.

Risankizumab, a medication for treatment of plaque-psoriasis, which was mainly developed by Boehringer Ingelheim, is marketed globally through our partner AbbVie under the brand name SKYRIZI®.

Net sales (in million EUR)

	2019	2018	Change
JARDIANCE®	2,152	1,461	+47.3%
SPIRIVA®	2,058	2,412	−14.7%
TRAJENTA® / JENTADUETO®	1,559	1,397	+11.6%
PRADAXA®	1,529	1,486	+2.9%

47.3%
growth of JARDIANCE®

With regard to the regional distribution of revenues in the Human Pharma business, the USA was once again the largest market with a share of 40%. Here, Boehringer Ingelheim generated sales of 5,576 million EUR, which corresponds to an increase of 9.2% compared with the previous year (currency-adjusted +3.6%).

The EUCAN region (Europe, Canada, Australia and New Zealand), our second-biggest market, accounted for 31%, with revenues of 4,381 million EUR. Sales increased by +9.6% compared to 2018 (3,999 million EUR). Exchange rate effects did not have any significant influence on the sales trend here.

Strong sales increase in the company's emerging markets

In the past year, the company's emerging markets registered strong sales growth of +19.9% (currency-adjusted +20.1%). The People's Republic of China was a key driving force in the region, with a currency-adjusted growth rate of +21.2%. Sales rose from 2,296 million EUR in the previous year to 2,753 million EUR in 2019.

In Japan, sales increased by +7.8% to 1,251 million EUR (currency-adjusted +1.1%). Sales in the previous year had amounted to 1,160 million EUR.

Net sales by region (in million EUR)

	2019	2018	Change
USA	5,576	5,104	+9.2%
Europe/Canada/Australia/New Zealand (EUCAN)	4,381	3,999	+9.6%
Emerging Markets	2,753	2,296	+19.9%
Japan	1,251	1,160	+7.8%

Animal Health

The volume of sales in the Animal Health business amounted to 4,035 million EUR in 2019. This represents a change of +1.9% over the previous year (currency-adjusted −0.7%).

Net sales (in million EUR)

	2019	2018	Change
NEXGARD®	740	610	+21.3%
FRONTLINE®	379	399	−5.0%
HEARTGARD®	318	299	+6.4%
INGELVAC CIRCOFLEX® / FLEXCOMBO®	238	303	−21.5%

The sales figures were negatively affected by the outbreak of African swine fever in Asia. In the TCM (China, Taiwan and Hongkong) region alone, sales plunged by −32.6%. The swine vaccine INGELVAC CIRCOFLEX® accordingly registered a strong decline in sales (−21.5%) to 238 million EUR.

Increasing price pressure was perceptible on both the company's pets segment and its swine segment. While the FRONTLINE® antiparasitic achieved sales of 379 million EUR, this was −5.0% lower than in the previous year.

Antiparasitics drive growth

The company's NEXGARD® product performed strongly in this environment, with revenues of 740 million EUR (2018: 610 million EUR) and +21.3% growth year-over-year.

HEARTGARD®, another antiparasitic, achieved +6.4% growth and registered sales of 318 million EUR (2018: 299 million EUR).

The horse segment was very successful in 2019 as well and realized currency-adjusted growth of +5.7% year-over-year.

Net sales by region (in million EUR)

	2019	2018	Change
USA	1,768	1,627	+8.7%
EUCAN	1,233	1,211	+1.8%
ALAMEA*	829	818	+1.3%
TCM**	205	304	–32.6%

* Asia, Latin America, Middle East and Africa

** China, Taiwan and Hongkong

Biopharmaceutical Contract Manufacturing

The Biopharmaceutical Contract Manufacturing business maintained its positive performance trend. The order situation for the entire business has developed positively, resulting in a high level of capacity utilization for biopharmaceutical production.

Continued strong growth in the Biopharmaceutical Contract Manufacturing

Other sales / discontinued operations

Other sales mainly contain discontinued operations which were winding down as expected. Under discontinued operations we aggregate activities of minor strategic importance for Boehringer Ingelheim, which include amongst others obligations and income resulting from the business swap with Sanofi. These are in particular service agreements as well as the BUSCOPAN® business in Brazil, which was excluded from the sale.

Financial position

(in million EUR)	2019
Financial funds as of 1.1.	**9,454**
Cash flow from operating activities	3,344
Cash flow from investing activities	–1,421
Cash flow from financing activities	–1,029
Change in financial funds from cash relevant transactions	**894**
Change in financial funds due to change of consolidated companies or exchange rate movements	29
Financial funds as of 31.12.	**10,377**

Boehringer Ingelheim's financial management instruments and methods are aimed at securing liquidity and ensuring appropriate management of financial risks. Our financial activities are therefore geared towards supporting the business strategy.

Cash inflow from operating activities amounted to 3,344 million EUR, which represents an increase of 356 million EUR in comparison to the previous year (2,988 million EUR). This is attributable to the positive business trend. Cash flow from investing activities amounted to 1,421 million EUR which is a similar level as prior year (2018: 1,403 million EUR) and reflects the significant investments in external innovation and strategic infrastructure to support the business activities.

High capital expenditure volume

Of particular note are our R&D investments with Amal Therapeutics SA and our cooperations with Yuhan Corporation or SoundTalks NV, which strengthen our R&D pipeline. In addition, major investments in fixed assets could reach further milestones in 2019. One investment was made in the expansion of the production facilities in Vienna for our Biopharmaceutical Contract Manufacturing. In 2019, around 230 million EUR were invested in the facility, which has been a significant site for the Group for decades. Boehringer Ingelheim made another major investment in its new development center for biopharmaceutical medicines (BDC) in Biberach. The BDC, whose foundation stone was laid in 2018, is intended to create 100 new jobs and to increase our contract manufacturing capacity. It focuses on therapeutic areas where the need for treatment is high, such as cancer and immunological diseases. More than 60 million EUR were invested in the BDC in 2019, supplementing a number of significant investments in Boehringer Ingelheim's global biopharmaceutical development network. A further important investment was made in the Animal Health business. In 2019, nearly 50 million EUR were invested in a new antigen production center for regulatory animal disease control in Jonage, France. The foundation stone for this major high-tech facility was laid in fall 2018. Planned overall investments in this production center of more than 200 million EUR are intended to enable our Animal Health business to respond to the growing demand for medicines to treat foot-and-mouth and bluetongue disease.

Cash outflow from financing activities in the amount of 1.029 million EUR comprises payments of 400 million EUR to the charitable Boehringer Ingelheim foundation, which supports basic research in the fields of natural and life science, payments to the parent company's shareholders, that are mainly used to pay personal taxes arising from Group business activities, and interest paid. In addition, a German private placement was repaid. Overall, after taking into consideration exchange effects and changes within the group of consolidated companies, this led to an increase in the Boehringer Ingelheim Group's financial funds of 923 million EUR to 10,377 million EUR.

Net assets position

(in million EUR)	31.12.2019	31.12.2018	Change	Change in %
Assets				
Intangible and tangible assets	9,636	9,400	236	
Financial assets	9,162	6,058	3,104	
Fixed assets	**18,798**	**15,458**	**3,340**	**+21.6%**
Inventories	3,563	3,312	251	
Trade accounts receivable	4,196	3,540	656	
Other receivables and other current assets	1,241	1,033	208	
Cash and cash equivalents	2,195	4,303	−2,108	
Current assets	**11,195**	**12,188**	**−993**	**-8.1%**
Other assets	3,487	3,242	245	
Total assets	**33,480**	**30,888**	**2,592**	**+8.4%**
Equity and liabilities				
Group equity	**14,681**	**12,334**	**2,347**	**+19.0%**
Provisions for pensions and similar obligations	5,185	4,712	473	
Tax provisions and other provisions	9,336	9,040	296	
Accounts payable and loans	1,715	2,142	−427	
– thereof residual term over 1 year:	83	45	38	
Liabilities	**16,236**	**15,894**	**342**	**+2.2%**
Other liabilities and difference from capital consolidation	2,563	2,660	−97	
Total equity and liabilities	**33,480**	**30,888**	**2,592**	**+8.4%**

In the 2019 financial year, Boehringer Ingelheim's total assets amounted to 33,480 million EUR, an increase of 2,592 million EUR as compared with the previous year. 923 million EUR of this growth was attributable in particular to an increase in the volume of financial funds (cash and long-term securities), which grew significantly due to the positive cash flow in the financial year. Long-term financial assets increased in this regard through the investment of cash in securities. Despite scheduled and unscheduled depreciation and amortization, tangible and intangible fixed assets increased due to the high volume of capital expenditure in the strategic expansion of the company's business, including in Human Pharma research, Biopharmaceuticals in Vienna (Austria) and Fremont, California (USA), and Animal Health in France. Working capital (receivables and inventories) especially picked up as a result of the positive sales trend in the US and increased inventories in the US, France and Greece. The other assets likewise increased thanks to the positive market trend for plan assets for pensions and similar obligations in the US. Another reason for the increase was higher deferred tax assets that resulted from temporary differences between the values in the consolidated companies' tax balance sheets and the values in the consolidated balance sheet. Currency effects also resulted in increases for all items on the asset side of the balance sheet.

Equity ratio increases despite higher balance sheet total

Group equity increased by 2,347 million EUR due to the Group profit in 2019 as well as positive currency differences. Equity amounted to 14,681 million EUR as of December 31, 2019. The equity ratio thus improved to around 44% (December 31, 2018: 40%) in spite of the higher balance sheet total. In addition to equity, the pension provisions and long-term liabilities are also available to the Group in the long term. The total of these three items amounted to 19,949 million EUR as of December 31, 2019, representing a share of 60% of the total assets. Consequently, as in the previous year, long-term disposable capital covers all intangible and tangible fixed assets as well as working capital.

Pension provisions increased in Germany, particularly due to a lower actuarial discount rate. The increase in other provisions correlates to the change in net sales, since the key elements represent provisions for discounts in the USA. The decrease in liabilities relates to other liabilities, liabilities to banks, and trade accounts payable, mainly in Germany. In 2019 the German private placement, which had been issued in 2009, was completely repaid. The other liabilities declined, mainly due to the release of the difference arising from capital consolidation and lower deferred tax liabilities from temporary differences.

Boehringer Ingelheim's positive performance in the 2019 financial year is also reflected in its net assets position. Boehringer Ingelheim remains a profitable and soundly financed company, making considerable capital expenditure and high R&D expenditure to ensure long-term growth and thus independence.

REPORT ON OPPORTUNITIES AND RISKS

Opportunities and risk management

When assessing the risks in the context of holistic opportunities and risk management, we also endeavor to take into account the resulting opportunities. Opportunity management is based on the strategies and objectives of the company and of individual businesses and operating business units, and is an integral part of the Group-wide planning and management systems. Those responsible for the businesses and functions bear direct responsibility for the early and systematic identification, analysis and use of opportunities. For Boehringer Ingelheim as a research-driven and innovative pharmaceutical company, the current research and development activities are naturally considered a relevant opportunity. Relevant projects have already been outlined in the Research and Development (R&D) chapter. We also look at digitalization as an opportunity and see new technological possibilities in the areas of research and (particularly clinical) development, as well as in the support of patients during therapy.

The aim of the risk management system implemented at Boehringer Ingelheim is to identify business-specific risks as early as possible (particularly risks that jeopardize the continued existence of the company); to assess them, and to reduce them to a reasonable level by means of suitable measures. The persons responsible for the key businesses and functions are also included in the process of calculating and assessing risks. The Group-wide risk and information system ensures that all identified risks are analyzed and assessed carefully. Following appropriate classification, adequate risk management measures are initiated and their implementation is consistently monitored.

In the year under review, internal auditing performed targeted routine audits as well as extraordinary audits around the world. In addition to adherence to legal requirements and internal Group guidelines, the main focal points were the functionality of systems, the effectiveness of internal controls for the prevention of loss of assets and the efficiency of structures and processes. Corresponding adjustments or optimizations were initiated as necessary.

Individual risks

The most important risks to which Boehringer Ingelheim is exposed are broken down into the following specific categories: financial risks, legal risks, production and environmental risks, personnel risks and industry-specific risks.

Risks are identified below as being “concrete” when they appear to be controllable by means of specific management procedures. The term “abstract” is used in the case of risks that cannot be completely controlled, even by means of targeted management procedures, regardless of the probability of their occurrence.

Financial risks

Relevant financial risks are themselves broken down as follows: currency risks, credit and country-specific risks, as well as financial investment and shareholding risks.

Currency risks

The global orientation of our business activities is subject to opportunities and risks due to exchange rate volatility, particularly with regard to the US dollar and Japanese yen. The Group monitors and quantifies these risks at regular intervals, making them predictable for future business by means of relevant hedging strategies and appropriate financial instruments, such as forward exchange contracts. The resultant risks are subsequently designated as being concrete and controllable and therefore limited.

Credit and country-specific risks

Boehringer Ingelheim is exposed to various credit and country-specific risks as a result of its international business activities. From the portfolio of trade accounts receivable and trade accounts payable, we have not identified any extraordinary risks for the Group beyond the usual level in the industry. The same applies to possible default risks for receivables, which are largely hedged against economic and political risks. We will continue to carefully track credit and country-specific risks, so as to be in a position to respond to negative changes in a timely manner. These risks, which we consider moderate, are therefore regarded as concrete.

Financial investment and shareholding risks

The Group pursues a defensive investment strategy in the management of its financial assets. This is reflected in the orientation of its portfolio, which is focused on European Economic and Monetary Union (EMU) government bonds with top credit ratings and short-term money market deposits. This results in a concrete, controllable and thus limited risk – but therefore only limited opportunities – for the major part of the financial investments. The net book value of some of the strategic investments in related companies is affected by market and business circumstances, which leads to a higher level of volatility in the fair market value. All specific risks have been covered by respective impairments in the consolidated financial statements.

Legal risks

The business activities of the Group are exposed to legal risks. A distinction is made between regulatory, liability and patent protection risks.

Regulatory risks

Boehringer Ingelheim is exposed to risks arising from legal disputes and proceedings as well as official investigations. As the legal or administrative decisions in ongoing or future proceedings cannot be predicted, we regard the resultant risks as being abstract and high.

Liability risks

The marketing and sale of pharmaceuticals are exposed to a potential product liability risk. Boehringer Ingelheim currently has product liability insurance for the company's risk profile. There is absolutely no guarantee, however, that this insurance coverage can be maintained at reasonable cost and acceptable conditions, or that it is sufficient to protect Boehringer Ingelheim against a claim or loss, or against all potential claims or losses. In case it is foreseeable that the product liability insurance does not cover or only partially covers a specific liability risk, the remaining risk exposure has been covered by a provision. We therefore see a moderate risk for the Group here.

Furthermore, product liability claims could tie up substantial financial resources and management capacity and be detrimental to the company's image in the event that the market considers the product to be unsafe or ineffective as a result of unexpected side effects. We see this as a moderate and abstract risk.

Patent protection risks

Protection of innovations through trademark and patent rights is of particular importance to Boehringer Ingelheim as a research company. These commercial protective rights are increasingly the target of attacks and breaches. We have taken the necessary precautions to allow us to detect threats at an early stage and, by commencing appropriate countermeasures, defend our legal position using all legal means available to us so that these moderate risks are regarded as concrete.

Production and environmental risks

Our quality management system and compliance processes are continuously optimized in close cooperation with the relevant authorities in order to ensure compliance with cGMP standards (current good manufacturing practices). Risks in this area continue to be of high significance to the Group and are classified as abstract.

In order to guarantee the supply of our products to the market, we have implemented measures that guarantee reliable and high-quality supplies for internal and external customers. In addition to supplier management on the procurement side, this also involves building up internal standby capacities. As a result, we see the risk as concrete.

Risks in the areas of environment, health, safety and sustainability (EHS&S) are preemptively minimized by ensuring global adherence to our high safety standards. Appropriate emergency plans have been drawn up for possible incidents of any kind and are practiced and subjected to comprehensive quality testing at regular intervals. As a result of these measures, these risks are classed as concrete and limited.

Personnel risks

Boehringer Ingelheim, as other companies, is exposed to demographic change and the resultant risk of being affected by a lack of appropriately qualified personnel. This potential risk can have a substantial impact on the company's business activities. It has therefore been included in the long-term planning process for many years and has gained strategic significance as a result.

Boehringer Ingelheim counters the risk by means of a comprehensive personnel concept. In the context of global personnel management, this also presents the Group with opportunities. Regardless of their ethnic background, gender or religion, we offer all of our company's employees development opportunities based on their professional abilities, social skills, personal aptitudes and willingness to take on responsibility in accordance with the needs of the company. In view of the countermeasures described above, the risk is regarded as moderate and concrete.

Industry-specific risks

Boehringer Ingelheim is subject to the industry-specific business risks of the pharmaceutical industry. These risks have partly materialized in the past financial year and are becoming increasingly important for Boehringer Ingelheim due to their effects. They are still considered high and abstract. In addition to the loss of exclusivity of products established on the market and risks associated with the development and registration of new products, these risks increasingly include changing and restrictive requirements relating to pricing and reimbursement on many sales markets. Frequently, the prices of pharmaceutical products are subject not only to state monitoring and regulation, but also to price pressure from cheaper generic drugs caused by the state reimbursement systems. Boehringer Ingelheim is therefore keeping a close eye on the various changes in its sales markets and takes appropriate measures in response to current developments.

Overall statement on the risk situation

From a current perspective, we are not aware of any risks that alone or in conjunction with other risks could lead to a lasting impairment of the company's assets, financial or earnings position that could jeopardize the continued existence of Boehringer Ingelheim.

REPORT ON EXPECTED DEVELOPMENTS

Boehringer Ingelheim can look back on a successful 2019 financial year in which we made our innovations available to more patients than in the previous year and contributed significantly to the health of livestock and pets. We also achieved our ambitious targets – both in absolute numbers and in comparison with our competitors – while creating a foundation for sustainable corporate development and long-term growth.

We look ahead optimistically to 2020 and will work passionately to continue improving human and animal health. However, the increasingly difficult market environment for the pharmaceutical industry, combined with the volatility of the economic environment, also makes planning capability increasingly challenging. The outbreak of the new coronavirus poses another multi-dimensional challenge: for our Chinese employees, for our global production network and for our global supply chain. In this rapidly evolving environment, we will take advantage of the opportunities that present themselves again in 2020 and respond courageously to risks that materialize.

To ensure our continued success on the market, and with a view to our competitiveness, it remains important that we preserve and make use of our financial flexibility for growth and innovation. In view of the many changes unfolding in health care systems which are faced with aging populations and increasing price pressure in many major markets – especially, but not exclusively, the core markets in the USA, Japan, Europe and China – we expect only limited growth impetus for the pharmaceutical industry in the coming year. We plan to focus even more strongly on our Animal Health customers and on solutions to their challenges, as well as on innovation in our product portfolio. The spread of the African swine fever to further countries remains a risk. Our priorities in our biopharmaceuticals business are supplying the market with our own products and contract manufacturing for customers. Beyond this, there is the completion of our LSCC large-scale production facility in Vienna (Austria). For 2020, we expect Boehringer Ingelheim to achieve a slight year-on-year increase in net sales on a comparable basis (adjusted for currency and extraordinary effects).

Our consistently high R&D expenditure, which once again increased in 2019, is compatible with our strategic focus on continuing to drive growth and the flow of new products. We achieved our goal of managing some of our R&D through external innovation and general partnerships in 2019, and we will continue to pursue this strategy in 2020. We invest in our own and external R&D with care, after close investigation of the therapeutic benefit and the associated prospects for success. The flow of innovative medicines in our research pipeline shows short-, medium- and long-term growth potential.

In addition to patent expiry and attacks on patents, the major challenges facing the research-driven pharmaceutical industry are the increasing amount of investment in R&D as well as bigger hurdles and increased costs associated with product approvals. In this context, the increasing cost pressure in health care systems as outlined above also has to be particularly emphasized. These systems are increasingly unwilling to make substantial investments in the development of new medicines and to contribute adequately to increased efficiency of the system as a whole. Animal Health research likewise requires major investments in both preventive research and diagnostic options. In conjunction with longer planning and development cycles for new products, this makes business less predictable; it requires us to quickly recognize and seize opportunities in both Human Pharma and Animal Health on the one hand, while subjecting costs and strategies to continual monitoring and adjustments on the other. To this end, we have launched initiatives over the past few years to accelerate our reaction to changes and to reduce organizational complexities as well as to lower our cost base in order to create potential for capital expenditure and to secure the company's long-term success.

Against the backdrop of a very successful 2019 and taking into account the expected economic and market environment, we expect operating income for 2020 on a comparable basis (adjusted for currency and extraordinary effects) to be on the level of the fiscal year 2019.

As a family-owned company, Boehringer Ingelheim's primary aim remains the creation of "Value through Innovation." Supported by long-term, sustainable organic growth, this vision will preserve the company's independence and competitiveness. We are confident that we will achieve our ambitious targets thanks to our great innovative strength based on a comprehensive portfolio of prospective products, our global presence and the support of our highly qualified and motivated employees in all of our businesses. We remain committed to our "Ambition 2025" and will research and develop innovative products and bring them to the market in areas where the medical need is high. We will break new ground with therapeutic approaches in both human and animal medicine. The aim of our endeavors is to make new medicines available to both humans and animals so they can be treated more effectively with new therapies.

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OVERVIEW OF SELECTED CONSOLIDATED COMPANIES

C.H. BOEHRINGER SOHN AG & CO. KG, INGELHEIM AM RHEIN

BOEHRINGER INGELHEIM VETMEDICA GMBH, INGELHEIM AM RHEIN

ARGENTINA (D)
Boehringer Ingelheim Animal Health Argentina S.A., *Buenos Aires*

AUSTRALIA (D, R)
Boehringer Ingelheim Animal Health Australia Pty. Ltd., *North Ryde*

BELGIUM (D)
Boehringer Ingelheim Animal Health Belgium S.A., *Brussels*

BRAZIL (D, P, R)
Boehringer Ingelheim Animal Health do Brasil Ltda., *São Paulo*

CANADA (D)
Boehringer Ingelheim Animal Health Canada Inc., *Burlington*

CHINA (D, P, R)
Nanchang Boehringer Ingelheim Animal Health Co., Ltd., *Nanchang*

Boehringer Ingelheim Animal Health (Shanghai) Co., Ltd., *Shanghai*

Boehringer Ingelheim Animal Health Operations (China) Co., Ltd., *Taizhou*

Boehringer Ingelheim Vetmedica (China) Co., Ltd., *Taizhou*

DENMARK (D, P)
Boehringer Ingelheim Animal Health Denmark A/S, *Copenhagen*

FRANCE (D, P, R)
Boehringer Ingelheim Animal Health France, *Lyon*

GREAT BRITAIN (D, P)
Boehringer Ingelheim Animal Health UK Limited, *Bracknell*

ITALY (D, P)
Boehringer Ingelheim Animal Health Italia S.p.A., *Milan*

JAPAN (D, R)
Boehringer Ingelheim Animal Health Japan Co., Ltd., *Tokyo*

MEXICO (D)
Boehringer Ingelheim Animal Health México S.A. de C.V., *Mexico City*

NETHERLANDS (D, P, R)
Boehringer Ingelheim Animal Health Netherlands B.V., *Velserbroek*

NEW ZEALAND (D, P, R)
Boehringer Ingelheim Animal Health New Zealand Limited, *Auckland*

PHILIPPINES (D)
Boehringer Ingelheim Animal Health Philippines, Inc., *Makati City*

PUERTO RICO (P)
Boehringer Ingelheim Animal Health Puerto Rico LLC, *Barceloneta*

SOUTH AFRICA (D)
Boehringer Ingelheim Animal Health South Africa Pty Ltd., *Randburg*

SOUTH KOREA (D)
Boehringer Ingelheim Animal Health Korea Ltd., *Seoul*

SPAIN (D)
Boehringer Ingelheim Animal Health España, S.A., *Barcelona*

TAIWAN (D)
Boehringer Ingelheim Animal Health Taiwan Co., Ltd., *Taipei*

THAILAND (D)
Boehringer Ingelheim Animal Health (Thailand) Limited, *Bangkok*

USA (D, P, R)
Boehringer Ingelheim Animal Health USA, Inc., *Wilmington, Delaware*

Newport Laboratories, Inc., *Wilmington, Delaware*

GERMANY (D, P, R)
Boehringer Ingelheim Corporate Center GmbH, *Ingelheim am Rhein*

Boehringer Ingelheim GmbH, *Ingelheim am Rhein*

Boehringer Ingelheim Pharma GmbH & Co. KG, *Ingelheim am Rhein*

Boehringer Ingelheim microParts GmbH, *Dortmund*

Boehringer Ingelheim Venture Fund GmbH, *Ingelheim am Rhein*

Boehringer Ingelheim Biopharmaceuticals GmbH, *Ingelheim am Rhein*

Boehringer Ingelheim Veterinary Research Center GmbH & Co. KG, *Hanover*

Boehringer Ingelheim Middle East and Africa GmbH, *Ingelheim am Rhein*

D *Distribution*

P *Production*

R *Research and development*

C.H. BOEHRINGER SOHN GRUNDSTÜCKSVERWALTUNG GMBH & CO. KG, INGELHEIM AM RHEIN

BOEHRINGER INGELHEIM INTERNATIONAL GMBH, INGELHEIM AM RHEIN

ARGENTINA D
- Boehringer Ingelheim S.A., *Buenos Aires*

AUSTRALIA D
- Boehringer Ingelheim Pty. Ltd., *North Ryde*

AUSTRIA D P R
- Boehringer Ingelheim RCV GmbH & Co. KG, *Vienna*
- Forschungsinstitut für molekulare Pathologie Gesellschaft mbH, *Vienna*
- ViraTherapeutics GmbH, *Innsbruck*

BELGIUM D
- SCS Boehringer Ingelheim Comm.V., *Brussels*

BRAZIL D P
- Boehringer Ingelheim do Brasil Química e Farmaceutica Ltda., *São Paulo*
- Solana Agro Pecuária Ltda., *Arapongas*

CANADA D
- Boehringer Ingelheim (Canada) Ltd., *Toronto*

CHILE D
- Boehringer Ingelheim Ltda., *Santiago de Chile*

CHINA D P
- Boehringer Ingelheim Shanghai Pharmaceuticals Co. Ltd., *Shanghai*
- Boehringer Ingelheim Biopharmaceuticals (China) Co., Ltd., *Shanghai*
- Boehringer Ingelheim (China) Investment Co., Ltd.,*Shanghai*
- Boehringer Ingelheim International Trading (Shanghai) Co., Ltd., *Shanghai*

COLOMBIA D
- Boehringer Ingelheim S.A., *Santa Fé de Bogotá*

CZECH REPUBLIC D
- Boehringer Ingelheim, spol. s.r.o., *Prague*

DENMARK D
- Boehringer Ingelheim Danmark A/S, *Copenhagen*

ECUADOR D
- Boehringer Ingelheim Del Ecuador Cia. Ltda., *Quito*

FINLAND D
- Boehringer Ingelheim Finland Ky, *Espoo*

FRANCE D
- Boehringer Ingelheim France S.A.S., *Paris*

GREAT BRITAIN D
- Boehringer Ingelheim Ltd., *Bracknell*

GREECE D P
- Boehringer Ingelheim Ellas A.E., *Athens*

HONG KONG D
- Boehringer Ingelheim (Hong Kong) Ltd., *Hong Kong*

INDIA D
- Boehringer Ingelheim India Private Ltd., *Mumbai*

INDONESIA D P
- PT Boehringer Ingelheim Indonesia, *Jakarta*

ISRAEL D
- Boehringer Ingelheim Israel Ltd., *Tel Aviv*

ITALY D P
- Boehringer Ingelheim Italia S.p.A., *Milan*
- Bidachem S.p.A., *Fornovo S. Giovanni*

JAPAN D P R
- Nippon Boehringer Ingelheim Co., Ltd., *Tokyo*
- Boehringer Ingelheim Seiyaku, *Yamagata*
- Boehringer Ingelheim Japan, Inc., *Tokyo*

MEXICO D P
- Boehringer Ingelheim Mexico S.A. de C.V., *Mexico City*
- Boehringer Ingelheim Vetmedica S.A. de C.V., *Guadalajara*
- Boehringer Ingelheim Promeco S.A. de C.V., *Mexico City*

NETHERLANDS D
- Boehringer Ingelheim B.V., *Alkmaar*

NEW ZEALAND D
- Boehringer Ingelheim (N.Z.) Ltd., *Auckland*

NORWAY D
- Boehringer Ingelheim Norway KS, *Asker*

PERU D
- Boehringer Ingelheim Peru S.A.C., *Lima*

PHILIPPINES D
- Boehringer Ingelheim (Philippines), Inc., *Manila*

POLAND D
- Boehringer Ingelheim Sp. z o.o., *Warsaw*

PORTUGAL D
- Unilfarma-Uniao Internacional de Laboratórios Farmacêuticos, Lda., *Lisbon*

RUSSIAN FEDERATION D
- OOO Boehringer Ingelheim, *Moscow*

SERBIA D
- Boehringer Ingelheim Serbia DOO Beograd, *Belgrad*

SOUTH AFRICA D
- Ingelheim Pharmaceuticals (Proprietary) Ltd., *Randburg*

SOUTH KOREA D
- Boehringer Ingelheim Korea Ltd., *Seoul*

SPAIN D P
- Boehringer Ingelheim España S.A., *Barcelona*

SWEDEN D
- Boehringer Ingelheim Aktiebolag, *Stockholm*

SWITZERLAND D R
- Boehringer Ingelheim (Schweiz) GmbH, *Basel*
- Amal Therapeutics SA, *Geneva*

TAIWAN D
- Boehringer Ingelheim Taiwan Ltd., *Taipei*

THAILAND V
- Boehringer Ingelheim (Thai) Ltd., *Bangkok*

TURKEY D
- Boehringer Ingelheim Ilaç Ticaret A.S., *Istanbul*

USA D P R
- Boehringer Ingelheim Pharmaceuticals Inc., *Wilmington, Delaware*
- Boehringer Ingelheim Fremont, Inc., *Wilmington, Delaware*
- Boehringer Ingelheim USA Corporation, *Wilmington, Delaware*

VIETNAM D
- Boehringer Ingelheim Animal Health Vietnam Limited Liability Company, *Ho Chi Minh City*

CONSOLIDATED BALANCE SHEET

Assets (in million EUR)	Notes [1]	31.12.2019	31.12.2018
Intangible assets	(3.1)	4,882	5,120
Tangible assets	(3.2)	4,754	4,280
Financial assets	(3.3)	9,162	6,058
Fixed assets		**18,798**	**15,458**
Inventories	(3.4)	3,563	3,312
Accounts receivable and other assets	(3.5)	5,437	4,573
Cash and cash equivalents		2,195	4,303
Current assets		**11,195**	**12,188**
Prepaid expenses		313	377
Deferred tax assets		3,000	2,784
Exceeding amount of plan assets		174	81
Total assets		**33,480**	**30,888**

Equity and liabilities (in million EUR)	Notes [1]	31.12.2019	31.12.2018
Shareholders' capital		178	178
Group reserves		14,709	12,453
Balance sheet currency conversion difference		– 207	– 298
Equity attributable to the parent company		**14,680**	**12,333**
Non-controlling interests		1	1
Group equity		**14,681**	**12,334**
Difference from capital consolidation		**1,471**	**1,511**
Provisions	(3.6)	14,521	13,752
Accounts payable and loans	(3.7)	1,715	2,142
Liabilities		**16,236**	**15,894**
Deferred income		441	463
Deferred tax liabillities		651	686
Total equity and liabilities		**33,480**	**30,888**

[1] For explanations, see relevant section in the notes to the consolidated financial statements.

CONSOLIDATED PROFIT AND LOSS STATEMENT

(in million EUR)	Notes [1]	2019	2018
Net sales	(4.1)	**18,997**	**17,498**
Changes in finished goods and work in process		224	244
Other own work capitalized		11	13
Other operating income	(4.2)	2,040	1,872
Total revenues		**21,272**	**19,627**
Cost of materials	(4.3)	−2,918	−2,606
Personnel expenses	(4.4)	−5,367	−5,276
Amortization of intangible assets and depreciation of tangible assets	(4.5)	−1,180	−1,089
Other operating expenses	(4.6)	−8,025	−7,184
Operating income		**3,782**	**3,472**
Financial income	(4.7)	−369	−654
Holding income	(4.8)	83	358
Income before taxes		**3,496**	**3,176**
Income taxes [2]	(4.9)	−775	−1,101
Income after taxes		**2,721**	**2,075**
Net income	(4.10)	2,721	2,075
Non-controlling interests		0	0
Group profit		**2,721**	**2,075**

[1] For explanations, see relevant section in the notes to the consolidated financial statements.
[2] Due to legal requirements the shareholders' personal taxes arising from group business activities are shown as withdrawals from the group reserves.

CASH FLOW STATEMENT

(in million EUR)	2019
Income after taxes (including non-controlling interests)	2,721
Amortization / reversal of write-downs of intangible assets and depreciation / reversal of write-downs of tangible assets	1,180
Change in provisions for pensions and similar obligations (including change of plan assets)	379
Change in other provisions	498
Other non-cash income and expenses	– 305
Gain from disposals of consolidated companies	– 2
Gain/loss from disposals of fixed assets	– 6
Grants received	– 9
Change in inventories	– 274
Change in accounts receivable and other assets not related to investing or financing activities	– 590
Change in trade accounts payable and other liabilities not related to investing or financing activities	9
Interest income / interest expenses	80
Other income from investments	– 27
Income taxes	775
Income taxes paid	– 1,085
Cash flow from operating activities	**3,344**
Payments to aquire intangible fixed assets	– 221
Payments to aquire tangible fixed assets	– 1,074
Payments to aquire financial fixed assets [1)]	– 53
Payments to aquire or generate plan assets	– 10
Payments relating to purchase price adjustments of disposed consolidated entities and disposed fixed assets	– 140
Investments in consolidated companies	– 85
Proceeds from disposals of intangible fixed assets	7
Proceeds from disposals of tangible fixed assets	17
Proceeds from disposals of financial fixed assets [1)]	40
Proceeds from disposals of consilidated entities	60
Interest received	23
Income from dividends	15
Cash flow from investing activities	**– 1,421**

CASH FLOW STATEMENT

(in million EUR)	2019
Cash receipts from grants	9
Interest paid	–49
Cash payments to shareholders of the parent company	–804
Proceeds from loans / cash repayments of loans	–185
Cash flow from financing activities	**–1,029**
Change in financial funds from cash relevant transactions	**894**
Changes in financial funds due to change of consolidated companies	13
Changes in financial funds due to exchange rate movements	16
Financial funds [2] as of 1.1.	**9,454**
Financial funds [2] as of 31.12	**10,377**

[1] Excl. fixed-asset investment securities.
[2] Cash and cash equivalents and investment securities within fixed assets.
(+) = source of funds, (-) = use of funds

STATEMENT OF CHANGES IN GROUP EQUITY

(in million EUR)	Shareholders' capital [1]	Group reserves [2]	Balance sheet currency conversion difference	Equity attributable to the parent company	Non-controlling interests	Group equity
Balance as of 31.12.2017	**178**	**10,868**	**–388**	**10,658**	**–1**	**10,657**
Contributions	0	62	0	62	0	62
Withdrawals	0	–544	0	–544	0	–544
Net income	0	2,075	0	2,075	0	2,075
Changes in consolidated companies	0	–8	–2	–10	2	–8
Currency effects	0	0	92	92	0	92
Balance as of 31.12.2018	**178**	**12,453**	**–298**	**12,333**	**1**	**12,334**
Withdrawals	0	–465	0	–465	0	–465
Net income	0	2,721	0	2,721	0	2,721
Currency effects	0	0	91	91	0	91
Balance as of 31.12.2019	**178**	**14,709**	**–207**	**14,680**	**1**	**14,681**

[1] The shareholders' capital consists of the equity of C.H. Boehringer Sohn AG & Co. KG and C.H. Boehringer Sohn Grundstücksverwaltung GmbH & Co. KG. The shareholders' capital consists only of the limited partner's capital contribution.
[2] The shareholders' personal taxes arising from group business activities are shown as withdrawals from the group reserves.

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS

1 Principles and methods

1.1 General principles

The consolidated financial statements of Boehringer Ingelheim for the 2019 financial year were prepared in accordance with Section 264a of the German Commercial Code (HGB), in line with the legal requirements to prepare consolidated financial statements under Section 290 et seq. HGB.

In accordance with Section 297 (1) HGB, the consolidated financial statements consist of the consolidated balance sheet, the consolidated profit and loss statement, the notes to the consolidated financial statements, the cash flow statement and the statement of changes in equity.

The consolidated financial statements were prepared in euros in accordance with Section 298 (1) in conjunction with Section 244 HGB.

To improve the clarity and transparency of the consolidated financial statements, individual items of the consolidated balance sheet and the consolidated profit and loss statement have been combined. These items are presented and explained separately in the notes. The additional disclosures required for the individual items can also be found in the notes.

1.2 Registry information

The parent company is registered under the name C.H. Boehringer Sohn AG & Co. KG, with its headquarters in Ingelheim am Rhein, in the commercial register of Mainz district court under the number HRA 21732.

1.3 Information on the group of consolidated companies

The parent company of the Boehringer Ingelheim Group is C.H. Boehringer Sohn AG & Co. KG, Ingelheim am Rhein. Boehringer AG, Ingelheim am Rhein, is the sole unlimited partner of this company.

The Boehringer Ingelheim Group consists of a total of 175 subsidiaries in Germany and abroad. 150 subsidiaries have been included in the consolidated financial statements of C.H. Boehringer Sohn AG & Co. KG under full consolidation rules. C.H. Boehringer Sohn Grundstücksverwaltung GmbH & Co. KG is a special purpose entity in which C.H. Boehringer Sohn AG & Co. KG bears a majority of the risks and opportunities in economic terms. C.H. Boehringer Sohn AG & Co. KG holds a majority of the voting rights in the other subsidiaries, either directly or indirectly.

In accordance with Section 296 (2) HGB, 22 subsidiaries were not included in the consolidation in the reporting year, as they are individually and collectively insignificant to the Group's net assets, financial and earnings position. The total amount of the sales, equity and net income for the year of the subsidiaries not included in consolidation accounts for less than 1% of the aggregated Group financial statements totals. For two further subsidiaries there are ongoing restrictions on control due to the terms of the articles of association. These companies were also not consolidated in accordance with Section 296 (1) No. 1 HGB.

The total number of subsidiaries decreased by one compared to the previous year:

- Seven companies were founded.
- Two companies were acquired.
- Eight companies lost their separate legal identity by merger.
- One affiliated company was liquidated.
- One company was sold.

The following subsidiaries were exempted from the duty to prepare and disclosure annual financial statements and management reports in accordance with Section 264 (3) HGB:

- Boehringer Ingelheim GmbH, Ingelheim am Rhein
- Boehringer Ingelheim Europe GmbH, Ingelheim am Rhein
- Boehringer Ingelheim Secura Versicherungsvermittlungs GmbH, Ingelheim am Rhein
- Boehringer Ingelheim Grundstücks-GmbH, Ingelheim am Rhein
- Boehringer Ingelheim Finanzierungs GmbH, Ingelheim am Rhein
- Boehringer Ingelheim R&D Beteiligungs GmbH, Ingelheim am Rhein
- Boehringer Ingelheim Venture Fund GmbH, Ingelheim am Rhein
- Boehringer Ingelheim Invest GmbH, Ingelheim am Rhein
- Boehringer Ingelheim Animal Health France Participations GmbH, Ingelheim am Rhein

The following subsidiaries were exempted from the duty to prepare and disclose annual financial statements and management reports in accordance with Section 264b HGB:

- C.H. Boehringer Sohn AG & Co. KG, Ingelheim am Rhein
- C.H. Boehringer Sohn Grundstücksverwaltung GmbH & Co. KG, Ingelheim am Rhein
- Boehringer Ingelheim Pharma GmbH & Co. KG, Ingelheim am Rhein
- Boehringer Ingelheim Veterinary Research Center GmbH & Co. KG, Hanover

Boehringer Ingelheim participates in one joint venture company, which has not been included in the consolidated financial statements either using the proportionate method or the equity method, since it is not material. Furthermore, Boehringer Ingelheim holds an interest in fifteen associated companies, which have not been accounted for using the equity method either due to their lack of significance. The resulting effect on the Group's total assets and net income is less than 1%.

1.4 Consolidation methods

For inventories and fixed assets, receivables, liabilities, and income and expense items, transactions between the companies included in consolidation were eliminated as part of debt consolidation procedures in accordance with Section 303 HGB, procedures to eliminate intercompany profits in accordance with Section 304 HGB and income and expenses consolidation procedures in accordance with Section 305 HGB.

The acquisition method was applied when including subsidiaries in the consolidation for the first time in accordance with Section 301 HGB. Companies were included in the consolidation for the first time on the date on which the company became a subsidiary.

The book value of the shares held by the parent company was offset against the corresponding equity of the subsidiary. Equity was carried at the amount of the fair value of the assets, liabilities, prepaid expenses, deferred income and special reserves included in the consolidated financial statements as of the time of consolidation. Any remaining positive balance was recorded as goodwill; any remaining negative balance was recorded as a difference from capital consolidation.

1.5 Currency translation

Assets and liabilities resulting from foreign currency transactions were translated using the average spot exchange rate as of the balance sheet date. The realization principle (Section 298 (1) in conjunction with Section 252 (1) No. 4 half-sentence 2 HGB) and the historical cost convention (Section 298 (1) in conjunction with Section 253 (1) sentence 1 HGB) were applied to items with a remaining term of more than one year.

In these consolidated financial statements, the financial statements of foreign subsidiaries domiciled in a state outside the eurozone that are denominated in a foreign currency have been converted into euros in accordance with Section 308a HGB using the modified closing date rate method.

Using the modified closing date rate method, the asset and liability items of the annual financial statements prepared in foreign currency were translated into euros using the average spot exchange rate as of the balance sheet date, with the exception of equity, which was translated using the historical rate. Items included in the profit and loss statement were translated into euros using the average rate. The resulting translation differences were reported within consolidated equity below the reserves in “Balance sheet currency conversion difference”.

The exchange rates for the Group’s most important currencies changed as follows during the reporting year (basis: 1 EUR):

	Spot rate		Average rate	
	31.12.2019	31.12.2018	2019	2018
US dollar	1.12	1.15	1.12	1.18
Japanese yen	121.94	125.85	122.06	130.41
Chinese renminbi	7.82	7.88	7.73	7.81

2 Accounting policies

2.1 Fixed assets

Acquired tangible and intangible assets are carried at cost, less scheduled straight-line amortization and depreciation determined under consideration of the technical and economic circumstances. This is based on the following useful lives:

Goodwill	10 years
Other intangible assets	2 to 15 years
Buildings	20 years
Technical facilities and machines	10 years
Other facilities, operating equipment	3 to 10 years

Only straight-line depreciation and amortization are used in the consolidated financial statements. Additional write-downs are recorded to reflect impairments when the value of assets has been considered permanently impaired. Manufacturing costs include materials and labor manufacturing costs, an appropriate portion of materials and labor overheads, and the depreciation of fixed assets (to the extent caused by production). Manufacturing costs do not include financing costs.

All capitalized intangible assets have finite useful lives.

Financial assets primarily include investment securities, shareholder rights and loans and were carried at the lower of cost or fair market value, if impaired. In the event that the reasons for the impairment losses recognized in previous financial years were no longer applicable, corresponding reversals were recorded.

2.2 Current assets, prepaid expenses, deferred income and exceeding amount of plan assets

Inventories are carried at the lower of cost or fair market value.

Raw materials, consumables and supplies are capitalized at the lower of average acquisition prices or fair market value on the balance sheet date.

Finished goods and work in progress are measured at manufacturing cost on the basis of individual calculations, taking into account the directly attributable costs of materials, direct labor costs, special direct costs, an appropriate share of material and production overhead costs and production-related depreciation.

Goods for resale are valued at the lower of either acquisition cost or fair market value.

All identifiable risks in inventories arising from above-average storage periods, diminished marketability and lower replacement costs were taken into account by recording appropriate valuation adjustments.

Inventories are valued loss-free – that is, deductions were made from the expected sales prices to reflect costs yet to be incurred.

Receivables and other assets were recognized at cost less allowances for specific risks and general credit risk. Low-interest or non-interest-bearing receivables with a term of more than one year were discounted.

Cash and cash equivalents, consisting of cash, balances at banks and checks, were recognized at the lower of cost or fair market value.

Prepaid expenses recorded in accordance with Section 250 (1) HGB include expenses paid in advance in respect of a defined period of time after the balance sheet date.

Deferred income recorded in accordance with Section 250 (2) HGB include proceeds that represent income relating to a defined period of time after the balance sheet date.

The fair market value of pension plan assets and the corresponding present value of pension obligations have been offset according to German GAAP. The exceeding amount of plan assets has been capitalized separately.

2.3 Difference from capital consolidation

The difference from capital consolidation reported on December 31, 2019 was primarily a result of the business swap of Boehringer Ingelheim's consumer healthcare business and Sanofi's animal health business, which was completed on January 1, 2017. This resulted in a difference from capital consolidation of 1,986 million EUR. The difference is amortized over an estimated period of fifteen years. The remaining balance of the difference amounted to 1,469 million EUR as of December 31, 2019.

The difference from capital consolidation reported on December 31, 2019 also included an amount arising from the acquisition of a US company in 2011. The original difference amounted to 157 million EUR. The difference is amortized over an estimated period of ten years. The remaining balance of this difference amounted to 2 million EUR as of December 31, 2019.

The difference from capital consolidation was primarily influenced by the current year release of 151 million EUR and by subsequent purchase price adjustments. The income from the release of the difference arising from capital consolidation is included in other operating income. The release is made corresponding to the amortization of those assets of the acquired company identified in the purchase price allocation not previously recognized in that company's balance sheet.

2.4 Group reserves

Group reserves include the retained earnings of the consolidated subsidiaries from prior and current years and consolidation entries that affect earnings.

2.5 Provisions

Tax provisions and other provisions include all uncertain liabilities and expected losses from executory contracts. They were carried at the amount required to settle the obligation based on reasonable prudent commercial judgment (that is, including future cost and price increases). Provisions with a remaining maturity of more than one year were discounted using the matched-term, average market interest rate. In the case of pension provisions this interest rate results from the last ten years average market interest rate and in the case of other provisions from the last seven years average market interest rate (in accordance with the "Rückstellungsabzinsungsverordnung", German Regulation on the Discounting of Provisions).

2.6 Accounts payable and loans

Accounts payable and loans were recognized at settlement amount.

2.7 Deferred taxes

To calculate deferred taxes arising from temporary or quasi-permanent differences between the carrying amounts of assets, liabilities, prepaid expenses and deferred income in the group financial statements and their carrying amounts for tax purposes or tax loss carryforwards, the amounts of the resulting tax benefits and expenses at the time that the differences will reverse were measured using tax rates specific to the respective consolidated company (4% – 39%). Deferred tax balances are not discounted. Differences due to consolidation measures in accordance with Sections 300 to 305 HGB were also measured using the company-specific tax rates applicable at the time of the expected reversal of the difference. Deferred tax assets on loss carryforwards were taken into account if it is likely that they will be used within the next five years.

Deferred tax assets and liabilities were reported without offsetting.

3 Notes to the consolidated balance sheet

3.1 Intangible assets

(in million EUR)	Acquired concessions / similar rights	Goodwill	Advance payments	Total
Acquisition / manufacturing costs				
Balance as of 1.1.2018	**6,676**	**5**	**19**	**6,700**
Currency conversion difference	182	0	0	182
Changes in consolidated companies	80	24	0	104
Additions	102	0	21	123
Disposals	−145	0	0	−145
Reclassifications	13	0	−14	−1
Balance as of 31.12.2018	**6,908**	**29**	**26**	**6,963**
Currency conversion difference	54	0	0	54
Changes in consolidated companies	34	57	0	91
Additions	214	0	7	221
Disposals	−117	0	0	−117
Reclassifications	23	0	−21	2
Balance as of 31.12.2019	**7,116**	**86**	**12**	**7,214**
Accumulated amortization				
Balance as of 1.1.2018	**1,325**	**3**	**0**	**1,328**
Currency conversion difference	36	0	0	36
Changes in consolidated companies	0	0	0	0
Additions	537	0	0	537
Write-ups	0	0	0	0
Disposals	−58	0	0	−58
Reclassifications	0	0	0	0
Balance as of 31.12.2018	**1,840**	**3**	**0**	**1,843**
Currency conversion difference	12	0	0	12
Changes in consolidated companies	−2	0	0	−2
Additions	589	6	0	595
Write-ups	0	0	0	0
Disposals	−117	0	0	−117
Reclassifications	1	0	0	1
Balance as of 31.12.2019	**2,323**	**9**	**0**	**2,332**
Book value as of 31.12.2018	**5,068**	**26**	**26**	**5,120**
Book value as of 31.12.2019	**4,793**	**77**	**12**	**4,882**

3.2 Tangible assets

(in million EUR)	Land and buildings	Technical facilities and machines	Other facilities / operating equipment	Advance payments / construction in progress	Total
Acquisition / manufacturing costs					
Balance as of 1.1.2018	**3,627**	**3,717**	**2,118**	**777**	**10,239**
Currency conversion difference	34	24	18	1	77
Changes in consolidated companies	0	1	0	0	1
Additions	62	88	124	676	950
Disposals	−19	−52	−101	−1	−173
Reclassifications	221	192	69	−481	1
Balance as of 31.12.2018	**3,925**	**3,970**	**2,228**	**972**	**11,095**
Currency conversion difference	27	19	14	3	63
Changes in consolidated companies	−61	−97	−3	−8	−169
Additions	62	85	156	770	1,073
Disposals	−46	−84	−110	−7	−247
Reclassifications	175	172	85	−434	−2
Balance as of 31.12.2019	**4,082**	**4,065**	**2,370**	**1,296**	**11,813**
Accumulated depreciation					
Balance as of 1.1.2018	**2,056**	**2,657**	**1,659**	**0**	**6,372**
Currency conversion difference	22	18	15	0	55
Changes in consolidated companies	0	0	0	0	0
Additions	162	232	158	0	552
Write-ups	−3	−5	0	0	−8
Disposals	−13	−48	−95	0	−156
Reclassifications	−1	3	−2	0	0
Balance as of 31.12.2018	**2,223**	**2,857**	**1,735**	**0**	**6,815**
Currency conversion difference	16	13	10	0	39
Changes in consolidated companies	−60	−95	−3	0	−158
Additions	190	225	170	0	585
Write-ups	0	0	0	0	0
Disposals	−40	−77	−104	0	−221
Reclassifications	8	−14	5	0	−1
Balance as of 31.12.2019	**2,337**	**2,909**	**1,813**	**0**	**7,059**
Book value as of 31.12.2018	**1,702**	**1,113**	**493**	**972**	**4,280**
Book value as of 31.12.2019	**1,745**	**1,156**	**557**	**1,296**	**4,754**

3.3 Financial assets

(in million EUR)	Investments in affiliated companies	Loans to affiliated companies	Investments in related companies	Loans to related companies	Investment securities	Other loans	Total
Acquisition / manufacturing costs							
Balance as of 1.1.2018	**7**	**0**	**991**	**0**	**5,076**	**173**	**6,247**
Currency conversion difference	0	0	0	0	2	3	5
Changes in consolidated companies	0	0	0	0	0	0	0
Additions	5	0	31	0	117	7	160
Disposals	0	0	−21	0	−29	−145	−195
Reclassifications	0	0	0	0	0	0	0
Balance as of 31.12.2018	**12**	**0**	**1,001**	**0**	**5,166**	**38**	**6,217**
Currency conversion difference	0	0	0	0	0	0	0
Changes in consolidated companies	−6	0	−11	0	0	0	−17
Additions	0	0	45	4	3,071	5	3,125
Disposals	0	0	−81	0	−46	−8	−135
Reclassifications	0	0	0	0	0	0	0
Balance as of 31.12.2019	**6**	**0**	**954**	**4**	**8,191**	**35**	**9,190**
Accumulated depreciation							
Balance as of 1.1.2018	**0**	**0**	**397**	**0**	**17**	**3**	**417**
Currency conversion difference	0	0	0	0	0	0	0
Changes in consolidated companies	0	0	0	0	0	0	0
Additions	0	0	2	0	1	0	3
Write-ups	0	0	−256	0	−3	0	−259
Disposals	0	0	−2	0	0	0	−2
Reclassifications	0	0	0	0	0	0	0
Balance as of 31.12.2018	**0**	**0**	**141**	**0**	**15**	**3**	**159**
Currency conversion difference	0	0	0	0	0	0	0
Changes in consolidated companies	0	0	0	0	0	0	0
Additions	0	0	3	0	2	0	5
Write-ups	0	0	−60	0	−7	0	−67
Disposals	0	0	−68	0	−1	0	−69
Reclassifications	0	0	0	0	0	0	0
Balance as of 31.12.2019	**0**	**0**	**16**	**0**	**9**	**3**	**28**
Book value as of 31.12.2018	**12**	**0**	**860**	**0**	**5,151**	**35**	**6,058**
Book value as of 31.12.2019	**6**	**0**	**938**	**4**	**8,182**	**32**	**9,162**

As in the previous year, the “Other loans” item does not include any loans to shareholders.

3.4 Inventories

(in million EUR)	31.12.2019	31.12.2018
Raw materials and supplies	635	626
Unfinished goods	1,763	1,602
Finished goods and goods for resale	1,155	1,071
Advance payments to suppliers	10	13
	3,563	**3,312**

3.5 Accounts receivable and other assets

(in million EUR)	31.12.2019	Residual term over 1 year	31.12.2018	Residual term over 1 year
Trade accounts receivable	4,196	2	3,540	0
Receivables from affiliated companies	19	0	24	0
Receivables from related companies	29	0	27	0
Other assets	1,193	176	982	67
	5,437	**178**	**4,573**	**67**

The “Other assets” item includes receivables from shareholders of 123 million EUR (previous year: around half a million EUR).

Receivables from affiliated companies almost exclusively consist of receivables from loans.

Receivables from related companies primarily consist of trade accounts receivable.

3.6 Provisions

(in million EUR)	31.12.2019	31.12.2018
Pension provisions and similar obligations	5,185	4,712
Tax provisions	1,816	1,812
Other provisions	7,520	7,228
	14,521	**13,752**

Provisions for pensions and similar obligations

The provisions for pensions and similar obligations were determined on the basis of actuarial calculations using the projected unit credit method, taking into account future adjustments in salaries and pensions.

In addition to local biometric data (in Germany, for example, 2018 G mortality tables published by Prof. Dr. Klaus Heubeck which have been adjusted for group-specific death probabilities and invalidity rates), pension obligations in the significant countries were calculated on the basis of the following actuarial parameters:

(in % as of December 31, 2019)	Germany	USA	Japan
Discount rate	2.71	3.96	1.08
Salary increase	3.50	4.00	3.51
Pension increase	1.88	3.00	0.00

Discounting rates were determined by reference to average market rates for 15-year maturities in accordance with the German Regulation on the Discounting of Provisions of March 11, 2016. The interest rates used to discount significant foreign pension obligations (USA and Japan) were determined with comparable parameters, in line with the German Regulation on the Discounting of Provisions of March 11, 2016.

The difference calculated in accordance with Section 253 (6) HGB amounts to 743 million EUR (previous year: 767 million EUR).

The plan assets intended solely to cover pension and similar obligations that are unavailable to all other creditors (plan assets as defined in Section 246 (2) sentence 2 HGB) were measured at fair market value, which is essentially derived from stock market prices, and offset against the underlying pension and similar obligations. The fair market value of the plan assets on the balance sheet date was 2,149 million EUR. The related amount of pension obligations and similar obligations was 7,160 million EUR.

Tax provisions

The tax provisions also include provisions for double taxation risks, which have resulted following the implementation of the action plans of the Organisation for Economic Co-operation and Development (OECD) as part of their international initiative known as the “Action Plan on Base Erosion and Profit Shifting” (BEPS).

Other provisions

Other provisions mainly include provisions for discounts and guarantees, personnel-related provisions, provisions for outstanding invoices, as well as provisions for litigation, legal claims and compensation for damages.

3.7 Accounts payable and loans

(in million EUR)	Residual term less than 1 year	Over 1 year	Thereof over 5 years	31.12.2019	31.12.2018	Residual term less than 1 year
Bank loans	247	9	0	256	420	412
Other accounts payable	1,385	74	35	1,459	1,722	1,685
thereof:						
– Trade accounts payable	*822*	*8*	*0*	*830*	*855*	*852*
– Advance payments received	*170*	*22*	*13*	*192*	*164*	*142*
– Accounts payable to affiliated companies	*3*	*5*	*5*	*8*	*9*	*4*
– Accounts payable to related companies	*2*	*0*	*0*	*2*	*1*	*1*
*– Other liabilities**	*388*	*39*	*17*	*427*	*693*	*686*
	1,632	**83**	**35**	**1,715**	**2,142**	**2,097**

* thereof:

– from taxes (in million EUR)	*205*	*225*
– social security liabilities (in million EUR)	*35*	*40*

As in the previous year, there were no liabilities secured by mortgages or similar collateral rights on the balance sheet date.

At the end of the year, there were liabilities to shareholders of 61 million EUR (previous year: 255 million EUR). These are presented within the “Other liabilities” item.

Accounts payable to affiliated companies include loans amounting to 4 million EUR (previous year: 4 million EUR) and trade accounts payable amounting to 4 million EUR (previous year: 5 million EUR).

4 Notes to the consolidated profit and loss statement

The structure of the consolidated profit and loss statement was based on the total cost format. Other taxes are included in other operating expenses.

To provide a better view of the earnings position, cost of materials has been partially reclassified to other operating expenses. The previous year's figure has also been adjusted by 452 million EUR for better comparability.

4.1 Net sales

by businesses (in million EUR)	2019	2018
Human Pharma	13,961	12,559
Animal Health	4,035	3,960
Biopharmaceutical Contract Manufacturing	786	734
Other sales	41	40
Discontinued Operations	174	205
	18,997	**17,498**

by region (in million EUR)	2019	2018
Americas	8,830	8,088
Europe	5,689	5,316
Asia/Australia/Africa (AAA)	4,478	4,094
	18,997	**17,498**

4.2 Other operating income

Other operating income includes income from currency translation of 811 million EUR (previous year: 783 million EUR).

4.3 Cost of materials

(in million EUR)	2019	2018
Costs of raw material, supplies and goods for resale	2,074	1,720
Expenditure on services	844	886
	2,918	**2,606**

4.4 Personnel expenses

(in million EUR)	2019	2018
Wages and salaries	4,349	4,260
Social benefits and retirement benefits	1,018	1,016
thereof: retirement benefits	267	305
	5,367	**5,276**

All interest effects of the measurement of the provisions for pensions and similar obligations were shown as a separate item of financial income.

Average headcount	2019	2018
Production	16,590	16,360
Marketing and sales	18,463	18,776
Research and development	9,154	8,552
Administration	6,104	5,960
Apprentices	704	685
	51,015	**50,333**

The methodology used to calculate the average number of employees was revised for the 2019 consolidated financial statements. The calculated average, which was originally based on the four previous end-of-quarter figures, has been changed to an assessment based on 12 month-end figures. The figures for 2018 have been adjusted in line with the new methodology. This has resulted in an overall difference of -37 employees for 2018.

4.5 Amortization of intangible assets and depreciation of tangible assets

Amortization of intangible assets and depreciation of tangible assets include impairment losses of 181 million EUR (previous year: 116 million EUR).

4.6 Other operating expenses

Other operating expenses include expenses from currency translation of 1,056 million EUR (previous year: 779 million EUR).

In addition, other items included in operating expenses are mainly the charges made to record provisions for legal risks and restructuring, as well as third-party services for research, development, medicine and marketing purposes, administrative expenses, fees and contributions, commissions, rent, freight and expenses for repairs carried out by third parties.

4.7 Financial income

(in million EUR)	2019	2018
Interest result from provisions for pensions and similar obligations and other provisions	– 393	– 665
Other interest expenses and similar expenses	– 133	– 149
Interest expenses and similar expenses	**– 526**	**– 814**
Amortization of and loss on disposal of financial fixed assets and short-term investments	– 2	– 1
Income from other investment securities and from long-term loans	105	104
Other interest income and similar income	54	57
	– 369	**– 654**

Gains and losses from plan assets and interest expense relating to pension and similar obligations were offset in accordance with Section 246 (2) sentence 2 HGB. In total, 357 million EUR in earnings from plan assets and 727 million EUR in interest expense relating to pension and similar obligations are included under “Interest result from provisions for pensions and similar obligations and other provisions”.

4.8 Holding income

(in million EUR)	2019	2018
Write-downs on financial assets	– 4	– 2
Write-ups of financial assets	60	256
Income from related companies	27	104
thereof: from disposal of related companies	12	91
	83	**358**

4.9 Income taxes

(in million EUR)	2019	2018
Current income taxes	1,027	1,588
Deferred taxes	– 252	– 487
	775	**1,101**

Current income taxes primarily include the corporation and trade tax expenses of the consolidated companies.

The total balance of deferred tax assets as of the balance sheet date amounted to 3,000 million EUR (previous year: 2,784 million EUR). Deferred tax assets primarily arise on the difference between the carrying amounts of provisions for pension obligations and for discounts, tax goodwill, intangible assets, inventories and tangible assets. Deferred tax liabilities of 651 million EUR (previous year: 686 million EUR) were recorded. These primarily relate to differences between the carrying amounts of intangible assets, tangible assets, inventories and provisions.

4.10 Net income

The net income for 2019 was positively influenced by non-period income (primarily from the reversal of other provisions) of 630 million EUR (previous year: 352 million EUR) and was negatively influenced by non-period expenses (mainly due to taxes for previous years) of 206 million EUR (previous year: 511 million EUR).

5 Notes to the cash flow statement

The cash flow statement shows the changes in cash and cash equivalents (cash and long-term investment securities that can be sold at any time) of the Boehringer Ingelheim Group resulting from cash inflows and outflows in the reporting year. In accordance with the German Accounting Standard on the cash flow statement (DRS 21), the cash flow statement has been broken down according to cash flows from operating activities and cash flows from investing and financing activities.

The changes in the balance sheet items of the affiliated companies included were translated using average rates for the year. As on the balance sheet, cash and cash equivalents are carried at the spot rate. The effect of exchange rate changes on cash and cash equivalents has been shown separately.

The financial funds also include financial assets with a remaining maturity exceeding three months on the date of acquisition. These financial assets can be converted into cash in the short-term.

The financial funds as of December 31, 2019 comprised the following items:

(in million EUR)	2019
Cash and cash equivalents	2,195
Financial assets	8,182
	10,377

The financial funds included 486 million EUR in restricted funds as of the balance sheet date.

6 Other disclosures

6.1 Contingent liabilities

(in million EUR)	31.12.2019	31.12.2018
Liabilities from guarantees	25	21
Warranties and the granting of securities for third-party liabilities	70	235
	95	**256**

The risk of utilization of these contingent liabilities is assessed as low on account of the good net assets, financial and earnings position.

6.2 Other financial commitments and off-balance sheet transactions

(in million EUR)	31.12.2019	31.12.2018
Rental and lease obligations	486	512
Residual other financial commitments	1,610	1,465
thereof: pension-related	0	10
	2,096	**1,977**

There are obligations from rental and lease agreements of 486 million EUR (previous year: 512 million EUR), of which 29 million EUR (previous year: 12 million EUR) relate to long-term rental agreements with non-consolidated subsidiaries.

The purpose of the lease agreements is the lower capital commitment compared to buying property and the absence of the resale risk. Risks could arise from the term of the lease should it not be possible to continue to utilize the properties fully. There are no indications of this at this time.

The residual other financial commitments include future capital expenditures of 1,279 million EUR (previous year: 1,125 million EUR).

6.3 Derivative financial instruments and valuation units

Due to its extensive international structure, the Boehringer Ingelheim Group is highly dependent on developments in the world's currencies and interest rates. To hedge these risks, particularly those emerging from delivery of goods, services, and financing, currency forwards and options are generally used for currency risks. Interest rate swaps and options are used for interest rate risks.

The use of derivative financial instruments and the organizational processes are set out in internal guidelines. There is a strict separation between trading, processing, documentation, and control.

Risk positions are regularly tracked, analyzed, and measured in a special Group-wide financial report. The positions entered into are periodically reevaluated and monitored. The fair value of the derivative financial instruments is calculated using generally accepted market valuation methods (currency forwards based on the present value method) taking into account the market data as of the balance sheet date.

Provisions of 114 million EUR were recognized for currency forwards not included in hedge accounting for which there was a negative fair value within one currency as of the balance sheet date. In line with the imparity principle, positive fair values within one currency are not recognized.

On the balance sheet date, the derivative financial instruments not included in hedge accounting valuation units were as follows:

	Nominal value		Fair value	
(in million EUR)	31.12.2019	31.12.2018	31.12.2019	31.12.2018
Foreign exchange forward contracts	5,620	3,906	– 71	– 27

To the extent that the requirements for hedge accounting of foreign currency forward exchange contracts with highly probable forecasted transactions in accordance with Section 254 HGB are met, the foreign currency forward exchange contracts are not recognized in the balance sheet in line with the net hedge presentation method.

The following accounting policies apply to the recognition of valuation units in accordance with Section 254 HGB:

Economic hedges are accounted for in the financial statements by the use of valuation units. The valuation units are recognized for each foreign currency based on the net amount of highly probable forecasted transactions and currency forwards that match the forecasted net cash flow in terms of maturity, nominal amount and foreign currency (macro hedge). The highly probable forecasted transactions (incoming and outgoing payments for planned sales and purchases) are derived from company planning. Ex-post analysis of planning has shown that the planned transactions are highly probable.

The opposing changes in value of the hedged item and the hedging instrument are fully offset as the critical terms (maturity, nominal amount, and foreign currency) match. An effective hedge can therefore be assumed both prospectively and retrospectively. The critical term match method is exclusively used to measure the prospective and retrospective effectiveness of hedges. Excess amounts under hedging transactions are not included in the valuation units.

As of December 31, 2019, hedges for highly probable forecasted net cash flows were recognized as follows:

January to December 2020:

Net cash flow (in million EUR)		Foreign exchange forward contracts (in million EUR)			
	Nominal value		Nominal value		Fair value
USD	1,674	USD	1,607	USD	–97
JPY	742	JPY	627	JPY	–23
AUD	131	AUD	100	AUD	–3
MXN	97	MXN	96	MXN	–8
CAD	256	CAD	146	CAD	–5
GBP	151	GBP	152	GBP	–9

January to December 2021:

Net cash flow (in million EUR)		Foreign exchange forward contracts (in million EUR)			
	Nominal value		Nominal value		Fair value
USD	2,171	USD	1,309	USD	–51
JPY	744	JPY	370	JPY	–12
AUD	17	AUD	12	AUD	0
MXN	24	MXN	20	MXN	–1
CAD	43	CAD	28	CAD	0
GBP	27	GBP	22	GBP	–1

January to December 2022:

Net cash flow (in million EUR)		Foreign exchange forward contracts (in million EUR)			
	Nominal value		Nominal value		Fair value
USD	2,182	USD	537	USD	–11
JPY	769	JPY	205	JPY	0

January to February 2023:

Net cash flow (in million EUR)		Foreign exchange forward contracts (in million EUR)			
	Nominal value		Nominal value		Fair value
USD	812	USD	145	USD	1
JPY	110	JPY	26	JPY	0

Furthermore, as of December 31, 2019, valuation units for foreign currency receivables were recognized as follows:

Receivables (in million EUR)		Foreign exchange forward contracts (in million EUR)			
	Nominal value		Nominal value		Fair value
RUB	171	RUB	71	RUB	–5
PLN	59	PLN	16	PLN	0

The amount of the hedged foreign currency risk correlates to the relative change in the exchange rate between the planning date and the realization date of the forecasted transactions. If all currencies were to appreciate or depreciate against the euro by 10.0%, there would be a foreign currency risk of +/– 1,018 million EUR without hedging.

6.4 Research and development expenses

(in million EUR)	2019	2018
Research and development expenses	3,462	3,164

Non-capitalized research and development expenses include, among other items, the costs associated with clinical studies.

6.5 Total auditor fees

Total fees charged to the Group by the auditor for the financial year amounted to 5.9 million EUR. 1.6 million EUR of this relates to audits of financial statements, 0.8 million EUR to other assurance services, 2.2 million EUR to tax advisory services and 1.3 million EUR to other services.

6.6 Subsequent events

On December 18, 2019, an asset purchase agreement was signed between Hypera S.A. and Boehringer Ingelheim on the sale of the Buscopan business in Brazil. This agreement contains the conditions for the closing and execution of the asset sale, including antitrust authority approval, and other relevant conditions. The transaction is expected to be concluded during the 2020 financial year. An amount equivalent to approximately 288 million EUR as of the balance sheet date was agreed as the selling price.

Since the end of the 2019 financial year, we have not become aware of any further events that are of material significance to the Group or that could lead to a reappraisal of its net assets, financial and earnings position.

6.7 Shareholdings

The list of companies included in the consolidated financial statements and the complete list of shareholdings presented in accordance with Section 313 (2) HGB are included in the audited consolidated financial statements submitted to the German Federal Gazette.

Ingelheim am Rhein, 2 March 2020
Boehringer AG

Board of Managing Directors

Hubertus von Baumbach	Carinne Knoche-Brouillon	Dr. Michel Pairet
Jean Scheftsik de Szolnok	Michael Schmelmer	

INDEPENDENT AUDITOR'S REPORT

To C.H. Boehringer Sohn AG & Co. KG, Ingelheim am Rhein

Qualified Audit Opinion on the Consolidated Financial Statements and Audit Opinion on the Group Management Report

We have audited the consolidated financial statements of C.H. Boehringer Sohn AG & Co. KG, Ingelheim am Rhein, and its subsidiaries (the Group), which comprise the consolidated balance sheet as at 31 December 2019, and the consolidated profit and loss statement, cash flow statement and statement of changes in group equity for the financial year from 1 January to 31 December 2019, and notes to the consolidated financial statements, including a summary of significant accounting policies. In addition, we have audited the group management report of C.H. Boehringer Sohn AG & Co. KG for the financial year from 1 January to 31 December 2019.

In our opinion, on the basis of the knowledge obtained in the audit,

- except for the effects of the matter described in section "Basis for the Qualified Audit Opinion on the Consolidated Financial Statements and the Audit Opinion on the Group Management Report" the accompanying consolidated financial statements comply, in all material respects, with the requirements of German commercial law and give a true and fair view of the assets, liabilities and financial position of the Group as at 31 December 2019 and of its financial performance for the financial year from 1 January to 31 December 2019, in accordance with German Legally Required Accounting Principles, and
- the accompanying group management report as a whole provides an appropriate view of the Group's position. In all material respects, this group management report is consistent with the consolidated financial statements, complies with German legal requirements and appropriately presents the opportunities and risks of future development.

Pursuant to Section 322 (3) sentence 1 HGB [Handelsgesetzbuch "German Commercial Code"], we declare that, except for the qualification of the audit opinion on the consolidated financial statements mentioned, our audit has not led to any reservations relating to the legal compliance of the consolidated financial statements and the group management report.

Basis for the Qualified Opinion on the Consolidated Financial Statements and the Audit Opinion on the Group Management Report

Contrary to Section 314 (1) number 6 letters a) and b) HGB the total remuneration granted to the members and the former members of the board of managing directors as well as the pension provisions recognized and not recognized for the former members of the board of managing directors are not disclosed in the notes to the consolidated financial statements.

We conducted our audit of the consolidated financial statements and of the group management report in accordance with Section 317 HGB and the German Generally Accepted Standards of Financial Statement Audits promulgated by the Institut der Wirtschaftsprüfer [Institute of Public Auditors in Germany] (IDW). Our responsibilities under those requirements and principles are further described in the "Auditor's Responsibilities for the Audit of the Consolidated Financial Statements and of the Group Management Report" section of our auditor's report. We are independent of the group entities in accordance with the requirements of German commercial and professional law,

and we have fulfilled our other German professional responsibilities in accordance with these requirements. We believe that the evidence we have obtained is sufficient and appropriate to provide a basis for our opinions on the consolidated financial statements and on the group management report.

Other Information

Management is responsible for the other information. The other information comprises the annual report, with the exception of the audited consolidated financial statements and group management report and our auditor's report.

Our opinions on the consolidated financial statements and on the group management report do not cover the other information, and consequently we do not express an opinion or any other form of assurance conclusion thereon.

In connection with our audit, our responsibility is to read the other information and, in so doing, to consider whether the other information

- is materially inconsistent with the consolidated financial statements, with the group management report or our knowledge obtained in the audit, or
- otherwise appears to be materially misstated.

Responsibilities of Management for the Consolidated Financial Statements and the Group Management Report

Management is responsible for the preparation of consolidated financial statements that comply, in all material respects, with the requirements of German commercial law and that the consolidated financial statements give a true and fair view of the assets, liabilities, financial position and financial performance of the Group in compliance with German Legally Required Accounting Principles. In addition, management is responsible for such internal control as they, in accordance with German Legally Required Accounting Principles, have determined necessary to enable the preparation of consolidated financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the consolidated financial statements, management is responsible for assessing the Group's ability to continue as a going concern. They also have the responsibility for disclosing, as applicable, matters related to going concern. In addition, they are responsible for financial reporting based on the going concern basis of accounting, provided no actual or legal circumstances conflict therewith.

Furthermore, management is responsible for the preparation of the group management report that, as a whole, provides an appropriate view of the Group's position and is, in all material respects, consistent with the consolidated financial statements, complies with German legal requirements, and appropriately presents the opportunities and risks of future development. In addition, management is responsible for such arrangements and measures (systems) as they have considered necessary to enable the preparation of a group management report that is in accordance with the applicable German legal requirements, and to be able to provide sufficient appropriate evidence for the assertions in the group management report.

Auditor's Responsibilities for the Audit of the Consolidated Financial Statements and of the Group Management Report

Our objectives are to obtain reasonable assurance about whether the consolidated financial statements as a whole are free from material misstatement, whether due to fraud or error, and whether the group management report as a whole provides an appropriate view of the Group's position and, in all material respects, is consistent with the consolidated financial statements and the knowledge obtained in the audit, complies with the German legal requirements and appropriately presents the opportunities and risks of future development, as well as to issue an auditor's report that includes our opinions on the consolidated financial statements and on the group management report.

Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with Section 317 HGB and in compliance with the German Generally Accepted Standards of Financial Statement Audits promulgated by the Institut der Wirtschaftsprüfer (IDW) will always detect a material misstatement. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these consolidated financial statements and this group management report.

We exercise professional judgement and maintain professional scepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the consolidated financial statements and of the group management report, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinions. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal controls.
- Obtain an understanding of internal control relevant to the audit of the consolidated financial statements and of arrangements and measures (systems) relevant to the audit of the group management report in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of these systems.
- Evaluate the appropriateness of accounting policies used by management and the reasonableness of estimates made by management and related disclosures.
- Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Group's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in the auditor's report to the related disclosures in the consolidated financial statements and in the group management report or, if such disclosures are inadequate, to modify our respective opinions. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the Group to cease to be able to continue as a going concern.
- Evaluate the overall presentation, structure and content of the consolidated financial statements, including the disclosures, and whether the consolidated financial statements present the underlying transactions and events in a manner that the consolidated financial statements give a true and fair view of the assets, liabilities, financial position and financial performance of the Group in compliance with German Legally Required Accounting Principles.

- Obtain sufficient appropriate audit evidence regarding the financial information of the entities or business activities within the Group to express opinions on the consolidated financial statements and on the group management report. We are responsible for the direction, supervision and performance of the group audit. We remain solely responsible for our opinions.
- Evaluate the consistency of the group management report with the consolidated financial statements, its conformity with [German] law, and the view of the Group's position it provides.
- Perform audit procedures on the prospective information presented by management in the group management report. On the basis of sufficient appropriate audit evidence we evaluate, in particular, the significant assumptions used by management as a basis for the prospective information, and evaluate the proper derivation of the prospective information from these assumptions. We do not express a separate opinion on the prospective information and on the assumptions used as a basis. There is a substantial unavoidable risk that future events will differ materially from the prospective information.

We communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

Frankfurt am Main, 3 March 2020

KPMG AG
Wirtschaftsprüfungsgesellschaft

Original German version signed by

Kneisel	Krauß
Wirtschaftsprüfer	Wirtschaftsprüfer
[German Public Auditor]	[German Public Auditor]

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RESPIRATORY DISEASES

Respiratory diseases are very common. Chronic obstructive pulmonary disease (COPD) and bronchial asthma are among the most prevalent chronic diseases and a frequent cause of morbidity and premature deaths worldwide.

Idiopathic pulmonary fibrosis (IPF) is a rare disease which is severely debilitating and ultimately lethal.

COPD

COPD is a chronic disease of the lungs that causes coughing, excessive mucus production and dyspnea and ultimately destroys the lung tissue. The alveoli and thus gas exchange are the most affected. This leads to a limitation of airflow, causing shortness of breath and other respiratory symptoms. The airflow limitation is only partially reversible and usually worsens over time, leading to disability and ultimately to death. Symptoms such as excess cough and breathlessness are the main reasons why COPD is very stressful for patients. Lung emphysema and chronic bronchitis are the main manifestations of COPD.

COPD is caused by continuous damage to the lungs resulting from inhaling pollutants, primarily cigarette smoke. However, other factors also need to be considered including indoor and outdoor air pollution. The course of COPD, which is a disease that occurs in the second half in a human's life, is characterized by an accelerated loss of lung function compared to normal ageing and by occasional sudden worsening of symptoms and function referred to as acute exacerbations. This can lead to a downward spiral of worsening symptoms and thus further inactivity.

Bronchial asthma

Bronchial asthma is a chronic inflammatory disorder of the airways. The inflammation is accompanied by airway hyperresponsiveness, which leads to a narrowing of the airways and recurrent episodes of wheezing, breathlessness and coughing. These symptoms occur particularly at night or in the early hours of the morning. It is now known that asthma can be triggered by genetic and environmental factors (e.g. allergens and viral infections). Unlike COPD, asthma can occur very early in childhood; it can also be present in adolescents or adults. Asthma is often underestimated as an easy-to-manage condition. However, almost one in two patients with asthma still experience symptoms while receiving maintenance therapy, putting them at increased risk of potentially life-threatening asthma exacerbations. In addition, patients often adjust their daily lives to accommodate their conditions and avoid physical exertion in day-to-day activities, which has a negative impact on quality of life.

Indications	Brand Names	Active Ingredients	
– Chronic obstructive pulmonary disease (COPD)	SPIRIVA® SPIRIVA® HANDIHALER® SPIRIVA® RESPIMAT®	*tiotropium bromide* 	Maintenance treatment of patients with COPD (including chronic bronchitis and emphysema), maintenance treatment of associated dyspnoea and for prevention of exacerbations.
– Bronchial asthma	SPIRIVA® RESPIMAT®	*tiotropium bromide* 	An add-on maintenance bronchodilator treatment in patients aged six years and older with severe asthma who experienced one or more severe asthma exacerbations in the past year.* * SPIRIVA® RESPIMAT® *is approved for use in asthma in the EU, Japan, the USA and many other countries. The label varies by country. Please refer to the local product information.*
– Chronic obstructive pulmonary disease (COPD)	SPIOLTO® RESPIMAT® STIOLTO® RESPIMAT® INSPIOLTO® RESPIMAT®	*tiotropium bromide, olodaterol hydrochloride* 	Maintenance treatment of airflow obstruction in patients with chronic obstructive pulmonary disease (COPD).
– Chronic obstructive pulmonary disease (COPD)	STRIVERDI® RESPIMAT®	*olodaterol hydrochloride* 	Maintenance treatment of patients with chronic obstructive pulmonary disease (COPD).
– Reversible bronchospasms associated with obstructive airway diseases	COMBIVENT® RESPIMAT®	*ipratropium bromide, salbutamol, sulphate* 	A combination of a short-acting anticholinergic and beta-adrenergic for the management of reversible bronchospasms associated with obstructive airway diseases in patients requiring more than one bronchodilator.
– Chronic obstructive pulmonary disease (COPD) – Chronic bronchitis – Bronchial asthma	ATROVENT®	*ipratropium bromide* 	Prevention and treatment of shortness of breath in patients with chronic obstructive pulmonary disease (COPD) and mild to moderate bronchial asthma in adulthood and childhood as a supplement to beta-agonists in cases of acute asthma.
– Chronic obstructive airway disorders	BERODUAL® BRONCHODUAL® DUOVENT®	*ipratropium bromide, fenoterol hydrobromide* 	Prevention and treatment of symptoms in chronic obstructive airway disorders with reversible airflow limitation such as bronchial asthma and especially chronic bronchitis with or without emphysema.

RESPIRATORY DISEASES (CONTINUED)

Idiopathic pulmonary fibrosis (IPF)

IPF is a chronic progressive lung disease associated with a markedly reduced life span and affecting as many as 14 – 43 people per 100,000 worldwide. IPF is characterized by progressive scarring of lung tissue and a loss of lung function over time. Development of scarred tissue is called fibrosis. Over time, as the tissue thickens and stiffens with scarring, the lungs lose their ability to take in and transfer oxygen into the bloodstream, and vital organs do not get enough oxygen. As a result, individuals with IPF experience shortness of breath, even when resting, and often have difficulty coping with the demands of everyday life due to their limited physical capacity.

Acute IPF exacerbations are defined as rapid deteriorations of symptoms and lung function within days or weeks. These events can occur at any point in the course of the disease, even at first presentation, and are associated with high mortality. All patients with IPF are at risk of acute IPF exacerbations.

Systemic sclerosis associated interstitial lung disease (SSc-ILD)

Systemic sclerosis (SSc), also known as scleroderma, is a rare incurable autoimmune disease affecting connective tissue. The disease is estimated to affect 15 to 24 people in every 100,000 in Europe and 2.5 million worldwide. SSc impacts four times as many women as men, and the onset of the disease typically occurs at a young age – between 25 and 55 years. It can cause scarring (fibrosis) of the skin as well as major organs such as the heart, lungs, digestive tract and kidneys and can have life-threatening complications. Approximately 25% of patients develop significant pulmonary involvement within three years of diagnosis. When SSc affects the lungs, it can cause interstitial lung disease (ILD), known as SSc-ILD. It is a key driver of mortality among people with SSc, accounting for approximately one third of deaths.

Indications	Brand Names	Active Ingredients		
– Bronchial asthma	BEROTEC®	*fenoterol hydrobromide*		Symptomatic treatment of acute asthma attacks. Prophylaxis of exercise-induced asthma bronchiale. Symptomatic treatment of allergic and non-allergic asthma bronchiale and other conditions with reversible airway narrowing, e.g. chronic obstructive bronchitis.
– Bronchial asthma – Allergic rhinitis	ALESION® FLURINOL®	*epinastine hydrochloride*		Prophylactic treatment of patients with bronchial asthma. Prophylaxis and symptomatic treatment of allergic rhinitis.
– Idiopathic pulmonary fibrosis (IPF) – Systemic sclerosis associated interstitial lung disease (SSc-ILD)	OFEV®	*nintedanib*		Treatment of patients with idiopathic pulmonary fibrosis (IPF). Approved in the USA, Brazil, Canada, Japan and other countries as therapy for SSc-ILD to slow down the rate of decline in pulmonary function.

CARDIOVASCULAR AND METABOLIC DISEASES

Cardiovascular (CV) disease is the leading cause of death worldwide and is still increasing in prevalence. Currently, it is responsible for nearly one in three deaths worldwide. One key risk factor for developing cardiovascular disease is the presence of diabetes: people with type 2 diabetes are two to four times more likely to develop cardiovascular disease than people without diabetes, and as a result, their life expectancy is up to 12 years shorter. Proper control of diabetes and other treatable risk factors is therefore vital for the prevention of cardiovascular events.

Stroke

Stroke is the rapidly developing loss of brain functions caused by a disrupted blood flow to the affected brain tissue. This can be due to ischemia (lack of blood supply) caused by thrombosis or embolism, or due to bleeding (hemorrhagic stroke). As a result, the affected area of the brain is unable to function and the damage quickly becomes permanent, if untreated. A stroke is an acute event requiring emergency diagnosis and intervention. Worldwide, stroke is one of the leading causes of death and long-term disability.

Symptoms of a transient ischemic attack (TIA) are similar to stroke, but last for only a few minutes or hours and do not result in permanent neurological damage. As a TIA may precede a stroke, emergency medical care and subsequent preventive treatment may be necessary.

Atrial fibrillation

Atrial fibrillation (AF) is the most common sustained heart rhythm condition, affecting approximately 2% of the total population. One in four adults over 40 develops AF in their lifetime. Patients with AF are at higher risk of developing blood clots in their upper left heart chamber, which can cause a stroke if the clot breaks loose and travels to the brain. AF leads to a five-fold increase in the risk of stroke, resulting in up to three million patients worldwide suffering AF-related strokes each year. For patients with AF, the risk of stroke can be reduced by appropriate anticoagulation therapy.

Prevention and treatment of venous thromboembolism

Venous thromboembolism (VTE) is an umbrella term that encompasses deep vein thrombosis (DVT) and pulmonary embolism (PE). DVT occurs when a thrombus (blood clot) forms in a deep vein, most commonly in the leg, and partially or completely blocks the flow of blood. As the thrombus grows, a portion may break away from the main clot and travel in the circulatory system to the lungs. The lodging of a blood clot in the arteries of the lung is called a PE. VTE is a serious disorder with potentially fatal consequences.

Patients undergoing orthopedic surgery are at considerable risk of developing DVT, and chronic venous insufficiency and/or pulmonary hypertension may develop in the longer term. To prevent VTE events and their consequences after orthopedic surgery, patients should receive some kind of thromboprophylaxis. Patients who have already suffered from VTE require anticoagulant treatment for secondary prevention of a recurrent thromboembolic event.

Reversing anticoagulation

Anticoagulation therapy offers important benefits for patients at risk of thromboembolic events. However, even though rare, there may be situations when rapid reversal of anticoagulation is medically necessary, e.g. if a patient taking an anticoagulant is involved in a severe car accident and needs emergency surgery.

Indications	Brand Names	Active Ingredients	
– Stroke prevention in atrial fibrillation – Primary prevention of venous thromboembolic events after orthopedic surgery – Treatment and secondary prevention of venous thromboembolic events	PRADAXA® PRADAXAR® PRAZAXA®	*dabigatran etexilate* 	Prevention of strokes and blood clots in patients with atrial fibrillation. Primary prevention of venous thrombo-embolic events (VTE) in adults after elective total hip or knee replacement surgery. Treatment of deep vein thrombosis (DVT) and pulmonary embolism (PE), and secondary prevention of recurrent DVT and PE in adults.
– Specific reversal of PRADAXA® (dabigatran etexilate)	PRAXBIND®	*idarucizumab* 	PRAXBIND® is a specific reversal agent for dabigatran and is indicated in adult patients treated with PRADAXA® (dabigatran etexilate) when rapid reversal of its anticoagulant effects is required: for emergency surgery/urgent procedures; in life-threatening or uncontrolled bleeding.
– Hypertension – Cardiovascular morbidity and mortality prevention	MICARDIS®	*telmisartan* 	Treatment of hypertension. For the reduction of the risk of myocardial infarction (heart attack), stroke or death from cardiovascular (CV) causes in patients 55 years of age or older at high risk of developing major CV events who are unable to take ACE inhibitors (US). For the reduction of cardiovascular morbidity in patients with manifest atherothrombotic cardiovascular disease (history of coronary heart disease, stroke or peripheral arterial disease), or patients with type 2 diabetes mellitus with documented target organ damage (EU).
– Hypertension	MICARDISPLUS® MICARDIS® PLUS MICARDIS® HCT CO-MICARDIS®	*telmisartan; hydrochlorothiazide* 	Treatment of hypertension alone or with other antihypertensive agents, to lower blood pressure. Lowering blood pressure reduces the risk of fatal and nonfatal cardiovascular events, primarily strokes and myocardial infarctions. Not indicated for initial therapy (US). Treatment of essential hypertension. MICARDISPLUS® fixed dose combination is indicated in adults whose blood pressure is not adequately controlled on telmisartan alone (EU).

CARDIOVASCULAR AND METABOLIC DISEASES (CONTINUED)

Hypertension and cardiovascular diseases

Hypertension (high blood pressure) is a chronic disease in which the blood pressure is chronically elevated. Hypertension is also one of the major risk factors for stroke, heart attacks, heart failure and chronic renal failure. The primary goal of anti-hypertensive treatment is to prevent such cardiovascular events and to reduce the risk of cardiovascular mortality.

Acute myocardial infarction

An acute myocardial infarction, or heart attack, occurs when a thrombus (blood clot) suddenly prevents blood flow to an area of the heart muscle. Unless the blood flow is restored quickly, the affected section of heart muscle becomes permanently damaged. Heart attacks are one of the most common causes of death in industrialized countries.

Indications	Brand Names	Active Ingredients	
– Hypertension	TWYNSTA® MICAMLO® MICARDIS® AMLO MICARDIS® DUO	*telmisartan, amlodipine* 	Treatment of hypertension alone or with other antihypertensive agents. As initial therapy in patients likely to need multiple antihypertensive agents to achieve their blood pressure goals (US). Add-on therapy in adult patients with not adequately controlled blood pressure on amlodipine, and replacement therapy in adult patients receiving telmisartan and amlodipine from separate tablets (EU).
– Acute ischemic stroke – Acute myocardial infarction – Acute massive pulmonary embolism – Catheter clearance due to thrombotic occlusion	ACTILYSE® ACTILYSE® CATHFLO®	*alteplase* 	Fibrinolytic treatment of acute ischemic stroke, acute myocardial infarction, acute massive pulmonary embolism. Fibrinolytic treatment of occluded catheters.
– Secondary prevention of stroke or transient ischemic attacks (TIA)	AGGRENOX® ASASANTIN® ASASANTIN® RETARD	*dipyridamole, acetylsalicylic acid* 	Prevention of stroke following an initial first stroke, or transient ischemic attacks (TIA).
– Acute myocardial infarction	METALYSE®	*tenecteplase* 	Fibrinolytic treatment of acute myocardial infarction.
– Hypertension	CATAPRESAN® CATAPRES® CATAPRESSAN®	*clonidine; clonidine hydrochloride* 	Treatment of hypertension.

CARDIOVASCULAR AND METABOLIC DISEASES (CONTINUED)

Diabetes

Type 2 diabetes is a chronic, progressive condition associated with elevated blood sugar levels that can cause long-term complications if not treated. An estimated four million deaths worldwide every year are linked directly to the long-term effects of diabetes. Type 2 diabetes is the most common form of the disease and accounts for up to 95% of all cases in the developed world. Currently, more than 425 million people in the world live with diabetes, which represents an enormous burden on health care systems globally. Without effective prevention and management strategies, it is estimated that the number of cases will reach 629 million by 2045.

In addition, type 2 diabetes is one of the major risk factors for cardiovascular disease. Life expectancy of people with type 2 diabetes at high cardiovascular risk decreases, on average, by up to 12 years. Overall, around half of deaths in people with type 2 diabetes are caused by concomitant cardiovascular disease, indicating a high unmet medical need.

In addition to cardiovascular disease, serious complications of diabetes include:

- Nephropathy, culminating in renal failure requiring dialysis
- Retinopathy with potential loss of vision
- Peripheral neuropathy with the risk of developing foot ulcers and potentially requiring foot or leg amputations
- Autonomic neuropathy, which can cause gastrointestinal, genitourinary and cardiovascular symptoms and sexual dysfunction.

Indications	Brand Names**	Active Ingredients		
– Type 2 diabetes mellitus	TRAJENTA® TRADJENTA® TRAZENTA® TRAYENTA®	*linagliptin*		Treatment of adults with type 2 diabetes mellitus as an adjunct to diet and exercise to improve glycemic control, used in monotherapy (if metformin is not tolerated or contraindicated) or in combination therapy.
– Type 2 diabetes mellitus	JENTADUETO® TRAYENTA DUO® TRAJENTA DUO® TRAJENTAMET®	*linagliptin, metformin hydrochloride*		Treatment of adults with type 2 diabetes mellitus as an adjunct to diet and exercise to improve glycemic control when treatment with metformin does not lead to sufficient control or when patients are treated with TRAJENTA® (linagliptin) and metformin.
– Type 2 diabetes mellitus	JARDIANCE® JARDIANZ®	*empagliflozin*		Treatment of adults with type 2 diabetes mellitus as an adjunct to diet and exercise to improve glycemic control and to reduce the risk of cardiovascular death in adults with type 2 diabetes mellitus and established cardiovascular disease.* ** US indication, December 2016. The label varies by country. Please refer to the local product information.*
– Type 2 diabetes mellitus	SYNJARDY® JARDIANCE DUO®	*empagliflozin, metformin hydrochloride*		Treatment of adults with type 2 diabetes mellitus as an adjunct to diet and exercise to improve glycemic control when treatment with both empagliflozin and metformin is appropriate.* ** US indication, December 2016. The label varies by country. Please refer to the local product information.*
– Type 2 diabetes mellitus	GLYXAMBI®	*empagliflozin, linagliptin*		Treatment of adults with type 2 diabetes mellitus as an adjunct to diet and exercise to improve glycemic control in adults with type 2 diabetes mellitus when both empagliflozin and linagliptin are appropriate treatments.* ** US indication, March 2015. The label varies by country. Please refer to the local product information.*

** Diabetes portfolio in collaboration with Eli Lilly and Company.

ONCOLOGY

Cancer is a threat to global health. In 2018, an estimated 18 million new cases of cancer were diagnosed worldwide and 9.6 million people died from cancer, nearly one in six global deaths (WHO World Cancer Factsheet 2018). The most common diagnosed cancer types were lung cancer (nearly 12%), breast cancer (nearly 12%), colorectal cancer (10%), prostate cancer (7%) and stomach cancer (6%).

Lung cancer

Lung cancer refers to malignant abnormal cell growth inside the lung tissue. It is the most common cancer with an estimated 2.1 million new cases per year worldwide (2018). Smoking is the primary cause of the disease, contributing to almost 90% of the cases. Recently, however, the incidence of lung cancer among non-smokers has increased. Lung cancer has a poor prognosis, with 1.8 million deaths per year, representing nearly 20% of all cancer deaths. Lung cancer symptoms are unspecific so that the disease may take many years to appear. Late diagnosis in an advanced stage of the disease results in an often dismal prognosis, with only 10–15% of lung cancer patients surviving five years or more following diagnosis.

There are different subtypes such as small cell lung cancer (SCLC) and non-small cell lung cancer (NSCLC). More than ten different molecular genetic aberrations (mutations) present in the tumor have been identified. By focusing on molecular changes that are specific to the respective subtype of lung cancer, targeted therapies have become more effective than other treatments. They show a survival benefit and are at the same time less harmful to normal cells, thereby reducing side effects.

Indications	Brand Names	Active Ingredients	
– Non-small cell lung cancer (NSCLC)	GIOTRIF® GILOTRIF®	*afatinib* 	First-line treatment of adult patients with locally advanced or metastatic non-small cell lung cancer (NSCLC) whose tumors have activating epidermal growth factor receptor (EGFR) mutations. For the treatment of patients with locally advanced or metastatic NSCLC of squamous histology progressing on or after platinum-based chemotherapy.
– Non-small cell lung cancer (NSCLC)	VARGATEF®	*nintedanib* 	Combination therapy with docetaxel for the treatment of adult patients with locally advanced, metastatic or locally recurrent non-small cell lung cancer (NSCLC) of adenocarcinoma tumor histology after first-line chemotherapy.

DISEASES OF THE CENTRAL NERVOUS SYSTEM

Mental and neurological diseases such as depression and Parkinson's disease significantly impact patients and their families and are also a substantial burden to society.

Parkinson's disease

Parkinson's disease (PD) is a degenerative disorder of the central nervous system. Patients usually notice motor symptoms like hand shaking (tremor) as their first sign of the disease, which may progress to include shaking of the arms, legs or head. Other motor symptoms that may develop over time include stiffness that often results in loss of facial expression and a gradual slowing or loss of motion, or "freezing". About 30 – 40% of patients also suffer from non-motor symptoms associated with PD, such as depression and sleep disorders. The primary symptoms are the result of a lack of the neurotransmitter dopamine in distinct areas of the human brain.

Restless legs syndrome (RLS)

Restless legs syndrome (RLS) is a common neurological disorder characterized by an uncontrollable urge to move the legs, primarily occurring in the evening and night hours. It is usually accompanied by unpleasant and sometimes painful sensations in the legs as well as disturbed sleep resulting in daytime tiredness or sleepiness. The sensations are felt deep within the legs and are described as creeping, crawling or aching.

INFECTIOUS DISEASES

HIV infection/AIDS

Acquired immune deficiency syndrome (AIDS) is a set of symptoms and infections resulting from the damage to the human immune system caused by the human immunodeficiency virus (HIV). If untreated, infection with HIV progressively reduces the effectiveness of the immune system and leaves individuals susceptible to opportunistic infections and tumors. Babies of infected mothers are at risk of getting the virus during pregnancy, childbirth or breastfeeding.

Indications	Brand Names	Active Ingredients	
– Parkinson's disease (PD) – Restless legs syndrome (RLS)	SIFROL® MIRAPEX® MIRAPEXIN® PEXOLA®	*pramipexole* 	Symptomatic treatment of idiopathic Parkinson's disease. It may be used as monotherapy or in combination with levodopa. Symptomatic treatment of idiopathic moderate to severe restless legs syndrome.
– Sleep disorders	LENDORMIN®	*brotizolam* 	Short-term treatment of disorders of initiating and maintaining sleep. Insomnia requiring pharmacological intervention.

Indications	Brand Names	Active Ingredients	
– HIV/AIDS	VIRAMUNE® VIRAMUNE XR®	*nevirapine* 	For the combination therapy of HIV-1 infection and (in several countries) for the prevention of mother-to-child transmission of HIV-1 in pregnant women who are not taking antiretroviral therapy at time of labor. Prolonged release tablets for once-daily dosing within combination therapy.
– HIV/AIDS	APTIVUS®	*tipranavir* 	Indicated for combination antiretroviral treatment of HIV-1-infected patients, co-administered with 200 mg of ritonavir, who are treatment-experienced and infected with HIV-1 strains resistant to more than one protease inhibitor.

LIVESTOCK – SWINE

Infectious respiratory diseases

INGELVAC CIRCOFLEX® is the first single-dose piglet vaccine for the control of porcine circovirus disease (PCVD). This vaccine provides significant reduction of mortality in the acute phase of PCVD as well as improved growth rates in the chronic phase of the disease. INGELVAC CIRCOFLEX® protects with minimal systemic adverse reactions or injection site swellings and can be used during gestation and lactation. Our INGELVAC® PRRS products are licensed for active immunization against the respiratory and reproductive form of porcine reproductive and respiratory syndrome (PRRS).

INGELVAC MYCOFLEX® provides proven safety, efficacy and rapid onset of long-lasting immunity against Mycoplasma hyopneumoniae (M. hyo.) with a single dose. INGELVAC MYCOFLEX® contains the IMPRANFLEX® adjuvant which allows for fresh mixing with INGELVAC CIRCOFLEX® to form FLEXCOMBO®.

INGELVAC PROVENZA® protects against multiple IAV-S strains and decreases nasal shedding, providing protection where pigs are most vulnerable.

Infectious enteric diseases

ENTERISOL® ILEITIS is the first and only oral live vaccine against ileitis, globally the most prevalent enteric disease in swine caused by Lawsonia intracellularis. It is licensed to improve weight gain and to reduce growth variability associated with the disease. ENTERISOL® ILEITIS helps to reduce the total antimicrobial use in pork production.

Indications	Brand Names	Active Ingredients	
– Infectious respiratory diseases	INGELVAC CIRCOFLEX®	*recombinant vaccine (porcine circovirus type 2, PCV2)* 	For the active immunization of pigs over the age of two weeks against porcine circovirus type 2 to reduce mortality, clinical signs – including weight loss – and lesions in lymphoid tissues associated with porcine circovirus diseases (PCVD). In addition, vaccination has been shown to reduce PCV 2 nasal shedding, viral load in blood and lymphoid tissues, and duration of viremia.
– Infectious respiratory diseases	INGELVAC® PRRS MLV INGELVAC PRRSFLEX® EU REPROCYC® PRRS EU	*attenuated live vaccine (PRRS virus type 2, type 1)* 	Depending on the product, for the active immunization of pigs at various ages against porcine reproductive and respiratory syndrome virus (PRRS).
– Infectious respiratory diseases	INGELVAC MYCOFLEX®	*inactivated vaccine (Mycoplasma hyopneumoniae)* 	For the active immunization of pigs from the age of three weeks to reduce lung lesions following infections with Mycoplasma hyopneumoniae.
– Infectious respiratory diseases	INGELVAC PROVENZA®	*attenuated live influenza vaccine (LAIV)* 	For the vaccination of pigs one day of age or older against influenza virus strains H1N2 and H3N2.
– Infectious enteric diseases	ENTERISOL® ILEITIS	*attenuated live vaccine (Lawsonia intracellularis)* 	For the active immunization of pigs from the age of three weeks against intestinal lesions caused by Lawsonia intracellularis infection and to reduce growth variability and loss of weight gain associated with the disease.

LIVESTOCK - CATTLE/RUMINANTS

Our cattle/ruminants business is a global leader in antiparasitic brands such as IVOMEC®, LONGRANGE® and EPRINEX®. These world renowned parasiticides treat and protect grazing animals from the harmful effects of internal and external parasites.

ZACTRAN® treats cattle with bacterial pneumonia and sheep with digital dermatitis infections.

BOVELA® is for active immunization of cattle of three months of age in terms of reproductive infectious diseases.

Indications	Brand Names	Active Ingredients	
– Internal and external parasites of cattle	IVOMEC®	*ivermectin* 	Depending on formulation, the product is for the treatment of nematodes, lice, mites, ticks, flies, lungworms and liver flukes.
– Internal and external parasites of cattle	LONGRANGE®	*eprinomectin, long-acting* 	The Theraphase® technology used to develop this formulation of eprinomectin allows a single treatment to last up to 100-150 days – long enough to break the parasite life cycle and effectively reduce parasite burdens on the pasture. LONGRANGE® is effective in the control of most internal and external parasites of cattle: gastrointestinal roundworms, lungworms, grubs, mites.
– Internal and external parasites of ruminants	EPRINEX®	*eprinomectin* 	Depending on formulation, the product is for the treatment of nematodes, lice, mites, ticks, flies and lungworms in cattle and sheep.
– Bacterial causes of respiratory disease and interdigital dermatitis (footrot)	ZACTRAN®	*gamithromycin* 	Depending on species indication (and country of registration), the product is for the treatment and metaphylaxis control of respiratory disease in cattle caused by key bacteria (Mannheimia, Pasteurella, Histophilus and Mycoplasma) and footrot disease in sheep caused by key bacteria (Fusobacterium and Dichelobacter).
– Reproductive infectious diseases in cattle	BOVELA®	*bovine viral diarrhoea (BVD) types 1 and 2* 	Reduces hyperthermia and minimizes the reduction of leukocyte count caused by bovine viral diarrhoea virus (BVDV-1 and BVDV-2); reduces virus shedding and viremia caused by BVDV-2 and prevents the birth of persistently infected calves caused by transplacental infection.

LIVESTOCK - CATTLE/RUMINANTS (CONTINUED)

Our vaccine PYRAMID®/PRESPONSE® is part of our expanding portfolio of respiratory and reproductive vaccines to prevent diseases that affect livestock.

METACAM® is a non-steroidal anti-inflammatory drug (NSAID), helping to minimize losses from inflammation and tissue damage in animals suffering from disease, hence addressing the need for maintained profitability and the concern for farm animal well-being.

Indications	Brand Names	Active Ingredients	
– Infectious respiratory diseases and reproductive disorders in cattle	PYRAMID® PRESPONSE®	*family of multivalent vaccine combinations including different modified live viruses: bovine viral diarrhoea (BVD) types 1 and 2, infectious bovine rhinotracheitis (IBR), parainfluenza 3 (PI3) and bovine respiratory syncytial virus (BRSV), and bacteria: Pasteurella multocida, Mannheimia haemolytica, L. canicola, L. grippotyphosa, L. hardjo, L. icterohaemmorrhagiae and L. pomona* 	The PYRAMID®/PRESPONSE® family of vaccines provides broad coverage for BVD types 1 and 2, IBR, BRSV, PI3 and Mannheimia haemolytica with only a single dose. They contain the MetaStim®* adjuvant system to enhance the animal's response for greater protection (US and Canada only). ** MetaStim® is a registered trademark of Zoetis Services LLC.*
– Pain and inflammatory disorders	METACAM®	*meloxicam* 	For the treatment of mastitis in lactating cows and for the control of pain associated with dehorning or surgery. It is also indicated for use in calves affected by diarrhoea and in cattle suffering from respiratory disease.

LIVESTOCK - POULTRY

Our poultry vaccine portfolio consists of a significant range of live and inactivated vaccines for broilers, layers and breeder hens, providing protection against the most critical viral and bacterial diseases like avian influenza, infectious bronchitis, Newcastle disease, infectious bursal disease, egg drop syndrome and avian coryza. This portfolio of preventive products helps producers worldwide to provide safe, affordable, abundant and sustainable high-quality poultry meat and eggs.

Indications	Brand Names	Active Ingredients	
– Various viral and bacterial diseases in poultry	GALLIMUNE® GALLIVAC® VOLVAC®	*polyvalent attenuated live and inactivated vaccine containing antigens for vaccination against avian influenza, Newcastle disease, avian coryza, egg drop syndrome, infectious bronchitis, infectious bursal disease, gallibacterium anatis* 	For vaccination of healthy chickens against diseases caused by the included antigens. For the prevention of the most common diseases in broiler chickens and diseases responsible for losses in egg production in layers.
– Infectious bursal disease and Marek's disease	VAXXITEK® HVT + IBD	*serotype 3, live Marek's disease vector, live vHVT013-69 recombinant virus (and diluent)* 	To prevent mortality and to reduce clinical signs and lesions of infectious bursal disease. The onset of protection is from two weeks and the protection extends to nine weeks. To reduce mortality, clinical signs and lesions of Marek's disease. The onset of protection is four days. A single vaccination is sufficient to provide reliable protection during the risk period.
– Infectious bursal, Newcastle and Marek's diseases	VAXXITEK® HVT + IBD + ND	*Bursal disease, Marek's disease, Newcastle disease vaccine, Serotype 3, live Marek's disease vector; the vaccine contains a gene of IBD and NDV (and diluent)* 	The vaccination of 18 to 19-day-old embryos and one-day-old chickens is effective against standard and variant infectious bursal, Newcastle and Marek's disease.
– Newcastle disease (ND)	AVINEW®	*live Newcastle disease virus, VG/GA-AVINEW strain* 	In broiler chickens from one day of age: active immunization against Newcastle disease to reduce mortality and clinical signs associated with the disease. In future layer and future breeder pullets from the age of four weeks: priming for active immunization against egg drop caused by Newcastle disease before vaccination with an inactivated vaccine (strain Ulster 2C) prior to the beginning of lay.
– Marek's disease	PREVEXXION™ RN	*live herpes virus chimera, serotype 1, strain RN1250 (and diluent)* 	The vaccine is recommended for in ovo vaccination of 18 to 19-day-old embryonated chicken eggs to protect against the very virulent Marek's disease.
– Newcastle and Marek's diseases	NEWXXITEK™ HVT + ND	*live Marek's disease vectored virus, serotype 3, that contains a gene insert from Newcastle disease (and diluent)* 	The vaccination of 18 to 19-day-old embryos and one-day-old chickens is effective against Marek's disease and Newcastle disease.

VETERINARY PUBLIC HEALTH (VPH)

We work with governments and private partners toward improving control and eradicating diseases such as foot-and-mouth disease, bluetongue virus and rabies.

Our foot-and-mouth vaccines portfolio works for the active immunization of cattle, sheep or pigs to reduce clinical signs and mortality following exposure to foot-and-mouth disease (FMD) virus.

RABISIN® is an inactivated vaccine against rabies, available as a clear colorless suspension for injection.

BTV PUR® is a multi-strain vaccine used for active immunization of sheep and cattle to prevent viremia and to reduce clinical signs caused by bluetongue virus.

Indications	Brand Names	Active Ingredients	
– Foot-and-mouth disease (FMD)	AFTOPOR® AFTOVAXPUR® AFTOVAX® AFTOBOV® OLEOSA AFTOVAXPUR® DOE	*mix of inactivated FMD virus antigens out of the widest range of vaccine strains* 	FMD vaccines with highly potent and purified antigens (AFTOPOR®, AFTOVAXPUR®, AFTOBOV® OLEOSA) have potential marker properties that allow differentiation between infected and vaccinated animals (DIVA) for endemic or emergency situations. AFTOVAXPUR® DOE is suitable for emergency situations only.
– Rabies	RABISIN® RABORAL V-RG®	*Rabisin: inactivated and adjuvanted rabies glycoproteins; Raboral V-RG: vaccina-vectored rabies vaccine* 	RABISIN® is used for the active immunization of dogs and cats to reduce mortality and clinical signs due to rabies infection. Immunity has been demonstrated one month after vaccination and has been shown to persist up to the next re-vaccination dose. RABORAL V-RG® is an oral rabies recombinant vaccine that protects raccoons and coyotes against rabies, thereby reducing the risk of exposure to rabies to humans and domestic animals. It is only sold to government agencies conducting rabies control programs.
– Bluetongue	BTV PUR®	*mix of inactivated bluetongue virus* 	Active immunization of sheep to prevent viremia and to reduce clinical signs caused by bluetongue virus serotypes 1, 2, 4 and/or 8 (combination of maximum 2 serotypes). Active immunization of cattle to prevent viremia caused by bluetongue virus serotypes 1, 2, 4 and/or 8, and to reduce clinical signs caused by bluetongue virus serotypes 1, 4 and/or 8 (combination of maximum 2 serotypes). Onset of immunity has been demonstrated three weeks (or five weeks in sheep for BTV2) after the primary vaccination course for BTV-1, BTV-2 (cattle), BTV-4 and BTV-8 serotypes.

COMPANION ANIMALS - HORSE

Our main equine products focus on the prevention and treatment of parasite infestations, management solutions for chronic diseases, gastric ulcers, and vaccines. Our equine portfolio also includes a range of flagship products for the treatment of joint disease, colic and respiratory disease, as well as a line of nutraceuticals.

PRASCEND® is indicated for the treatment of pituitary pars intermedia dysfunction (PPID), which is also known as equine Cushing's disease. Clinical signs of PPID are hypertrichiosis, laminitis, change in body conformation and lack of performance. Treatment with PRASCEND® is life-long.

VETERA® vaccines are the first US vaccine portfolio to include multiple convenient combinations of disease protection for horses from as young as four months of age. The vaccines protect against as many as nine infectious organisms including influenza, herpes, the West Nile virus, tetanus and others. This enables customised protection for each horse with limited needle injections.

GASTROGARD®/ULCERGARD® is indicated for the treatment and prevention of equine gastric ulcers, which is one of the most common diseases in horses. GASTROGARD® is supplied in an easy-to-use oral paste form and has been the first choice for treatment of gastric ulcers since its launch in 1999. ULCERGARD® in the USA is the preventive of choice for horses with an increased risk of developing gastric ulcers.

EQVALAN®/ZIMECTERIN® contains ivermectin, a leading ingredient that controls a wide variety of important internal parasites, including bots and benzimidazole-resistant small strongyles, in an easy-to-administer oral paste. EQVALAN®/ZIMECTERIN® is approved for adult horses and foals as young as six weeks of age.

EQVALAN® DUO/GOLD, ZIMECTERIN® gold combines ivermectin with praziquantel, an ingredient that specifically controls tapeworms.

ARTI-CELL® FORTE is the world's first licensed veterinary stem cell product which is a ready-to-use intra-articular injection of chondrogenic induced mesenchymal cells for the treatment of lameness in horses. ARTI-CELL® FORTE is one of the latest additions to the equine portfolio and is available in a range of countries within the EU as of 2019.

ASERVO® EQUIHALER® is the first inhalation product for the treatment of severe equine asthma. This product is a novel glucocorticoid pro-drug (ciclesonide inhalation solution) delivered in an inhaler specifically designed for use in horses, and implementing the Soft Mist™ technology derived from the RESPIMAT® inhalers in human pharma. This exciting new introduction gained final authorization and product availability in the EU in early 2020; further approvals in other countries are expected in due course.

Indications	Brand Names	Active Ingredients	
– Pituitary pars intermedia dysfunction (PPID)	PRASCEND®	*pergolide mesylate* 	Symptomatic treatment of clinical signs associated with pituitary pars intermedia dysfunction (PPID, also known as equine Cushing's disease).
– Combination vaccine against up to nine common diseases in horses	VETERA®	*Eastern, Western and Venezuelan encephalomyelitis, tetanus, West Nile virus, equine herpes virus, equine influenza viruses* 	For vaccination of healthy horses as an aid in the prevention of diseases caused by the included antigens (US and Canada only).
– Equine gastric ulcers	GASTROGARD® ULCERGARD®	*omeprazole* 	For treatment and prevention of gastric ulcers and prevention of recurrence of gastric ulcers in horses and foals four weeks of age and older.
– Internal parasites	EQVALAN® ZIMECTERIN® EQVALAN® GOLD EQVALAN® DUO ZIMECTERIN® GOLD	*ivermectin* *ivermectin, praziquantel* 	For treatment and prevention of parasitic infestations in horses and donkeys due to large and small strongyles, ascarids. GOLD/DUO includes treatment against tapeworms.
– Reduction of mild to moderate recurrent lameness associated with non-septic joint inflammation in horses	ARTI-CELL®* FORTE	*chondrogenic induced equine allogeneic peripheral blood-derived mesenchymal stem cells* 	For treatment of mild to moderate lameness linked to non-infective joint inflammation in horses. It contains stem cells which are obtained from equine blood. Stem cells can develop into other types of cells. The stem cells in the active substance (mesenchymal stem cells) are treated so that they develop into cartilage cells.
– Severe equine asthma	ASERVO® EQUIHALER®	*ciclesonide inhalation solution* 	For the alleviation of clinical symptoms of severe equine asthma characterized by coughing, nasal discharge, nasal flaring, increased breathing effort at rest, or abnormal lung sounds.

* ARTI-CELL® FORTE is a registered trademark of Global Stem Cell Technology BE.

COMPANION ANIMALS - PETS

Our pets portfolio offers diverse solutions for some of the most important needs of canine and feline health including industry-leading parasiticides, vaccines, and therapeutics to address major chronic diseases: heart failure, kidney diseases, hypertension, epilepsy and osteoarthritis.

For 25 years, FRONTLINE® has been a leader in flea and tick control on dogs and cats, and is one of the most trusted brands in animal health.[1] FRONTLINE® continues to bring innovation to the category, with the recent launch of FRONTLINE TRI-ACT®, which features repellency and insecticidal efficacy on many disease-carrying flying insects and which decreases the risk of transmission of vector-borne pathogen.[2]

NEXGARD® contains the active ingredient afoxolaner and was the first oral medication that treats both fleas and ticks in dogs. Because of its efficacy and palatable, beef-flavored soft chew formulation, NEXGARD® is currently the best-selling pet medication in the animal health industry.[3]

NEXGARD SPECTRA® combines the flea and tick efficacy of afoxolaner in NEXGARD® with a broad-spectrum deworming ingredient, milbemycin oxime, in the same beef-flavored chew. NEXGARD SPECTRA® is not only effective in treating fleas and ticks, but also protects dogs against deadly parasites such as heartworm and lungworm as well as gastrointestinal parasites.

HEARTGARD® PLUS contains the active ingredients ivermectin and pyrantel in a soft beef chew. When given monthly, ivermectin is effective in preventing deadly heartworm disease. Pyrantel is effective in the treatment and control of round worms as well as hookworms. HEARTGARD® was launched in 1987 as the first monthly heartworm preventative and is still the best-selling heartworm preventative in the world.[4]

BROADLINE® offers pet owners all-in-one convenience providing confidence that their cat has the broadest possible protection. It protects cats against the broadest spectrum of internal and external parasites, including adult fleas, flea eggs, flea larvae, ticks, heartworms, hookworms, roundworms and tapeworms.

As the first of a new class of heart treatments termed inodilators, VETMEDIN® has been shown to significantly improve clinical signs and extend life expectancy in dogs with congestive heart failure originating from dilated cardiomyopathy or valvular insufficiency (mitral and/or tricuspid regurgitation). Recent studies have also shown that when used preclinically in appropriate asymptomatic cases of either dilated cardiomyopathy in Doberman pinschers or valvular insufficiency, VETMEDIN® significantly delays the onset of clinical signs of congestive heart failure.

[1] Data on file.
[2] A novel combination of fipronil and permethrin (Frontline Tri-Act®/Frontect®) reduces risk of transmission of Babesia canis by Dermacentor reticulatus and of Ehrlichia canis by Rhipicephalus sanguineus ticks to dogs. Jongejan et al. Parasites & Vectors (2015) 8:602.
[3] Data on file.
[4] Data on file.

Indications	Brand Names	Active Ingredients	
– Antiparasitic: canine/feline external parasites	FRONTLINE® FRONTLINE COMBO® FRONTLINE PLUS® FRONTLINE TRI-ACT® FRONTECT®	*fipronil* *fipronil/s-methoprene* *fipronil/permethrin* 	FRONTLINE® is indicated for the treatment and prevention of fleas, ticks and chewing lice in dogs and cats, and aids in the control of sarcoptic mange in dogs. FRONTLINE PLUS®/ FRONTLINE COMBO® is indicated for the treatment and prevention of fleas, ticks and chewing lice in dogs and cats. Also breaks the flea life cycle by preventing the development of immature stages. It aids in the control of sarcoptic mange in dogs. FRONTLINE TRI-ACT®/FRONTECT® is indicated for the treatment and prevention of flea and tick infestations where repellent (anti-feeding) activity is necessary against sandflies, biting flies and/or mosquitos. For dogs only.
– Antiparasitic: canine external parasites	NEXGARD®	*afoxolaner* 	NEXGARD® is delivered in a highly palatable beef-flavored chew that kills adult fleas and is indicated for the treatment and prevention of flea infestations and the treatment and control of tick infestations in dogs and puppies for one month.
– Antiparasitic: canine internal and external parasites	NEXGARD SPECTRA®	*afoxolaner, milbemycin oxime* 	NEXGARD SPECTRA® is delivered in a highly palatable beef-flavored chew that kills adult fleas and is indicated for the treatment and prevention of flea and tick infestations. Prevents heartworm disease and treats and controls hookworm, roundworm, whipworm and lungworm infestations in dogs and puppies.
– Antiparasitic: canine internal parasites	HEARTGARD® PLUS	*ivermectin, pyrantel* 	For use in dogs to prevent canine heartworm disease by eliminating the tissue stage of heartworm larvae for a month (30 days) after infection, and for the treatment and control of roundworms and hookworms.
– Antiparasitic: feline internal and external parasites	BROADLINE®	*fipronil, (s)-methoprene, eprinomectin, praziquantel*  	Protects cats against the broadest spectrum of internal and external parasites including adult fleas, flea eggs, flea larvae, ticks, heartworms, hookworms, roundworms, and tapeworms.
– Congestive heart failure	VETMEDIN®	*pimobendan* 	Treatment of canine congestive heart failure originating from dilated cardiomyopathy or valvular insufficiency (mitral and/or tricuspid regurgitation). Treatment of dilated cardiomyopathy in the preclinical stage (asymptomatic with an increase in left ventricular end-systolic and end-diastolic diameter) in Doberman Pinschers. Treatment of dogs with myxomatous mitral valve disease (MMVD) in the preclinical stage (asymptomatic with a systolic mitral murmur and evidence of increased heart size) to delay the onset of clinical symptoms of heart failure.

COMPANION ANIMALS - PETS (CONTINUED)

METACAM® is a non-steroidal anti-inflammatory drug (NSAID). It is available as an oral suspension, tablets and injectable solution for dogs and as an oral suspension and injectable solution for cats. In dogs, the indications include the alleviation of inflammation and pain in both acute and chronic musculoskeletal disorders as well as the reduction of pain following surgery. In cats, the indications include the alleviation of inflammation and pain in acute and chronic musculoskeletal disorders, as well as for the alleviation of mild to moderate postoperative pain. The variety of formulations offers veterinarians and owners the flexibility to use the formulation they prefer in individual cases to manage the various levels of inflammation and pain associated with the licensed indications.

In 2005, PREVICOX® was launched as a new NSAID (selective COX-2 inhibitor) for dogs that addresses one of the category's main drivers: the need for efficacious pain relief with ensured safety over the long term. PREVICOX® is indicated for the relief of pain and inflammation associated with osteoarthritis and for the relief of post-operative pain and inflammation associated with soft- tissue, orthopedic and dental surgery.

SEMINTRA® is the first-ever licensed angiotensin receptor blocker (ARB) for veterinary use. It provides a proven, convenient and safe compliance solution for cats, cat owners and vets. SEMINTRA® is available as 4mg/ml and 10mg/ml oral solution. SEMINTRA® (4mg/ml) was first launched in 2013 for the reduction of proteinuria associated with chronic kidney disease (CKD) in cats. In 2018, SEMINTRA® (10mg/ml) was launched for the control (US)/treatment (EU) of feline systemic hypertension. It is the first vet-licensed product for feline hypertension in the US.

Since its launch in 2009 PROZINC® has become the proven choice for feline patients and their owners for convenient management of feline diabetes. Having this reliable, long-acting insulin as a treatment option has made the difference in the lives of cats and their owners. With the approval of PROZINC® for canine patients, we have the opportunity to expand our impact to become the first-choice solution for successful management of diabetes in both dogs and cats.

Our pet vaccine product portfolio includes the PUREVAX® feline vaccines formulated to provide effective protection without the use of adjuvants and RECOMBITEK®, providing targeted protection for dogs through recombinant technology.

Indications	Brand Names	Active Ingredients	
– Pain and inflammatory diseases	METACAM®	*meloxicam* 	METACAM® is used to reduce specific types of post-operative pain and inflammation as well as musculoskeletal disorders in dogs and cats.
– Pain and inflammatory diseases	PREVICOX®	*firocoxib* 	For the relief of pain and inflammation associated with osteoarthritis as well as specific types of post-operative pain in dogs.
– Chronic kidney disease (CKD) in cats – Hypertension in cats	SEMINTRA®	*telmisartan* 	Management of chronic kidney disease (CKD) and feline systemic hypertension (US and EU) in cats.
– Diabetes	PROZINC®	*protamine zinc* 	For the treatment of diabetes mellitus in cats and dogs to achieve reduction of hyperglycemia and improvement of associated clinical signs.
– Feline vaccines portfolio	PUREVAX®	*feline herpes virus* *feline calicivirus* *feline panleukopenia virus* *chlamydophila felis* *recombinant vectored feline leukemia virus* *recombinant vectored rabies virus* 	PUREVAX® is the only fully adjuvant-free feline vaccine range and leverages its innovative canarypox technology for FeLV and rabies. It also offers sustained protection on rabies for up to three years.
– Canine vaccines portfolio	RECOMBITEK®*	*recombinant vectored canine distemper virus,* *canine parvovirus,* *canine adenovirus type 2,* *canine parainfluenza virus,* *coronavirus,* *leptospira Canicola,* *leptospira grippotyphosa,* *leptospira icterohaemorrhagiae,* *leptospira Pomona,* *recombinant borrelia burgdorferi,* *bordetella bronchiseptica* 	RECOMBITEK® features a complete line of canine vaccines including: RECOMBITEK® lyme: The only vaccine that contains OspA in a non-adjuvant formulation. REKOMBITEK® oral bordatella: Effective and safe protection made easy.

* In the US and others.

C.H. Boehringer Sohn AG & Co. KG, Ingelheim am Rhein

COMPARISON OF BALANCE SHEET AND FINANCIAL DATA 2010 – 2019

(in million EUR)

Assets (as of December 31)	2010	2011	2012	2013	2014
Intangible assets	736	710	682	582	592
Tangible assets	3,314	3,442	3,103	2,887	3,070
Financial assets	3,168	3,953	4,222	4,737	5,312
Fixed assets	**7,218**	**8,105**	**8,007**	**8,206**	**8,974**
Inventories	1,850	1,998	2,095	2,083	2,237
Accounts receivable and other assets (incl. prepaid expenses, deferred taxes and exceeding amount of plan assets)	4,047	4,652	4,814	5,131	5,546
Liquid funds	3,118	3,903	2,374	2,879	3,294
Current and other assets	**9,015**	**10,553**	**9,283**	**10,093**	**11,077**
Total assets	**16,233**	**18,658**	**17,290**	**18,299**	**20,051**

Equity and Liabilities (as of December 31)	2010	2011	2012	2013	2014
Shareholders' capital	178	178	178	178	178
Group reserves (incl. balance sheet currency conversion difference)	5,408	5,812	4,763	5,619	6,884
Group profit	888	1,476	1,237	1,324	1,047
Equity attributable to the parent company	**6,474**	**7,466**	**6,178**	**7,121**	**8,109**
Non-controlling interests	0	0	0	1	2
Group equity	**6,474**	**7,466**	**6,178**	**7,122**	**8,111**
Difference from capital consolidation	**0**	**157**	**134**	**104**	**91**
Provisions (incl. deferred taxes)	6,598	7,402	7,749	7,817	8,840
Liabilities (incl. deferred income)	3,161	3,633	3,229	3,256	3,009
Total liabilities (incl. deferred taxes and deferred income)	**9,759**	**11,035**	**10,978**	**11,073**	**11,849**
Total equity and liabilities	**16,233**	**18,658**	**17,290**	**18,299**	**20,051**

Summary of selected financial data	2010	2011	2012	2013	2014
Net sales	12,586	13,171	14,691	14,065	13,317
Operating income	1,896	2,272	1,853	2,114	2,140
Operating income as % of net sales	15.1	17.3	12.6	15.0	16.1
Income after taxes	888	1,476	1,237	1,324	1,046
Income after taxes as % of net sales	7.1	11.2	8.4	9.4	7.9
Return on equity (in %)	15.0	22.8	16.6	21.4	14.7
Equity ratio (in %)	39.9	40.0	35.7	38.9	40.4
Cash flow from operating activities	2,056	2,570	2,170	1,819	2,015
Financial funds	6,113	7,711	6,467	7,514	8,507
Personnel expenses	3,358	3,664	4,024	4,071	4,116
Personnel expenses as % of net sales	26.7	27.8	27.4	28.9	30.9
Average number of employees	42,224	44,094	46,228	47,492	47,743
Research and development expenses	2,453	2,516	2,795	2,743	2,654
R&D as % of net sales	19.5	19.1	19.0	19.5	19.9
Investments in tangible assets	519	458	562	558	548
Depreciation of tangible assets	498	535	793	640	449

2015	2016	2017	2018	2019
606	550	5,372	5,120	4,882
3,264	3,045	3,867	4,280	4,754
5,933	6,092	5,830	6,058	9,162
9,803	**9,687**	**15,069**	**15,458**	**18,798**
2,483	2,610	3,087	3,312	3,563
6,463	6,837	7,159	7,815	8,924
4,536	7,005	3,071	4,303	2,195
13,482	**16,452**	**13,317**	**15,430**	**14,682**
23,285	**26,139**	**28,386**	**30,888**	**33,480**

2015	2016	2017	2018	2019
178	178	178	178	178
7,844	9,296	10,703	10,080	11,781
1,577	1,853	– 223	2,075	2,721
9,599	**11,327**	**10,658**	**12,333**	**14,680**
4	0	– 1	1	1
9,603	**11,327**	**10,657**	**12,334**	**14,681**
71	**52**	**1,729**	**1,511**	**1,471**
10,543	12,233	13,482	14,438	15,172
3,068	2,527	2,518	2,605	2,156
13,611	**14,760**	**16,000**	**17,043**	**17,328**
23,285	**26,139**	**28,386**	**30,888**	**33,480**

2015	2016	2017	2018	2019
14,798	15,850	18,056	17,498	18,997
2,269	2,872	3,487	3,472	3,782
15.3	18.1	19.3	19.8	19.9
1,576	1,849	– 229	2,075	2,721
10.7	11.7	– 1.3	11.9	14.3
19.4	19.3	– 2.0	19.5	22.1
41.2	43.3	37.5	39.9	43.8
2,232	2,888	2,624	2,988	3,344
10,200	11,989	8,130	9,454	10,377
4,518	4,570	4,934	5,276	5,367
30.5	28.8	27.3	30.2	28.3
47,501	45,692	49,610	50,333	51,015
3,004	3,112	3,078	3,164	3,462
20.3	19.6	17.0	18.1	18.2
591	645	872	950	1,073
475	516	521	552	585

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PHOTOS

Andreas Reeg (page 2, 4, 5)

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