

THE INVENTOR COMP

A journey through the world of research at Bayer

Bayer is an inventor company and intends to continue in this tradition of innovation in the future. In 2004, the company invested some $\text{€}2.3$ billion in research and development. High levels of investment alone do not form the basis for success at Bayer, however: another important cornerstone is creativity. Bayer's inventors are driven by one ambition: to create new ideas.

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Future



Erwin Bischoff

Biochemist Dr. Erwin Bischoff and his team conducts research on erectile dysfunction.

2006

Anticancer drug

Scientists at Bayer HealthCare are optimistic that their drug for renal cancer will gain marketing authorization in the coming years, possibly by 2006. The active substance has been undergoing global Phase III testing since October 2003 (see page 82).



2001

Innovative crop protection

Bayer scientists Kozo Shiokawa, Shinichi Tsuboi, Shinzo Kagabu, Shoko Sasaki, Koichi Moriya and Yumi Hattori develop the insecticide Calypso®, which is effective against biting and sucking insects while leaving useful insects completely unharmed.

1995

Luminous plastic

The conductive polymer Baytron® is used to create innovative displays for automobile interiors. It was developed by Dr. Gerhard Heywang, Dr. Friedrich Jonas and Werner Schmidtberg.



ANY

Werner Heisenberg could have been talking about the milestones of research at Bayer when he said, "Science is made by man". These achievements may have been the work of individuals, but one thing is clear: behind every new development there stands a whole team of scientists. As a company with a great tradition of innovation and a Nobel prize-winner in its ranks, Bayer and its highly qualified employees intend to continue setting standards in research-intensive fields in the future.

Reiner Fischer

In 1987, Dr. Reiner Fischer and his team of crop protection researchers discovered the tetramic acids, a new class of active acaricidal substances. This discovery formed the basis for the development of products such as the anti-mite substance **Envidor®**, which contains the active ingredient spiroadiclofen. **Envidor®** is particularly effective against spider mites.



1993

Biotechnology helps

Bayer's first recombinant drug product Kogenate® is used to treat hemophilia. Dr. Hans-Jürgen Henzler played a crucial role in the development of the production procedure.

1990

New therapy for diabetics

Bayer scientist Walter Puls develops Glucobay®. This product, containing the active ingredient acarbose, enables effective treatment of diabetes.

1973

Successful antifungal treatment

Bayer scientist Professor Karl-Heinz Büchel develops Canesten® to combat the growing number of infections caused by microscopically small fungi.



Friedrich Bossert Wulf Vater

Post-World War II, Bayer's pharmaceutical experts focussed their attention on coronary heart disease. After ten years of research, Dr. Friedrich Bossert (left), Dr. Wulf Vater and their team discovered a compound that improves the supply of blood and oxygen to the heart muscle and lowers blood pressure. This substance was launched under the name **Adalat®** in 1975.



Otto Bayer

The research carried out by Professor Otto Bayer (no relation to the founder of the company) and his team into isocyanate chemistry in 1937 laid the foundation for a new class of polymer: **polyurethanes**. Today it is difficult to imagine what our daily lives would be like without these plastics, which are found in car seats, surface coatings, television sets and shoes.



1967

All-plastic car launched

The all-plastic car from Bayer is celebrated as a landmark in automotive engineering and a development that pointed the way ahead for vehicle designers.



1964

Sulfur-free air

The world's first double-contact facility for manufacturing sulfuric acid goes on stream in Leverkusen. This process developed by Bayer researchers removes sulfur dioxide from off-gases generated in production.

1954

Fashionable fibers

Dralon® – a polyacrylonitrile fiber – marches triumphantly through the worlds of fashion and furniture. Bayer chemists Peter Kurtz and Otto Bayer first synthesize acrylonitrile in 1939.



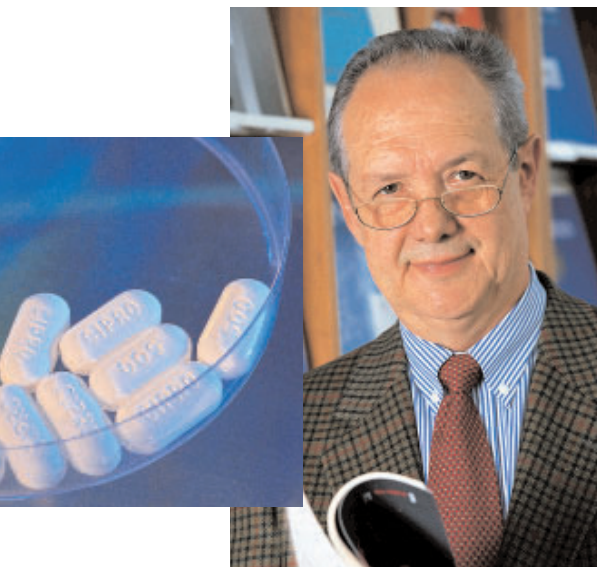
Hermann Schnell

With the development of **Makrolon®** in 1953, Dr. Hermann Schnell and his team achieved a quantum leap in polymer chemistry. The properties of this polycarbonate – such as crystal-clear transparency, high heat resistance and toughness – open the door to applications ranging from food packaging through CDs and DVDs to car windows.



Klaus Grohe Hans-Joachim Zeiler

The foundations for the industrial production of penicillins were laid in the early 1940s. These substances were among Bayer's most important products until well into the 1980s. Today, **Ciprobay®** is Bayer's top antibiotic. The breakthrough came from Dr. Klaus Grohe (left), who used a new concept to synthesize the substance for the first time. Dr. Hans-Joachim Zeiler (right) and his team then developed the drug product, which was launched in 1987. **Ciprobay®** is effective against many bacterial infections.



1944

Breakthrough in crop protection

With the synthesis of **E 605®**, Dr. Gerhard Schrader succeeds in developing a substance that is effective against around 500 pests – a breakthrough in the war against global hunger.



1934

Successful against malaria

Dr. Hans Andersag discovers an agent against the fatal tropical disease: **Plasmodin®**. It is still regarded as one of the most important drugs for malaria prevention today.



1929

All-purpose rubber

Dr. Walter Bock and Eduard Tschunkur achieve a breakthrough in the synthesis of rubber: they develop **Neoprene®**, an all-purpose rubber for tires and technical goods.



Felix Hoffmann

Bayer's first outstanding discovery occurred well before World War I: in 1897, Dr. Felix Hoffmann and his team succeeded in synthesizing acetylsalicylic acid. Under the brand name **Aspirin®**, this drug product ultimately became known as the Drug of the 20th Century. More than 100 years later, it is still the most popular and effective analgesic of them all for millions of people around the world.



Bernd Riedl

The search for anticancer substances is a top-priority project at Bayer. One particularly promising candidate is the new **Raf kinase** and **VEGFR inhibitor** which has been undergoing Phase III trials to test its efficacy in patients with advanced kidney tumors since October 2003. Dr. Bernd Riedl synthesized this active substance which belongs to a new class of anticancer drugs that inhibit key proteins in tumor growth. The development project team is headed by Dr. Edward Huguenel.

1927

Seed dressing protects against fungi
Dr. Wilhelm Bonrath recognizes the outstanding seed-dressing qualities of phenyl mercury acetate. Two years later, the first dry seed dressing (**Ceresan®**) is launched to protect plants against fungi such as the lethal rye ergot.



1923

Pioneers against tropical diseases
Thanks to physician Wilhelm Roehl, **Germanin®** – a product to treat sleeping sickness – is developed.

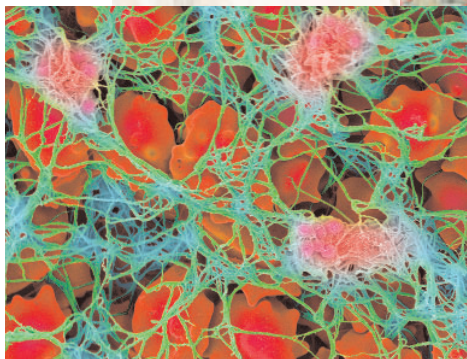
1910

Synthetic rubber
Demand for rubber rises due to increased motorization. Bayer develops the first synthetic rubber to be produced on an industrial scale: methyl rubber.



Elisabeth Perzborn Susanne Röhrig Alexander Straub

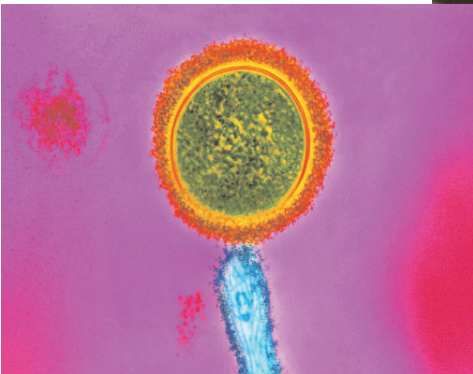
Patients who are bed-ridden for extended periods of time following surgery are at an increased risk of thrombosis in their leg veins, which can on occasion result in life-threatening pulmonary embolism. For several years, Dr. Elisabeth Perzborn (left), Dr. Susanne Röhrig (right) and Dr. Alexander Straub have been conducting research into a **Factor Xa inhibitor** that can prevent the formation of life-threatening blood clots.



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Gerhard Domagk

The discovery of the sulfonamides in the early 1930s by Professor Gerhard Domagk (right) and his team was a pioneering achievement in the war against infections, for which Domagk received the 1939 Nobel Prize for Medicine. Sulfonamides were the first drugs that could be used systematically against a broad spectrum of bacterial infections – and **Prontosil** was the most effective of them all. One of the first patients to be successfully treated with the product was Domagk's six-year-old daughter.



1892

Blossoming crop protection

The first synthetic organic crop protection agent (Antinonin) is developed by Bayer; it is one of the cheapest and best agents to control the nun moth.



1888

The foundation of the pharmaceuticals business

Bayer sets up a pharmaceutical development unit and starts manufacturing organic starting materials for drug products. Dr. Oskar Hinsberg develops the antipyretic phenacetin.

1863

The founder years (1863–1881)

On August 1, 1863, Friedrich Bayer, a chemist, and Johann Friedrich Weskott, a master dyer, found the general partnership Friedr. Bayer & Co."

