

Beiersdorf Research & Development

- **135 years of skin research**
- **1,290 employees worldwide in Research & Development**
- **€143 million investments**
- **Internationally leading skin research center in Hamburg**
- **Regional development laboratories increase closeness to consumers**

Beiersdorf's research and development expertise has been driving the company's success for 135 years. The most important resources behind this research and development are the specialist expertise, pioneering spirit, and dedication of our employees, which enable us to reinvent skin care every day and bring outstanding innovations to the global market.

Our research activities and focuses vary by business segment: In the Consumer Business Segment, Beiersdorf develops innovative, high-quality skin care products. Our research anticipates future trends and the needs and wishes of consumers for innovative, effective, well-tolerated skin care and delivers products to match these requirements. In the tesa Business Segment, the focus is on developing top-quality self-adhesive system and product solutions. Here, our aim is to make our customers' workflows even more efficient and effective, identify needs, and respond flexibly to special requirements and market trends.

At the end of 2017, 1,290 people were employed in Beiersdorf's Research and Development area (previous year: 1,153*). Of this total, 797 (previous year: 677*) worked in the Consumer Business Segment and 493 (previous year: 476) in the tesa Business Segment.

Research and Development Excellence

Beiersdorf has built its global reputation on a strong tradition in skin care expertise. Innovations that meet consumers' expectations are the key to our success and a major growth driver. Our effective, efficient research and development staff work hard to bring innovative products to market and to develop pioneering formulas and technologies.

Our research focused on the following areas in 2017:

Together with the "Center for Free-Electron Laser Science" (CFEL) in Hamburg, we researched the reasons why skin's energy metabolism declines with age. Our expert team found that older skin has a significantly more fragmented mitochondrial network, with smaller, more compact clusters of keratinocytes (cells that form the skin barrier). The discovery can help us develop approaches to cosmetic intervention, which stimulate the energy metabolism. Building on coenzyme Q10, this is conceived to help us find well-tolerated solutions to counter the signs of skin aging. A study with the University of Zurich (ETH) focusing on metabolomics (the metabolism of cells) and transcriptomics (research of gene expression) also confirmed lower levels of the coenzyme Q10 in older skin. In addition, a change in the metabolism of key proteins, glycolysis, and glycerolipids was shown, which is highly important for the integrity of the skin barrier and moisture balance.

Another research focus was the skin's moisture content and the effectiveness of moisturizing creams. Over the last few decades, these have been measured with more approximating electrical techniques, particularly involving skin conductance and capacity measurements (e.g. corneometry). After working for several years together with researchers from the "Deutsches Elektronen-Synchrotron", "Walnut Technology Consulting GmbH", and other institutes,

Beiersdorf biophysics researchers were able to develop a unique, confocal imaging device capable of recording the depth profile of moisture content in the epidermis, especially the stratum corneum (outermost layer of the epidermis). Even tiny changes in moisture content can be examined in high resolution, without interference from electrolytes. Using this technique, the team disproved the traditional view derived from corneometry that aluminum chlorohydrate (ACH) used in antiperspirants dries the skin. It was shown that ACH has no effect on the skin's moisture content and that therefore even consumers with dry skin can safely use antiperspirants.

As stress not only affects our consumers' general health and wellbeing, but also their skin and hair, Beiersdorf put the topic of "stress" at the center of its research activities in 2017. Together with the Charité University Hospital in Berlin, the University Hospital in Giessen, and the Health Service of the German Federal Foreign Office, researchers found indications of a change in the balance of the immune system and a reduction in hair growth in women exposed to high levels of stress. These results underscore the necessity of developing a holistic approach to skin and hair care.

Creating an immersive experience of skin care and finding exciting, memorable ways to teach people about the skin was another aim of the research and development team in the year under review. Research teams from Beiersdorf worked with Hamburg-based "VR Nerds" and other start-ups from the technology sector to develop a special application in just six months: Beiersdorf VR Skin Exploration. Using VR (virtual reality) goggles, a special type of 3D glasses, the application takes users on a virtual journey through the skin and allows them to witness the impact of different skin care ingredients, magnified 2,500 times. While moving through the three-dimensional space, the user can touch details, playfully interact with the environment, or call up dermatological facts from within the application. Beiersdorf VR Skin Exploration is used to demonstrate the properties of Beiersdorf products in a range of settings such as trade fairs and press events.

Global Open Innovation Network

Partnerships have long been part of our innovation strategy. We therefore work as part of a collaborative network with leading research institutes, universities, and suppliers. Since 2016, all Open Innovation activities at Beiersdorf have been gathered under the umbrella "Pearlfinders – We Open Innovation". We systematically expanded our activities and partnerships in this area in the year under review.

The Open Innovation platform "Trusted Network" has been a central component of our innovation strategy since 2011. The online network based on trust, fairness, and partnership gives external partners from all around the world access to our confidential scientific research topics and invites them to offer their own ideas and solutions.

Knowledge Exchange with Physicians

During the year under review, Beiersdorf continued and expanded its work with the "Professor Paul Gerson Unna Akademie", which was founded in 2016. The academy is dedicated to the continuing and advanced training of physicians. By opening the academy, we are also working to intensify the dialog between research and medical practice, thereby constantly increasing treatment successes for patients in the area of skin care. In 2017, we offered product-neutral and needs-oriented education courses with the Professor Paul Gerson Unna Akademie in Germany. Some of these were eligible for CME (Continuing Medical Education) points as part of mandatory continuing education for physicians. In the 2018 fiscal year, it is planned to expand this work internationally. The academy is supported by the Eucerin team.

Closeness to Consumers and Markets

Our global research and development presence is key to our success. We employed about 600 researchers and developers at our large skin research center in Hamburg as of December 31, 2017. Work here concentrates on new discoveries to provide even better support to the skin's own metabolic processes. Based on the results, our experts in product development combine the utilized ingredients with varied properties to deliver the right benefits and sensory properties of new products. As product safety and tolerability are the top priority for Beiersdorf, newly developed products are tested before market launch externally or at Beiersdorf's own test center within the skin research facility. A total of 600 studies with 16,000 participants were conducted during the reporting period.

As culture, climate, and aesthetic preferences differ all over the world, we also operate regional and local development labs in Brazil, China, India, Japan, Mexico, and the United States in addition to the skin research center in Hamburg. These laboratories enable us to develop skin care products specifically for local needs. In 2017, for example, we locally developed the following products:

- In **India**, we introduced NIVEA body lotions with licorice extract, sunscreens and ingredients for a cooling effect. The body lotions address the regional consumer wish for a more even skin tone and a cooling sensation, which is preferred in this hot and humid climate.
- Our development laboratory in Wuhan (**China**) developed NIVEA hair shampoo with a more powerful cleaning effect that responds to the specific needs of Asian consumers to remove dandruff and grease from the scalp quickly and deeply.
- In Latin America, Beiersdorf developed special soap bars for the Brazilian market. In **Brazil**, most consumers use bar soaps in their daily face and body cleansing routine. Men often use them for shaving as well, especially in the shower. Therefore NIVEA launched the first 3 in 1 Men Soap, which is designed to not only cleanse body and face, but also to offer comfortable shaving.

Innovations

We have set ourselves the objective of introducing new products and creating pioneering technologies that generate added value for our consumers. We therefore continuously invest in future-oriented research and development projects. At €143 million in the year under review, investments in research and development were up 4.9% on the previous year's level (€136 million).

The following innovations were among the key product launches in the reporting year:

- The new **NIVEA Q10plusC** product line combines coenzyme Q10 with pure vitamin C. The formula combats tired skin and alleviates first wrinkles.
- The newly launched NIVEA Urban Skin Detox & Protect product range with hyaluronic acid is aimed at younger, city-dwelling consumers. Ultra-light gel-cream face care formulas give the skin 48-hour moisture. At the same time, the skin's own resistance to "city stress" factors such as UV light, high air pollution, and air-conditioning is strengthened.
- With the new **NIVEA PURE SKIN electric face cleansing brush**, which cleans seven

times more effectively than bare hands, Beiersdorf has entered the market for skin care devices. The electric brush has a pleasantly soft cleansing motion, removes excess dead skin, and boosts skin circulation. Three different brush heads designed for different skin types are available, each containing around 36,000 ultra-fine brush hairs.

- In **NIVEA Sun Protect & Care**, Beiersdorf has developed a groundbreaking innovation whose special formula not only reliably protects skin from UVA and UVB radiation, but also makes it easier to wash out stains on clothing caused by UV filters. This is a truly remarkable achievement considering the stain issue has existed for decades and until now there have not been any other solutions on the market.
- The **NIVEA Creme & Oil Pearls Shower Cream** range – available with cherry blossom, ylang-ylang, or lotus scent – combines the tried and tested shower cream with argan oil and oil pearls. Thanks to its innovative formula, the product provides gentle cleansing and a touchably smooth skin feel.
- NIVEA Body Milk and the NIVEA Body lotions have been improved with the **NIVEA Deep Moisture Serum**, providing long-lasting noticeably smoother skin. The formula with lipids provides and locks moisture into the skin for 48 hours.
- **Eucerin DermoPure**, the care range for blemish- and acne-prone skin, works deep to provide long-lasting reduction of existing blemishes and prevention of new ones. The “DermoPure Skin Renewal Treatment” contains 10% Hydroxy Complex, a highly effective combination of peeling agents (glycolic, salicylic, and polyhydroxy acids) and visibly improves skin condition. The “DermoPure Mattifying Fluid” also helps to reduce excess sebum. Licochalcone A soothes skin irritation and inflammation.
- The new **Hansaplast Silicone Soft Plasters** are suitable especially for sensitive, irritation-prone, or hairy skin, and for children and older people. Thanks to the innovative plaster technology, the plasters are not only very gentle on the skin but can be removed 100% pain-free despite still adhering reliably. The silicon technology means that, unlike plasters with conventional adhesives, they hardly tear off any skin cells or hair when being removed.
- Labello introduced a new lip care ball to the market in the reporting year: Labellino. The **Labellino** balm provides the lips with long-lasting moisture. The trendy premium product, available in four different flavors, appeals primarily to young target groups.
- With the “**Männer Frische**” range, we have introduced an antiperspirant series especially for men for the first time under the **Hidrofugal** brand. Catering for men's needs, the range features highly effective protection and a powerful fresh formula.
- **La Prairie** has added the newly launched **White Caviar Illuminating Pearl Infusion** to its White Caviar range. The product enriched with golden caviar extracts is based on a novel, patented formula that tackles all three types of skin discoloration for the first time. La Prairie White Caviar Illuminating Pearl Infusion visibly lightens and firms the skin, providing a luminous, even complexion.

* Prior-year figure adjusted due to changes in the internal reporting structure.

More information on research and development at Beiersdorf: www.Beiersdorf.com/research.

March 2018