

Beiersdorf Research & Development

- **Around 702 R&D employees worldwide in Consumer Business Segment**
- **Internationally leading skin research center in Hamburg**
- **Regional development laboratories increase closeness to consumers**
- **About 1,900 studies with approximately 45,000 participants in all regions in 2016**
- **Filed patents for 47 innovations in 2016**

* The year-on-year change is primarily the result of internal restructuring

Beiersdorf's expertise in the area of research and development has been driving our company's success for more than 130 years. The Consumer Business Segment develops innovative, high-quality skin care products that are tailored to the needs and wishes of consumers worldwide.

At the end of 2016, 1,178* people were employed in Beiersdorf's Research and Development area (previous year: 1,108). Of this total, 702* (previous year: 637) worked in the Consumer Business Segment and 476 (previous year: 471) in the tesa Business Segment.

Leading Skin Care Expertise

Beiersdorf has built its global reputation on a strong tradition in skin care expertise. Leading skin care research and development are the basis of our innovative success and the superior products we provide our consumers.

In the year under review, Beiersdorf research progressed in fundamental questions of skin metabolism, focusing especially on the aging process. Our research activities in this field aim to further understand skin aging and identify new routes to skin care solutions that effectively reduce age-induced skin changes.

One major cause of skin aging is the decline in cell energy metabolism. Ever since our discovery of the coenzyme Q10 for skin care, Beiersdorf has pursued supplementation and stimulation of the energy metabolism as a well-tolerated option for addressing signs of skin aging. To push progress further, Beiersdorf cooperates with the "Center for Free-Electron Laser Science" (CFEL) at the University of Hamburg. In a recent project, researchers developed a computer-based simulation technique that will enable a better understanding of the fundamental processes of cellular energy production, including cell degeneration during aging. Future work will focus on translating the simulation findings into new products with a stronger impact on the stimulation of cellular energy.

Researchers at Beiersdorf are also exploring skin of diabetics because important conclusions about skin aging processes in general can be drawn from the cellular processes of diabetic skin. In collaboration with the Universities of Heidelberg and Hanover, our researchers elucidated the pivotal role of the reduced activity of the enzyme glyoxalase in key functional deficits of diabetic skin. With this reduced enzyme activity, the natural ability of the epidermal keratinocyte skin cells to detoxify declines, which eventually impedes the regeneration of nerves in the skin. The sensory

impairment and defective skin structure these causes are phenomena observed both in diabetic and in aged skin. This insight will form a basis for future product development targeting the recovery of diabetic and aging skin.

Change in skin pigmentation is another aspect of skin aging. In the year under review, a collaborative research program with the Laboratory of Cell Biology at the National Cancer Institute of the U.S. National Institutes of Health revealed that age spots are rooted in a dysregulation of the keratinocytes. This finding of the collaborative research disproved the traditional belief of excessive melanin production as the root cause of age spots and can lead to more effective products addressing age spots.

Beiersdorf Research and Development was also working on improving deodorant effectiveness. To offer mild yet effective products that are well tolerated, we screened and evaluated a wide range of novel antimicrobial agents that control malodor-causing bacteria in the axilla. This led to the identification of an ingredient which proved to have good skin tolerability and the ability to reduce malodor significantly even for 48 hours. With this discovery Beiersdorf is setting superior standards in terms of antimicrobial effectiveness of deodorants.

Product safety and tolerability are of utmost importance for Beiersdorf. An essential part of our responsible research and development work is therefore to continuously refine the portfolio of safety test methods. In 2016, substantial progress was made in measuring the penetration of substances into the skin. Beiersdorf contributes intensively to the major initiative of the European Cosmetic Industry Association (Cosmetics Europe). In the year under review, a collaborative research team demonstrated the validity of the in vitro model for the prediction of human skin penetration of substances. This model is approved as a test method by the Organisation for Economic Co-operation and Development (OECD).

We Open Innovation

Since 2016, all Open Innovation activities of Beiersdorf are gathered under the umbrella “Pearlfinders – We Open Innovation.” In addition to maintaining and strengthening our innovation network and strategic partnerships with leading research institutes, universities, and suppliers, Beiersdorf has systematically expanded its activities in this area over the past years and continued to do so during the year under review.

Since 2011, one of the central elements of our innovation strategy is the Open Innovation platform “Trusted Network,” where Beiersdorf scientists exchange ideas with external experts on concrete technical challenges. Another tool is the global network “Innoget.” In the year under review, Beiersdorf extended its collaboration with the platform and established its own profile on the Innoget portal to make further contacts in the scientific community and in industry within a protected environment. Other formats operating under Pearlfinders are, for example, in-house events like the “Supplier Fair” and the “Formulation Academy.” At these events, selected innovation partners present trends in technology and other ideas. Beiersdorf has a long and successful tradition in setting up partnerships. To date, we have cooperated with more than 500 external partners in a large number of projects.

Exchange of MEDICAL knowledge

Beiersdorf established during the year under review an independent institution that is devoted to the continuing and advanced training of physicians: the Professor P. G. Unna Akademie. By opening the academy, we are working to intensify the dialog between research and medical practice, thereby constantly increasing treatment

successes for patients. For this, a wide range of product-neutral and need-oriented education courses is being offered. An independent committee whose membership changes annually oversees the academy, identifies training needs and sets the thematic direction of the continuing education courses.

Close to Consumers and Markets

At Beiersdorf, closeness to consumers is an indispensable prerequisite for the development of new products. Our approach is to gain in-depth knowledge of the varying needs and customs of our consumers in the different regions and integrate their specific demands into all steps of our innovation process, from idea creation to post-launch assessment. Our regional Research and Development laboratories allow us to launch products catering to local needs and enable a fast and precise response to market changes.

In the year under review, Beiersdorf conducted about 1,900 studies with approximately 45,000 participants across all regions. Based on regional consumer tests we customize product formulas and design specific packaging solutions. As a result of our regional Research and Development efforts, several new products were introduced to the local markets in the year under review, including the following examples:

- In Latin America, Beiersdorf developed the high-quality NIVEA Creme Care soap with a caring formula customized for the Brazilian market. The launch strengthened NIVEA as a caring brand in the locally important shower soap segment. Beiersdorf also launched a body lotion with sun protection factor (SPF) 15. This body lotion was developed in our laboratory in Silao (Mexico) and targets the demand by the Mexican market for body products with SPF due to high sun exposure in daily life.
- For the Middle East and North Africa (MENA) region, we introduced the body lotion range NIVEA Skin Delight, which has formulas with rose and lavender scent. The body lotions address the regional consumer wish for rich and caring formulas with delicate fragrances.
- Our development laboratory in Wuhan (China) developed the NIVEA MEN Oil Control series that responds to the specific skin needs of Asian men. Also for the Chinese market, we developed the efficacious NIVEA Make Up Clear, which is specially adapted to remove long-lasting and waterproof make-up.

Innovations

The Consumer Business Segment filed patents for 47 innovations in the year under review (previous year: 61) and its products repeatedly set significant new market trends. In 2016, the key innovations included the following:

- NIVEA Deo Protect & Care encompasses a new range of products in the deodorants and antiperspirants segment. The innovative products combine effective 48-hour protection with the ingredients of NIVEA Creme. They are characterized by the unique NIVEA scent and are mild and well-tolerated by the delicate underarm skin.
- NIVEA Cellular Anti-Age Volume Filling Pearls actively counteracts signs of aging skin. The patented pearls formula is based on the highest concentration of hyaluronic acid within the NIVEA Face Care range, plus creatine and a “collagen booster” (in vitro evidence). The new product actively improves the regeneration processes of the skin for more firmness and elasticity.
- With NIVEA Creme Care Facial Cleansing, Beiersdorf has introduced cleansing products that combine mild and caring, but thorough cleansing. The cleansing products come in three different application formats: milk, cream, and wipes.

They contain selected ingredients as well as the scent of the NIVEA Creme and are suitable for all skin types.

- For effective sun protection, Beiersdorf introduced a new application: NIVEA Sun Protection Roll-On. The roll-on is easy to handle and offers a quick application of sun protection on the skin. The product has a fast-absorbing, non-sticky formula, which works immediately and ensures reliable, highly effective UVA and UVB protection.
- In Europe, Beiersdorf relaunched the NIVEA MEN Active Energy series and extended it with additional products. One of them is NIVEA MEN Active Energy Morning Fix Face Gel, which relies on an innovative micropigment technology to reduce the effects of tiredness and delivers a fresh skin feeling.
- The NIVEA Professional product series was strengthened with a relaunch of existing products and new line extensions. The product line offers premium products to counteract signs of skin aging. Consisting of four sublines, the products include optimally dosed ingredients such as vitamins E and C, hyaluronic acid and Bioxlift®.
- With NIVEA Care Shower Silk Mousse, Beiersdorf entered a new sub-segment in the shower category. Three variants of the shower mousses are offered based on an extra-mild formula with silk extracts. The creamy foam of the mousses delivers a silky skin feeling.
- NIVEA Hairmilk Care Shampoo and Conditioner are designed for dry hair and stand for mild, rich hair care. They contain milk proteins, macadamia oil and Eucerit®, which is also used in NIVEA Creme. The products enrich the hair without weighing it down.
- The Eucerin Elasticity+Filler range is developed for mature skin that suffers from deep wrinkles and decreasing elasticity. The formulas with ingredients like silymarin, hyaluronic acid and argan oil nourish and strengthen fragile skin and plump up wrinkles.
- ABC Heat Plaster 4.8 mg contains capsaicin from natural chili, is extra thin and has a backing of 100% viscose. The plaster offers long-lasting pain relief while ensuring high wearing comfort so that the user can actively move and thereby supports the healing process.
- The Cellular Radiance Perfecting Fluide Pure Gold by La Prairie contains an exclusive combination of pure gold, golden reflecting agents, and collagen-boosting peptide. The fluid calms the skin's appearance and imparts a fine finish. Over the long term, skin firmness is improved and the texture continuously smoothed.
- La Prairie also further expanded its successful Skin Caviar Collection with the Skin Caviar Essence-in-Lotion. Leaving the skin refined and perfectly moisturized, the lotion offers an ideal opening and improvement of the daily skin care ritual.

For more information on research and development at Beiersdorf, please visit www.Beiersdorf.com/research.

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