

PRESS RELEASE

Cosmetics based on bio-active ingredients

BRAIN AG granted patent protection for the development of biological compounds used in antiperspirants and deodorants

- **US patent rights for novel screening systems to identify natural compounds which reduce sweat production**
- **Technological innovation addresses growing markets for natural-source and aluminium-free antiperspirants and deodorants**
- **BRAIN in first talks with potential commercialisation partners**

BRAIN AG has been granted patent protection by the United States Patent and Trademark Office (USPTO) for novel screening systems which help find biological compounds that reduce the production of sweat (WO 2014/027050). The protected molecular biological systems are based on a key molecule discovered by BRAIN researchers which paves the way for the systematic screening of natural compounds that reduce the production of sweat. The US patent (US9809853 B2) was granted in November 2017. EU area patent protection by the European Patent Office (EPO) is expected to follow in early 2018.

BRAIN's protected technology offers efficient and reliable solutions to meet the growing demand in biological deodorants and antiperspirants.

Zwingenberg
18 December 2017

B·R·A·I·N
Biotechnology Research
And Information Network AG
Darmstädter Str. 34-36
64673 Zwingenberg
Germany
www.brain-biotech.de

Media Contact
Thomas Deichmann
Head of Public Relations
Tel.: +49-(0)-6251-9331-72
Fax: +49-(0)-6251-9331-11
E-Mail: td@brain-biotech.de

IR Contact
Dr. Martin Langer
Executive Vice President
Corporate Development
Tel.: +49-(0)-6251-9331-16
Fax: +49-(0)-6251-9331-11
E-Mail: ir@brain-biotech.de

Follow us on [Twitter](#)
<https://twitter.com/BRAINbiotech>



Growing market for biological ingredients

In 2015, the global antiperspirants and deodorants market was worth USD 65bn. The turnover is expected to grow to almost USD 79bn until 2020, while global 2024 figures are set to exceed USD 91bn (Statista 2017). The 2015 annual sales volume of the antiperspirant and deodorant active ingredients market addressable by BRAIN's solutions amounted to USD 1.6bn. Due to the strong demand in natural ingredients, growth in this segment will outperform the overall antiperspirant and deodorant market. For these ingredients, experts expect a compound annual growth rate (CAGR) of 6.7 per cent from 2014 to 2021. The 2021 market volume is estimated to reach USD 2.4bn. With a one-third market share, Europe is the region with the highest turnover for antiperspirant and deodorant ingredients, followed by North America and Asia-Pacific (Persistence Market Research 2016).

BRAIN is prepared to participate in these markets with its product solutions by joining forces with global cosmetics and skin care players. BRAIN is currently conducting first talks with other companies to pave the way for joint product developments.

Says Dr Jürgen Eck, CEO of BRAIN AG: "As we gain more and more insights into the biological processes that occur in the human skin and thanks to our sophisticated screening procedures we can now broaden our development portfolio for personal care products. Being a bioeconomy company, one of our priorities is to develop natural-source applications for gentle cosmetics and skin care products and healthier food. The patent protection for our ground-breaking inventive work is a significant prerequisite for the development and marketing of new products."

Specific skin and taste cell expertise

The patent protection granted in the US is based on a joint scientific breakthrough by BRAIN AG and the Darmstadt Dermatology Clinic (Hautklinik Darmstadt) which improves the understanding of sweat

B·R·A·I·N

production in human skin. The paper published in *Experimental Dermatology* by the involved scientists is regarded as pathbreaking, both in terms of basic research and concerning the development of gentle and skin-friendly body care products which reduce the production of sweat.

The patent's claims protect BRAIN's work on a specific membrane protein which occurs in the secretory cells of the sweat glands and plays a direct role in the production of sweat. Development work based thereon involves *in vitro* procedures to identify natural active ingredients for antiperspirant cosmetics. These *in vitro* procedures harness cell cultures with the protected active molecule integrated in their membranes. Using this cell-based procedure and fluorescent dyes, some initial natural active ingredients from the BRAIN BioArchive have been directly screened for their inhibiting properties and are currently being further investigated.

Aluminium-free cosmetics

Aluminium is a light metal that occurs naturally on Earth. Humans absorb aluminium through food and fresh water and it may also be found in aluminium-containing cosmetics and antiperspirant products, which mechanically block the sweat gland pores to reduce perspiration. Permanent exposure to and high doses of aluminium are considered harmful to health. In order to avoid over-exposure, the German Federal Institute for Risk Assessment (Bundesinstitut für Risikobewertung, BfR) – in agreement with other organisations – recommends limiting the amounts of aluminium salts in antiperspirants.

The quest for new care products is driven by the growing consumer demand in natural ingredients which reliably protect against the production of sweat and body odours. BRAIN's solution combines these characteristics by biologically reducing the production of sweat right at the sweat glands. The microbiological cell-based procedure developed by BRAIN may also potentially be used for therapeutic

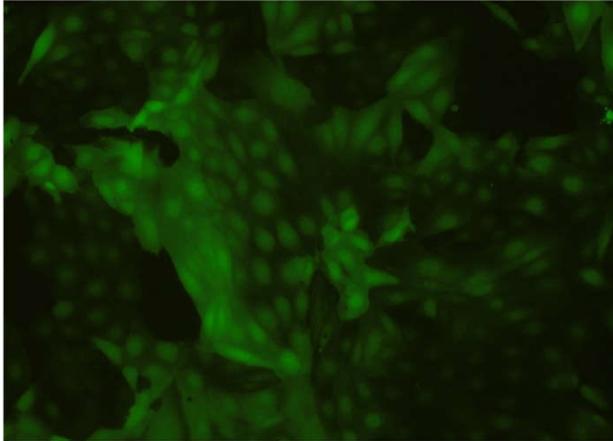
B·R·A·I·N

purposes in patients suffering from excessive sweating (hyperhidrosis).

BRAIN is also exceptionally well positioned in the field of human taste cell research. BRAIN's comprehensively protected expertise in this area is key to the success of the DOLCE programme launched by the company to develop natural sugar substitutes and sweetness enhancers.

Further information:

- WIPO Patentscope, WO 2014/027050: <https://patentscope.wipo.int/search/en/search.jsf>
- EPO Espacenet, US9809853 (B2): https://worldwide.espacenet.com/publicationDetails/biblio?FT=D&date=20171107&DB=EPODOC&locale=en_EP&CC=US&NR=9809853B2&KC=B2&ND=4#
- Ertongur-Fauth, T., Hochheimer, A., Buescher, J. M., Rappich, S. and Krohn, M. (2014), A novel *TMEM16A* splice variant lacking the dimerization domain contributes to calcium-activated chloride secretion in human sweat gland epithelial cells. *Exp Dermatol*, 23: 825–831. doi:10.1111/exd.12543, <http://onlinelibrary.wiley.com/doi/10.1111/exd.12543/full>
- Wilson, T. E. and Metzler-Wilson, K. (2015), Sweating chloride bullets: understanding the role of calcium in eccrine sweat glands and possible implications for hyperhidrosis. *Exp Dermatol*, 24: 177–178. doi:10.1111/exd.12595, <http://onlinelibrary.wiley.com/doi/10.1111/exd.12595/full>
- Federal Institute for Risk Assessment (Bundesinstitut für Risikobewertung, BfR): Aluminium-containing antiperspirants contribute to aluminium intake, Opinion 007/2014, 26 February 2014, http://www.bfr.bund.de/en/a-z_index/aluminium-129853.html
- Global beverage company has joined DOLCE: <https://www.brain-biotech.de/en/press/globaler-getraenkekonzern-tritt-dolce-bei>



Microscopic image of human sweat gland cells, cultivated in a petri dish. The sweat gland cells are stained with a fluorescent sensor molecule (green). BRAIN's patented technology helps identify natural active ingredients which reduce the production of sweat.

Photo: BRAIN AG, Germany

Photo Download via Press Release online: <https://www.brain-biotech.de/en/press/>

About BRAIN

B.R.A.I.N. Biotechnology Research and Information Network AG (BRAIN AG; ISIN DE0005203947 / WKN 520394) is one of Europe's leading technology companies in the field of industrial biotechnology, the core discipline of Bioeconomy. As such, BRAIN identifies previously untapped, efficient enzymes, microbial producer organisms or natural substances from complex biological systems that can be put to industrial use. The innovative solutions and products developed by help of this „Toolbox of Nature“ are successfully applied in the chemistry, the cosmetics and the food industries. BRAIN's business model is based on two pillars – BioScience and BioIndustrial. The BioScience comprises its frequently exclusive collaboration business with industrial partners. BioIndustrial comprises the development and commercialization of BRAIN's own products and active product components. Further information is available at www.brain-biotech.de/en.

Disclaimer

This press release contains forward-looking statements. These statements reflect the current views, expectations, and assumptions of the management of BRAIN AG and are based on information currently available to the management. Forward-looking statements are not guarantees of future performance and involve known and unknown risks and uncertainties that could cause actual results, performance or events to differ materially from those expressed or implied in such statements. There are numerous factors which could influence the future performance by and future developments at BRAIN AG and the BRAIN group of companies. Such factors include, but are not limited to, changes in the general economic and competitive environment, risks associated with capital markets, currency exchange rate fluctuations, changes in international and national laws and regulations, in particular with respect to tax laws and regulations, and other factors. BRAIN AG does not undertake any obligation to update or revise any forward-looking statements.