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PRESS RELEASE

BRAIN granted key patent in the United States

- **Technology is used for the identification of natural taste ingredients and innovative solutions for modern food**
- **Next generation of cell-culture technology, for reliable human taste measurements**

Zwingenberg August 03, 2016: The bioeconomy company BRAIN AG (ISIN DE0005203947 / WKN 520394), announces today the grant of the US-patent 9,404,080 with the title "Human taste cells capable of continuous proliferation". This confers intellectual property rights to BRAIN on using these cells for investigating the mechanisms of taste modulation and screening for novel all-natural taste molecules in the US. Further patent applications out of PCT procedures are in the patent evaluation and prosecution process. Cells and human taste cell technologies that have been developed in the wake of this patent are applied in several strategic collaborations with leading industry partners for the development of ingredients for food formulations to improve taste and reduce calories and salt intake.

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Many countries start to implement additional food taxes on high caloric or high salt food. Mexico implemented a sugar tax in 2014. Great Britain recently decided to do so in April 2017, not least because overconsumption of fat, salt and sugars has a massive impact on the economic burden of healthcare systems. In a joint research study with Dr. Toni Meier from the University of Halle-Wittenberg in Germany, published in the scientific journal PLOS ONE in 2015, BRAIN illustrates that an unbalanced nutrition associated costs mount up to 16.8 billion EUR per year solely in Germany. From that one can deduce a high need for food industry to develop natural ingredients which help to reduce sugar, fat or salt in their food and beverage formulations. Such approaches need to have innovative and reliable technologies in place.

Conventional, recombinant screening technologies using simplified and very limited cell models, in the past did lead to the discovery of a few taste modulators but also revealed major drawbacks and are no longer accepted by food industries. Ideally, human taste cells should be used to emulate the complexity of human taste response to taste modulators in a most genuine way.

In general, human taste cells are short-lived cells which hardly proliferate *in vitro*. Before BRAIN established in house human taste cell (HTC) technologies, it was not possible to use human taste cells as a model, due to the lack of homogenous, proliferating cell lines with defined properties. Latter is a prerequisite to establish comprehensive research and screening programs.

Scientists at BRAIN have invented, established and patented a method to obtain long-living primary human taste cell lines derived from fungiform taste papillae of the human tongue and filed a patent application (WO 2013/160415) on a resulting cell line. Advancements within this technology already resulted in the development of diverse human taste cell lines which provide new insights into taste reception and should enable the identification of novel taste modulators e.g. for bitter, sweet, umami, sour, salty and even fat taste. The granted US-patent includes claims covering

the use of these proprietary cell lines for screening purposes. The parallel patent in Europe EP2841565 is expected to be granted in due time.

“For the generation of human taste cell lines volunteer tongue biopsy samples are utilized. Based on that, scientists at BRAIN established a method to prolong proliferation of cells to an extent that selected taste cell lines are now amenable to lab conditions and screening programs to identify taste modulators in a high-throughput fashion. Cell lines generated like that are suitable for investigating gustatory responses of humans and provide valuable new insights into human taste reception and signal transduction mechanisms”, explains Dr. Katja Riedel, Research Scientist and Project Manager at BRAIN.

“We are very proud to receive patent coverage for our stably proliferating genuine like taste cells. The constant advancement of our proprietary ScreenLine - human taste cell technology has enabled us already to identify and develop novel all-natural taste modulating compounds for the food industries”, adds Dr. Michael Krohn, Executive Vice President and Unit Head BioActives at BRAIN. "There is a pressing need from industry and politics for novel food ingredients with the aim to reduce calories and salt consumption and to improve food formulations."

“For BRAIN the taste cell technology is an important asset within our corporate strategy“, says Dr. Jürgen Eck, CEO of BRAIN. “We were able to join forces with several strategic collaboration partners to apply the technology for the identification of a new generation of taste modulating all natural compounds, already. However, the IP was only the cornerstone in a development process of human taste cell technologies that should enable us to extend our business by further industrial co-operations."

BRAIN´s portfolio of patents and patent applications include more than 350 claims regarding proprietary technologies and various fields of application.

About BRAIN

BRAIN 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. Today, BRAIN's business model is based on two pillars – "BioScience" and "BioIndustrial". The first pillar, "BioScience", comprises its – frequently exclusive – collaboration business with industrial partners, include BASF, Bayer Schering, Clariant, DSM, Evonik Degussa, Henkel, Nutrinova, RWE, Sandoz, Südzucker and Symrise

The second pillar "BioIndustrial" comprises the development and commercialisation of BRAIN's own products and active product components. Further information is available at www.brain-biotech.de/enFurther information is available at

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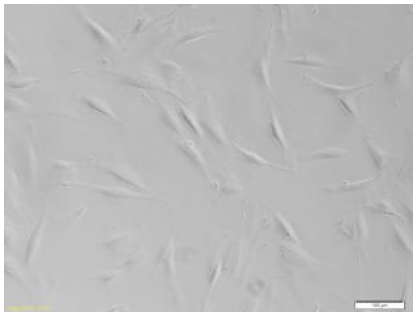
Pictures:



Human taste cell lines: microscopic image of a more than 70 passages cultivated human taste cell line (HTC)

These cells can be used to locate new, natural taste modulators

Kerstin Rudert, Archive BRAIN AG, Zwingenberg