

## Collaboration between BRAIN Biotech and AMSilk: Protein engineering successfully improves structural proteins for performance materials

- **First patent application registered**
- **BRAIN Biotech relies on protein engineering expertise and bioinformatics for rational protein design**

**Zwingenberg / Neuried (Germany), March 5, 2024** - BRAIN Biotech AG, leading provider of solutions for the biologization of industry, and AMSilk GmbH, a global leader in advanced materials made from spider silk-based proteins, announce the successful completion of the first phase of a development collaboration. After a year of working together, they have specifically optimized a natural structural protein and subsequently registered the first PCT patent (“Patent Cooperation Treaty”) for this process.

The aim of the collaboration is to advance the development of high-performance protein-based fibers for the performance materials market, with the specific properties of these structural proteins being optimized for various high-performance fields of application in the textile sector. In addition to the economic dimension, both companies pursue a common strategic goal: of building a more sustainable future through bio-based solutions in the textile industry.

AMSilk has developed a wide range of use cases for its spider silk-based proteins, from developing the leading spinning process for silk protein fibers, to transforming proteins into silk beads, gels and solutions to unlock the power of their coating effects. Due to its unique combination of strength and flexibility, spider silk is the gold standard of bioindustrial materials. AMSilk's recombinant proteins are wholly biodegradable, can be fully recycled and contain no traces of microplastics. AMSilk's silk protein-based fibers set completely new standards within the apparel industry. They offer extremely broad performance characteristics and are also a high-quality alternative with low CO<sub>2</sub> consumption compared to other natural or fossil-based materials.

The structural proteins underlying AMSilk's protein fibers can be modified at the amino acid level using BRAIN Biotech's technologies so that the products can be tailored to specific market requirements.

The success of this strategic R&D collaboration is based on the use of BRAIN Biotech's rational design in protein engineering. Using this technology, BRAIN Biotech has built a successful track record over many years in the enzyme technology unit at Zwingenberg. BRAIN Biotech had already successfully used its protein engineering strategy in the development of a variety of

protein and enzyme products in order to tailor them for industrial applications. In addition to AMSilk's scientific expertise in the field of spider silk-based proteins, AMSilk also contributes an understanding of customer and market requirements. The results of the collaboration that have now been achieved show once again that the applied scientific strategy can lead to completely new products.

**Dr. Alexander Pelzer**, Head of Research & Development at BRAIN Biotech at the Zwingenberg site, emphasizes: "Our successful rational protein engineering is based on the combination of two factors: the experience of our team – in conjunction with sequencing and structure-based bioinformatics methods, including AI predictions. The strategic R&D partnership with AMSilk is an excellent example of the power of our protein engineering pipeline."

Pelzer cites powerful bioinformatics including the various AI approaches used by the experienced protein engineering experts at BRAIN Biotech as the basis for protein engineering, tailoring their approach to each specific inquiry. Drawing on the profound experience of their team, suggested optimizations are then implemented using molecular biology and tested in the laboratory. After successfully producing and characterizing these structural proteins on a milliliter scale, BRAIN Biotech scales up the top candidates in a fermenter on a liter scale, making them available to AMSilk for application testing.

**Alexander Pelzer adds:** "Many of the protein fibers that we have designed and manufactured at BRAIN Biotech showed greatly improved properties in real applications. We are very pleased that once again we have been able to contribute to the success of a customer – in this case AMSilk."

**Gudrun Vogtentanz**, Chief Scientific Officer at AMSilk, says about the cooperation: "Together with BRAIN Biotech, we are bringing tailor-made material solutions to the market that not only meet the needs of customers but are sustainable. This will enable us to revolutionize the performance materials market in the long term, which is currently dominated by fossil-based textiles. With their years of protein engineering expertise and with our common vision, BRAIN Biotech is an ideal fit as a development partner."

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#### **About AMSilk**

AMSilk is a global leader in advanced materials made from spider silk-based proteins. AMSilk's spider silk-based proteins are wholly biodegradable and biocompatible. Based on renewable plant based feedstock, they do not contain any substances of animal origin and come with a CO<sub>2</sub> greenhouse gas emission reduction of up to 90% and more than 90% less land and water use compared to other protein fibers. Their high-performance qualities enable a wide range of applications in the textile, homecare, biomedical, and automobile industries.

AMSilk's truly sustainable materials outperform existing, fossil-based products not only through their optimal relationship between performance and positive environmental impact, but also through the adaptability of multiple benefits to a broad range of meaningful applications. AMSilk aims to expand the use of its biobased, biodegradable, recyclable, and biocompatible products, reducing dependence on the natural resources of the planet. The Company has already collaborated with industry-leading global companies and plans to continue partnering with influential worldwide enterprises in its vision to make high performance materials for a sustainable future.

For more information, please visit [www.amsilk.com](http://www.amsilk.com).

### **About BRAIN Biotech**

BRAIN Biotech AG is a leading European provider of bio-based products and solutions such as enzymes and proteins, microbial production strains, natural substances and biotechnological solutions for more sustainable industrial processes. The company focuses on the areas of nutrition, health and the environment.

BRAIN Biotech AG is the parent company of the internationally active BRAIN Biotech Group. The group divides its business activities into three segments: The BioProducts segment includes the product business with specialized enzymes and other proteins, for the production of which the group operates fermentation plants in Great Britain and production plants in continental Europe and the USA. The BioScience segment offers research-intensive customer-specific solutions based on enzyme technology, strain development, bioprocess development and natural product screening. In the BioIncubator segment, the company carries out its own R&D projects or those initiated with partners with high value creation potential. A particularly promising incubator project concerns the development of our own CRISPR-based gene editing technology platform, which is currently being set up and expanded by Akribion Genomics (in start-up planning).

Through its own R&D activities, the group is continually expanding its product portfolio in the area of specialty enzymes and small molecules. The latter are the starting point for screenings, e.g. for novel active ingredient candidates for pharmaceutical applications.

BRAIN Biotech AG has been listed in the Prime Standard of the Frankfurt Stock Exchange since February 9, 2016 (stock exchange symbol: BNN; securities identification number: ISIN DE0005203947 / WKN 520394). The company employs around 330 people and achieved sales of EUR 55.3 million in the 2022/23 financial year.

More information at: [www.brain-biotech.com](http://www.brain-biotech.com), [LinkedIn](#), [Threads](#) and [Youtube](#).

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BRAIN Biotech AG assumes no obligation to update the statements contained in this release.