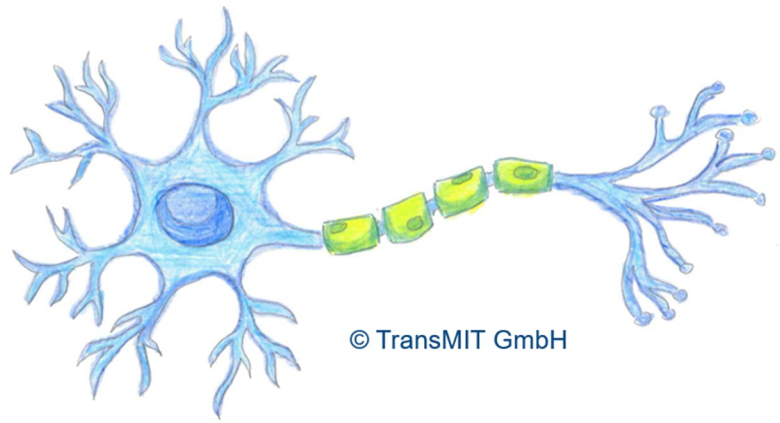
TransMIT
Gesellschaft für Technologietransfer mbH

Personalized Frequency Optimization for VNS/tVNS Therapies for Depression, Sleep Disorders, and Neurological Disorders

Vagus Nerve Stimulation, Neurotechnology

DESCRIPTION OF TECHNOLOGY

Current systems for invasive and transcutaneous vagus nerve stimulation (VNS/tVNS) typically use standardized stimulation frequencies. Stimulation parameters are usually selected empirically and take only limited account of individual neurofunctional differences. This leads to variable treatment outcomes, longer titration periods, and a large number of patients who do not respond adequately to treatment.
Therefore, a new algorithm was developed that analyses functional imaging data (fNIRS and/or fMRI) during a standardized stimulation protocol and uses this data to determine the optimal patient-specific stimulation frequency for vagus nerve stimulation. The technology is based on the analysis of dynamic changes in neural networks and identifies the frequency at which the strongest therapeutically relevant network modulation is generated.



FIELDS OF APPLICATION

The fields of application include the treatment of depression, sleep disorders, multiple sclerosis, anxiety disorders, epilepsy, and other neurological and psychiatric conditions for which vagus nerve stimulation is indicated.

AT A GLANCE …

Application Fields

- personalized neuromodulation
- neuroimaging
- treatment of neurological disorders

Business

- medical technology
- neurology
- neurotechnology

USP

- individual determination of the optimal stimulation frequency
- shortening of the setup and optimization phase
- software-based expansion without fundamental hardware changes
- identification of potential non-responders before the start of therapy
- first place in the 2025 Hessian Ideas Competition

Development Status

- prototype
- can be integrated into existing VNS/tVNS platforms

Patent Status

Priority applications filed on 19.08.2025 with the European Patent Office.

REFERENCE NO. **TM 1252**

ADVANTAGES OVER THE PRIOR AR

The new method enables data-driven personalization of vagus nerve stimulation and can help differentiate existing products from standard solutions. It allows for improved prediction of treatment response.

STATE OF THE PRODUCT DEVELOPMENT

An initial prototype is available. Initial tests to develop improved treatments for sleep disorders and depression have already been conducted.

MARKET POTENTIAL

The global neuromodulation market is growing rapidly and encompasses numerous indications with high unmet medical needs. Despite technological advances, the parameterization of VNS/tVNS systems has thus far been based primarily on standardized protocols. Our technology enables, for the first time, biomarker-based customization of the stimulation frequency as well as the prediction of treatment response. This creates the potential for improved clinical outcomes, more efficient therapies, and sustainable differentiation of existing neuromodulation platforms.

COOPERATION OPPORTUNITIES

On behalf of its shareholder, Philipps University of Marburg, TransMIT GmbH is seeking strategic partners for licensing, joint product development, market launch, or clinical validation in Germany, Europe, the U.S. and Asia.

A TECHNOLOGY OF

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