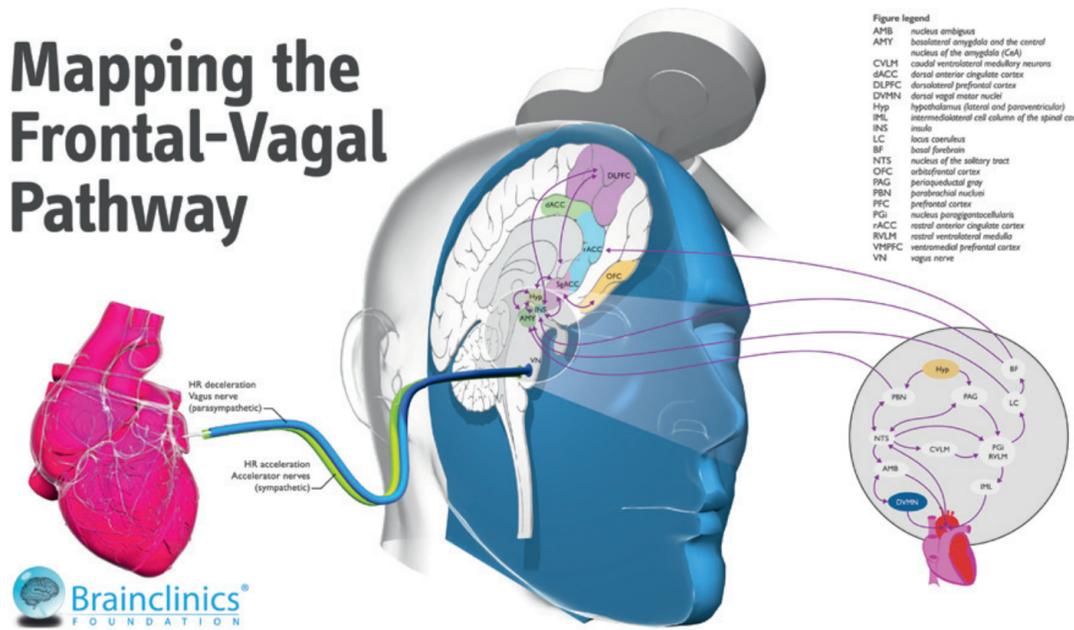
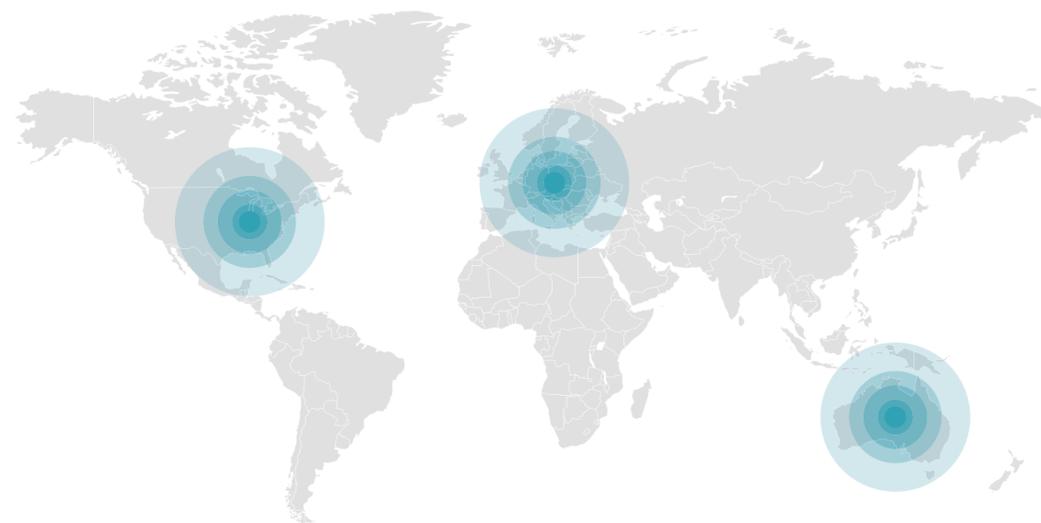


# Mapping the Frontal-Vagal Pathway



## YOUR PARTNER

Built upon a team with a **strong scientific background** neuroCare is the best partner for addressing advanced scientific challenges. neuroCare evolves continuously as a result of ongoing cooperation with renowned brain researchers. Our team strives to meet our **high standards in functionality and quality** not only today but also in the future. This is the reason why neuroCare Solutions are used in leading hospitals and research institutions **worldwide.**



*"We may have found a more accurate way of finding the best treatment point for the depression network."*

Dr. Marleen Stam, Psychologist NIP and TMS Specialist

We developed and test a new method that employs knowledge about the functional role of the subgenual anterior cingulate cortex (sgACC) in parasympathetic regulation, such as heart rate control. With this approach we can determine in real time the cortical area that is functionally connected to the sgACC. Previous studies have shown that stimulation of both the DLPFC as well as the sgACC leads to heart rate deceleration, most likely through downstream connectivity with the vagal nerve.

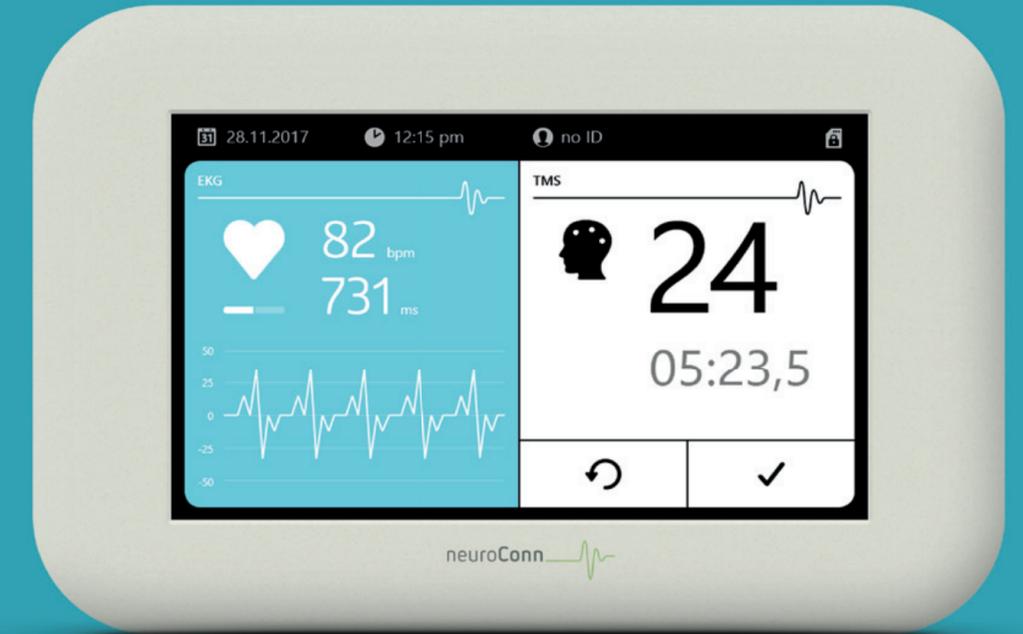
Many studies suggest the role of the connectivity of the DLPFC and the sgACC in depression treatment. Previous research has demonstrated that neuromodulation of either of these nodes modulates parasympathetic activity and results in a heart rate deceleration. **A new method called Neuro-Cardiac Guided rTMS helps to adequately target the DLPFC-sgACC network** (Iseger T. et al., 2017, 2018).

NCG-ENGAGE HR supports clinicians to find the individual spot of maximum heart rate deceleration within the DLPFC - for the best outcome!

# NCG-ENGAGE HR

## Assistance System for TMS

Planning, positioning and control for effective stimulation



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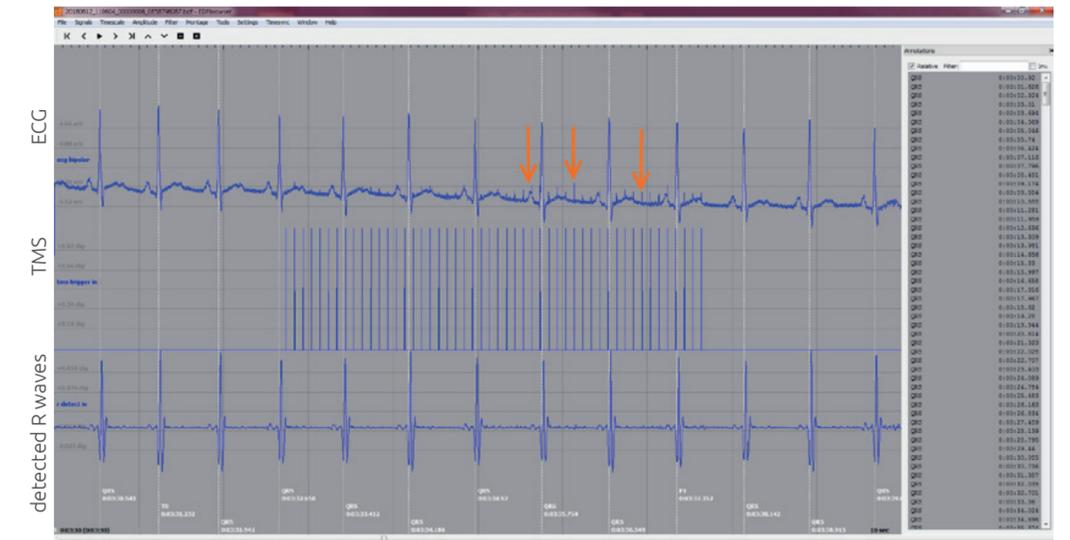
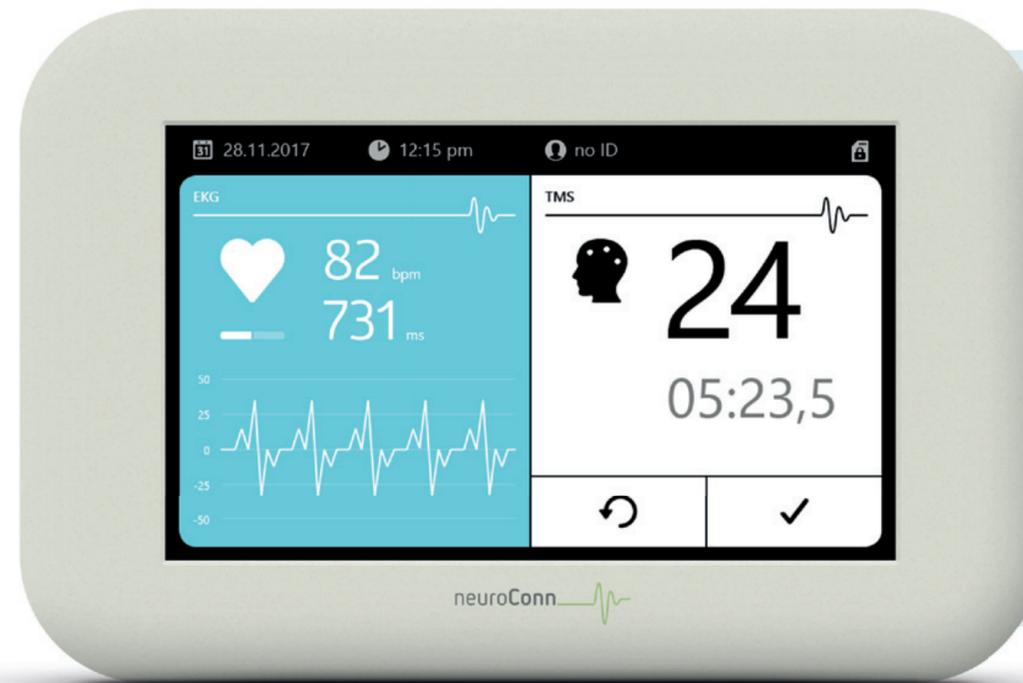
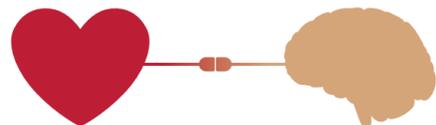


neuroCare Solutions



People with depression generally show a higher heart rate and lower heart rate variability (HRV). This suggests that the heart is connected to the same network involved in depression. Several studies have shown that these brain structures are indeed connected to the heart. Heart rate decelerations were also reported on the dorsolateral prefrontal cortex (DLPFC) as a result of TMS treatments.

The NCG-TMS method aims to assess whether the TMS treatment really 'hits' the depression network by looking at the heartbeat. If there is no decelerating, it is possible that the DLPFC and thus specifically the subgenual anterior cingulate cortex (sgACC) is not getting stimulated. With this method, a different location on the scalp might be found where the heart rate does show deceleration. As a result, it could then be decided to continue the treatment on this 'alternative' location.



## The NCG-ENGAGE HR: Flexible, Precise, Efficient

The device is designed to make TMS therapy easy and intuitive for the best outcome. **Neuro-Cardiac-Guided TMS enables clinicians to find the individual most effective entry point to the frontal vagal network via feedback of the heart rate.** It is a unique and high-quality technology. The design is set up to give the patient the best feeling during TMS therapy due to highest efficacy. **With the NCG-ENGAGE HR you can customize TMS therapy for a better outcome and highest performance.**

### Features:

- Easy-to-use ECG cable for safe recording during TMS
- Touch screen to show data and user interaction
- Stimulation output ECG stored on SD card (EDF + format)
- Connecting cables for receiving the trigger from different TMS devices

### Technical data:

- R wave detection sensitivity 99.9 %
- R wave specificity 99.1 % (comprehensive data base without TMS artefacts)
- 24 bit resolution; SNR > 90 dB; noise RTI < 15  $\mu$ Vpp
- ECG input for neuroConn's ECG cable
- input for medical DC power supply
- TTL input via BNC 5V TTL
- SD card: speed class  $\geq$  10; memory capacity  $\geq$  16 GB; reading speed  $\geq$  90 MB/s; writing speed  $\geq$  45 MB/s
- provides robust R wave detection