

Sleep as the key to understanding ME/CFS

The Federal Ministry of Research, Technology and Space (BMFTR) is supporting the “Sleep-Neuro-Path” research network with around 1.6 million euros. Coordinated by the Central Institute of Mental Health (CIMH) in Mannheim, a team of scientists is investigating the role of sleep-related biomarkers in the development of myalgic encephalomyelitis/chronic fatigue syndrome (ME/CFS). The aim is to better understand the mechanisms and causes of ME/CFS in order to pave the way for personalized therapeutic approaches.

ME/CFS – a disease that is not yet understood

ME/CFS is a complex, as yet incompletely understood neuroimmunological disease that is associated with severe fatigue, exercise intolerance, cognitive impairment, sleep disorders and increased sensitivity to stimuli. Those affected are severely restricted in their everyday lives. During the COVID-19 pandemic, there has been a significant increase in the number of ME/CFS affected persons as part of the post-COVID disease spectrum. Despite the high disease burden, clinical treatment options are unfortunately very limited to date – partly because there is a lack of fundamental biological knowledge about the disease.

Sleep as a window to brain function

The “Sleep-Neuro-Path” research network therefore aims to gain a better understanding of the biological mechanisms of ME/CFS. Coordinated by the Central Institute of Mental Health (CIMH) in Mannheim, a team of scientists is working with the Fraunhofer Institute for Digital Media Technology IDMT in Oldenburg, the University Medical Center Schleswig-Holstein in Kiel and the paediatric clinic at Marien-Hospital Wesel to investigate the role of sleep-related biomarkers in the development of ME/CFS. To this end, the researchers are analyzing specific characteristics of brain activity during sleep, which provide information on functional disorders of neuronal networks. The analysis of electroencephalograms (EEG) is particularly helpful here. The aim is to visualize changes in brain activity. These could provide new indications of disease-related processes.

Identify predictors at an individual level

“Our focus is on investigating how certain sleep characteristics can be linked to results from imaging techniques, biochemical analyses and genetic risk profiles,” explains Dr. Claudia Schilling, head of the Neuropsychiatric Sleep Disorders research group at the CIMH and coordinator of the “Sleep-Neuro-Path” research network. An examination of brain metabolism using 7 Tesla magnetic resonance spectroscopy will also be used. “This combination enables us to identify potential predictors for ME/CFS at an individual level,” Schilling continues. This could pave the way for personalized therapy in the long term.

Mobile EEG measurements for adolescents in the home environment

A particular focus of the research consortium is the study of seriously ill adolescents. To this end, the consortium is working together with a clinic for pediatric and adolescent medicine with special expertise in the treatment of ME/CFS at Marien-Hospital Wesel. The Fraunhofer IDMT is using a mobile EEG system as research demonstrator for this purpose, which enables low-stress recording of brain activity during sleep in familiar surroundings. “Our flexible EEG electrode systems can be easily attached to the facial area like a plaster and are therefore less annoying during sleep than the sensors commonly used in sleep laboratories. The aim is to minimise the stress for sensitive and severely ill patient groups,” says Dr. Insa Wolf, Head of the Mobile Neurotechnologies Group at the Fraunhofer IDMT.

The University Medical Center Schleswig-Holstein in Kiel is also contributing its expertise in the analysis of sleep-related and blood-based biomarkers. The close collaboration between the partners has created an interdisciplinary research network that combines different perspectives on the disease.

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Source: Central Institute of Mental Health (CIMH)

Further information

- ▶ [Central Institute of Mental Health \(CIMH\)](#)