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Bern researchers identify sleep as possible target to improve recovery after ischemic stroke

Until today neurorehabilitation is the only approach that promotes recovery after stroke. Researchers at the Neurology Department of the University of Bern and Inselspital have provided first evidence that sleep could be targeted to improve post-stroke recovery.

Despite spending nearly one-third of our life asleep, many of the biological mechanisms and functions of sleep remain a mystery to modern neuroscience. Sufficient sleep is essential for multiple functions including cognitive functions, memory consolidation and maintenance of brain and body health.

Stroke is a focal neurological deficit of acute onset and vascular origin. It has an estimated life-time risk of 25% for those aged over 25 years and represents worldwide the second most common cause of death and disability.

In the last 3 decades a complex bidirectional relationship between sleep and stroke was recognized. On the one hand, sleep-wake disorders (SWD) were shown to represent an independent risk for stroke. On the other hand, some SWD were observed to arise "de novo" from stroke. Finally, experimental and clinical observations documented a negative effect of SWD on stroke outcome.

Over the last 25 years, Prof. Bassetti and his team made fundamental clinical and experimental contributions to our current understanding on the relationship between sleep and stroke. In the last 5 years, Prof. Bassetti and Prof. Adamantidis developed a common experimental and clinical program to further elucidate the interaction between sleep and stroke and to test the hypothesis that sleep enhancement may have a beneficial effect on stroke outcome.

Slow wave sleep improves motor recovery after stroke

In this "proof of concept" study, the team of the two researchers from University of Bern could show that the induction of slow wave sleep in a rodent model of stroke through optogenetics – a technology that enables the ability to control neuronal activity and brain waves with light – to improve motor recovery after stroke. These findings further implicate slow waves – a predominant type of brain waves during sleep - in promoting brain plasticity, providing a new conceptual view of their role in the long-standing controversy about their role for the brain in health and disease. The results of this study have been published in *The Journal of Neuroscience*.

The present findings open the option of sleep promotion/enhancement (e.g., by drugs or or transcranial brain stimulation) to enhance recovery after stroke.

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IRC Decoding Sleep

The Interfaculty Research Cooperation, “Decoding Sleep: From Neurons to Health & Mind”, is an interdisciplinary project funded by the University of Bern, which started on the 1st of March 2018. It is comprised of 13 research groups from the Faculty of Science, Medicine and Human Sciences and bridges several domains including Medicine, Psychology, Psychiatry and Computer Science. The project aims to gain new and in-depth understanding of the function and regulation of sleep-wake-rhythms and to develop strategies for early and personalized therapies of sleep-wake and neuropsychiatric disorders.

https://www.sleep.unibe.ch/index_eng.html

Contact:

Prof. Dr. Claudio Bassetti, Dept of Neurology, University of Bern, and Inselspital, Bern
Telefon +41 78 890 86 06 / claudio.bassetti@insel.ch

Prof. Dr. Antoine Adamantidis, Dept of Neurology and Dept for BioMedical Research (DBMR),
University of Bern and Inselspital, Bern.
Phone +41 79 288 10 23 / antoine.adamantidis@dbmr.unibe.ch