

Media release, October 27, 2020

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.

This study was supported by the Inter-Faculty Cooperation funding “Sleep & Health” from the University of Bern, the Inselspital University Hospital Bern, the Sinergia grant on “sleep & stroke” from the Swiss National Science Foundation, and the European Research Council.

Publication details: Laura Facchin, Cornelia Schoene, Armand Mensen, Mojtaba Bandarabadi, Federica Pilotto, Smita Saxena, Paul-Antoine Libourel, Claudio L. Bassetti and Antoine R. Adamantidis: *Slow waves promote sleep-dependent plasticity and functional recovery after stroke*, The Journal of Neuroscience, pre-released online on Oct 21st 2020.
<https://doi.org/10.1523/JNEUROSCI.0373-20.2020>

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

Experts:

Prof. Dr. Claudio Bassetti, Director and Head of Department of Neurology, University of Bern, and Inselspital, Bern

Phone +41 632 30 66 / Claudio.bassetti@insel.ch

Prof. Dr. Antoine Adamantidis, Dept of Neurology and Dept for BioMedical Research (DBMR), University of Bern and Inselspital, Bern.

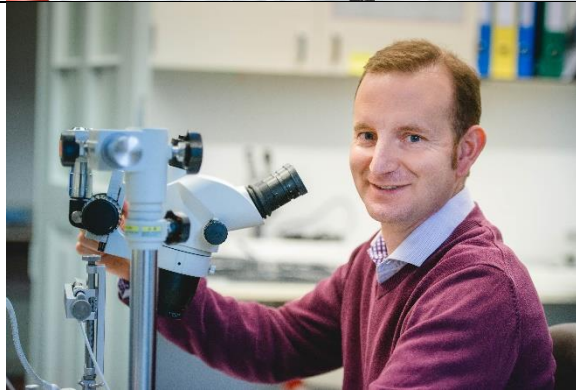
Phone +41 79 288 10 23 / antoine.adamantidis@dbmr.unibe.ch

Contact:

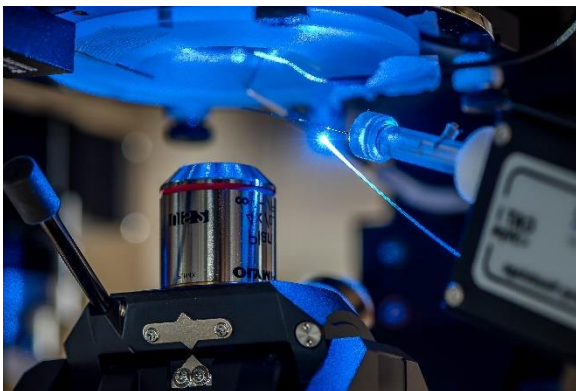
Media relations Insel Gruppe AG: Kommunikation@insel.ch, +41 31 632 79 25



Prof. Dr. Claudio Bassetti, xxx... and Director of the Interfaculty Research Cooperation "Decoding Sleep". © Courtesy of Claudio Bassetti



Prof. Dr. Antoine Adamantidis, Department of BioMedical Research (DBMR), University of Bern, Neurology group, and Department of Neurology, Inselspital, Bern University Hospital. © Tanja Läser for Insel Gruppe



Using optogenetics, specific neurons in the brain can be controlled with light pulses. © Pascal Gugler for Insel Gruppe

University of Bern

Globally connected and regionally anchored, the [University of Bern](http://www.unibe.ch/) is focused on excellence in research and teaching. It was here that Albert Einstein qualified as a lecturer.

Internationally renowned for space research, dentistry, climate science and biomedical engineering, it also hosts several global research platforms in areas such as sustainable development.

With roots in the 1500s, this comprehensive university is based in the heart of Switzerland's capital, Bern, near its UNESCO-listed medieval old town. Some 19,000 students from more than 125 nations benefit from a full range of disciplines at all levels, ranging from medicine to mathematics, economics to world literature, archaeology to law and more.

<http://www.unibe.ch/>

Insel Gruppe

The Insel Gruppe is Switzerland's leading group of hospitals for university and integrated medicine. It offers comprehensive health care based on groundbreaking quality, research, innovation and education. The six Insel Gruppe hospitals (Inselspital, Aarberg, Belp, Münsingen, Riggisberg and Tiefenau) carried out around 864 000 outpatient consultations and treated about 65 000 in-patients in the financial year 2019. The Insel Gruppe employs almost 10 800 members of staff from 100 nations. It provides training for a large number of professions and is the most important institution for the further training of young physicians.

<http://www.inselgruppe.ch>