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Leading sleep research continues

A large-scale interdisciplinary research project on sleep at the University of Bern came to an end this year. The findings of this project will benefit the population through various programs and will be pursued further thanks to numerous grants.

It is still unclear why we spend around a third of our lives sleeping. In order to better understand the function and regulation of the sleep-wake rhythm and to develop strategies for early and personalised therapies for sleep-related disorders, a large, interdisciplinary research project was launched six years ago - the so-called Interfaculty Research Cooperation (IRC) "Decoding Sleep". This project was completed this year. However, the great knowledge gained by the researchers from the fields of medicine, psychology, psychiatry and computer science in over 100 scientific publications and two patents has now made it possible to continue the research in numerous follow-up projects, which are being funded with a total of 13 million Swiss francs. Last but not least, this also benefits the general public, for example in the form of counselling in the Swiss Sleep House Bern.

Leading global sleep network

Claudio Bassetti, Chief Physician of the Department of Neurology at Inselspital and head of the now completed major interdisciplinary project, looks back with "gratitude and pride". Sleep research and sleep medicine have a 40-year tradition in Bern which all started in the 1980s with the recording of brain waves as well as eye and respiratory movements. In the 1990s, this collaboration of pneumologists and neurologists resulted in Switzerland's first interdisciplinary sleep lab.

Soon, the disciplines of psychiatry and paediatrics got involved. "Over the last 12 years we have invested a lot and gained researchers from even more areas to investigate the mysteries of sleep," says Bassetti. This resulted not only in the Experimental Neurology Center (ZEN) but also in the NeuroTec lab where sleep researchers work together with engineers to develop new test equipment. The IRC "Decoding Sleep" was able to rely on this wide interdisciplinary base.

"With computer-aided modelling, we have also ventured into new dimensions. And that is how we have secured ourselves a leading position in the field of sleep research," explains Bassetti. "And I'm not the only one saying that." The external assessors that critically reviewed the IRC after it had finished, have confirmed that the sleep network formed by researchers and doctors in Bern is "one of the five or ten most important in the world".

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Improving the population's sleep

In addition to the numerous contacts established between researchers from different disciplines, the IRC "Decoding Sleep" also created physical structures that will endure in the long term. Among these structures, Fred Mast, Professor of Psychology at the University of Bern and co-head of the "Decoding Sleep" research consortium, counts newly developed research equipment, such as the bed mounted on a hydraulic platform, which can move back and forth in all directions in his group's laboratory like a high-tech cradle. “We use it to investigate whether calming movements have an effect on sleep architecture – and perhaps even prolong deep sleep,” says Mast.

By structures, however, Mast also means newly created organisational units and refers, for example, to the "Swiss Sleep House Bern", which opened at the end of 2022 and is aimed at the entire population. After all, sleep problems have become a widespread disease in the western world. They are often associated with considerable suffering and high economic costs. “In Switzerland, there are more than two million people who have trouble sleeping,” says Bassetti. “And most of these are not being treated at all or not receiving the correct treatment. We want to be able to reach these people better.” The interdisciplinary team carries out a free sleep check on site to determine who is affected by which type of sleep disorder and can initiate suitable treatment if necessary. "This usually achieves better results than the sleeping pills that are too often prescribed by doctors," says Bassetti.

Using artificial intelligence to improve sleeping pills

However, members of the IRC "Decoding Sleep" also want to improve the quality of sleep with further research projects. For example, with a research project recently funded by the Swiss National Science Foundation with 2.5 million Swiss francs, in which software is to be developed that can predict how suitable various drug candidates are as sleeping tablets based on the activity of brain cells during sleep.

“Although today's sleeping pills make it easier to fall asleep, they have a lot of side-effects,” says Athina Tzovara, professor at the Institute of Computer Science and the Centre for Experimental Neurology at the University of Bern and co-lead of the IRC "Decoding Sleep", who is involved in the project. “That is why the search for new substances is so important,” continues the expert on applications of artificial intelligence in the neurosciences. In that respect, the project is a typical result of the IRC as it benefits from the synergies between experimental researchers and specialists from computer science.

Further information and contact details can be found on the following page.

Interfaculty Research Cooperation "Decoding Sleep"

The Interfaculty Research Cooperation, "Decoding Sleep: From Neurons to Health & Mind", was an interdisciplinary project funded by the University of Bern, which started on the 1st of March 2018 and was completed at the end of 2023. It was comprised of 13 research groups from the Faculties of Science, Medicine and Human Sciences and bridged several domains including Medicine, Psychology, Psychiatry and Computer Science.

The project aimed to gain new and in-depth understanding of the function and regulation of sleep-wake-rhythms and developed strategies for early and personalized therapies of sleep-wake and neuropsychiatric disorders.

More information

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