



## **Sleep deprivation and disruption harm mind and body**

*A chronic lack of sleep not only impairs cognitive abilities but also increases the risk of heart disease and diabetes. Current research discussed at the Congress of the European Academy of Neurology in Amsterdam show that not only the amount of sleep is important but also whether it is done at the right time.*

**Amsterdam, 24 June 2017** – “Too little sleep reduces our cognitive abilities and has a negative impact on physical health. Unfortunately, this crucial topic is still all too often undervalued in the health care sector,” warned Prof Pierre Maquet, head of the Neurology Department at Liège University in Belgium at the 3<sup>rd</sup> Congress of the European Academy of Neurology (EAN) in Amsterdam.

### **1.5 hours less sleep than our grandparents**

On average, Americans today sleep 6.5 hours a night and Europeans about seven. Prof Maquet: “This is about one and a half hours less than our grandparents used to sleep. That means we suffer from a chronic lack of sleep.” Not least, this situation impacts the processing of information in the brain. Prof Maquet: “Above all else, a lack of sleep impairs the ability to retain new information in the memory. The information can be absorbed but not permanently stored in the brain. Instead, it is lost in the long term. Apparently the memory traces laid down following every new item of information remain fragile until they are firmed up and incorporated in the long-term memory while a person is asleep.”

### **A lack of sleep promotes obesity and heart disease**

Intensive research is conducted on the effects that a lack of sleep has on physical health. Prof Maquet: “We still do not know all of the long-term consequences but we do know that too little sleep promotes obesity and is a risk factor for cardiovascular diseases.” A lack of sleep increases the appetite and also changes eating habits. The craving for unhealthy food with a lot of sugar and fat quickly sets the BMI soaring. Prof Maquet: “This, in turn, starts a vicious cycle. Overweight people suffer from sleep apnoea and are then less able to sleep through the night. This situation additionally increases their risk of heart disease.”

### **Not only too little sleep is harmful but so is sleeping at the wrong time**

Further studies indicate that a chronic lack of sleep also weakens the immune system and increases susceptibility to infections and viral diseases. The long-term consequences might be substantially more serious: Prof Maquet: “There are small studies showing that shift workers have a slightly higher cancer risk, but we will need more data in the future to obtain reliable evidence for this conclusion.”

As Prof Maquet’s own research indicates, health risks arise not just from a lack of sleep but also from the permanent disruption of the natural rhythm of day and night (circadian dysrhythmia). In a test setup, young and fully healthy test subjects had to stay awake for 42 hours and do various cognitive tasks during this period. Their brain activity was recorded in the process with functional magnetic resonance tomography. In the end, a completely

unexpected result emerged: There is not just one biological clock; there are several. Prof Maquet summarized: "To our surprise, it turns out that there are differences in the circadian rhythm between various regions of the cerebral cortex. Every local biological clock seems to react to a lack of sleep in and of itself. That suggests that information processing is optimal only if we are sleeping at the right time."

### **Neurologists should devote more attention to the quality of sleep**

In the light of these findings, the expert urged his colleagues to pay substantially more attention to their patients' quality of sleep. Prof Maquet: "The effects of a lack of sleep and disorders of the diurnal rhythm are undervalued by most people. We must increasingly recognize that sleep has a decisive influence on health and the course of many neurological diseases. Even simple questions can be extremely helpful to our patients and the course of their therapy, questions like these: Do you sleep well? Do you snore? Do you suffer from sleepiness during the day or sleeplessness at night?"

### **Risk for diabetics**

A study by Prof Hans Romijn at Leiden University Medical Centre (LUMC) showed that too little sleep also disrupts metabolism. The study participants exhibited nearly one-fourth less sensitivity to insulin after just a single night of only four hours of sleep. Prof Romijn, currently Chairman of the Board of Directors at the Academic Medical Center at the University of Amsterdam: "This effect occurred in patients with type 1 diabetes as well as healthy participants. To date, little is known about the underlying mechanisms but a change in the activity of the autonomous nervous system brought about by a lack of sleep might play a role". For diabetes patients this means that despite insulin injections they can have an elevated blood sugar level and thus a higher risk of heart disease, renal dysfunctions and other secondary diseases. Prof Romijn: "Diabetics need an extra dose of insulin after their meals after one night without sufficient sleep. Sleeping too little on a regular basis is not advisable for anyone but especially not for this patient group."

**Sources:** Muto et al. Local modulation of human brain responses by circadian rhythmicity and sleep debt. *Science* 2016, 353-6300; Thanh Dang-Vu et al. Neuroimaging in Normal and Abnormal Sleep. In: *Sleep Disorder Medicine*, 2017. van den Berg et al. A single night of sleep curtailment increases plasma acylcarnitines: Novel insights in the relationship between sleep and insulin resistance. *Archives of Biochemistry and Biophysics*, Volume 589, 1 January 2016, Pages 145–151;

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