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Conceptual Paper

The II Pillar of Sleep, Must be Called a New Treatment

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For many centuries, sleep has been overlooked, it being considered a passive event, in which nothing happened, a simple absence of wakefulness. In the 70's, some time after electroencephalography was had been developed and as it was discovered how the brain works when we sleep, great progress was made in our understanding of sleep, as a special characteristic of the animal world. Sleep is a universal feature of animals from humans to worms. Nonetheless, the electroencephalographic characteristics of sleep, slow-wave sleep and rapid eye movement (REM) sleep have been attributed to animal evolution, occurring only in those with more advanced nervous systems [1] such as birds, reptiles and mammals. Recently, Leung., *et al.* from Stanford University identified similar phases to those of slow-wave and REM sleep in zebrafish sleep features that suggest that sleep may exists since the beginning of evolution; they distinguish phases of slow-wave and REM sleep and found that ependymal cells are activated by melanin [2]. They also found that ependymal cells of fish are activated by melanin-concentrating hormone, a neuropeptide hormone involved in REM sleep in mammals, suggesting that sleep developed around 450 million years ago.

Literally, we are not able to live without oxygen, water, food and sleep. It is essential for human health. It is true that our need for sleep varies change with age [3]. At birth, babies' neonates sleep most of the day, between 16 and 17 hours, with a polyphasic pattern of sleep over 24 hours. At 4 to 6 weeks of life, nighttime sleep becomes more stable, following falling in line with the light-dark cycle. REM sleep is predominant at this period. In this period, REM sleep prevails, this being essential for learning from their experiences. As children grow, daytime sleep decreases and nighttime sleep increases, reaching patterns similar to those in adults by 6 months of age. For healthy sleep in this first stage of life, we need endogenous synchronizers such as melatonin, cortisol and body temperature, as well as zeitgebers (exogenous synchronizers) such as light, noise and habits meaning that parents are responsible for helping children get good quality sleep using these synchronizers. It is easy to notice that a direct consequence of a bad sleep of children is a worse rest of their parents. However, it has more important effects. We may believe that the main consequence of our children sleeping well is parents sleeping well. But the issue of sleep has much wider implications. It has been demonstrated that poor quality sleep has a negative impact on the behavioural, cognitive and emotional function of children. Memory and learning problems related to not sleeping properly lead to poorer academic performance. In fact, it has been reported that up to 20% of children with poor sleep repeat a school year [4].

In adulthood, there is a change in our need for sleep, although it is still essential for health. Notably, our lifestyles and new technologies have led to the boom development of a new disorder, which has become is now very common, namely, insufficient sleep syndrome. Individuals with this condition do not get the quantity or quality of nighttime sleep to stay awake and normally alert during the day. In other words, they do not sleep enough. It could be considered that they are voluntarily depriving themselves of sleep, but this disorder is trig-

gered by external factors [5], such as exposure to electronic devices, intake of caffeine and other stimulants, stress and a high workload, among others. These factors are more frequent in teenagers and young adults. As well as the short-term consequences such as sleepiness and irritability, poor sleep has been associated with obesity, diabetes, hypertension, cardiovascular disease and mood disorders such as depression.

Sleep plays an essential role in the production of various different hormones, hormone sleep-wakefulness rhythms being robust and each of the hormones those involved following its own circadian pattern. It is known that lack of sleep can have an impact on the levels of hormones that control appetite and hunger, ghrelin and leptin, respectively. Specifically, sleep deprivation decreases leptin levels and increases ghrelin levels [6]. This increases our urge to eat, which may result in an energy imbalance and weight gain. Additionally, sleeping less than necessary leads to over activation of the sympathetic system and the hypothalamic-pituitary-adrenal axis [7]. These processes promote insulin resistance with the corresponding higher risk of diabetes. Sleeping for fewer than 5 hours during the night is associated with an elevated risk of hypertension in people between 32 and 59 years of age [8]. A single night of poor sleep in people with hypertension may lead to an increase in their blood pressure the following day. This phenomenon, together with the sympathetic hyperactivity associated with sleep deprivation, may explain the higher risk of cardiovascular diseases.

But how many hours should we sleep? This question is difficult to answer. In recent years, it has been suggested that sleeping less than 6 hours and more than 9 hours increases the risk of death [9] and cardiovascular events [10]. Apparently, 7 hours is the ideal amount of sleep; being more significant in adults under 65 years old [11]. In fact, a study published this year [12], which analysed sleep objectively using actigraphy in almost 4000 individuals, showed that the probability of developing atherosclerosis was 27% higher in people sleeping fewer than 6 hours than in those sleeping 7 to 8 hours. Furthermore, if sleep was fragmented, the risk was 34% higher.

For many years, it has been believe that sleeping was a waste of time. We now know that getting an adequate amount of good quality sleep, at all ages, allows us to grow properly, and makes us more intelligent, slimmer, more competent and happier. And, furthermore, good sleep prevents cardiovascular diseases and lengthens life. Sleep is the new health pill.

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