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SLEEP

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It was probably not long after humans first questioned the meaning of life that someone turned to the significance of sleep. Why do we need it? Why do we spend so much of our life doing it? And what is this strange alternative reality we experience while we sleep?

These big questions still loom large, but researchers have been focusing on more practical matters. We now know how an intricate interaction of neurotransmitters in different parts of the brain switches us from being fully alert to unconscious, and back again (page S2). But the brain does not shut down — studies of its electrical activity are revealing how sleep boosts learning, providing tantalizing clues to the formation of memory (S4).

Sleep is proving important for more than the mind. Studies that restrict the duration and quality of sleep show that lost sleep can lead to metabolic disorders, immune dysfunctions and chronic disease (S6). And researchers are probing the link between sleep disruption and weight gain (S8).

At the root of many sleep problems is the way modern life — especially the advent of artificial light — has decoupled humans from the natural world, disrupting the brain's master clock (S13). Projects are underway to track this desynchronization and reveal how people differ in their tendency to sleep (S10). A lack of sleep can have pernicious effects in those with a mood disorder, and understanding why should help them manage these conditions (S14).

We also need safer ways to treat insomnia. One promising approach is to combine drugs with cognitive therapy (S16). Such sleep disturbances may be one of the first signs of neurodegenerative diseases (S19) — but could a prolonged lack of sleep cause these debilitating diseases in the first place?

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Tony Scully

Science Editor, Nature Outlook

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