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Commentary

Interactions between Sleep and Circadian system

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DESCRIPTION

The tight connection between the circadian system and sleep makes it difficult to unravel their individual contributions to the balance between health and illness. Adaptation to spatial niches (ie, sea/land/air) is focused on adapting to many aspects of physiology (from fins and fins to lungs, legs and wings) and temporal niches (day/night) is most evident in sensory physiology. As animals adapted to one temporary niche (eg day or night), they did not adapt much to the other niche. This discipline involved separate actions, bringing more activity in one niche and more rest in the other. The most obvious examples are photoactive (diurnal) or darkly active (nocturnal) animals. More or less stable human sleep is the result of this specialization. Over the course of evolution, more and more sleep-specific functions to be considered have been segregated to circadian/biological "nights". Sleep is commonly regarded as brain function, mainly because it is associated with decreased responsiveness, but many physiological functions aligned with this temporal segregation, such as brain maintenance, as well as metabolic and immune function.

The circadian system regulates almost every aspect of physiology, from gene expression to sleep. It can be argued that circadian health is equal to overall health, but the two can be formally separated. In mutant animals lacking a circadian clock, environmental stress (eg: bacteria, diet, toxins) is associated with the etiology of the disease and recovery therapy may still be effective. These animals are more vulnerable without a healthy circadian system, but overall health can still be protected or restored.

"Sleep" and "Wake" are placeholders for the various features that occur between these states. The research of sleep experts gives us insight into a rich collection of sleep functions. The depiction of sleep was limited to unconsciousness and dreaming. Awakening can be defined as the opposite of sleep, a state of conscious interaction with reality, without the need for the details of a rich collection of features to define it.

Despite their close coupling, the circadian system and sleep can be formally distinguished from each other. The circadian system is a continuous process, and sleep is a state within this process. If the circumstance system is a Ferris wheel, sleep will be one or more cabins that move within the Ferris wheel. There may be additional distinct temporal functions and structures within the "sleep" cabin (eg, non-REM sleep and ultradian rhythms of REM sleep). Keep in mind that due to the wide range of chronotypes, biological nights can differ significantly from actual environmental nights. Although we can potentially sleep at any time of the day if we are tired enough, falling asleep is easier at some circadian phases than at others. The structure (and underlying function) of sleep also depends on the stage of the circadian rhythm of sleep. In other words, the functionality within the cabin depends on where the cabin hangs on the Ferris wheel. In addition, sleep/wakefulness can directly or indirectly affect the circadian phase response to light.

Specific experimental conditions are required to distinguish between the effects of circadian rhythm and sleep on physiology. Observational study designs cannot separate these two effects. This is because humans sleep primarily at biological nights and not at all possible circadian rhythms.

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