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Letter to the Editor

In the big picture of COVID-19 pandemic: what can sleep do



The world is grappling with the 2019 novel coronavirus disease (COVID-19) pandemic, however, currently there are no effective antivirals or vaccines. Therefore, mitigating propagation of the virus and boosting immunity are of crucial importance. As suggested by clinical intervention studies, sleep is involved in an individual's susceptibility to infection [1]. Based on the emerging literature about the pathogenesis of COVID-19, we would emphasize the potential role of sleep in the prevention and control of COVID-19.

Angiotensin-converting enzyme (ACE)-2 has been recognized as the receptor of SARS-CoV-2 spike [2]. A newly published review posited that ACE2 might exhibit circadian rhythm due to indirect effects of circadian rhythm changes in the renin angiotensin system, indicating the possible link of circadian rhythm to COVID-19 susceptibility [2]. Additionally, when exposed to COVID-19 infection, a series of pro-inflammatory cytokines were activated, increasing the risk of developing a cytokine storm [3]. Sleep exerted roles in modulation of the synthesis and secretion of numerous cytokines, including detrimental interleukin (IL)-6 and tumor necrosis factor (TNF)- α , both of which were closely related with cytokine storm; and the disrupted circadian rhythm could result in certain cytokine peaks being displaced from night to daytime [4]. Melatonin, a sleep-inducing hormone, is associated with the reduction of cytokines (eg, IL-6 and TNF- α); thus, melatonin is anti-inflammatory and immune enhancing, which has been suggested as an adjuvant therapy for COVID-19 [3]. Moreover, when infected, increased sleep in *Drosophila* was identified as host defense to promote survival and combat infection, further pointing out the great potential of promoting sleep in anti-infective therapy [5].

As a summary, it is highly probable that sleep is involved in the pathological process of COVID-19. Furthermore, it is recommended that medical professionals educate the public on how to develop good sleep habits in order to help people to respond to this pandemic more effectively.

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Conflict of interest

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