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Introduction

Sleep is an essential component of human health, integral to [illegible]

Discussion

Insu cient sleep has been shown to cause signi cant disruptions [illegible]

e ects on the brain and behaviour.

Adenosine

Adenosine levels increase during wakefulness and decrease during sleep, playing a crucial role in promoting sleep. In conditions of sleep deprivation, adenosine accumulates excessively, leading to heightened sleep pressure. is accumulation can impair cognitive functions such as attention, memory, and executive function, as the brain struggles to maintain alertness.

Serotonin

Serotonin is vital for regulating mood, appetite, and sleep. Sleep deprivation a ects serotonin levels, o en leading to mood disturbances such as irritability, anxiety, and depression. e disrupted serotonin signaling can also impact the regulation of the sleep-wake cycle, creating a vicious cycle of sleep disruption and mood instability.

Dopamine

Dopamine is crucial for motivation, reward processing, and cognitive functions. Sleep deprivation alters dopamine transmission, which can result in decreased motivation, impaired learning, and an increased propensity for risk-taking behaviors. e diminished reward sensitivity can also contribute to mood disorders and decreased overall well-being [2].

Cortisol

Cortisol, the primary stress hormone, typically follows a diurnal rhythm, peaking in the early morning and declining throughout the day. Sleep deprivation disrupts this rhythm, leading to elevated cortisol levels, particularly in the evening. is elevation contributes to increased stress, anxiety, and impaired cognitive performance, exacerbating the negative e ects of sleep loss on mental and physical health.

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