## **MAY 2025**

## **The Science of Sleep**

We think of sleep as a passive state, however, it is a rather complex and dynamic process<sup>1</sup> involving neurons (or nerve cells) and their reactions with hormone production, both of which are crucial for our physical and mental well-being. Understanding the physiology of sleep and the importance of each phase reveals why quality rest is essential for optimal brain function and overall health.

Sleep is characterized by distinct stages that cycle throughout the night<sup>2</sup>, each playing a unique role in brain restoration and function. This cycle, comprised of four stages, repeats several times each night and helps lead you into progressively deeper sleep.

**Stage 1** is the transition from wakefulness to sleep. It's a light sleep stage, characterized by slow eye movements and a gradual decrease in muscle activity. You might experience sudden muscle contractions during this stage. While brief, Stage 1 sleep allows the brain to begin its transition to a more restful state.

**Stage 2** constitutes the majority of our sleep time. During Stage 2, your body temperature drops, your heart rate slows, and your brain waves become slower with occasional bursts of rapid brain activity. These bursts are thought to play a role in memory consolidation and protecting against external stimuli.

**Stage 3**, also known as **Deep Sleep**, is the most restorative stage of sleep. During Stage 3, your body repairs tissues, builds bone and muscle, and strengthens the immune system. This stage is also critical for cognitive restoration including the clearance of metabolic waste products from the brain.

After Stage 3, your body enters **REM sleep** which is characterized by rapid eye movements, increased heart rate and breathing, and vivid dreams. During REM sleep, the brain is highly active, resembling wakefulness in its electrical activity. The intense brain activity during REM is thought to be involved in processing emotional

experiences, contributing to emotional regulation and mental well-being.

Each stage of the sleep cycle plays a part in your brain function and health. When sleep disruption or sleep deprivation occurs, you may experience:

- impaired cognitive function, including memory, attention, and decision-making,
- an increased risk of mood disorders, such as depression and anxiety,
- a weakened immune system, and/or
- increased risk of chronic diseases, such as cardiovascular disease, diabetes, and Alzheimer's disease.

By prioritizing consistent and quality sleep, you can support your cognitive abilities, emotional well-being, and physical health. This includes establishing a regular sleep schedule, creating a restful sleep environment, and practicing good sleep habits.

Don't sleep on your sleep routine! Get the proper quality and quantity of sleep to keep your mind and body at their best.



<sup>&</sup>lt;sup>1</sup> Brain Basics: Understanding Sleep, National Institutes of Health, <u>https://www.ninds.nih.gov/health-information/public-education/brain-basics/brain-basics-understanding-sleep</u>, Last reviewed February 25, 2025

<sup>&</sup>lt;sup>2</sup> The Science of Sleep: Understanding What Happens When You Sleep, Johns Hopkins Medicine, <u>https://www.hopkinsmedicine.org/health/wellness-and-prevention/the-science-of-sleep-understanding-what-happens-when-you-sleep</u>, accessed March 10, 2025

