

SLEEP AND YOUR BRAIN CHEMISTRY

A QUICK GUIDE TO NEUROTRANSMITTERS AND HORMONES IN SLEEP

Sleep is not just about closing your eyes. It is carefully guided by brain chemicals (neurotransmitters) and body messengers (hormones). Neurotransmitters act like chemical messengers in the brain, helping you transition between wakefulness and different sleep stages. Hormones act more like the body's rhythm setters, shaping when sleep begins, how deep it goes, and how steady it stays through the night. Together, these two systems work in harmony to create sleep that feels deep, refreshing, and restorative.

KEY NEUROTRANSMITTERS IN SLEEP

GABA (GAMMA-AMINOBUTYRIC ACID)

- Acts as the brain's **brake pedal**
- Helps reduce neural activity and supports sleepiness
- Supports sleep-promoting pathways, including deep NREM sleep
- Many sleep medications work by boosting GABA



GLUTAMATE

- The brain's **gas pedal**
- Keeps you alert and awake
- Higher glutamate-related arousal may contribute to insomnia, racing thoughts, or disrupted sleep-related memory processing



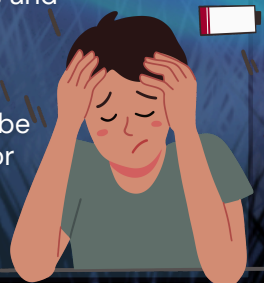
SEROTONIN

- Helps the brain make melatonin (the sleep hormone)
- Regulates temperature and stage transitions
- Changes in serotonin signaling may affect REM sleep, dreams, mood, and sleep timing



NOREPINEPHRINE (NE)

- Heightens alertness and stress response
- High levels: lighter, fragmented sleep
- Lower activity may be linked with fatigue or reduced alertness



ACETYLCHOLINE (ACH)

- Drives REM sleep and vivid dreams
- Critical for memory consolidation
- Changes in acetylcholine signaling may affect REM sleep and memory



DOPAMINE

- Promotes wakefulness and motivation
- Higher dopamine signaling may support wakefulness and alertness
- Lower dopamine signaling may be linked with fatigue, low motivation, or sleepiness



KEY HORMONES IN SLEEP

MELATONIN

- The body's **night signal**
- Rises in darkness to cue sleep onset
- Low or mistimed melatonin may contribute to delayed or disrupted sleep timing



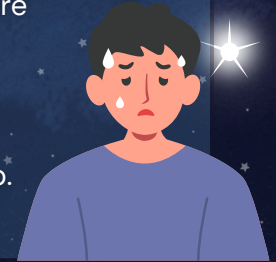
CORTISOL

- A daytime-alertness signal
- Peaks in the morning to wake you up, lowers at night
- Higher nighttime cortisol may be linked with stress-related insomnia or fragmented sleep



ESTROGEN

- Interacts with serotonin, GABA, and temperature regulation, which can affect sleep
- Estrogen shifts may affect hot flashes, awakenings, and sleep.



PROGESTERONE

- Progesterone metabolites can interact with GABA-related calming pathways
- Hormone shifts before menstruation may worsen sleep for some people



TESTOSTERONE

- Testosterone and sleep influence each other; poor sleep can lower testosterone, and low testosterone may be linked with fatigue or poorer sleep quality



OREXIN (HYPOCRETIN)

- Keeps you awake and prevents sudden sleep
- Low orexin is strongly linked with narcolepsy type 1
- Higher orexin activity may contribute to wakefulness or insomnia-like symptoms



TAKEAWAY

- Neurotransmitters are chemical messengers that help guide sleep-wake transitions.
- Hormones help shape sleep timing, depth, and stability across the night.
- When both are in balance, sleep feels restorative and refreshing.
- Changes in either system may contribute to insomnia, restless nights, or daytime fatigue.



Sleep is the result of a team effort between brain chemistry and hormones. If sleep feels unrefreshing, talk with your provider about whether one or both of these systems may be part of the picture.