



PILLAR 03

SLEEP

"A WELL RESTED BRAIN IS A HEALTHY BRAIN"

Chronic inadequate sleep puts people at higher risk for neurodegenerative disorders, dementia, depression, mood disorders, heart disease, high blood pressure, weight gain, obesity and even cancer. While a day or two of staying awake late into the night, or a couple of days after traveling through a few time zones may be uncomfortable, repeatedly disrupting the circadian clock has adverse health consequences on every system in the body. Going to sleep late is not a badge of honour, and you cannot play with your body clock. Sleep is so important that it must be prioritized.

Circadian rhythms are 24-hour cycles that are part of the body's internal clock, running in the background timing in essential functions and processes. One of the most important and well-known circadian rhythms is the sleep-wake cycle. Even before we wake up in the morning, the internal clock prepares the body for waking up. It begins to shut down the production of the sleep hormone melatonin from the pineal gland. Breathing becomes slightly faster, and the heartbeat picks up a few beats per minute as the blood pressure rises slightly. The core body temperature notches up half a degree even before we open our eyes.

Our entire sense of health is guided by our daily rhythms. Shortly after opening our eyes, the adrenal glands produce more cortisol to get the day started. Being in good health means waking up feeling rested and refreshed from having a good night's sleep, having a healthy bowel movement to eliminate toxins collected at night, and feeling alert, light, and hungry for breakfast.

After a good night's sleep and a nourishing breakfast, the brain is primed for the day. As the day goes by, cortisol continues to rise until it peaks. When evening rolls in, body temperature begins to drop as does cortisol, the production of the sleep hormone melatonin begins to rise and the body prepares for sleep. In the evening, ideally one starts feeling tired and can fall asleep without much effort.

Sleep is not a default mode during which the brain shuts down. It is a critical phase during which the body replenishes itself in a variety of ways that ultimately affects every system, from the brain



to the heart, the immune system, and all the inner workings of our metabolism. It also consolidates memories based on the sensory information we took in during the day by backing up this information as it creates new synapses, or connections between different neurons. Additionally, the brain produces specific hormones at night.

The brain has a built-in detoxifying mechanism. The body clears waste and fluid from tissues through the lymphatic system. Lymph is the colourless fluid in specialized vessels that carries toxic waste and cellular debris. These compounds are filtered as they pass through lymph nodes. The lymph itself then goes into the bloodstream. Scientists long thought that the brain didn't have a lymphatic system and instead relied on waste slowly diffusing from brain tissue into the cerebrospinal fluid. We now know that the brain has its own drainage pathway called the glymphatic system. Sleep activates the glymphatic system, while shrinking brain cells by 60%. This creates more space in between cells, leaving room for the cerebrospinal fluid to circulate and flush out the toxins that have built up during the day.

The quality and amount of sleep you get has an astonishing impact on you. Sleep is like a reset button and is a necessary phase of regeneration. Billions of molecular tasks go on during sleep at the cellular level to ensure you can live another day. Sufficient sleep keeps you sharp, creative, attentive, and able to process information quickly. Sleep habits ultimately rule everything about you- how big your appetite is, how fast your metabolism runs, how strong your immune system is, how insightful you can be, how well you cope with stress and how well you can consolidate experiences in your brain and remember things.

Just one night of sleep deprivation can spike levels of inflammation. Sleep deprivation disrupts the circadian rhythm, affecting both the body's metabolism and levels of hormones, which helps the body to sleep. This disruption in metabolism and important sleep related hormones exacerbates the sleep disturbances, and the cycle continues. Unless this cycle is broken, the damage worsens.

The problem is that most people don't get enough quality sleep. The glymphatic system doesn't come alive the moment you close your eyes, it activates when you hit the point of your sleep cycle known as REM sleep. There are four stages of sleep with REM being the deepest of the cycles. These stages are repeated throughout the night. The first three stages are known as non-REM stages, and typically last up to 15 minutes each. The first REM stage usually happens an hour and a half after you fall asleep and lasts around 10 minutes. Then you go back through stages 2,



3, and 4, with each REM stage getting longer as the night goes on. The longer you can be in REM sleep, the better for your brain. Trouble falling asleep or frequent waking during the night means not enough time REM sleep, and as a result, toxins build up in the brain. As we know, inflammation leads to neuroinflammation, which is a causal factor for neurodegenerative diseases.

Additionally, your circadian rhythm revolves around your sleep habits. We are largely disconnected from the natural light and dark cycles. Specialized cells in the eye retina communicate with the brain depending on what they pick up. They respond to blue lights from your cell phone, computer or street lights or light coming from a clear blue sky by telling your body to make the hormone cortisol that wakes you up. When we see blue light in the evening and night time, instead of the brain starting to induce drowsiness and prepare the body for sleep, it will still be making cortisol. Hence the circadian rhythm becomes dysregulated.

CAUSES OF POOR SLEEP & HOW TO ADDRESS THEM

1. Poor sleep schedule: Because the circadian rhythm is so important, staying consistent about your sleep and wake schedule is critical. This way your hormones will follow a similar pattern each day.

ACTION STEPS:

- Try to go to bed within the same hour every night and preferably before 10:00pm.
- Avoid hitting the snooze button and get up at the same time every day.

2. Bad nutrition and blood sugar imbalance: Blood sugar imbalances can disrupt sleep tremendously. When blood sugar becomes too low, the body produces cortisol in order to bring it back up, potentially stimulating the body to wake up.

ACTION STEPS:

- Don't eat food high in sugar or high on the glycemic index (foods that turn into sugar in the body at a fast rate such as breads, pasta, refined flour or snack foods) before bed to avoid this spike which will be followed by a crash causing a cortisol surge.

3. Nutrient deficiencies: If your diet is lacking in certain nutrients, this can contribute to bad sleep. Certain nutrients act as cofactors in biochemical processes that create relaxing chemicals like GABA, serotonin and melatonin. The body relies on nutrients such as



magnesium, B vitamins, Vitamin D, Zinc, Omega3 and amino acids to create these relaxing chemical messengers. If deficient, the relaxing chemicals are underproduced.

ACTION STEPS:

- Be sure to eat a balanced, whole foods diet high in these nutrients.
- Test to see if you are deficient in these nutrients and supplement if necessary.

4. LED lights: Blue lights from devices are detrimental to sleep. Blue light disrupts melatonin levels because the brain confuses the phone's artificial light with daylight. This reduces melatonin production.

ACTION STEPS:

- Turn off electronics at least 2 hours before bedtime, and charge your phone outside your room so that notifications don't wake you up. Another great option is to purchase blue light-blocking glasses and wear them 2-4 hours before going to sleep.

5. Stress: Stress is natural. Too much of it, however, negatively impacts all aspects of health. Stress can make it difficult to fall asleep, whether it be by way of anxious thoughts keeping you up, a faster heart rate or rapidly fluctuating blood sugar levels.

ACTION STEPS:

- Find an effective way to relax. Take time to unwind and destress in order to lower your heart rate. Reading, taking a bath, and journaling are great ways to calm your mind and prepare your body for bed.

STRATEGIES TO IMPROVE SLEEP

The following strategies are things you can start implementing right away to ensure you are getting the sleep you need.

1. Get some sunlight: Sunlight is an important signal for the circadian rhythm. When sunlight hits our eyes in the morning, the brain signals the adrenal glands to secrete cortisol. This release gives the body its initial burst of energy for the day. Morning light is just as important as going to sleep on time for proper rhythms.



ACTION STEPS:

- First thing in the morning, get outside and let sunshine in your eyes for 5-15 minutes.
- Let the sunlight in without glasses or contact lenses. Be cautious not to look directly into the sun, though.
- Do not look at your phone before seeing the sun.

2. Get moving: Early morning moving also sends signals to the brain that it is morning and helps set the circadian clock. Regular physical activity also promotes good sleep, enabling you to achieve and maintain ideal weight, which in turn also helps with good sleep.

ACTION STEPS:

- Take a quick 5-15 minute morning walk.

3. Understand caffeine: caffeine doesn't actually give you energy. It blocks the activity of a chemical in the brain called adenosine. Adenosine is a chemical whose job it is to tell us when we are tired. Caffeine closely resembles adenosine. As a result, it can bind to adenosine receptors and prevent adenosine from telling us we are tired. This in turn provides us with a perceived boost in energy. While caffeine may have its benefits, make sure it isn't causing bad sleep.

ACTION STEPS:

- Avoid caffeine past 2:00.

4. Stick to a schedule: Irregular sleep patterns are detrimental to your health. Get up at the same time every day and go to sleep at the same time every night, including weekends, to set your circadian clock. Your brain also makes associations between routines. When doing similar routines every night, the brain associates it with sleep.

ACTION STEPS:

- Go to sleep at the same time every night and wake up at the same time every morning.
- Create a night routine to enable your body to wind down and mentally prepare for sleep. Start around 30 minutes before sleep time.
- Don't hit the snooze button. It only makes you drowsier because once your body wakes up in the morning your body begins the hormonal cascade designed to wake you up.



5. Watch what you eat: Eating close to bedtime causes disturbances to the circadian rhythm signaling daytime vs. sleep time. Additionally, sugar consumption close to bedtime causes spikes in blood sugar levels. Both of these reasons influence your sleep dramatically.

ACTION STEPS:

- Don't eat 3 hours before bedtime.

6. Eliminate electronics: Nearly all light, whether natural sunlight in origin or artificial light from lightbulbs, computers, smartphones- all contain blue light. Blue light suppresses melatonin production which you need for sleep. Electronics are also a distraction and can cause bad habits such as checking texts and social media before bed.

ACTION STEPS:

- Avoid all blue light a few hours before sleep for optimum melatonin production.

7. Calm your mind: Many people can't stop their racing mind and therefore can't relax to fall asleep.

ACTION STEPS:

- Pray or write down/journal about anything that is troubling you and decide to put your thoughts aside for the night. This will result in better sleep, and chances are that will help you come to clearer resolutions in the morning.
- Practice gratitude by writing down 3 things you are grateful for before going to sleep.

8. Blackout your room: Make your room as dark as possible. Even the smallest amount of light is perceived by the brain and sets off cortisol production.

ACTION STEPS:

- Use blackout curtains plus take extra care to eliminate all sources of light.
- Consider a sleep eye mask.
- Don't look at your watch/clock/phone if you wake in the middle of the night.

9. Keep room cool: The ideal temperature for sleeping is between 60-67 degrees fahrenheit. The body needs to drop its core temperature for optimal sleep.



ACTION STEPS:

- Lower room temperature at night.

SUPPLEMENTAL SUPPORT FOR SLEEP

Although reliance on supplements for sleep isn't ideal, there are some supplements that can improve a number of physiological pathways in the body and regulate sleep more effectively.

- Magnesium
- L-Theanine
- Melatonin
- GABA
- Camomile tea

For more targeted help by looking at root causes of sleep issues, reach out to us at NeuroGems.

Sleep supports the brain and is necessary to reset and regenerate the brain.