

Sleep, Everyone's Doing It. So Why Can't You?

We live in one of the most stimulating periods in the history of mankind. There are enough gadgets, gizmos, commercials, TV shows, video games, movies, concerts, and other forms of entertainment and recreation that no one could do them all even if you had multiple lifetimes to devote to them. Also, many people have many more demands on their time with work, paperwork, and family obligations, that it makes you often push the limits of what your body and mind are capable of without rest.

Almost every life form on earth needs a period of sleep in order to survive. We as humans are *driven* to sleep. It is an urge that we either resist or succumb to. We all know that we need it, but a question that has been asked for centuries is: Why?

There are several theories about why the body requires sleep. These are primarily based on the observations of what occurs when sleep is deprived. One theory is that sleep is required because the body needs to recuperate from the stresses of the environment that occur during the awake hours, particularly in the nervous system and the immune system. Another is that long term memory storage and development, as well as learning are dependent upon adequate sleep in order to fully form and organize in the brain. William Dement, founder of the Stanford University Sleep Research Center was asked what he knew about the reason people need sleep

after 50 years of research. His answer was, "As far as I know, the only reason we need to sleep that is really, really solid is because we get sleepy." This then begs the question, why do we get sleepy?

Our bodies operate on several rhythms, heartbeat, lung breath, and other internal rhythms. While these rhythms do vary slightly from person to person, the mechanisms that create the rhythms are the same. It all starts with the sun. The sun creates a 24-hour cycle on the earth and in the body, likewise, has its own 24-hour rhythm that is based on the perception of light. The eyes perceive the light of the sun and send this sensory information to the brain along the optic nerve. At a junction along the optic nerve is a tiny region of the brain in the hypothalamus called the *Suprachiasmatic nucleus* or SCN for short. The SCN is essentially the body's master clock. Similar to all the workers in one factory working by one giant clock on the far wall, so too does the body base all of its 24-hour cycles on this one clock. Sleep/wake, body temperature, and certain hormone levels are all regulated by the SCN. These body functions that are tied to this master clock are known as *circadian rhythms*.

Obviously, the circadian rhythm we can most easily observe is our sleep. Sleeping, though, is not as straightforward as it sounds. Anyone who's ever had a poor night's sleep can attest to that. Variances in sleep length and sleep quality are caused by several factors. The most important elements come from the environment one is trying to sleep in.

Ensuring that these environmental factors are in place is modernly called "sleep hygiene". Sleep hygiene is essentially creating an ideal sleeping environment that will rule out any external cause of poor sleep. The first factor is light. Common sense dictates that it is easier to fall asleep in the dark than with the lights on, but what is critical to optimum sleep is that the room is dark *enough*. Clock displays, screensavers, nightlights, un-shaded windows are all sources of light that can create a sleeping area that is too bright for sleeping. A study conducted on women found that women who slept in bedrooms that were too bright had a significantly increased risk of developing breast cancer. Making sure your bedroom is dark enough is very important.

Noise is the next most obvious consideration. The quiet environment of night often makes small noises seem much louder. Comfort of the bed, sleeping position, refraining from conducting activities in the bed other than sleep and sex help to condition the body into treating the bed as a sleeping environment rather than an activity environment. Also, abstaining from exercise, and eating, within two hours of sleep are also beneficial. Also, abstain from consuming caffeine or alcohol six hours before sleep.

Two common terms used in the study of the sleeping process are sleep *cycles* and sleep *stages*. Sleep stages are varying levels of sleep that range from nearly awake to very deep.

REM stands for Rapid Eye Movement, and it is a manifestation

of the level just below awake where the all of the muscles of the body disengage except for those that control basal metabolism and the eyes. Dreams are most vivid in this state.

The next three stages below are classified as Non-REM sleep, or N1, N2, and N3. N1 is the beginning of actual sleep and is evidenced by slow eye movement and specific brain wave activity. Some people jerk awake from this stage believing that they were fully awake. N2 is the stage in which 45-50% of our sleep occurs in. Muscles are not paralyzed as in REM sleep and dreaming is quite rare. N3, which used to be N3 and 4, was previously labeled the transition state between medium and deep sleep. This is also known as *slow wave sleep* or SWS, and is also where most parasomnial conditions like teeth-grinding, sleep walking, sleep terrors, and restless leg syndrome occur. Obviously, the muscles are no longer paralyzed and dreams are more common, but are often less vivid and forgotten upon awakening.

Sleeping also occurs in cycles where one goes through all of the stages of sleep several times throughout the night. 7-8 cycles in the approximate average. Quality sleep is usually determined by the smoothness through which the body transitions through these stages. In order for the body to do so, certain hormones and neurotransmitters must be available and properly regulated. The two most important to the sleep cycle are melatonin (vitamin B1) and serotonin.

Melatonin has been shown in numerous studies to reduce the amount of time it takes for someone to enter REM sleep, especially in people who have primary sleep disorders. This time is called sleep onset latency. Melatonin is produced in the pineal gland in the brain, which begins producing it after the SCN sends the activation signal when it gets dark. Taking supplemental melatonin within one hour of going to bed helps reduce sleep onset latency especially when the environment is dark enough. If the bedroom or sleeping area is not dark enough, the effects of the melatonin will not be as effective.

Serotonin is a neurotransmitter that is produced in the brain and is critical in the smooth transition from REM sleep and the subsequent stages to N3. Serotonin, as well as melatonin, is a derivative of tryptophan. Tryptophan is one of the 20 standard amino acids and is essential in the human diet. Tryptophan has been available for years as a sleep aid and numerous studies over the past decade or more have shown it be effective, especially in people who have sleeping difficulties.

It is important to note that there are two different types of tryptophan available in supplement form. One is standard L-tryptophan, and the other is 5-HTP. 5-HTP is tryptophan that has already been attached to another molecule that makes it able to cross the blood brain barrier, which standard L-tryptophan cannot. While some might advertise that because 5-HTP can reach the brain more easily, and thus become serotonin and effect sleep quality, empirical results have not found this

to be the case. Strangely, some individuals report reduced effectiveness of 5-HTP for sleep as compared to L-tryptophan.

There is also a misconception that turkey is much higher in tryptophan than other dietary sources and is the reason for Thanksgiving meal drowsiness. Turkey actually has the same amount of tryptophan in its meat as other poultry, and the drowsiness is more likely from over-eating than from the turkey itself.

The benefits of proper sleep hygiene, which includes low light, proper diet, and bed comfort, as well as supplementing with melatonin and tryptophan as necessary, can greatly improve the length and quality of a night's sleep. It is important to keep in mind, though, that each person's situation and body are unique, and it is important to consult with a qualified healthcare professional before making any significant changes to one's lifestyle or supplement regimen.

No matter what the true purpose, or purposes, of sleep actually are, all that truly matters is that we are able to wake up feeling properly rested with enough energy to make it all the way through the day. The physical, as well as emotional, benefits of a good night's sleep are not to be underestimated.



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