



# HEALTH BENEFITS OF SLEEP

Sleep doesn't just feel good, it's a life-saving, necessary human function. Our bodies don't operate normally when we're sleep deprived. Research shows just one night of NO SLEEP can impair movement, focus and destroy your mood. The longer you go without sleep, the bigger the toll it takes on your health. 95% of Americans have insomnia at some point during their lives. Chronic insomnia occurs in 25% of the adult population and occurs in 50% of the elderly population. It's never been more important to understand SLEEP then now!

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## How often do you get a great night's sleep?

We're curious, if you used a scale from 1-5 where "1" is never and "5" is always, How often would you say you get a great night's sleep? Go ahead and pick a number out loud. Consistent with your responses, most people are not getting the quality of sleep they need to live the life they want.

1. Never
2. Rarely
3. Sometimes
4. Often
5. Always

The statistics are dismal. 50-70 million U.S. adults have sleep or wakefulness disorders. 1/3 of Americans get fewer than 7 hours of sleep per night. 12-18 million U.S. adults have sleep apnea and 70% of high school student are not getting enough sleep on school nights.

Insomnia is more prevalent in women and 1/3 of adults are sleeping during daylight hours daily.

If you haven't been sleeping well there goes all goals related to your health and well-being. I'm sure you're not surprised that sleep impacts everything.



# SAD FACT: Most People Get Poor Sleep!



## Poor Sleep Negatively Impacts:

Turns out, not sleeping affects your life a lot:

**Your health.** Sleeping an average of less than **6 hours** per night raises lifetime **heart attack** risk by



**50%**

LACK OF SLEEP MAY BE KILLING YOU

- Hormones
- Performance
- Brain Function
- Focus
- Weight
- Health

# WHAT HAPPENS WHEN YOU DON'T SLEEP?

## AFTER A WHILE YOUR...

- Risk of death goes up
- Sperm count decreases
- Heart disease risk increases
- Diabetes risk goes up
- Risk of some cancers may increase
- Obesity risk jumps
- Stroke risk quadruples

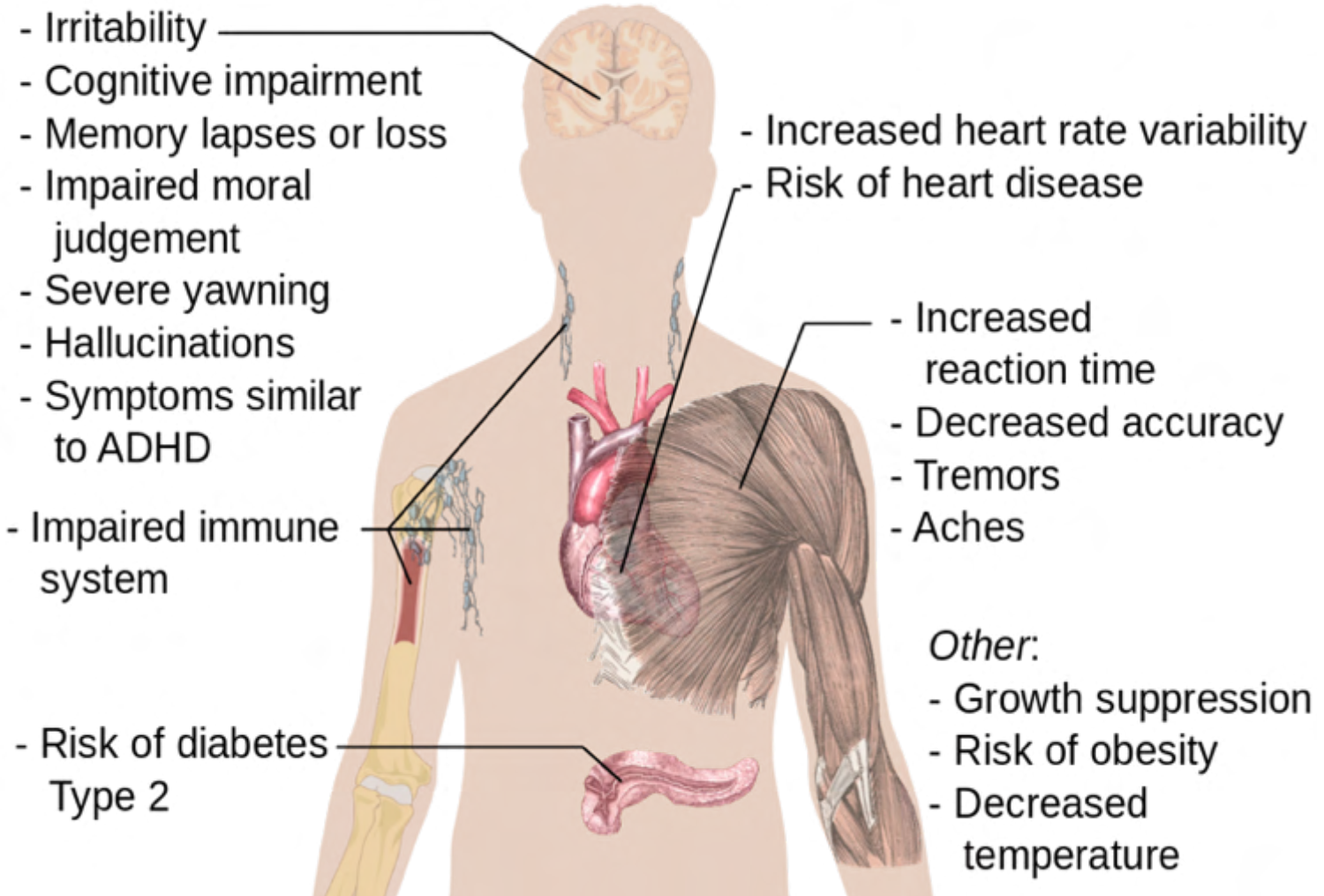
## Lose Sleep, Lose Your Mind And Health



# EFFECTS OF SLEEP DEPRIVATION



## Effects of Sleep deprivation



# SLEEP DEPRIVATION & ALZHEIMER'S



**THE CLEAN CYCLE** Lack of sleep may contribute to Alzheimer's disease by robbing the brain of the time it needs to wash away sticky proteins.

## SCIENCENEWS.ORG

### Sleep Deprivation May Speed Up Development Of Alzheimer's Disease

Neuroscientist Barbara Bendlin studies the brain as Alzheimer's disease develops. When she goes home, she tries to leave her work in the lab. But one recent research project has crossed into her personal life: She now takes sleep much more seriously.

Bendlin works at the University of Wisconsin–Madison, home to the Wisconsin Registry for Alzheimer's Prevention, a study of more than 1,500 people who were ages 40 to 65 when they signed up. Members of the registry did not have symptoms of dementia when they volunteered, but more than 70% had a family history of Alzheimer's disease.

Since 2001, participants have been tested regularly for memory loss and other signs of the disease, such as the presence of amyloid-beta, a protein fragment that can clump into sticky plaques in the brain.

Those plaques are a hallmark of Alzheimer's, the most common form of dementia.

Each person also fills out lengthy questionnaires about their lives in the hopes that one day the information will offer clues to the disease. Among the inquiries: How tired are you?

Some answers to the sleep questions have been eye-opening. Bendlin and her colleagues identified 98 people from the registry who recorded their sleep quality and had brain scans. Those who slept badly — measured by such things as being tired during the day - tended to have more A-beta plaques visible on brain imaging, the researchers reported in 2015 in *Neurobiology of Aging*.

# SLEEP DEPRIVATION & ALZHEIMER'S

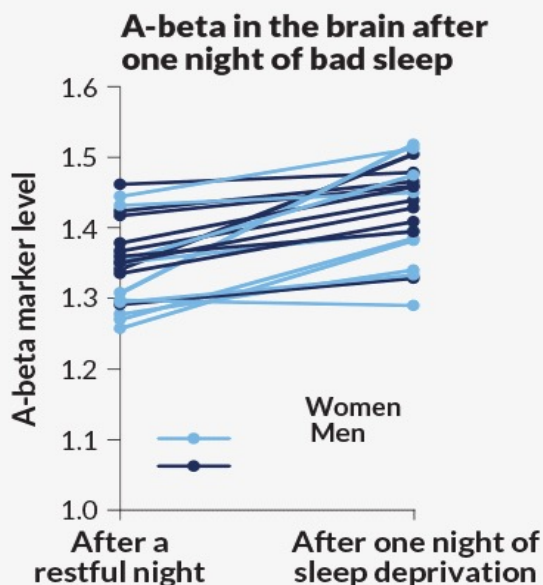
In a different subgroup of 101 people willing to have a spinal tap, poor sleep was associated with biological markers of Alzheimer's in the spinal fluid, Bendlin's team reported last year in *Neurology*. The markers included some related to A-beta plaques, as well as inflammation and the protein tau, which appears in higher levels in the brains of people with Alzheimer's.

Bendlin's studies are part of a modest but growing body of research suggesting that a sleep-deprived brain might be more vulnerable to Alzheimer's disease.

He thinks Alzheimer's disease is a kind of garbage collection problem. As nerve cells, or neurons, take care of business, they tend to leave their trash lying around. They throw away A-beta, which is a leftover remnant of a larger protein that is thought to form connections between neurons in the developing brain, but whose role in adults is still being studied. The body usually clears away A-beta.

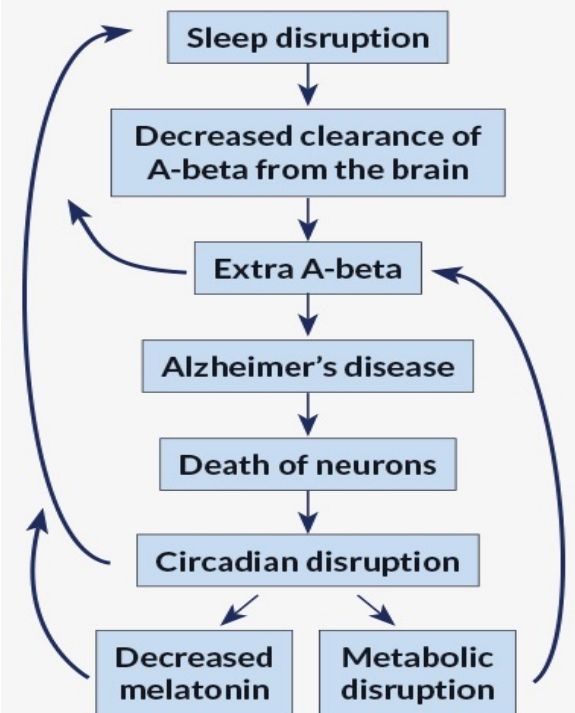
## One bad night

Using PET scans to measure amyloid-beta markers, researchers compared levels of A-beta in the brains of 20 healthy volunteers after one restful night and after one night of sleep deprivation. Levels of the plaque-forming A-beta rose in most people tested.



## Losing sleep

Alzheimer's disease disrupts sleep. And disrupted sleep itself might encourage Alzheimer's by allowing buildup of amyloid-beta, or A-beta, which is thought to lead to the death of neurons. This cycle of sleep deprivation can also affect levels of the hormone melatonin, which helps the body to sleep, and can interfere with metabolism, a disruption that is also a risk factor for Alzheimer's.



Source: Y. Saeed and S.M. Abbott/Current Neurology and Neuroscience Reports 2017

But sometimes, especially when cheated on sleep, the brain doesn't get the chance to mop up all the A-beta that the neurons produce, according to a developing consensus. A-beta starts to collect in the small seams between cells of the brain, like litter in the gutter.

If A-beta piles up too much, it can accumulate into plaques that are thought to eventually lead to other problems such as inflammation and the buildup of tau, which appears to destroy neurons and lead to Alzheimer's disease.

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# NIGHT SHIFT & SLEEP DEPRIVATION



## Night Shift and Sleep Deprivation

### Shift Work Disorder

- Shift work disorder is the term coined to describe people for whom shift work has caused a constellation of symptoms. Among these are excessive sleepiness when you need to be awake and the counterpoint, insomnia.
- People who have shift work disorder report that even when they do sleep, they don't wake refreshed. They may have difficulty concentrating, low energy, irritability or depression. These symptoms interfere with relationships, work and family life.

### Sleep Deprivation and Health

- Most healthy adults need about seven or eight hours of sleep in a 24-hour period. Chronic sleep deprivation has been implicated in several health problems. Among these are heart attacks, high blood pressure and abnormal heart rhythms.
- Obesity has also been linked to sleep deprivation, as have gastrointestinal disorders and even some types of cancer. Then there's the risk of an accident while driving, or of making a serious error in a patient-care setting.

### Who is at Risk

- More than 20% of the U.S. workforce is involved in shift work
- Nearly 30% of the full time employed nurses participate in shift work. (Barger L.K., et al.: Impact of extended-duration shifts on medical errors, adverse events, and attentional failures. PLoSMed3:e487, 2006)





# WHY YOUR BODY LOVES SLEEP?

## STAGE 1:

- Muscles relax, may twitch
- Slow eye movements

## STAGE 2:

- Breathing, heart rate regular
- Body temp drops
- Lose sense of place
- Slower brain waves
- Eye movement stops

## STAGE 3:

- Blood pressure drops
- Muscles relax
- Tissue grows & repairs
- Energy is restored
- Hormones are released
- Even slower brain waves

## STAGE 4:

- Brain is active dreaming
- Eyes dart rapidly
- Muscles are paralyzed
- Irregular breathing & heart rate

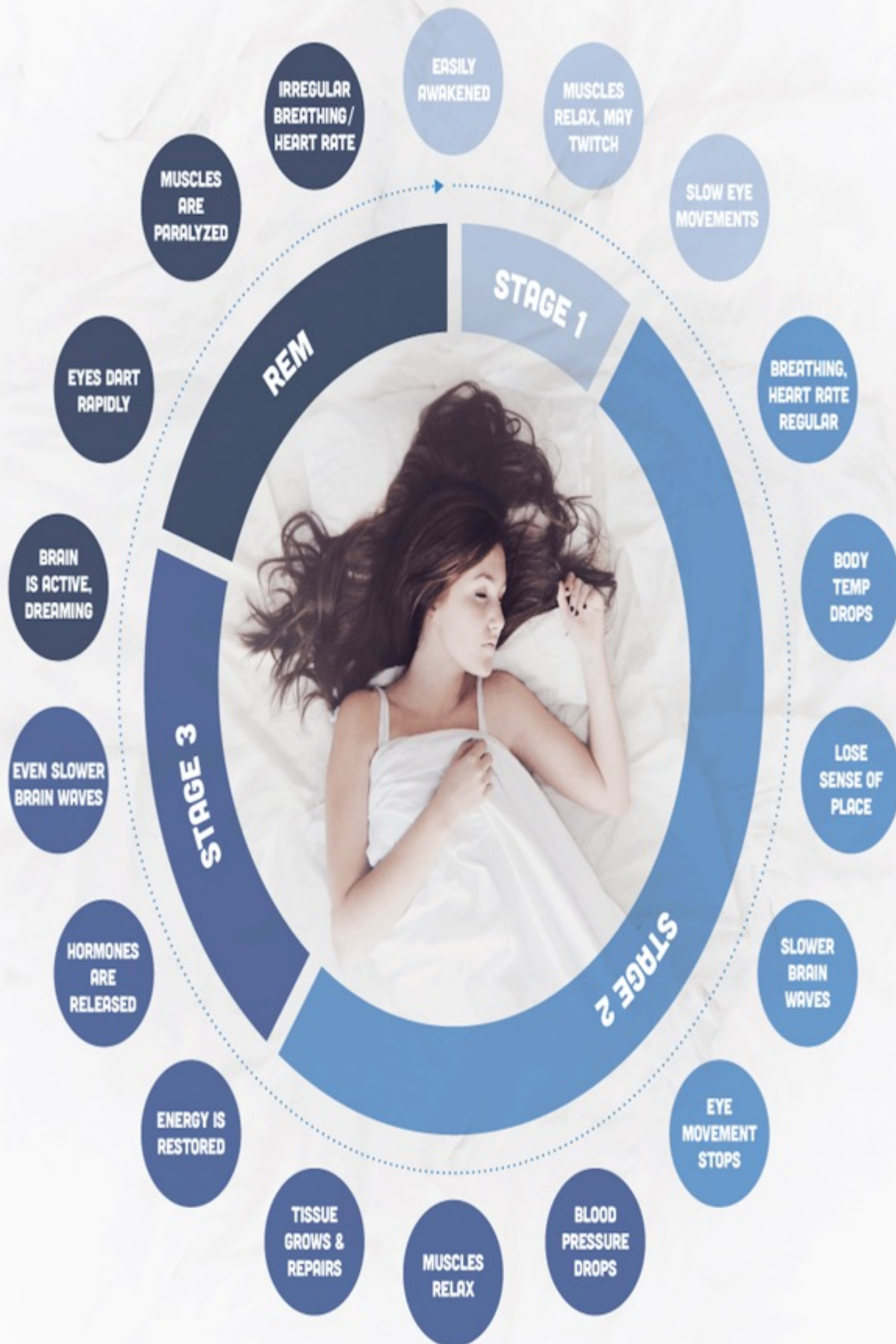
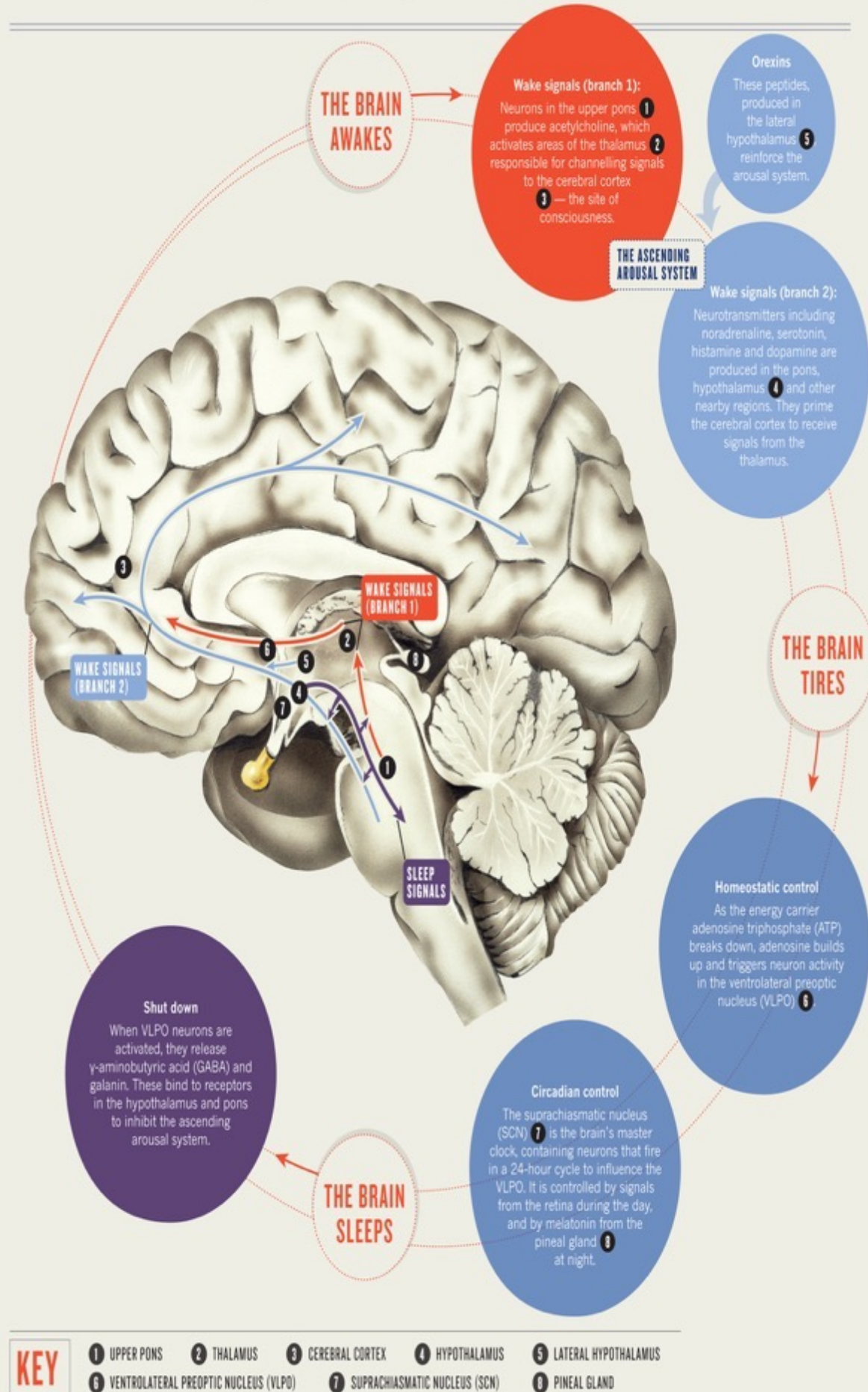


Photo: Getty

Sources: National Sleep Foundation; U.S. Department of Health and Human Services; University of Rochester Medical Center; National Center on Sleep Disorders Research; Philip Gehrman, Ph.D., assistant professor of psychiatry, University of Pennsylvania

# THE ANATOMY OF SLEEP

- The ebb and flow of neurotransmitters switches our brains between sleep and wakefulness in carefully regulated cycles.
- The phases of sleep: In a typical 8hr sleep, the brain moves through different stages of electrical activity in repeating cycles that last about 90 min.
- Rapid Eye Movement (REM) sleep is linked to distinctive electrical activity in the brain and is often associated with dreaming and “restorative” healing sleep.



# THE ANATOMY OF SLEEP

Awake Slow wave sleep REM

Newborn



High level of REM sleep may help brain development

Child



Children spend more time in slow-wave sleep than adults, and the intensity of this electrical activity is linked to how well they learn

Teenager



Lack of slow-wave sleep can hamper learning ability

Adult



Slow-wave sleep declines as the ageing brain loses grey matter from the medial prefrontal cortex, with adults less able to lay down new memories

NEWBORN

CHILD

TEENAGER

ADULT

# THE 5 STAGES OF SLEEP

A GUIDE TO

## Stages of Sleep

5 STAGES OF HEALTHY SLEEP, SLEEP PATTERNS, & SLEEP CYCLE

NREM  
STAGE 1

1

Stage 1 is the "light sleep" phase which is 2-5% of the daily sleep. Easily interrupted, not fully asleep.

NREM  
STAGE 2

2

Stage 2 is a more intense "light sleep" phase which is 45-55% of daily sleep. Slow brain waves, eye movement stops.

NREM  
STAGE 3

3

Stage 3 begins the "deep sleep" phase at 3-8% of sleep. Very slow brain waves, difficult to interrupt.

NREM  
STAGE 4

4

Stage 4 is a more intense "deep sleep" phase which is 10-15% of daily sleep. Brain only produces delta waves.

REM  
SLEEP

5

REM sleep, or "restful sleep" stage. Rapid Eye Movement (REM), brain activity increases.



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## What is REM sleep and how is it helpful?

**REM or Rapid Eye Movement** is a deep sleep, where your body gets some of the most restful sleep. This is the stage where you dream, have more brain activity and move around less. Although your brain is active, it's very relaxing and restorative sleep.

It takes time to reach the **REM** stage, so if your sleep is often interrupted during the night, you could be missing out on some important **REM** sleep. Throughout the night, you cycle through several sleep stages.

Stages one and two are light sleep, stages three and four are deeper, **REM** is deepest. During the night, you move back and forth between the sleep stages and each time you reach **REM** it lasts a little longer.



# THE 5 STAGES OF SLEEP

## WHILE YOU WERE SLEEPING

The Five Stages of Sleep

### STAGE 1

#### DROWSY

Transition between wakefulness and sleep.

Brain produces slow brain waves called theta waves.

Only lasts about 5-10 minutes.

If you awake during this stage, you might think that you weren't really asleep.

### STAGE 2

#### LIGHT SLEEP

Brain produces rhythmic brain waves called sleep spindles.

Body temperature decreases.

Heart rate slows.

Lasts about 20 minutes.

### STAGE 3

#### MODERATE SLEEP

Brain starts to produce deep, slower brain waves called delta waves.

Transitional period between a light sleep and deep sleep.

### STAGE 4

#### DEEP SLEEP

A very deep sleep

Delta waves continue

Lasts about 30 minutes

Bed wetting and sleepwalking occur during the end of this stage

### STAGE 5

#### REM SLEEP

Known as Rapid Eye Movement

Characterized by eye movements, increased respiration rate and brain activity.

Muscles become more relaxed while brain system is more active.

Dreaming occurs because of the increase in brain activity and temporary paralysis of voluntary muscles.



## Sleep Cycles Explained: The Five Stages Of Sleep

Have you ever wondered what happens when after we close our eyes and drift off to sleep?

While our bodies may appear to be inactive during this period, there's a lot going on behind the scenes. Sleep is not one homogeneous entity: It's actually comprised of **5 distinct stages** that repeat cyclically throughout the night. Understanding how sleep stages work can help you work towards getting the most out of your sleep; and can make planning the most refreshing nap a breeze.

### The Sleep Cycle

Your brain cycles through 5 different sleep stages throughout the night, with a full cycle taking 90-120 minutes to complete.

The first cycle progresses from Stage 1 all the way down to REM; then we cycle back out of deep sleep going from REM to Stage 1, then back down again. [1]

The duration and frequency of the different stages also changes over time. The REM component of each sleep cycle increases as the night goes on, so that REM effectively dominates the second half of the evening.



# THE 5 STAGES OF SLEEP



Meanwhile, slow-wave (Stages 3 and 4) sleep decreases as morning approaches. Additionally, we undergo 3 full cycles of non-REM sleep before finally settling into our first phase of REM approximately 1-3 hours after we first drift off. [2] Each stage is unique and plays a specific role in the sleep process.

## STAGE 1:

This is the transition period being waking and sleep. During this brief stage you actually drift in-and-out of sleep and can be easily aroused by external stimuli. You may maintain awareness of your external surroundings yet feel a sense of distance from them.

The brain starts to shift from the unsynchronized waves associated with waking, to slower, more predictable Alpha waves and finally into Theta waves. The body enters a state of relaxation: Breathing becomes more regular, and your heart rate begins to slow down.

However, the muscles are still quite active when compared to other sleep stages. It's common to experience the phenomenon known as hypnic jerk -- sudden muscle spasms which are often perceived as falling.

### Features:

- Drift in and out of wakefulness
- Easily awakened
- Muscles quite active
- Less than 10-minutes long
- 5% total sleep time



# THE 5 STAGES OF SLEEP

## STAGE 2:



This is the first stage of *unequivocal sleep*. Your conscious awareness begins to wane even further, and the muscles throughout the body

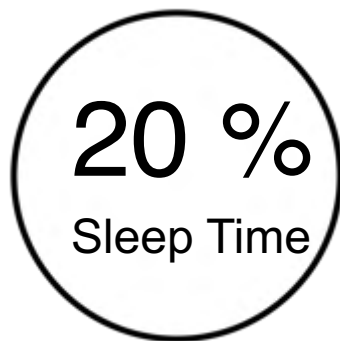
relax. Theta waves are more predominant, but are now interspersed with two unique wave phenomena: Sleep Spindles (a sudden increase in wave frequency) and K Complexes (a sudden increase in wave amplitude). These help enforce sleep by suppressing your response to the outside world.

45-50% of total sleep time.

### Features:

- First stage of sleep.
- Sudden bursts of brain activity.
- 45-50% total sleep time.

## STAGE 3 & 4:



Together stages 3 and 4 are known as Delta, deep or slow-wave sleep. It's extremely difficult to wake someone from deep sleep, and if you do wake from these stages you are likely to experience *sleep inertia*: characterized by brain fog and disorientation.

The stages get their name from the very slow Delta waves which predominate brain activity. You may still experience some sleep spindles, but much fewer and far between than in Stage 2 sleep.

Stage 4 is distinguished from Stage 3 by the amount of delta waves. Once these reach over 50% of brain activity you are in Stage 4 sleep.

Your heart rate, blood pressure and body temperature are all at their lowest during these stages. Your body begins to release certain hormones, there is more blood flow to the muscles, and tissue growth/repair takes place. [3]

# THE 5 STAGES OF SLEEP

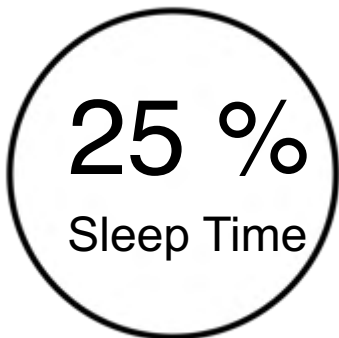
## STAGE 3 & 4:

Dreaming is more common during Stage 4 than other non-REM stages; but this does not compare to REM sleep. Delta Sleep is also when people experience parasomnias, such as sleep-walking, sleep-talking, and night-terrors.

### Features:

- Extremely slow brain waves begin (Delta waves)
- Still interspersed with faster waves (spindles)
- Most restorative sleep 15-20% total sleep time

## STAGE 5: REM



REM Sleep gets its name from its more iconic feature: Rapid, jerky eye movements. However, it's also known as *paradoxical sleep* due to the presence of brain waves similar to that of a waking state.

Your breathing becomes rapid and irregular, while blood pressure and heart rate increase to that of waking levels. Your core temperature is also not well regulated during this stage, and signs of sexual arousal are typical.

We experience the majority of our dreams during REM, and due to the unique brain activity, these are also our most vivid and memorable dreams. The voluntary muscles are effectively paralyzed, which is believed to be a mechanism to prevent you from acting out your dreams.

### Features:

- Eyes perform jerky, rapid movements
- 20-25% total sleep time
- Vivid dreams
- Voluntary muscles paralyzed
- >80% sleep in newborns

- 1) [https://web.mst.edu/~psyworld/sleep\\_stages.htm](https://web.mst.edu/~psyworld/sleep_stages.htm)
- 2) <https://www.uofmhealth.org/health-library/hw48331>
- 3) <https://sleepfoundation.org/how-sleep-works/what-happens-when-you-sleep>





Dream sweetly  
Sleep peacefully  
Wake happily

Nutra  
Relief 