

# Sleep-How to get it. How to Maintain it

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# Basic Physiology



## Basic Stages of Sleep NREM and REM



**NREM**-Function is to prune away the junk of the day, where memory is locked down, Glymphatic system flushing begins here by increasing CSF flow into the brain, neurotransmitter sensitivity is reset by resting



**REM** –Function is governed by our limbic system, where our basic instincts and emotions arise. Reinforces the connections needed for task and memory. Helps with spacial and emotional memory lock down, it's where the glymphatic system shrinks and flushes out the toxins, tau protein

# For Illustration A Typical Sleep Cycle

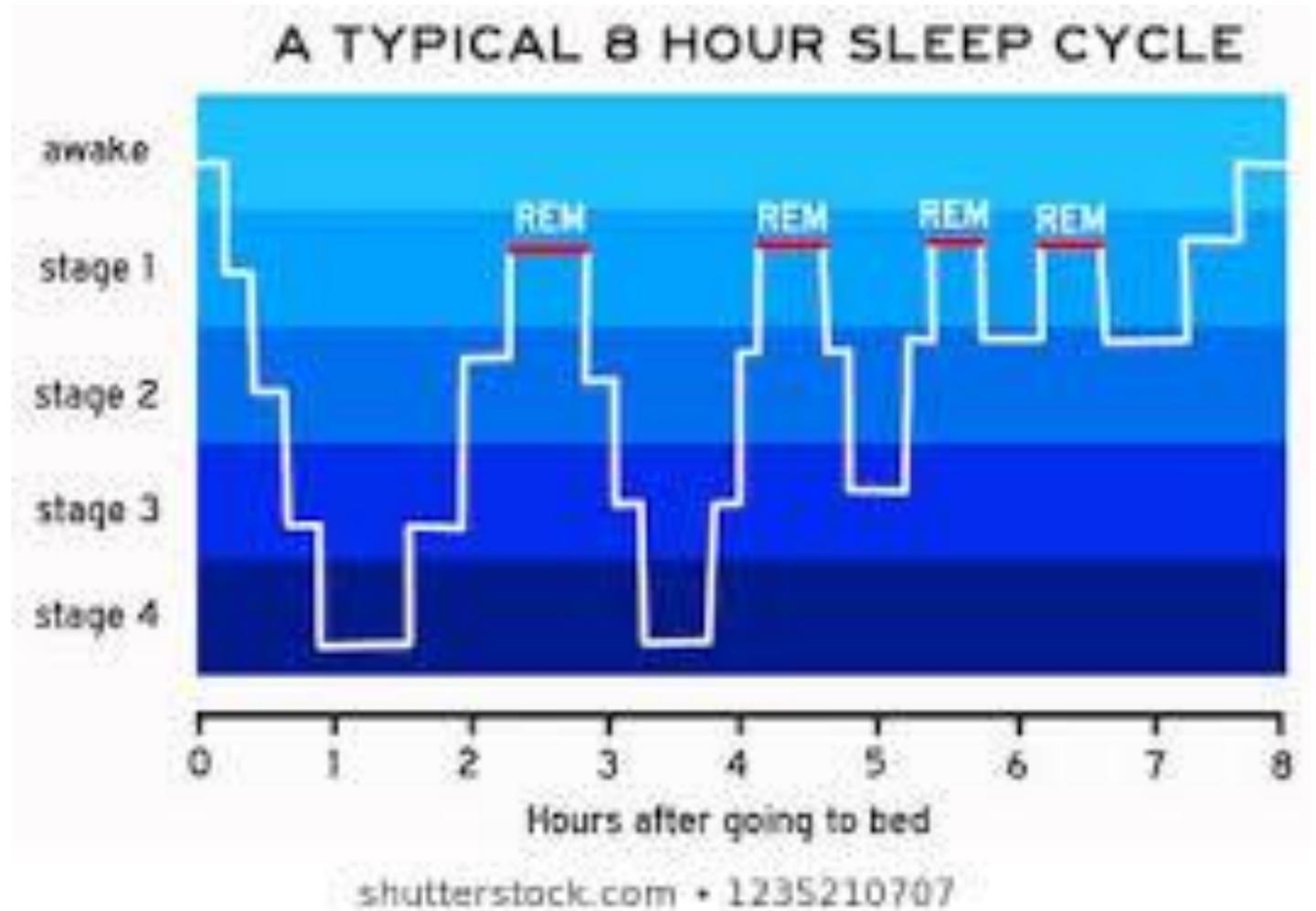
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Cycles of REM

Stages of NREM

Stages do vary in depth

Every stage has a vital role to play in brain health, memory, emotion regulation, etc.

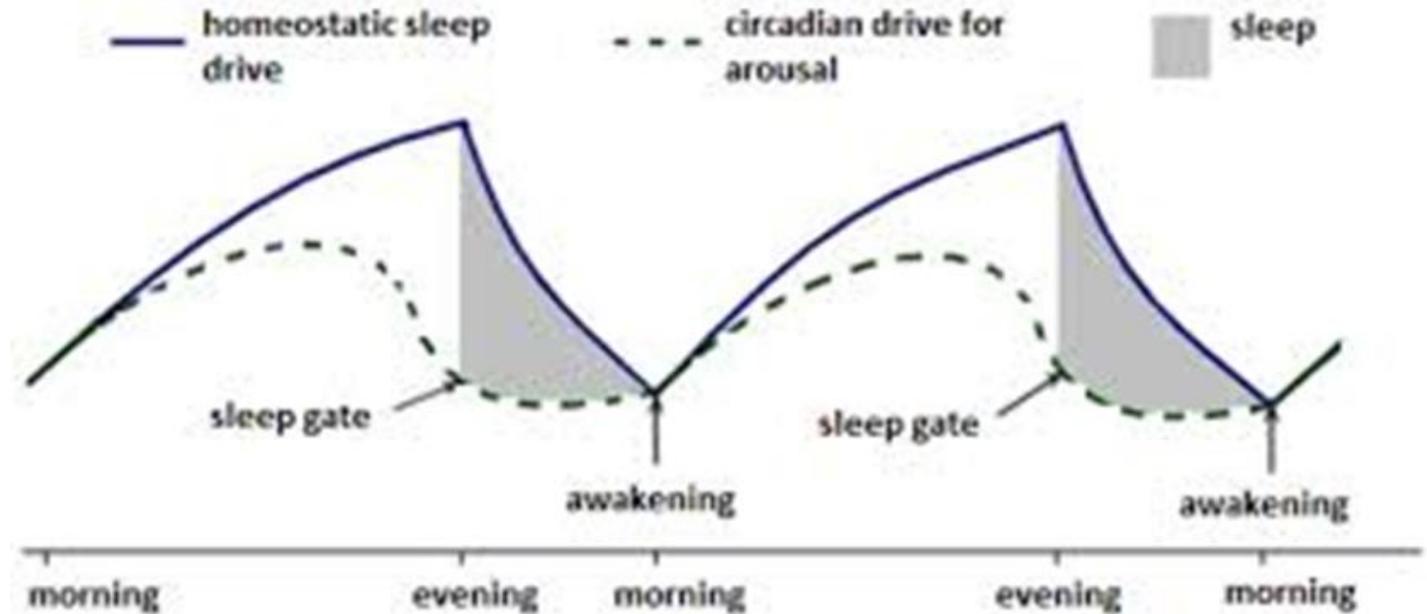


# Factors Relating to Sleep and Wakefulness

Normal sleep wake cycle

Circadian cycle

Sleep pattern based on evening rest daytime worker

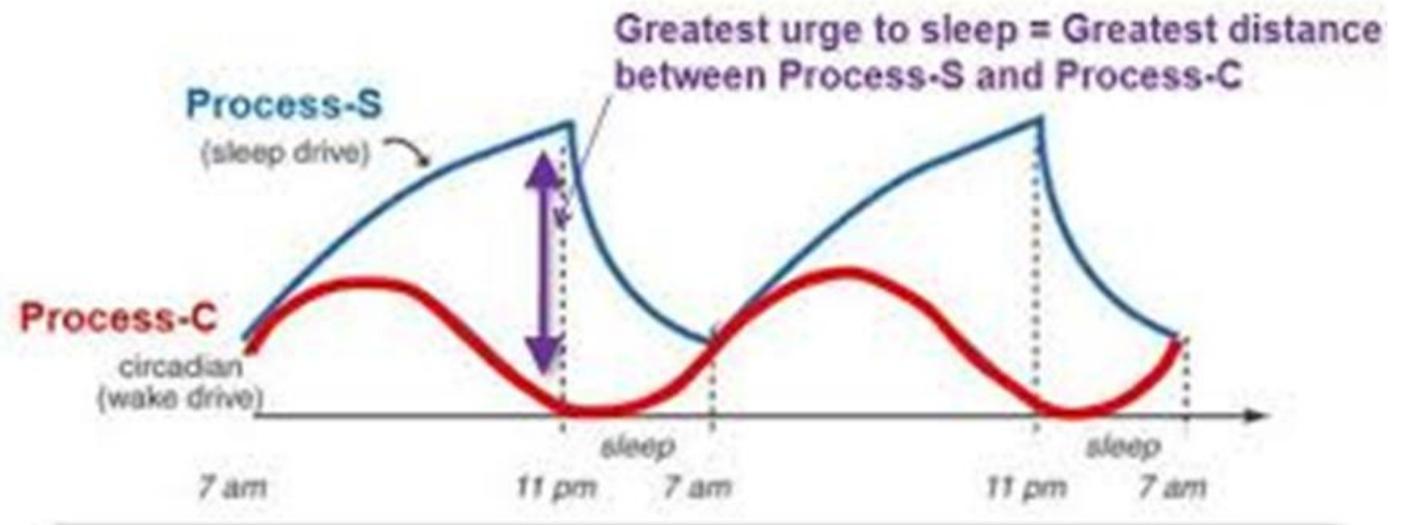


# Factors Relating to Sleep and Wakefulness

Process "S" is your sleep drive which is driven by the production of Adenosine

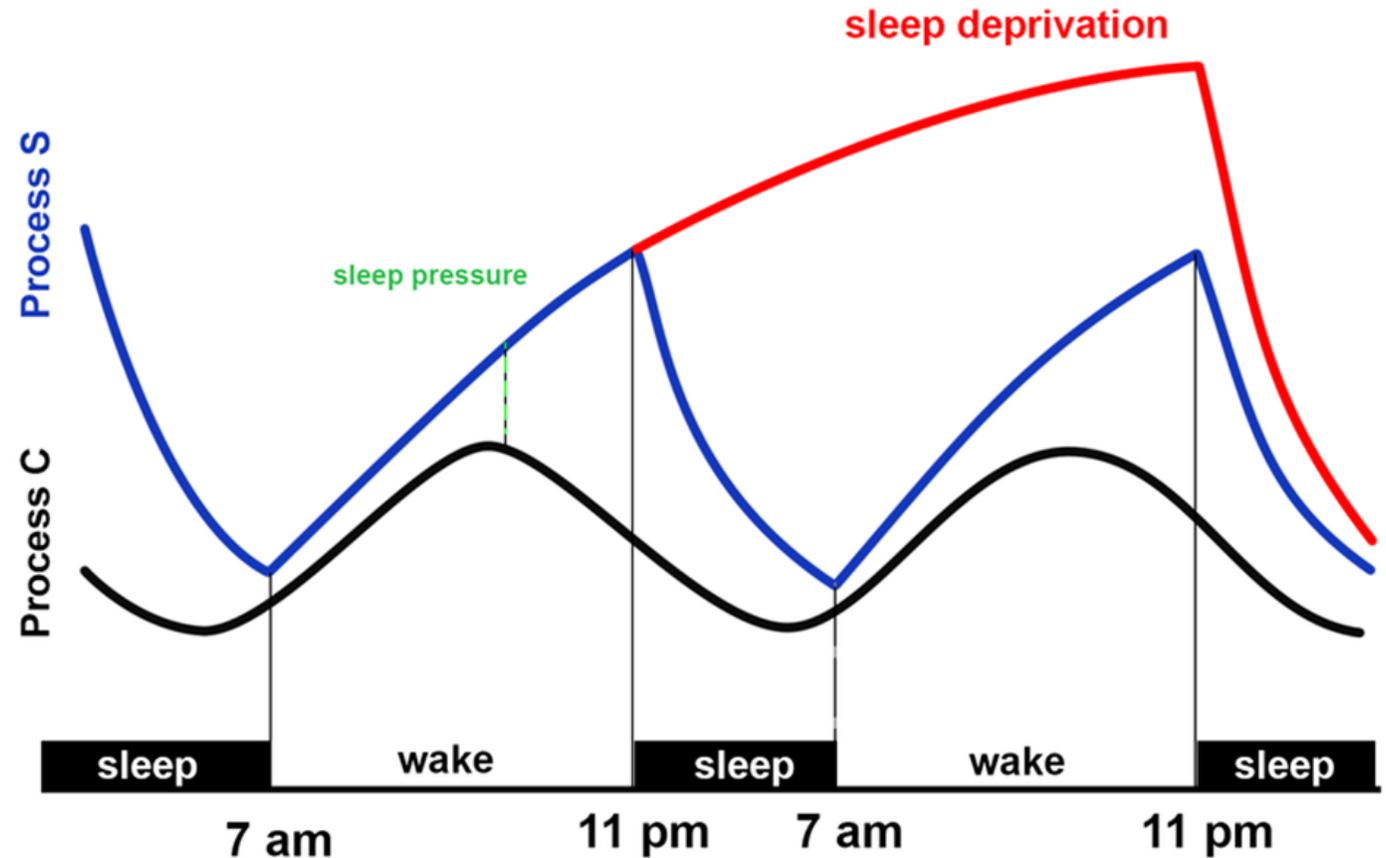
"Sleep pressure" is greatest when you are late in the day and your circadian rhythm is at the lowest

This is a key point in understanding the impact of caffeine late in the day and caffeine crashes in the afternoon



# Factors Relating to Sleep and Wakefulness

This is key in understanding the impact of sleep deprivation with the natural sleep cycle and sleep pressure. In addition, the loss of NREM/REM to organize memories and emotions it is easy to understand how the loss of sleep can lead to mistakes, emotional regulation issues and memory lapses.



# Sleep Hygiene-stick to a schedule/routine

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Sleep as much as you need to feel refreshed during the following day

**Get up at the same time each day, 7 days a week**

Exercise regularly-earlier in the day

Bedroom should be comfortable and free from light and noise- dark and gadget free

Bedroom is comfortable temperature during the night-cool room

Get adequate amount of sunlight -especially in the morning



# Sleep Hygiene-stick to a schedule/routine (con't)

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Cut down on all caffeine products

Avoid alcohol especially in the evening/before bed

Smoking can disturb sleep

Don't take your problems to bed

Do not try to fall asleep

Do not lie in bed awake and do not go to be during the day  
to escape

## Sleep Hygiene- stick to a schedule/routine (con't)



Eat regular meals and do not go to bed hungry and avoid large meal before bed



Avoid excess liquids in the evening



Avoid medications that can disrupt your sleep



Use a winddown routine before bed/relaxation process



Take a hot bath before bedtime



Turn the clock so you cannot see it



Avoid naps after 3 pm

# Screening Tools- free, online, easy to use

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Pittsburgh  
Sleep Quality  
Questionnaire

The Insomnia  
Severity Index

Epworth  
Sleepiness  
Scale

Treatment and  
Strategies  
Beyond  
Hygiene

# Sleep Diary- Key Elements

Sleep and awake times

Number of awakenings at night

Triggers associated with awakenings

Stressful events during the day

Timing and duration of exercise

Amount of alcohol and caffeine consumed and time of consumption

Pre-bedtime routines

Medications taken before going to sleep

Recording upon awakening

# Therapies/Training

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## Stimulus Control Therapy

Component of CBT-I

First line Treatment



## Sleep Restriction Therapy

Component of CBT-I

First line Treatment



## Second line interventions

**Phototherapy**

**Relaxation training**

- Progressive Muscle Relaxation
- Autogenic Training
- Breathing
- Imagery

**Medication**

# Stimulus Control Therapy

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Associate bed with sleepiness

*Regular morning rise time*

- *Strengthens circadian clock*

*Go to bed only when sleepy*

- After 15-20 if not asleep get out of bed and do something relaxing
- Go back to bed when sleepy
- Repeat

Limit daytime naps to 15-30 min taken

7-9 hours after rise time

Set an alarm –get up same time every day

You may not sleep much the first night

# Sleep Restriction Therapy

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SRT emphasizes that individuals with insomnia spend too much time in bed

attempting to sleep, which leads to increased wakefulness, fragmented sleep, and variability

SRT uses limited sleep deprivation:

- increase the homeostatic sleep drive
- Sleep consolidation occurs on subsequent night
- Compresses sleep

SRT facilitates:

- regular sleep-wake rhythm through consistent scheduling.



# Second Line Interventions

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Phototherapy- Full Spectrum Wave-Length Light, circadian lights, blue lights

Relaxation training

Progressive Muscle Relaxation- guided and practiced

Autogenic Training-exercise to produce physical responses, warmth, relaxation

Breathing- by count

Imagery- focused exercises on time, place

# Trackers and Medications

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## **Trackers:**

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Fatigue Science Readiband

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WHOOP band

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Google watch

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## **Medications**

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Melatonin

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Sedative-Hypnotics

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Other Medication

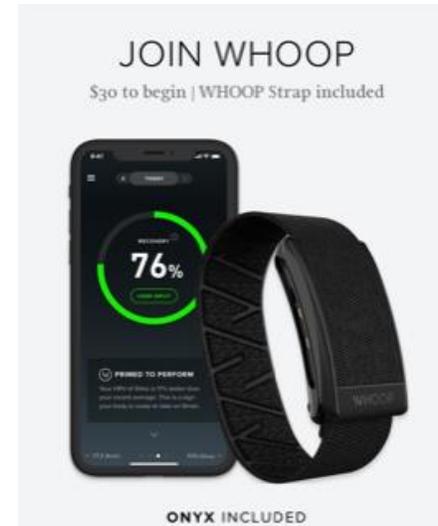
# Trackers

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Sleep Trackers or Apps can help you identify and improve sleep habits

Proprietary yet successful algorithms track professional athletes and have gained attention from the department of transportation for accident reduction

Some combine fitness tracking and sleep monitoring for overall performance coaching



Stay ahead with proactive help

Get proactive and personalized help from your Google Assistant. Look up commute times, see upcoming reservations, check your flight status and more.



Explore more ways your Google Assistant can help

Get Your Readiband™

Leaders in sports, military, and top-tier industrial firms rely on our proprietary approach to optimizing human performance through the science of sleep.

Get yours today.



# Sleep is a Big Problem and a Big Business

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IT TOOK 40 YEARS FOR STAR WARS TO  
EARN 4 BILLION IN REVENUE



IT TOOK ZOLPIDEM (AMBIEN) 24  
MONTHS TO MAKE 4 BILLION IN  
REVENUE

# Medication Classifications- Basics

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**Non-Benzo-Sedative hypnotics**-bind to GABA-like receptors increasing sleepiness

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**Benzodiazepines**-enhance action of GABA which slows activity making sleepiness

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**Orexin Receptor Antagonist**-Orexin keeps you awake, block it to increase sleepiness

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**Melatonin Receptor Agonists**- Melatonin regulates the circadian rhythm and induces the sleepier feeling

# Medication General Points

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Sedation is not sleep

No medication on the market creates sleep

Melatonin is ok to try but is often dosed too high and because there is no regulation it is often widely variable within the same batch

Melatonin is probably best at .5-2 mg but likely over dosed in most cases and its effect is still largely thought to be placebo

All sedative hypnotics have the potential to be associated with impaired memory, grogginess, sedation and amnesia. There are over 15 serious large case matched correlation studies with increase risk of death from infection, death by motor vehicle accidents and cancer deaths. This emphasizes the need for proper informed consent.

Scientific data on all sleep aides show minimal benefit over time with some exceptions

CBTI is the most effective sleep treatment and has been shown to be effective ten years alter



# Cognitive Behavioral Therapy for Insomnia

## CBT-I

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### COGNITIVE PROCESSES MAINTAIN INSOMNIA

The five processes that maintain insomnia:

1. Worry
2. Selective attention to and monitoring for sleep-related threats
3. Misperception of sleep and daytime deficits
4. Unhelpful beliefs about sleep
5. Counterproductive safety measures

### 3 PHASES FOR TREATMENT USING CBT-I

#### Conceptualization phase

- Cognitive model of daytime and nighttime problems that elucidate the vicious cycles

#### Intervention phase

- Daytime and nighttime models are used to individualize behavior experiments directly test and reverse the insomnia-maintaining processes

#### Discovery phase

- Identification of treatment gains
- Relapse prevention
- Goals to sustain benefits.

Why We Sleep: The New Science of Sleep and Dreams by  
Matthew Walker, Ph.D.: Scriber, An Imprint of Simon &  
Schuster, Inc. New York, USA, 2017, 368 Pages

<https://www.sleepfoundation.org/>

[https://www.nhlbi.nih.gov/files/docs/public/sleep/healthy\\_sleep.pdf](https://www.nhlbi.nih.gov/files/docs/public/sleep/healthy_sleep.pdf)

Cognitive Behavioral Treatment of Insomnia, A  
Session by Session Guide, 2008, Perlis, et al.

# Credits

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