

The Importance of Sleep & Circadian Health

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SBCC Extension

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Overview

- ***Definitions of sleep and circadian states***
- ***Sleep History***
- ***Sleep health and Sleep disorders***

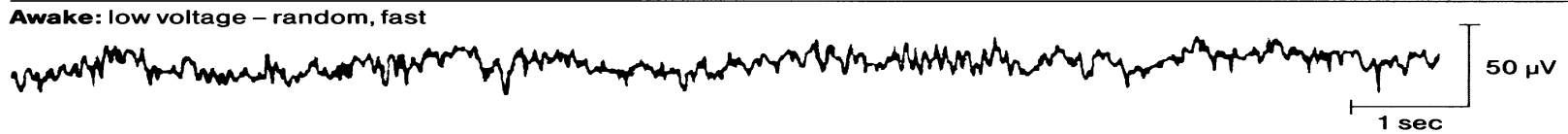
What is sleep?



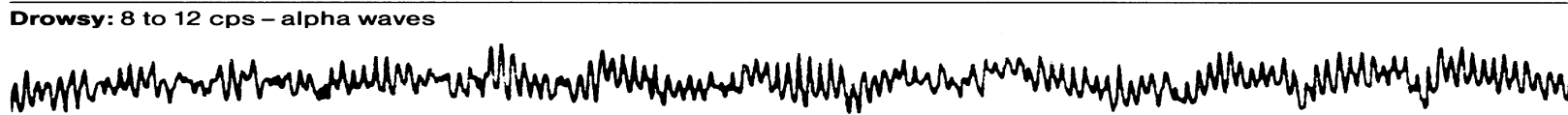
“Sleep is a reversible behavioral state of perceptual disengagement from and unresponsiveness to the environment. It is also true that sleep is a complex amalgam of physiological and behavioral processes”.

(Carskadon & Dement, Principles and Practice of Sleep Medicine, 1987)

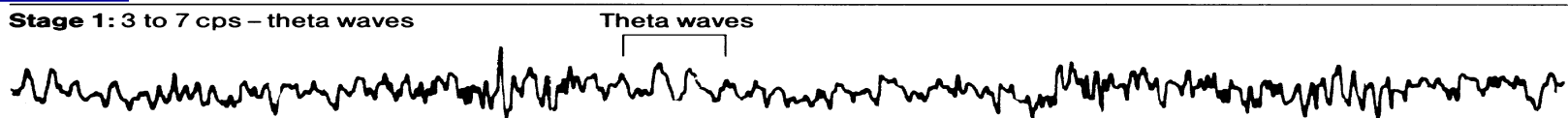
Awake



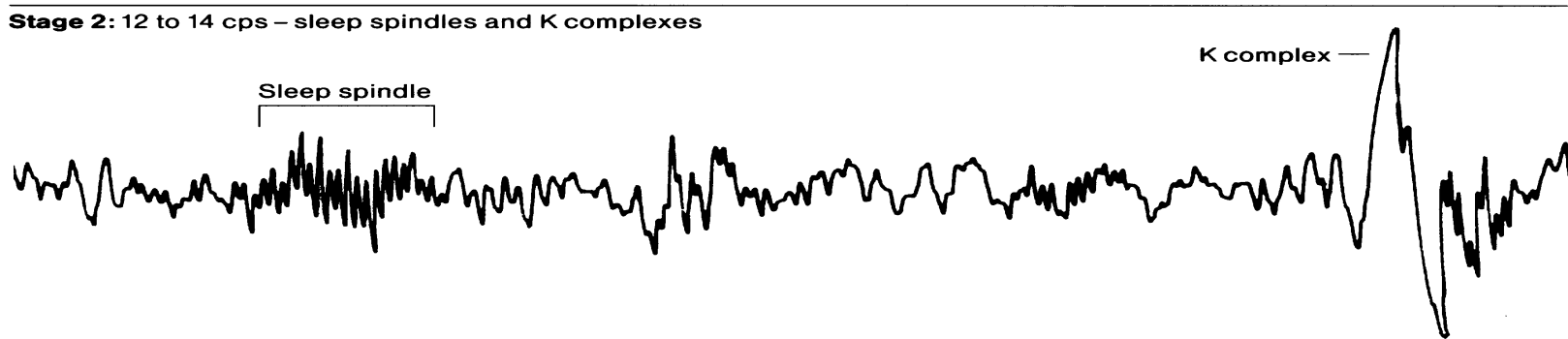
Drowsy



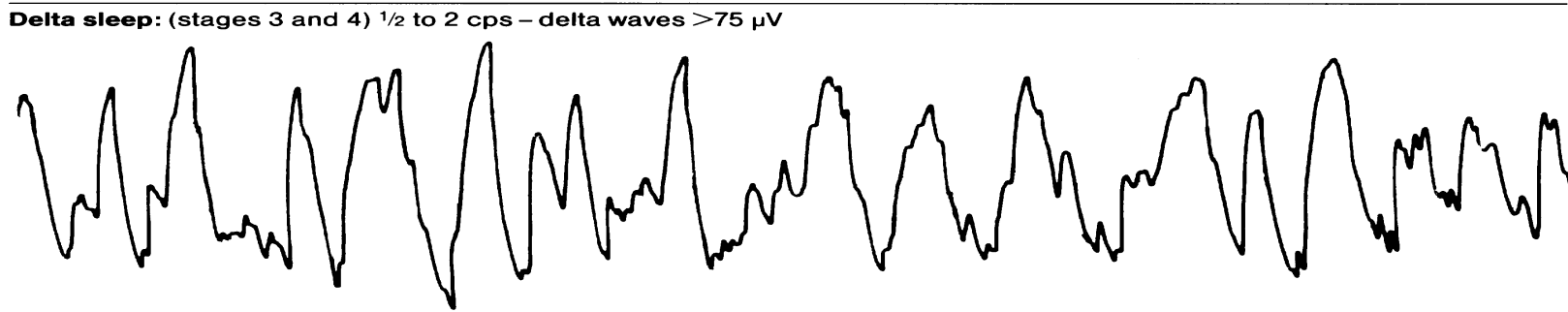
Stage 1



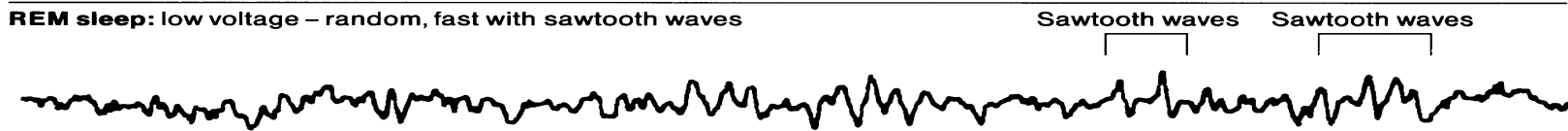
Stage 2



Stage 3



Stage
REM



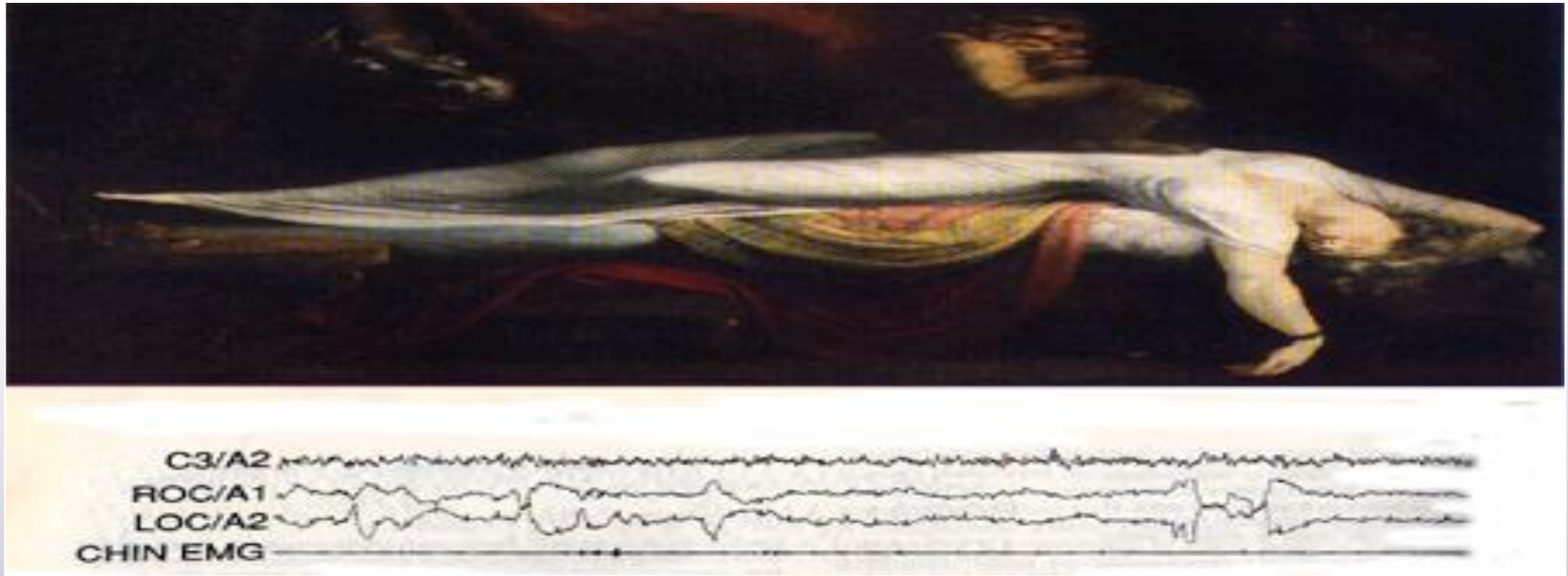
Stage 3



- 25% of the sleep period
- Passive, unresponsive to most environmental stimuli
- “Prevalence of parasympathetic influence...
Quiescence of sympathetic activity”¹
- Deeply relaxed musculature

¹Parmegigiani, P.L. Principles and Practice of Sleep Medicine, 2000

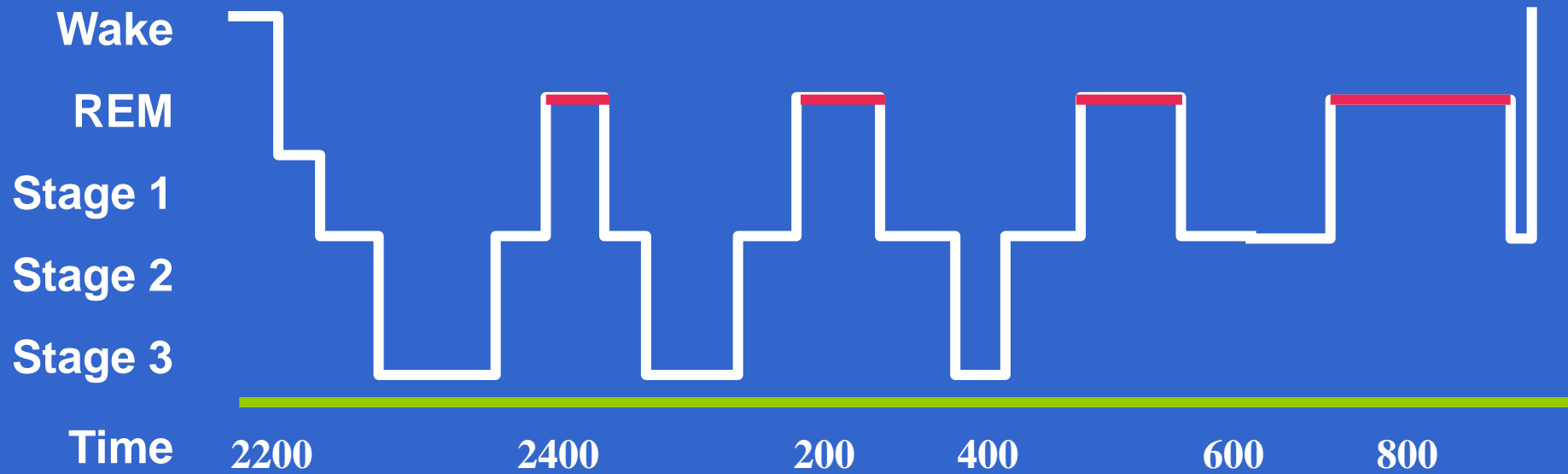
Rapid Eye Movement (REM)



- 25% of the sleep period
- Active and purposeful cognition, non-responsive to most environment stimuli
- Variable balance between sympathetic and parasympathetic control
- Atonia of peripheral musculature

Hypnogram

Sleep Stage Distribution






- ✧ NonREM Stage 3 is dominant during the first half of night
- ✧ Sleep stage REM is dominant during the second half of night

Vulnerability during the night and Sleep

- Night was believed a time of danger with dangerous vapors, wandering demons and hungry spirits.
- We are perceptually challenged at night and large predators roam at night so there are more than imagined risks.
- It was a common belief that at night the soul leaves the body making us vulnerable, particularly if we wandered outside at night.

Upanishads, Mandukya

Waking Consciousness and Sleep

- ❖ The sound  A-U-M + 
- ❖ Waking ('A' - Jāgrat) – Interaction of the self and external world.
- ❖ Dreaming ('U' - Svapna) – Self exploration of internal state of self and emotion.
- ❖ Deep Sleep ('M' - Suṣupti) – Innermost world with self in state of internal suspension and bliss.
- ❖ The Fourth  Turiya). Brahma the state interconnect-universal awareness. Sleep of Clear light?



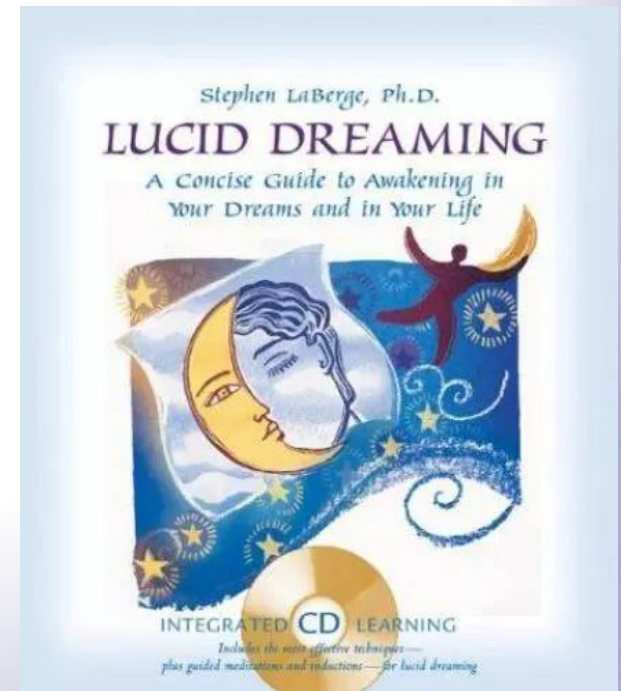
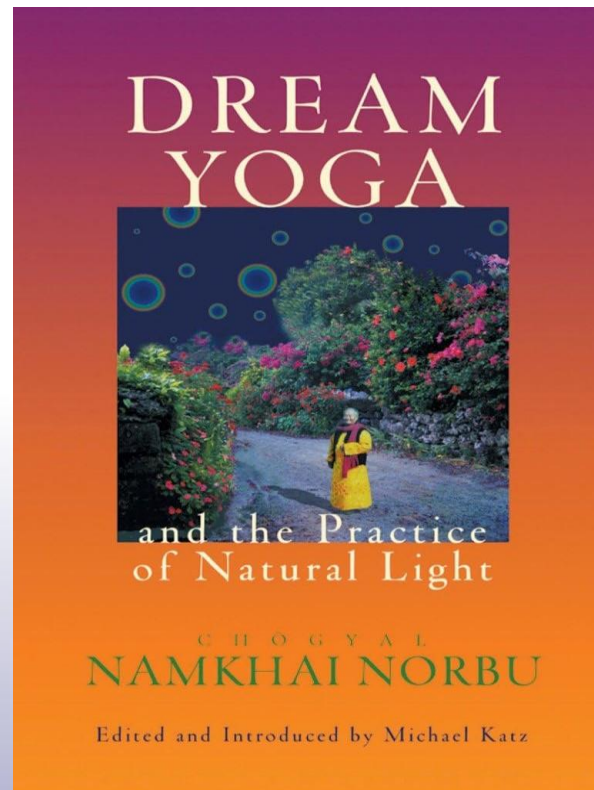
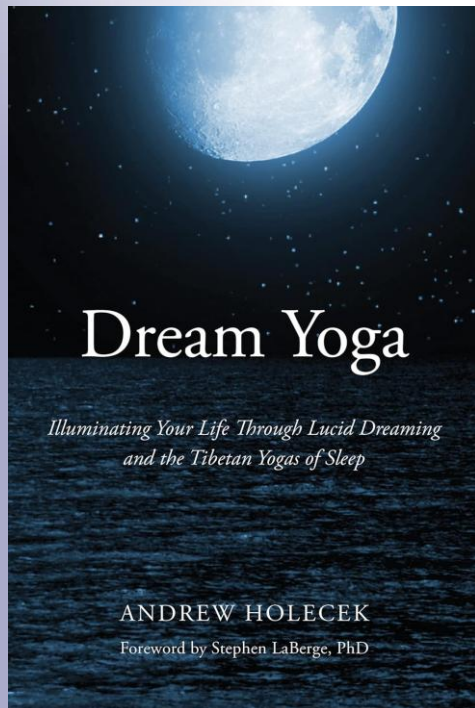
THE
TIBETAN YOGAS
OF DREAM
AND SLEEP



Tenzin Wangyal Rinpoche

- ❖ Daytime is preparation for sleep.
- ❖ Clearing Karmic traces in preparation of exploration during sleep.
- ❖ Cultivating conscious engagement during dream sleep states (lucid dreaming).
- ❖ All in preparation for our final transition allowing us to guide our awareness into the afterlife, Bardo

Dream Yoga and Lucid Dreaming





Hacking your

**DREAMS
& DESIRES**

BREAKTHROUGH!



Scientific Background Discoveries of Molecular Mechanisms Controlling the Circadian Rhythm

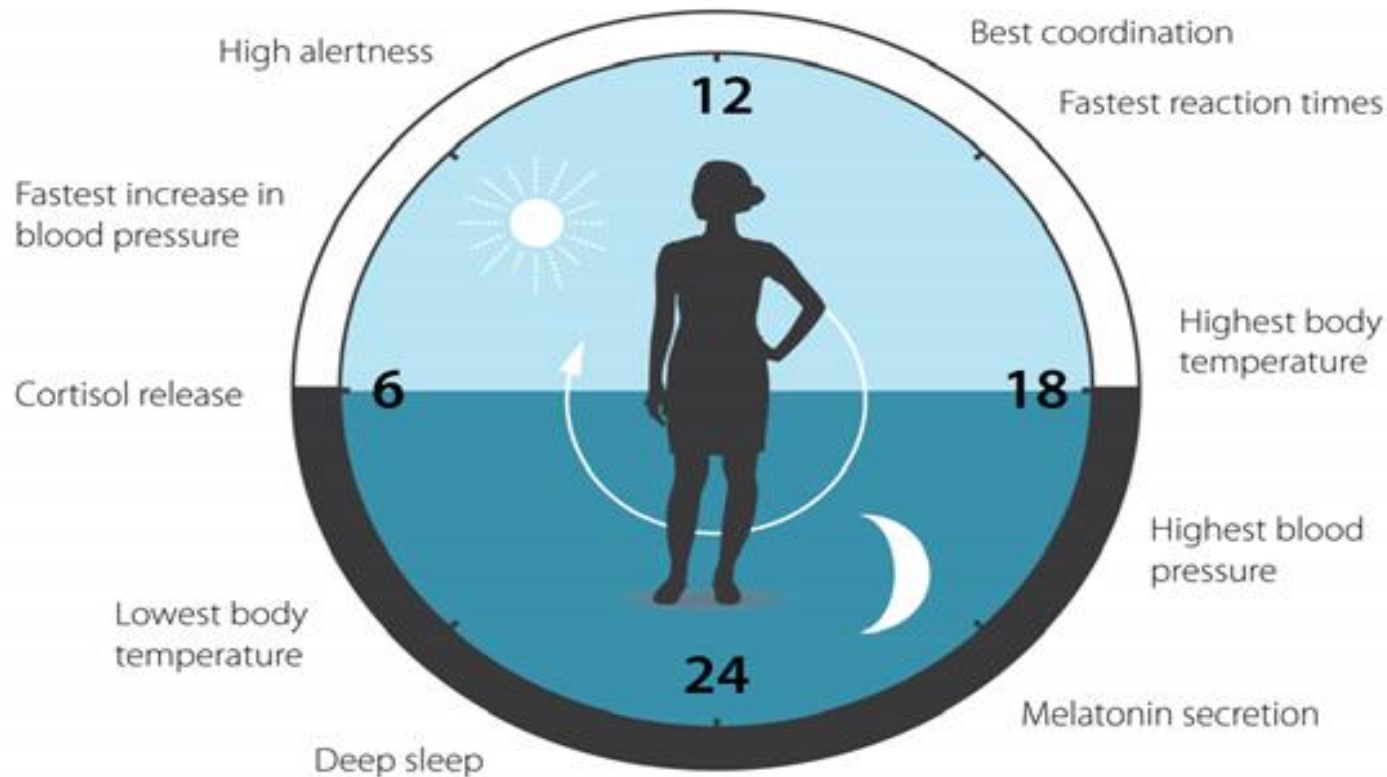
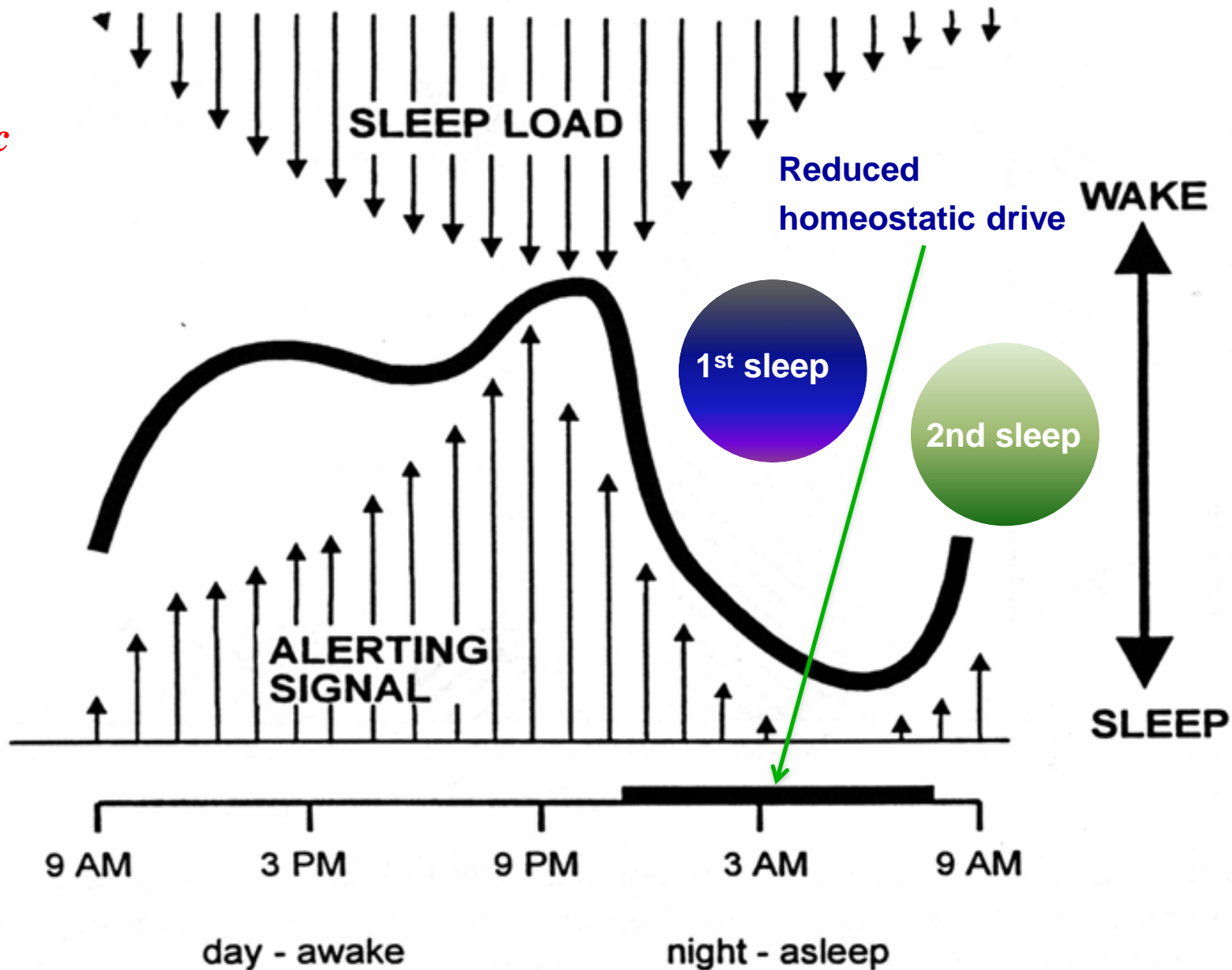


Figure 3. The circadian clock has an impact on many aspects of our physiology.

This clock helps to regulate sleep patterns, feeding behavior, hormone release, blood pressure and body temperature. A large proportion of our genes are regulated by the clock.

Process S
Sleep
Homeostatic

Process C
Circadian



SLEEP DURATION

&

SLEEP TIMING

Cognitive/Emotional Functions of Sleep

- Neural Replay: Neurons in the hippocampus replay sequences of activity patterns that occurred during learning, which strengthens memory traces.
- Synaptic Homeostasis: Sleep helps balance synaptic strengthening and weakening, which is essential for efficient memory storage and cognitive function.
- Neurotransmitter Activity: Changes in neurotransmitter levels, such as acetylcholine and serotonin, during different sleep stages facilitate different aspects of memory consolidation.
- Emotion Down regulation occurs during REM when there is a relative shut down of serotonergic and noradrenergic facilitates

Sleep & Circadian Activation of the Glymphatic System

NIH RESEARCH MATTERS

October 28, 2013

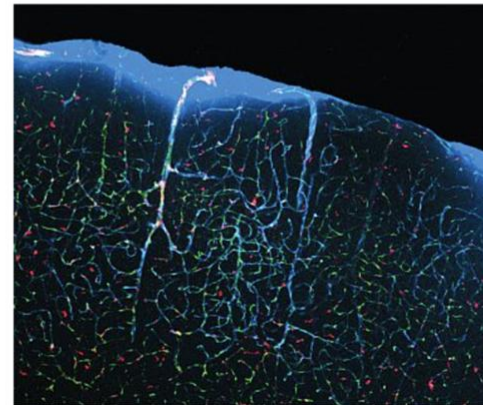
How Sleep Clears the Brain



A mouse study suggests that sleep helps restore the brain by flushing out toxins that build up during waking hours. The results point to a potential new role for sleep in health and disease.

Scientists and philosophers have long wondered why people sleep and how it affects the brain. Sleep is important for storing memories. It also has a restorative function. Lack of sleep impairs reasoning, problem-solving, and attention to detail, among other effects. However, the mechanisms behind these sleep benefits have been unknown.

Dr. Maiken Nedergaard and her colleagues at the University of Rochester Medical Center recently discovered a system that drains waste products from the brain. Cerebrospinal fluid, a clear liquid surrounding the brain and spinal cord, moves through the brain along a series of channels that surround blood vessels. The system is managed by the brain's glial cells,



Cerebrospinal fluid (blue) flows through the brain and clears out toxins through a series of channels that expand during sleep. Maiken Nedergaard

Sleep & Circadian Health

- Coined at the NIH and defined as practicing optimal sleep and circadian habits and identifying and treating sleep disorders.
- Arianna Huffington
- LeBron James



Nap-Types

- **Appetitive – due to insufficient sleep**
- **Prophylactic – anticipating sleep debt**
- **Circadian – preference**
- **The Cat vs. the Dog nap**

Sleepiness, Tiredness & Fatigue

- **Sleepiness** – inability to maintain wakefulness
- **Tiredness** – persistent feelings of poor focus, motivation and need for more sleep
- **Fatigue** – low physical energy and discomfort associated with illness, exertion and/or chronic deficient sleep

Sleep Tools

- Snoring – Polysomnographic sleep study
 - Stop Bang - <http://www.stopbang.ca/osa/screening.php>
- Sleep log – Everyone
- Chronotype – Morningness Eveningness Scale (<https://www.cet-surveys.com/>)
- Daytime Sleepiness - <https://epworthsleepinessscale.com/about-the-ess/>

Insomnia

- Trouble falling asleep**
- Trouble staying asleep**
- Poor sleep quality**
- Impairment in daytime function**

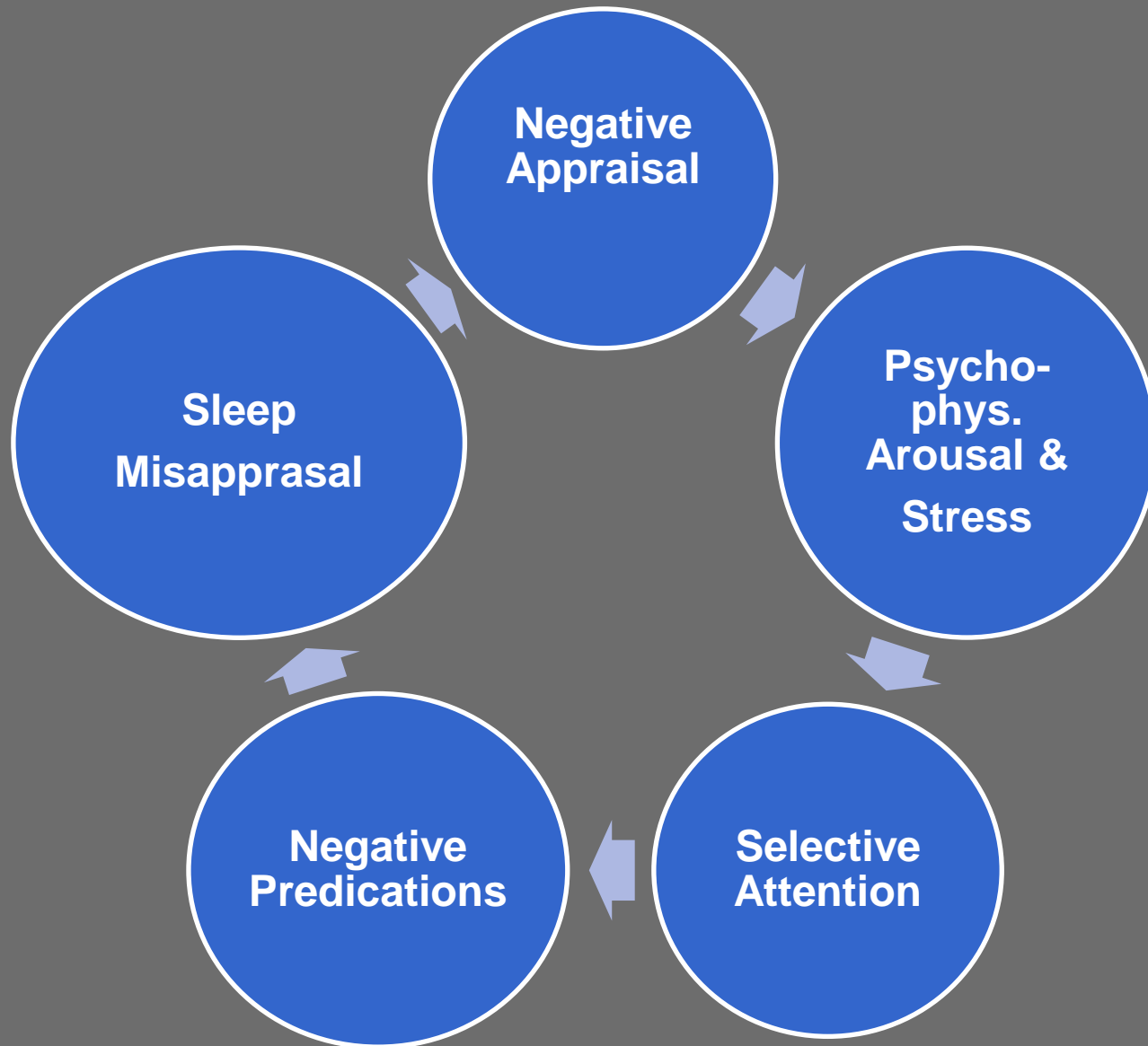
Cognitive Behavior Therapy for *Insomnia (CBTI)*

- Sleep Hygiene
 - Sleep related habits
 - Prioritization of sleep
- Sleep Education
 - Sleep schedule, duration and continuity
- Stimulus Control
 - Dissociate stimulus (e.g., bed) associated with frustration/activation
- Cognition
 - Address sleep-related misconceptions, predictions
 - Tools to decrease cognitive arousal

Cognitive Behavior Therapy for *Insomnia (CBTI) - Continued*

- Sleep Restriction
 - Limit TST to weekly average
 - Setting a fixed sleep window
- Relaxation Therapy
 - Tools to decrease physiological and cognitive activation

Cognitive Model of Insomnia



Relaxation & Mindfulness Training

- Decrease somatic and cognitive arousal
- Distraction
 - Deep breathing
 - Somatic relaxation (e.g., progressive muscle relaxation)
 - Cognitive techniques (guided imagery)

Sleep Hygiene

- Establish Sleep as a priority
- Regular bed & wake times
- Cut out (dog) naps
- Eliminate or regulate caffeine habit
- Eliminate stimulating behavior before bedtime
- No electronic media use within a half hour of bedtime
- Quiet time & close time
- Establish an early evening worry time

Insomnia Treatment- Education Pearls

- It is normal to wake up at night.
- Do not watch the clock
- Falling back to sleep in the morning is a skill

Sleep Medicines - Classes

- Benzodiazepines (old - Xanax, Valium; new – Ambien, Sonata, Lunesta)
- Anti seizure (gabapentin)
- Anti depressant (trazadone)
- Antihistamines (Benadryl, Atarax)

Sleep Medicines - Uses

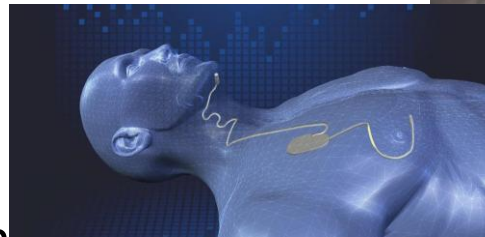
- Short term use insomnia
- Pain and sleep problems
- Major life stressor
- Chronic PTSD and insomnia

OSA – When to Order Polysomnographic Study

- **Snoring + 2 needs assessment:**
 - Loud snoring and gasping
 - Hypertension and heart disease
 - Diabetes
 - BMI >30
 - Family history of OSA Tx
 - Age >50

Obstructive Sleep Apnea-Treatment

- Nasal steroids/Nasal saline.
- Continuous Positive Airway Pressure (CPAP).
- Upper airway surgery
- Mouth tape/Breatheright.
- Dental appliances.
- Inspire-implantable stimulation
- nasal pressure and nasal flow.



Circadian Rhythm Disorder

Delayed or Advanced Sleep Phase Syndrome

- Definition:
A shift of the sleep phase to a later or earlier period that conflicts with work schedules & social norms
- Social Jet Lag!

Cannabis, Cannabinoids, and Sleep: a Review of the Literature

Kimberly A Babson ¹, James Sottile ², Danielle Morabito ³

Affiliations + expand

PMID: 28349316 DOI: 10.1007/s11920-017-0775-9

Abstract

Purpose of review: The current review aims to summarize the state of research on cannabis and sleep up to 2014 and to review in detail the literature on cannabis and specific sleep disorders from 2014 to the time of publication.

- CBD and THC have variable effects on sleep.
- Withdrawal effects
- REM suppression

Top Sleep Tips

- Sleep timing and duration
- No electronic media 30 minutes of bedtime
- Regular bedtime rituals
- Quiet and together time before bedtime
- Comfortable sleep environment
- Cut out Caffeine
- **NEVER DRIVE SLEEP DEPRIVED!**

Resources & Brief Bibliography

- American Academy of Sleep Medicine - AASM.org
- National Institutes of Health - Starsleep.nhlbi.nih.gov
- National Sleep Foundation - Sleepfoundation.org
- A Clinical Guide to Pediatric Sleep: Diagnosis and Management of Sleep Problems (Jodi Mindell & Judith Owens)
- Matthew Walker, *Why We Sleep*
- Glovinsky and Spielman, *The Insomnia Answer*

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THANK YOU