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**“You know you’re in love when you
can’t fall asleep
because reality is
finally better than
your dreams.”**

— Dr. Seuss



A Good Night's Sleep Does Wonders for the Brain and Body



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Health Benefits of *Sleep*



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Sleep Facts

- ✓ Between 1910 - 1960, average sleep duration was 9 hours
- ✓ **Current average is 7.5 hours**
- ✓ 1/3 of population sleeps 6 hours or less
- ✓ Estimated that **adults need an average of 8 - 8.5 hours and children need 9 - 10**
- ✓ Shift workers sleep less than 5 hours per work day
- ✓ Sleep problems add about **\$15.9 billion** to US health care costs
- ✓ More than **1,500 deaths a year caused by drivers falling asleep at the wheel**



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Scary Sleep Statistics from NIH

- ✓ School-age children need at least 10 hours of sleep daily
- ✓ Teens need 9-10 hours
- ✓ Adults need 7-8 hours
- ✓ Nearly 30% of adults reported an average of ≤ 6 hours of sleep per day in 2005-2007
- ✓ In 2009, only 31% of high school students reported getting at least 8 hours of sleep on an average school night



<http://www.drritamarie.com/go/CDCInsufficientSleep>

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Sleep Tidbits



- ✓ **70% of Americans are sleep deprived**
- ✓ **One of the most common causes of being tired is lack of quality sleep**
- ✓ According to Dr. Mark Hyman, the most important thing you can do for your health is have enough sleep
- ✓ **Insufficient sleep leads to imbalance between melatonin and growth hormone**, leading to stunted growth, decreased repair, and slower healing

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Sleep Benefits

- ✓ **Fat burning:** reduces cortisol and increases leptin
- ✓ Increased lean body **growth and repair:** enhances growth hormone and DHEA
- ✓ Enhances **focus and attention**
- ✓ Detoxification and metabolic **waste removal**
- ✓ Enhances **learning**, memory, and creativity
- ✓ Improves **insulin sensitivity**
- ✓ **Decreases cancer risk** via melatonin
- ✓ Enhances serotonin and **reduces depression**
- ✓ **Reduces inflammation:**
CRP higher with less than 6 hours of sleep
- ✓ **Enhances endurance** and stamina



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Sleep Deprivation Effects

- ✓ **Nurses and shift worker studies:** higher incidences of heart disease
- ✓ **Sleep deficit leads** to performance loss, slowed reaction time, impaired memory, and decreased motivation
- ✓ **Brain uptake of glucose drops** as much as 7% with sleep deprivation
- ✓ One sleepless night can induce **insulin resistance** in healthy people



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Fun Facts about Sleep

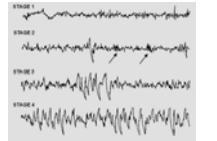
- ✓ Men dream about other men 70% of the time
- ✓ Women dream about men and women equally
- ✓ We can only dream about faces we've seen
- ✓ 12% of people only dream in black and white
- ✓ **Which animal are you most like?**
 - Koalas sleep 22 hours a day
 - Giraffes sleep 1.9 hours a day in 5-10 minute sessions
- ✓ **10 days of sleep deprivation can be lethal**
- ✓ 1 in 50 teenagers still wet the bed
- ✓ Within 5 minutes of awakening 50% of dream is forgotten; within 10 minutes 90% is gone



<http://www.drritamarie.com/go/BetterSleepCouncilStatsAndResearch>

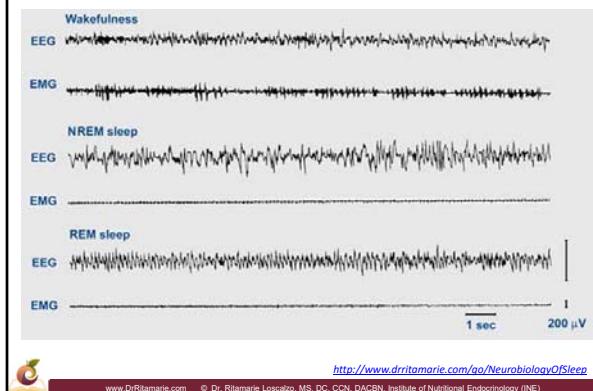
Sleep and Brain Wave Measurement

- ✓ **Sleep Definition:** Loss of consciousness and reduced responsiveness to external stimuli
- ✓ **Sleep Measurement:** In 1929 German psychiatrist, Hans Berger, discovered that the electrical activity of the brain could be recorded as brain waves - the electroencephalogram (EEG)
- ✓ **EEG Frequencies are Grouped into Bands:**
 - Delta, 0.5 to 4 Hz – Stage 3
 - Theta, 4 to 8 Hz – Stage 1, Stage 3
 - Alpha, 8 to 12 Hz – Wakeful and relaxed, i.e. meditation – Stage 1
 - Sigma, 12 to 14 Hz – Stage 2
 - Beta, 14 to 30 Hz – Wakeful and alert
 - Gamma, 30 to 50 Hz



<http://www.drritamarie.com/go/NeurobiologyOfSleep> <http://www.drritamarie.com/go/Consciousness>
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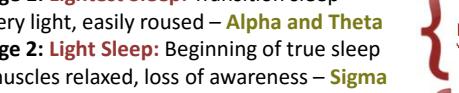
EEG and EMG Measurements

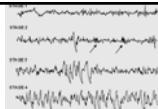


The 5 Stages of Sleep

Brain activity falls by only 10% during sleep

- ✓ **Stage 1: Lightest Sleep:** Transition sleep
 - very light, easily roused – **Alpha and Theta**
- ✓ **Stage 2: Light Sleep:** Beginning of true sleep
 - muscles relaxed, loss of awareness – **Sigma**
- ✓ **Stage 3: Deep Sleep**
 - **Theta and Delta**
- ✓ **Stage 4: Deepest Sleep:** Restorative
 - **Delta**
- ✓ **Stage 5: REM Stage:** Deep sleep
 - dreaming, muscles blocked – **Theta and Alpha**





REM Sleep: Dreaming

- ✓ Brain is extremely active - similar waves to those while awake - **theta and alpha**
- ✓ Blood pressure increases
- ✓ Breathing becomes faster and irregular
- ✓ The eyes dart back and forth
- ✓ Most dreaming occurs in this stage
- ✓ Brain completely blocks muscles
- ✓ **Essential for well-being** along with Stage 4
- ✓ **When sleeping time is reduced, duration of REM and deep sleep remains the same**



REM Sleep and Memory

✓ Long-term memory is formed

- Actual neuron structures that represent memories are created
- Essential for the process of memory reorganization
- Memories that are not important are discarded and others are enhanced



✓ New experiences are organized into networks

- Networks enable us to see the connection between old and new memories
- This process is accountable for late night problem solving
- When you wake up the following morning, you know the solution; REM sleep has helped you find it

✓ Intensive firing of neurons

- Scientists assume that dreams are result of this stimulation
- Similar brain waves to awake state



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Deep Sleep

- ✓ Body regeneration most active

- ✓ Blood supply and growth hormone increased

- ✓ On average, people need approximately 2 hours per night

- ✓ Deep sleep will **not be increased beyond needed amount**

- ✓ **Light sleep will be reduced to preserve the amount of deep sleep.**



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Studies on the Impact of Sleep

- ✓ **Stanford University study:** College football players who tried to sleep at least 10 hours a night for 7 – 8 weeks improved their average sprint time and had less daytime fatigue and more stamina



✓ Pediatrics Journal 2009 study:

Children ages 7 - 8 who got less than 8 hours of sleep a night were more likely to be hyperactive, inattentive, and impulsive



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Sleep Cycles

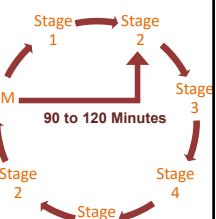
✓ **Normal sleep cycle pattern:**

➤ Stage 1, 2, 3, 4, 3, 2, 5 (REM)

- REM usually occurs about 90 minutes after falling asleep

- ✓ **The number of completed cycles** is more important than the number of hours spent sleeping.

- ✓ **Waking up mid-cycle** usually results in feeling tired throughout the entire day.



<http://www.drritamarie.com/go/OptimizeSleepHormones>

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Analyzing Sleep Cycles

On days you need to wake up at a certain time, pay attention to how long it takes to fall asleep and how you feel when awakened

Pick a day or two (i.e., a weekend when you don't need to get up at a specific time), go to bed at regular time, and sleep until you awaken naturally

Get up when you awaken and note how long you sleep

Calculate length of sleep cycle

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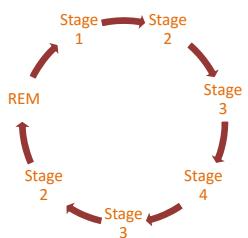
Calculate Sleep Cycle

- ✓ If you always wake up at a certain time, you are likely at the end of a sleep cycle

✓ Takes a little guess and check

- ✓ Subtract from hours until awakening how long it usually takes to fall asleep (ask a partner for help if possible)

- ✓ Use chart on next page to get an idea if sleep cycle is length



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Sleep Cycle Chart Excerpt

Amount of Time Asleep (hours)	Length of Your Sleep Cycle (in minutes)		
	Most Likely	Likely	Possible, but Unlikely
7.00	84	105	60, 70
7.10	86	108	61, 72
7.20	88	110	63, 73
7.30	90	75	64, 113
7.40	92	77	66, 115
7.50	94	78	67, 118
8.00	96	80	60, 69, 120
8.10	82	98	61, 70
8.20	83	100	63, 71
8.30	85	102	64, 73
8.40	87	104	65, 74
8.50	88	76	66, 106
9.00	90	77	60, 68, 108

Chart excerpted from p 11 – 12 of <http://www.drittamarie.com/go/OptimizeSleepHormones>
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Hormones That Influence and Are Influenced by Sleep

- ✓ Insulin/Glucagon
- ✓ Cortisol/DHEA
- ✓ Growth Hormone
- ✓ Leptin/Ghrelin
- ✓ Melatonin
- ✓ Estrogen/Progesterone
- ✓ Testosterone



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