

A woman with curly hair is sleeping peacefully in a bed, wearing a yellow long-sleeved shirt and white shorts with a green and blue striped waistband. Above her head, a large thought bubble contains a close-up of a very large, protruding belly, symbolizing the connection between sleep and weight. The background is a solid light orange color. On the left side of the slide, there are several orange circles of varying sizes and vertical lines.

SLEEP AND YOUR WEIGHT

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<http://dosleep.doctorsoffice.net>

OBJECTIVES

- What is sleep?
- As a culture, where does sleep fit in rank?
- Sleep and obesity
- Tips for better sleep



WHAT IS SLEEP?



RAPIDLY REVERSIBLE



UNCONSCIOUS

COMPLEX



PHYSIOLOGIC REGULATION IN SLEEP

NREMS

FUNCTIONS

REMS

ENDOCRINE

GH early secretion
PRL early secretion
ACTH late secretion
T late secretion
TSH inhibition

BREATHING

Regular decrease
Effective
Effective
Active
Tone maintained

Ventilation
Reflexes proprioceptive
Chemoceptive
Intercostal muscles
Upper airways muscles

Variable amplitude
Overridden
Overridden
Inactive
Tone reduced

CIRCULATION

Eurhythmic decrease
Regular decrease
Regular decrease
Effective
Effective

Heart rate
Blood pressure
Cardiac output
Reflexes proprioceptive
Chemoceptive

Variably arrhythmic
Irregular oscillations
Irregular oscillations
Overridden
Overridden

GASTROINTESTINAL

Decreased function

Decreased function

RENAL

Decreased urine flow

Decreased urine flow

SEXUAL

Penile erection

HOMEOSTATIC

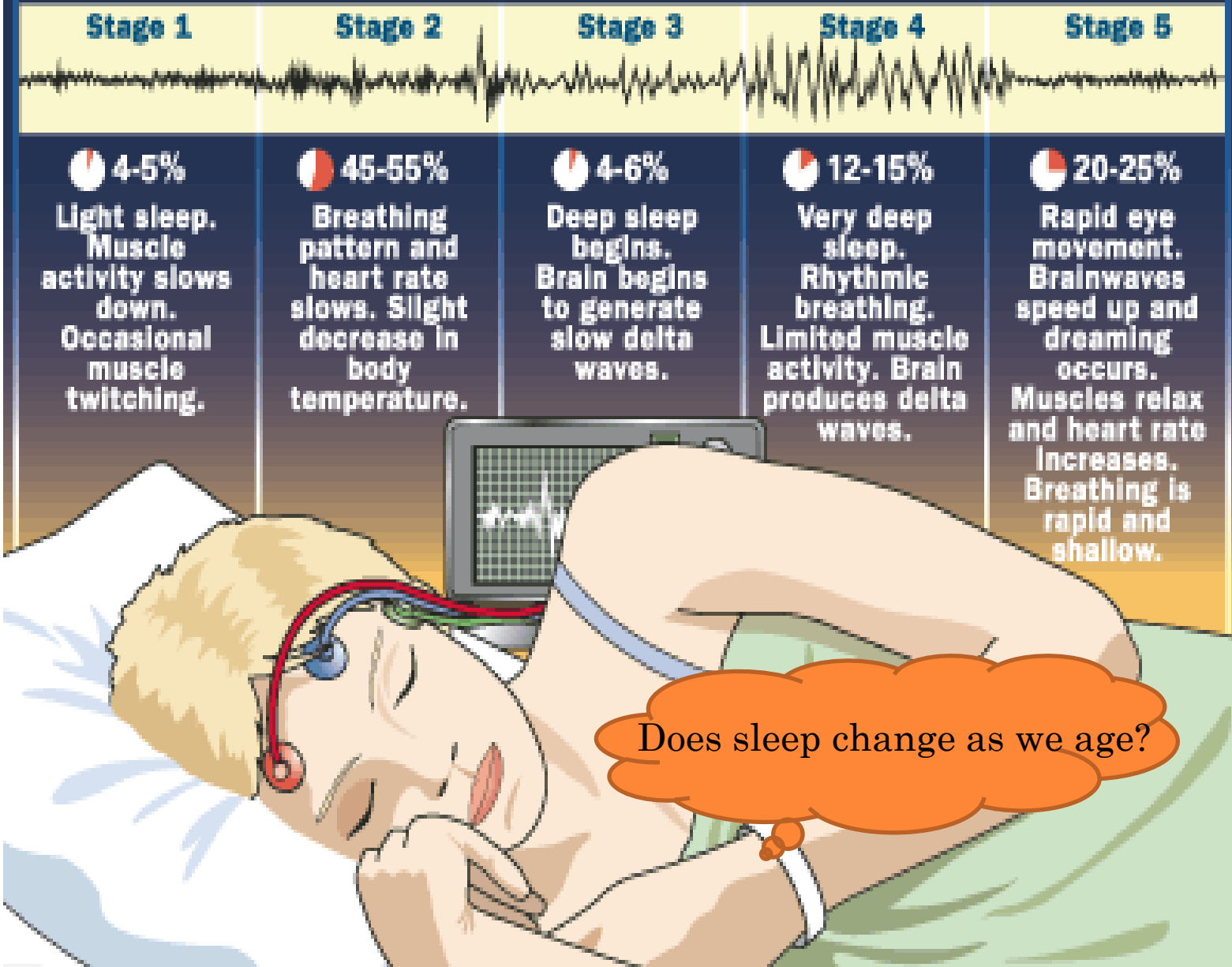
REGULATION

POIKILOSTATIC

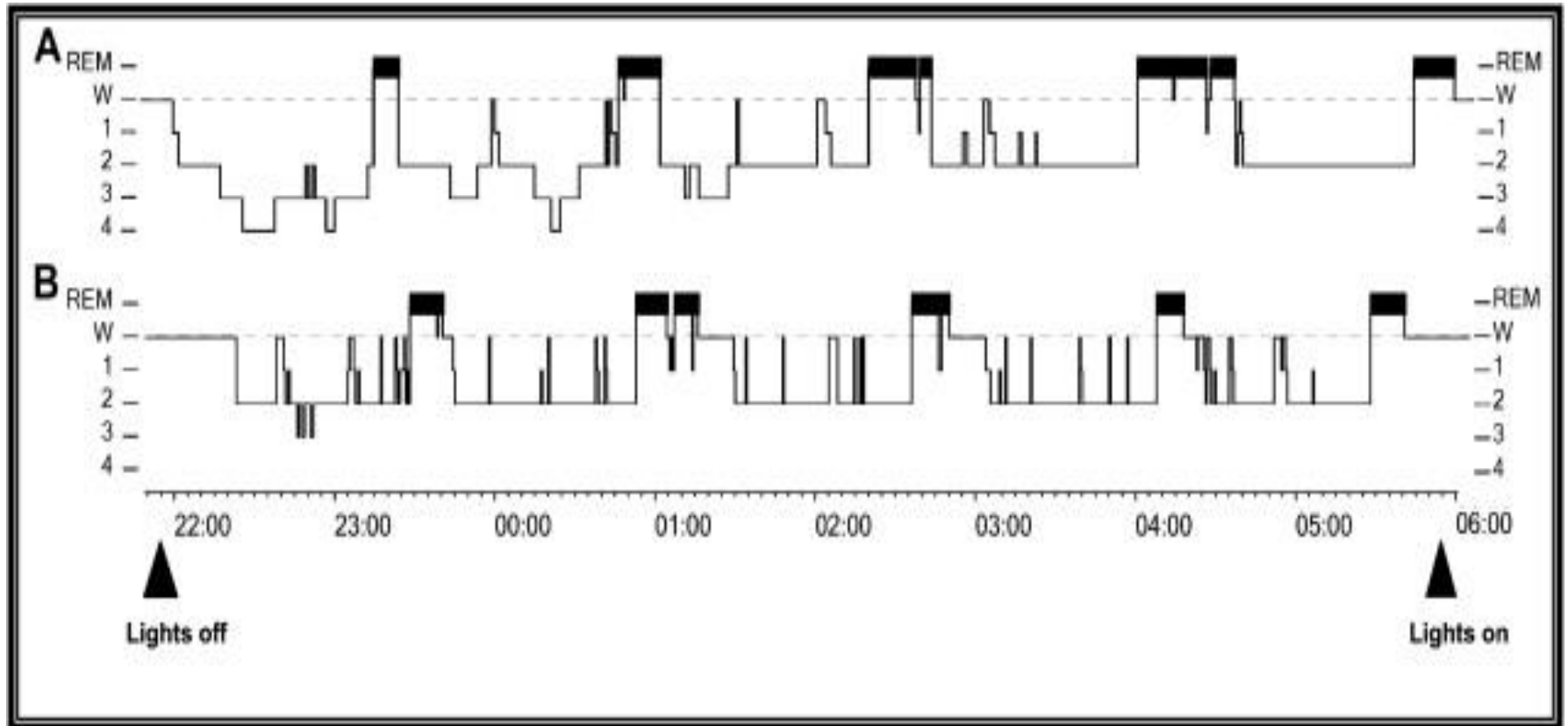
GH, growth hormone; PRL, prolactin; ACTH, adrenocorticotrophic hormone; T, testosterone; TSH, thyroid-stimulating hormone



100% Sleep Cycle



HYPNOGRAM



WHERE DOES SLEEP FIT IN

COMPUTER

SEX

FAMILY

EXERCISE

VISITING
FRIENDS

SCHOOL

SLEEP

VACATIONS

CLEANING

WORK

DRIVING

PAYING
BILLS

SHOPPING

GROOMING

RELIGIOUS
ACTIVITIES

WHAT AFFECTS SLEEP?

- Medical diseases
 - Heart failure, diabetes, COPD, neuropathy, dementia, etc.
- Psychiatric diseases
 - Anxiety, depression, schizophrenia, PTSD, etc.
- Sleep disorders
 - Apnea, narcolepsy, RLS/PLMS, nightmares
- Medications
 - Antidepressants, antihypertensive medications, sleepers, stimulants
- Habits
 - Alcohol, caffeine, work done in bed, computer
- Lifestyle
 - Voluntary, sleep restriction, shift work, etc.

AND LOTS OF OTHERS



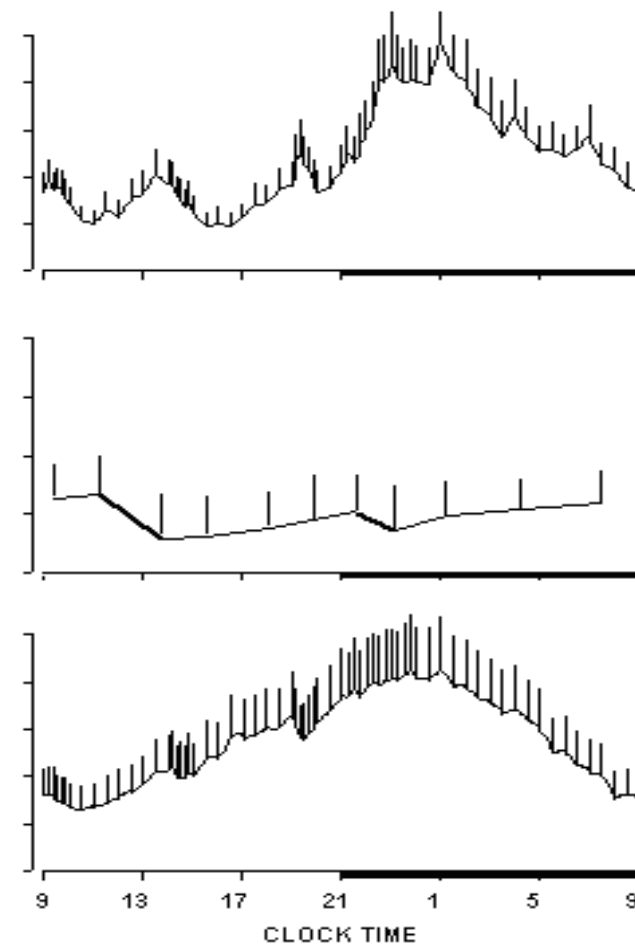
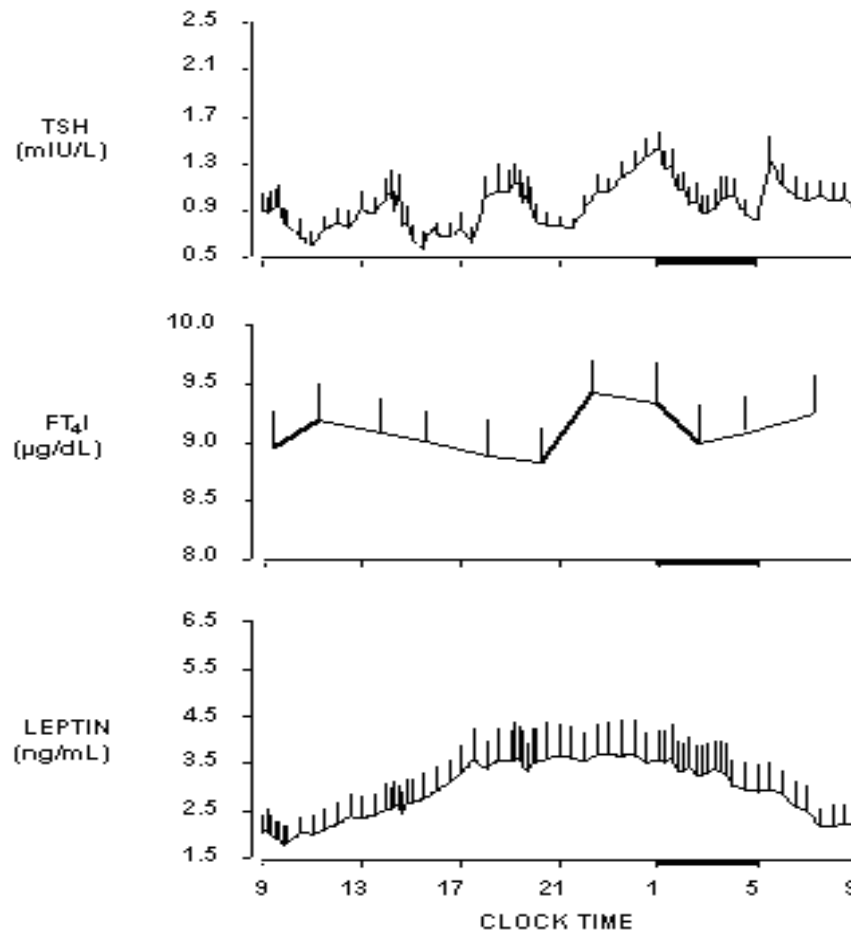
THE PARADIGM ...



HORMONES AND SLEEP – NORMAL CHANGE

**4 HOURS IN BED
3h49' OF SLEEP**

**12 HOURS IN BED
9h03' OF SLEEP**



BALANCE



**ENOUGH
SLEEP**

**NOT
ENOUGH
SLEEP**



**LOW GHRELIN =
NORMAL APPETITE**

**HIGH LEPTIN =
SATISFIED AFTER EATING**

**HIGH GHRELIN =
MAKES YOU HUNGRY**

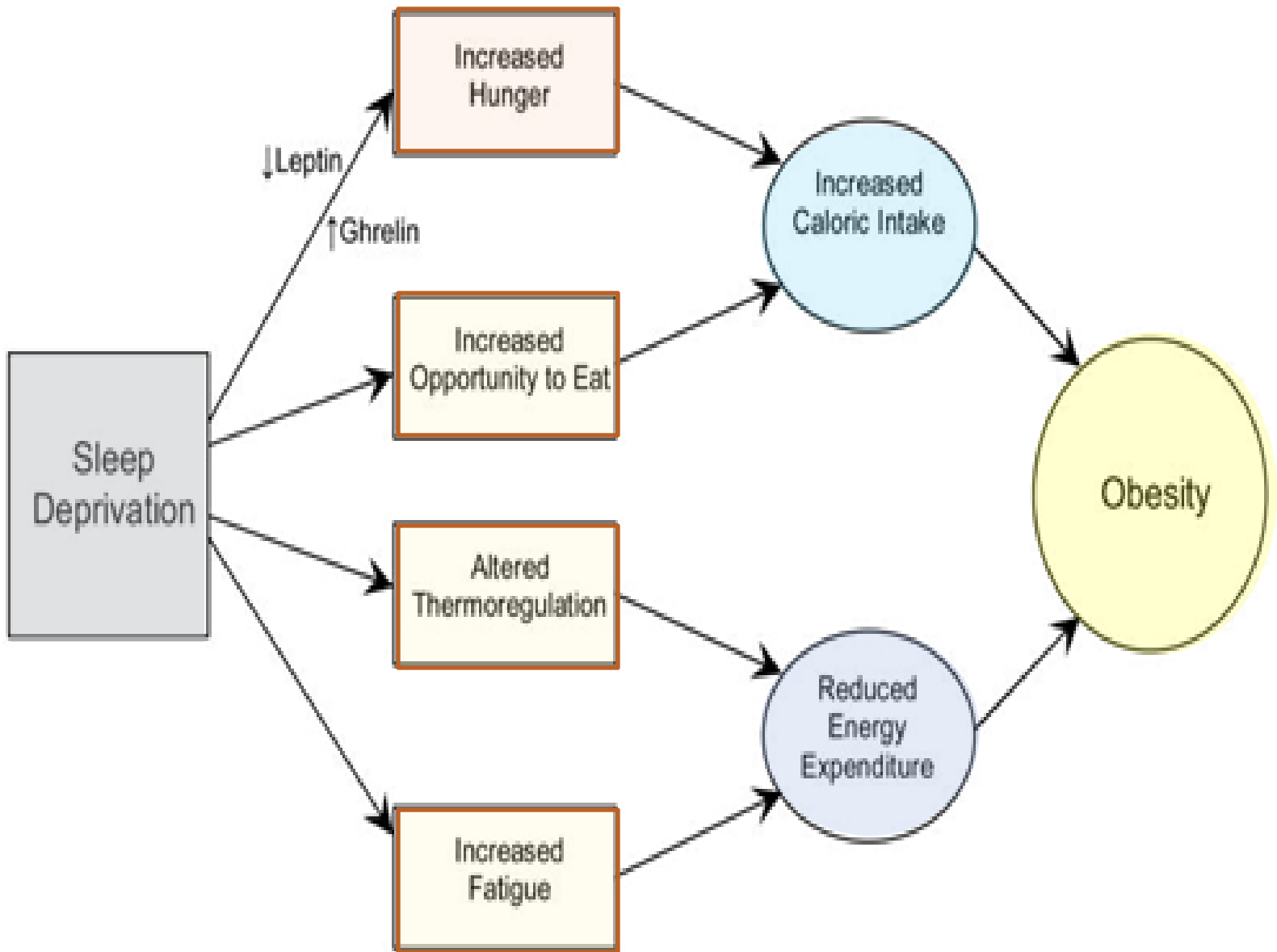
**LOW LEPTIN =
UNSATISFIED
(EVEN AFTER EATING A
NUTRITIOUS MEAL)**



CORTISOL AND SLEEP

- Under circadian control
 - Highest around 8AM
 - Lowest between midnight and 4AM
- Stress (physiologic and emotional) is can cause significant disruption of cortisol production
 - Surges happen more frequently
 - Natural peaks become higher
 - Troughs are more shallow
- Cortisol is a regulator of blood glucose
 - Direct relationship (aka: cortisol high → glucose high)
- Blood glucose dips contribute frequently to nighttime awakening and signal body to “refuel”





SLEEP DISRUPTION

- Physiologic disruption can delay return of normal hormonal levels and physiologic mechanisms by days (typically between 1-3 days)
- Chronic sleep deprivation may take years or decades to reverse



Torchette et al Study: Associations Between Sleep Duration Pattern and Overweight/Obesity at Age 6

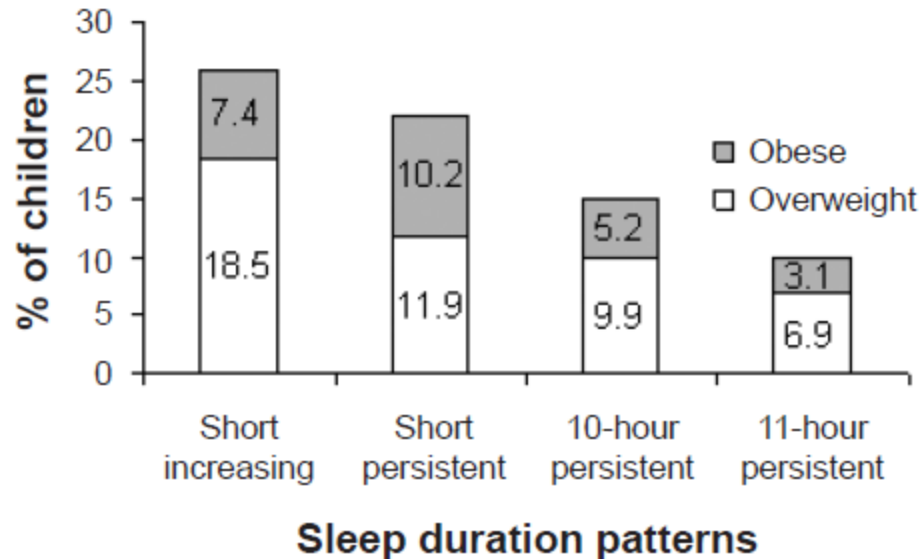


Figure 2—Data courtesy of the Quebec Institute of Statistics. Percentage of obese and overweight children as a function of longitudinal sleep duration patterns (normal: $n = 979$, overweight: $n = 105$, and obese: $n = 54$).

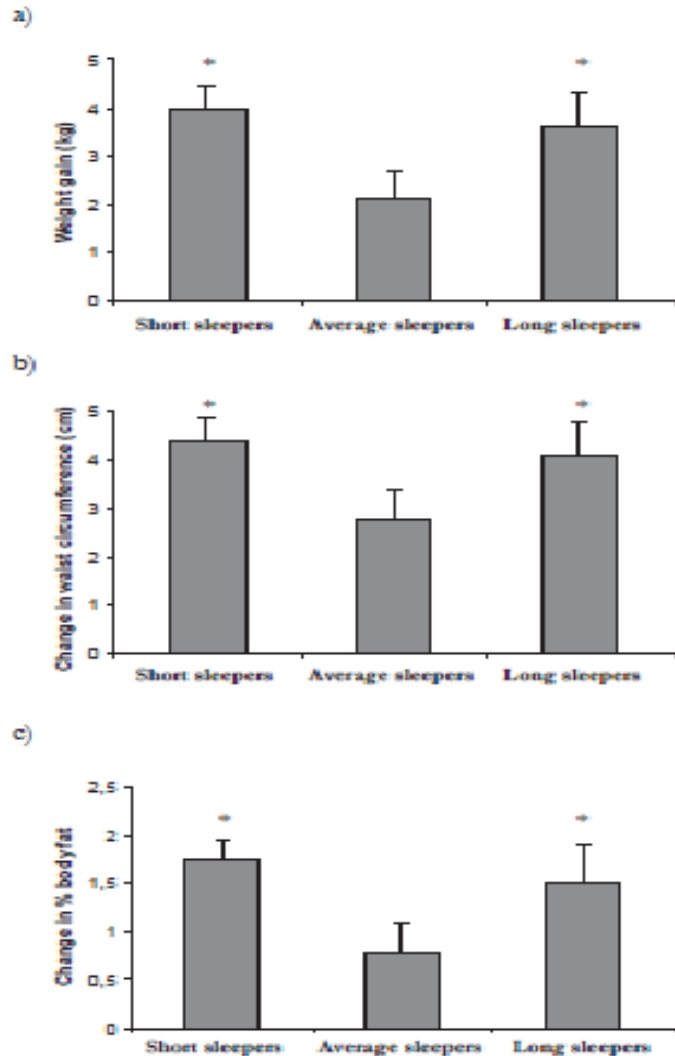


Figure 1—Mean (a) weight gain, (b) change in waist circumference, and (c) change in percentage of body fat by sleep-duration group. The model was adjusted for age, sex, baseline body mass index, study phase, length of follow-up, resting metabolic rate, smoking habits, employment status, education level, total annual family income, menopause status, shift-working history, alcohol intake, coffee intake, total caloric intake, and participation in vigorous physical activity. *Significantly different from the 7-8 hours sleeping group (average sleepers), $P < 0.05$.

The Association Between Sleep Duration and Weight Gain in Adults: A 6 Year Prospective Study from Quebec Family Study

- 276 patients aged 21 to 64 years
- From families with at least one parent and one offspring with BMI > 32).

Short sleepers 5-6 hours

Average sleepers 7-8 hours

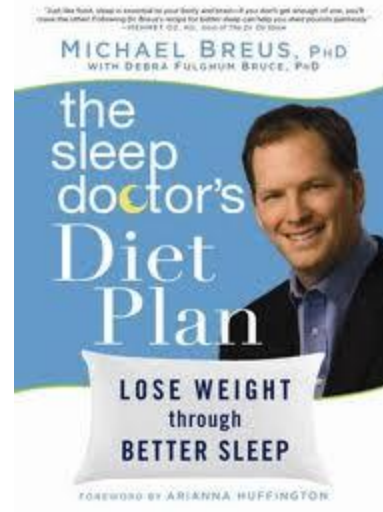
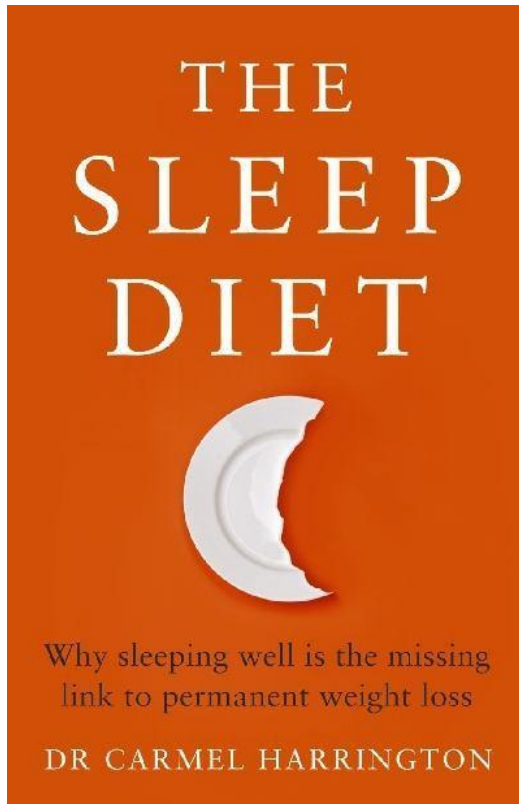
Long sleepers 9-10 hours

A WORD ABOUT SHIFT WORKERS

- Shift work is defined as work periods that are outside of the typical standard daylight work hours.
- Shift workers, in large studies including two recent studies by Geliebter (2000) and Swuazono (2008) found that shift workers have higher BMI and gain more weight when followed over time than those that are not “shift workers.”
- Proposed mechanism:
 - **Sleep loss**
 - Poor diet
 - Lack of regular exercise



NOT A NEW IDEA ...



SLEEP QUANTITY

- Sleep time less than 6 hours
 - 48% greater chance of developing or dying from heart disease
 - 15% greater chance of experiencing or dying from a stroke
- Compared with people who sleep seven to nine hours a night
 - more likely to develop calcium deposits in their coronary arteries,
- Sleep-deprived subjects get just one more hour of sleep per night, they had a 33% decrease in their odds of developing calcium deposits in their arteries.

December 2008 in *JAMA*

February 2011 *European Heart Journal*



THE DANGERS of SLEEP DEPRIVATION

By A. Page

Just one week of insufficient sleep alters the activity of our genes, which control our response to stress, immunity, inflammation and overall health. Here are the hidden health hazards caused by sleep deprivation.



NEARLY 40%
OF ADULTS FALL ASLEEP DURING THE DAY WITHOUT MEANING TO AT LEAST **ONCE A MONTH**

60 MILLION AMERICANS HAVE CHRONIC SLEEP DISORDERS

- MARCOLEPSY
- SLEEP APNEA
- RESTLESS LEGS SYNDROME
- PERIODIC LIMB MOVEMENT
- INSOMNIA

SLEEP FRAGMENTATION ...



Better sleep is just a night away.



MAKE THE MOST OF YOUR SLEEP

- **Pay attention to quality.**
- **Don't get too much of a good thing.**
- **Rise* and shine at the same time.**
- **Prepare for bed.**
- **Plan your healthy lifestyle around sleep.**
- **De-stress daily.**
- **Get out of bed if you can't sleep.**
- **Start a sleep journal.**



TIPS FOR NAPPING

- Location
- Duration
- Frequency
- Planned napping (anticipatory)
- Caution!



Is napping normal?



TWO WEEK SLEEP DIARY



INSTRUCTIONS:

1. Write the date, day of the week, and type of day: Work, School, Day Off, or Vacation.
2. Put the letter "C" in the box when you have coffee, cola or tea. Put "M" when you take any medicine. Put "A" when you drink alcohol. Put "E" when you exercise.
3. Put a line (|) in the box to show when you go to bed. Shade in the box that shows when you think you fell asleep.
4. Shade in all the boxes that show when you are asleep at night or when you take a nap during the day.
5. Leave boxes unshaded to show when you wake up at night and when you are awake during the day.

SAMPLE ENTRY BELOW: On a Monday when I worked, I jogged on my lunch break at 1 PM, had a glass of wine with dinner at 6 PM, fell asleep watching TV from 7 to 8 PM, went to bed at 10:30 PM, fell asleep around Midnight, woke up and couldn't get back to sleep at about 4 AM, went back to sleep from 5 to 7 AM, and had coffee and medicine at 7:00 in the morning.

Today's Date	Day of the week	Type of Day Work, School, Off, Vacation	Noon	1PM	2	3	4	5	6PM	7	8	9	10	11PM	Midnight	1AM	2	3	4	5	6AM	7	8	9	10	11AM
sample	Mon.	Work		E					A													C	M			

Many kinds are available online. This one through American Academy of Sleep Medicine or my website: <http://dosleep.doctorsoffice.net> Under subheading FORMS

week 1

week 2

Bardmoor Medical Arts Building
8839 Bryan Dairy Road, Suite 210
Largo, FL 33777
Phone - (727) 734-6716

Morton Plant Mease Sleep Centers

BayCare Outpatient Center
12780 Race Track Road, Suite 115
Tampa, FL 33626
Phone - (813) 635-2110

Mease Countryside Medical Arts Building
1840 Mease Drive, Suite 120
Safety Harbor, FL 34695
Phone - (727) 734-6716

Morton Plant North Bay Medical Arts Building
6633 Forest Avenue, Suite 1A
New Port Richey, FL 34653
Phone - (727) 734-6716

Ptak Orthopaedic & Neuroscience Pavilion (Morton Plant)
430 Morton Plant Street, Suite 100
Clearwater, FL 33756
Phone - (727) 734-6716



QUESTIONS?

To get more information:

- <http://yoursleep.aasmnet.org>
- www.cdc.gov
- www.womensheart.org
- www.yoursleepandyou.com
- www.understandingsleep.org
- <http://dosleep.doctorsoffice.net>

