Sleep

- Circadian rhythm: daily 24-hour cycle of waking and sleeping
- Most adults need about 8 hours of sleep each night
- A typical college student sleeps only 6-7 hours a night on weekdays
Sleep and Your Health

- *Sleep* is a period of rest and recovery from the demands of wakefulness.
- It can be described as a state of unconsciousness or partial consciousness from which a person can be roused by stimulation.
- We spend about a third of our lives sleeping.
- Sleep is strongly associated with overall health and quality of life.
- Restoration and growth take place during the deepest stages of sleep.
- Natural immune system moderators increase during sleep and promote resistance to viral infections.
- A lack of sleep can lead to a breakdown in the body’s health-promoting processes.
  - *Short sleep*: less than 7 hours; increases risk of negative health outcomes.
  - *Long sleep*: 10 hours or more; has not been found to have negative health consequences.
Health Effects of Sleep

- Mental health risks: dementia, Alzheimer's, multiple sclerosis, Parkinson's disease
- Suppressed immune system
- Risk of breast cancer
- High blood pressure: risk of heart disease and stroke
- Risk of diabetes
- Overweight and obesity
- Risk of prostate cancer
- Safety risk: Slowed reaction time
Health Effects of Sleep

- Sleep deprivation and disorders are associated with serious physical and mental health conditions.
  - Obesity and diabetes
  - Motor vehicle accidents
  - Heart disease, stroke, high blood pressure
  - Decreased immune function
  - Cancer
  - Mental disorders and neurodegenerative diseases
Sleep Deprivation

- *Sleep deprivation* is the lack of sufficient time asleep, a condition that impairs physical, emotional, and cognitive functioning
- Effects all domains of functioning
  - Reaction time, coordination, judgment
  - Memory
Sleep Deprivation

- *Sleep debt* is the difference between the amount of sleep attained and the amount of sleep needed to maintain alert wakefulness during the daytime, when the amount attained is less than the amount needed.
- Can’t make up for it with extra sleep on weekends
  - May disrupt sleep structure
- Prescription stimulants not a healthy solution
What Makes You Sleep?

- Circadian rhythms are maintained by the *suprachiasmatic nuclei (SCN)* in the brain
  - Serve as an internal “biological clock” that controls body temperature and levels of alertness and activity
  - SCN also signal the pineal gland to release melatonin and signal the pituitary gland to release growth hormone during sleep
- *Melatonin* is a hormone that increases relaxation and sleepiness
- Biological clock resets every morning
The Structure of Sleep

- The brain cycles into two main states of sleep:
  - *Non-rapid eye movement (NREM)*
  - *Rapid eye movement (REM)*
- Stages of NREM sleep
  - Stage 1: relaxed, half-awake sleep
  - Stage 2: brain activity slows and movement stops
  - Stages 3 and 4: deep sleep
    - Blood pressure drops
    - Heart rate slows
    - Blood supply to brain minimized
Brain Structures Involved in Sleep and Waking

**Retina (eye)**
The job of the retina at the back of the eye is to sense changes in light levels during day and night. Once nerves in the retina are stimulated, the signal is sent through the optic nerve to the hypothalamus.

**Suprachiasmatic nuclei (SCN)**
These two tiny neural structures are located in the hypothalamus and function as a master biological clock. By monitoring levels of light entering the eyes and managing body temperature, hormone release, and metabolic rate, the SCN control falling asleep and awakening.

**Pineal gland**
Regulated by the SCN, the pineal gland releases melatonin, a hormone that elicits drowsiness and sleep.

**Pituitary gland**
Also regulated by the SCN, the pituitary gland releases growth hormone during sleep to help repair damaged body tissues.

**Pons**
Located in the brain stem, the pons is active during REM sleep, when it signals nerves in the spine to immobilize the body to prevent movement during dreams.
REM Sleep

- Rapid eye movement (REM) sleep
  - Dream stage: noticeable eye movements
  - *REM sleep paralysis*: no muscle tone
- Appears to give the brain the opportunity to file ideas and thoughts into memory
  - Scientists believe that creativity and novel ideas are more likely to flourish during REM
- Insufficient REM sleep may impair memory and the ability to learn new skills
- The *REM rebound effect* demonstrates the importance of REM sleep to the brain
Sleep Cycles

- Children and adolescents experience large quantities of “deep sleep”
- As people get older, high-quality, deep sleep becomes more elusive
- Sleep structure essentially same for men and women
  - Women have more slow wave sleep and experience more insomnia
One Night’s Sleep Cycles

[Graph showing sleep cycles with stages and REM periods marked.]
Insomnia

- Difficulty falling or staying asleep
- Thirty to forty percent of adults report experiencing insomnia at least a few nights a week
- Can be caused by stress, anxiety, medical problems, poor sleep environment, noisy or restless partners, schedule changes, etc.
- Distress over inability to fall asleep also contributes
Sleep Apnea

- Periods of nonbreathing during sleep
  - Also known as breathing-related sleep disorder
- Almost 40% of U.S. population may have some form of sleep apnea
  - 80-90% undiagnosed
- Central sleep apnea: brain fails to regulate diaphragm and other breathing mechanisms correctly (rare)
- Obstructive sleep apnea: upper airway obstructed during sleep
Obstructive Sleep Apnea
Sleepwalking Disorder

- Disorder in which a person rises out of an apparently deep sleep and acts as if awake
  - Affects 1-15% of population
  - Episodes typically last less than 10 minutes
- Most sufferers have no family history of the disorder
- May be brought on by excessive sleep deprivation, fatigue, stress, illness, excessive alcohol, use of sedatives
Sleep-Related Eating Disorder

- **Sleep-related eating disorder (SRED):** disorder in which a person rises from bed during the night and eats and drinks while asleep
  - Seventy-five percent are female
  - The person has no memory of the episode in the morning, and does not experience indigestion or feelings of fullness after the binge

- **Night eating syndrome:** person eats excessively during the night while awake
  - Repeatedly awakens during the night to eat, then eats very little during the day
Evaluating Your Sleep

- Take the sleep latency test
  - *Sleep latency*: amount of time it takes a person to fall asleep
- Check for symptoms of a sleep disorder
- Look at behavior change strategies
- If referred to a sleep clinic or lab, you may be asked to monitor your sleeping habits at home, or you may be evaluated at the lab
  - *Multiple Sleep Latency Test*: administered as an index of daytime sleepiness, usually repeated five times during the day
Establishing Good Sleep Habits

• Maintain a regular sleep schedule
• Create a sleep-friendly environment
• Avoid caffeine, nicotine, and alcohol
• Get regular exercise, but not close to bedtime
• Manage stress and establish relaxing bedtime rituals
• Avoid eating too close to bedtime
• Take a break from technology
• Remember air quality
• Get rid of dust mites
• Be smart about napping
• Consider your bed partner
Overall Sleep Quality for Types of Exercisers

Overall sleep quality for types of exercisers

- Vigorous: 14% Very bad, 57% Fairly bad, 26% Fairly good, 0% Very good
- Moderate: 18.5% Very bad, 57% Fairly bad, 20% Fairly good, 0% Very good
- Light: 20% Very bad, 60% Fairly bad, 16% Fairly good, 0% Very good
- No activity: 30.5% Very bad, 39% Fairly bad, 17% Fairly good, 0% Very good

Overall health quality for types of exercisers

- Vigorous: 8% Poor, 44% Fair, 47% Good, 0% Excellent
- Moderate: 10% Poor, 59% Fair, 30% Good, 0% Excellent
- Light: 19% Poor, 64% Fair, 15% Good, 0% Excellent
- No activity: 30% Poor, 51% Fair, 7% Good, 0% Excellent
Using Sleep Aids

- About 15% of adults use a prescription or over-the-counter sleep aid a few nights a week.
- Frequently-prescribed sleep medications induce sleep but suppress both deep sleep and REM sleep.
  - Daytime side effects include decreased memory and intellectual functioning.
- OTC products contain antihistamine.
  - Can cause dehydration, agitation, constipation.
  - Rebound insomnia can occur.
    - Worse than before medication taken.
Using Sleep Aids

- Complementary and alternative products and approaches include:
  - Herbal products, most commonly valerian
    - Can interact with other medication and drugs
  - Dietary supplements
    - Melatonin
  - Aromatherapy
    - No strong scientific evidence
  - Relaxation drinks
    - Not enough scientific research
- Important to consult with your physician