Chapter Five

Sleep
Endocrine System

• Made up of ductless glands that produce hormones
  • Hormones control various body functions/processes
  • Hormones are released slowly into the circulatory system to maintain homeostasis (works with the nervous system in this process)

• Pituitary Gland = “Master Gland”
  • Produces hormones that direct the functions of all the other glands
Sleep and Your Health

• Daily 24-hour cycle of waking and sleeping (Circadian Rhythm)

• Most adults need about 8 hours of sleep each night

• Typical college student sleeps only 6-7 hours a night on weekdays

• Sleeping in on the weekends does not fully recapture lost sleep
What Is Sleep?

- Sleep is a period of rest and recovery from the demands of wakefulness
- Can be described as a state of unconsciousness or partial consciousness from which a person can be roused by stimulation
The Health Effects of Sleep

- Overall health and quality of life
- Restoration and growth – during deep sleep
- Natural immune system increase
- A lack of sleep can lead to a breakdown in the body’s health-promoting processes
Sleep Deprivation and Sleep Disorders

- Often associated with serious physical and mental health conditions, including:
  - Cardiovascular disease
  - Metabolic disorders
  - Endocrine disorders
  - Immunological disorders
  - Respiratory disorders
  - Mental health disorders
  - Overweight and obesity
Sleep Deprivation

- Sleep deprivation is the lack of sufficient time asleep; a condition that impairs physical, emotional, and cognitive functioning
  - Daytime drowsiness is a key symptom
What Makes You Sleep?

- **Circadian Rhythms** ("circa"-about; "dia"-day)
- External cues, esp light
- **SCN** (**suprachiasmatic nuclei**; **part of the hypothalamus, directly behind optic n.**)
  - Internal “biological clock” controls body temperature and levels of alertness and activity; control is active during daytime
  - **SCN** signals the pineal gland to release **melatonin**
    - **Melatonin** is a hormone that increases relaxation and sleepiness
  - **SCN** signals the pituitary gland to release growth hormone during sleep
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.
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

- Rapid Eye Movement (REM) sleep
  - Dream stage: Noticeable eye movements
  - Brain activity similar to wakefulness
One Night's Sleep Cycles
REM Sleep and the Brain

• Most likely to dream during REM sleep
• 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
• *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
- Some experts believe sleep problems are caused by lifestyle choices
  - Changes in diet
  - Decreased mental stimulation and exercise
  - Daytime naps
  - Going to bed too early
Getting a Good Night's Sleep

• 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
• Establish relaxing bedtime rituals
• Avoid eating too close to bedtime
• Be smart about napping
• Get rid of dust mites and other bedroom pests
• Consider your bed partner
• Prescription or over-the-counter medications can be useful
• Consider complementary and alternative products or approaches