02
Chapter

Chapter 2

An Integrative Approach to Psychopathology

02
Chapter

Outline

- One-Dimensional vs. Multidimensional Models
- Genetic Contributions to Psychopathology
- Neuroscience and its Contributions to Psychopathology
- Behavioral and Cognitive Psychology
- Emotions
- Cultural, social and interpersonal factors
- Lifespan development

02
Chapter

Focus Questions

- *What are the features of unidimensional and multidimensional models of psychopathology?*
- *How do genes interact with environment to influence behavior?*
- *How do different brain regions and neurotransmitters influence psychopathology?*
- *How to behavioral, emotional and cognitive science influence explanations of mental illness?*
- *How do cultural factors affect psychopathology?*

One-Dimensional vs. Multidimensional Models (slide 1 of 2)

- One-dimensional Models
  - Explain behavior in terms of a single cause
  - Could mean a paradigm, school, or conceptual approach
  - Tend to ignore information from other areas
  - Example: Explaining obsessive-compulsive disorder as the result of family history alone

One-Dimensional vs. Multidimensional Models (slide 2 of 2)

- Multidimensional Models
  - Interdisciplinary, eclectic, and integrative
  - “System” of influences that cause and maintain suffering
  - Draw upon information from several sources
  - Abnormal behavior results from multiple influences

02 Chapter

Multidimensional Models of Abnormal Behavior

- Major Influences
  - Biological
  - Behavioral
  - Emotional
  - Social & cultural
  - Developmental
  - Environmental

What Caused Judy's Phobia? (slide 1 of 2)

- Behavioral factors
  - Conditioned response to sight of blood
- Biological factors
  - Genetics – inherited tendencies
  - Physiology (e.g., lightheadedness)
- Emotional influences
  - Fear and anxiety
- Social factors
  - E.g., attention from others

02 Chapter

What Caused Judy's Phobia? (slide 2 of 2)

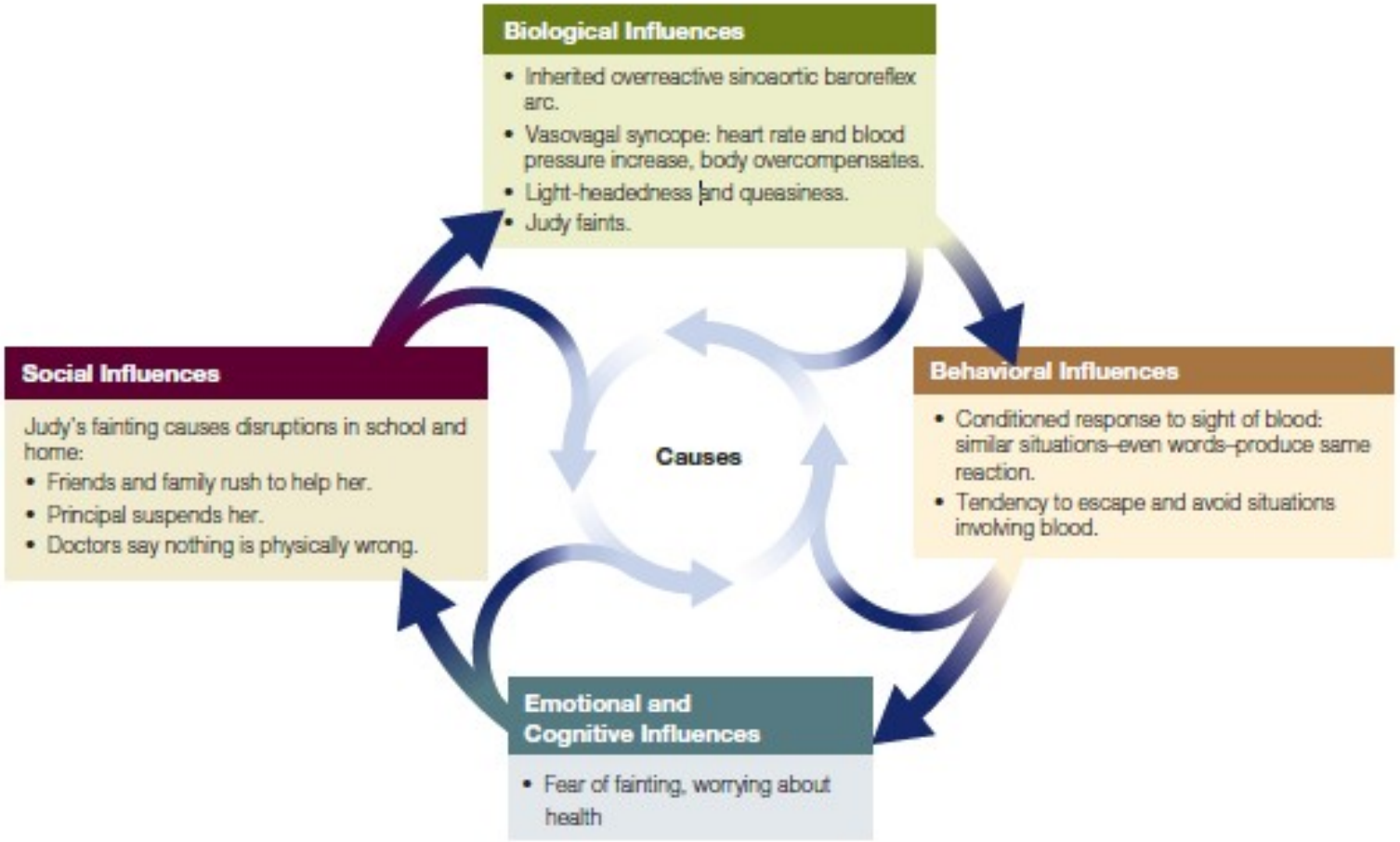


FIGURE 2.1
Judy's case.

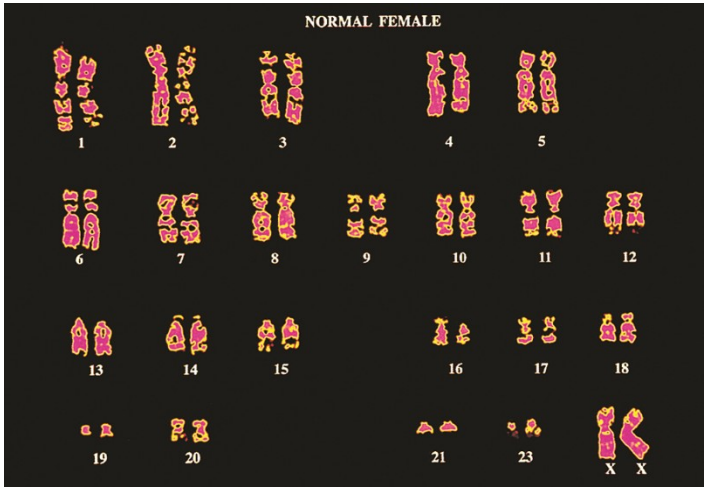
02 Chapter

Genetic Contributions to Psychopathology

- Nature of genes
  - Deoxyribonucleic acid (DNA) – the double helix
  - 46 chromosomes in 23 pairs
  - Dominant vs. recessive genes
  - Determine parts of physical and mental characteristics
    - Phenotype vs. genotype

02
Chapter

Karyotype of a Normal Female



02 Chapter

Genetic Contributions to Psychopathology

- Development and behavior is almost always polygenetic
  - Rare exceptions: single-gene determinants (e.g., Huntington's disease, phenylketonuria)
- Generally speaking, genes account for less than 50% of variations in psychopathology

02 Chapter

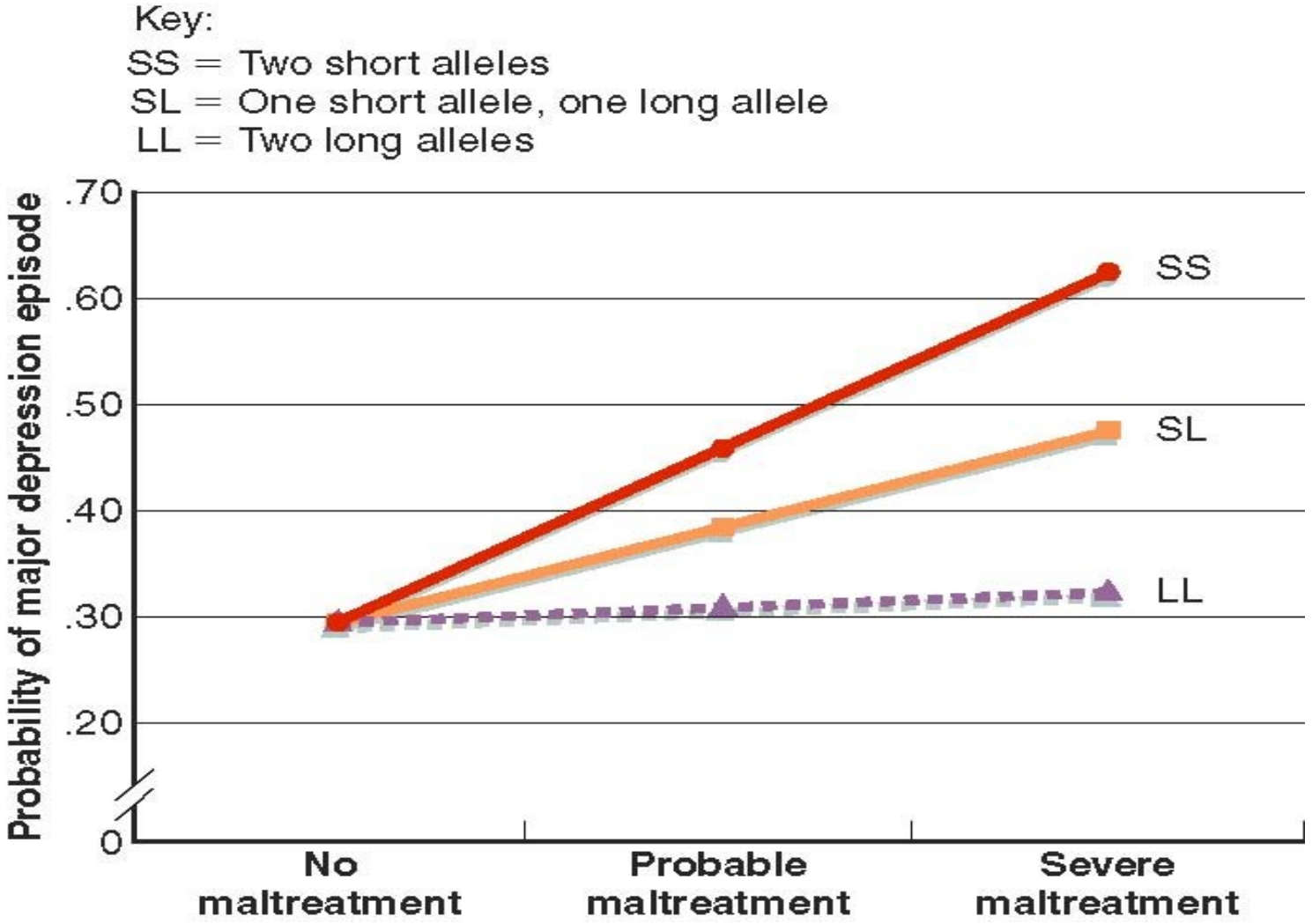
New Developments in the Study of Genes and Behavior

- One study: heritability estimates ranged from ~30 to 60% for cognitive traits
- Adverse life events can trump the influence of genes
  - Example: If only one identical twin experiences a traumatic life event, the twins' cognitive abilities may be more discrepant later
- Recent research suggests that genetic contributions should not be considered without also considering the environment

The Interaction of Genetic and Environmental Effects

- Eric Kandel and gene-environment interactions
  - The genetic structure of cells actually changes as a result of learning experiences
    - E.g., an inactive gene may become active because of environmental influences

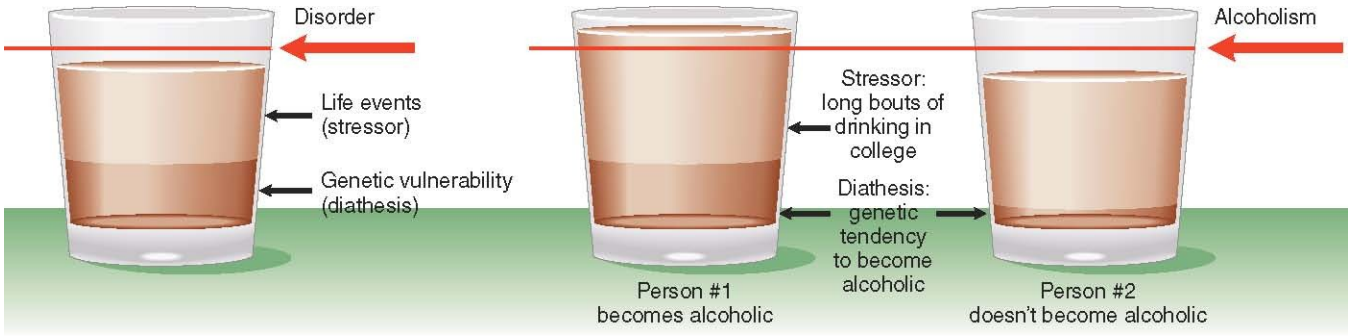
The Interaction of Genetic and Environmental Effects (slide 1 of 3)



The Interaction of Genetic and Environmental Effects (slide 2 of 3)

- Diathesis-stress model: Disorders are the result of underlying risk factors combining with life stressors that cause a disorder to emerge

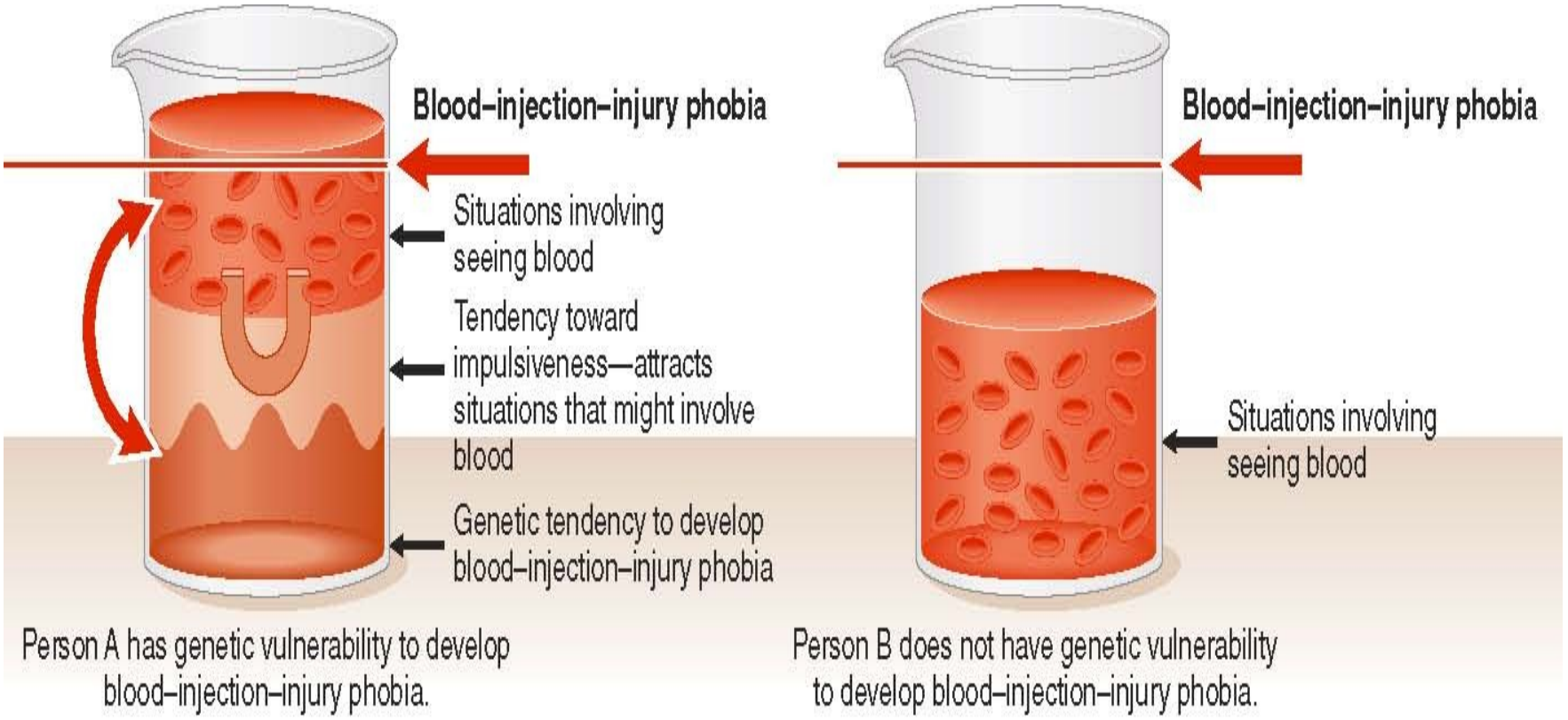
The Diathesis-Stress Model



The Interaction of Genetic and Environmental Effects (slide 3 of 3)

- Reciprocal gene-environment model
  - Outcomes are a result of interactions between genetic vulnerabilities and experience
  - Examples: depression, impulsivity
- Genetics may make people more likely to seek out certain environments, thus affecting their experiences

Gene-Environment Correlation model



02 Chapter

Epigenetics and the Nongenomic "Inheritance" of Behavior

- Epigenetics
  - Environmental influences (e.g., stress, nutrition) actually affect the expression of certain genes both for the individual and descendants

  - Cross fostering studies of development
  - Rats who were born to anxious moms (i.e. genetic influence = anxiety) but raised by calm moms (i.e. environmental influence = calm) grew up calm
    - i.e., environment "overrides" genes

02 Chapter

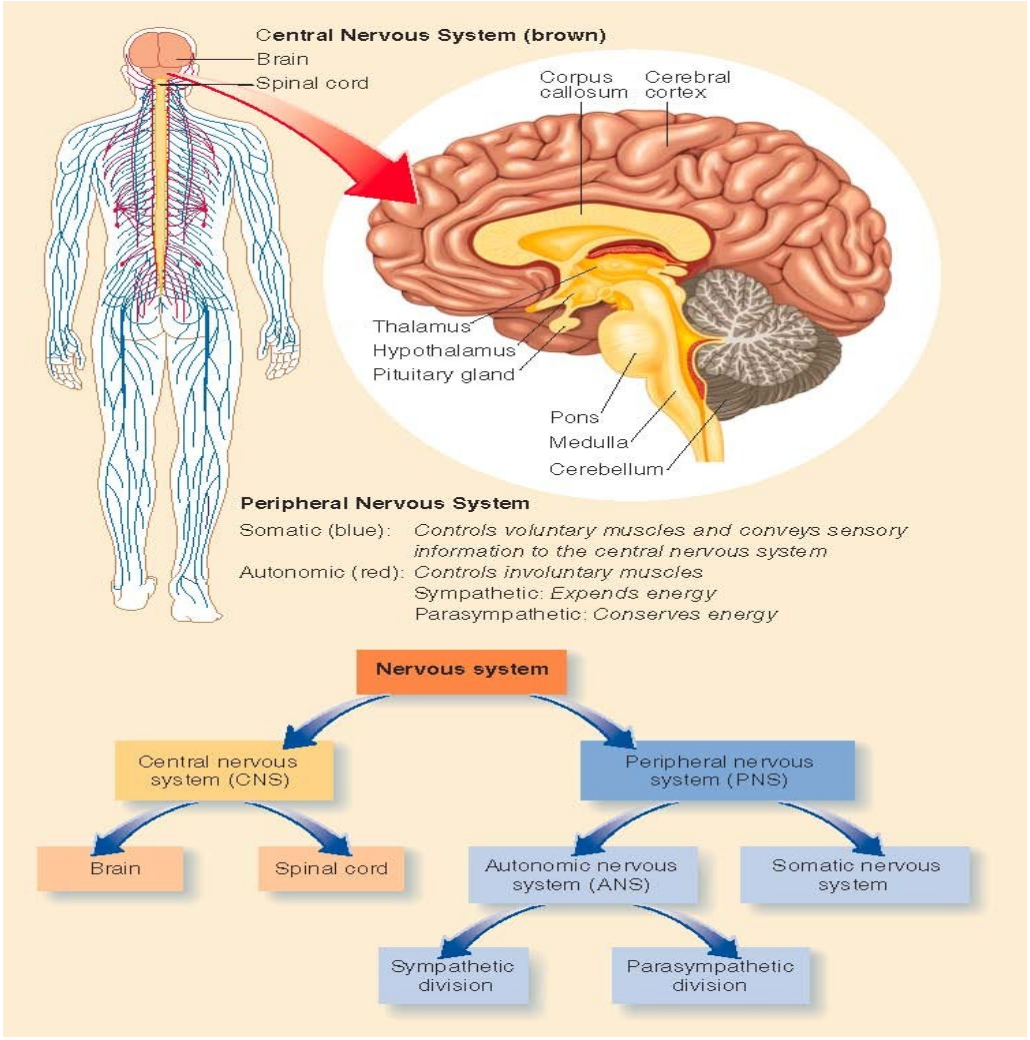
Neuroscience and its Contributions to Psychopathology

- The field of neuroscience
  - The role of the nervous system in disease and behavior

- The central nervous system
  - CNS
    - Brain and spinal cord
  - PNS
    - Somatic and autonomic branches

02
Chapter

The Central Nervous System



02 Chapter

Neuroscience and the Central Nervous System (slide 1 of 2)

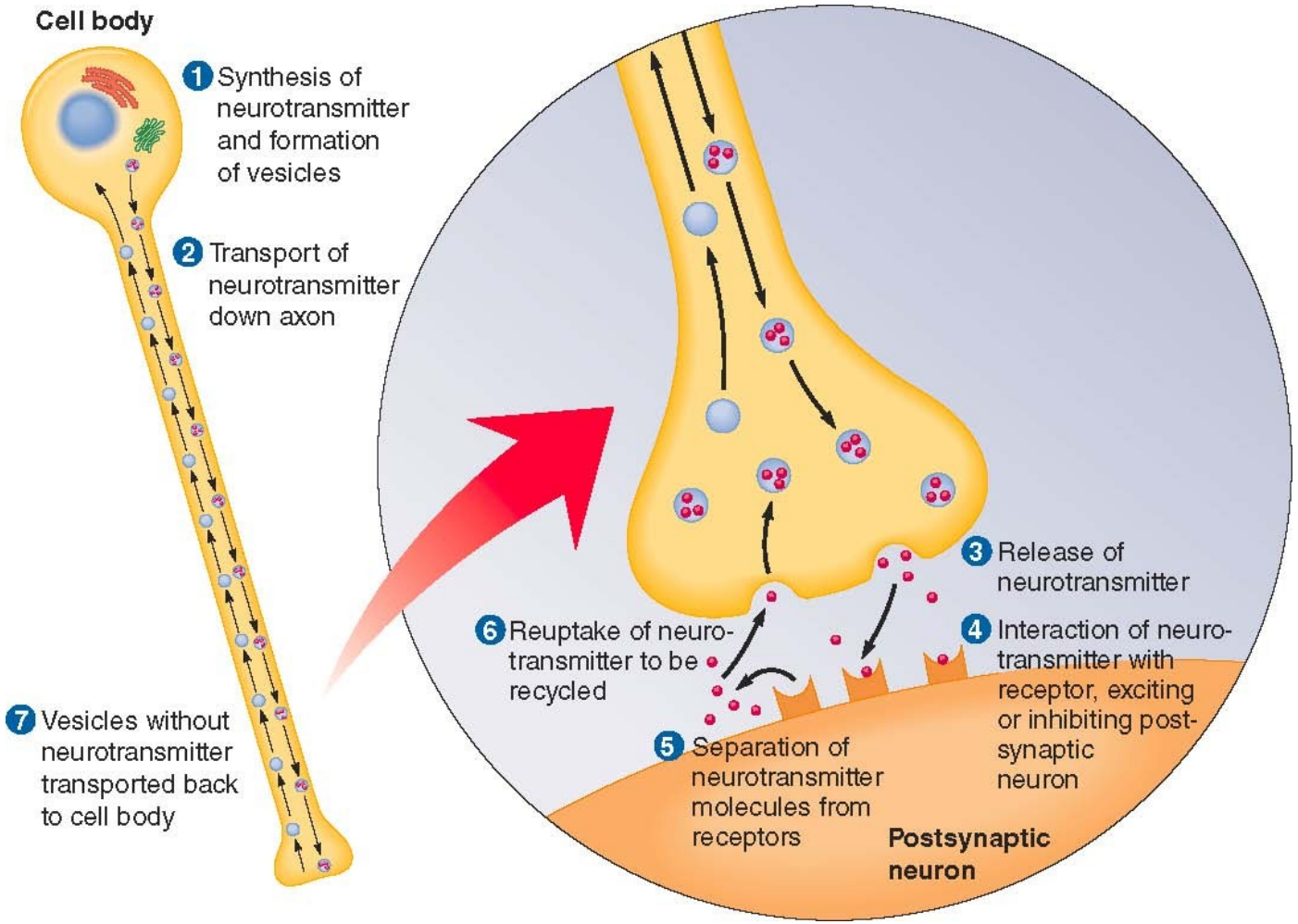
- The Neuron
  - Soma – cell body
  - Dendrites – branches that receive messages from other neurons
  - Axon – trunk of neuron that sends messages to other neurons
  - Axon terminals – buds at end of axon from which chemical messages are sent
  - Synapses – small gaps that separate neurons

Neuroscience and the Central Nervous System (slide 2 of 2)

- Neurons operate electrically, but communicate chemically
  - Neurotransmitters are the chemical messengers

02
Chapter

Neuron Transmissions



The Structure of the Brain

- Two main parts:
  - Brain stem
    - Basic functions
    - Contains hindbrain, midbrain, thalamus and hypothalamus (between brainstem and forebrain)
  - Forebrain
    - Higher-order functions
    - Contains limbic system, basal ganglia, cerebral cortex (larges part of the brain, the wrinkled outer structure)

Neuroscience and Brain Structure (slide 1 of 4)

- Hindbrain – regulates automatic processes
  - Medulla – heart rate, blood pressure, respiration
  - Pons – regulates sleep stages
  - Cerebellum – involved in physical coordination
- Midbrain
  - Coordinates movement with sensory input
  - Contains parts of the reticular activating system (RAS)

Neuroscience and Brain Structure (slide 2 of 4)

- Limbic system
  - Involved in emotional processing, aggression
  - Thalamus – receives and integrates sensory information
  - Hypothalamus – eating, drinking, aggression, sexual activity
- Basal ganglia: Thought to partially control motor activity

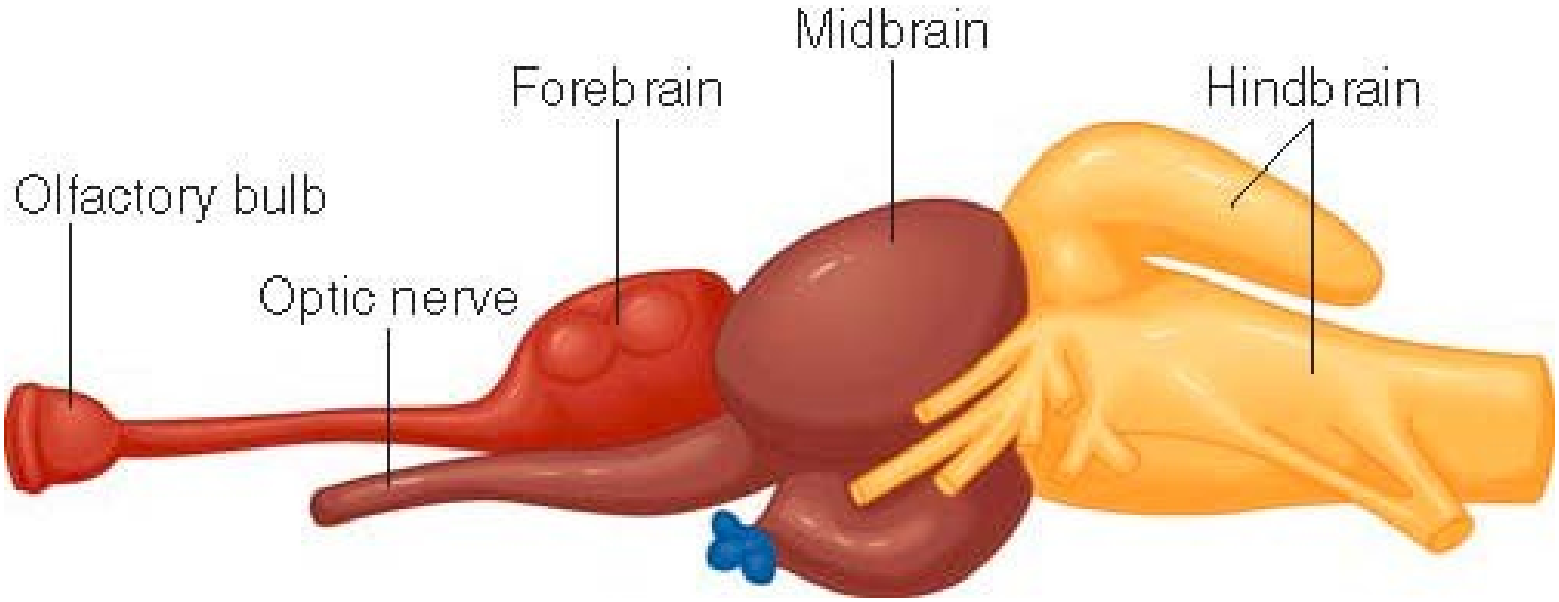
Neuroscience and Brain Structure (slide 3 of 4)

- Forebrain
  - Most sensory, emotional, and cognitive processing
  - Cerebral cortex contains two specialized hemispheres (left and right)
    - Each hemisphere has four lobes with specialized processes

Neuroscience and Brain Structure (slide 4 of 4)

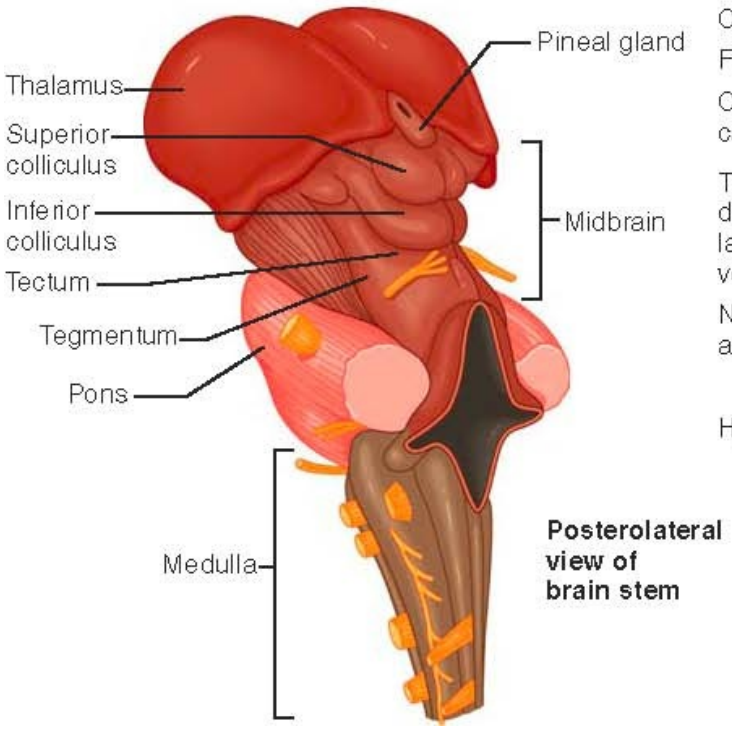
- Lobes of the Cerebral Cortex and some of their important functions
  - Frontal – thinking and reasoning abilities, memory
  - Parietal – touch recognition
  - Occipital – integrates visual input
  - Temporal – recognition of sights and sounds, long-term memory storage

The Divisions of the Brain

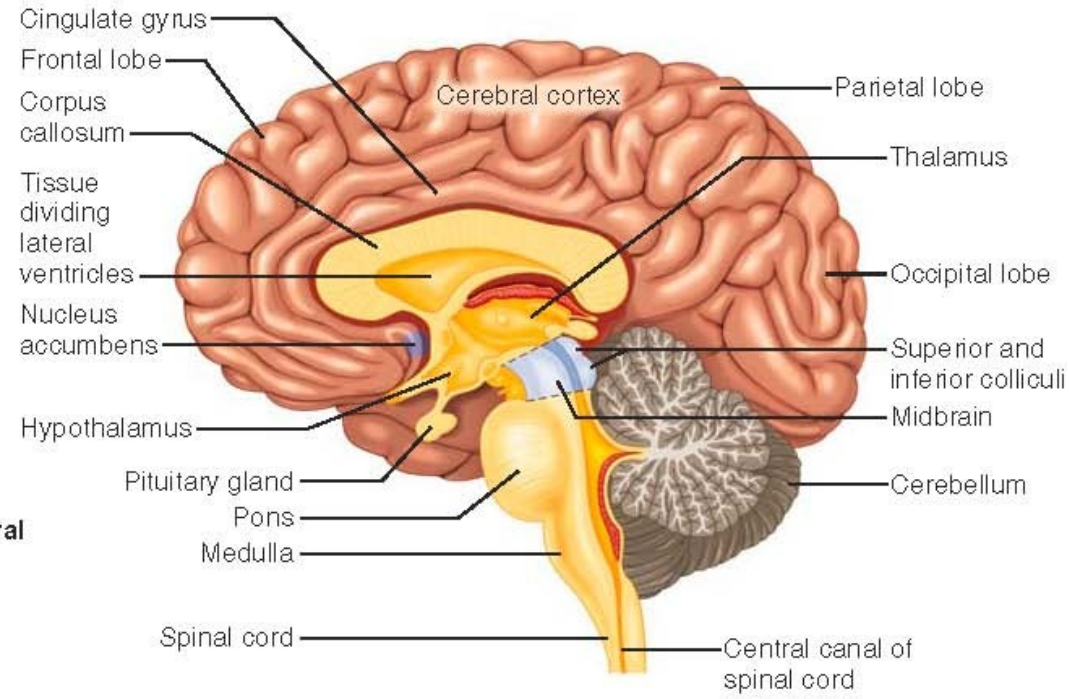


02
Chapter

Major Structures of the Brain

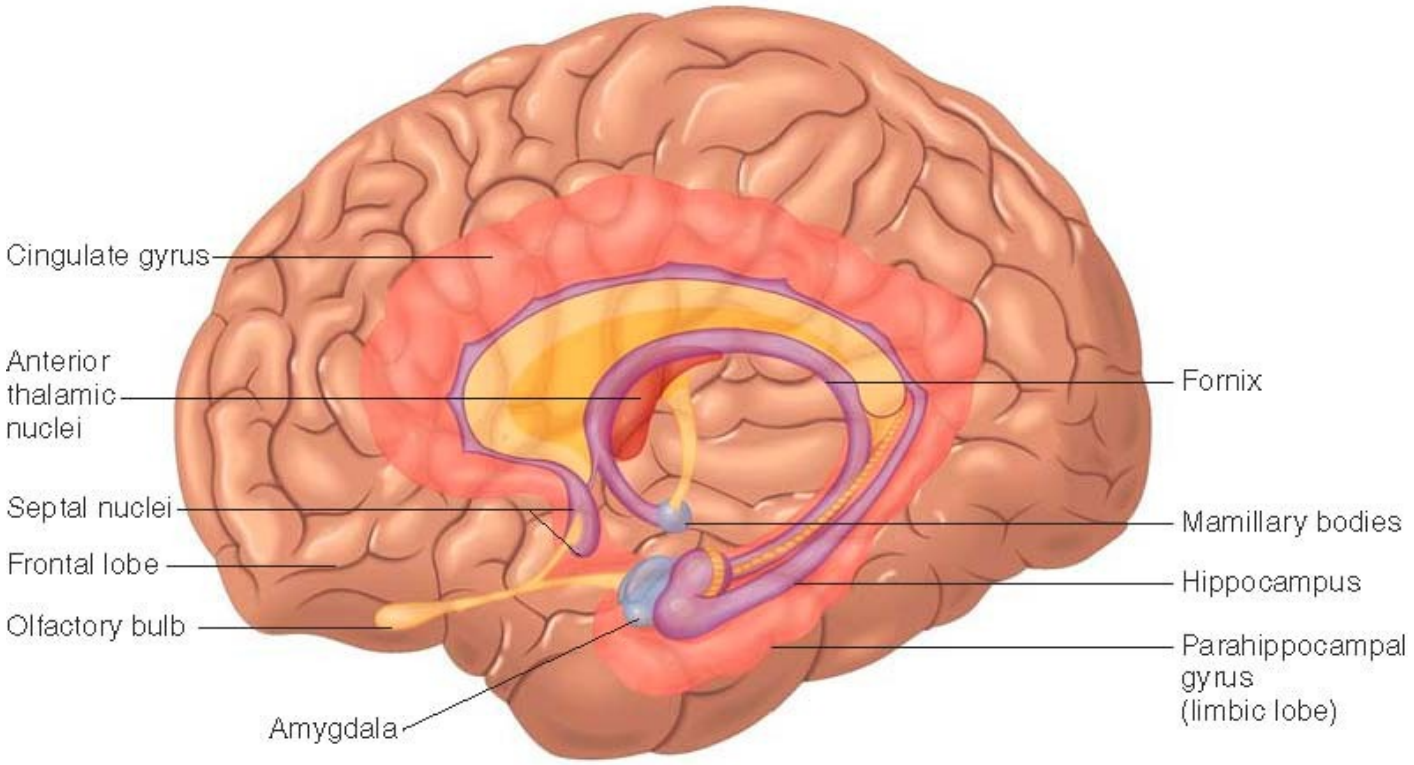


Posterolateral view of brain stem



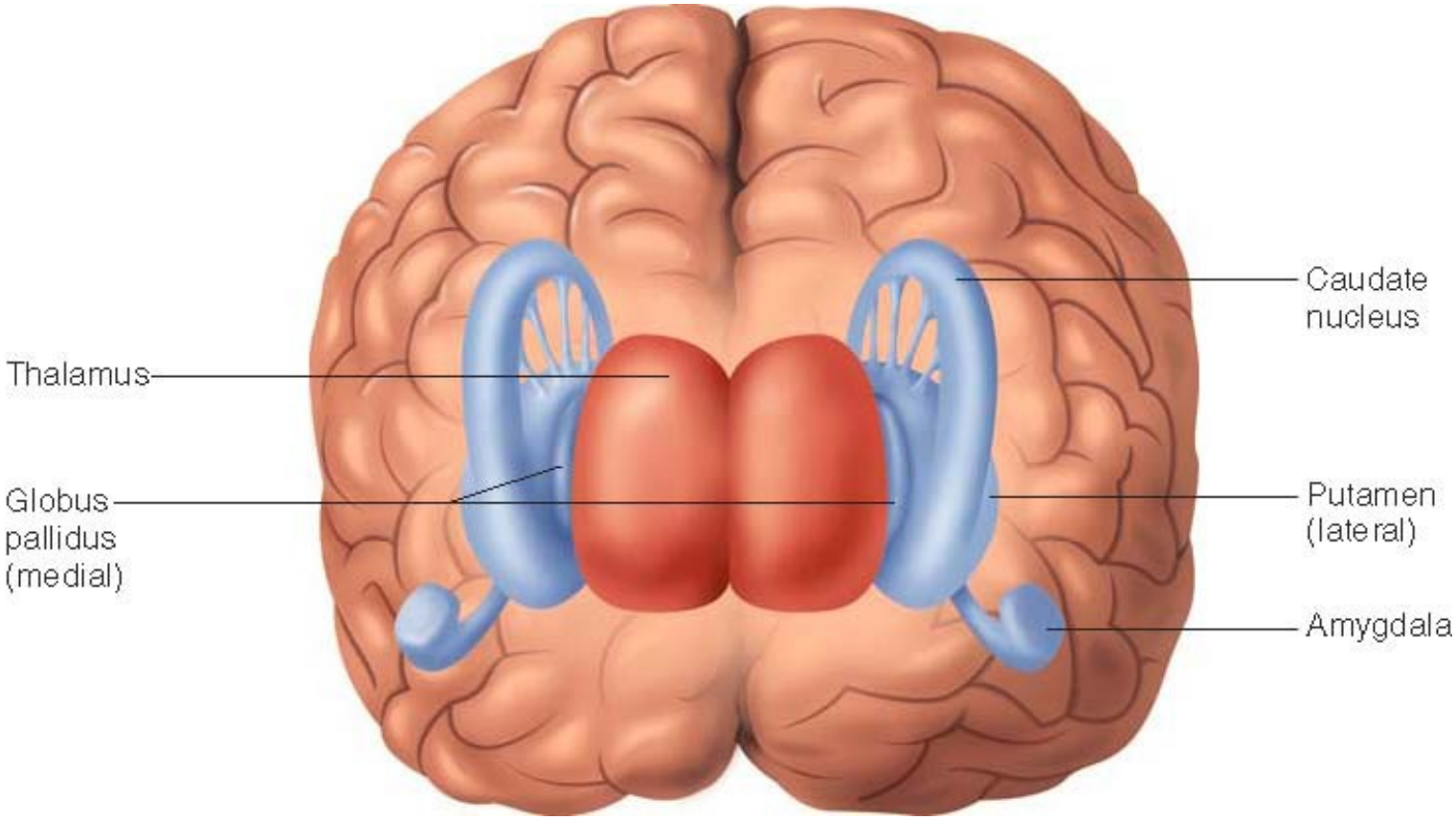
02
Chapter

The Limbic System



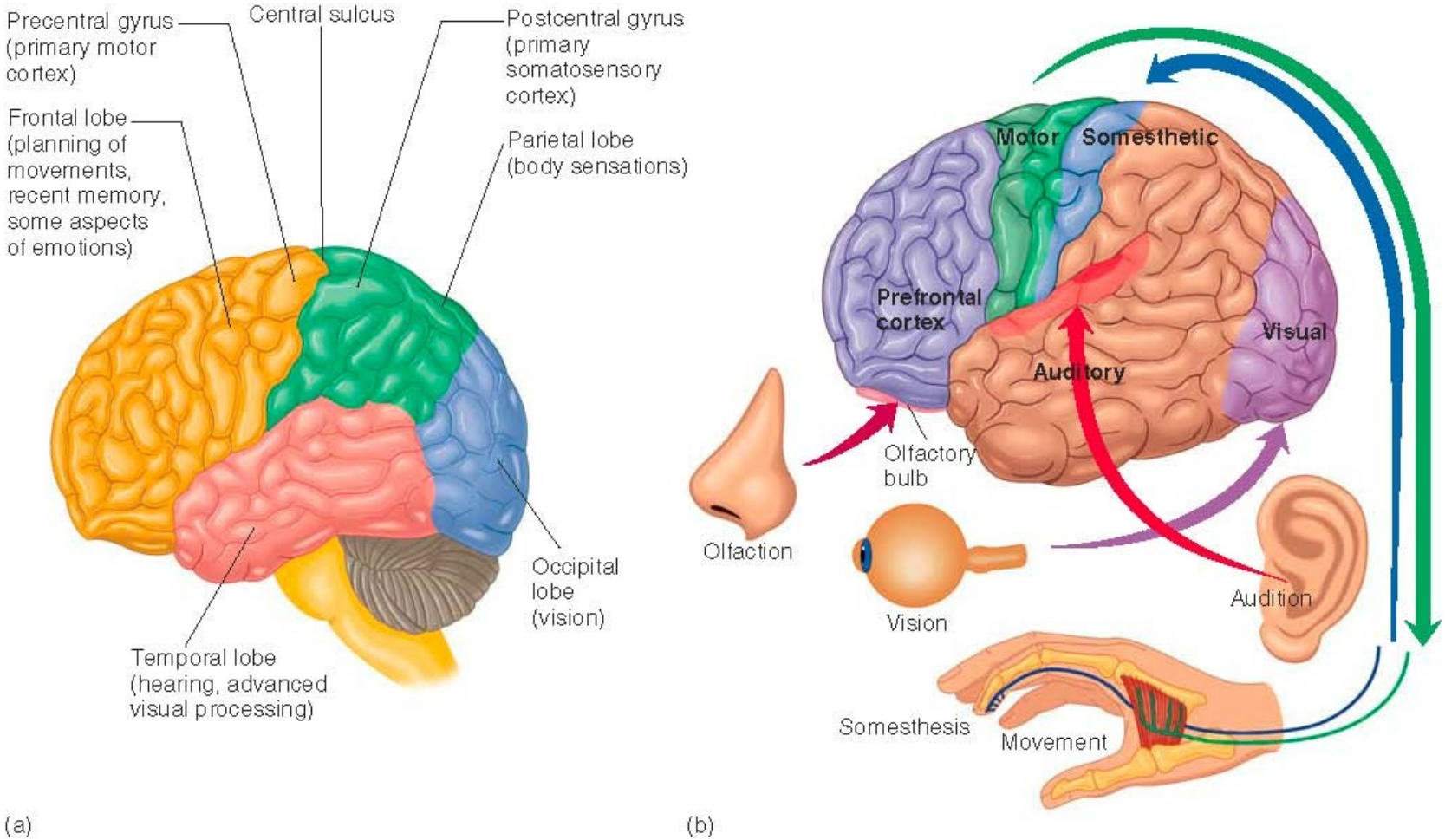
02
Chapter

The Basal Ganglia



02 Chapter

The Human Cerebral Cortex and its Functions

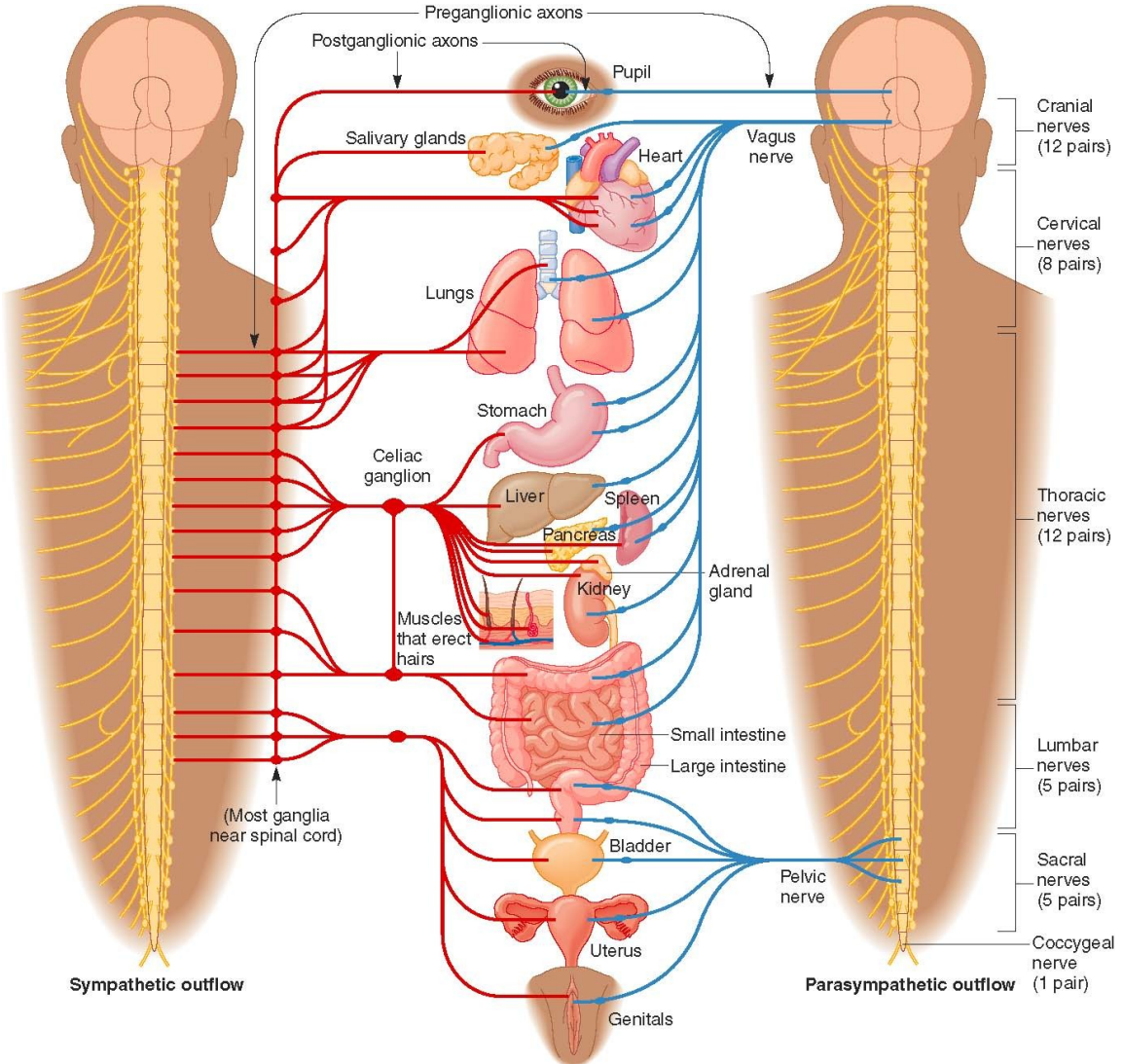


Peripheral Nervous System

- Somatic branch of PNS
  - Controls voluntary muscles and movement
- Autonomic branch of the PNS
  - Involuntary processes
  - Sympathetic and parasympathetic branches
  - Regulates cardiovascular system & body temperature
  - Also regulates the endocrine system and aids in digestion

02
Chapter

The Sympathetic and Parasympathetic Nervous Systems



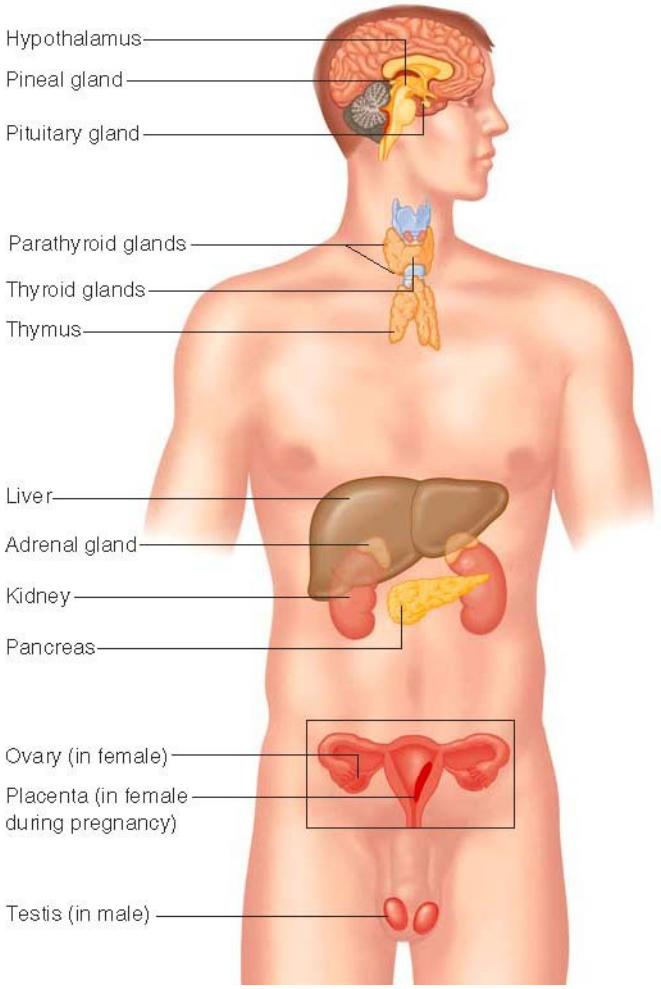
02
Chapter

Neuroscience: Endocrine Systems

- The Endocrine System
  - Regulates release of hormones
- The Hypothalamic-Pituitary-Adrenalcortical axis (HPA axis)
  - Integration of endocrine and nervous system function
- Dysregulated hormones implicated in some forms of psychopathology

02
Chapter

Endocrine Glands



02
Chapter

Neurotransmitters

- Functions of Neurotransmitters
  - “Chemical messengers” - transmit messages between brain cells
  - Other chemical substances in the brain
    - Agonists
    - Inverse agonists
    - Antagonists
    - Most drugs are either agonistic or antagonistic

02 Chapter

Neuroscience: Functions of Main Types of Neurotransmitters

- Main types of neurotransmitters
  - Serotonin (5-HT)
  - Glutamate
  - Gamma aminobutyric acid (GABA)
  - Norepinephrine
  - Dopamine

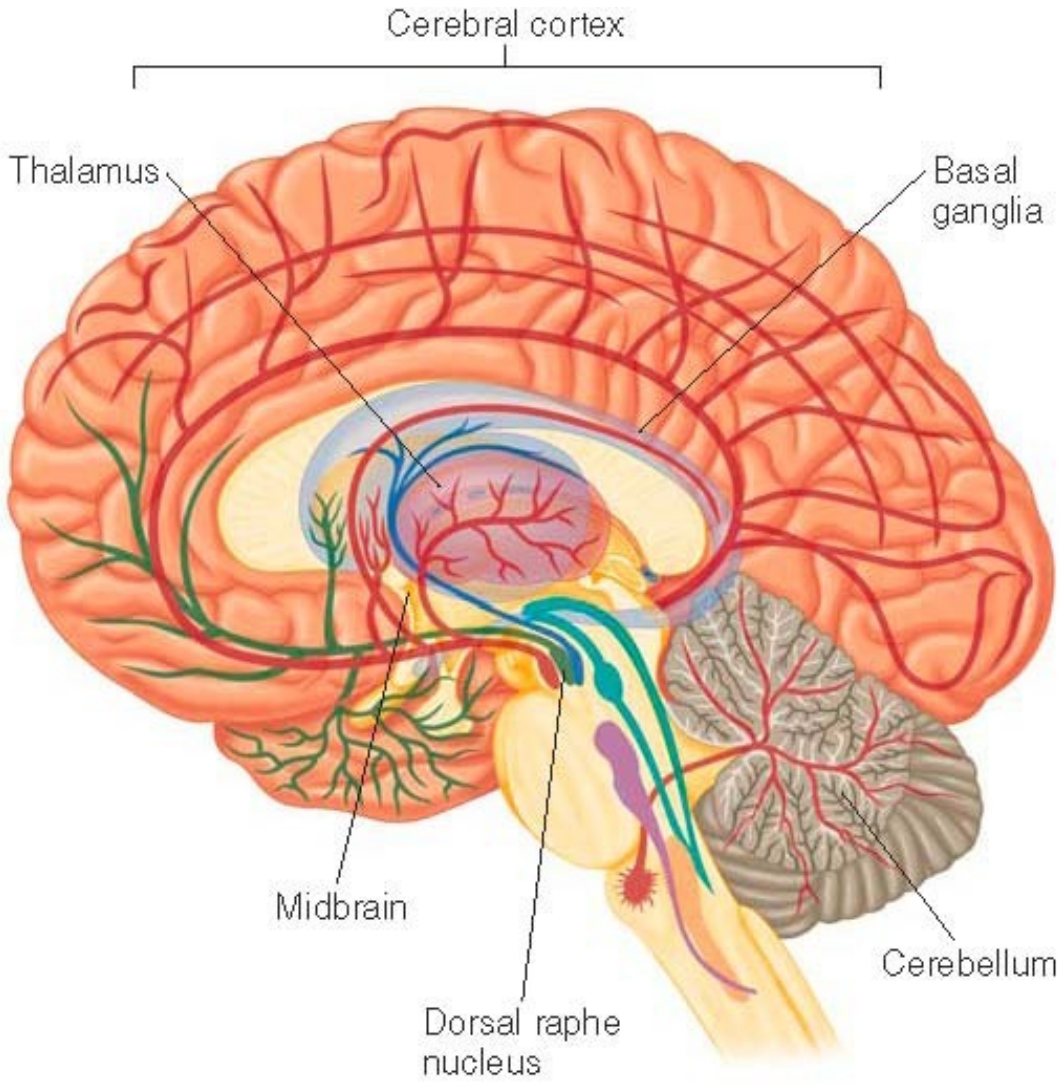
02
Chapter

Serotonin

- Also known as 5-hydroxytryptamine (5-HT)
- Influences information processing, behavior, mood and thoughts
- Dysregulated serotonin may contribute to depression
- Very low serotonin linked to instability and impulsivity

02
Chapter

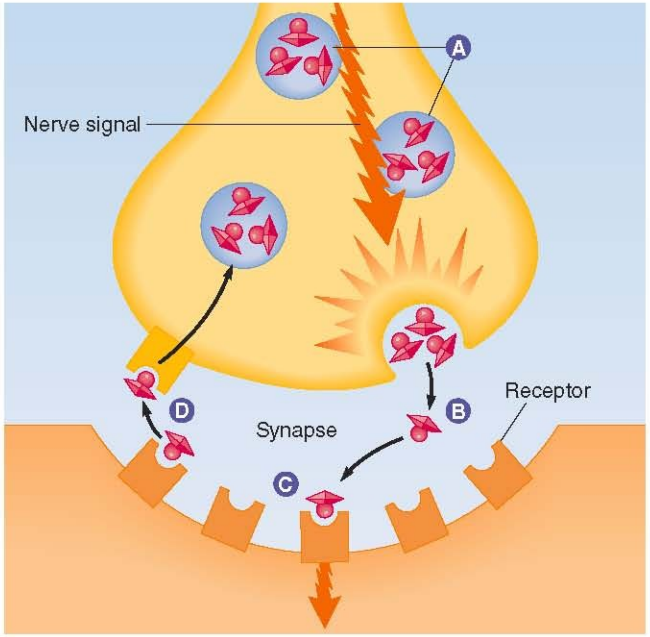
Serotonin Pathways in the Brain



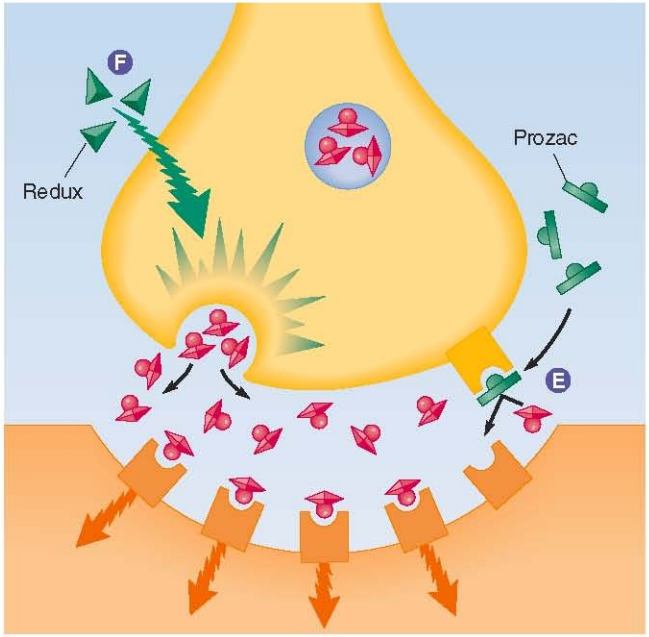
02
Chapter

Manipulating Serotonin in the Brain

How Neurotransmitters Work
Neurotransmitters are stored in tiny sacs at the end of the neuron (A). An electric jolt makes the sacs merge with the outer membrane, and the neurotransmitter is released into the synapse (B). The molecules diffuse across the gap and bind receptors, specialized proteins, on the adjacent neuron (C). When sufficient neurotransmitter has been absorbed, the receptors release the molecules, which are then broken down or reabsorbed by the first neuron and stored for later use (D).



How Serotonin Drugs Work
Prozac enhances serotonin's effects by preventing it from being absorbed (E). Redux and fenfluramine (antiobesity drugs) cause the release of extra serotonin into the synapse (F). Unfortunately, these drugs have been recalled by the FDA for dangerous cardiovascular side effects (see Chapter 8).



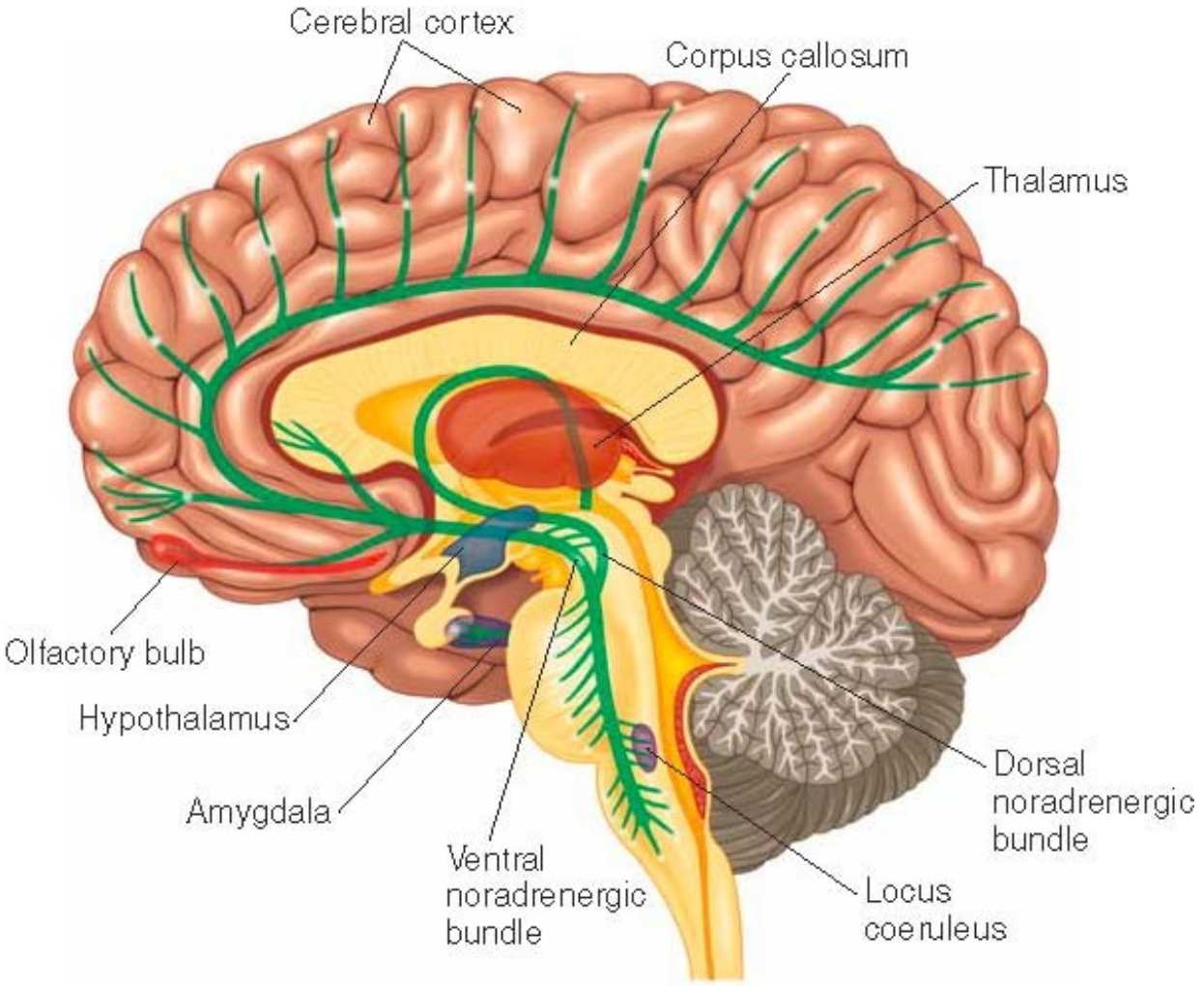
Receptor Variation
There are at least 15 different serotonin receptors, each associated with a different function.

Norepinephrine

- Also called noradrenaline
- Involved in alarm responses and basic bodily processes (e.g. breathing)

02
Chapter

Norepinephrine Pathways



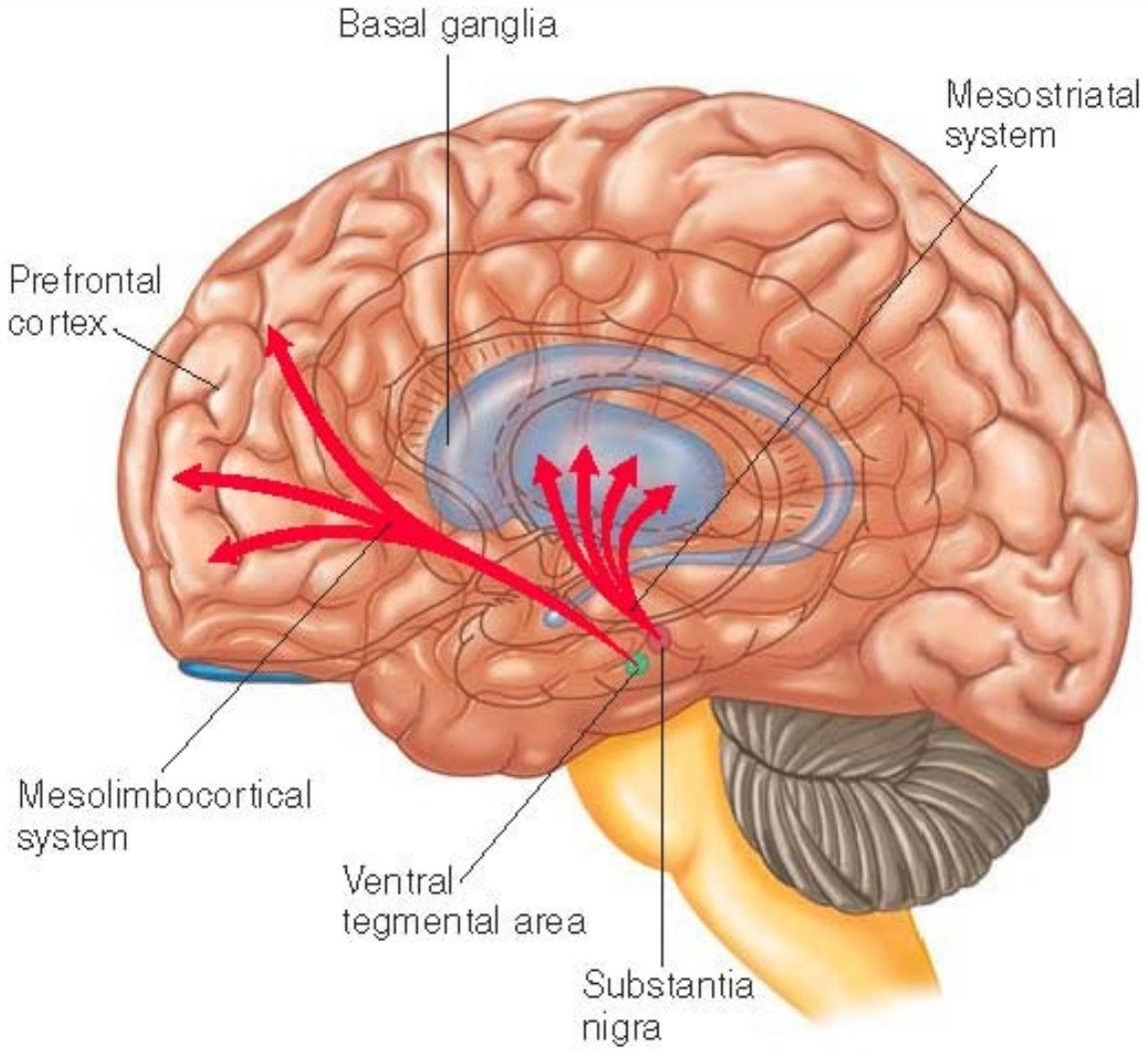
02
Chapter

Dopamine

- Implicated in depression and ADHD
- Link between excessive dopamine and schizophrenia
- Link between reduced dopamine and Parkinson’s disease

02
Chapter

Dopamine Pathways



Implications for Psychopathology

- Certain types of brain activity may be associated with abnormal behavior
- Example: OCD
  - Patients have increased activity in part of the frontal lobe (orbital surface)
  - Man developed OCD after
  - This overactivity is reduced after effective treatment

02 Chapter

Psychosocial Influences on Brain Structure and Function (slide 1 of 3)

- Psychosocial influences on the brain
  - Neurological activity may change as a result of psychotherapy > suggests that psychosocial influences affect brain function
  - Placebos may also change brain function
  - Psychotherapy
  - Stress and early development
- Interactions of psychosocial factors with brain structure and function
  - Developmental disorders
  - Environment and brain structures

Psychosocial Influences on Brain Structure and Function (slide 2 of 3)

- More stimulating environments appear to promote neurodevelopment
- Stress and early development
  - *Sense of control over environment* appears important

Psychosocial Influences on Brain Structure and Function (slide 3 of 3)

- Monkeys were given neurochemical designed to trigger extreme anxiety
  - Monkeys raised in uncontrollable environment responded with panic
  - Monkeys raised in controllable environment responded with aggression

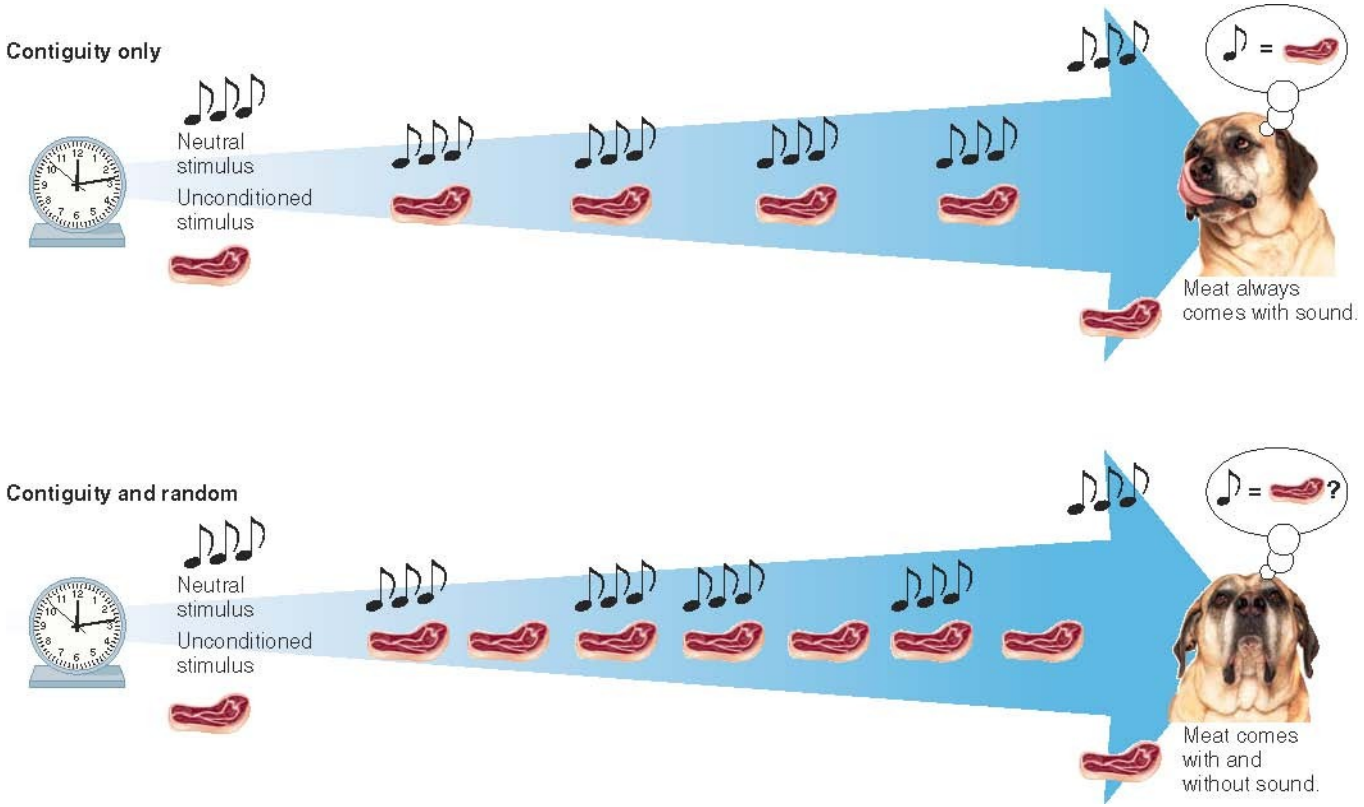
02 Chapter

The Contributions of Behavioral and Cognitive Science

- Conditioning and cognitive processes
  - Early research on classical conditioning: Simple associations are learned between two things that tend to occur together
  - Later research indicated that it is not always that simple – influenced by higher-order cognitive processes

02
Chapter

Classical Conditioning



The Contributions of Behavioral and Cognitive Science (slide 1 of 4)

- Other types of learning
  - Respondent and operant learning
    - Learn to repeat behaviors followed by desirable consequences and decrease behaviors followed by undesirable consequences

The Contributions of Behavioral and Cognitive Science (slide 2 of 4)

- Other types of learning
  - Learned helplessness
    - First demonstrated in animal models, but may contribute to the maintenance of depression
    - Rats given occasional shocks
      - Gave up trying to control the shocks if attempts were ineffective (i.e., “learned” not to bother trying)

The Contributions of Behavioral and Cognitive Science (slide 3 of 4)

- Other types of learning
  - Social learning
    - Based on research of Albert Bandura
    - Modeling and observational learning: Learn to copy the behaviors that seem to turn out well for other people

The Contributions of Behavioral and Cognitive Science (slide 4 of 4)

- Other types of learning
  - Prepared learning
    - It is easier to learn associations that would have been helpful to our ancestors
    - Example: Easier to acquire a fear of spiders because it was adaptive for our ancestors to fear (possibly poisonous) spiders

Cognitive Science and the Unconscious

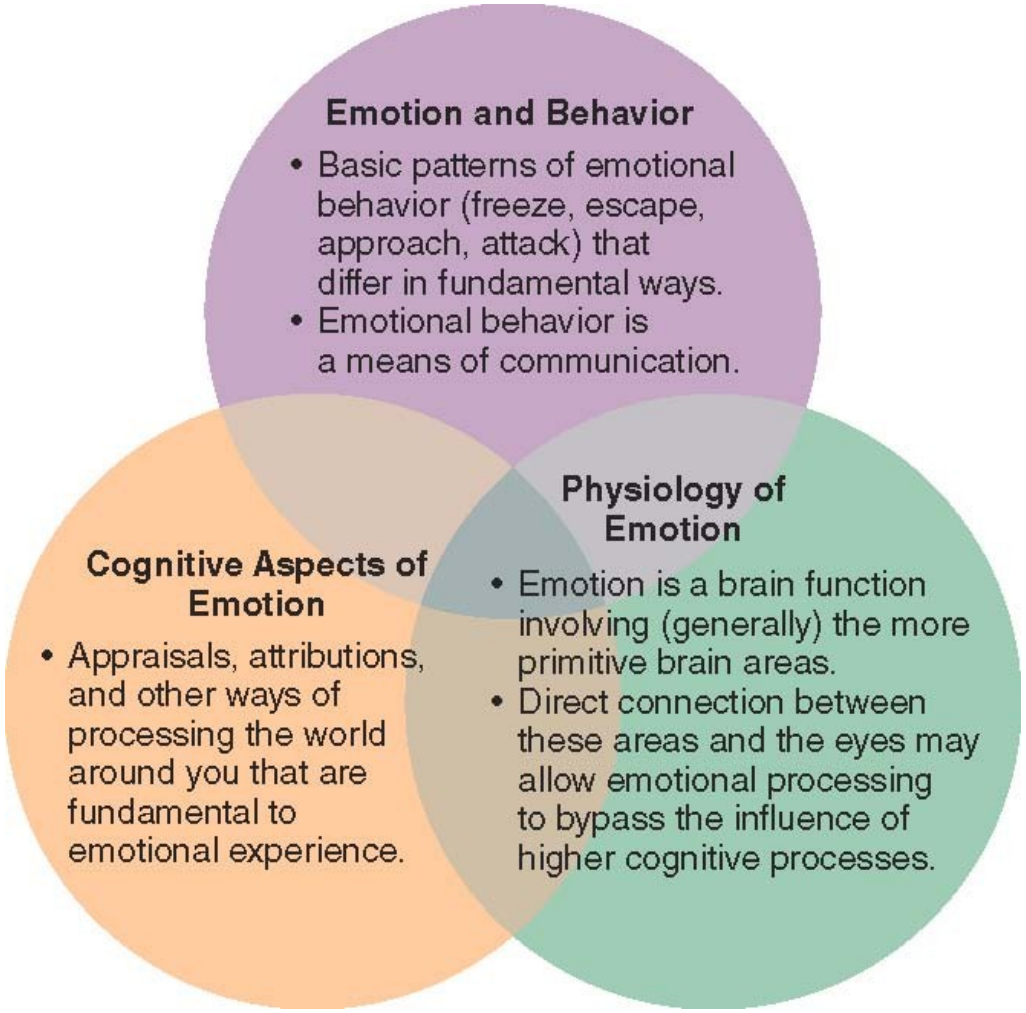
- There may be a dissociation between behavior and consciousness
  - Implicit memory
    - Acting on the basis of experiences that are not recalled
  - Blind sight
    - Some people who are blind can still sense objects that would be in their visual field even if they do not experience sight
  - Some experimental tests reveal implicit processing

02 Chapter

The Role of Emotion in Psychopathology

- The nature of emotion
  - To elicit or evoke action
  - Action tendency different from affect and mood
- Components of emotion
  - Behavior, physiology, and cognition
  - Example of fear: Anxious thoughts, elevated heart rate, tendency to flee

Components of Emotion



Anger and Your Heart

- Chronic hostility increases risk for heart disease
- This effect is stronger than many physiological risk factors
- Efficiency of heart pumping is decreased when angry
  - This effect is reversed when people practice forgiveness toward an offense

Emotions and Psychopathology

- Suppressing negative emotions increases sympathetic nervous system activity
- Dysregulated emotions are key features of many mental disorders
  - Example: Panic attack = fear occurring at the wrong time

02 Chapter

Cultural, Social, and Interpersonal Factors in Psychopathology (slide 1 of 3)

- Cultural factors
  - Influence the form and expression of behavior
- Example: Children raised to be autonomous are less fearful
- Example: Culturally-bound fears
  - Susto (Latin America): symptoms of anxiety occurring when an individual believes (s)he has been struck by black magic

Cultural, Social, and Interpersonal Factors in Psychopathology (slide 2 of 3)

- Gender effects
  - Men and women may differ in emotional experience and expression
  - Examples:
    - 90% of insect phobia sufferers are female
    - Most bulimia sufferers are female
    - Alcohol use disorders are more common in men
  - May be related to gender roles: Certain ways of coping with emotion are more acceptable for men or women

Cultural, Social, and Interpersonal Factors in Psychopathology (slide 3 of 3)

- Effect of social support
  - Low social support related to mortality, disease, and psychopathology
  - Frequency and quality important
  - Social support especially important in the elderly

Social Stigma of Psychopathology

- Culturally, socially, and interpersonally situated
- Problems with social stigma
  - May limit the degree to which people express mental health problems
    - E.g., concealing feelings of depression > unable to receive support from friends
  - May discourage treatment seeking

02 Chapter

Global Incidence of Psychological Disorders

- Mental health accounts for 13% of world disease burden
- Mental health care very limited in developing countries
  - Sub-Saharan Africa: only one psychiatrist per 2 million people
- Even in the US, only 1 in 3 people with a mental disorder has received any treatment

02 Chapter

Life-Span and Developmental Influences Over Psychopathology

- Life-span developmental perspective
  - Addresses developmental changes
  - Influence and constrain what is normal and abnormal
- The principle of equifinality
  - From developmental psychopathology
  - Several paths to a given outcome
  - Paths vary by developmental stage

Summary of the Multidimensional Perspective of Psychopathology (slide 1 of 2)

- Multiple causation
  - The rule, not the exception
- Take a broad, comprehensive, systemic perspective
  - Biological and neuroscientific
  - Cognitive and emotional
  - Social, cultural, and developmental factors

Summary of the Multidimensional Perspective of Psychopathology (slide 2 of 2)

- A multidimensional, comprehensive approach puts us in the best position to:
  - Understand the causes of psychopathology
  - Alleviate and prevent psychopathology