

02

Chapter

Chapter 2

An Integrative Approach to Psychopathology

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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

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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 do behavioral, emotional and cognitive science influence explanations of mental illness?*
- *How do cultural factors affect psychopathology?*

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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

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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

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Multidimensional Models of Abnormal Behavior

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

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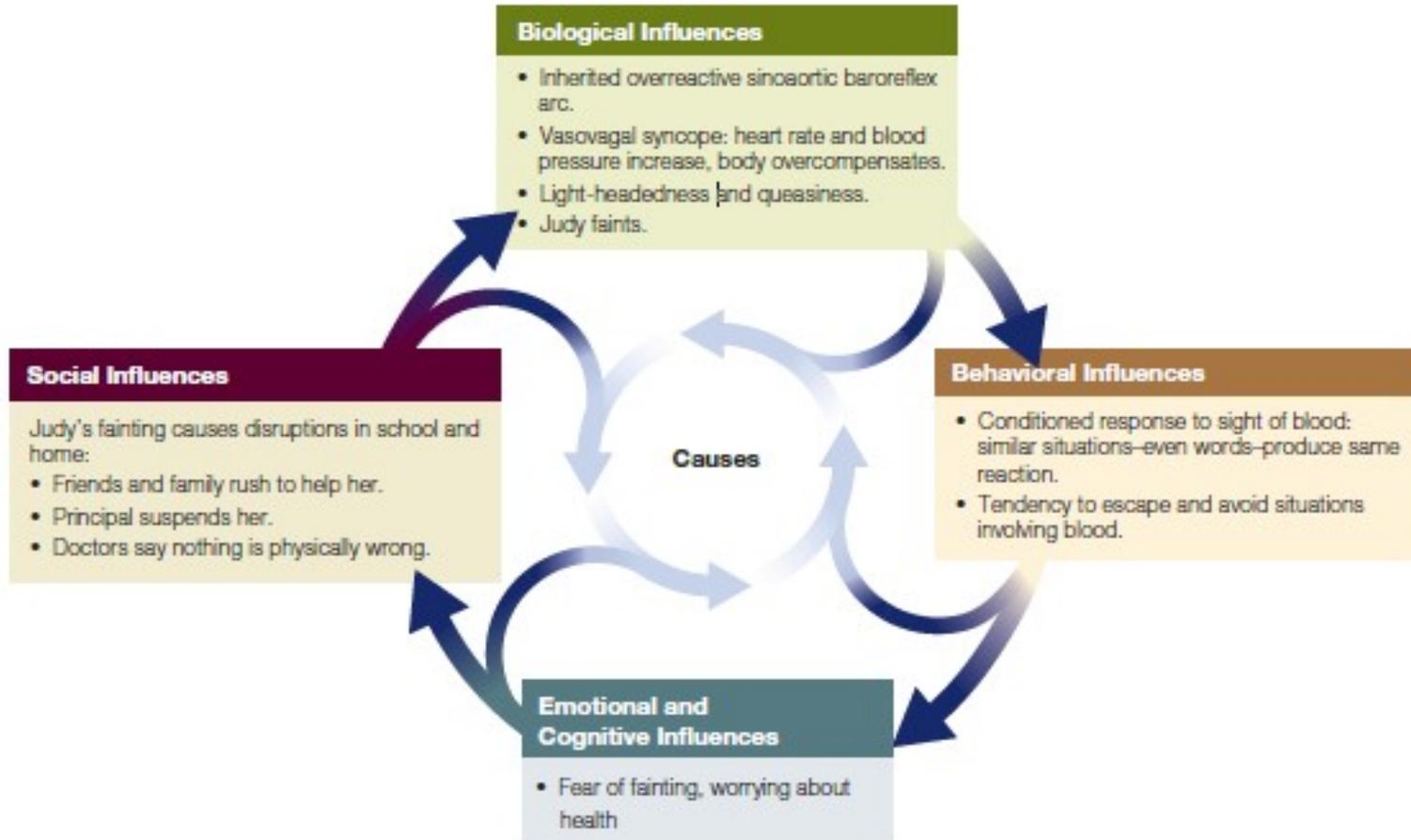
What Caused Judy's Phobia? (slide 1 of 2)

- 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

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



● **FIGURE 2.1**
Judy's case.

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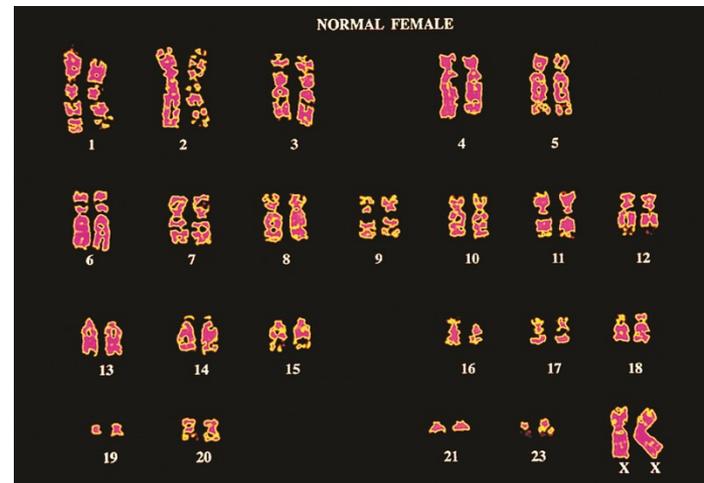
Genetic Contributions to Psychopathology

- 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

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Karyotype of a Normal Female



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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

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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

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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

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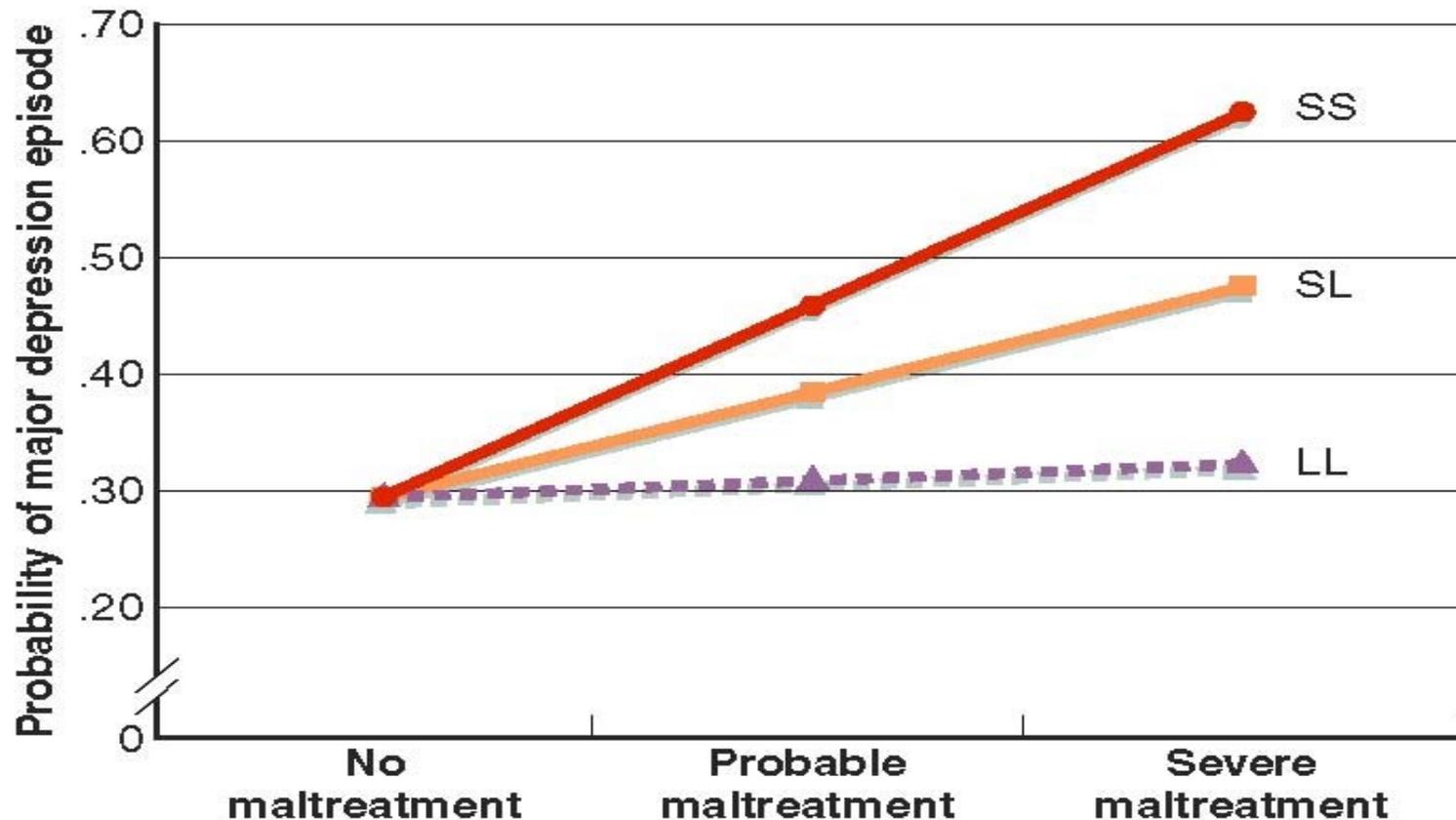
The Interaction of Genetic and Environmental Effects (slide 1 of 3)

Key:

SS = Two short alleles

SL = One short allele, one long allele

LL = Two long alleles



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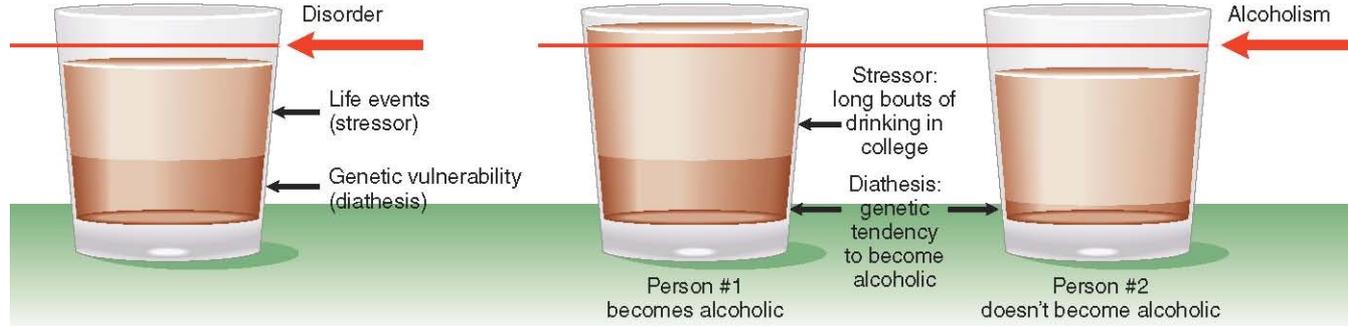
The Interaction of Genetic and Environmental Effects (slide 2 of 3)

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

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The Diathesis-Stress Model



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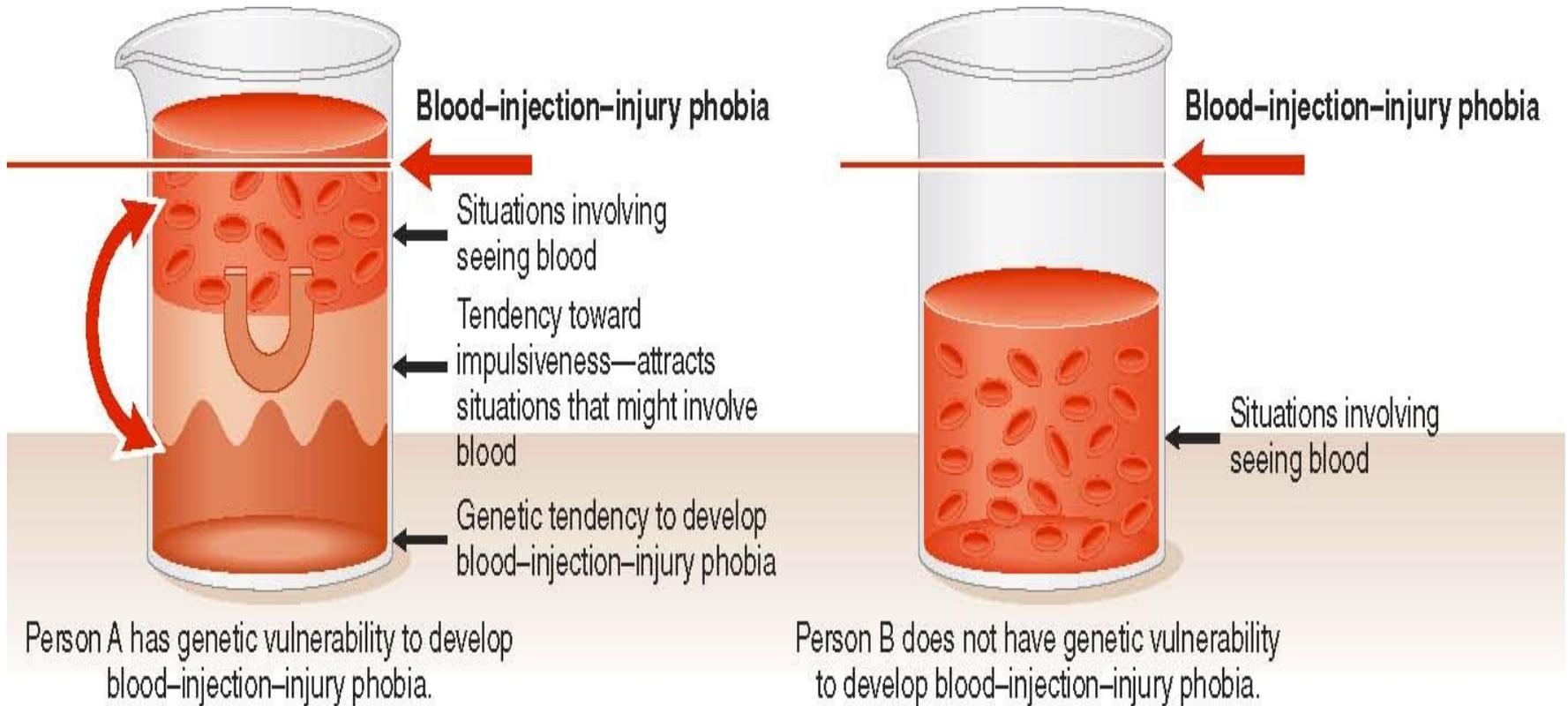
The Interaction of Genetic and Environmental Effects (slide 3 of 3)

- 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

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Gene-Environment Correlation model

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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

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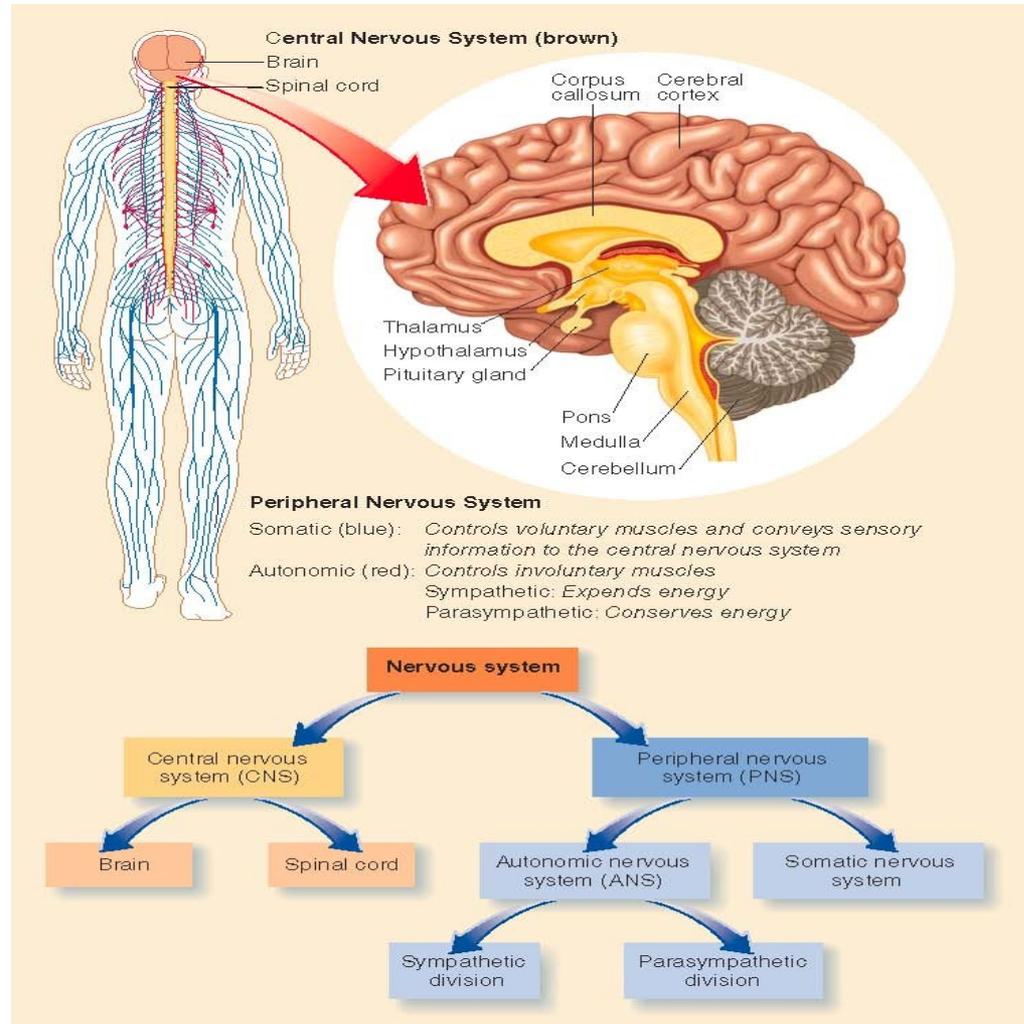
Neuroscience and its Contributions to Psychopathology

- 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

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The Central Nervous System



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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

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

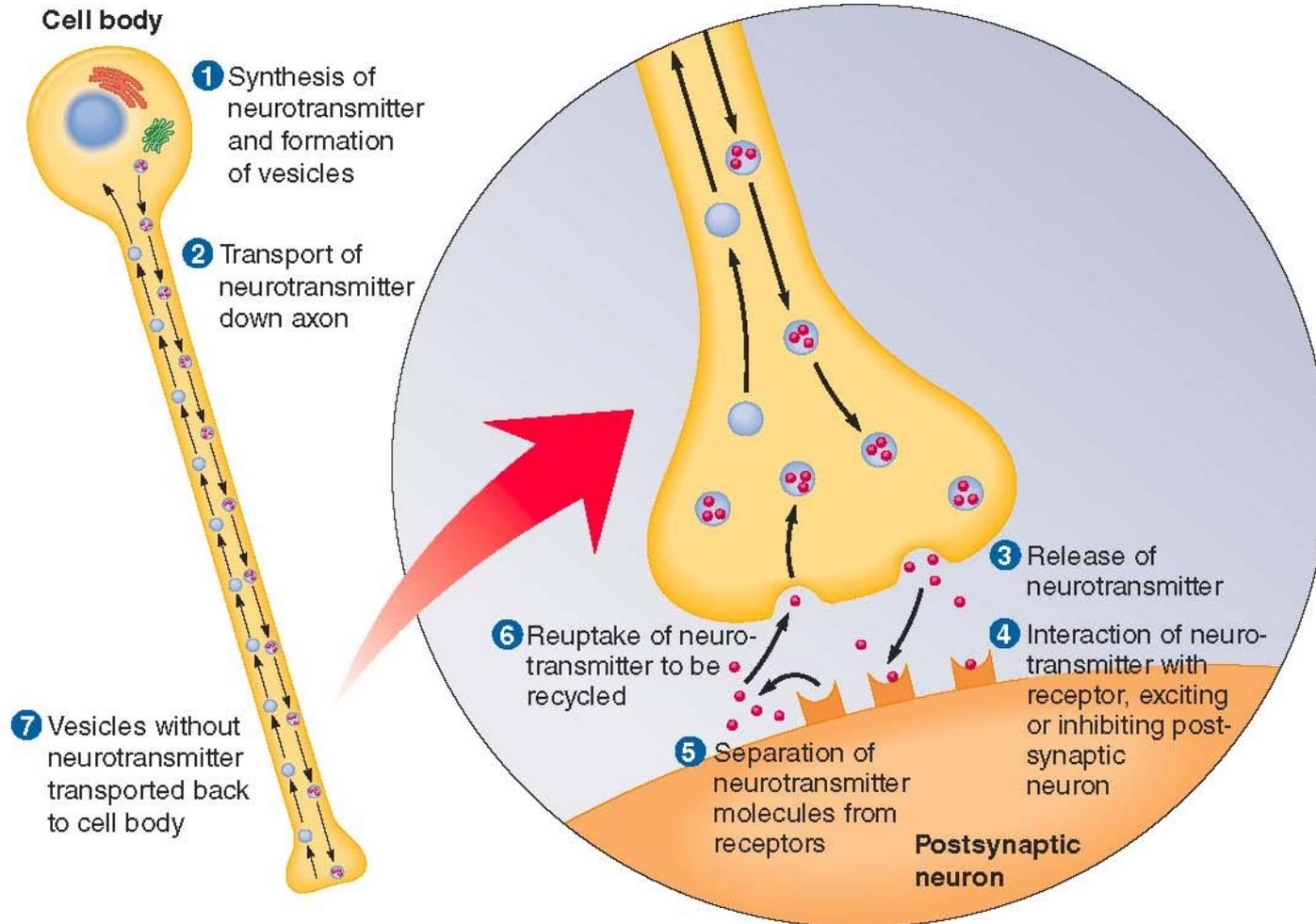
Chapter

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

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Neuron Transmissions



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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)

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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)

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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

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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

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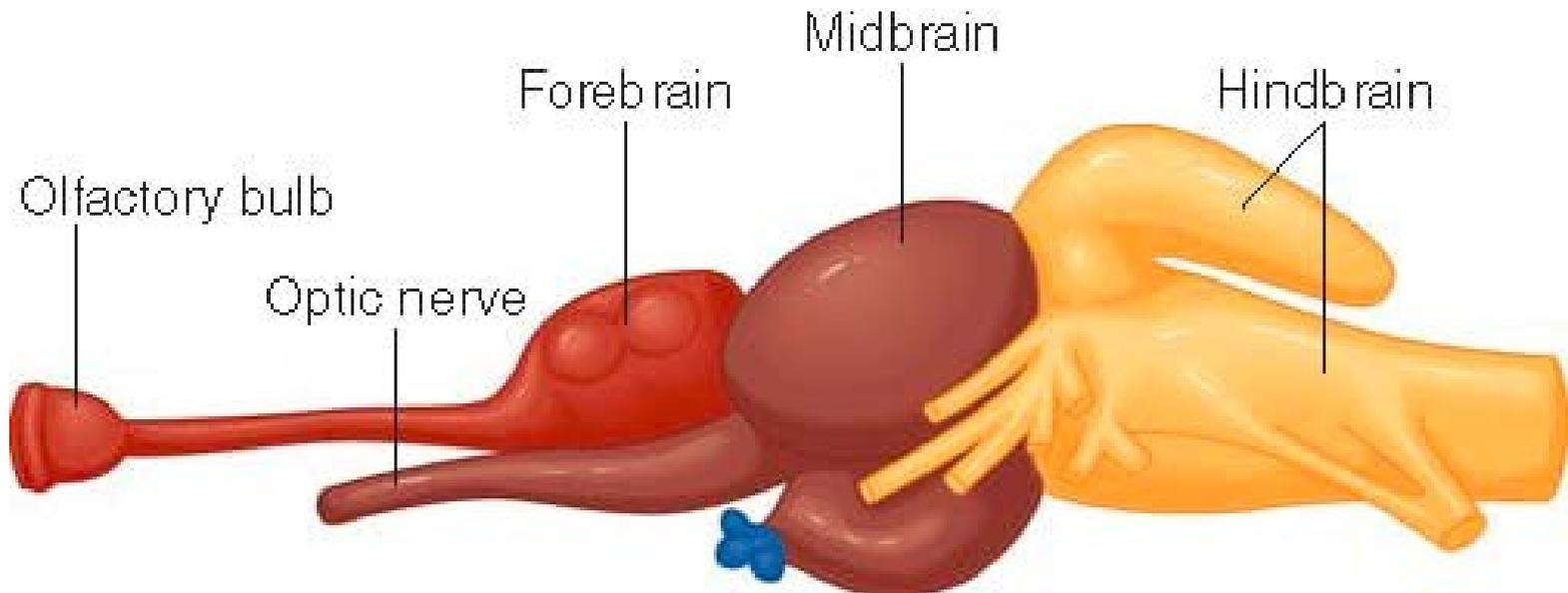
Neuroscience and Brain Structure (slide 4 of 4)

- 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

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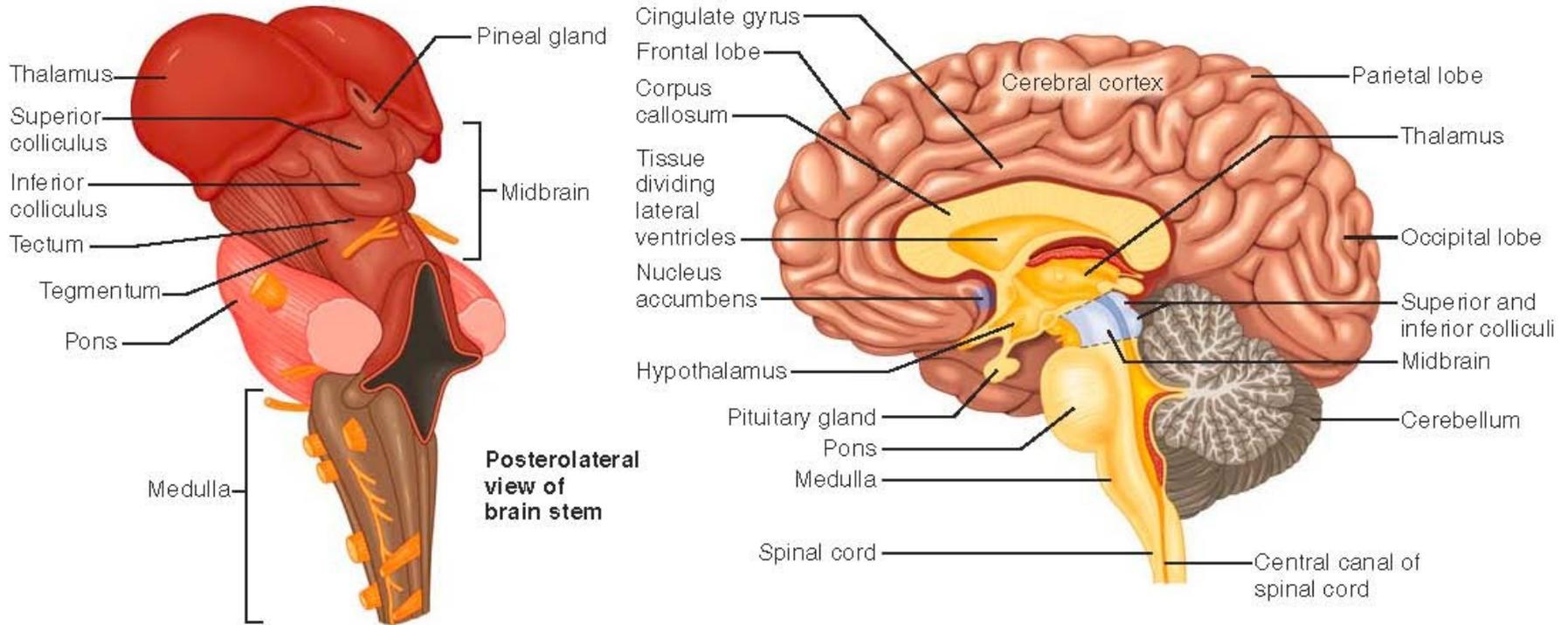
The Divisions of the Brain



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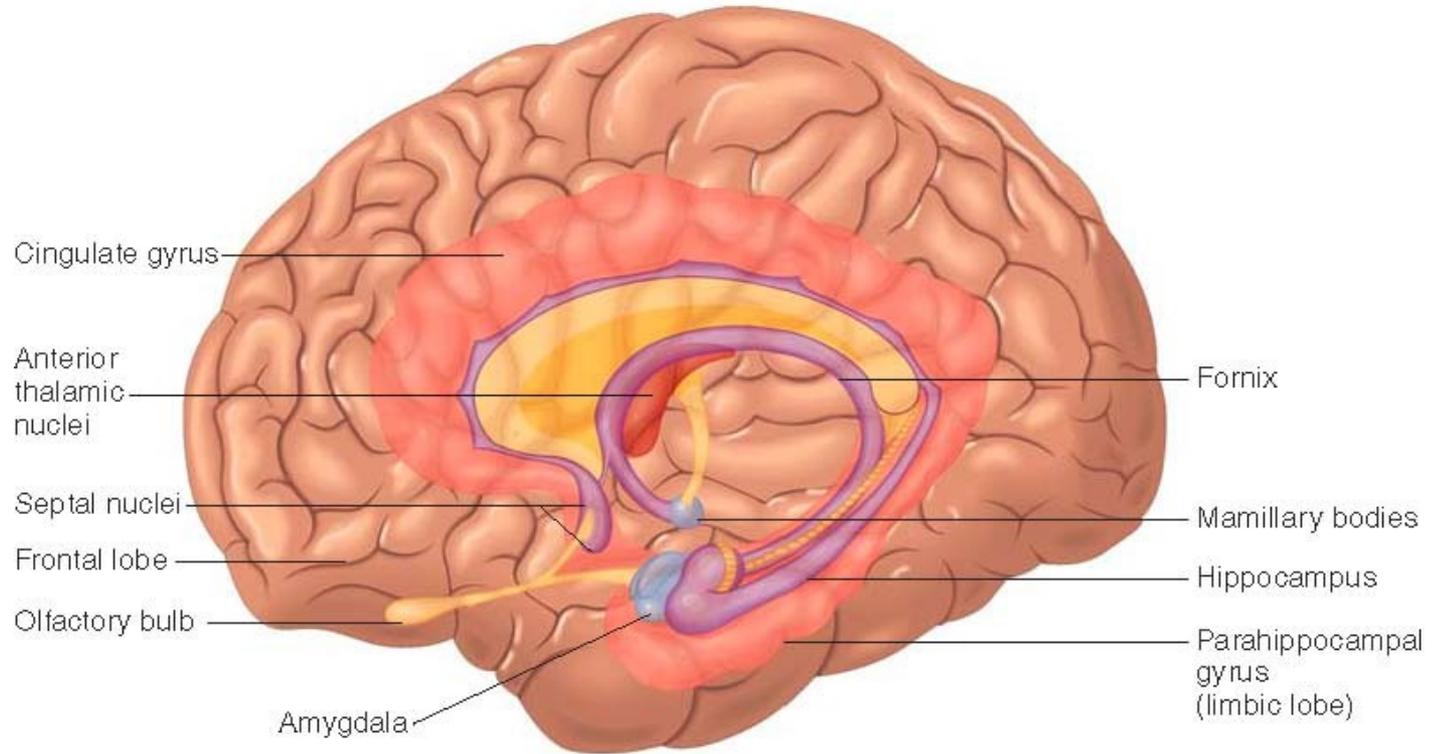
Major Structures of the Brain



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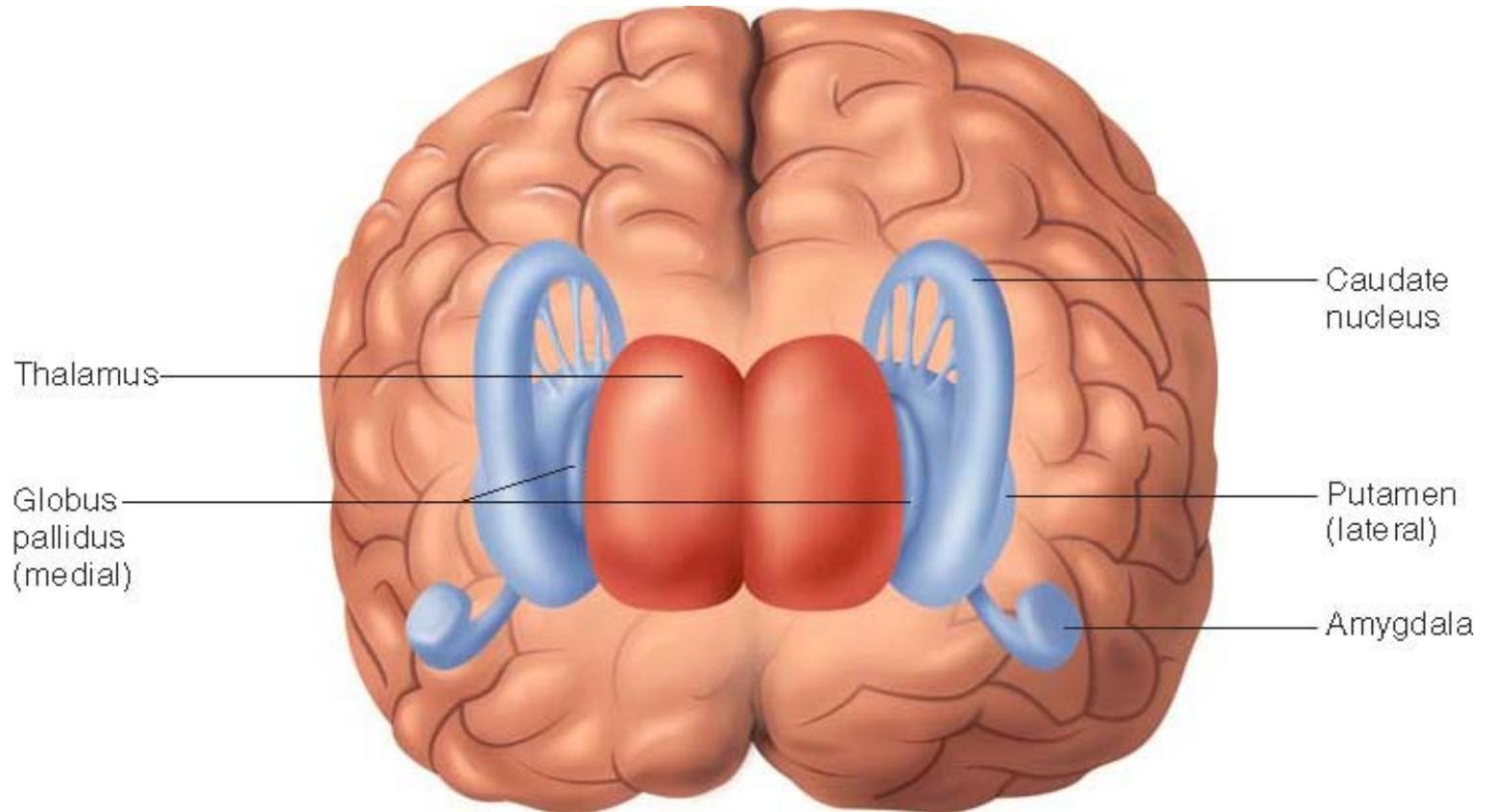
The Limbic System



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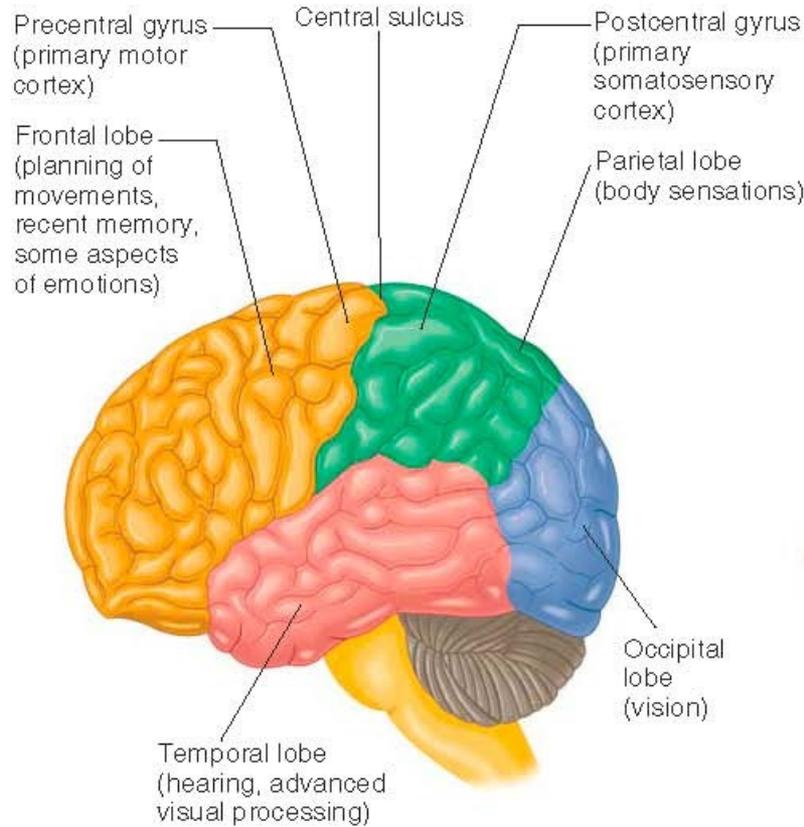
The Basal Ganglia



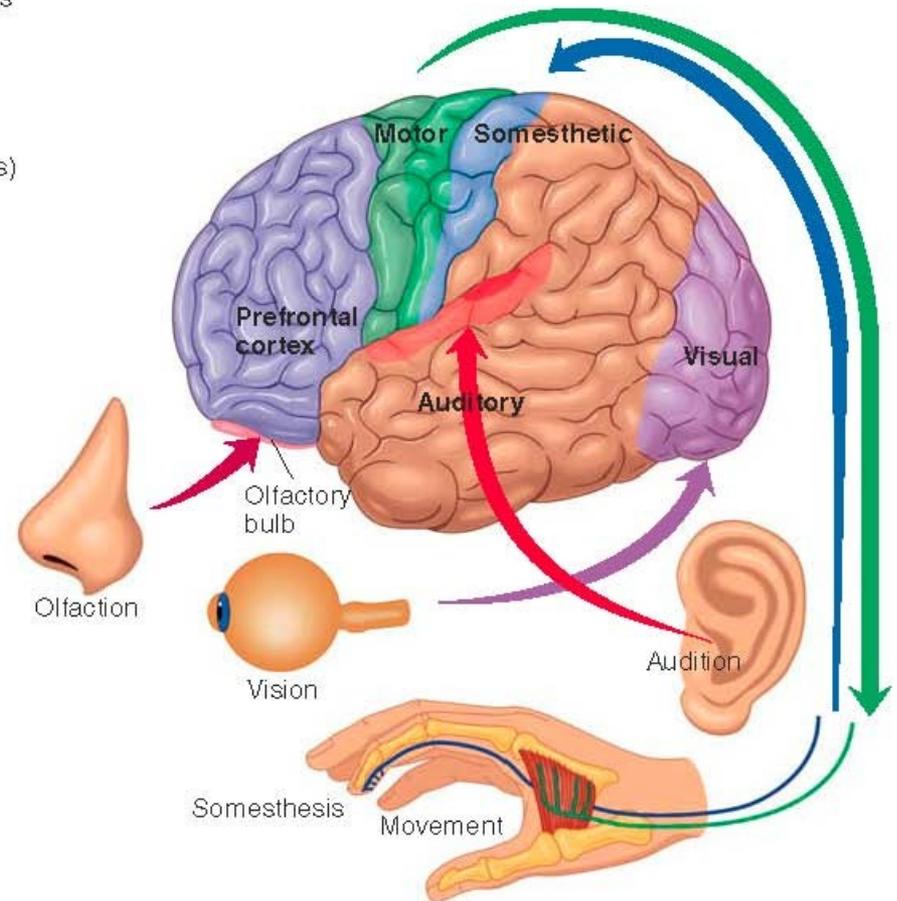
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The Human Cerebral Cortex and its Functions



(a)



(b)

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Chapter

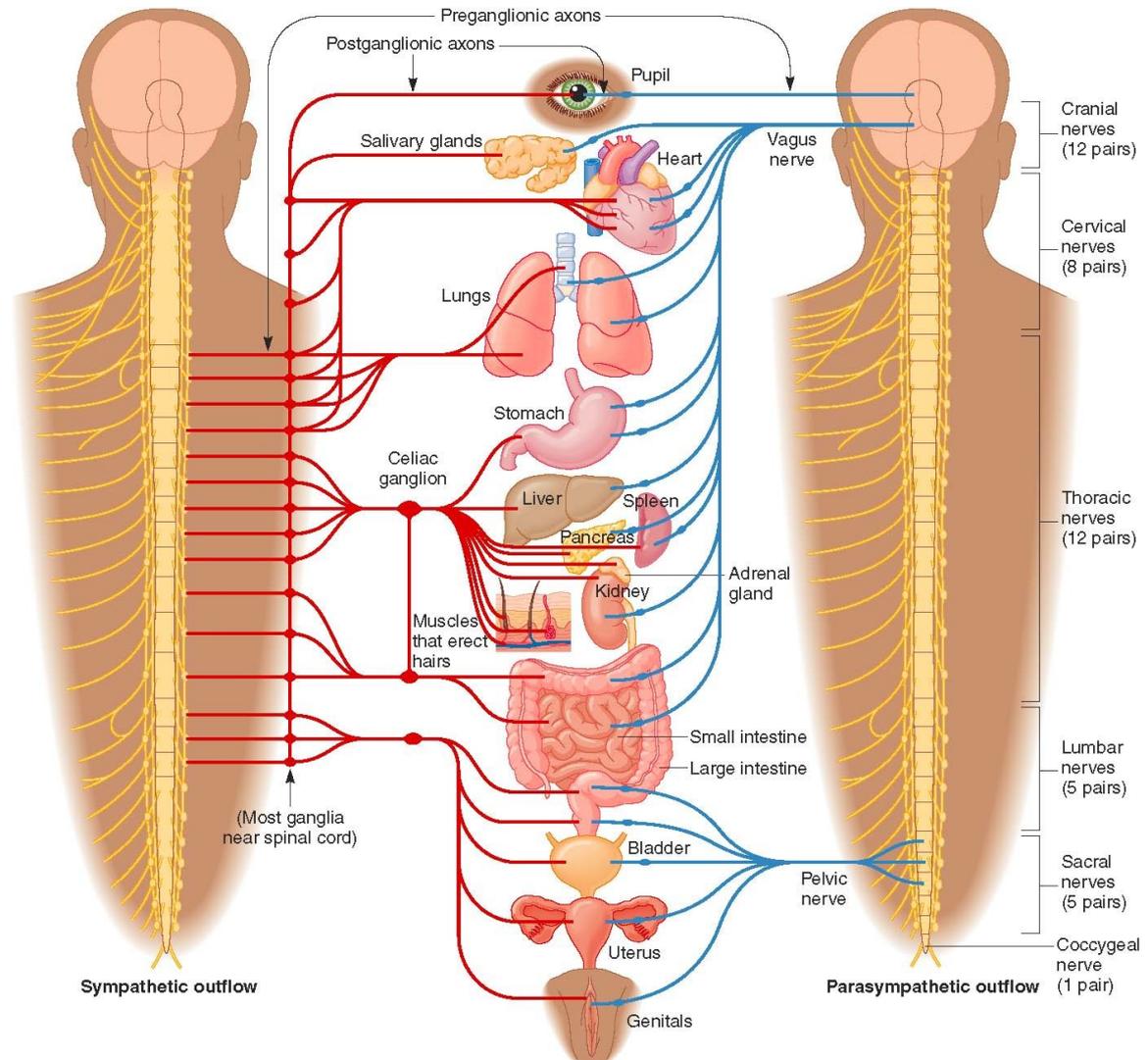
Peripheral Nervous System

- 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

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The Sympathetic and Parasympathetic Nervous Systems



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Neuroscience: Endocrine Systems

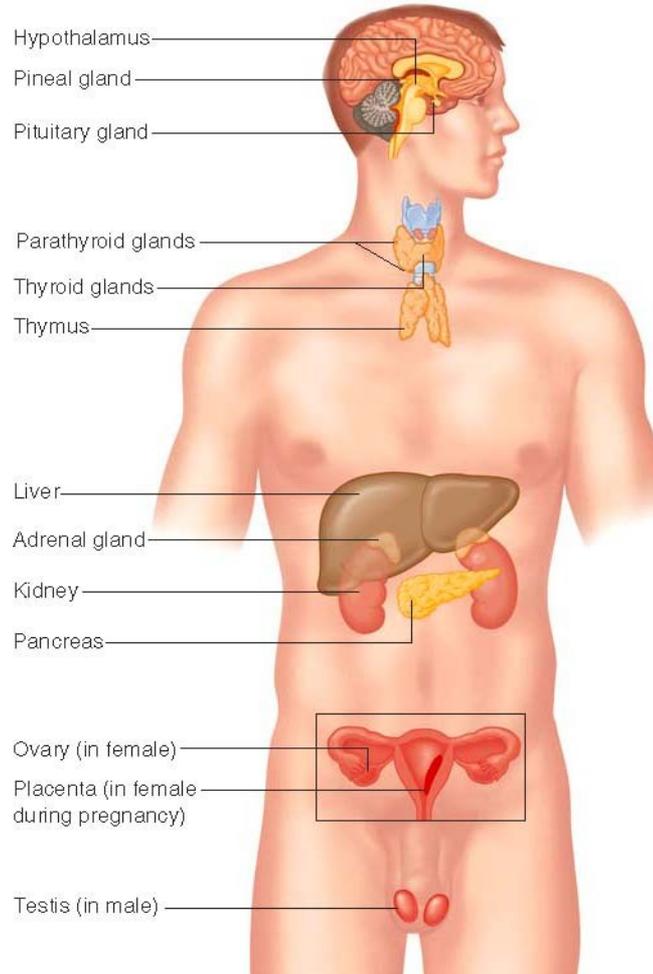
Chapter

- 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

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Endocrine Glands



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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

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Neuroscience: Functions of Main Types of Neurotransmitters

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

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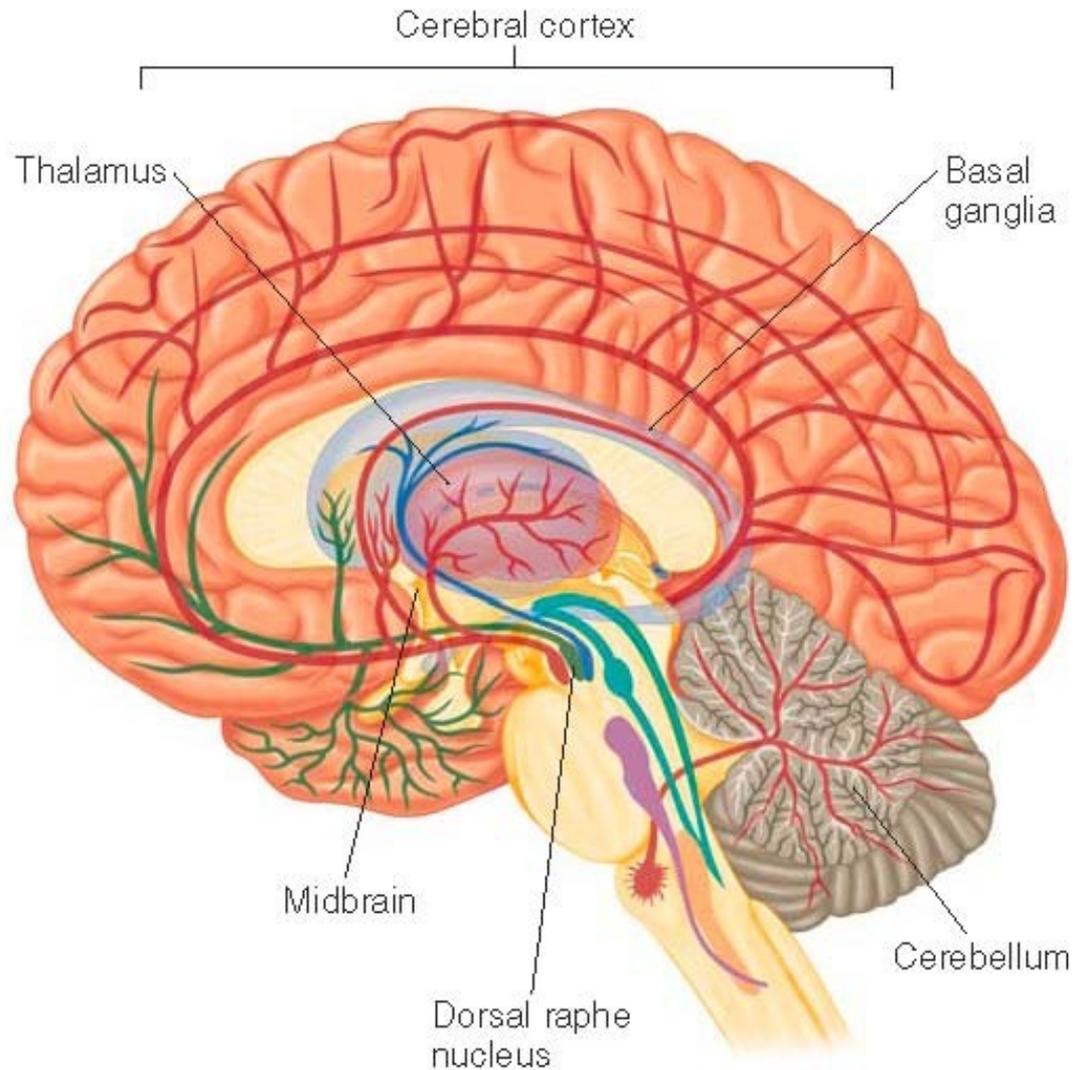
Serotonin

- 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

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Serotonin Pathways in the Brain



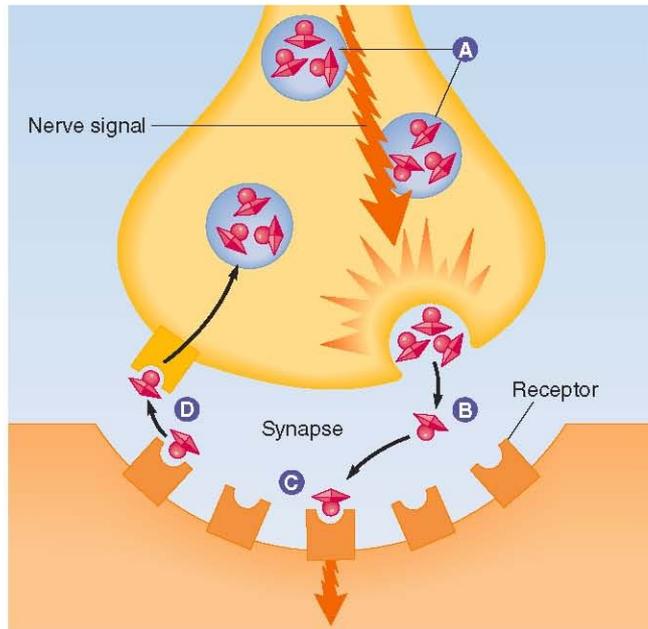
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Manipulating Serotonin in the Brain

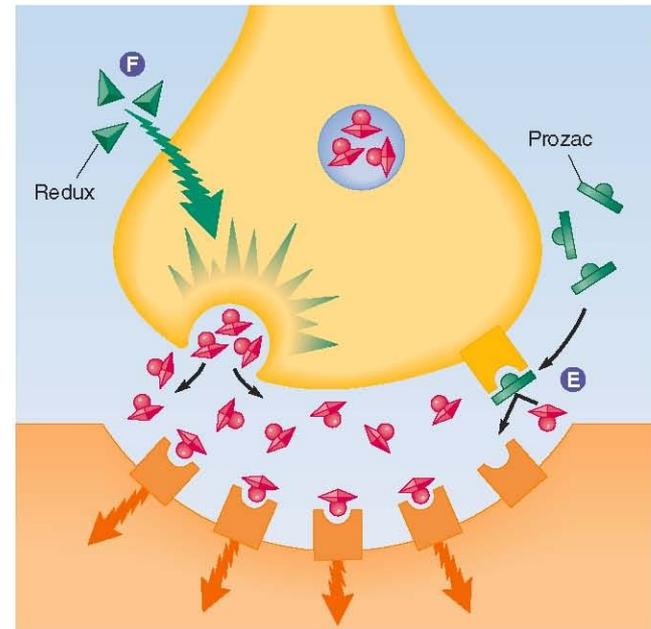
How Neurotransmitters Work

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.



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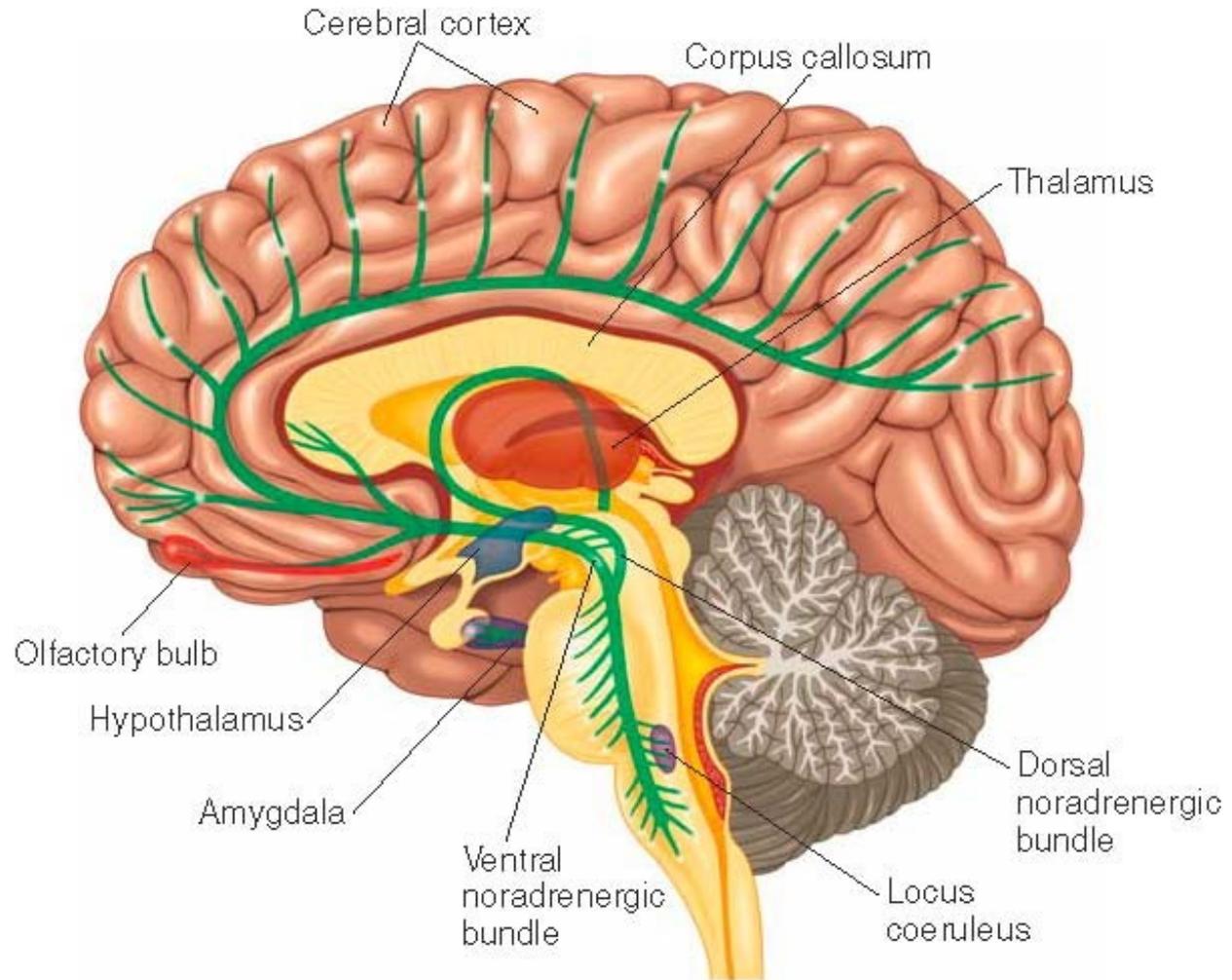
Norepinephrine

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

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Norepinephrine Pathways



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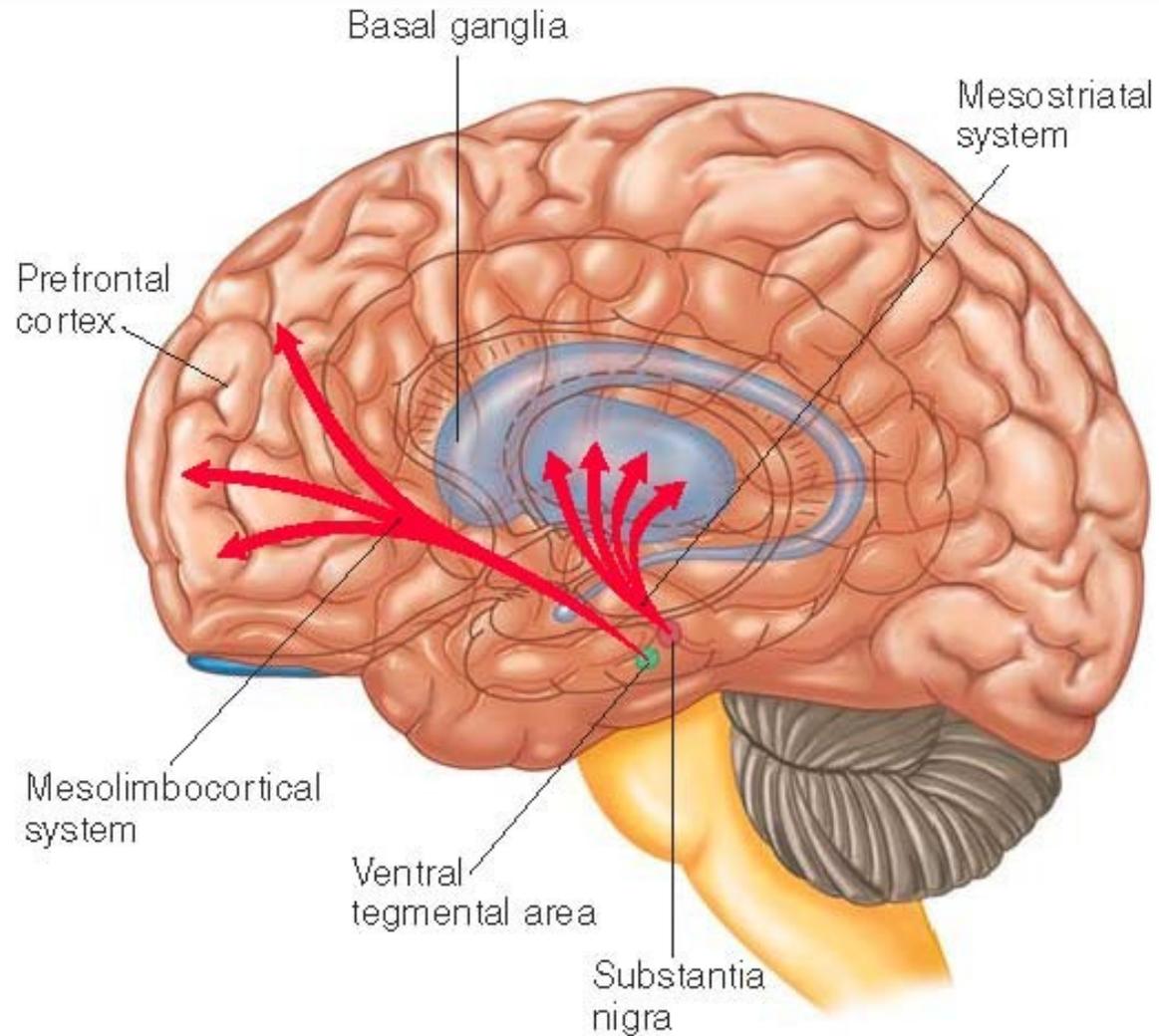
Dopamine

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

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Chapter

Dopamine Pathways



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Chapter

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

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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

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Chapter

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

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Chapter

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

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The Contributions of Behavioral and Cognitive Science

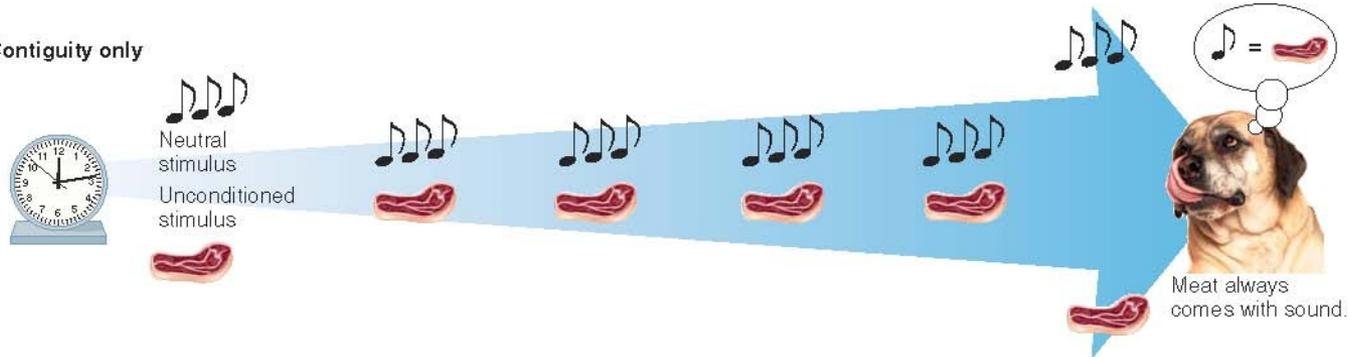
- Conditioning and cognitive processes
 - Early research on classical conditioning: Simple associations are learned between two things that tend to occur together
 - Later research indicated that it is not always that simple – influenced by higher-order cognitive processes

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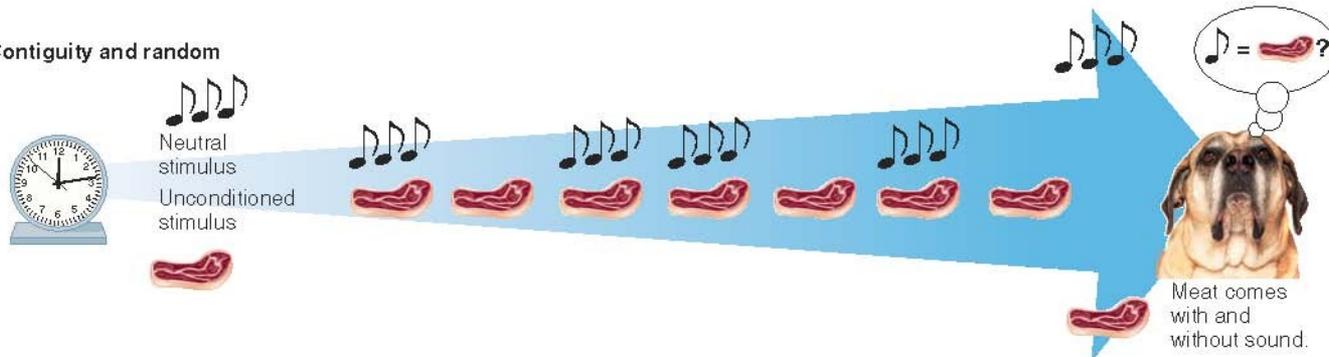
Chapter

Classical Conditioning

Contiguity only



Contiguity and random



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Chapter

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

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Chapter

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)

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Chapter

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

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Chapter

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

02

Cognitive Science and the Unconscious

Chapter

- 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

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The Role of Emotion in Psychopathology

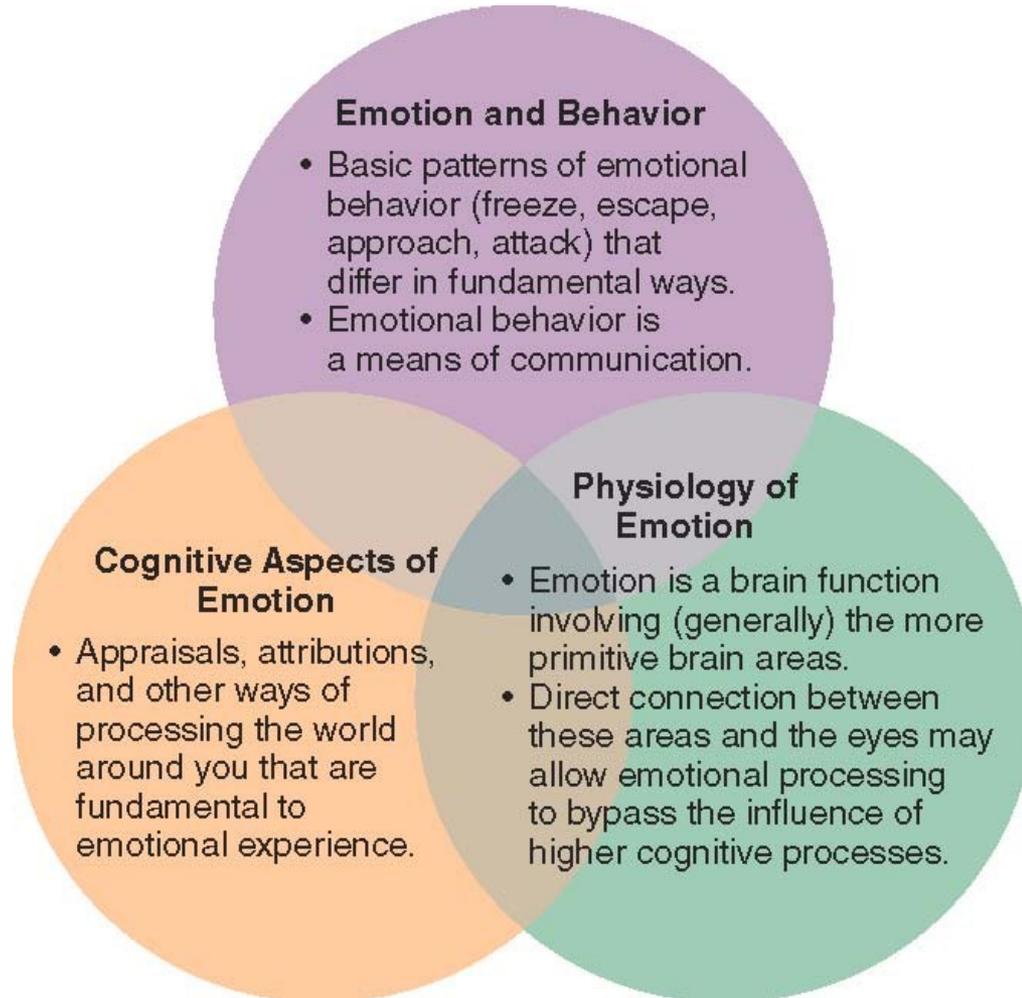
Chapter

- 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

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Chapter

Components of Emotion



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Chapter

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

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Emotions and Psychopathology

Chapter

- 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

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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

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Chapter

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

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Chapter

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

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Social Stigma of Psychopathology

Chapter

- 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

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Global Incidence of Psychological Disorders

Chapter

- 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

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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

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Chapter

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

02

Chapter

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