

Anatomy and Physiology I

Course Text

VanPutte, Cinnamon, Jennifer Regan, and Andrew Russo. *Seeley's Anatomy & Physiology*, 13th edition, McGraw-Hill, 2022, ISBN: 9781264103881

The text is provided digitally as part of the course enrollment. Students may find used, new, or rental print copies by searching for the ISBN.

Course Description

This course provides a comprehensive look at the human body's structure and functions. Topics include organization of the body, characteristics of life, anatomical terminology, how the body maintains homeostasis, the relationship of chemistry to anatomy and physiology, and cell function and division. The skin, skeletal system, muscles, and nervous system are examined. Sensory organs and the endocrine system are also presented. Several diseases and disorders are discussed, and as well as the cause, detection, and treatment of them.

Course Objectives

After completing this course, you will be able to:

- Describe the structural and functional organization of the body.
- Explain the characteristics of life.
- Use anatomical terminology.
- Describe how the body maintains homeostasis.
- Relate chemistry to the field of anatomy and physiology.
- Describe how cells function and divide.
- Discuss the structures and functions of the integumentary, skeletal, muscular, nervous and endocrine systems.
- Describe how muscles, bones, and nerves work together to create movement.
- Describe the structure and function of sensory organs.
- Compare healthy and diseased tissues.
- Name several diseases and disorders of the body and explain what causes them.
- Explain how diseases and disorders of the body are detected and treated.
- Describe the interactions between various organ systems in the body.

Course Prerequisites

There are no prerequisites to take Anatomy & Physiology I.

Important Terms

In this course, different terms are used to designate tasks:

- **Proctoring:** all final exams require proctoring which can be completed conveniently from your home. A webcam is required.
- **Tutoring:** memberships include online tutoring for students to access with any content/subject related questions in the place of faculty. If your tutor is not able to answer your questions please contact a student advisor.
- **Practice Quiz:** Non-graded quizzes that help highlight the content which will be assessed on graded exams.
- **Graded Exam:** A graded online assessment.

Academic Integrity Statement

Academic integrity is the pursuit of scholarly activity in an honest, truthful and responsible manner. Violations of academic integrity include, but are not limited to, plagiarism, cheating, fabrication and academic misconduct. Failure to comply with the Academic Integrity Policy can result in a failure and/or zero on the attempted assignment/examination, a removal from the course, disqualification to enroll in future courses, and/or revocation of an academic transcript.

Course Completion Policy

In order for a course to be considered complete, all required coursework must be attempted, submitted, and graded. Required coursework consists of graded assignments. Any Academic Integrity Policy violations may prevent a course from being considered complete.

Course Evaluation Criteria

Your score provides a percentage score and letter grade for each course. A passing percentage is **70%** or higher.

There are a total of 1000 points in the course:

Topic	Assessment	Points
4	Graded Exam 1	125
8	Graded Exam 2	125
8	Midterm Exam	200
12	Graded Exam 3	125
16	Graded Exam 4	125
17	Cumulative Final Exam	300

Course Topics and Objectives

Topics	Topic	Subtopics	Objectives
1	Introduction to Anatomy and Physiology	<ul style="list-style-type: none"> • Structural and Functional Organization of the Body • Characteristics of Life • Homeostasis and Homeostatic Mechanisms • Anatomical Terminology 	<ul style="list-style-type: none"> • Describe the levels or organization of the body. • Describe the different types of Anatomical Imaging used in the clinical setting. • List the 11 organ systems along with their major organs and functions. • Define the characteristics of life. • Define homeostasis and explain its importance. • Differentiate between positive and negative feedback mechanisms and give examples of each. • Describe the anatomical position and directional terminology used to locate body structures. • Know correct anatomical terminology for all body parts and regions. • Describe the three major planes of the body. • Describe the major trunk cavities, their divisions, and organs located in each. • Describe the quadrants and nine regions of the abdomen and organs found in each. • List the serous membranes, their locations, and functions.
2	Chemistry for Anatomy and Physiology Students	<ul style="list-style-type: none"> • Basic Chemistry • Chemical Reactions and Energy • Inorganic Chemistry • Organic chemistry 	<ul style="list-style-type: none"> • Identify and define elements, atoms, ions, molecules, matter, mass, and weight. • Recognize symbols for the most important elements, atoms, ions, and molecules in the body • Explain the subatomic particles of an atom. • Define atomic number, mass number, isotope, atomic mass, and molarity. • Compare and contrast ionic and covalent bonds. • Know the difference between a molecule and a compound. • Explain hydrogen bonding. • Discuss solubility and dissociation. • Summarize the characteristics of synthesis, decomposition, reversible, and oxidation-reduction reactions. • Illustrate what happens in dehydration and hydrolysis reactions.

Topics	Topic	Subtopics	Objectives
			<ul style="list-style-type: none"> • Discuss potential and kinetic energy. • Describe the factors that affect chemical reactions. • Differentiate between organic and inorganic compounds. • Describe the properties of water. • Describe the pH scale and its relationship to acids, bases, and neutral substances. • Explain how buffers work. • Describe the structural organization and functions of carbohydrates, lipids, and proteins. • Explain how enzymes work. • Describe the structures and functions of nucleic acids.
3	Cell Biology	<ul style="list-style-type: none"> • Functions of the Cell • Plasma Membrane • Membrane Lipids • Membrane Proteins • Movement Through the Plasma Membrane • Endocytosis and Exocytosis • The Nucleus and Cytoplasmic Organelles 	<ul style="list-style-type: none"> • Describe the general parts of a cell. • Describe the functions of cells. • Describe the structure and function of the plasma membrane. • Explain the formation of a membrane potential. • Describe the structures and functions of membrane lipids and proteins. • Explain the ways that substances pass through the plasma membrane. • Discuss diffusion and list substances that diffuse across the cell membrane. • Explain osmosis and describe the differences among hypertonic, hypotonic, and isotonic solutions. • Describe mediated transport. • Explain facilitated diffusion, active transport, and secondary active transport. • Describe the processes of endocytosis and exocytosis. • Describe the structure and function of the nucleus and the nucleolus. • Explain the structures and functions of ribosomes, rough end smooth ER, the Golgi apparatus, secretory vesicles, lysosomes, peroxisomes, proteosomes, mitochondria, centrosomes, cilia, flagella, and microvilli.
4	Genetics	<ul style="list-style-type: none"> • Genes and Gene Expression • Cell Life Cycle 	<ul style="list-style-type: none"> • Describe transcription and translation in the process of gene expression.

Topics	Topic	Subtopics	Objectives
		<ul style="list-style-type: none"> Genetics 	<ul style="list-style-type: none"> Explain the roles of DNA, mRNA, tRNA, and rRNA in protein synthesis. Explain the genetic code. Explain what occurs during posttranscriptional processing and posttranslational processing. Describe the stages of the cell life cycle. Explain DNA replication. Explain the events of mitosis and cytokinesis. Define genetics and explain the roles of chromosomes in inheritance. Discuss Mendel's and modern theories of genetics. Define and give examples of phenotypes and genotypes. Explain karyotype. Describe the major patterns of inheritance. Describe the differences between mitosis and meiosis. Discuss various genetic disorders.
5	Tissues	<ul style="list-style-type: none"> Histology Embryonic Tissue Epithelial Tissue Connective Tissue Muscle Tissue Nervous Tissue Tissue Membranes Tissue Damage and Inflammation Tissue Repair 	<ul style="list-style-type: none"> List the four main tissue types. Define histology, biopsy, and autopsy. Describe the three embryonic germ layers and give examples of adult structures that are derived from each. Describe the general characteristics and major functions of epithelial tissue. Classify epithelial tissues based on number of cell layers and cell shapes. Describe the various types of epithelial tissues, including their functions and locations. Describe the structural specializations of epithelial tissues along with their functions. Explain the differences between exocrine and endocrine glands. Classify exocrine glands based on their structures and functions. Describe the various functions of connective tissues. Describe the cells of connective tissues. Describe the components found in the matrix of connective tissues.

Topics	Topic	Subtopics	Objectives
			<ul style="list-style-type: none"> List the different types of connective tissues giving their locations, structures, and functions. List and describe the three types of muscle tissue. Give the structure, location, and function of each. Describe the structure, location, and function of nervous tissue. Explain the difference between neurons and neuroglia. Give the locations, structures, and functions of mucous, serous, and synovial membranes. Describe the process of inflammation including the five signs of inflammation. Explain the major events of tissue repair. Explain how cancer cells differ from normal cells.
6	Integumentary System	<ul style="list-style-type: none"> Functions of the Integumentary System Skin Subcutaneous Tissue Accessory Skin Structures Physiology of the Integumentary System Burns and Other Skin Disorders 	<ul style="list-style-type: none"> Describe the general functions of the integumentary system. Describe the structure and function of the epidermis. Describe the layers of the epidermis. Discuss the differences between thick and thin skin. Describe the major factors that affect skin. Describe the structure and functions of the dermis. Discuss the different types of skin cancer. Describe the structure and function of subcutaneous tissue. Describe the structures and functions of hairs, glands of the skin, and nails. Recall the major bones and joints in the body. Describe how burns are assessed and classified. Explain the importance of skin in protection, sensation, temperature regulation, and vitamin D production. Describe the general treatment of burns and how burns affect various organ systems. Describe common conditions and infections that affect skin.

Topics	Topic	Subtopics	Objectives
7	Bones and Skeletal System	<ul style="list-style-type: none"> • Functions of the Skeletal System • Cartilage • Bone Histology • Bone Anatomy • Bone Development • Bone Growth • Bone Remodeling • Bone Repair • Calcium Homeostasis • Skeletal Anatomy Overview • Axial Skeleton • Appendicular Skeleton • Bone Disorders 	<ul style="list-style-type: none"> • List the components and describe the functions of the skeletal system. • List the three types of cartilage and describe the structure, location, and function of each. • Describe the components found in the matrix of bone. • List the types of bone cells and give their functions. • Describe the structures and locations of woven, lamellar, compact and spongy bone. • Classify bones according to their shapes. Give examples of each. • Describe the parts of a typical long bone. • Explain the process of intramembranous ossification. Give examples of bones formed through this process. • Describe the steps of endochondral ossification. Give examples of bones formed through this process. • Explain how bones grow in length and width. • List factors that affect bone growth. • Define bone remodeling and explain its importance. • Explain the steps in bone repair. • Explain the role of bone in calcium homeostasis. • Describe the roles of PTH and calcitonin in bone remodeling and calcium homeostasis. • Describe how bone fractures are classified. • Discuss osteoporosis and how it affects other organ systems. • Know the anatomical terms for bone features. • Describe the differences between the axial and appendicular skeletons. List the bones of each. • Know the bones of the skull including their sutures and other features. • Explain the location, function, and structure of the hyoid bone. • Describe the shape and divisions of the vertebral column.

Topics	Topic	Subtopics	Objectives
			<ul style="list-style-type: none"> • Explain the common features of the vertebrae and contrast the structure of vertebra from each region. • List and describe the bones and cartilages of the rib cage. • Describe three different types of ribs. • Discuss the following disorders associated with the skeletal system: cleft lip, cleft palate, scoliosis, kyphosis, lordosis, spina bifida, herniated intervertebral disk, and whiplash. • Describe the girdles that make up the appendicular skeleton. • Describe the bones of the upper limb. • Explain why the pelvic girdle is more stable than the pectoral girdle. • Describe the differences between the male pelvis and the female pelvis. • Describe the bones of the lower limb. • Describe carpal tunnel syndrome and fractures of the malleoli.
8	Joints	<ul style="list-style-type: none"> • Classes of Joints • Types of Movement • Range of Motion • Descriptions of Selected Joints • Joint Disorders 	<ul style="list-style-type: none"> • Explain the differences among fibrous, cartilaginous, and synovial joints. • Explain the differences among and give example of joints classified as synarthroses, amphiarthroses, and diarthroses. • List the three types of fibrous joints. Give the structures and examples of each. • List the two types of cartilaginous joints. Give the structures and examples of each. • Describe the structure of a synovial joint. • Describe the different types of synovial joints. Give example of each. • Differentiate among uniaxial, biaxial, and multiaxial synovial joints. Give examples of each. • Describe the following types of movements: flexion, extension, plantar flexion, dorsiflexion, abduction, adduction, supination, pronation, elevation, depression, protraction, retraction, excursion, opposition, reposition, inversion, eversion, rotation, and circumduction.

Topics	Topic	Subtopics	Objectives
			<ul style="list-style-type: none"> • Describe the factors that affect normal range of motion at a joint. • Describe the structures and movements of the following joints: TMJ, shoulder, hip, elbow, knee and ankle. • Describe the following types of joint disorders: arthritis, osteoarthritis, rheumatoid arthritis, gout, Lyme disease, bursitis, bunion, tendinitis, dislocation, and sprain.
9	Muscular System Histology and Physiology	<ul style="list-style-type: none"> • Functions of the Muscular System • General Properties of Muscle • Skeletal Muscle Structure • Sliding Filament Model • Physiology of Skeletal Muscle Fibers • Physiology of Skeletal Muscle • Muscle Fatigue • Energy Sources • Slow and Fast Fibers • Heat Production • Smooth Muscle • Cardiac Muscle • Muscle Disorders 	<ul style="list-style-type: none"> • Explain the functions of the Muscular System. • Describe the functional properties of muscle tissue. • Compare and contrast skeletal, smooth, and cardiac muscle tissue. • Describe the connective tissue components of skeletal muscle. • Explain the blood supply and innervations of skeletal muscle. • Describe the components of a muscle fiber. • Describe the structures of thin and thick myofilaments. • Describe the arrangement of myofilaments within a sarcomere. • Explain the sliding filament theory. • Describe the A band, I band, and H zone and what happens to them during contraction. • Describe the resting membrane potential and how it is generated. • Explain the role of ion channels in the production of an action potential. • Explain the production of an action potential, including depolarization and repolarization. Describe how an action potential is propagated across the plasma membrane. • Explain the all-or-none principal. • Describe the structure of a neuromuscular junction, and explain how an action potential is transmitted across the junction. • Describe a muscle twitch, and the events that occur in each phase of a muscle twitch.

Topics	Topic	Subtopics	Objectives
			<ul style="list-style-type: none"> • Describe a motor unit, and how motor unit number affects muscle control. • Explain how whole muscles respond in a graded fashion, and how the force of contraction can be increased. • Describe the process of treppe. • Describe recruitment and multiple motor unit summation. • Describe complete tetanus and incomplete tetanus. • Explain how the length of a muscle affects the amount of tension produced in the muscle. • Distinguish between isometric and isotonic contractions. • Describe how muscle tone is maintained. • Describe the sources of energy used to produce ATP in muscle fibers. • Define oxygen debt and recovery oxygen consumption. • Describe fast-twitch and slow-twitch muscle fibers. • Describe how exercise affects muscle fibers. • Describe the structure of smooth muscle cells. • Describe how smooth muscle cells contract. • List and describe two types of smooth muscle types. Give locations of each type. • Describe the regulation of smooth muscle activity. • Discuss the structure and function of cardiac muscle fibers. • Describe the following muscle disorders: Myotonic and Duchenne muscular dystrophy, cramps, fibromyalgia, atrophy, tendinitis, fibrosis, and fibrositis.
10	Muscular System Gross Anatomy	<ul style="list-style-type: none"> • General Principles of Skeletal Muscle Anatomy • Head and Neck Muscles • Trunk Muscles • Upper Limb Muscles 	<ul style="list-style-type: none"> • Explain the following terms and give examples of each: origin, insertion, agonist, antagonist, synergist, fixator, and prime mover. • Describe the different types of muscles based on shape and fasciculus arrangement. Describe how they differ in strength.

Topics	Topic	Subtopics	Objectives
		<ul style="list-style-type: none"> • Lower Limb Muscles • Disorders of Muscles 	<ul style="list-style-type: none"> • Explain how muscles are named. • Describe the three classes of lever systems in the body and give examples of each. • Name the muscles of the head and neck. Describe the locations and actions of each. • Name the muscles of the trunk. Describe the locations and actions of each. • Name the muscles of the upper limb. Describe the locations and actions of each. • Name the muscles of the lower limb. Describe the locations and actions of each. • Describe the following disorders: laryngospasm, back pain, torn rotator cuff, tennis elbow, shin splints, plantar fasciitis, and Achilles tendon injuries.
11	Functional Organization of Nervous Tissue	<ul style="list-style-type: none"> • Functions of the Nervous System • Divisions of the Nervous System • Cells of the Nervous System • Organization of Nervous Tissue • Electrical Signals • The Synapse • Neuronal Pathways and Circuits 	<ul style="list-style-type: none"> • Explain the functions of the nervous system. • List the divisions of the nervous system and describe the characteristics of each. • Describe the structure of a neuron. • Describe the classification of neurons based on structure and function. • Describe the different types of neuroglia. • Describe the structure and function of myelin. How is it formed in the CNS and PNS? • Distinguish between gray and white matter and describe components found in each. • Describe a resting membrane potential and how it is created. • Explain how resting membrane potential can change. • Describe a graded potential. • Describe the creation of an action potential and how it is propagated. • Discuss the all-or-none principle and how it relates to an action potential. • Explain the refractory period. • Discuss the factors that determine action potential frequency, and the five levels of stimulation.

Topics	Topic	Subtopics	Objectives
			<ul style="list-style-type: none"> • Describe the factors that affect the speed of action potential conduction. • Describe the structure and function of a synapse. • Explain the difference between electrical and chemical synapses. • Describe how a neurotransmitter is released into a synapse and removed from the synapse. • Explain the effects of neurotransmitter binding to receptors. • Discuss the affects of neuromodulation. • Explain excitatory and inhibitory postsynaptic potentials. • Explain the roles of presynaptic inhibition and facilitation. • Describe the processes of spatial and temporal summation. • Describe convergent and divergent neuron pathways. • Describe an oscillating circuit. • Describe how nervous tissue responds to injuries.
12	Spinal Cord, Spinal Nerves, Brain, and Cranial Nerves	<ul style="list-style-type: none"> • Spinal Cord • Reflexes • Spinal Nerves • Development of the CNS • Brainstem • Cerebellum • Diencephalon • Cerebrum • Meninges, Ventricles, and Cerebrospinal Fluid • Cranial Nerves 	<ul style="list-style-type: none"> • Describe the general structure of the spinal cord. • Name the meninges and their spaces surrounding the spinal cord. • Describe the structure of the spinal cord in cross section. • Describe the components of a monosynaptic and a polysynaptic reflex arc. • Describe the following types of reflexes: stretch reflex, a Golgi tendon reflex, a withdrawal reflex, and a cross extensor reflex. • Describe the connective tissue components of a nerve. • List the number and locations of the 31 pairs of spinal nerves. • Describe a dermatome and its clinical importance. • Explain how spinal nerves branch into rami and plexuses. • List the major plexuses and the major nerves that exit each plexus. Describe the body regions innervated by the major nerves.

Topics	Topic	Subtopics	Objectives
			<ul style="list-style-type: none"> • Describe the possible implications of a spinal cord injury. • Describe the symptoms of radial, ulnar, median, and sciatic nerve damage. • Describe the fetal beginnings of the brain. • Name the pouches that develop from the neural tube and the adult brain structures that they become. • Explain the origin of the brain ventricles. • List the parts of the brainstem and describe the structure and function of each. • Describe the structure of the cerebellum. • Describe the major regions of the cerebellum and the functions of each. • List the parts of the diencephalon. Describe the location and function of each. • Describe the structure of the cerebrum. • Describe the functions of each cerebral lobe. • List and describe three types of tracts found in the cerebrum. • List the basal nuclei and explain their functions. • List the parts of the limbic system. Give the function of each. • Describe the meninges and spaces within them that surround the brain. • Describe the locations of the found ventricles of the brain. • Explain the circulation and functions of CSF. • Describe the blood supply to the brain. • Describe the structure and function of the blood-brain barrier. • List the cranial nerves. Give the location and functions of each. • Describe cranial reflexes. • Describe the possible outcomes of traumatic brain injuries, skull fractures, hydrocephalus, and improper dental anesthesia • Describe neurofibromatosis.

Topics	Topic	Subtopics	Objectives
13	Integration of Nervous System Functions	<ul style="list-style-type: none"> • Sensation • Control of Skeletal Muscles • Brainstem Functions • Higher Brain Functions 	<ul style="list-style-type: none"> • Describe the types of somatic and visceral sensory receptors. • Describe the roles of receptor potentials and adaptation. • Differentiate between primary and secondary receptors, and between tonic and phasic receptors. • List the major ascending sensory tracts and describe the functions of each. • Describe the sensory and association areas of the cerebral cortex and discuss their interactions. • Describe the primary motor area of the cerebral cortex and describe how it interacts with other parts of the frontal lobe. • Distinguish between upper and lower motor neurons, and between direct and indirect tracts. • Explain how the basal nuclei and the cerebellum regulate motor function. • Describe the sensory input from the brainstem. • Explain the role of the reticular activating system. • Discuss the motor output and reflexes of the brainstem. • Discuss the cortical areas needed for speech. • Describe the pathway that connects the cerebral hemispheres. • Describe the types of brain wave patterns and how they relate to sleep. • Compare and contrast the features of working, short-term, and both types of long-term memory. • Describe the functions of the limbic system. • Describe different types of pain, their causes and treatments. • Describe the following disorders: amyotrophic lateral sclerosis, Brown-Sequard syndrome, Parkinson disease, aphasia, multiple sclerosis, Alzheimer disease, Huntington disease, cerebral palsy, cerebellar lesions, Tay-Sachs disease, epilepsy, dyslexia, stroke, headaches, addiction, obsession, and compulsion.

Topics	Topic	Subtopics	Objectives
14	The Special Senses	<ul style="list-style-type: none"> • Olfaction • Taste • Visual System • Hearing and Balance 	<ul style="list-style-type: none"> • Describe olfactory neurons and explain how airborne molecules can stimulate action potentials in olfactory nerves. • Describe the areas of the brain where olfaction is interpreted. • Define olfactory adaptation. • Describe the structures and functions of the different types of tongue papillae. • Describe the structure and function of a taste bud. • List and describe the five major taste sensations. • Describe how smell and taste are related. • Describe how action potentials are generated in a taste cell. • Trace the gustatory pathway from a taste receptor to the cerebral cortex. • Describe the structures and functions of the accessory structures of the eye. • Explain the chambers of the eye and the fluids they contain. • Name the layers of the eye and the parts of each layer. Describe the structures and functions of each part. • Describe the differences between rods and cones. • Describe the structure of the retina. • Describe how light stimulates action potentials. • Describe how images are focused onto the retina. • Describe the visual pathway from receptors to the visual cortex. • Describe binocular vision and depth perception. • Describe the structures of the outer, middle, and inner ear. Explain the functions of each structure. • Describe the locations of the fluids in the inner ear. • Discuss the characteristics of sound. • Explain how action potentials are generated by hair cells in the spiral organ. • Trace sounds waves as they travel from the outer ear to the spiral organ. • Describe the auditory pathway from the spiral organ to the auditory cortex.

Topics	Topic	Subtopics	Objectives
			<ul style="list-style-type: none"> Describe how static and dynamic equilibrium are detected. Describe how balance is detected and interpreted by the cerebral cortex. Discuss the following disorders: cataracts, conjunctivitis, trachoma, neonatal gonorrheal ophthalmia, stye, myopia, hyperopia, presbyopia, astigmatism, strabismus, diplopia, color blindness, macular degeneration, glaucoma, diabetic retinopathy, retinal detachment, retinitis pigmentosa, conductive hearing loss, sensorineural hearing loss, otosclerosis, tinnitus, otitis media, inner ear infection, motion sickness, and Meniere disease.
15	Autonomic Nervous System	<ul style="list-style-type: none"> Contrasting the Somatic and Autonomic Nervous Systems Anatomy of the Autonomic Nervous System Physiology of the Autonomic Nervous System Regulation of the Autonomic Nervous System Functional Generalizations About the Autonomic Nervous System 	<ul style="list-style-type: none"> Explain the differences between the somatic and autonomic nervous systems. Describe the divisions of the autonomic nervous system. Explain the arrangements of sympathetic and parasympathetic neurons and ganglia. Describe the organization and functions of the enteric nervous system. Describe the major autonomic nerve plexuses in the body. Describe cholinergic and adrenergic neurons. Compare the two types of cholinergic receptors. Describe the different types of adrenergic receptors. Explain how autonomic reflexes maintain homeostasis. Explain the meanings of dual innervation, opposite effects, cooperative effects, general effects and localized effects of the ANS. Describe the effects of the sympathetic nervous system on the body. Describe the effects of the parasympathetic nervous system on the body.
16	Functional Organization of the Endocrine	<ul style="list-style-type: none"> Principles of Chemical Communication 	<ul style="list-style-type: none"> Describe the four classes of chemical messengers. Define hormone and target tissue.

Topics	Topic	Subtopics	Objectives
	System and Endocrine Glands	<ul style="list-style-type: none"> • Hormones • Control of Hormone Secretion • Hormone Receptors and Mechanisms of Action • Overview of the Endocrine System • Pituitary Gland and Hypothalamus • Thyroid Gland • Parathyroid Glands • Adrenal Glands • Pancreas • Hormonal Regulation of Nutrient Utilization • Hormones of the Reproductive System • Hormones of the Pineal Gland • Other Hormones and Chemical Messengers 	<ul style="list-style-type: none"> • Explain how the nervous system and endocrine system are similar and different. • Describe the common characteristics of hormones. • Describe the effects of binding proteins on hormone levels. • Describe the chemical classes of hormones. • Explain the transport of lipid-soluble and water-soluble hormones. • Explain the main patterns of hormone secretion. • Explain the processes that stimulate hormone secretion. • Explain the processes that inhibit hormone secretion. • Describe how hormone levels are maintained in the blood. • Describe a hormone receptor and explain how a target cell may increase or decrease its sensitivity to a hormone. • Describe the two major types of receptor classes. • Describe amplification and its importance. • Explain the functions of the endocrine system. • Describe the structure and location of the pituitary gland and hypothalamus. • Describe the relationship between the pituitary gland and the hypothalamus. • List the hormones secreted by the hypothalamus. Describe the target, regulation, and action of each. • List the hormones secreted by the anterior pituitary. Describe the target, regulation, and action of each. • List the hormones secreted by the posterior pituitary. Describe the target, regulation, and action of each. • Describe the disorders associated with pituitary hormones. • Describe the structure and location of the thyroid gland. • List the hormones secreted by the thyroid gland. Describe the target, regulation, and action of each.

Topics	Topic	Subtopics	Objectives
			<ul style="list-style-type: none"> • Discuss disorders associated with the thyroid gland. • Describe the structure and locations of the parathyroid glands. Give the target, regulation, and action of PTH. • Describe the structure and location of the adrenal glands. • Name the layers of the adrenal cortex and list the hormones secreted by each layer. • Give the target, regulation, and action of each adrenal cortex hormone. • Describe the hormones secreted by the adrenal medulla. • Discuss disorders associated with adrenal glands. • Describe the structure and location of the pancreas. • List the hormones secreted by the pancreatic islets. Describe the target, regulation, and action of each. • Discuss type 1 and type 2 diabetes mellitus. • Describe the hormones needed to regulate nutrients immediately after a meal and 1-2 hours after a meal. • Describe how the nervous and endocrine systems interact during exercise to provide energy to cells. • Describe the hormones secreted by reproductive organs. • Describe the structure and location of the pineal gland. • Describe the hormones secreted by the pineal gland. • Describe the hormones released by the thymus, kidneys, digestive system and heart. • Explain the difference between autocrine and paracrine chemical messengers. Give examples of each.

[Back to Top](#)