

SUBJECT NAME: Human Physiology

SUBJECT DESCRIPTION

The subject focus is on cellular physiology, homeostasis, and the nervous, muscular, cardiovascular, respiratory, renal, integumentary, and gastrointestinal systems. Specific topics include homeostasis, cellular communication, endocrinology, neuronal transmission, sensory physiology, muscle function, and organ system physiology. The subject content emphasizes systems integration as it relates to whole body function.

CONTENT COVERED

- Homeostasis and control systems
- Principles of cellular physiology: membrane transport, membrane potentials
- Cellular communication and signaling
- Principles of endocrinology
- Neuronal transmission
- Central nervous system
- Autonomic nervous system
- Principles of sensory physiology and overview of the special senses
- Muscle physiology
- Principles of cardiovascular function
- Mechanics of respiration
- Gas exchange and transport
- Overview of renal physiology
- Overview of gastrointestinal physiology and digestion
- Role of the integumentary system in protection, sensory perception and waste excretion

KEY PERFORMANCE INDICATORS (KPIs)

1. Describes the hierarchical organization of the human organism from molecules to organ systems.
2. Explains how a resting membrane potential is established and maintained using the Nernst and Goldman equations and how it differs from an action potential.
3. Explains the mechanisms underlying cellular excitability of a neuron and the initiation and propagation of action potentials.
4. Understands the role and function of the central, peripheral and autonomic nervous systems as they relate to human function in health and disease.
5. Understands the basic physiology and pathophysiology of the cardiovascular, respiratory, renal, reproductive, and nervous systems.
6. Understands the regulation of human body functions by the endocrine, gastrointestinal, immune, and neurological systems.
7. Understands the basic physiology and pathophysiology of the skeletal and musculotendinous systems of the body.
8. Explains how the human system functions, including the principle of homeostasis and how specific physiological parameters are regulated through positive and negative feedback reflex loops.
9. Applies knowledge of the function of the somatic and special senses, including tactile sensation, vision, olfaction gustation, and audition, and the role they play in human health and environmental interaction.
10. Explains the function of the cardiovascular system, including electrical conduction in the heart, the cardiac cycle, and regulation of cardiac output.

11. Understands the functional characteristics of the respiratory system, including mechanics of quiet breathing, regulation of airway resistance, and gas composition, and exchange.
12. Applies knowledge of renal system function, including the principles of reabsorption and regulation of the glomerular filtration rate in maintaining health.
13. Explains the function of the gastrointestinal system, including oral, gastric and intestinal phases of digestion and absorption of macronutrients.
14. Considers the impact of environmental factors on physiology.