

I. Introduction to Physiology: The Cell and General Physiology

- 1. Functional Organization of the Human Body and Control of the "Internal Environment"*
- 2. The Cell and Its Functions*
- 3. Genetic Control of Protein Synthesis, cell function, and cell reproduction*

II. Membrane Physiology, Nerve, and Muscle

- 4. Transport of Substances Through Cell Membranes*
- 5. Membrane Potentials and Action Potentials*
- 6. Contraction of Skeletal Muscle*
- 7. Excitation of Skeletal Muscle: Neuromuscular Transmission and Excitation-Contraction Coupling*
- 8. Excitation and Contraction of Smooth Muscle*

III. The Heart

- 9. Cardiac Muscle; The Heart as a Pump and Function of the Heart Valves*
- 10. Rhythmical Excitation of the Heart*
- 11. The Normal Electrocardiogram*
- 12. Electrocardiographic Interpretation of Cardiac Muscle and Coronary Blood Flow Abnormalities: Vectorial Analysis*
- 13. Cardiac Arrhythmias and Their Electrocardiographic Interpretation*

IV. The Circulation

- 14. Overview of the Circulation; Biophysics of Pressure, Flow, and Resistance*
- 15. Vascular Distensibility and Functions of the Arterial and Venous Systems*
- 16. The Microcirculation and Lymphatic System: Capillary Fluid Exchange, Interstitial Fluid, and Lymph Flow*
- 17. Local and Humoral Control of Tissue Blood Flow*
- 18. Nervous Regulation of the Circulation and Rapid Control of Arterial Pressure*
- 19. Role of the Kidneys in Long-Term Control of Arterial Pressure and in Hypertension: The Integrated System for Arterial Pressure Regulation*
- 20. Cardiac Output, Venous Return, and Their Regulation*
- 21. Muscle Blood Flow and Cardiac Output During Exercise; the Coronary Circulation and Ischemic Heart Disease*

- 22. *Cardiac Failure*
- 23. *Heart Valves and Heart Sounds; Valvular and Congenital Heart Defects*
- 24. *Circulatory Shock and Its Treatment*

V. The Body Fluids and Kidneys

- 25. *The Body Fluid Compartments: Extracellular and Intracellular Fluids; Edema*
- 26. *The Urinary System: Functional Anatomy and Urine Formation by the Kidneys*
- 27. *Glomerular Filtration, Renal Blood Flow, and Their Control*
- 28. *Renal Tubular Reabsorption and Secretion*
- 29. *Urine Concentration and Dilution; Regulation of Extracellular Fluid Osmolarity and Sodium Concentration*
- 30. *Renal Regulation of Potassium, Calcium, Phosphate, and Magnesium; Integration of Renal Mechanisms for Control of Blood Volume and Extracellular Fluid Volume*
- 31. *Acid-Base Regulation*
- 32. *Diuretics, Kidney Diseases*

VI. Blood Cells, Immunity, and Blood Coagulation

- 33. *Red Blood Cells, Anemia, and Polycythemia*
- 34. *Resistance of the Body to Infection: I. Leukocytes, Granulocytes, the Monocyte-Macrophage System, and Inflammation*
- 35. *Resistance of the Body to Infection: II. Immunity and Allergy*
- 36. *Blood Types; Transfusion; Tissue and Organ Transplantation*
- 37. *Hemostasis and Blood Coagulation*

VII. Respiration

- 38. *Pulmonary Ventilation*
- 39. *Pulmonary Circulation, Pulmonary Edema, Pleural Fluid*
- 40. *Principles of Gas Exchange; Diffusion of Oxygen and Carbon Dioxide Through the Respiratory Membrane*
- 41. *Transport of Oxygen and Carbon Dioxide in Blood and Tissue Fluids*
- 42. *Regulation of Respiration*
- 43. *Respiratory Insufficiency - Pathophysiology, Diagnosis, Oxygen Therapy*

VIII. Aviation, Space, and Deep-Sea Diving Physiology

44. *Aviation, High Altitude, and Space Physiology*

45. *Physiology of Deep-Sea Diving and Other Hyperbaric Conditions*

IV. The Nervous System: A. General Principles and Sensory Physiology

46. *Organization of the Nervous System, Basic Functions of Synapses, and Neurotransmitters*

47. *Sensory Receptors, Neuronal Circuits for Processing Information*

48. *Somatic Sensations: I. General Organization, the Tactile and Position Senses*

49. *Somatic sensations: II. Pain, Headache, and Thermal Sensations*

X. The Nervous System: B. The Special Senses

50. *The Eye: I. Optics of Vision*

51. *The Eye: II. Receptor and Neural Function of the Retina*

52. *The Eye: III. Central Neurophysiology of Vision*

53. *The Sense of Hearing*

54. *The Chemical Senses - Taste and Smell*

XI. The Nervous System: C. Motor and Integrative Neurophysiology

55. *Motor Functions of the Spinal Cord; the Cord Reflexes*

56. *Cortical and Brain Stem Control of Motor Function*

57. *Contributions of the Cerebellum and Basal Ganglia to Overall Motor Control*

58. *Cerebral Cortex, Intellectual Functions of the Brain, Learning, and Memory*

59. *Behavioral and Motivational Mechanisms of the Brain - The Limbic System and the Hypothalamus*

60. *States of Brain Activity - Sleep, Brain Waves, Epilepsy, Psychoses, and Dementia*

61. *The Autonomic Nervous System and the Adrenal Medulla*

62. *Cerebral Blood Flow, Cerebrospinal Fluid, and Brain Metabolism*

XII. Gastrointestinal Physiology

63. *General Principles of Gastrointestinal Function - Motility, Nervous Control, and Blood Circulation*

64. *Propulsion and Mixing of Food in the Alimentary Tract*

- 65. *Secretory Functions of the Alimentary Tract*
- 66. *Digestion and Absorption in the Gastrointestinal Tract*
- 67. *Physiology of Gastrointestinal Disorders*

XIII. Metabolism and Temperature Regulation

- 68. *Metabolism of Carbohydrates and Formation of Adenosine Triphosphate*
- 69. *Lipid Metabolism*
- 70. *Protein Metabolism*
- 71. *The Liver as an Organ*
- 72. *Dietary Balances; Regulation of Feeding; Obesity and Starvation; Vitamins and Minerals*
- 73. *Energetics and Metabolic Rate*
- 74. *Body Temperature Regulation and Fever*

XIV. Endocrinology and Reproduction

- 75. *Introduction to Endocrinology*
- 76. *Pituitary Hormones and Their Control by the Hypothalamus*
- 77. *Thyroid Metabolic Hormones*
- 78. *Adenocortical Hormones*
- 79. *Insulin, Glucagon, and Diabetes Mellitus*
- 80. *Parathyroid Hormone, Calcitonin, Calcium and Phosphate Metabolism, Vitamin D, Bone, and Teeth*
- 81. *Reproductive and Hormonal Functions of the Male (and Function of the Pineal Gland)*
- 82. *Female Physiology Before Pregnancy and Female Hormones*
- 83. *Pregnancy and Lactation*
- 84. *Fetal and Neonatal Physiology*

XV. Sports Physiology

- 85. *Sports Physiology*