**Χαρακτηριστικά:**

- Focuses on the **developmental physiology of the fetus and newborn**, offering expert guidance on how to effectively manage the many health problems seen in newborn and premature infants
- Provides **comprehensive updates throughout**, including new knowledge of the genetic underpinnings of physiologic processes and many new and improved tables and figures
- Contains **new chapters** covering genetic control of development, multi-omics, sleep, neuroinflammation, climate change, intrauterine inflammation, and gas transport in the blood
- Features **1,000 full-color diagrams, graphs and anatomic illustrations**, nearly 170 chapters, and more than 350 global contributors
- Includes **chapters devoted to clinical correlation** that help explain the implications of fetal and neonatal physiology, as well as clinical applications boxes throughout
- Shares the knowledge and fresh perspectives of **many new authors, as well as new co-editor Dr. Wendy Chung,** who brings further expertise in genetics and genomics to the editorial board
- **An eBook version is included with purchase.** The eBook allows you to access all of the text, figures, and references, with the ability to search, make notes and highlights, and have content read aloud. Additional digital ancillary content may publish after the publication date

**Περιεχόμενα:**

**Section 1: GENETICS AND EMBRYOLOGY**
1. Basic Genetic Principles
2. Epigenetics
3. Gene Regulation During Development
4. Basic Embryology
5. Regulation of Embryogenesis
6. Multiomics in Fetal and Neonatal Development
7. The Extracellular Matrix in Development
8. Angiogenesis
9. Prenatal Diagnosis

**Section 2: PLACENTA AND INTRAUTERINE ENVIRONMENT**
10. Placental Development
11. Regulation of the Placental Circulation
12. Mechanisms of Transfer Across the Human Placenta
13. Endocrine and Paracrine Function of the Human Placenta
14. Intraamniotic Infection/Inflammation and the Fetal Inflammatory Response Syndrome
15. Fetal Origins of Adult Disease

16. Placental Function in Intrauterine Growth Restriction

**Section 3: DEVELOPMENTAL PHARMACOLOGY**

17. Basic Pharmacologic Principles
18. Principles of Pharmacokinetics
19. The Physiology of Placental Drug Disposition
20. Pharmacogenomics
21. Drug Distribution in Fetal Life
22. Drug Transfer During Breastfeeding

**Section 4: INTRAUTERINE AND POSTNATAL GROWTH**

23. Placental and Fetal Circulatory, Metabolic, and Transcriptomic Changes Accompanying Fetal Growth Restriction
24. Endocrine Factors Affecting Neonatal Growth
25. Human Milk Composition and Function in the Infant

**Section 5: PERINATAL IRON, MINERAL, AND VITAMIN METABOLISM**

26. Fetal and Neonatal Iron Metabolism
27. Fetal and Neonatal Calcium, Phosphorus, and Magnesium Homeostasis
28. Zinc in the Fetus and Neonate
29. Vitamin A Metabolism in the Fetus and Neonate
30. Vitamin E Nutrition in Pregnancy and From Infancy to Early Life
31. Vitamin K Metabolism in the Fetus and Neonate

**Section 6: LIPID METABOLISM**

32. Maternal-Fetal Transfer of Lipid Metabolites
33. Brown Adipose Tissue: Development and Function
34. Lipids as an Energy Source for the Premature and Term Neonate
35. Ketone Body Metabolism in the Newborn
36. Long-Chain Polyunsaturated Fatty Acids in Neurobehavioral Development

**Section 7: CARBOHYDRATE METABOLISM**

37. Glucose Metabolism in the Fetus and Newborn and Methods for Its Investigation
38. Role of Glucoregulatory Hormones in Hepatic Glucose Metabolism During the Perinatal Period
39. Cell Glucose Transport and Glucose Handling During Fetal and Neonatal Development

**Section 8: PROTEIN METABOLISM**

40. General Concepts of Protein Metabolism
41. Placental Transfer and Fetal Requirements of Amino Acids

**Section 9: THERMOREGULATION**

42. Temperature Control in Newborn Infants

**Section 10: SKIN**

43. Embryonic and Fetal Development
44. Structure and Function of Newborn Skin

**Section 11: FETAL AND NEONATAL CARDIOVASCULAR PHYSIOLOGY**

45. Cardiovascular Development
46. Developmental Electrophysiology in the Fetus and Neonate
47. Developmental Biology of the Pulmonary Vasculature
48. Development of the Gastrointestinal Circulation in the Fetus and Newborn
49. Physiology of Congenital Heart Disease in the Neonate
50. Regulation of Cardiovascular Function During Fetal and Newborn Life
51. Nutritional and Environmental Effects on the Fetal Circulation
52. Mechanisms Regulating Closure of the Ductus Arteriosus
53. Umbilical Circulation

**Section 12: THE LUNG**

54. Normal and Abnormal Structural Development of the Lung
55. Regulation of Alveolarization
56. Physiologic Mechanisms of Normal and Altered Lung Growth Before and After Birth
57. Molecular Mechanisms of Lung Development and Lung Branching Morphogenesis
58. Upper Airway Structure, Function, Regulation, and Development
59. Regulation of Lower Airway Function
60. Functional Development of Respiratory Muscles
61. Mechanics of Breathing
62. Pulmonary Gas Exchange in the Developing Lung
63. Oxygen Transport and Delivery
64. Control of Breathing in Fetal Life and Onset and Control of Breathing in the Neonate
65. Basic Mechanisms of Oxygen Sensing and Adaptation to Hypoxia
66. Mechanisms of Neonatal Lung Injury
67. Impaired Lung Growth After Injury in Preterm Lung
68. Antenatal Factors That Influence Postnatal Lung Development and Injury
69. Regulation of Pulmonary Circulation

**Section 13: SURFACTANT**

70. Historical Perspective
71. Developmental Biology of Lung Stem Cells
72. Surfactant Homeostasis: Composition and Function of Pulmonary Surfactant Lipids and Proteins
73. Structure and Development of Alveolar Epithelial Cells
74. Regulation of Surfactant-Associated Phospholipid Synthesis and Secretion
75. Antenatal Hormonal Therapy for Prevention of Respiratory Distress Syndrome
76. Surfactant Treatment

77. Genetics and Physiology of Surfactant Dysfunction Disorders

**Section 14: PHYSIOLOGY OF GASTROINTESTINAL TRACT IN THE FETUS AND NEONATE**

78. Trophic Factors and Regulation of Gastrointestinal Tract and Liver Development
79. Organogenesis of the Gastrointestinal Tract
80. Development of Gastric Secretory Function
81. Development of the Enteric Nervous System and Gastrointestinal Motility
82. Development of the Endocrine and Exocrine Pancreas
83. Digestive-Absorptive Functions in Fetuses and Infants
84. Development of the Microbiome

**Section 15: LIVER AND BILIRUBIN METABOLISM**

85. Organogenesis and Histologic Development of the Liver
86. Bile Acid Metabolism During Development
87. Fetal and Neonatal Bilirubin Metabolism

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88. Development of the Kidney: Morphology and Mechanisms
89. Functional Development of the Kidney in Utero
90. Development and Regulation of Renal Blood Flow in the Neonate
91. Postnatal Development of Glomerular Filtration Rate in Neonates
92. Renal Transport of Sodium During Development
93. Potassium Homeostasis in the Fetus and Neonate
94. Role of the Kidney in Calcium and Phosphorus Homeostasis
95. Transport of Amino Acids in the Fetus and Neonate
96. Organic Anion Transport in the Developing Kidney
97. Concentration and Dilution of Urine
98. Urinary Acidification
99. Response to Nephron Loss in Early Development

**Section 17: FLUID AND ELECTROLYTE METABOLISM**

100. Fluid Distribution in the Fetus and Neonate
101. Regulation of Acid-Base Balance in the Fetus and Neonate

**Section 18: DEVELOPMENTAL HEMATOPOIESIS**

102. Developmental Biology of Hematopoietic Stem Cells
103. Neutropoiesis and Homeostasis
104. Developmental Erythropoiesis
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**Section 19: HEMOSTASIS**

106. Developmental Hemostasis

**Section 20: DEVELOPMENTAL IMMUNOBIOLOGY**

107. Host Defense Mechanisms Against Bacteria
108. Host Defense Mechanisms Against Fungi
109. Host Defense Mechanisms Against Viruses
110. T-Cell Development
111. B Cell Development
112. Mononuclear Phagocyte System
113. Normal and Abnormal Neutrophil Physiology in the Fetus and Newborn
114. The Complement System of the Fetus and Newborn
115. Immunology of Human Milk
116. Neonatal Pulmonary Host Defense

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118. Mechanisms of Cell Death in the Developing Brain
119. Development of the Blood-Brain Barrier
120. Developmental Aspects of Pain
121. Neonatal Sleep in Brain Development and Injury
122. Cerebellar Development—The Impact of Preterm Birth and Comorbidities
123. Electroencephalography in the Preterm and Term Infant
124. Intraventricular Hemorrhage in the Neonate
125. Pathophysiology of Neonatal Cerebral White and Gray Matter Injury
126. Fetal and Neonatal Physiology: Cellular and Molecular Mechanisms of Neonatal Brain Injury and Neuroprotection
127. Neuroimmune Interaction in Brain Development and Diseases
128. Neuroprotective Therapeutic Hypothermia

**Section 22: SPECIAL SENSORY SYSTEMS IN THE FETUS AND NEONATE**

129. Early Development of the Human Auditory System
130. Gustatory Sensation (Taste)
131. Development of Olfaction

**Section 23: ENDOCRINE FUNCTION**

132. Hypothalamus: Neuroendometabolic Center
133. Growth Factor Regulation of Fetal Growth
134. Growth Hormone, Prolactin, and Placental Lactogen in the Fetus and Newborn
135. Luteinizing Hormone and Follicle-Stimulating Hormone Secretion in the Fetus and Newborn Infant
136. Development of the Hypothalamus-Pituitary- Adrenal Axis in the Fetus
137. Fetal and Neonatal Adrenocortical Physiology
138. Fetal and Neonatal Thyroid Physiology

**Section 24: OVARY AND TESTIS**

139. Genetics of Sex Determination and Differentiation
140. Differentiation of the Ovary
141. Testicular Development and Descent

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142. Physiology of Twin-Twin Transfusion
143. Physiology of Neonatal Resuscitation
144. Pathophysiology of Neonatal Sepsis
145. Pathophysiology of Neonatal Hypoglycemia
146. Pathophysiology of Cardiomyopathies
147. Pathophysiology of Persistent Pulmonary Hypertension of the Newborn
148. Pathophysiology of Shock in the Fetus and Neonate
149. Pathophysiology of Apnea of Prematurity and Intermittent Hypoxemia
150. Pathophysiology of Respiratory Distress Syndrome
151. Pathophysiology of Meconium Aspiration Syndrome
152. Pathophysiology of Bronchopulmonary Dysplasia
153. Pathophysiology of Ventilator-Dependent Infants
154. Pathophysiology of Gastroesophageal Reflux
155. Pathophysiology and Prevention of Neonatal Necrotizing Enterocolitis
156. Pathophysiology of Acute Bilirubin Encephalopathy and Kernicterus Spectrum Disorders
157. Pathophysiology of Neonatal Acute Kidney Injury
158. The Pathophysiology of Pulmonary Edema in the Developing Lung
159. Pathophysiology of Retinopathy of Prematurity
160. Pathophysiology of Neonatal Hypoxic-Ischemic Brain Injury
161. Pathophysiology of Neonatal Acute Bacterial Meningitis
162. Pathophysiology of Neural Tube Defects
163. Pathophysiology of Preeclampsia
164. Pathophysiology of Preterm Birth
165. Climate Change Stressors and Impacts on Pregnancy
166. Pathophysiology of Chorioamnionitis: Host Immunity and Microbial Virulence
167. Pathophysiology of Genetic Neonatal Disease
168. Genetic Variants and Neonatal Disease
169. Understanding Fetal and Neonatal Responses to Hypoxia