

Contents

1

<i>Methods of Histology and Cytology</i>	1
Methods for Direct Observation of Living Tissues and Cells	2
Isolation of Components of Living Cells by	
Differential Centrifugation	8
Preparation and Examination of Killed Tissue	9
Principles of Microscopic Analysis	21
X-ray Diffraction	31

2

<i>The Cell and Cell Division</i>	35
The Cell	35
Cytoplasmic Organelles	37
Cytoplasmic Matrix Components	58
Cytoplasmic Inclusions	61
Nuclear Organelles	63
Cell Division	70
Mitosis	70
Meiosis	74
Human Chromosomes	74

3

<i>Epithelium</i>	83
Classification of Epithelia	84
Specializations of Epithelia	90
Specializations of the Free Surface	98

4

<i>Glands and Secretion</i>	108
Exocrine Glands	108
Synthesis, Storage, and Release of Protein Rich	
Secretory Products	108

Classification of Exocrine Glands.....	117
Histological Organization of Exocrine Glands.....	121
Control of Exocrine Secretion.....	122
Endocrine Glands.....	123
Cytology of Protein and Polypeptide Secreting Endocrine Glands.....	125
Cytology of Steroid Secreting Endocrine Glands.....	126
Storage and Secretion of Hormones.....	127
Relation of Endocrine Cells to Blood and Lymph Vascular Systems.....	130
Control Mechanisms and Interrelations Within the Endocrine System.....	132
Mechanisms of Hormone Action on Target Cells.....	134
5	
Blood	136
Formed Elements of Blood.....	137
Erythrocytes.....	137
Blood Platelets.....	139
Leukocytes.....	141
Other Components of Blood.....	153
6	
Connective Tissue Proper	158
Loose Connective Tissue.....	158
Extracellular Components.....	159
Fixed Cellular Elements.....	171
Mononuclear Wandering Cells.....	175
Serous Membranes.....	186
Dense Connective Tissue.....	188
Connective Tissue with Special Properties.....	189
Histophysiology of Connective Tissue.....	190
7	
Adipose Tissue	196
Histological Characteristics of the Adipose Tissues.....	196
Histogenesis of Adipose Tissue.....	201
Histophysiology of Adipose Tissue.....	202
8	
Blood Cell Formation	209
Hemopoiesis During Embryonic Development.....	210
Histological Organization of the Bone Marrow.....	212

Theories of Hemopoiesis and Cell Lineages	213
Erythropoiesis	216
Thrombopoiesis	221
Granulopoiesis	224
Monopoiesis	230
Lymphopoiesis in the Marrow	231
9	
<i>Cartilage</i>	233
Hyaline Cartilage	234
Elastic Cartilage	239
Fibrocartilage	239
Other Varieties of Cartilage and Chondroid Tissue	240
Regeneration of Cartilage	241
Regressive Changes in Cartilage	241
Histophysiology of Cartilage	242
10	
<i>Bone</i>	244
Macroscopic Structure of Bones	244
Microscopic Structure of Bones	246
Submicroscopic Structure and Composition of Bone Matrix	253
The Cells of Bone	254
Histogenesis of Bone	262
Histophysiology of Bone	279
Joints and Synovial Membranes	282
11	
<i>Muscular Tissue</i>	288
Smooth Muscle	288
Skeletal Muscle	295
Cardiac Muscle	315
Histogenesis of Muscular Tissue	328
Regeneration of Muscular Tissue	330
12	
<i>The Nervous Tissue</i>	333
<i>by Jay B. Angevine</i>	
The Structure of the Neuron	336
Distribution, Forms, and Varieties of Neurons	347
The Nerve Fiber	351
Peripheral Nerve Endings	358

Autonomic Nervous System	364
Neuroglia	366
The Synapse and the Relationships of Neurons	369
Development of the Neurons and of the Nervous Tissue	373
Connective Tissue, Choroid Plexus, Ventricles, and the Meninges of the Central Nervous System.....	375
Response of the Neuron to Injury	382

13

<i>Blood and Lymph Vascular Systems</i>	386
Blood Capillaries.....	386
The Structural Basis of Exchange Across the Capillary Wall.....	393
Arteries	396
Veins	409
Vascular Specializations and Ancillary Organs	413
The Heart	416
Impulse Conducting System	418
Histogenesis of the Blood Vessels	420
Lymphatic Vessels.....	420

14

<i>The Immune System</i>	427
<i>by Elio Raviola</i>	
Cells of the Immune System	430
Cytology of the Cells of the Immune System.....	430
Histophysiology	434
Lymphoid Tissue	446
Histophysiological Overview of the Immune System.....	451

15

<i>Thymus</i>	457
<i>by Elio Raviola</i>	
Histological Organization	457
Normal, Accidental, and Experimental Involution.....	465
Histophysiology of the Thymus.....	465

16

<i>Lymph Nodes</i>	471
<i>by Elio Raviola</i>	
Histological Organization	471
Histophysiology of Lymph Nodes.....	481

17

<i>Spleen</i>	487
<i>by Elio Raviola</i>	
Histological Organization	487
Histogenesis and Regeneration of the Spleen	498
Histophysiology of the Spleen	499

18

<i>Hypophysis (Pituitary Gland)</i>	503
Pars Distalis	505
Acidophils (Alpha Cells)	507
Basophils (Beta Cells)	509
Chromophobes (Reserve Cells)	510
Blood Supply	511
Histophysiology of the Pars Distalis	512
Histophysiological Correlations	515
Releasing Hormones	515
Pars Intermedia	516
Histophysiology of the Pars Intermedia	517
Pars Infundibularis or Tuberalis	518
Neurohypophysis	518
Histophysiology of the Neurohypophysis	520

19

<i>The Thyroid Gland</i>	524
Histological Organization	524
Histophysiology of the Thyroid Gland	528

20

<i>Parathyroid Glands</i>	535
Histophysiology of the Parathyroid	538

21

<i>Adrenal Glands and Paraganglia</i>	540
The Adrenal Cortex	540
The Adrenal Medulla	543
Blood Supply and Lymphatic Drainage of the Adrenal	546
Nerves of the Adrenal	548
Histophysiology of the Adrenal Cortex	549
Histophysiology of the Adrenal Medulla	551
Histogenesis of the Adrenal Glands	552
The Paraganglia	553

22

<i>The Pineal Gland</i>	556
Histophysiology of the Pineal Gland	560

23

<i>Skin</i>	563
The Epidermis	563
The Melanocyte System	571
Mucocutaneous Junctions	576
The Dermis.....	577
Hairs.....	579
Nails	587
Glands.....	588
Blood and Lymphatic Vessels.....	592
Nerves.....	593
Histogenesis of the Skin and Its Accessories	594

24

<i>Oral Cavity and Associated Glands</i>	598
The Oral Cavity.....	599
The Tongue.....	601
Glands of the Oral Cavity.....	605
Tonsils	615
The Pharynx.....	617

25

<i>The Teeth</i>	621
Histogenesis of the Teeth.....	631

26

<i>The Esophagus and Stomach</i>	639
Esophagus	639
Glands of the Esophagus.....	640
Histophysiology of the Esophagus	641
Stomach	643
Gastric Glands	647
Histophysiology of the Stomach	654
Cell Renewal and Regeneration.....	655

27

<i>Intestines</i>	658
The Small Intestine	658
The Intestinal Mucosa	658

The Appendix.....	673
The Large Intestine	674
The Histophysiology of Intestinal Absorption.....	676
Blood Vessels of the Gastrointestinal Tract	680
Lymph Vessels of the Gastrointestinal Tract.....	681
Nerves of the Intestinal Tract	682
Histogenesis of Intestines	686

28

<i>The Liver and Gallbladder</i>	688
Liver.....	688
Histological Organization of the Liver.....	688
Regeneration.....	712
Histophysiology of the Liver.....	713
Bile Ducts	717
The Gallbladder and Choledochoduodenal Junction	718

29

<i>Pancreas</i>	726
The Exocrine Pancreas	726
The Endocrine Pancreas	729
The Duct System	733
Blood Vessels, Lymphatics, and Nerves	735
Regeneration.....	737
Histophysiology of the Exocrine Pancreas.....	737
Histophysiology of the Endocrine Pancreas.....	739

30

<i>Respiratory System</i>	743
The Nose.....	743
The Larynx.....	746
The Trachea.....	748
The Lungs.....	748
Respiratory Structures of the Lungs.....	750

31

<i>The Urinary System</i>	766
Kidneys	766
Uriniferous Tubules.....	767
Juxtaglomerular Complex	782
Blood Supply	784
Lymphatics	786
Nerves.....	787
Histophysiology of the Kidneys	787

Passages for the Excretion of Urine	794
Urethra	799

32

<i>Male Reproductive System</i>	805
Testis	805
Seminiferous Tubules	807
The Spermatozoon	811
Spermatogenesis	819
Interstitial Tissue	833
Blood Vessels and Lymphatics of the Testis	835
Histophysiology of the Testis	837
Excretory Ducts of the Testis	841
Ductuli Efferentes	842
Accessory Glands of the Male Reproductive Tract	847
The Penis	851
Semen	855

33

<i>Female Reproductive System</i>	858
Ovary	858
The Oviduct or Fallopian Tube	880
Uterus	883
Endocrine Regulation of the Female Reproductive System	895
Implantation	897
Placenta	898
Vagina	902
External Genitalia	904

34

<i>Mammary Gland</i>	907
Resting Mammary Gland	907
Active Mammary Gland	908
Endocrine Control of Mammary Gland Function	911
Regression of the Mammary Gland	914

35

<i>The Eye</i>	917
Structure of the Eye in General	917
Dimensions, Axes, Planes of Reference	918
Fibrous Tunic	920
The Uvea (The Vascular Tunic)	926
Refractive Media of the Eye	934
The Retina	937
Histophysiology of the Retina	953

Blood Vessels of the Eye	956
Lymph Spaces of the Eye	957
Nerves of the Eye	957
Accessory Organs of the Eye.....	957
Histogenesis of the Eye	961

36

<i>The Ear</i>	964
External Ear.....	964
Middle Ear.....	965
Tympanic Cavity.....	965
Tympanic Membrane	966
Auditory Tube	967
Internal Ear	968
The Bone Labyrinth.....	968
The Membranous (or Endolymphatic) Labyrinth	970
The Perilymphatic Labyrinth	981
Endolymph and Perilymph.....	983
Nerves of the Labyrinth.....	984
Blood Vessels of the Labyrinth.....	985
Embryological Development of the Ear	987
Functional Considerations	990
<i>Index</i>	993