

Contents

PART I	INTRODUCTION TO THE CELL	1
Chapter 1	Cells and Genomes	1
Chapter 2	Cell Chemistry and Bioenergetics	43
Chapter 3	Proteins	109
PART II	BASIC GENETIC MECHANISMS	175
Chapter 4	DNA, Chromosomes, and Genomes	175
Chapter 5	DNA Replication, Repair, and Recombination	237
Chapter 6	How Cells Read the Genome: From DNA to Protein	299
Chapter 7	Control of Gene Expression	369
PART III	WAYS OF WORKING WITH CELLS	439
Chapter 8	Analyzing Cells, Molecules, and Systems	439
Chapter 9	Visualizing Cells	529
PART IV	INTERNAL ORGANIZATION OF THE CELL	565
Chapter 10	Membrane Structure	565
Chapter 11	Membrane Transport of Small Molecules and the Electrical Properties of Membranes	597
Chapter 12	Intracellular Compartments and Protein Sorting	641
Chapter 13	Intracellular Membrane Traffic	695
Chapter 14	Energy Conversion: Mitochondria and Chloroplasts	753
Chapter 15	Cell Signaling	813
Chapter 16	The Cytoskeleton	889
Chapter 17	The Cell Cycle	963
Chapter 18	Cell Death	1021
Chapter 19	Cell Junctions and the Extracellular Matrix	1035
PART V	CELLS IN THEIR SOCIAL CONTEXT	1035
Chapter 20	Cancer	1091
Chapter 21	Development of Multicellular Organisms	1145
Chapter 22	Stem Cells and Tissue Renewal	1217
Chapter 23	Pathogens and Infection	1263
Chapter 24	The Innate and Adaptive Immune Systems	1297
Glossary		G: 1
Index		I: 1
Tables	The Genetic Code, Amino Acids	T: 1