

Box Contents

ADVANCED CONCEPTS

- BOX 1-1** Mendelian Laws, 6
- BOX 3-1** The Uniqueness of Molecular Shapes and the Concept of Selective Stickiness, 61
- BOX 6-1** Ramachandran Plot: Permitted Combinations of Main-Chain Torsion Angles ϕ and ψ , 124
- BOX 6-2** Glossary of Terms, 130
- BOX 6-3** The Antibody Molecule as an Illustration of Protein Domains, 133
- BOX 9-3** ATP Control of Protein Function: Loading a Sliding Clamp, 282
- BOX 9-5** *E. coli* DNA Replication Is Regulated by DnaA-ATP Levels and SeqA, 294
- BOX 10-3** Quantitation of DNA Damage and Its Effects on Cellular Survival and Mutagenesis, 323
- BOX 10-6** The γ Family of DNA Polymerases, 336
- BOX 11-1** How to Resolve a Recombination Intermediate with Two Holliday Junctions, 350
- BOX 12-2** The Xer Recombinase Catalyzes the Monomerization of Bacterial Chromosomes and of Many Bacterial Plasmids, 392
- BOX 12-4** Mechanism of Transposition Target Immunity, 413
- BOX 13-2** The Single-Subunit RNA Polymerases, 443
- BOX 15-1** CCA-Adding Enzymes: Synthesizing RNA without a Template, 513
- BOX 15-2** Selenocysteine, 520
- BOX 15-3** uORFs and IRESs: Exceptions That Prove the Rule, 533
- BOX 15-4** GTP-Binding Proteins, Conformational Switching, and the Fidelity and Ordering of the Events of Translation, 546
- BOX 16-1** Expanding the Genetic Code, 589
- BOX 18-4** Concentration, Affinity, and Cooperative Binding, 641
- BOX 19-5** Is There a Histone Code?, 691
- BOX 20-1** Amino Acid Biosynthetic Operons Are Controlled by Attenuation, 707
- BOX 21-2** Review of Cytoskeleton: Asymmetry and Growth, 741
- BOX 21-3** Overview of *Drosophila* Development, 748
- BOX 21-6** Gradient Thresholds, 757
- BOX 21-8** Homeotic Genes of *Drosophila* Are Organized in Special Chromosome Clusters, 764

KEY EXPERIMENTS

- BOX 1-2** Genes Are Linked to Chromosomes, 10
- BOX 2-1** Chargaff's Rules, 26
- BOX 2-2** Evidence That Genes Control Amino Acid Sequences in Proteins, 31
- BOX 4-1** DNA Has 10.5 bp per Turn of the Helix in Solution: The Mica Experiment, 84
- BOX 4-2** How Spots on an X-Ray Film Reveal the Structure of DNA, 88
- BOX 4-3** Proving that DNA Has a Helical Periodicity of ~ 10.5 bp per Turn from the Topological Properties of DNA Rings, 103
- BOX 6-4** Three-Dimensional Structure of a Protein Is Specified by Its Amino Acid Sequence (Anfinsen Experiment), 135
- BOX 7-2** Sequenators Are Used for High-Throughput Sequencing, 163
- BOX 8-1** Micrococcal Nuclease and the DNA Associated with the Nucleosome, 226
- BOX 8-2** Nucleosomes and Superhelical Density, 230
- BOX 8-3** Determining Nucleosome Position in the Cell, 245
- BOX 9-4** The Identification of Origins of Replication and Replicators, 290
- BOX 12-3** Maize Elements and the Discovery of Transposons, 408
- BOX 14-1** Adenovirus and the Discovery of Splicing, 471
- BOX 14-2** Converting Group I Introns into Ribozymes, 479
- BOX 14-3** Identification of Docking Site and Selector Sequences, 490
- BOX 18-1** Activator Bypass Experiments, 624
- BOX 18-2** Jacob, Monod, and the Ideas behind Gene Regulation, 628
- BOX 18-5** Evolution of the λ Switch, 645
- BOX 18-6** Genetic Approaches That Identified Genes Involved in the Lytic/Lysogenic Choice, 649

BOX 19-4 Evolution of a Regulatory Circuit, 683

BOX 20-2 Discovery of miRNAs and RNAi, 722

BOX 21-4 Activator Synergy, 752

BOX 21-7 *cis*-Regulatory Sequences in Animal Development and Evolution, 759

BOX 22-1 Bistability and Hysteresis, 782

MEDICAL CONNECTIONS

BOX 5-1 An RNA Switch Controls Protein Synthesis by Murine Leukemia Virus, 112

BOX 9-2 Anticancer and Antiviral Agents Target DNA Replication, 268

BOX 9-6 Aging, Cancer, and the Telomere Hypothesis, 307

BOX 10-1 Expansion of Triple Repeats Causes Disease, 316

BOX 10-2 The Ames Test, 321

BOX 10-4 Linking Nucleotide Excision Repair and Translesion Synthesis to a Genetic Disorder in Humans, 330

BOX 10-5 Nonhomologous End Joining, 332

BOX 11-2 The Product of the Tumor Suppressor Gene *BRCA2* Interacts with Rad51 Protein and Controls Genome Stability, 367

BOX 11-3 Proteins Associated with Premature Aging and Cancer Promote an Alternative Pathway for Holliday Junction Processing, 368

BOX 12-1 Application of Site-Specific Recombination to Genetic Engineering, 386

BOX 14-4 Defects in Pre-mRNA Splicing Cause Human Disease, 497

BOX 14-5 Deaminases and HIV, 503

BOX 15-5 Antibiotics Arrest Cell Division by Blocking Specific Steps in Translation, 552

BOX 15-7 A Frontline Drug in Tuberculosis Therapy Targets SsrA Tagging, 565

BOX 18-3 Blocking Virulence by Silencing Pathways of Intercellular Communication, 635

BOX 19-3 Histone Modifications, Transcription Elongation, and Leukemia, 670

BOX 19-6 Transcriptional Repression and Human Disease, 696

BOX 20-3 microRNAs and Human Disease, 727

BOX 21-1 Formation of iPS Cells, 734

BOX 21-5 Stem Cell Niche, 755

TECHNIQUES

BOX 5-2 Creating an RNA Mimetic of the Green Fluorescent Protein by Directed Evolution, 115

BOX 7-1 Forensics and the Polymerase Chain Reaction, 160

BOX 9-1 Incorporation Assays Can Be Used to Measure Nucleic Acid and Protein Synthesis, 261

BOX 13-1 Consensus Sequences, 436

BOX 15-6 Ribosome and Polysome Profiling, 561

BOX 19-1 The Two-Hybrid Assay, 664

BOX 19-2 The ChIP-Chip and ChIP-Seq Assays Are the Best Method for Identifying Enhancers, 666