Lewin's GENES XII

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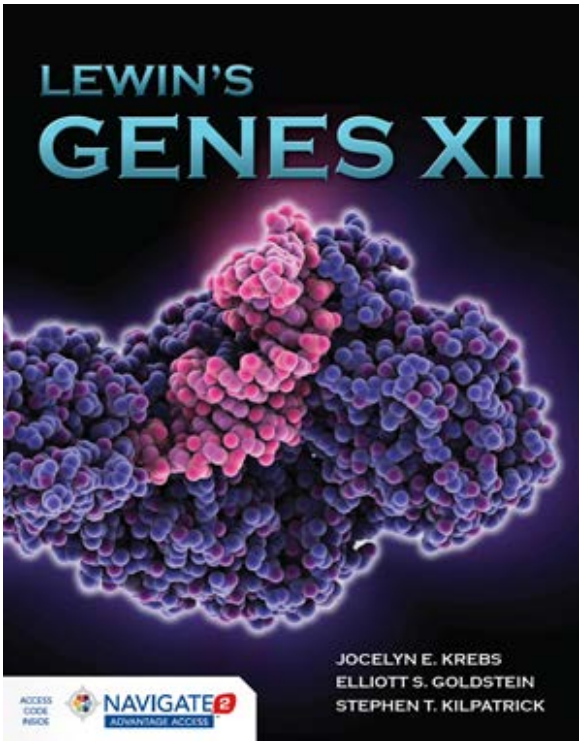

Jocelyn E. Krebs, PhD, University of Alaska, Anchorage
Elliott S. Goldstein, PhD, Arizona State University
Stephen T. Kilpatrick, PhD, University of Pittsburgh at Johnstown

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SEE WHAT'S NEW TO THE TWELFTH EDITION!

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This Transition Guide outlines many of the changes and new content in the *Twelfth Edition*. Use this guide for an easy transition to the new edition.

Long considered the quintessential molecular biology textbook, for decades ***Lewin's GENES*** has provided the most modern presentation to this transformative and dynamic science. Now in its twelfth edition, this classic text continues to lead with new information and cutting-edge developments, covering gene structure, sequencing, organization, and expression. Leading scientists provide revisions and updates in their respective areas of study offering readers current research and relevant information on the rapidly changing subjects in molecular biology. No other text offers a broader understanding of this exciting and vital science or does so with higher quality art and illustrations. ***Lewin's GENES XII*** continues to be the clear choice for molecular biology and genetics.

All chapters have been carefully and thoroughly revised and updated with the latest scientific and education research.

A completely redesigned interior layout will draw in the reader and help to engage students in the high-quality pedagogical features.

CHAPTER OUTLINE

Table of Contents comparison to transition from the *Eleventh* to the *Twelfth Edition*

GENES XI	***GENES XII***
Part 1 Genes and Chromosomes	**Part 1: Genes and Chromosomes**
Chapter 1 Genes Are DNA	Chapter 1: Genes are DNA and Encode RNAs and Polypeptides
Chapter 2 Genes Encode RNAs and Polypeptides	Chapter 2: Methods in Molecular Biology and Genetic Engineering
Chapter 3 Methods in Molecular Biology and Genetic Engineering	Chapter 3: The Interrupted Gene
Chapter 4 The Interrupted Gene	Chapter 4: The Content of the Genome
Chapter 5 The Content of the Genome	Chapter 5: Genome Sequences and Evolution
Chapter 6 Genome Sequences and Gene Number	Chapter 6: Clusters and Repeats
Chapter 7 Clusters and Repeats	Chapter 7: Chromosomes
Chapter 8 Genome Evolution	Chapter 8: Chromatin
Chapter 9 Chromosomes	**Part 2: DNA Replication and Recombination**
Chapter 10 Chromatin	Chapter 9: Replication Is Connected to the Cell Cycle
Part 2 DNA Replication and Recombination	Chapter 10: The Replicon: Initiation of Replication

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Chapter 11 Replication Is Connected to the Cell Cycle	Chapter 11: DNA Replication
Chapter 12 The Replicon: Initiation of Replication	Chapter 12: Extrachromosomal Replicons
Chapter 13 DNA Replication	Chapter 13: Homologous and Site-Specific Recombination
Chapter 14 Extrachromosomal Replicons	Chapter 14: Repair Systems
Chapter 15 Homologous and Site-Specific Recombination	Chapter 15: Transposable Elements and Retroviruses
Chapter 16 Repair Systems	Chapter 16: Somatic DNA Recombination and Hypermutation in the Immune System
Chapter 17 Transposable Elements and Retroviruses	**Part 3: Transcription and Posttranscriptional Mechanisms**
Chapter 18 Somatic Recombination and Hypermutation in the Immune System	Chapter 17: Prokaryotic Transcription
Part 3 Transcription and Posttranscriptional Mechanisms	Chapter 18: Eukaryotic Transcription
Chapter 19 Prokaryotic Transcription	Chapter 19: RNA Splicing and Processing
Chapter 20 Eukaryotic Transcription	Chapter 20: mRNA Stability and Localization
Chapter 21 RNA Splicing and Processing	Chapter 21: Catalytic RNA
Chapter 22 mRNA Stability and Localization	Chapter 22: Translation
Chapter 23 Catalytic RNA	Chapter 23: Using the Genetic Code
Chapter 24 Translation	**Part 4: Gene Regulation**
Chapter 25 Using the Genetic Code	Chapter 24: The Operon
Part 4 Gene Regulation	Chapter 25: Phage Strategies
Chapter 26 The Operon	Chapter 26: Eukaryotic Transcription Regulation
Chapter 27 Phage Strategies	Chapter 27: Epigenetics I
Chapter 28 Eukaryotic Transcription Regulation	Chapter 28: Epigenetics II
Chapter 29 Epigenetic Effects Are Inherited	Chapter 29: Noncoding RNA
Chapter 30 Regulatory RNA	Chapter 30: Regulatory RNA

IMPORTANT CHAPTER UPDATES

In addition to the key updates made to all chapters, the authors have provided more detailed notes on significant changes in certain chapters.

Chapter 1

- ✓ Previously Chapters 1 & 2 in Eleventh Edition
- ✓ Added more information about the Hershey-Chase and Meselson-Stahl experiments
- ✓ Updated information about mutations
- ✓ Expanded discussion of RNAs and RNA splicing

Chapter 2

- ✓ Previously Chapter 3 in Eleventh Edition
- ✓ Addition of section on genome editing, including TALENs, ZPNs, and CRISPR/Cas9

Chapter 3

- ✓ Previously Chapter 4 in Eleventh Edition
- ✓ Updated information on large genes
- ✓ Added references

Chapter 4

- ✓ Previously Chapter 5 in Eleventh Edition
- ✓ Updated information about genome mapping
- ✓ Added content about genome-wide association studies to detect genes associated with human phenotypes
- ✓ Updated discussion of transposons

Chapter 5

- ✓ Previously Chapters 6 & 8 in Eleventh Edition
- ✓ Updated whole genome sequence information, genome sizes, and gene numbers for some organisms
- ✓ Updated discussion of pseudogenes

Chapter 6

- ✓ Previously Chapter 7 in Eleventh Edition
- ✓ Updated discussion of DNA profiling

Chapter 7

- ✓ Previously Chapter 9 in Eleventh Edition
- ✓ Added and updated information on bacterial nucleoid structure and dynamics, including the role of NAPs (nucleoid associated proteins)
- ✓ Added and updated information on eukaryotic centromere and telomere structure and function,
- ✓ Included new information on chromosome territories and replication domains

Chapter 8

- ✓ Previously Chapter 10 in Eleventh Edition
- ✓ New information on topologically associated domains (TADs) and updates throughout

Chapter 9

- ✓ Previously Chapter 11 in Eleventh Edition
- ✓ Major modification to section on shape and spatial organization of a bacterium during chromosome segregation and cell division
- ✓ Major modification to section on *min* and *noc/slm* genes regulating the location of the septum
- ✓ Major modification to section on separation of the chromosomes
- ✓ Major modification to chromosomal segregation requiring site-specific recombination

Chapter 10

- ✓ Previously Chapter 12 in Eleventh Edition
- ✓ Updated references

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Chapter 11
- ✓ Previously Chapter 13 in Eleventh Edition
- ✓ Updated references

Chapter 12
- ✓ Previously Chapter 14 in Eleventh Edition

Chapter 13
- ✓ Previously Chapter 15 in Eleventh Edition

Chapter 14
- ✓ Previously Chapter 16 in Eleventh Edition
- ✓ Expanded discussion of repair by methyltransferases
- ✓ Updated information on pathways of double strand break repair
- ✓ Expanded discussion of repair in the chromatin context, including PARylation

Chapter 15
- ✓ Previously Chapter 17 in Eleventh Edition

Chapter 16
- ✓ Previously Chapter 18 in Eleventh Edition
- ✓ Extensive updates and reorganization throughout
- ✓ New section on epigenetics and noncoding RNAs in V(D)J recombination, CSR and SHM

Chapter 17
- ✓ Previously Chapter 19 in Eleventh Edition
- ✓ Updated section on interactions between sigma factor and core RNA polymerase during promoter escape
- ✓ Updated section on stalled RNA polymerase

Chapter 18
- ✓ Previously Chapter 20 in Eleventh Edition
- ✓ New material on enhancer RNAs (eRNA)
- ✓ Update references
- ✓ New material on Pol/DNA binding, clearance, and pause button mechanism

Chapter 19
- ✓ Previously Chapter 21 in Eleventh Edition
- ✓ Updated information about histone mRNAs
- ✓ Added references

Chapter 20
- ✓ Previously Chapter 22 in Eleventh Edition

Chapter 21
- ✓ Previously Chapter 23 in Eleventh Edition
- ✓ Added information about synthetic ribozymes and synthetic inteins, taxonomic distribution of Group I introns, and the splicing mechanism for Group II introns
- ✓ Added references

Chapter 22
- ✓ Previously Chapter 24 in Eleventh Edition
- ✓ Updated information about ribosomal translocation and about mRNA stability
- ✓ Added references

Chapter 23
- ✓ Previously Chapter 25 in Eleventh Edition
- ✓ Added information about variations to genetic code
- ✓ Added references

Chapter 24
- ✓ Previously Chapter 26 in Eleventh Edition
- ✓ Updated references
- ✓ Updated material on how transcription factors slide on DNA

Chapter 25
- ✓ Previously Chapter 27 in Eleventh Edition
- ✓ Added references

Chapter 26
- ✓ Previously Chapter 28 in Eleventh Edition
- ✓ Added references
- ✓ Expanded discussion of the functional interactions between chromatin remodeling complexes and histone modifying complexes and histone modifications

Chapter 27
- ✓ Previous Chapter 29 in Eleventh Edition divided into two and reorganized
- ✓ Expanded discussion of epigenetic drift and transgenerational epigenetic inheritance

Chapter 28
- ✓ Previous Chapter 29 in Eleventh Edition divided into two and reorganized
- ✓ Updates on dosage compensation and imprinting

Chapter 29
- ✓ Previously Chapter 30 in Eleventh Edition
- ✓ Updated references

Chapter 30
- ✓ NEW chapter on Interfering RNAs

ORGANIZATIONAL NOTE & CUSTOM PUBLISHING INFORMATION

For instructors who prefer to order topics with the essentials of DNA replication and gene expression followed by more advanced topics, the following chapter sequence is suggested:

Introduction: Chapter 1
Gene and Genome Structure: Chapters 4–6
DNA Replication: Chapters 9–12
Transcription: Chapters 17–20
Translation: Chapters 22–23
Regulation of Gene Expression: Chapters 7–8 and 24–30
Other chapters can be covered at the instructor's discretion.

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