



Genetics: From Genes to Genomes, 6th edition

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List of Changes:

The sixth edition has been revised and modernized significantly as compared with the fifth edition. We scrutinized the entire text and clarified the language wherever possible. In total, we created more than 50 new Figures and Tables, and revised more than 100 in addition. We also wrote more than 125 new end-of-chapter problems, and revised many other problems for clarity. The entire Solutions Manual and Study Guide was corrected and revised for clarity. We added several new Fast Forward, Genetics and Society, and Tools of Genetics Boxes on modern topics. Chapter 9 in the 5th edition was split into two separate chapters in the 6th edition: Chapter 9 (Digital Analysis of DNA) and Chapter 10 (Genome Annotation).

Along with the numerous text changes, the authors have also spent a great deal of time updating the test bank and question bank content to align more closely to the text.

There will also be new video tutorials for difficult concepts in every chapter!

Every chapter of the sixth edition was improved significantly from the fifth edition. The most important changes in the sixth edition are summarized below:

Chapter 3 Extensions to Mendel's Laws

- Relationship between epistasis and complementation explained more clearly.
- Discussion of two-gene versus multifactorial inheritance now separated for clarity.
- Comprehensive Example about dog coat colors expanded to include molecular explanations for the various gene activities.

Chapter 4 The Chromosome Theory of Inheritance

- Figures and text altered to clarify that each chromatid has a centromere.
- New Fast Forward Box: Visualizing X Chromosome Inactivation in Transgenic Mice

- Chapter 5 Linkage, Recombination, and the Mapping of Genes on Chromosomes**
- New Fast Forward Box: Mapping the Crossovers that Generate Individual Human Sperm
- Chapter 6 DNA Structure, Replication, and Recombination**
- Improvements to diagrams of DSB repair model of recombination.
 - New section about site-specific recombination.
- Chapter 7 Anatomy and Function of Gene: Dissection Through Mutation**
- Reorganized and clarified material to separate the discussion of DNA sequence alteration mechanisms from DNA repair mechanisms.
- Chapter 9 Digital Analysis of DNA**
- Improved depiction of plasmid cloning vectors.
 - Renovated explanation of paired-end whole-genome shotgun sequencing.
- Chapter 10 Genome Annotation**
- Improved depiction of alternative RNA splicing.
 - New illustration of consensus amino acid sequences in proteins.
 - New material on the evolution of de novo genes.
- Chapter 12 The Eukaryotic Chromosome**
- New material on synthetic yeast chromosomes.
- Chapter 15 Organellar Inheritance**
- New Fast Forward Box about the Mitochondrial Eve concept.
- Chapter 17 Gene Regulation in Eukaryotes**
- New Tools of Genetics Box: The Gal4/UASG Binary *Gene Expression System*
 - *New part of Epigenetics section: Can Environmentally Acquired Traits Be Inherited?*
 - New part of Regulation After Transcription section: Transacting Proteins Regulate Translation
- Chapter 18 Manipulating the Genomes of Eukaryotes**
- New part of Targeted Mutagenesis section: CRISPR/ Cas9 Allows Targeted Gene Editing in Any Organism
 - New Tools of Genetics Box: How Bacteria Vaccinate Themselves Against Viral Infections with CRISPR/Cas9
 - New Genetics and Society Box: Should We Alter the Genomes of Human Germ Lines?
- Chapter 19 The Genetic Analysis of Development**
- Comprehensive Example of *Drosophila* body patterning revised to clarify that homeotic genes function within parasegments, and to clarify the concept of a morphogen.
- Chapter 20 The Genetics of Cancer**
- Clarified the fact that mutation drives cancer progression.
 - Improved explanation of driver and passenger mutations.
 - Increased coverage of tumor genome sequencing and the heterogeneity of mutations in different individuals with cancers in the same organ.

Chapter 22 The Genetics of Complex Traits

- Revised the section on heritability to clarify: lines of correlation and correlation coefficients; how to use different kinds of human twin studies to estimate the heritability of complex quantitative traits and complex discrete traits.
- New explanation of how to use the chi-square test for independence for GWAS.

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