



## Genetics (with InfoTrac): The Continuity of Life

*By Daniel J. Fairbanks, W. Ralph Andersen*

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For quite some time textbooks have steered the teaching of genetics down a fairly narrow path - transmissions genetics first, followed by molecular genetics. In *Genetics: The Continuity of Life*, Fairbanks and Andersen modernize the study of genetics for students. With a clear, robust style, the authors approach genetics at its most fundamental molecular level, building on students' previous exposure from other courses. Once the molecular concepts are in place, transmission genetics is more easily understood. The result is a textbook that reflects the way geneticists think about solving genetics problems in a completely integrative manner. Students relate to the organization and are able to grasp the larger concepts and their applications.

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## **Genetics (with InfoTrac): The Continuity of Life** By Daniel J. Fairbanks, W. Ralph Andersen

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## **Genetics (with InfoTrac): The Continuity of Life** By Daniel J. Fairbanks, W. Ralph Andersen **Bibliography**

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## **Editorial Review**

### **Review**

1. INTRODUCTION Genetics in Human Society / The Universality of Genetic Principles / Model Organisms / Organizing the Study of Genetics / The Concept of the Gene / Genetic Analysis PART I: MOLECULAR FOUNDATIONS OF GENETICS 2. DNA STRUCTURE AND REPLICATION The Genetic Material / Nucleic Acid Structure / Semiconservative DNA Replication / The Process of DNA Replication / Replication of Entire DNA Molecules 3. TRANSCRIPTION AND RNA PROCESSING The Central Dogma / Overview of Transcription and RNA Processing in Prokaryotes and Eukaryotes / Initiation of Transcription / Elongation / Termination / Transcription of rRNAs and tRNAs / mRNA Processing / Processing of rRNAs and tRNAs 4. TRANSLATION AND PROTEIN FUNCTION Amino Acids and Polypeptides / The Genetic Code / Ribosomes, the Sites of Translation / The Role of tRNA / Deciphering the Genetic Code / Initiation of Translation / Elongation / Termination / Protein Structure and Function 5. MUTATION Types of Mutations / Spontaneous Mutation / Induced Mutations / DNA Repair Mechanisms 6. AN INTEGRATED VIEW OF GENE EXPRESSION The Anatomy of a Gene and Its Expression / The Human ss-Globin Gene / Enzymes, Biochemical Pathways, and Mutation PART II: GENETICS OF CELLS 7. BACTERIAL GENETICS Bacterial Culture / Structure of Bacterial Chromosomes / DNA Transfer and Recombination / Transformation / Conjugation / Phage Life Cycles / Transduction / Genome Sequencing 8. REGULATION OF GENE EXPRESSION The lac Operon / Mutations in the lac Operon / The trp Operon / Regulation of Lysis and Lysogeny / Transcriptional Gene Regulation in the Eukaryotes / Gene Regulation Beyond Transcription 9. RECOMBINANT DNA AND MOLECULAR ANALYSIS Recombinant DNA / Plasmid Cloning Vectors / Vectors for Cloning Large DNA Inserts / Cloning Strategies / Expression Vectors / The Polymerase Chain Reaction (PCR) / Gel Electrophoresis / DNA, RNA and Protein Blotting / DNA Sequencing 10. EUKARYOTIC GENOME ORGANIZATION Repetitive and Nonrepetitive DNA / Eukaryotic DNA Packaging / The Eukaryotic Chromosome / Gene Organization in Chromosomes / Whole Genome Organization 11. MITOSIS, MEIOSIS, AND LIFE CYCLES The Cell Cycle and Mitosis / Meiosis / A Closer Look at Prophase I / Life Cycles PART III: GENETICS AND ORGANISMS 12. MENDELIAN GENETICS Mendel's Experiments / The Molecular Basis of Dominance / The Cellular Basis for Segregation / The Cellular Basis of Independent Assortment / Mendelian Inheritance in Humans / Mendelian Genetics and Probability / About Mendel 13. VARIATIONS ON MENDEL'S THEME Multiple Alleles and Dominance Relations / Epistasis / Penetrance and Expressivity / DNA Markers in Genetic Analysis 14. SEX DETERMINATION AND SEX-RELATED INHERITANCE Promotion of Cross-Fertilization / Sex Determination / Heteromorphic Chromosomes and Sex Determination / Sex-Linked Inheritance / Dosage Compensation / Sex-Influenced and Sex-Limited Traits 15. CHROMOSOME MAPPING The Discovery of Linkage and Crossing-Over / Two-Factor Linkage Analysis / Map Distance Correction / Three-Factor Linkage Analysis / Multifactor Chromosome Mapping / Genetic Mapping in Humans / Physical Chromosome Mapping / Practical Applications of Chromosome Mapping 16. GENETIC FINE STRUCTURE Tetrad Analysis / Unordered Tetrad Analysis / Gene Conversion and the Mechanism of Crossing-Over / Intragenic Recombination / Complementation / Fine-Structure Mapping / Mitotic Crossing-Over 17. ALTERATIONS IN CHROMOSOME NUMBER AND STRUCTURE Aneuploidy / Polyploidy / Alterations of Chromosome Structure / Chromosome Alterations in Humans 18. EXTRANUCLEAR INHERITANCE The Origins and Cellular Functions of Mitochondria and Plastids / Organellar Genomes / Mitochondrial Inheritance / Mitochondrial DNA and Genetic Disorders in Humans / Plastid Inheritance / Other Types of Extranuclear Inheritance / Correctly Recognizing Extranuclear Inheritance PART IV: GENETICS OF POPULATIONS 19. POPULATION GENETICS Hardy-Weinberg Equilibrium / Genetic Change in Populations / Mutation / Migration / Non-Random Mating / Selection / Random Genetic Drift 20.

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