

## Chapter 1: Human Genome

### 1.1. INTRODUCING GENES AND GENOME

- **Genetics** – study of heredity, traits and their variations.
  - study of how traits are transmitted.
- **Heredity** – transmission of traits and biological information.
- **Genes** – basic unit of heredity.
  - inherit cell's production of proteins.
  - consist of long DNA.
  - provide encoding genes are scattered among 3.2 billion DNA bases in each set of chromosomes.
- **Proteins** – control the characteristics of every individual.
- **DNA (Deoxyribonucleic Acid)** – transmits information in sequence of nitrogenous bases.
- **Genomes** – make up of complete set of genetic instructions characteristic of each an organism.
  - all of our cells contain two sets copies of genomes.
- **Genomics** – scientific field that analyzes genomes.
  - reveals how closely related are different species.

### 1.2 LEVELS OF GENETICS AND GENOMICS

- **DNA (Deoxyribonucleic Acid)**
  - Shape: double helix
  - Consist of: alternating sugar and phosphates
  - Function: provide information to manufacture specific proteins



- 4 types of nitrogenous bases:
  - Adenine (A) and Thymine (T)
  - Cytosine (C) and Guanine (G)
  - Each set of these complementary bases is a code for a particular amino acid.
- **Amino Acid** – building blocks of protein.
  - align and link like snap beads forming protein

### 1.3. THREE PROCESSES OF ACCESSING GENETIC INFORMATION

- **DNA replication** – (1) chains of double helix untwist and separate.
  - (2) each full helix is a new partner chain from two DNA bases.
- **Transcription** – (3) copies the sequence of one strand of DNA molecule into mRNA.
- **Translation** – (4) each 3 RNA bases is a new attract another type of RNA, that functions as a connector, bringing in a particular amino acid.
  - (5) Amino acids align and link to form protein.

### 1.2 THE HUMAN GENOME

- **20,125 protein-encoding genes** comprise the genome.
  - Accounts: 1.5 percent of human genome, 8.5 percent of known genetic diseases.
- **Alloles** ("gene variants") – some proteins – encoding genes may vary in DNA base sequence from parent to parent that is passed to the next generation.
- **Mutations** ("changed gene") – variation or change in genes, causing a disease.

### 1.3. INHERITED DISEASES

- **Cystic Fibrosis** – inherited disease
  - Change of a "C" to "T" inserts amino acid rather than the amino acid glycine which results to proteins becoming abnormal
  - Cystic Fibrosis Transmembrane

# Chapter 1the Human Genome 342

**Curtis S. Adams**



## **Chapter 1the Human Genome 342:**

Solutions Manual for An Introduction to Genetic Analysis David Scott,2012 Since its inception Introduction to Genetic Analysis IGA has been known for its prominent authorship including leading scientists in their field who are great educators This market best seller exposes students to the landmark experiments in genetics teaching students how to analyze experimental data and how to draw their own conclusions based on scientific thinking while teaching students how to think like geneticists Visit the preview site at [www.whfreeman.com/IGA10epreview](http://www.whfreeman.com/IGA10epreview) Karp's Cell and Molecular Biology Gerald Karp,Janet Iwasa,Wallace Marshall,2020-02-19 Karp s Cell and Molecular Biology delivers a concise and illustrative narrative that helps students connect key concepts and experimentation so they better understand how we know what we know in the world of cell biology This classic text explores core concepts in considerable depth often adding experimental detail It is written in an inviting style and at mid length to assist students in managing the plethora of details encountered in the Cell Biology course The 9th Edition includes two new sections and associated assessment in each chapter that show the relevance of key cell biology concepts to plant cell biology and bioengineering **Genetic Information** Alison K. Thompson,Ruth F. Chadwick,2007-07-23 It is difficult to think of an example of an advancement in the biological sciences that has had an impact on society similar to that of the new genetics Recent developments in biotechnology have occasioned much discussion among academics professionals and lay people alike In particular many questions and concerns have arisen over the acquisition access and control of genetic information There are several reasons why the new genetics has commanded such widespread attention and why it is now the subject of considerable debate Special reference is given in this volume to the implications of genetic information for five different subject areas eugenics the insurance industry the commercialisation of genetic testing strategies for raising public awareness and the value of theoretical ethical and sociological frameworks in the debate This diverse collection of papers attempts to address and critically discuss issues surrounding the control of and access to genetic information from ethical medical legal and theoretical points of view The first and shortest section of the book attempts to address concerns over the eugenic potential of new biotechnologies It also provides a historical context for the debate for controversy over the subject of eugenics predates the current debate over genetic information by a considerable length of time Indeed by the time the first patent was issued for Chakrabarty s strain of oil eating bacteria in the early 1970s the term eugenics had already acquired strong pejorative connotations **Practical Bioinformatics** Michael Agostino,2012-09-26 Practical Bioinformatics is specifically designed for biology majors with a heavy emphasis on the steps required to perform bioinformatics analysis to answer biological questions It is written for courses that have a practical hands on element and contains many exercises for example database searches protein analysis data interpretation to Cumulated Index Medicus ,1990 **Repeated Sequences in the Human Genome** Catherine Marie Houck,1980 **Consensus Sequences and Variability Information for the Human and Chimpanzee rDNA Repeats** Curtis S.

Adams,2008      *Motor System Disorders, Part I* David S. Younger,2023-08-08 Motor System Disorders Normal Physiology and Function and Neuromuscular Disorders summarizes recent advances and best practice for understanding normal physiology and function of the larger motor system as well as the diagnosis course and treatment of neuromuscular disorders The work will include neuroanatomy circuits and synapses It discusses how different parts of the brain contribute to motor control including both vestibular and cerebellar motor control as well as the influences of the parietal and frontal lobes Diagnostic methods include genetic evaluation electrodiagnosis pathology and brain imaging Neuromuscular disorders of both children and adults will be included Identifies normal motor control physiology and function including neuroanatomy circuits and synapses Discusses vestibular and cerebral motor control and contributions of parietal and frontal lobes Provides diagnostic methods including genetic evaluation electrodiagnosis brain imaging and pathology analyses Summarizes the diagnosis course and best practice treatment of neuromuscular disorders Explores neuromuscular disorders in adults and children      **Index Medicus** ,1913      **Introduction to Genetic Analysis** Anthony J.F. Griffiths,Susan R. Wessler,Sean B. Carroll,John Doebley,2010-12-24 Since its inception Introduction to Genetic Analysis IGA has been known for its prominent authorship including leading scientists in their field who are great educators This market best seller exposes students to the landmark experiments in genetics teaching students how to analyze experimental data and how to draw their own conclusions based on scientific thinking while teaching students how to think like geneticists Visit the preview site at [www.whfreeman.com/IGA10epreview](http://www.whfreeman.com/IGA10epreview)      **Motor System Disorders, Part II** David S. Younger,2023-08-22 This comprehensive review of research and best practice clinical management of spinal cord neurodegenerative and cerebral disorders is intended for both researchers and clinicians Encompassing hereditary and acquired disorders from disease and accident the book explores motor control disorders associated with stroke dementia seizure encephalitis and more Covering disorders of both children and adults the book discusses the latest advances in treatments related to neuroplasticity neural tissue transplantation and immunotherapy Summarizes assessment disease course and best practice treatment Includes hereditary disorders and disorders from disease or accident Discusses advances in neuroplasticity tissue transplantation immunotherapy and other treatments Reviews effects of dementia stroke seizure encephalitis cancer and more      **Taking Sides** Carol Levine,1995      **Catalogue of the Library of the Peabody Museum of Archaeology and Ethnology, Harvard University** Peabody Museum of Archaeology and Ethnology. Library,1963      *Clinical Genetics in Nursing Practice* Felissa R. Lashley,1998 New edition of a formerly out of print work published in 1984 when the author s name was Felissa Cohen It emphasizes the importance of understanding genetics in nursing and maintains that health professionals still are not fully educated in this field Covers such topics as major genetic disorders      *Essentials of Obstetrics and Gynecology* Neville F. Hacker,J. George Moore,1998 The 3rd Edition of this popular text continues to offer readers a concise complete and clearly written review of the basic science and clinical practice of obstetrics and gynecology Thoroughly revised and updated to

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