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Scientific Frontiers in
Developmental Toxicology and Risk
Assessment reviews advances made
during the last 10-15 years in fields

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such as developmental biology, molecular biology, and genetics. It describes a novel approach for how these advances might be used in combination with existing methodologies to further the understanding of mechanisms of

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developmental toxicity, to improve the assessment of chemicals for their ability to cause developmental toxicity, and to improve risk assessment for developmental defects. For example, based on the recent advances, even the smallest,

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simplest laboratory animals such as the fruit fly, roundworm, and zebrafish might be able to serve as developmental toxicological models for human biological systems. Use of such organisms might allow for rapid and inexpensive testing of large

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numbers of chemicals for their potential to cause developmental toxicity; presently, there are little or no developmental toxicity data available for the majority of natural and manufactured chemicals in use. This new approach to developmental

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toxicology and risk assessment will require simultaneous research on several fronts by experts from multiple scientific disciplines, including developmental toxicologists, developmental biologists, geneticists,

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epidemiologists, and biostatisticians.

Originally published under the title:

Genetics in medicine / James S.

Thompson and Margaret W.

Thompson.

Sugar chains (glycans) are often
attached to proteins and lipids and

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have multiple roles in the organization and function of all organisms. "Essentials of Glycobiology" describes their biogenesis and function and offers a useful gateway to the understanding of glycans.

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Cytogenomics demonstrates that chromosomes are crucial in understanding the human genome and that new high-throughput approaches are central to advancing cytogenetics in the 21st century.
After an introduction to (molecular)

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cytogenetics, being the basic of all
cytogenomic research, this book
highlights the strengths and
newfound advantages of
cytogenomic research methods and
technologies, enabling researchers to
jump-start their own projects and

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more effectively gather and interpret chromosomal data. Methods discussed include banding and molecular cytogenetics, molecular combing, molecular karyotyping, next-generation sequencing, epigenetic study approaches, optical

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mapping/karyomapping, and CRISPR-cas9 applications for cytogenomics. The book's second half demonstrates recent applications of cytogenomic techniques, such as characterizing 3D chromosome structure across different tissue types

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and insights into multilayer organization of chromosomes, role of repetitive elements and noncoding RNAs in human genome, studies in topologically associated domains, interchromosomal interactions, and chromoanagenesis. This book is an

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important reference source for researchers, students, basic and translational scientists, and clinicians in the areas of human genetics, genomics, reproductive medicine, gynecology, obstetrics, internal medicine, oncology, bioinformatics,

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medical genetics, and prenatal testing, as well as genetic counselors, clinical laboratory geneticists, bioethicists, and fertility specialists. Offers applied approaches empowering a new generation of cytogenomic research using a

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balanced combination of classical
and advanced technologies Provides
a framework for interpreting
chromosome structure and how this
affects the functioning of the
genome in health and disease
Features chapter contributions from

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international leaders in the field

Advances in Animal Genomics

Our Genes, Our Choices

Genomics I

Bioinformatics for Geneticists

Analysis of Complex Disease

Association Studies

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An Introduction to Human
Molecular Genetics

**Significant advances in our
knowledge of genetics were
made during the twentieth
century but in the most
recent decades, genetic**

research has dramatically increased its impact throughout society. Genetic issues are now playing a large role in health and public policy, and new knowledge in this field will

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continue to have significant implications for individuals and society. Written for the non-majors human genetics course, Human Genetics, 3E will increase the genetics knowledge of students who

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are learning about human genetics for the first time. This thorough revision of the best-selling Human Genome, 2E includes entirely new chapters on forensics, stem cell biology,

**bioinformatics, and
societal/ethical issues
associated with the field.
New special features boxes
make connections between
human genetics and human
health and disease.**

Carefully crafted pedagogy includes chapter-opening case studies that set the stage for each chapter; concept statements interspersed throughout the chapter that keep first-

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**time students focused on
key concepts; and end-of-
chapter questions and
critical thinking activities.
This new edition will
contribute to creating a
genetically literate student**

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**population that
understands basic
biological research,
understands elements of
the personal and health
implications of genetics,
and participates effectively**

**in public policy issues
involving genetic
information . Includes
topical material on
forensics, disease studies,
and the human genome
project to engage non-**

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**specialist students Full,
4-color illustration program
enhances and reinforces
key concepts and themes
Uniform organization of
chapters includes interest
boxes that focus on human**

**health and disease, chapter-
opening case studies, and
concept statements to
engage non-specialist
readers**

**Nutrigenomics is the
rapidly developing field of**

**science that studies
nutrient-gene interaction.
This field has broad
implications for
understanding the
interaction of human
genomics and nutrition, but**

can also have very specific implications for individual dietary recommendations in light of personal genetics. Predicted applications for nutrigenomics include genomics-based dietary

**guidelines and personalized
nutrition based on
individual genetic tests.
These developments have
sweeping ethical, legal and
regulatory implications for
individuals, corporations**

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and governments. This book brings together experts in ethics, law, regulatory analysis, and communication studies to identify and address relevant issues in the

**emerging field of
nutritional genomics.
Contributing authors are
experts in the social aspects
of biotechnology
innovation, with expertise
in nutrigenomics. From**

**addressing the concern that
nutrigenomics will
transform food into
medicine and undermine
pleasures associated with
eating to the latest in the
science of nutrigenomics,**

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**this book provides a world-
wide perspective on the
potential impact of
nutrigenomics on our
association with food.
*Explores the rapidly
developing, yet not fully**

**understood, impact of
nutrigenomics on the
relationship to food
medicalization, genetic
privacy, nutrition and
health. *Provides ground
for further exploration to**

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**identify issues and provide
analysis to aid in policy and
regulation development
*Provides ethical and legal
insights into this unfolding
science, as well as serving
as a model for thinking**

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**about issues arising in
other fields of science and
technology**

**Our Genes, Our Choices:
How Genotype and Gene
Interactions Affect
Behavior - First Prize**

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**winner of the 2013 BMA
Medical Book Award for
Basic and Clinical Sciences
- explains how the
complexity of human
behavior, including
concepts of free will,**

**derives from a relatively
small number of genes,
which direct
neurodevelopmental
sequence. Are people free
to make choices, or do
genes determine behavior?**

Paradoxically, the answer to both questions is "yes," because of neurogenetic individuality, a new theory with profound implications. Author David Goldman uses judicial, political, medical,

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and ethical examples to illustrate that this lifelong process is guided by individual genotype, molecular and physiologic principles, as well as by randomness and

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environmental exposures, a combination of factors that we choose and do not choose. Written in an authoritative yet accessible style, the book includes practical descriptions of the

function of DNA, discusses the scientific and historical bases of genetics, and introduces topics of epigenetics and the predictive power of behavioral genetics. First

**Prize winner of the 2013
BMA Medical Book Award
for Basic and Clinical
Sciences Poses and resolves
challenges to moral
responsibility raised by
modern genetics and**

**neuroscience Analyzes the
neurogenetic origins of
human behavior and free
will Written by one of the
world's most influential
neurogeneticists, founder
of the Laboratory of**

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**Neurogenetics at the
National Institutes of
Health
Human Genome
EpidemiologyA Scientific
Foundation for Using
Genetic Information to**

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**Improve Health and Prevent
Disease Oxford University
Press**

**Mechanisms of Inherited
Diseases**

A Practical Guide

Human Genes and Genomes

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A Story of Four Letters Essential Genetics

A thought-provoking exploration
of deleterious mutations in the
human genome and their effects
on human health and wellbeing
Despite all of the elaborate

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mechanisms that a cell employs to handle its DNA with the utmost care, a newborn human carries about 100 new mutations, originated in their parents, about 10 of which are deleterious. A mutation replacing just one of

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the more than three billion nucleotides in the human genome may lead to synthesis of a dysfunctional protein, and this can be inconsistent with life or cause a tragic disease. Several percent of even young people

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suffer from diseases that are caused, exclusively or primarily, by prei;1?2]existing and new mutations in their genomes, including both a wide variety of genetically simple Mendelian diseases and diverse complex

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diseases such as birth anomalies, diabetes, and schizophrenia. Milder, but still substantial, negative effects of mutations are even more pervasive. As of now, we possess no means of reducing

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the rate at which mutations appear spontaneously. However, the recent flood of genomic data made possible by next-generation methods of DNA sequencing, enabled scientists to explore the impacts of

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deleterious mutations on humans with previously unattainable precision and begin to develop approaches to managing them. Written by a leading researcher in the field of evolutionary genetics, Crumbling

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Genome reviews the current state of knowledge about deleterious mutations and their effects on humans for those in the biological sciences and medicine, as well as for readers with only a general scientific

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literacy and an interest in human genetics. Provides an extensive introduction to the fundamentals of evolutionary genetics with an emphasis on mutation and selection Discusses the effects of pre-existing and new

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mutations on human genotypes and phenotypes Provides a comprehensive review of the current state of knowledge in the field and considers crucial unsolved problems Explores key ethical, scientific, and social

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issues likely to become relevant in the near future as the modification of human germline genotypes becomes technically feasible Crumbling Genome is must-reading for students and professionals in human genetics,

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genomics, bioinformatics, evolutionary biology, and biological anthropology. It is certain to have great appeal among all those with an interest in the links between genetics and evolution and how they are likely

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to influence the future of human health, medicine, and society.

Human Population Genetics and Genomics provides researchers/students with knowledge on population genetics and relevant statistical

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approaches to help them become more effective users of modern genetic, genomic and statistical tools. In-depth chapters offer thorough discussions of systems of mating, genetic drift, gene flow and subdivided

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populations, human population history, genotype and phenotype, detecting selection, units and targets of natural selection, adaptation to temporally and spatially variable environments, selection in age-

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structured populations, and genomics and society. As human genetics and genomics research often employs tools and approaches derived from population genetics, this book helps users understand the basic

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principles of these tools. In addition, studies often employ statistical approaches and analysis, so an understanding of basic statistical theory is also needed. Comprehensively explains the use of population

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genetics and genomics in
medical applications and
research Discusses the
relevance of population genetics
and genomics to major social
issues, including race and the
dangers of modern eugenics

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proposals Provides an overview of how population genetics and genomics helps us understand where we came from as a species and how we evolved into who we are now
Genome Engineering via CRISPR-

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Cas9 Systems presents a compilation of chapters from eminent scientists from across the globe who have established expertise in working with CRISPR-Cas9 systems. Currently, targeted genome

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engineering is a key technology for basic science, biomedical and industrial applications due to the relative simplicity to which they can be designed, used and applied. However, it is not easy to find relevant information

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gathered in a single source. The book contains a wide range of applications of CRISPR in research of bacteria, virus, algae, plant and mammalian and also discusses the modeling of drosophila, zebra fish and

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protozoan, among others. Other topics covered include diagnosis, sensor and therapeutic applications, as well as ethical and regulatory issues. This book is a valuable source not only for beginners in genome

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engineering, but also researchers, clinicians, stakeholders, policy makers, and practitioners interested in the potential of CRISPR-Cas9 in several fields. Provides basic understanding and a clear

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picture on how to design, use
and implement the CRISPR-Cas9
system in different organisms
Explains how to create an animal
model for disease research and
screening purposes using
CRISPR Discusses the

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application of CRISPR-Cas9
systems in basic sciences,
biomedicine, virology,
bacteriology, molecular biology,
neurology, cancer, industry, and
many more
"Ridley leaps from chromosome

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to chromosome in a handy summation of our ever increasing understanding of the roles that genes play in disease, behavior, sexual differences, and even intelligence. . . . He addresses not only the ethical

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quandaries faced by contemporary scientists but the reductionist danger in equating inheritability with inevitability." — The New Yorker The genome's been mapped. But what does it mean? Matt Ridley's Genome is

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the book that explains it all: what it is, how it works, and what it portends for the future Arguably the most significant scientific discovery of the new century, the mapping of the twenty-three pairs of chromosomes that make

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up the human genome raises almost as many questions as it answers. Questions that will profoundly impact the way we think about disease, about longevity, and about free will. Questions that will affect the rest

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of your life. Genome offers extraordinary insight into the ramifications of this incredible breakthrough. By picking one newly discovered gene from each pair of chromosomes and telling its story, Matt Ridley

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recounts the history of our species and its ancestors from the dawn of life to the brink of future medicine. From Huntington's disease to cancer, from the applications of gene therapy to the horrors of

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eugenics, Ridley probes the scientific, philosophical, and moral issues arising as a result of the mapping of the genome. It will help you understand what this scientific milestone means for you, for your children, and for

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humankind.

Genes, Brain Function, and
Behavior

Heritable Human Genome Editing

Thompson & Thompson

Genetics in Medicine

How Genotype and Gene

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Interactions Affect Behavior
Human Genome Epidemiology
Molecular Genetics and the
Human Personality

**Genome editing is a
powerful new tool for
making precise alterations**

to an organism's genetic material. Recent scientific advances have made genome editing more efficient, precise, and flexible than ever before. These advances have spurred an explosion of

interest from around the globe in the possible ways in which genome editing can improve human health. The speed at which these technologies are being developed and applied has

led many policymakers and stakeholders to express concern about whether appropriate systems are in place to govern these technologies and how and when the public should be

**engaged in these decisions.
Human Genome Editing
considers important
questions about the human
application of genome
editing including: balancing
potential benefits with**

**unintended risks, governing
the use of genome editing,
incorporating societal values
into clinical applications and
policy decisions, and
respecting the inevitable
differences across nations**

and cultures that will shape how and whether to use these new technologies. This report proposes criteria for heritable germline editing, provides conclusions on the crucial need for public

**education and engagement,
and presents 7 general
principles for the
governance of human
genome editing.**

**Advances in Animal
Genomics provides an**

**outstanding collection of
integrated strategies
involving traditional and
modern - omics (structural,
functional, comparative and
epigenomics) approaches
and genomics-assisted**

**breeding methods which
animal biotechnologists can
utilize to dissect and decode
the molecular and gene
regulatory networks involved
in the complex quantitative
yield and stress tolerance**

**traits in livestock. Written
by international experts on
animal genomics, this book
explores the recent advances
in high-throughput, next-
generation whole genome
and transcriptome**

Molecular

sequencing, array-based genotyping, and modern bioinformatics approaches which have enabled to produce huge genomic and transcriptomic resources globally on a genome-wide

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**scale. This book is an
important resource for
researchers, students,
educators and professionals
in agriculture, veterinary
and biotechnology sciences
that enables them to solve**

Molecular

**problems regarding
sustainable development
with the help of current
innovative biotechnologies.
Integrates basic and
advanced concepts of animal
biotechnology and presents**

future developments

Describes current high-throughput next-generation whole genome and transcriptome sequencing, array-based genotyping, and modern bioinformatics

Molecular

**approaches for sustainable
livestock production
Illustrates integrated
strategies to dissect and
decode the molecular and
gene regulatory networks
involved in complex**

**quantitative yield and stress
tolerance traits in livestock
Ensures readers will gain a
strong grasp of
biotechnology for
sustainable livestock
production with its well-**

illustrated discussion

Genomics is the study of the genomes of organisms. The field includes intensive efforts to determine the entire DNA sequence of organisms and fine-scale

genetic mapping efforts. It is a discipline in genetics that applies recombinant DNA, DNA sequencing methods, and bioinformatics to sequence, assemble, and analyze the function and

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structure of genomes.

**Genomics I - Humans,
Animals and Plants is the
first volume of our Genomics
series. There are totally
three volumes in this series.
Chapter 1 describes the**

**development of a unique
nascent DNA enrichment
peak detection algorithm
which utilizes Savitzky-Golay
convolution kernel
smoothing at different base-
pair resolutions. Chapter 2**

summarizes disease-causing mutations in the human genome which affect RNA splicing. Chapter 3 discusses Reactive oxygen species (ROS), which are reactive ions and free radicals

generated by oxidative reactions. ROS can damage cells by reacting with cellular macromolecules including DNA. Chapter 4 proposes a methodological approach to analyze

Molecular

**telomeric chromatin
structure independently of
Interstitial Telomeric
Sequences (ITSs). The
method is based on the use
of the frequently cutting
enzyme Tru9I. In Chapter 5,**

the authors detail recent advances in understanding mechanisms of gene regulation in *Drosophila*. A combination of molecular genetics and mathematical modeling approaches reveals

**the emerging evidence for
an underlying architecture
of transcription factor
binding sites in cis-
regulatory modules. Chapter
6 provides a systematic
evaluation and general**

**summary of the gene
expression spectra of drug
metabolizing enzymes and
transporters (DMETs).
Chapter 7 addresses the
problem of determination of
absolute copy numbers in**

**the tumor genomic profile
measured by a single
nucleotide polymorphism
array. Chapter 8 describes
bioinformatics of computer-
based reconstruction of the
mitochondrial DNA**

Molecular

**sequences of extinct
hominin lineages and
demonstrates how to identify
evolutionary important
information that these
ancestral DNA sequences
provide. Chapter 9 proposes**

**a phylogenetic identity of
human and monkeys
chlamydial strains and role
of plasmids and causative
agents genotypes in
chlamydiosis pathogenesis.
Defined the relationship**

**between plasmid presence
and InCA protein activity. In
Chapter 10, based on a
comparison of seven
different inbred mouse
strains in a model of
chemical-induced asthma, it**

demonstrates the genetic background of the different mouse strains has a large impact on the phenotypical outcome of TDI-induced asthma and suggests caution has to be taken when

**comparing results from
different mouse strains.
Chapter 11 reviews the
phylogenetic study of rabies
virus emergence in wild
carnivores in Turkey using
viral genomic sequence**

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analysis. It also considers options for control rabies using oral vaccination and how phylogenetic information can support attempts to control the disease. Chapter 12 reveals global

transcriptomic changes that occur during germination in plants. The methods of analyzing high-throughput data in plants are described and the biological significance of these

transcriptomic changes are discussed. Chapter 13 discusses the different covalent histone modifications in plants and their role in regulating gene expression and focuses on

the SET-domain containing proteins belonging to the Polycomb-Group (PcG) and trithorax-Group (trxG) protein complexes and their targets in plants. Chapter 14 describes a genome-wide

strategy to identify high-identity segmental duplications, combine molecular cytogenetics assays.. In Chapter 15, the authors introduce a map-based cloning and functional

identification of a rice gene that plays an important role for the substance storage in the endosperm. In Chapter 16, three deep-sequencing studies are presented, which were included in a project

**develop of a specific
biocontrol strategy for
sustainable agriculture in
desert ecosystems.**

**Preceded by Genomics and
clinical medicine / edited by
Dhavendra Kumar. [First**

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edition]. 2008.

**What Genes Do, How They
Malfunction, and Ways to
Repair Damage
Implications for Health and
Social Policy
Molecular Biology of the Cell**

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The Human Genome in Health and Disease

**Save all of your digital assets
in DNA format**

Nutrition and Genomics

The human genome is a linear
sequence of roughly 3 billion

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bases and information regarding this genome is accumulating at an astonishing rate. Inspired by these advances, *The Human Genome in Health and Disease: A Story of Four Letters* explores the

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intimate link between sequence information and biological function. A range of sequence-based functional units of the genome are discussed and illustrated with inherited disorders and cancer.

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In addition, the book considers valuable medical applications related to human genome sequencing, such as gene therapy methods and the identification of causative mutations in rare genetic

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disorders. The primary audiences of the book are students of genetics, biology, medicine, molecular biology and bioinformatics. Richly illustrated with review questions provided for each

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chapter, the book helps students without previous studies of genetics and molecular biology. It may also be of benefit for advanced non-academics, which in the era of personal genomics, want to

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learn more about their
genome. Key selling features:
Molecular sequence
perspective, explaining the
relationship between DNA
sequence motifs and biological
function Aids in understanding

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the functional impact of mutations and genetic variants
Material presented at basic level, making it accessible to students without previous studies of genetics and molecular biology Richly

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illustrated with questions provided to each chapter In the 1960's and 1970's, personality and mental illness were conceptualized in an intertwined psychodynamic model. Biological psychiatry for

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many un-weaved that model
and took mental illness for
psychiatry and left personality
to psychology. This book brings
personality back into biological
psychiatry, not merely in the
form of personality disorder

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but as part of a new intertwined molecular genetic model of personality and mental disorder. This is the beginning of a new conceptual paradigm!! This breakthrough volume marks the beginning of

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a new era, an era made possible by the electrifying pace of discovery and innovation in the field of molecular genetics. In fact, several types of genome maps have already been completed,

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and today's experts confidently predict that we will have a smooth version of the sequencing of the human genome -- which contains some 3 billion base pairs Such astounding progress helped

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fuel the development of this remarkable volume, the first ever to discuss the brand-new -- and often controversial -- field of molecular genetics and the human personality. Questioning, critical, and

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strong on methodological principles, this volume reflects the point of view of its 35 distinguished contributors -- all pioneers in this burgeoning field and themselves world-class theoreticians, empiricists,

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clinicians, developmentalists,
and statisticians. For students
of psychopathology and others
bold enough to hold in
abeyance their understandable
misgivings about the
conjunction of "molecular

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genetics" and "human personality," this work offers an authoritative and up-to-date introduction to the molecular genetics of human personality. The book, with its wealth of facts, conjectures, hopes, and

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misgivings, begins with a preface by world-renowned researcher and author Irving Gottesman. The authors masterfully guide us through Chapter 1, principles and methods; Chapter 4, animal

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models for personality; and Chapter 11, human intelligence as a model for personality, laying the groundwork for our appreciation of the remaining empirical findings of human personality qua personality.

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Many chapters (6, 7, 9, 11, and 13) emphasize the neurodevelopmental and ontogenetic aspects of personality, with a major emphasis on the receptors and transporters for the

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neurotransmitters dopamine and serotonin. Though these neurotransmitters are a rational starting point now, the future undoubtedly will bring many other candidate genes that today cannot even be

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imagined, given our ignorance of the genes involved in the prenatal development of the central nervous system.

Chapter 3 provides an integrative overview of the broad autism phenotype, and

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as such will be of special interest to child psychiatrists. Chapters 5, 8, and 10 offer enlightening information on drug and alcohol abuse. Chapter 14 discusses variations in sexuality. Adding

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balance and mature perspectives on how all the chapters complement and sometimes challenge one another are Chapter 2, written by a major figure in the renaissance of the relevance to

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psychopathology of both genetics and personality; Chapters 15-17, informed critical appraisals citing concerns and cautions about premature applications of this information in the policy arena;

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and Chapter 18, a judicious
contemplation by the editors
themselves of this promising --
and, to some, alarming -- field.
Clear and meticulously
researched, this eminently
satisfying work is written to

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introduce the subject to postgraduate students just beginning to develop their research skills, to interested psychiatric practitioners, and to informed laypersons with some scientific background.

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In the nearly 60 years since Watson and Crick proposed the double helical structure of DNA, the molecule of heredity, waves of discoveries have made genetics the most thrilling field in the sciences.

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The study of genes and genomics today explores all aspects of the life with relevance in the lab, in the doctor's office, in the courtroom and even in social relationships. In this helpful

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guidebook, one of the most respected and accomplished human geneticists of our time communicates the importance of genes and genomics studies in all aspects of life. With the use of core concepts and the

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integration of extensive references, this book provides students and professionals alike with the most in-depth view of the current state of the science and its relevance across disciplines. Bridges the

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gap between basic human genetic understanding and one of the most promising avenues for advances in the diagnosis, prevention and treatment of human disease. Includes the latest information on diagnostic

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testing, population screening,
predicting disease
susceptibility,
pharmacogenomics and more
Explores ethical, legal,
regulatory and economic
aspects of genomics in

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medicine. Integrates historical (classical) genetics approach with the latest discoveries in structural and functional genomics

Genes, Brain Function, and Behavior offers a concise

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description of the nervous system that processes sensory input and initiates motor movements. It reviews how behaviors are defined and measured, and how experts decide when a behavior is

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perturbed and in need of treatment. Behavioral disorders that are clearly related to a defect in a specific gene are reviewed, and the challenges of understanding complex traits such as

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intelligence, autism and schizophrenia that involve numerous genes and environmental factors are explored. New methods of altering genes offer hope for treating or even preventing

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difficulties that arise in our genes. This book explains what genes are, what they do in the nervous system, and how this impacts both brain function and behavior. Presents essential background, facts,

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and terminology about genes,
brain function, and behavior
Builds clear explanations on
this solid foundation while
minimizing technical jargon
Explores in depth several
single-gene and chromosomal

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neurological disorders Derives lessons from these clear examples and highlights key lessons in boxes Examines the intricacies of complex traits that involve multiple genetic and environmental factors by

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applying lessons from simpler disorders Explains diagnosis and definition Includes a companion website with Powerpoint slides and images for each chapter for instructors and links to resources

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Principles and Practice
Human Genome Editing
Ancestral DNA, Human Origins,
and Migrations
DNA Digital Data Storage
A Scientific Foundation for
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concise, practical resource. Drs.
Mary Norton, Jeffrey A. Kuller,
Lorraine Dugoff, and George
Saade fully cover the clinically
relevant topics that are key to
providers who care for pregnant
women and couples

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contemplating pregnancy. It's an ideal resource for Ob/Gyn physicians, maternal-fetal medicine specialists, and clinical geneticists, as well as midwives, nurse practitioners, and other obstetric providers. Provides a

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comprehensive review of basic principles of medical genetics and genetic counseling, molecular genetics, cytogenetics, prenatal screening options, chromosomal microarray analysis, whole

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exome sequencing, prenatal ultrasound, diagnostic testing, and more. Contains a chapter on fetal treatment of genetic disorders. Consolidates today's available information and experience in this important

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area into one convenient resource.

What Is DNA Digital Data Storage The technique of storing digital information in DNA involves encoding and decoding binary data to and

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from artificially produced strands of DNA. How You Will Benefit (I) Insights, and validations about the following topics: Chapter 1: DNA digital data storage Chapter 2: Base pair Chapter 3: Human genome

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Chapter 4: Genomics Chapter 5:
DNA sequencer Chapter 6:
Sequence analysis Chapter 7:
DNA synthesis Chapter 8:
Synthetic biology Chapter 9:
DNA sequencing Chapter 10:
Ancient DNA Chapter 11: Ewan

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Birney Chapter 12:

Oncogenomics Chapter 13:

Artificial gene synthesis Chapter

14: ABI Solid Sequencing

Chapter 15: Whole genome

sequencing Chapter 16: RNA-

Seq Chapter 17: European

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Nucleotide Archive Chapter 18:
Circulating tumor DNA Chapter
19: Transcriptomics
technologies Chapter 20: CRAM
(file format) Chapter 21: Nick
Goldman (II) Answering the
public top questions about DNA

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digital data storage. (III) Real world examples for the usage of DNA digital data storage in many fields. (IV) 17 appendices to explain, briefly, 266 emerging technologies in each industry to have 360-degree full

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understanding of DNA digital
data storage' technologies. Who
This Book Is For Professionals,
undergraduate and graduate
students, enthusiasts,
hobbyists, and those who want
to go beyond basic knowledge

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or information for any kind of DNA digital data storage. According to the National Institute of Health, a genome-wide association study is defined as any study of genetic variation across the entire

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human genome that is designed to identify genetic associations with observable traits (such as blood pressure or weight), or the presence or absence of a disease or condition. Whole genome information, when

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combined with clinical and other phenotype data, offers the potential for increased understanding of basic biological processes affecting human health, improvement in the prediction of disease and

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patient care, and ultimately the realization of the promise of personalized medicine. In addition, rapid advances in understanding the patterns of human genetic variation and maturing high-throughput, cost-

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effective methods for genotyping are providing powerful research tools for identifying genetic variants that contribute to health and disease. This burgeoning science merges the principles of

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statistics and genetics studies to make sense of the vast amounts of information available with the mapping of genomes. In order to make the most of the information available, statistical tools must

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be tailored and translated for the analytical issues which are original to large-scale association studies. Analysis of Complex Disease Association Studies will provide researchers with advanced biological

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knowledge who are entering the field of genome-wide association studies with the groundwork to apply statistical analysis tools appropriately and effectively. With the use of consistent examples throughout

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the work, chapters will provide readers with best practice for getting started (design), analyzing, and interpreting data according to their research interests. Frequently used tests will be highlighted and a critical

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analysis of the advantages and disadvantage complimented by case studies for each will provide readers with the information they need to make the right choice for their research. Additional tools

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including links to analysis tools, tutorials, and references will be available electronically to ensure the latest information is available. Easy access to key information including advantages and disadvantage

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of tests for particular
applications, identification of
databases, languages and their
capabilities, data management
risks, frequently used tests
Extensive list of references
including links to tutorial

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websites Case studies and Tips
and Tricks

What does the birth of babies
whose embryos had gone
through genome editing
mean--for science and for all of
us? In November 2018, the

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world was shocked to learn that two babies had been born in China with DNA edited while they were embryos--as dramatic a development in genetics as the cloning of Dolly the sheep was in 1996. In this book, Hank

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Greely, a leading authority on law and genetics, tells the fascinating story of this human experiment and its consequences. Greely explains what Chinese scientist He Jiankui did, how he did it, and

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how the public and other
scientists learned about and
reacted to this unprecedented
genetic intervention.

Cytogenomics

Classical and Molecular Genetics

Mapping and Sequencing the

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Human Genome

Science, Health, Society

Genome Engineering via CRISPR-
Cas9 System

Essentials of Genomics and
Bioinformatics

This book is entitled Classical and

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Molecular Genetics. The two major areas of genetics – classical genetics and molecular genetics – are covered in 15 chapters. The author has attempted to cover the basics of classical and molecular genetics, without exhaustive details or repetitive examples. Chapter 1 includes basic concepts of genetics, branches of

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genetics, development of the field of genetics, and the scope of genetics.

Chapter 2 covers genetic terminology, and Mendel ' s principles. Chapter 3 focuses on modifications of Mendelian ratios, epistasis and nonepistatic inter-genic genetic interaction. Chapter 4 comprises cell cycle, and chromosome theory of

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heredity. Chapter 5 describes multiple alleles. Chapter 6 deals with genetic linkage, crossing over, and genetic mapping. Chapter 7 illustrates sex determining mechanisms, sex linkage, and sex related traits. Chapter 8 summarizes the molecular structure and replication of DNA, experimental proof of DNA as the

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genetic material, genetic code, and gene expression. Chapter 9 presents structure and organization of genes and chromosomes. Chapter 10 summarizes the importance of heredity and environment. Chapter 11 discusses gene mutations. Chapter 12 addresses chromosome mutations, and genetic disorders. Chapter

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13 includes extranuclear genetics. Chapter 14 presents genetics of bacteria and viruses. Chapter 15 focuses on recombinant DNA technology.

Medical and Health Genomics provides concise and evidence-based technical and practical information on the applied and translational aspects of genome sciences

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and the technologies related to non-clinical medicine and public health. Coverage is based on evolving paradigms of genomic medicine—in particular, the relation to public and population health genomics now being rapidly incorporated in health management and administration, with further implications for clinical

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sciences across disease discovery, genetic analysis, genetic screening, and prevention and management Details the impact of clinical genomics across a diverse array of public and community health issues, and within a variety of global healthcare systems

Heritable human genome editing - making

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changes to the genetic material of eggs, sperm, or any cells that lead to their development, including the cells of early embryos, and establishing a pregnancy - raises not only scientific and medical considerations but also a host of ethical, moral, and societal issues. Human embryos whose genomes have been edited

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should not be used to create a pregnancy until it is established that precise genomic changes can be made reliably and without introducing undesired changes - criteria that have not yet been met, says Heritable Human Genome Editing. From an international commission of the U.S. National Academy of Medicine, U.S.

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National Academy of Sciences, and the U.K.'s Royal Society, the report considers potential benefits, harms, and uncertainties associated with genome editing technologies and defines a translational pathway from rigorous preclinical research to initial clinical uses, should a country decide to permit such

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uses. The report specifies stringent preclinical and clinical requirements for establishing safety and efficacy, and for undertaking long-term monitoring of outcomes. Extensive national and international dialogue is needed before any country decides whether to permit clinical use of this technology, according to

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the report, which identifies essential elements of national and international scientific governance and oversight. Ancestral DNA, Human Origins, and Migrations describes the genesis of humans in Africa and the subsequent story of how our species migrated to every corner of the globe. Different phases of this

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journey are presented in an integrative format with information from a number of disciplines, including population genetics, evolution, anthropology, archaeology, climatology, linguistics, art, music, folklore and history. This unique approach weaves a story that has synergistic impact in the clarity and level of understanding that will

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appeal to those researching, studying, and interested in population genetics, evolutionary biology, human migrations, and the beginnings of our species.

Integrates research and information from the fields of genetics, evolution, anthropology, archaeology, climatology, linguistics, art, music, folklore and history,

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among others Presents the content in an entertaining and synergistic style to facilitate a deep understanding of human population genetics Informs on the origins and recent evolution of our species in an approachable manner

Genomes 3

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Medical and Health Genomics
Essentials of Glycobiology
Science, Ethics, and Governance
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Clinical Ethics at the
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and Reproductive

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Technologies offers
thorough discussions on
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screening, genetic
engineering and the use
of CRISPR gene editing,
mitochondrial gene

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replacement therapy, sex
selection, predictive
testing, secondary
findings, embryo
reduction and the moral
status of the embryo,
genetic enhancement, and

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the sharing of genetic data. Chapter contributions from leading bioethicists and clinicians encourage a global, holistic perspective on applied

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challenges and the moral questions relating the implementation of genetic reproductive technology. The book is an ideal resource for practitioners,

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regulators, lawmakers,
clinical researchers,
genetic counselors and
graduate and medical
students. As the Human
Genome Project has
triggered a

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technological revolution
that has influenced
nearly every field of
medicine, including
reproductive medicine,
obstetrics, gynecology,
andrology, prenatal

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genetic testing, and
gene therapy, this book
presents a timely
resource. Provides
practical analysis of
the ethical issues
raised by cutting-edge

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techniques and recent
advances in prenatal and
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from leading
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clinicians who offer a

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global, holistic
perspective on applied
challenges and moral
questions relating to
genetic and genomic
reproductive technology
Discusses preconception

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carrier screening,
genetic engineering and
the use of CRISPR gene
editing, mitochondrial
gene replacement
therapy, ethical issues,
and more

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Raising hopes for
disease treatment and
prevention, but also the
specter of
discrimination and
"designer genes,"
genetic testing is

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potentially one of the most socially explosive developments of our time. This book presents a current assessment of this rapidly evolving field, offering

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principles for actions
and research and
recommendations on key
issues in genetic
testing and screening.
Advantages of early
genetic knowledge are

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balanced with issues
associated with such
knowledge: availability
of treatment, privacy
and discrimination,
personal decisionmaking,
public health

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objectives, cost, and more. Among the important issues covered: Quality control in genetic testing. Appropriate roles for public agencies, private

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health practitioners,
and laboratories. Value-
neutral education and
counseling for persons
considering testing. Use
of test results in
insurance, employment,

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and other settings.

Provides an overview of the rapidly evolving field of genomics with coverage of nucleic acid technologies, proteomics and bioinformatics. It

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includes chapters on applications in human health, agriculture and comparative genomics and also contains two chapters on the legal and ethical issues of

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genomics, a topic that is becoming increasingly important as genomics moves out of the laboratory into practical applications. A unique exploration of

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the principles and
methods underlying
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and biotechnology - from
two top researchers In

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Genomics, Charles R.
Cantor, former director
of the Human Genome
Project, and Cassandra
L. Smith give the first
integral overview of the
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technologies behind the
Human GenomeProject and
the field of molecular
genetics and
biotechnology.Written
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in mind-from chemists

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andbiologists to
computer scientists and
engineers-the book
beginswith a review of
the basic properties of
DNA and the
chromosomesthat package

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it in cells. The authors describe the three main techniques used in DNA analysis- hybridization, polymerase chain reaction, and

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electrophoresis-and
present a complete
exploration ofDNA
mapping in its many
different forms. By
explaining both
thetheoretical

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principles and practical
foundations of
modernmolecular genetics
to a wide audience, the
book brings
thescientific community
closer to the ultimate

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goal of understanding the
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DNA. Genomics features:
Topical organization
within chapters for easy
reference A discussion
of the developing

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methods of sequencing,
such as sequencing by
hybridization (SBH) in
which data is read
through words instead of
letters Detailed
explanations and

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critical evaluations of
the many different types
of DNA maps that can be
generated-
including cytogenetic and
restriction maps as well
as interspecies

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cellhybrids Informed
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Crumbling Genome
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The Science and Ethics
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Molecular

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What exactly is a gene?
How does cloning actually
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a bad idea? Could we ever

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clone a human? The Rough
Guide To Genes & Cloning
answers all these
questions and more. From
the inside story of cells
and their structure and
the sleuths who cracked

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the genetic code to DNA cloning, twins and Dolly the sheep. Illustrated throughout with helpful pictures and diagrams, this Rough Guide turns the microscope on the things

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that make us what we are.
There is growing
enthusiasm in the
scientific community about
the prospect of mapping
and sequencing the human
genome, a monumental

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project that will have far-reaching consequences for medicine, biology, technology, and other fields. But how will such an effort be organized and funded? How will we

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develop the new
technologies that are
needed? What new legal,
social, and ethical
questions will be raised?
Mapping and Sequencing the
Human Genome is a

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blueprint for this proposed project. The authors offer a highly readable explanation of the technical aspects of genetic mapping and sequencing, and they

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recommend specific interim and long-range research goals, organizational strategies, and funding levels. They also outline some of the legal and social questions that

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might arise and urge their
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accessible, student-
friendly introduction to

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modern genetics. Designed for the shorter, less comprehensive course, the Sixth Edition presents carefully chosen topics that provide a solid foundation to the basic

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understanding of gene mutation, expression, and regulation. It goes on to discuss the development and progression of genetics as a field of study within a societal

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and historical context.
The Sixth Edition includes
new learning objectives
within each chapter which
helps students identify
what they should know as a
result of their studying

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and highlights the skills they should acquire through various practice problems. What's new in the Sixth Edition? Chapter 1 includes a new section on the origin of life

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Chapter 2 includes a revised discussion of the complementation test and how it is used to determine whether two mutations have defects in the same gene Chapter 3

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incorporates new data showing that the folding of interphase chromatin into chromosome territories has the form of a fractal globule. It also includes a new

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section on progenitor cells and embryonic stem cells Chapter 4 includes a new section discussing how copy-number variation in human amylase evolved in response to increased

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dietary starch as well as
the latest on hotspots of
recombination Chapter 5 is
updated with the latest
information on hazards of
polycarbonate food
containers. It also

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includes a new section on the genetics of schizophrenia and autism spectrum disorder Chapter 6 includes a revised section on restriction mapping and also discusses

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the newest massively parallel DNA sequencing technologies that can yield the equivalent of 200 human genomes' worth of DNA sequence in a single sequencing run

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Chapter 7 has been updated with a shortened and streamlined discussion of recombination in bacteriophage Chapter 8 includes new discoveries concerning the mechanisms

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of intrinsic
transcriptional
termination as well as rho-
dependent termination
Chapter 9 is updated with
a new section on
stochastic effects on gene

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expression and an expanded discussion of the lactose operon. There is also a revised discussion of galactose gene regulation in yeast, as well as new sections on lon noncoding

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RNAs Chapter 10 includes
new sections on ancient
DNA sequences of the
Neandertal and Denisovan
genomes Chapter 11
examines master control
genes in development

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Chapter 12 includes a new section on the repair of double-stranded breaks in DNA by nonhomologous end joining or template-directed gap repair Chapter 13 has been

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extensively revised with the latest data on cancer. Chapter 14 includes a new section on the detection of natural selection, as well as a new section on conservation genetics Key

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Features of Essential
Genetics, Sixth Edition:
New Learning Objectives
within each
Advances in genomics are
expected to play a central
role in medicine and

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public health in the future by providing a genetic basis for disease prediction and prevention. The transplantation of human gene discoveries into meaningful actions to

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improve health and prevent disease depends on scientific information from multiple disciplines, including epidemiology. This book describes the important role that

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epidemiologic methods play in the continuum from gene discovery to the development and application of genetic tests. It proceeds systematically from the

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fundamentals of genome
technology and gene
discovery, to
epidemiologic approaches
to gene characterization
in the population, to the
evaluation of genetic

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tests and their use in health services. These methodologic approaches are then illustrated with several disease-specific case studies. The book provides a scientific

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foundation that will help
researchers, policy
makers, and practitioners
integrate genomics into
medical and public health
practice.

Genome

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Issues of Ethics, Law,
Regulation and
Communication

Pan-genomics:

Applications, Challenges,
and Future Prospects

Assessing Genetic Risks

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Scientific Frontiers in
Developmental Toxicology
and Risk Assessment

Pan-genomics: Applications,
Challenges, and Future Prospects
covers current approaches,

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challenges and future prospects of pan-genomics. The book discusses bioinformatics tools and their applications and focuses on bacterial comparative genomics in order to leverage the development of precise drugs and treatments for

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specific organisms. The book is divided into three sections: the first, an "overview of pan-genomics and common approaches, brings the main concepts and current approaches on pan-genomics research; the second, "case studies

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in pan-genomics, thoroughly discusses twelve case, and the last, "current approaches and future prospects in pan-multiomics , encompasses the developments on omics studies to be applied on bacteria related studies. This book

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is a valuable source for bioinformaticians, genomics researchers and several members of biomedical field interested in understanding further bacterial organisms and their relationship to human health. Covers the entire

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spectrum of pangenomics,
highlighting the use of specific
approaches, case studies and future
perspectives Discusses current
bioinformatics tools and strategies
for exploiting pangenomics data
Presents twelve case studies with

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different organisms in order to provide the audience with real examples of pangenomics applicability

The VitalBook e-book version of Genomes 3 is only available in the US and Canada at the present time.

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To purchase or rent please visit <http://store.vitalsource.com/show/9780815341383> Covering molecular genetics from the basics through to genome expression and molecular phylogenetics, Genomes 3 is the latest edition of this pioneering

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previous two editions by putting genomes, rather than genes, at the centre of molecular genetics teaching. Recognizing that molecular biology research was being driven more by genome sequencing and functional analysis

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than by research into genes, this approach has gathered momentum in recent years.

An Introduction to Human
Molecular Genetics Second Edition
Jack J. Pasternak The Second
Edition of this internationally

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acclaimed text expands its coverage of the molecular genetics of inherited human diseases with the latest research findings and discoveries. Using a unique, systems-based approach, the text offers readers a thorough explanation of

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the gene discovery process and how defective genes are linked to inherited disease states in major organ and tissue systems. All the latest developments in functional genomics, proteomics, and microarray technology have been

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thoroughly incorporated into the text. The first part of the text introduces readers to the fundamentals of cytogenetics and Mendelian genetics. Next, techniques and strategies for gene manipulation, mapping, and

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isolation are examined. Readers will particularly appreciate the text's exceptionally thorough and clear explanation of genetic mapping. The final part features unique coverage of the molecular genetics of distinct biological

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systems, covering muscle, neurological, eye, cancer, and mitochondrial disorders.

Throughout the text, helpful figures and diagrams illustrate and clarify complex material. Readers familiar with the first edition will recognize

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the text's same lucid and engaging style, and will find a wealth of new and expanded material that brings them fully up to date with a current understanding of the field, including: * New chapters on complex genetic disorders, genomic

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imprinting, and human population genetics * Expanded and fully revised section on clinical genetics, covering diagnostic testing, molecular screening, and various treatments This text is targeted at upper-level

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undergraduate students, graduate students, and medical students. It is also an excellent reference for researchers and physicians who need a clinically relevant reference for the molecular genetics of inherited human diseases.

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Human Population Genetics and
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23 Chapters