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Chapter 14

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***Heritable
human genome
editing -
making changes
to the genetic
material of
eggs, sperm,***

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***or any cells
that lead to
their
development,
including the
cells of early
embryos, and
establishing a
pregnancy -
raises not
only
scientific and***

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medical considerations but also a host of ethical, moral, and societal issues. Human embryos whose genomes have been edited should not be

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***used to create
a pregnancy
until it is
established
that precise
genomic
changes can be
made reliably
and without
introducing
undesired
changes -***

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***criteria that
have not yet
been met, says
Heritable
Human Genome
Editing. From
an
international
commission of
the U.S.
National
Academy of***

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***Medicine, U.S.
National
Academy of
Sciences, and
the U.K.'s
Royal Society,
the report
considers
potential
benefits,
harms, and
uncertainties***

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***associated
with genome
editing
technologies
and defines a
translational
pathway from
rigorous
preclinical
research to
initial
clinical uses,***

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***should a
country decide
to permit such
uses. The
report
specifies
stringent
preclinical
and clinical
requirements
for
establishing***

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***safety and
efficacy, and
for
undertaking
long-term
monitoring of
outcomes.
Extensive
national and
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dialogue is
needed before***

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***any country
decides
whether to
permit
clinical use
of this
technology,
according to
the report,
which
identifies
essential***

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in human
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genomics and
also contains
two chapters
on the legal
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issues of
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topic that is
becoming
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fields such as
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biology,
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biology, and
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describes a novel
approach for how
these advances
might be used in**

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combination with existing methodologies to further the understanding of mechanisms of developmental toxicity, to improve the assessment of chemicals for their ability to

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cause

**developmental
toxicity, and to
improve risk
assessment for
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example, based
on the recent
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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

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**might allow for
rapid and
inexpensive
testing of large
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
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**will require
simultaneous
research on
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The authors describe the three main techniques used in DNA analysis—Southern hybridization, polymerase chain reaction, and electrophoresis—and present a complete exploration of DNA mapping in its many different forms. By

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*explaining both
the theoretical
principles and
practical
foundations of
modern molecular
genetics to a wide
audience, the book
brings the scientific
community closer
to the ultimate goal
of
understanding the
biological function*

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of DNA. Genomics features: Topical organization within chapters for easy reference A discussion of the developing methods of sequencing, such as sequencing by hybridization (SBH) in which data is read through words instead of letters

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

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predictions for the future of DNA sequencing
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

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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

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nutrition based on individual genetic tests. These developments have sweeping ethical, legal and regulatory implications for individuals, corporations and governments. This book brings together experts in ethics, law,

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*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*

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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, this

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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*

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*medicalization,
genetic privacy,
nutrition and
health. *Provides
ground for further
exploration to
identify issues and
provide analysis to
aid in policy and
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development
*Provides ethical
and legal insights
into this unfolding*

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science, as well as serving as a model for thinking about issues arising in other fields of science and technology

There is growing enthusiasm in the scientific community about the prospect of mapping and sequencing the

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human genome, a monumental 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 develop the new technologies that are needed?

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What new legal, social, and ethical questions will be raised? Mapping and Sequencing the Human Genome is a blueprint for this proposed project. The authors offer a highly readable explanation of the technical aspects of genetic mapping

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

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*urge their early
consideration by
policymakers.*

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*Humans, Animals
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*Our Genes, Our
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*The Science and
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Humans

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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

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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

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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,

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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

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crucial need for public education and engagement, and presents 7 general principles for the governance of human genome editing. Significant advances in our knowledge of genetics were made during the twentieth century but in the most recent decades, genetic research has

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

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cancer. 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 disorders. The primary audiences of the book are students of genetics, biology, medicine, molecular

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Clinical Ethics at the
Crossroads of Genetic
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Dhavendra Kumar.
[First edition]. 2008.
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1970's, personality and mental illness were conceptualized in an intertwined psychodynamic model. Biological psychiatry for many un-weaved that model and took mental illness for psychiatry and left personality to psychology. This book brings

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personality back into biological psychiatry, not merely in the form of personality disorder 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

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of 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, and today's experts confidently predict that we will have a

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smooth version of the sequencing of the human genome -- which contains some 3 billion base pairs Such astounding progress helped fuel the development of this remarkable volume, the first ever to discuss the brand-new -- and often controversial -- field of molecular genetics

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and the human
personality.

Questioning, critical,
and strong on
methodological
principles, this
volume reflects the
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contributors -- all
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class theoreticians,

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empiricists, clinicians, developmentalists, and statisticians. For students of psychopathology and others bold enough to hold in abeyance their understandable misgivings about the conjunction of "molecular genetics" and "human personality," this work offers an

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authoritative and up-to-date introduction to the molecular genetics of human personality. The book, with its wealth of facts, conjectures, hopes, and misgivings, begins with a preface by world-renowned researcher and author Irving Gottesman. The

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authors masterfully guide us through Chapter 1, principles and methods; Chapter 4, animal models for personality; and Chapter 11, human intelligence as a model for personality, laying the groundwork for our appreciation of the remaining empirical

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findings of human personality qua personality. 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 neurotransmitters

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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 imagined, given our ignorance of the genes involved in the prenatal

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development of the central nervous system. Chapter 3 provides an integrative overview of the broad autism phenotype, and as such will be of special interest to child psychiatrists. Chapters 5, 8, and 10 offer enlightening information on drug and alcohol abuse.

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Chapter 14 discusses variations in sexuality. Adding 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 psychopathology of

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both genetics and personality; Chapters 15-17, informed critical appraisals citing concerns and cautions about premature applications of this information in the policy arena; and Chapter 18, a judicious contemplation by the editors themselves of

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this promising -- and, to some, alarming -- field. Clear and meticulously researched, this eminently satisfying work is written to introduce the subject to postgraduate students just beginning to develop their research skills, to interested psychiatric

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practitioners, and to informed laypersons with some scientific background.

According to the National Institute of Health, a genome-wide association study is defined as any study of genetic variation across the entire human genome that is designed to identify

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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 combined with clinical and other phenotype data, offers the potential for increased understanding of

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basic biological processes affecting human health, improvement in the prediction of disease and patient care, and ultimately the realization of the promise of personalized medicine. In addition, rapid advances in understanding the patterns of human

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genetic variation and maturing high-throughput, cost-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 statistics and

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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 be tailored and translated for the analytical issues which are original to large-scale

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association studies. Analysis of Complex Disease Association Studies will provide researchers with advanced biological knowledge who are entering the field of genome-wide association studies with the groundwork to apply statistical analysis tools appropriately and

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genomics are
expected to play a
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by providing a genetic basis for disease prediction and prevention. The transplantation of human gene discoveries into meaningful actions to improve health and prevent disease depends on scientific information from multiple disciplines, including

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epidemiology. This book describes the important role that epidemiologic methods play in the continuum from gene discovery to the development and application of genetic tests. It proceeds systematically from the fundamentals of genome technology and gene discovery,

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to epidemiologic approaches to gene characterization in the population, to the evaluation of genetic tests and their use in health services.

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summarizes the importance of heredity and environment.

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to Genes &
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mutations in the
human genome and
their effects on
human health and
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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

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just one of 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 suffer

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*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 the rate at which

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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
deleterious
mutations on*

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*humans with
previously
unattainable
precision and begin
to develop
approaches to
managing them.*

*Written by a leading
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field of evolutionary
genetics, Crumbling
Genome reviews the*

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*current state of
knowledge about
deleterious
mutations and their
effects on humans
for those in the
biological sciences
and medicine, as
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with only a general
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and an interest in*

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fundamentals of
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existing and new*

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*mutations on human
genotypes and
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the field and
considers crucial
unsolved problems
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issues likely to*

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*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,
genomics,*

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*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
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health, medicine,
and society.*

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demonstrates that
chromosomes are
crucial in
understanding the
human genome and
that new high-
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approaches are central to advancing cytogenetics in the 21st century. After an introduction to (molecular) cytogenetics, being the basic of all cytogenomic research, this book highlights the strengths and

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newfound

*advantages of
cytogenomic
research methods
and technologies,
enabling researchers
to jump-start their
own projects and
more effectively
gather and interpret
chromosomal data.
Methods discussed*

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*include banding and
molecular
cytogenetics,
molecular combing,
molecular
karyotyping, next-
generation
sequencing,
epigenetic study
approaches, optical
mapping/karyomapp
ing, and CRISPR-*

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*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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chromosomes, role
of repetitive
elements and
noncoding RNAs in
human genome,
studies in
topologically
associated domains,
interchromosomal
interactions, and*

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chromoanagenesis.

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students, basic and
translational
scientists, and
clinicians in the
areas of human
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reproductive*

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technologies*

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framework for
interpreting
chromosome
structure and how
this affects the
functioning of the
genome in health
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Sugar chains

(glycans) are often attached to proteins and lipids and have multiple roles in the organization and function of all organisms.

"Essentials of Glycobiology" describes their

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biogenesis and function and offers a useful gateway to the understanding of glycans.

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whose embryos
had gone through
genome editing
mean--for
science and for
all of us? In
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the 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 Greely, a leading authority on law

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***and genetics,
tells the
fascinating story
of this human
experiment and
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consequences.
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what Chinese
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Jianguo did, how
he did it, and how***

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

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***decide when a
behavior is
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***

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***understanding
complex traits
such as
intelligence,
autism and
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that involve
numerous genes
and
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methods of altering genes offer hope for treating or even preventing difficulties that arise in our genes. This book explains what genes are, what they do in the nervous system,

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impacts both
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