New Human Genetics

Mapping and Sequencing the Human GenomeNational Academies Press

Debating Human Genetics is based on ethnographic research focusing primarily on the UK publics who are debating and engaging with human genetics, and related bio and techno-science. Drawing on recent interviews and data, collated in a range of public settings, it provides a unique overview of multiple publics as they 'frame' the stake of the debates in this emerging, complex and controversial arena. The book outlines key sites and applications of human genetics that have sparked public interest, such as biobanks, stem cells, genetic screening and genomics. It also addresses the 'scientific contoversies' that have made considerable impact in the public sphere – the UK police DNA database, gene patenting, 'saviour siblings', and human cloning. By grounding the concepts and issues of human genetics in the real life narratives and actions of patient groups, genetic watchdogs, scientists, policy makers, and many other public groups, the book exemplifies how human genetics is a site where public knowledge and value claims converge and collide, and identifies the emergence of 'hybrid publics' who are engaging with this hybrid science.

In 1953, James Watson and Francis Crick discovered the double helix structure of DNA. The discovery was a profound, Nobel Prize-winning moment in the history of genetics, but it did not decipher the messages on the twisted, ladderlike strands within our cells. No one knew what the human genome sequence actually was. No one had cracked the code of life. Now, at the beginning of a new millennium, that code has been cracked. Kevin Davies, founding editor of the leading journal in the field, Nature Genetics, has relentlessly followed the story as it unfolded, week by week, for ten years. Here for the first time, in rich human, scientific, and financial detail, is the dramatic story of one of the greatest scientific feats ever accomplished: the mapping of the human genome. In 1990, the U.S. government approved a 15-year, $3 billion plan to launch the Human Genome Project, whose goal was to sequence the 3 billion letters of human DNA. At the helm of the project was James Watson, who resigned after only a couple of years, following a feud with National Institutes of Health (NIH) Director Bernadine Healy over gene patenting. His successor was the brilliant young medical geneticist Francis Collins, who had made his name discovering the gene for cystic fibrosis. As Davies reports, Collins is a devout Christian who has traveled to Africa to work in a missionary hospital. He believes the human genome sequence is "the language of God." Just as Collins became project director, J. Craig Venter, a maverick DNA sequencer and Vietnam veteran, was leaving the NIH to start his own private research institute. Venter had developed a simple "shotgun" strategy for sequencing DNA, and his fame skyrocketed when his new institute proved his sequencing system worked by becoming the first to sequence the entire genome of a microorganism. Only 3 percent of the human genome had been sequenced by early 1998, the public project's halfway point. That same year, Venter was approached by PE Corporation to launch a private human genome project. He stunned the world when he announced the formation of a new company to sequence the human genome in a mere three years for $300 million. A war of words broke out between public and private researchers. Undeterred, Venter built Celera Genomics with the motto "Speed matters. Discovery can't wait." and an $80 million supercomputer. While the insults intensified, Celera's stock price soared, tumbled, and soared again. Negotiations for cooperation between the public and private institutes began, only to fall apart in acrimony. Then in the spring of 2000 President Clinton stepped in, telling his science adviser to restart negotiations. History was about to be made. Davies captures the drama of this momentous achievement, drawing on his own genetics expertise and interviews with key scientists including Venter and Collins, as well as Eric Lander, an MIT computer wizard who refers to the public genome project as "the forces of good"; Kari Stefánsson, the genetics entrepreneur who is remaking Iceland's economy; and John Sulston, chief of the UK genome project, who led the charge against gene patenting. Davies has visited geneticists around the world to illustrate a vast international enterprise working on the frontier of human knowledge. Cracking the Genome is the definitive account of how the code that holds the answers to the origin of life, the evolution of humanity, and the future of medicine was broken.

This two-volume set provides a general overview of the evolution of the human genome; The first volume overviews the human genome with descriptions of important gene groups. This second volume provides up-to-date, concise yet ample knowledge on the genome evolution of modern humans. It comprises twelve chapters divided into two parts discussing "Non-neutral Evolution on Human Genes" (Part I) and "Evolution of Modern Human Populations" (Part II.) The most significant feature of this book is the continent-wise discussion of modern human dispersal using human genomic data in Part II. Recent results such as introgression of paleogenomes to modern humans, new methods such as computer simulation of global human dispersals, and new information on genes for humanness will be of particular interest to the readers. Since the euchromatin regions of the human genome was sequenced in 2003, a huge number of research papers were published on modern human evolution for a variety of populations. It is now time to summarize these achievements. This book stands out as the most comprehensive book on the modern human evolution, focusing on genomic points of view with a broad scope. Primary target audiences are researchers and graduate students in evolutionary biology.

Heritable Human Genome Editing

Ancient DNA and the New Science of the Human Past

Mapping and Sequencing the Human Genome

Human Genetics and Genomics

The Handbook of Genetics & Society

Science, Health, Society

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.

Human Molecular Genetics is an established and class-proven textbook for upper-level undergraduates and graduate students which provides an authoritative and integrated approach to the molecular aspects of human genetics. While maintaining the hallmark features of previous editions, the Fourth Edition has been completely updated. It includes new Key Concepts at the beginning of each chapter and annotated further reading at the conclusion of each chapter, to help readers navigate the wealth of information in this subject. The text has been restructured so genomic technologies are integrated throughout, and next generation sequencing is included. Genetic testing, screening, approaches to therapy, personalized medicine, and disease models have been brought together in one section. Coverage of cell biology including stem cells and cell therapy, studying gene function and structure, comparative genomics, model organisms, noncoding RNAs and their functions, and epigeneties have all been expanded.

The sequencing of the human genome has brought human genetics into a new era of study resulting in the generation of an explosive amount of information. Application of genomic, proteomic, and bioinformatics technologies to the study of human genetics has made it possible for human genetic diseases to be studied on an unprecedented scale, both in silico and in the wet lab. This volume provides up-to-date coverage of the broad range of research topics in this fascinating area. In the first part of the book, a whole spectrum of approaches to human genetics research is reviewed for both background and the latest progress. In the second, important topics related to genetic research of various complex human diseases are discussed. The robust content and diverse array of subjects allow the book to serve as both a concise "encyclopedia" that introduces basic and essential concepts of human genetics and an in-depth review of the current understanding of genetic research in human diseases.

The #1 NEW YORK TIMES Bestseller The basis for the PBS Ken Burns Documentary The Gene: An Intimate History Now includes an excerpt from Siddhartha Mukherjee's new book Song of the Cell! From the Pulitzer Prize–winning author of The Emperor of All Maladies—a fascinating history of the gene and "a magisterial account of how human minds have laboriously, ingeniously picked apart what makes us tick" (Elle). "Sid Mukherjee has the uncanny ability to bring together science, history, and the future in a way that is understandable and riveting, guiding us through both time and the mystery of life itself." —Ken Burns "Dr. Siddhartha Mukherjee dazzled readers with his Pulitzer Prize–winning The Emperor of All Maladies in 2010. That achievement was evidently just a warm-up for his virtuoso performance in The Gene: An Intimate History, in which he braids science, history, and memoir into an epic with all the range and biblical thunder of Paradise Lost" (The New York Times). In this biography Mukherjee brings to life the quest to understand human heredity and its surprising influence on our lives, personalities, identities, fates, and choices. "Mukherjee expresses abstract intellectual ideas through emotional stories…[and] swaddles his medical rigor with rhapsodic tenderness, surprising vulnerability, and occasional flashes of pure poetry" (The Washington Post). Throughout, the story of Mukherjee's own family—with its tragic and bewildering history of mental illness—reminds us of the questions that hang over our ability to translate the science of genetics from the laboratory to the real world. In riveting and dramatic prose, he describes the centuries of research and experimentation—from Aristotle and Pythagoras to Mendel and Darwin, from Boveri and Morgan to Crick, Watson and Franklin, all the way through the revolutionary twenty-first century innovators who mapped the human genome. "A fascinating and often sobering history of how humans came to understand the roles of genes in making us who we are—and what our manipulation of those genes might mean for our future" (Milwaukee Journal-Sentinel), The Gene is the revelatory and magisterial history of a scientific idea coming to life, the most crucial science of our time, intimately explained by a master. "The Gene is a book we all should read" (USA TODAY).

How Gene Splicing Helps Researchers Fight Inherited Disease

The New Human Genetics

Mobilizing Mutations

Curiosity Guides: The Human Genome

Current Topics In Human Genetics: Studies In Complex Diseases

This is a concise overview of a complex and fast moving field. The text explains amongst many things the special problems encountered in human genome analysis. Boxed case studies are incorporated to help student comprehension of this topic.

The rapid advancement of genetic science, fuelled by the Human Genome Project and other related initiatives, promises a new kind of public health practice based on the pre-detection of disease according to calculations of genetic risk. This book by two well-known sociologists: * explores the implications of the new genetics for public health as a body of knowledge and a domain of practice * assesses the impact of new genetic information and technologies on conceptions of health, illness, embodiment, self and citizenship * critically examines the complex discourses surrounding human genetics and public health. The New Genetics and The Public's Health addresses the emerging social and political consequences of the new genetics and provides a stimulating critique of current research and practice in public health.

Analogies play a fundamental role in science. To understand how and why, at a given moment, a certain analogy was used, one has to know the specific, historical circumstances under which the new idea was developed. This historical background is never presented in scientific articles and quite rarely in books. For the general reader, the undergraduate or graduate student who learns the subject for the first time, but also for the practitioner who looks for inspiration or who wants to understand what his colleague working in another field does, these historical circumstances can be fascinating and useful. This book discusses a series of analogy effects in subatomic physics, the prediction and theory of which the author has contributed to in the last 50 years. These phenomena are presented at a level accessible to the non-specialist, without formulae but with emphasis on the personal and historical background: memoirs of meetings, discussions and correspondence with collaborators and colleagues. As such, besides its scientific aspects, the book constitutes an absorbing witness account of a holocaust survivor who subsequently illegally crossed the Iron Curtain to escape communist persecution.

In 2001, scientists were finally able to determine the full human genome sequence, and with the discovery began a genomic voyage back in time. Since then, we have sequenced the full genomes of a number of mankind's primate relatives at a remarkable rate. The genomes of the common chimpanzee (2005) and bonobo (2012), orangutan (2011), gorilla (2012), and macaque monkey (2007) have already been identified, and the determination of other primate genomes is well underway. Researchers are beginning to unravel our full genomic history, comparing it with closely related species to answer age-old questions about how and when we evolved. For the first time, we are finding our own ancestors in our genome and are thereby gleaning new information about our evolutionary past. In Ancestors in Our Genome, molecular anthropologist Eugene E. Harris presents us with a complete and up-to-date account of the evolution of the human genome and our species. Written from the perspective of population genetics, and in simple terms, the book traces human origins back to their source among our earliest human ancestors, and explains many of the most intriguing questions that genome scientists are currently working to answer. For example, what does the high level of discordance among the gene trees of humans and the African great apes tell us about our respective separations from our common ancestor? Was our separation from the apes fast or slow, and when and why did it occur? Where, when, and how did our modern species evolve? How do we search across genomes to find the genomic underpinnings of our large and complex brains and language abilities? How can we find the genomic bases for life at high altitudes, for lactose tolerance, resistance to disease, and for our different skin pigmentations? How and when did we interbreed with Neandertals and the recently discovered ancient Denisovans of Asia? Harris draws upon extensive experience researching primate evolution in order to deliver a lively and thorough history of human evolution. Ancestors in Our Genome is the most complete discussion of our current understanding of the human genome available.

A Cell Bank Helps Researchers Fight Inherited Disease

An Intimate History

Hacking Darwin

Human Genetics in the Age of Patient Advocacy

Anthropology: Current and Future Developments

Debating Human Genetics

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

The DNA sequence that comprises the human genome--the genetic blueprint found in each of our cells--is undoubtedly the greatest code ever to be broken. Completed at the dawn of a new millennium, the feat electrified both the scientific community and the general public with its tantalizing promise of new and better treatments for countless diseases, including Alzheimer's, cancer, diabetes, and Parkinson's. Yet what is arguably the most important discovery of our time has also opened a Pandora's box of questions about who we are as humans and how the unique information stored in our genomes can and might be used, making it all the more important for everyone to understand the new science of genomics. In the CURIOSITY GUIDE TO THE HUMAN GENOME, Dr. John Quackenbush, a renowned scientist and professor, conducts a fascinating tour of the history and science behind the Human Genome Project and the technologies that are revolutionizing the practice of medicine today. With a clear and engaging narrative style, he demystifies the fundamental principles of genetics and molecular biology, including the astounding ways in which genes function, alone or together with other genes and the environment, to either sustain life or trigger disease. In addition, Dr. Quackenbush goes beyond medicine to examine how DNA-sequencing technology is changing how we think of ourselves as a species by providing new insights about our earliest ancestors and reconfirming our inextricable link to all life on earth. Finally, he explores the legal and ethical questions surrounding such controversial topics as stem cell research, prenatal testing, forensics, and cloning, making this volume of the Curiosity Guides series an indispensable resource for navigating our brave new genomic world.

Drawing on startling new evidence from the mapping of the genome, an explosive new account of the genetic basis of race and its role in the human story Fewer ideas have been more toxic or harmful than the idea of the biological reality of race, and with it the idea that humans of different races are biologically different from one another. For this understandable reason, the idea has been banished from polite academic conversation. Arguing that race is more than just a social construct can get a scholar run out of town, or at least off campus, on a rail. Human evolution, the consensus view insists, ended in prehistory. Inconveniently, as Nicholas Wade argues in A Troublesome Inheritance, the consensus view cannot be right. And in fact, we know that populations have changed in the past few thousand years—to be lactose tolerant, for example, and to survive at high altitudes. Race is not a bright-line distinction; by definition it means that the more human populations are kept apart, the more they evolve their own distinct traits under the selective pressure known as Darwinian evolution. For many thousands of years, most human populations stayed where they were and grew distinct, not just in outward appearance but in deeper senses as well. Wade, the longtime journalist covering genetic advances for The New York Times, draws widely on the work of scientists who have made crucial breakthroughs in establishing the reality of recent human evolution. The most provocative claims in this book involve the genetic basis of human social habits. What we might call middle-class social traits—thrift, docility, nonviolence—have been slowly but surely inculcated genetically within agrarian societies, Wade argues. These "values" obviously had a strong cultural component, but Wade points to evidence that agrarian societies evolved away from hunter-gatherer societies in some crucial respects. Also controversial are his findings regarding the genetic basis of traits we associate with intelligence, such as literacy and numeracy, in certain ethnic populations, including the Chinese and Ashkenazi Jews. Wade believes deeply in the fundamental equality of all human peoples. He also believes that science is best served by pursuing the truth without fear, and if his mission to arrive at a coherent summa of what the new genetic science does and does not tell us about race and human history leads straight into a minefield, then so be it. This will not be the last word on the subject, but it will begin a powerful and overdue conversation.

In 2000, President Bill Clinton signaled the completion of the Human Genome Project at a cost in excess of $2 billion. A decade later, the price for any of us to order our own personal genome sequence--a comprehensive map of the 3 billion letters in our DNA--is rapidly and inevitably dropping to just $1,000. Dozens of men and women--scientists, entrepreneurs, celebrities, and patients--have already been sequenced, pioneers in a bold new era of personalized genomic medicine. The $1,000 genome has long been considered the tipping point that would open the floodgates to this revolution. Do you have gene variants associated with Alzheimer's or diabetes, heart disease or cancer? Which drugs should you consider taking for various diseases, and at what dosage? In the years to come, doctors will likely be able to tackle all of these questions--and many more--by using a computer in their offices to call up your unique genome sequence, which will become as much a part of your medical record as your blood pressure.

Human Genetics: The Basics

Cracking the Genome

Studies in Complex Diseases

Brave New World?

The Human Genome

Inside the Race To Unlock Human DNA

There is growing enthusiasm in the scientific community about the prospect of mapping and sequencing the 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? 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 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 urge their early consideration by policymakers.

Heritable human genome editing - making 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 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. 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 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 the report, which identifies essential elements of national and international scientific governance and oversight.

An authoritative Handbook which offers a discussion of the social, political, ethical and economic consequences and implications of the new bio-sciences. The Handbook takes an interdisciplinary approach providing a synoptic overview of contemporary international social science research on genetics, genomics and the new life sciences. It brings together leading scholars with expertise across a wide-ranging spectrum of research fields related to the production, use, commercialisation and regulation of genetics knowledge. The Handbook is structured into seven cross-cutting themes in contemporary social science research on genetics with introductions written by internationally renowned section editors who take an interdisciplinary approach to offer fresh insights on recent developments and issues in often controversial fields of study. The Handbook explores local and global issues and critically approaches a wide range of public and policy questions, providing an invaluable reference source to a wide variety of researchers, academics and policy makers.

Advances in genomics are expected to play a central role in medicine and 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 improve health and prevent disease depends on scientific information from multiple disciplines, including 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, to epidemiologic approaches to gene characterization in the population, to the evaluation of genetic tests and their use in health services. These methodologic approaches are then illustrated with several disease-specific case studies. The book provides a scientific foundation that will help researchers, policy makers, and practitioners integrate genomics into medical and public health practice.

Genome

Human Molecular Genetics

Human Genes and Genomes

The Troubled Helix

The $1,000 Genome

Editing Humanity

This newly updated edition sheds light on the secrets of the sequence, highlighting the myriad ways in which genomics will impact human health for generations to come.

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 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 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-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 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-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

Human genetics has blossomed from an obscure branch of biological science and occasional explanation for exceedingly rare disorders to a field all of its own that affects everyone. Human Genetics: The Basics introduces the key questions and issues in this emerging field, including: The common ancestry of all humanity The role of genes in sickness and health Debates over the use of genetic technology Written in an engaging, narrative manner, this concise introduction is an ideal starting point for anyone who wants to know more about genes, DNA, and the genetic ties that bind us all.

Human Evolutionary Genetics is a groundbreaking text which for the first time brings together molecular genetics and genomics to the study of the origins and movements of human populations. Starting with an overview of molecular genomics for the non-specialist (which can be a useful review for those with a more genetic background), the book shows h

Evolution of the Human Genome II

The Revolution in DNA Sequencing and the New Era of Personalized Medicine

The New Science of Human Evolution

Human Genome Editing

Inside the Race to Unlock Human DNA

The Human Genome in Health and Disease

Human Genetics and Genomics, Third Edition, is the new rendition of the classic textbook Human Genetics: A Problem-Based Approach. Thoroughly updated and restructured, this brand new edition uses both a classic didactic approach to teach basic genetic concepts and a problem-based approach to demonstrate the clinical applications of genetics in medical practice. By combining both these approaches, Human Genetics and Genomics is suitable both as a textbook for genetics courses, and as a bridge into the clinical environment. The third edition features greater emphasis on cutting edge technologies and the latest genetic issues, and a vast array of new pedagogy, such as: Clinical snapshots covering major genetic disorders Ethical Implications boxes discussing related ethical issues Key summary points at the beginning of each chapter and Q&As at the end of each chapter for self-assessment Hot topics covering new and emerging areas in genetics Recommended reading for each chapter A companion website at www.blackwellpublishing.com/korfgenetics

This wide ranging and compelling account surveys the exciting opportunities and difficult problems which arise from the new human genetics. The availability of increasingly sophisticated information on our genetic make-up presents individuals, and society as a whole, with difficult decisions. Although it is hoped that these advances will ultimately lead the way to the effective treatment and screening for all diseases with a genetic component, at present many individuals are 'condemned' to a life sentence, in the knowledge that they have or will develop an incurable genetic disease.

One of the key issues facing us in the next millennium is the ability to manipulate the genetics of living organisms. The possibility of manipulating human genetics raises many theological, ethical and socio-political issues. These include specific decisions about whether the technology will be developed, how it will be applied and more general questions about the technical manipulation of 'natural' processes. From a theological perspective the human genome project not only challenges particular doctrines, such as that of creation, eschatology and anthropology, but also raises particular issues of social justice and medical ethics. The purpose of this book is to bring together the collective expertise of theologians, scientists and social scientists in order to provide a forum for critique and public debate focused on the human genome project.It is hoped that the results presented in this book offer a sophisticated theological and ethical response.

The human genome is a linear sequence of roughly 3 billion 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 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. 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 biology and bioinformatics. Richly illustrated with review questions provided for each 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 learn more about their genome. Key selling features: Molecular sequence perspective, explaining the relationship between DNA sequence motifs and biological function Aids in understanding 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 illustrated with questions provided to each chapter

A Scientific Foundation for Using Genetic Information to Improve Health and Prevent Disease

Scientific Frontiers in Developmental Toxicology and Risk Assessment

Science, Ethics, and Governance

A Story of Four Letters

Human Population Genetics and Genomics

Genes, Race and Human History

“Ridley leaps from chromosome 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 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 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 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 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 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 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 humankind.

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. 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 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 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 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 testing, population screening, predicting disease susceptibility, pharmacogenomics and more Explores ethical, legal, regulatory and economic aspects of genomics in medicine. Integrates historical (classical) genetics approach with the latest discoveries in structural and functional genomics

"A gifted and thoughtful writer, Metzl brings us to the frontiers of biology and technology, and reveals a world full of promise and peril." — Siddhartha Mukherjee MD, New York Times bestselling author of The Emperor of All Maladies and The Gene Passionate, provocative, and highly illuminating, Hacking Darwin is the must read book about the future of our species for fans of Homo Deus and The Gene. After 3.8 billion years humankind is about to start evolving by new rules... From leading geopolitical expert and technology futurist Jamie Metzl comes a groundbreaking exploration of the many ways genetic-engineering is shaking the core foundations of our lives — sex, war, love, and death. At the dawn of the genetics revolution, our DNA is becoming as readable, writable, and hackable as our information technology. But as humanity starts retooling our own genetic code, the choices we make today will be the difference between realizing breathtaking advances in human well-being and descending into a dangerous and potentially deadly genetic arms race. Enter the laboratories where scientists are turning science fiction into reality. Look towards a future where our deepest beliefs, morals, religions, and politics are challenged like never before and the very essence of what it means to be human is at play. When we can engineer our future children, massively extend our lifespans, build life from scratch, and recreate the plant and animal world, should we?

Molecular methodologies are crucial to our understanding of human population diversity, as well as our evolutionary relationships with nonhuman primates. The completion of the Human Genome Project has given researchers a complete human reference sequence of genes. Combined with very important advances in sequencing and bioinformatics technologies, genetic research projects are now of a multidisciplinary nature. Anthropologists have the tools to seek information related to questions concerning the origin of the human species. Genomics in Biological Anthropology: New Challenges, New Opportunities explores the impact of new advances in molecular methods, such as DNA sequencing, amplification and analysis on our knowledge about the genetics of prehistoric and existing humans. Topics covered in this volume include an overview of genomic projects, mitochondrial DNA (mtDNA) analysis, ancient DNA, mutation rates in chromosome Y, genomics of isolated populations, complex phenotypes and forensic anthropology. This volume is a concise primer for students and general readers learning the basics about human genetics, human evolution and biological anthropology

The Gene
Human Evolutionary Genetics
Genetic Engineering and the Future of Humanity
Contemporary Issues in Public Policy and Ethics
New Human Genetics
Genomics in Biological Anthropology: New Challenges, New Opportunities

Human genetics has blossomed from an obscure biological science and explanation for rare disorders to a field that is profoundly altering health care for everyone. This thoroughly updated new edition of Human Genetics: The Basics provides a concise background of gene structure and function through the lens of real examples, from families living with inherited diseases to population-wide efforts in which millions of average people are learning about their genetic selves. The book raises compelling issues concerning: • The role of genes in maintaining health and explaining sickness • Genetic testing, gene therapy, and genome editing • The common ancestry of all humanity and how we are affecting our future. Written in an engaging, narrative manner, this concise introduction is an ideal starting point for anyone who wants to know more about genes, DNA, genomes, and the genetic ties that bind us all.
With every passing year, more and more people learn that they or their young or unborn children carries a genetic mutation. But what does this mean for the way we understand a person? Today, genetic mutations are being used to diagnose novel conditions like the XYY, Fragile X, NGLY1 mutation, and 22q11.2 Deletion syndromes, carving out rich new categories of human disease and difference. Daniel Navon calls this form of categorization "genomic designation," and in Mobilizing Mutations he shows how mutations, and the social factors that surround them, are reshaping human classification. Drawing on a wealth of fieldwork and historical material, Navon presents a sociological account of the ways genetic mutations have been mobilized and transformed in the sixty years since it became possible to see abnormal human genomes, providing a new vista onto the myriad ways contemporary genetic testing can transform people's lives. Taking us inside these shifting worlds of research and advocacy over the last half century, Navon reveals the ways in which knowledge about genetic mutations can redefine what it means to be ill, different, and ultimately, human.
Scientific Frontiers in Developmental Toxicology and Risk Assessment reviews advances made during the last 10-15 years in fields 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 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, 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 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 toxicology and risk assessment will require simultaneous research on several fronts by experts from multiple scientific disciplines, including developmental toxicologists, developmental biologists, geneticists, epidemiologists, and biostatisticians.
David Reich describes how the revolution in the ability to sequence ancient DNA has changed our understanding of the deep human past. This book tells the emerging story of our often surprising ancestry - the extraordinary ancient migrations and mixtures of populations that have made us who we are.
Mapping the New Genomic Era
Ancestors in Our Genome
A Troublesome Inheritance
Social and Psychological Implications of the New Human Genetics
The Autobiography of a Species in 23 Chapters
Who We Are and How We Got Here

One of the world's leading experts on genetics unravels one of the most important breakthroughs in modern science and medicine. Ilf our genes are, to a great extent, our destiny, then what would happen if mankind could engineer and alter the very essence of our DNA coding? Millions might be spared the devastating effects of hereditary disease or the challenges of disability, whether it was the pain of sickle-cell anemia to the ravages of Huntington's disease. But this power to "play God" also raises major ethical questions and poses threats for potential misuse.
For decades, these questions have lived exclusively in the realm of science fiction, but as Kevin Davies powerfully reveals in his new book, this is all about to change. Engrossing and page-turning, Editing Humanity takes readers inside the fascinating world of a new gene editing technology called CRISPR, a high-powered genetic toolkit that enables scientists to not only engineer but to edit the DNA of any organism down to the individual building blocks of the genetic code. Davies introduces readers to arguably the most profound scientific breakthrough of our time. He tracks the scientists on the front lines of its research to the patients whose powerful stories bring the narrative movingly to human scale. Though the birth of the "CRISPR babies" in China made international news, there is much more to the story of CRISPR than headlines seemingly ripped from science fiction. In Editing Humanity, Davies sheds light on the implications that this new technology can have on our everyday lives and in the lives of generations to come.
Theology, Ethics and the Human Genome
The New Genetics and The Public's Health
The CRISPR Revolution and the New Era of Genome Editing
Current Topics in Human Genetics
Human Genome Epidemiology
Human Evolution Viewed from Genomes