



[eBooks] CRISPR People: The Science And Ethics Of Editing Humans

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CRISPR People

CRISPR People-Henry T. Greely 2021-02-16 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 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 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 how the public and other scientists learned about and reacted to this unprecedented genetic intervention.

CRISPR People-Henry T. Greely 2021 "Beginning with the amazing tale of the Chinese "CRISPR Babies," Greely tells the complex story of human germline editing, covering the science, ethics, law, and politics"--

Editing Humanity-Kevin Davies 2020-10-06 One of the world's leading experts on genetics unravels one of the most important breakthroughs in modern science and medicine. If 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.

Crispr-Yolanda Ridge 2020-09-08 We can change the world with genetic modification—but should we? CRISPR stands for clustered regularly interspaced short palindromic repeats. If it sounds complicated, it is—but it's also one of the most powerful ways we can shape the future. And it's poised to completely upend the way we think about science. Author Yolanda Ridge tackles this topic in a friendly and accessible tone, with two introductory chapters covering the basics of DNA and genetic modification before taking readers through the ways that this ground-breaking science could affect them by potentially: - eliminating diseases like malaria and cancer, - improving the stability of our food supply, and - helping to manage conservation efforts for threatened animals and environments. But all of these possible advancements come with risks, the biggest being that the consequences are unknown. Chapters end with "Stop, Go, Yield" sections encouraging readers to consider the pros and cons of using CRISPR. "Cutting Questions" give readers the opportunity to further reflect on the ethics of the science. CRISPR is a game changer. This important book, with detailed scientific illustrations, brings much needed clarity to a topic that will affect readers for generations to come.

A Crack in Creation-Jennifer A. Doudna 2017-06-13 BY THE WINNER OF THE 2020 NOBEL PRIZE IN CHEMISTRY Finalist for the Los Angeles Times Book Prize "The future is in our hands as never before, and this book explains the stakes like no other." — George Lucas "Required reading for every concerned citizen." — New York Review of Books Not since the atomic bomb has a technology so alarmed its inventors that they warned the world about its use. That is, until 2015, when biologist Jennifer Doudna called for a worldwide moratorium on the use of the gene-editing tool CRISPR—a revolutionary new technology that she helped create—to make heritable changes in human embryos. The cheapest, simplest, most effective way of manipulating DNA ever known, CRISPR may well give us the cure to HIV, genetic diseases, and some cancers. Yet even the tiniest changes to DNA could have myriad, unforeseeable consequences, to say nothing of the ethical and societal repercussions of intentionally mutating embryos to create "better" humans. Writing with fellow researcher Sam Sternberg, Doudna—who has since won the Nobel Prize for her CRISPR research—shares the thrilling story of her discovery and describes the enormous responsibility that comes with the power to rewrite the code of life. "An invaluable account. . . . We owe Doudna several times over." — Guardian

Human Genome Editing-National Academies of Sciences, Engineering, and Medicine 2017-08-13 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.

Altered Inheritance-Françoise Baylis 2019-09-17 With the advent of CRISPR gene-editing technology, designer babies have become a reality. Françoise Baylis insists that scientists alone cannot decide the terms of this new era in human evolution. Members of the public, with diverse interests and perspectives, must have a role in determining our future as a species.

The CRISPR Generation-Kiran Musunuru 2019-11-29 A leading physician, scientist, and expert in gene editing explains how a series of scientific breakthroughs led to the medical scandal of the decade. In November 2018, Dr. He Jiankui of Shenzhen, China, announced via YouTube that he had created the world's first gene-edited babies. It soon became clear that this was not a historic scientific achievement, but rather a historic ethical fiasco, a deeply flawed experiment on unborn human beings. What made it possible for a rogue scientist with no medical training to covertly and recklessly alter the genes of babies? What does the future hold now that the first members of the CRISPR generation have been born? In *The CRISPR Generation*, Dr. Kiran Musunuru takes the reader through an insider's view of the history of the gene-editing field, key discoveries about how gene editing can be used to prevent and treat diseases like AIDS and heart attacks, a full account of the events surrounding Dr. He's revelation to the world, a dissection of Dr. He's scientific and ethical lapses, and a look ahead to the consequences of gene editing for humankind, both good and bad. Gene-editing technology has the potential to cause untold damage if taken up by the wrong hands and used irresponsibly. But it also promises to be a boon for the health of patients otherwise destined for disease and suffering.

The End of Sex and the Future of Human Reproduction-Henry T. Greely 2016-05-30 Within twenty, maybe forty, years most people in developed countries will stop having sex for the purpose of reproduction. Instead, prospective parents will be told as much as they wish to know about the genetic makeup of dozens of embryos, and they will pick one or two for implantation, gestation, and birth. And it will be safe, lawful, and free. In this work of prophetic scholarship, Henry T. Greely explains the revolutionary biological technologies that make this future a seeming inevitability and sets out the deep ethical and legal challenges humanity faces as a result. "Readers looking for a more in-depth analysis of human genome modifications and reproductive technologies and their legal and ethical implications should strongly consider picking up Greely's *The End of Sex and the Future of Human Reproduction*....[It has] the potential to empower readers to make informed decisions about the implementation of advancements in genetics technologies." —Dov Greenbaum, *Science* "[Greely] provides an extraordinarily sophisticated analysis of the practical, political, legal, and ethical implications of the new world of human reproduction. His book is a model of highly informed, rigorous, thought-provoking speculation about an immensely important topic." —Glenn C. Altschuler, *Psychology Today*

Modern Prometheus-Jim Kozubek 2018-04-26 This book tells the dramatic story of Crispr and the potential impact of this gene-editing technology.

The Human Gene Editing Debate-John H. Evans 2020-08-19 In 2018 the first genetically modified babies were reportedly born in China, made possible by the invention of CRISPR technology in 2012. This controversial advancement overturned the pre-existing moral consensus, which had held for over fifty years before: while gene editing an adult person was morally acceptable, modifying babies, and thus subsequent generations, crossed a significant moral line. If this line is passed over, scientists will be left without an agreed-upon ethical limit. What do we do now? John H. Evans here provides a meta-level guide to how these debates move forward and their significance to society. He explains how the bioethical debate has long been characterized as a slippery slope, with consensually ethical use at the top, nightmarish dystopia at the bottom, and specific agreed-upon limits in between, which draw the lines between the ethical and the unethical. Evans frames his analysis around these limits, or barriers. Historically they have existed to guide scientists and to prevent the debate from slipping down the metaphorical slope into unacceptable eugenicist possibilities, such as in Aldous Huxley's novel *Brave New World* or the movie *Gattaca*. Evans examines the history of how barriers were placed, then fell, then replaced by new ones, and discusses how these insights inform where the debate may head. He evaluates other proposed barriers relevant to where we are now, projects that most of the barriers suggested by scientists and bioethicists will not hold, and cautiously identifies a few that could serve as the moral boundary for the next generation. At a critical time in this new era of intervention in the human genome, *The Human Gene Editing Debate* provides a necessary, comprehensive analysis of the conversation's direction, past, present, and future.

Crispr-Wolfgang Hunter 2018-05-18 Brilliant scientists, maniacal Russians, global leaders and paranoid Mennonites populate this prophetic thriller. First discovered only a few years ago, CRISPR could be the answer to mankind's prayers or the cause of civilizations demise. It could cure cancer or kill every human on the planet. CRISPR is unregulated, dirt cheap, and available to anyone with an Internet account and a credit card. This novel will enlighten you, and scare you, like nothing you have ever read.

The Mutant Project-Eben Kirksey 2021-03-03 An anthropologist visits the frontiers of genetics, medicine, and technology to ask: whose values are guiding gene-editing experiments, and what are the implications for humanity? At a conference in Hong Kong in November 2018, Dr. Jiankui He announced that he had created the first genetically modified babies—twin girls named Lulu and Nana—sending shockwaves around the world. A year later, a Chinese court sentenced Dr. He to three years in prison for "illegal medical practice." As scientists elsewhere start to catch up with China's vast genetic research programme, gene editing is fuelling an innovation economy that threatens to widen racial and economic inequality. Fundamental questions about science, health, and social justice are at stake. Who gets access to gene-editing technologies? As countries loosen regulations around the globe, can we shape research agendas to promote an ethical and fair society? Professor Eben Kirksey takes us on a groundbreaking journey to meet the key scientists, lobbyists, and entrepreneurs who are bringing cutting-edge genetic modification tools like CRISPR to your local clinic. He also ventures beyond the scientific echo chamber, talking to doctors, hackers, chronically ill patients, disabled scholars, and activists and who have alternative visions of a genetically modified future for humanity. The Mutant Project empowers us to ask the right questions, uncover the truth, and navigate this new era of scientific enquiry.

Hacking the Code of Life-Nessa Carey 2019-03-07 '[A]n excellent, brisk guide to what is likely to happen as opposed to the fantastically remote.' - Los Angeles Review of Books In 2018 the world woke up to gene editing with a storm of controversy over twin girls born in China with genetic changes deliberately introduced by scientists - changes they will pass on to their own offspring. Genetic modification (GM) has been with us for 45 years now, but the new system known as CRISPR or gene editing can manipulate the genes of almost any organism with a degree of precision, ease and speed that we could only dream of ten years ago. But is it ethical to change the genetic material of organisms in a way that might be passed on to future generations? If a person is suffering from a lethal genetic disease, is it unethical to deny them this option? Who controls the application of this technology, when it makes 'biohacking' - perhaps of one's own genome - a real possibility? Nessa Carey's book is a thrilling and timely snapshot of a cutting-edge technology that will radically alter our futures and the way we prevent disease. 'A focused snapshot of a brave new world.' - Nature 'A brisk, accessible primer on the fast-moving field, a clear-eyed look at a technology that is already driving major scientific advances - and raising complex ethical questions.' - Emily Anthes, *Undark*

CRISPR-Cas-University Jennifer Doudna 2016-03-23 The development of CRISPR-Cas technology is revolutionizing biology. Based on machinery bacteria use to target foreign nucleic acids, these powerful techniques allow investigators to edit nucleic acids and modulate gene expression more rapidly and accurately than ever before. Featuring contributions from leading figures in the CRISPR-Cas field, this laboratory manual presents a state-of-the-art guide to the technology. It includes step-by-step protocols for applying CRISPR-Cas-based techniques in various systems, including yeast, zebrafish, Drosophila, mice, and cultured cells (e.g., human pluripotent stem cells). The contributors cover web-based tools and approaches for designing guide RNAs that precisely target genes of interest, methods for preparing and delivering CRISPR-Cas reagents into cells, and ways to screen for cells that harbor the desired genetic changes. Strategies for optimizing CRISPR-Cas in each system—especially for minimizing off-target effects—are also provided. Authors also describe other applications of the CRISPR-Cas system, including its use for regulating gene activation and repression, and discuss the development of next-generation CRISPR-Cas tools. The book is thus an essential laboratory resource for all cell, molecular, and developmental biologists, as well as biochemists, geneticists, and all who seek to expand their biotechnology toolkits.

The State of Science-Marc Zimmer 2020-07-20 New research and innovations in the field of science are leading to life-changing and world-altering discoveries like never before. What does the horizon of science look like? Who are the scientists that are making it happen? And, how are we to introduce these revolutions to a society in which a segment of the population has become more and more skeptical of science? Climate change is the biggest challenge facing our nation, and scientists are working on renewable energy sources, meat alternatives, and carbon dioxide sequestration. At the same time, climate change deniers and the politicization of funding threaten their work. CRISPR, (Clustered Regularly Interspaced Short Palindromic Repeats) repurposes bacterial defense systems to edit genes, which can change the way we live, but also presents real ethical problems. Optogenetics will help neuroscientists map complicated neural circuitry deep inside the brain, shedding light on treating Alzheimer's and Parkinson's disease. Zimmer also investigates phony science ranging from questionable "health" products to the fervent anti-vaccination movement. Zimmer introduces readers to the real people making these breakthroughs. Concluding with chapters on the rise of women in STEM fields, the importance of US immigration policies to science, and new, unorthodox ways of DIY science and crowdsourcing funding, *The State of Science* shows where science is, where it is heading, and the scientists who are at the forefront of progress.

The Genome Odyssey-Dr. Euan Angus Ashley 2021-02-23 In *The Genome Odyssey*, Dr. Euan Ashley, Stanford professor of medicine and genetics, brings the breakthroughs of precision medicine to vivid life through the real diagnostic journeys of his patients and the tireless efforts of his fellow doctors and scientists as they hunt to prevent, predict, and beat disease. Since the Human Genome Project was completed in 2003, the price of genome sequencing has dropped at a staggering rate. It's as if the price of a Ferrari went from \$350,000 to a mere forty cents. Through breakthroughs made by Dr. Ashley's team at Stanford and other dedicated groups around the world, analyzing the human genome has decreased from a heroic multibillion dollar effort to a single clinical test costing less than \$1,000. For the first time we have within our grasp the ability to predict our genetic future, to diagnose and prevent disease before it begins, and to decode what it really means to be human. In *The Genome Odyssey*, Dr. Ashley details the medicine behind genome sequencing with clarity and accessibility. More than that, with passion for his subject and compassion for his patients, he introduces readers to the dynamic group of researchers and doctor detectives who hunt for answers, and to the pioneering patients who

open up their lives to the medical community during their search for diagnoses and cures. He describes how he led the team that was the first to analyze and interpret a complete human genome, how they broke genome speed records to diagnose and treat a newborn baby girl whose heart stopped five times on the first day of her life, and how they found a boy with tumors growing inside his heart and traced the cause to a missing piece of his genome. These patients inspire Dr. Ashley and his team as they work to expand the boundaries of our medical capabilities and to envision a future where genome sequencing is available for all, where medicine can be tailored to treat specific diseases and to decode pathogens like viruses at the genomic level, and where our medical system as we know it has been completely revolutionized.

Genome Engineering via CRISPR-Cas9 System-Vijai Singh 2020-02-18 Genome Engineering via CRISPR-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 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 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 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 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 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 application of CRISPR-Cas9 systems in basic sciences, biomedicine, virology, bacteriology, molecular biology, neurology, cancer, industry, and many more

Gene Editing-Yuan-Chuan Chen 2019-05-29 Gene-editing technologies (e.g., ZFNs, TALENs, and CRISPRs/Cas9) have been extensively used as tools in basic research. They are further applied in manufacturing agricultural products, food, industrial products, medicinal products, etc. Particularly, the discovery of medicinal products using gene-editing technologies will open a new era for human therapeutics. Though there are still many technical and ethical challenges ahead of us, more and more products based on gene-editing technologies have been approved for marketing. These technologies are promising for multiple applications. Their development and implications should be explored in the broadest context possible. Future research directions should also be highlighted. In this book, the applications, perspectives, and challenges of gene-editing technologies are significantly demonstrated and discussed.

How to build a dragon or dietrying, as a satirical look at cutting-edge science-Knoepfler Paul 2019-06-25 What if you could have your own real dragon? While that might seem like just a fantasy, today cutting-edge science has brought us to the point where it might really be possible. This book looks into the possibilities of making living, fire-breathing dragons. The world has been fascinated with dragons for thousands of years. Fictional dragons still have a firm place in pop culture, such as Smaug from *The Hobbit* as well as the dragons in *Game of Thrones* and in the *How to Train Your Dragon* movies. This new book discusses using powerful technologies such as CRISPR gene editing, stem cells, and bioengineering to make real dragons. It also goes through what useful information we can learn from animals such as Pteranodons and amazing present-day creatures in our quest to build actual dragons. The book goes on to discuss the possibility of building other mythical creatures such as unicorns and mermaids. Overall, *How to Build A Dragon* is also meant as a satirical look at cutting-edge science, and it pokes fun at science hype. Anyone who is interested in dragons or cutting-edge science will enjoy this book! It is written in a humorous, approachable way making science fun and easy to understand, including for young adults. The author is well-known scientist Paul Knoepfler who is familiar to the public for his TED talk on designer babies with more than 1.3 million contributions to lay stories on new science concepts such as stem cells and CRISPR. He is also known for his TED x on designer babies with more than 1.3 million views, and his two books — . The co-author, his daughter Julie Knoepfler, is a high school student interested in science and writing. She has her own blog on literary and film analysis, and enjoys taking a humorous look at culture through writing.

Neuroethics-Martha J. Farah 2010 Neuroethics : an overview -- Better brains -- Brain, self, and authenticity -- Brain reading -- Neuroscience and justice -- Brains and persons.

Redesigning Life-John Parrington 2016-08-25 Since the birth of civilisation, human beings have manipulated other life-forms. We have selectively bred plants and animals for thousands of years to maximize agricultural production and cater to our tastes in pets. The observation of the creation of artificial animal and plant variants was a key stimulant for Charles Darwin's theory of evolution. The ability to directly engineer the genomes of organisms first became possible in the 1970s, when the gene for human insulin was introduced into bacteria to produce this protein for diabetics. At the same time, mice were modified to produce human growth hormone, and grew huge as a result. But these were only our first tuddering steps into the possibilities of genetic engineering. In the past few years, the pace of progress has accelerated enormously. We can now cut and paste genes using molecular scissors with astonishing ease, and the new technology of genome editing can be applied to practically any species of plants or animals. 'Mutation chain reaction' can be used to alter the genes of a population of pests, such as flies; as the modified creatures breed, the mutation is spread through the population, so that within a few generations the organism is almost completely altered. At the same time, scientists are also beginning to synthesize new organisms from scratch. These new technologies hold much promise for improving lives. Genome editing has already been used clinically to treat AIDS patients, by genetically modifying their white blood cells to be resistant to HIV. In agriculture, genome editing could be used to engineer species with increased food output, and the ability to thrive in challenging climates. New bacterial forms may be used to generate energy. But these powerful new techniques also raise important ethical dilemmas and potential dangers, pressing issues that are already upon us given the speed of scientific developments. To what extent should parents be able to manipulate the genetics of their offspring - and would designer babies be limited to the rich? Can we effectively weigh up the risks from introducing synthetic lifeforms into complex ecosystems? John Parrington explains the nature and possibilities of these new scientific developments, which could usher in a brave, new world. We must rapidly come to understand its implications if we are to direct its huge potential to the good of humanity and the planet.

CRISPR Gene Editing-Yonglun Luo 2019-04-23 This detailed volume guides readers through strategic planning and user-friendly guidelines in order to select the most suitable CRISPR-Cas system and target sites with high activity and specificity. Methods covering CRISPR gRNA design, CRISPR delivery, CRISPR activity quantification (indel quantification), and examples of applying CRISPR gene editing in human pluripotent stem cells, primary cells, gene therapy, and genetic screening are included. Written for the highly successful *Methods in Molecular Biology* series, chapters include introductions to their respective topics, lists of the necessary materials and reagents, step-by-step, readily reproducible laboratory protocols, and tips on troubleshooting and avoiding known pitfalls. Authoritative and invaluable, *CRISPR Gene Editing: Methods and Protocols* will assist undergraduates, graduates, and researchers with detailed guidelines and methods for the vitally important CRISPR gene editing field. Chapter 3 is available open access under a CC BY 4.0 license via link.springer.com.

CRISPR-Cas Systems-Rodolphe Barrangou 2012-12-13 CRISPR/Cas is a recently described defense system that protects bacteria and archaea against invasion by mobile genetic elements such as viruses and plasmids. A wide spectrum of distinct CRISPR/Cas systems has been identified in at least half of the available prokaryotic genomes. On-going structural and functional analyses have resulted in a far greater insight into the functions and possible applications of these systems, although many secrets remain to be discovered. In this book, experts summarize the state of the art in this exciting field.

Hacking Darwin-Jamie Metzl 2019-04-23 "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?

Gene Drives on the Horizon-National Academies of Sciences, Engineering, and Medicine 2016-08-28 Research on gene drive systems is rapidly advancing. Many proposed applications of gene drive research aim to solve environmental and public health challenges, including the reduction of poverty and the burden of vector-borne diseases, such as malaria and dengue, which disproportionately impact low and middle income countries. However, due to their intrinsic qualities of rapid spread and irreversibility, gene drive systems raise many questions with respect to their safety relative to public and environmental health. Because gene drive systems are designed to alter the environments we share in ways that will be hard to anticipate and impossible to completely roll back, questions about the ethics surrounding use of this research are complex and will require very careful exploration. *Gene Drives on the Horizon* outlines the state of knowledge relative to the science, ethics, public engagement, and risk assessment as they pertain to research directions of gene drive systems and governance of the research process. This report offers principles for responsible practices of gene drive research and related applications for use by investigators, their institutions, the research funders, and regulators.

How to Grow a Human-Philip Ball 2019-10-16 Two summers ago, scientists removed a tiny piece of flesh from Philip Ball's arm and turned it into a rudimentary "mini-brain." The skin cells, removed from his body, did not die but were instead transformed into nerve cells that independently arranged themselves into a dense network and communicated with each other, exchanging the raw signals of thought. This was life—but whose? In his most mind-bending book yet, Ball makes that disconcerting question the focus of a tour through what scientists can now do in cell biology and tissue culture. He shows how these technologies could lead to tailor-made replacement organs for when we fail, to new medical advances for repairing damage and assisting conception, and to new ways of "growing a human." For example, it might prove possible to turn skin cells not into neurons but into eggs and sperm, or even to turn oneself into the constituent cells of embryos. Such methods would also create new options for gene editing, with all the attendant moral dilemmas. Ball argues that such advances can therefore never be about "just the science," because they come already surrounded by a host of social narratives, preconceptions, and prejudices. But beyond even that, these developments raise questions about identity and self, birth and death, and force us to ask how mutable the human body really is—and what forms it might take in years to come.

Life's Edge-Carl Zimmer 2021-03-09 "Carl Zimmer is one of the best science writers we have today." —Rebecca Skloot, author of *The Immortal Life of Henrietta Lacks* We all assume we know what life is, but the more scientists learn about the living world—from protocols to brains, from zygotes to pandemic viruses—the harder they find it is to locate life's edge. Carl Zimmer investigates one of the biggest questions of all: What is life? The answer seems obvious until you try to seriously answer it. Is the apple sitting on your kitchen counter alive, or is only the apple tree it came from deserving of the word? If we can't answer that question here on earth, how will we know when and if we discover alien life on other worlds? The question hangs over some of society's most charged conflicts—whether a fertilized egg is a living person, for example, and when we ought to declare a person legally dead. Life's Edge is an utterly fascinating investigation that no one but one of the most celebrated science writers of our generation could craft. Zimmer journeys through the strange experiments that have attempted to re-create life. Literally hundreds of definitions of what that should look like now exist, but none has yet emerged as an obvious winner. Lists of what living things have in common do not add up to a theory of life. It's never clear why some items on the list are essential and others not. Coronaviruses have altered the course of history, and yet many scientists maintain they are not alive. Chemists are creating droplets that can swarm, sense their environment, and multiply. Have they made life in the lab? Whether he is handling pythons in Alabama or searching for hibernating bats in the Adirondacks, Zimmer reveals in astounding examples of life at its most bizarre. He tries his own hand at evolving life in a test tube with unerving results. Charting the obsession with Dr. Frankenstein's monster and how Coleridge came to believe the whole universe was alive, Zimmer leads us all the way into the labs and minds of researchers working on engineering life from the ground up.

CRISPR-Xin Wang 2017-12 Genome editing using CRISPR has been identified as one breakthrough technology in recent research. Today, it is difficult to open a journal or a newspaper without reading about the application of CRISPR gene editing technology to basic research, public health, therapeutics or diagnostics. Although some problems of CRISPR remain to be solved, such as bio-safety and ethical issues, it may change peoples futures. This book is to meet the needs of basic molecular biochemists, pharmacologists, medical students, clinical practitioners and scientists, as well as a broad spectrum of readers who wish to understand the advances in research and applications of CRISPR. The contributing authors are basic scientists as well as students who major in biochemistry and pharmacology. The book presents the current research in the CRISPR model, focusing on its advances and applications. Topics discussed in this compilation include: Targeting of hepatic diseases using CRISPR; applications and advances of CRISPR in animal models; gene targeting on the Cyp2c Locus in rats via CRISPR; applications of CRISPR for therapy in human genetic diseases; utilization of CRISPR in gene function and drug target validation; applications of CRISPR in plant genome editing; and genome editing on human embryos using CRISPR.

The Alchemy of Us-Ainissa Ramirez 2020-03-03 In the bestselling tradition of *Stuff Matters* and *The Disappearing Spoon*: a clever and engaging look at materials, the innovations they made possible, and how these technologies changed us. In *The Alchemy of Us*, scientist and science writer Ainissa Ramirez examines eight inventions—clocks, steel rails, copper communication cables, photographic film, light bulbs, hard disks, scientific labware, and silicon chips—and reveals how they shaped the human experience. Ramirez tells the stories of the woman who sold time, the inventor who inspired Edison, and the hotheaded undertaker whose invention pointed the way to the computer. She describes, among other things, how our pursuit of precision in timepieces changed how we sleep; how the railroad helped commercialize Christmas; how the necessary brevity of the telegram influenced Hemingway's writing style; and how a young chemist exposed the use of Polaroid's cameras to create passports to track black citizens in apartheid South Africa. These fascinating and inspiring stories offer new perspectives on our relationships with technologies. Ramirez shows not only how materials were shaped by inventors but also how those materials shaped culture, chronicling each invention and its consequences—intended and unintended. Filling in the gaps left by other books about technology, Ramirez showcases little-known inventors—particularly people of color and women—who had a significant impact but whose accomplishments have been hidden by mythmaking, bias, and convention. Doing so, she shows us the power of telling inclusive stories about technology. She also shows that innovation is universal—whether it's splicing beats with two turntables and a microphone or splicing genes with two test tubes and CRISPR.

The Genome War-James Shreeve 2007-12-18 The long-awaited story of the science, the business, the politics, the intrigue behind the scenes of the most ferocious competition in the history of modern science—the race to map the human genome. On May 10, 1998, biologist Craig Venter, director of the Institute for Genomic Research, announced that he was forming a private company that within three years would unravel the complete genetic code of human life—seven years before the projected finish of the U.S. government's Human Genome Project. Venter hoped that by decoding the genome ahead of schedule, he would speed up the pace of biomedical research and save the lives of thousands of people. He also hoped to become very famous and very rich. Calling his company Celera (from the Latin for "speed"), he assembled a small group of scientists in an empty building in Rockville, Maryland, and set to work. At the same time, the leaders of the government program, under the direction of Francis Collins, head of the National Human Genome Research Institute at the National Institutes of Health, began to mobilize an unexpectedly unified effort to beat Venter to the prize—knowledge that had the potential to revolutionize medicine and society. The stage was set for one of the most thrilling—and important—dramas in the history of science. The Genome War is the definitive account of that drama—the race for the greatest prize biology has had to offer, told by a writer with exclusive access to Venter's operation from start to finish. It is also the story of how one man's ambition created a scientific Camelot where, for a moment, it seemed that the competing interests of pure science and commercial profit might be gloriously reconciled—and the national repercussions that resulted when that dream went awry.

International Law and the Future of Freedom-John H. Barton 2014-04-16 International Law and The Future of Freedom is the late John Barton's exploration into ways to protect our freedoms in the new global international order. This book forges a unique approach to the problem of democracy deficit in the international legal system as a whole—looking at how international law concretely affects actual governance. The book draws from the author's unparalleled mastery of international trade, technology, and financial law, as well as from a wide array of other legal issues, from espionage law, to international criminal law, to human rights law. The book defines the new and changing needs to assert our freedoms and the appropriate international scopes of our freedoms in the context of the three central issues that our global system must resolve: the balance between security and freedom, the balance between economic equity and opportunity, and the balance between community and religious freedom. Barton explores the institutional ways in which those rights can be protected, using a globalized version of the traditional balance of powers division into the global executive, the global legislature, and the global judiciary.

Genetics & Health-Em Tansey 2017

Blueprint-Robert Plomin 2019-07-02 A top behavioral geneticist makes the case that DNA inherited from our parents at the moment of conception can predict our psychological strengths and weaknesses. In *Blueprint*, behavioral geneticist Robert Plomin describes how the DNA revolution has made DNA personal by giving us the power to predict our psychological strengths and weaknesses from birth. A century of genetic research shows that DNA differences inherited from our parents are the consistent lifelong sources of our psychological individuality—the blueprint that makes us who we are. Plomin reports that genetics explains more about the psychological differences among people than all other factors combined. Nature, not nurture, is what makes us who we are. Plomin explores the implications of these findings, drawing some provocative conclusions—among them that parenting styles don't really affect children's outcomes once genetics is taken into effect. This book offers readers a unique insider's view of the exciting synergies that came from combining genetics and psychology. The paperback edition has a new afterword by the author.

Loneliness-John T. Cacioppo 2009 A pioneering neuroscientist draws on detailed studies to demonstrate the correlation between social environments and health, offering insight into the differences between chronic loneliness and depression while explaining how social isolation can affect perceptions, behavior, and physiology. Reprint.

Viruses, Pandemics, and Immunity-Arup K. Chakraborty 2021-02-16 "Informed and accessible overview of viruses and pandemics, how our immune system combats

them, and how diagnostic tests, vaccines, and antiviral therapies work to form the foundation of public health"--

The Science of Human Perfection-Nathaniel Comfort 2012-09-25 A thoughtful new look at the entwined histories of genetic medicine and eugenics, with probing discussion of the moral risks of seeking human perfection

Regenesis-George M. Church 2014-04-08 "Bold and provocative... Regenesis tells of recent advances that may soon yield endless supplies of renewable energy, increased longevity and the return of long-extinct species."—New Scientist In *Regenesis*, Harvard biologist George Church and science writer Ed Regis explore the possibilities—and perils—of the emerging field of synthetic biology. Synthetic biology, in which living organisms are selectively altered by modifying substantial portions of their genomes, allows for the creation of entirely new species of organisms. These technologies—far from the out-of-control nightmare depicted in science fiction—have the power to improve human and animal health, increase our intelligence, enhance our memory, and even extend our life span. A breathtaking look at the potential of this world-changing technology, *Regenesis* is nothing less than a guide to the future of life.

DNA-James D. Watson 2017 Updated to include new findings in gene editing, epigenetics, agricultural chemistry, as well as two new chapters on personal genomics and cancer research

Git-R-Done-Larry the Cable Guy 2005-10-11 *Git-R-Done* is chock-full of fart jokes and straight talk about America. I sat down one day and said to myself, "Larry, you've done it all. You've got three gold records, a successful DVD, a hit TV show, a picture of Shania Twain givin' ya the finger, and most important, the high score on Frogger. What more could you possibly do?" Then I started thinking about writing a book. I wanted mostly to write *Git-R-Done* for all those good Americans who just wanna laugh like I do. Come on inside and hear me make fun of Janet Reno, Rosie O'Donnell, and my fat sister, who caused a twelve-tray pileup in front of the caramel nut rolls at the country buffet. I'm gonna tell you why Dick Trickle is my hero, why we need to get back to good ol' common sense, and why I prefer a picture of the Last Supper with NASCAR drivers as the disciples over just about anything. Lord, I apologize! The book will go down in history as one of America's most important events since the breakup of Aldo Nova. Even my mom liked the book—here's what she said: "There's really not much I can say here except for I apologize to everyone ahead of time for the crap you are about to read." *Git-R-Done* is just plain funny, I don't care who ya are! Also available as an eBook.