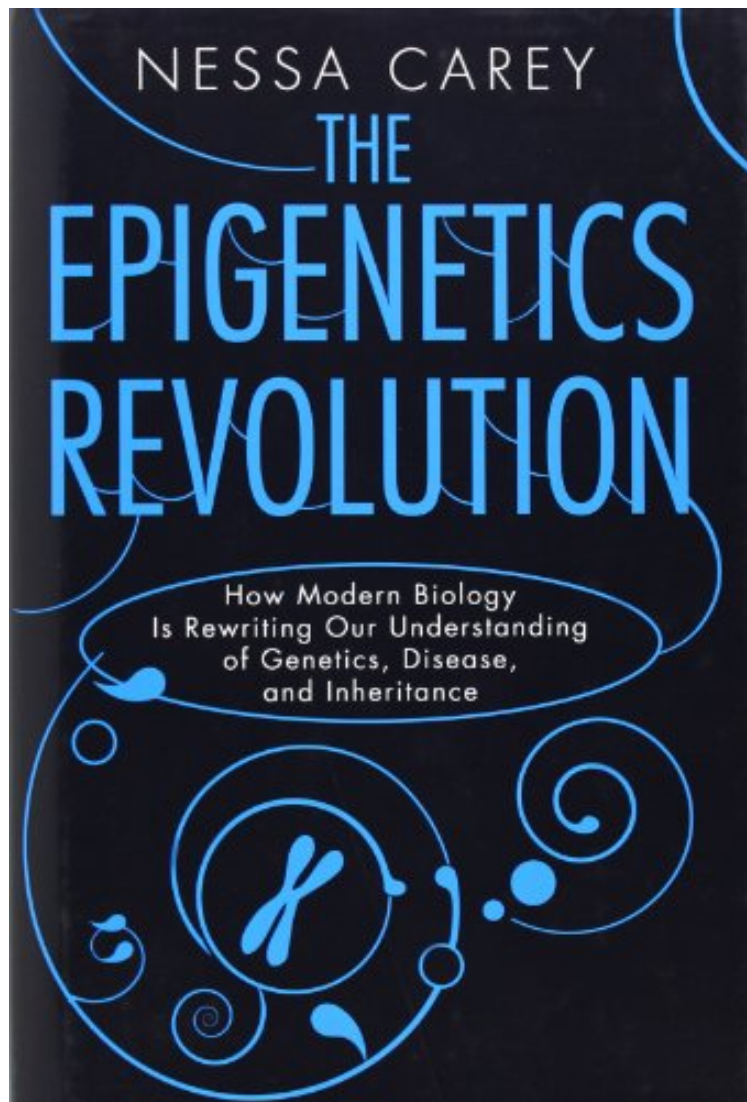


[Free read ebook] The Epigenetics Revolution: How Modern Biology Is Rewriting Our Understanding of Genetics, Disease, and Inheritance

The Epigenetics Revolution: How Modern Biology Is Rewriting Our Understanding of Genetics, Disease, and Inheritance

Nessa Carey

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Nessa Carey : The Epigenetics Revolution: How Modern Biology Is Rewriting Our Understanding of Genetics, Disease, and Inheritance before purchasing it in order to gauge whether or not it would be worth my time, and all praised The Epigenetics Revolution: How Modern Biology Is Rewriting Our Understanding of Genetics, Disease, and Inheritance:

4 of 5 people found the following review helpful. Worth reading twice, at least. By Andrew K. Galloway I obtained this book via interlibrary loan. After reading and a couple days reflection, I ordered the book from . Oscar Wilde once said that a book not worth reading twice is probably not worth reading once. I strongly feel this book passes the OW test with flying colors. I did not understand everything I read but, so what? I understood the general idea and since I have followed the so-called Human Genome revolution, it has certainly modified and vastly improved my understanding of life, all life. It should also be remembered that science is moving very fast in recent decades and, there will, no doubt, be better and more knowledge via the bio revolution in the years to come. Do not depend on the media and TV to keep you abreast of these developments. TV hype and limited time cannot even scratch the surface if you want even a basic understanding of this and other, complex subjects. Francis Crick boasted of having discovered the "Secret of Life" when he, a physicist, discovered the shape of the DNA molecule. It was a great discovery, but thinking that it, and it alone was the Secret of Life is an exaggeration. Followed, of course by similar claims when the human genome was fully mapped. A note of caution based on such claims might be that, we should not, think, that epigenetics is the final answer to our struggle to understand LIFE, per se, in its totality. We may never get to that point but efforts should never cease and we are lucky indeed to have such writers as Nessa Carey to give us a ring side seat into watching these developments unfold. Thank you Nessa.

1 of 1 people found the following review helpful. On the slightly negative I found some portions of the book more detailed than I would like. The read was very worthwhile. By John T This book is an eye opener. I have known about epigenetics from earlier magazine articles in New Science, but so little was known at that time and I guess it was time to get an update. It seems that genetics only tell some of the story and it takes genes plus epigenetics to make phenotypes. It is an unfolding story. The "temporary" modifications to DNA and Histones are a big part of the unfolding story of life. On the slightly negative I found some portions of the book more detailed than I would like. The read was very worthwhile!

7 of 8 people found the following review helpful. A little steep for the non-technical reader. By Daniel N. Lionsden One reviewer on the back cover said that Nessa Carey's "book combines an easy style with a textbook's thoroughness....A bold attempt to bring epigenetics to a wide audience." While it is an easy style, it is not an easy read. It becomes very technical in some parts. Her writing is seasoned with occasional light-hearted quips and plenty of interesting narratives. Maybe her book could have been made more user-friendly for the layman if she had put the very technical material in appendices and kept the warm, friendly chats in the main text. Such a tactic might help the less-technically-minded reader peruse her book if her intent was to capture a wide audience. Is it possible that acquired characteristics can be inherited to the third, or even the fourth generation? Carey thinks so. She quotes Exodus 20:5, "For I, the Lord your God, am a jealous God, punishing the children for the sins of the fathers to the third and fourth generation of those who hate me Exodus," as a segue for chapter 6, "The Sins of the Fathers." She assures the reader that acquired characteristic can be passed on to several generations of offspring. In a narrowly defined sense, Lamarck was correct. Biology professors taught me that Lamarck was wrong, that acquired characteristics were not passed from parents to offspring, and that all inherited traits were based strictly and squarely on DNA. Nessa Carey insists "that for some very specific situations Lamarckian inheritance is taking place, and we have a handle on the molecular mechanism behind it." (p. 110) The mechanism of epigenetics involves the methylation of DNA or histones. Methylation involves the attachment of a methyl group (-CH₃) to the target molecule. There is also acetylation, phosphorylation, and other chemical modifications of DNA or histones that moderate the activity of genes. On her website, Carey explains epigenetics this way: "Every time we see two things which are genetically identical, but which aren't the same, we're seeing epigenetics in action. This affects huge amounts of life on earth and has a big impact on human health. The science is weird, heretical and fascinating." You have probably heard, "You are what you eat." In the case of honeybees, this is undoubtedly true. Carey explains how queen bees become queens and how worker bees (also female) become workers. She says that a virgin queen mates with several male bees (drones) before settling down to produce a hive of new bees. The drones usually come from other hives and very seldom from the same hive as the virgin queen. Nevertheless, a hive contains thousands of genetically identical bees. (p. 283) Of course, there are thousands of others that are genetically different from the group that is identical. Nevertheless, how does a larval bee become a queen rather than a worker? Dr. Carey explains that young worker bees (nurse bees) feed all honeybee larvae royal jelly for the first three days after hatching. After that time, nurse bees feed royal jelly to only the larvae that are to become queens. She says that no one understands why the nurse bees continue to feed royal jelly to only a few of the larvae. Who decides which larvae should become queens? Maybe there is some genetic or epigenetic tag that clues the worker bees. Carey doesn't suggest this. The pattern of early feeding completely determines whether a larva will develop into a worker or into a queen. This scenario "just SHRIEKS epigenetics," remarks Carey [emphasis added]. I thought her discussion about rat babies who received much maternal care vs. the babies of mother rats who were lackadaisical at licking and grooming was very interesting. The well-nurtured babies became well-adjusted, calmer adults, while the less-nurtured babies became stressed-out adults. Carey describes several experiments that rule out purely genetic and psychological outcomes of maternal care. One might suppose that giving a juvenile rat a nurturing environment might improve the laid-back response to stress, but Carey leaves no doubt that good nurturing during the first week of a rat's life causes epigenetic changes. She said that "being licked and groomed by the mother set off a chain of events that led to epigenetic changes

in the cortisol receptor gene." (p. 241)She explains how experimenters determined this. For instance, baby rats that had nurturing mothers were switched to lackadaisical mothers after the first week of life. These babies still displayed the calmer, laid-back traits when subjected to stress as adults. Babies of lackadaisical mothers were switched to nurturing mothers, and they became stressed-out adults. Dr. Carey examined the relationship between various diseases and epigenetic events. Is it possible that cancers could be cured if the right promoter regions of genes were methylated or demethylated? She explains that trying to prevent cancer via epigenetic modification could create worse problems for the patient. Even using epigenetics to promote longevity might actually cause cancer and early death. The relationships in genetics and epigenetics are finely tuned, and as a creationist, I see the interdependent relationships as indicators of God's handiwork. Carey sees the same things as products of a long process of evolution. Carey, like most evolutionists, believes that evolution produced the epigenetic systems. Presumably, because her book is about epigenetics and not evolution, she doesn't back up her occasional claims that epigenomes evolved. On the other hand, Thomas Woodward and James Gills claim the epigenome was designed in their book *The Mysterious Epigenome: What Lies Beyond DNA*.

Epigenetics can potentially revolutionize our understanding of the structure and behavior of biological life on Earth. It explains why mapping an organism's genetic code is not enough to determine how it develops or acts and shows how nurture combines with nature to engineer biological diversity. Surveying the twenty-year history of the field while also highlighting its latest findings and innovations, this volume provides a readily understandable introduction to the foundations of epigenetics. Nessa Carey, a leading epigenetics researcher, connects the field's arguments to such diverse phenomena as how ants and queen bees control their colonies; why tortoiseshell cats are always female; why some plants need cold weather before they can flower; and how our bodies age and develop disease. Reaching beyond biology, epigenetics now informs work on drug addiction, the long-term effects of famine, and the physical and psychological consequences of childhood trauma. Carey concludes with a discussion of the future directions for this research and its ability to improve human health and well-being.

Anyone seriously interested in who we are and how we function should read this book. (Peter Forbes *The Guardian*) Nessa Carey takes us on a lively and up-to-date tour of what's known about epigenetic mechanisms and their implications for ageing and cancer. (Laurence Hurst, *University of Bath Focus Magazine*) [Nessa Carey's] book combines an easy style with a textbook's thoroughness.... A bold attempt to bring epigenetics to a wide audience. (Jonathan Weitzman *Nature*) Carey's report on the rapidly developing state of epigenetics research may help nonscientists with public-policy, investment, and health-care decisions. (Booklist) An exhilarating exploration of an exciting new field, and a good gift for a bright biology student looking for a career choice. (Kirkus) An enlightening introduction to what scientists have learned in the past decade about [epigenetics]. (Carl Zimmer *The Wall Street Journal*) This book provides an excellent introduction to a fascinating new field that may revolutionize our understanding of human health and disease. Highly recommended. (Library Journal) A must-read for every intelligent person who likes to know what is going on in modern science. (Graham Storrs *New York Journal of Books*) [Carey] provides an excellent and largely accurate account of a fascinating and fast-moving area of modern biology. (Jonathan Hodgkin *Times Literary Supplement*) Written in an engaging manner using everyday metaphors to clarify complex concepts and utilizing well-defined diagrams, the author has produced an outstanding book with her wit and expertise. (Rita Hoots *NSTA Recommends* (National Science Teachers Association)) [A] mercifully clear writer. (Katharine Whitemore *The Boston Globe*) About the Author Nessa Carey is a visiting professor at Imperial College in London and currently works in the biotechnology and pharmaceutical industries, where she has specialized in epigenetics for nearly a decade. She has strong relationships with leading epigenetics researchers, medical labs in Europe, and with some of the most prestigious institutions in the United States, including the Harvard Medical School, the MD Anderson Cancer Center, and the Wistar Institute.