

REVIEWS OF

Why We Get Sick: The New Science of Darwinian Medicine

by George C. Williams, Ph.D. and Randolph M. Nesse,

M.D. Times Books, 1995 ISBN: 0-8129-2224-7

By specialists and ordinary readers.

- "This is the most important book written about issues in biomedicine in the last fifty years. When the world's leading evolutionary biologist (Williams) teams up with a thoughtful physician (Nesse), the product is a gripping exploration of why our bodies respond the way they do to injury and disease."
—Michael S. Gazzaniga, Ph.D.,
director, Center for Neuroscience,
University of California at Davis
- "Every so often, a book comes along that has power to change the way we live and die.
[This splendid book is one, and it could well revolutionize the way physicians are taught, the way they practice, and even the way parents watch over their child with a fever or a cough.](#)"
—Professor Robert Ornstein,
author of *The Psychology of Consciousness*
- " *Why We Get Sick* is certain to be recognized as [one of the most important books of the decade](#), and what's more, it's beautifully written"
—Roger Lewin
Author of Human Evolution, 3rd Edition
- "By bringing the evolutionary vision systematically into one of the last unconquered provinces, Nesse and Williams have devised not only means for the improvement of medicine but [fundamental new insights](#) into the human condition."
—Edward O. Wilson. Harvard University
- "[Buy two copies and give one to your doctor.](#)"
—Richard Dawkins, author of *The Selfish Gene*
- "Darwinian medicine . . . holds that there are evolutionary explanations for human disease and physical frailties, just as for everything else in biology, and that [these insights can inspire better treatments](#). In *Why We Get Sick* ... two proponents of Darwinian medicine lay out the ambitious reach of the adventurous [new science](#)"
— *The New York Times Magazine*

- "Would you accept that eating certain kinds of red meat could help ward off heart attacks? That taking aspirin when you are sick could make things worse? That mothers should sleep right next to infants to prevent sudden infant death? You might after hearing how your prehistoric ancestors lived, according to a small but growing tribe of 'Darwinian medicine' thinkers. They argue that [for too long physicians have ignored the forces that shaped us over evolutionary eons. . . . Such ideas are . . . controversial, but that's the point.](#)"

— *Wall Street Journal*

- "*Why We Get Sick* offers both [a provocative challenge to medicine](#) and a thoughtful discussion of how evolutionary theory applies to people."

—*Business Week*

- **From Publishers Weekly**

Nesse and Williams have written a lively discourse on the application of the principles of evolutionary biology to the dilemmas of modern medicine. Nesse, a physician and an associate professor of psychiatry, and Williams, a professor of ecology and evolution, provide a primer on Darwin's theory of natural selection. They explain that the functional design of organisms-e.g., our bodies-may suggest new ways of addressing illness. The book begins with a look at the causes of disease and their evolutionary influences. But the book mainly assesses the concept of adaptation by natural selection, and illustrates the ways Darwinian thinking can be applied to medical problems. As one example, the authors examine the use of penicillin over the past 60 years against bacterial infections. [The book's quirky information may speak to a broad audience: researchers](#), for instance, have found that relatives of schizophrenics have an unusually high frequency of inclusion in Who's Who-which may counterbalance drawbacks of the disorder in evolutionary terms. The tendency toward child abuse, too, may be influenced, the authors say, by evolution and the passing on of genes. And there may well be an evolutionary reason to welcome morning sickness, they argue: nausea and food aversions during pregnancy apparently evolved to impose dietary restrictions on the mother so as to correspond with fetal vulnerability and, thereby, minimize fetal exposure to food toxins.

- **From Library Journal**

Offering [new insights on the failure of evolution to eradicate disease](#), psychiatrist Nesse and ecologist Williams offer numerous suggestions on why certain seemingly negative traits have not been eliminated through natural selection. A brief discussion of the basics of evolution is provided, along with examples of how the theory of natural selection may relate to aging, cancer, allergies, and other diseases. One particularly intriguing chapter is devoted to the possibility of an evolutionary contribution to psychological disorders such as excessive anxiety or depression. Marc Lappe's recent

Evolutionary Medicine: Rethinking the Origins of Disease (LJ 10/15/94) conveys a similar message on [the increasing need to consider evolutionary principles in the treatment of disease](#). Both books are thought-provoking and worthy purchases, but librarians interested in a slightly less technical narrative may prefer *Why We Get Sick*.

—Tina Neville,

Univ. of South Florida at St. Petersburg Lib.

- **From Booklist**

Although they realize that evolution selects not for health but for reproductive success, the Darwinian physicians of Nesse and Williams' trope see the body as "a bundle of careful compromises." These Darwinians also see trouble-causing genes as those that combine good and bad features because they have not adapted completely from their Stone Age purposes to the diverse demands of today's environment and ways of living. Physicians should look for the evolutionary, not the proximate, causes of disease, Darwinians say. For example, the gene that causes sickle-cell anemia, which is most often seen in malaria-ridden areas, actually protects the individual who has it from malaria (and now, apart from in areas endangered by malaria, this gene is decreasing in frequency). When physicians look at allergy, cancer, even mental diseases, through Darwinian eyes they see and, Nesse and Williams say, will increasingly [see medical problems in a new and thought-provoking light](#). *Why We Get Sick* deserves pondering by both physicians and laypersons.

— William Beatty

- *Why We Get Sick: The New Science of Darwinian Medicine*

Review by **Niraj Mistry**

The book, *Why We Get Sick: The New Science of Darwinian Medicine* is the result of the collaboration of two great evolutionists: Randolph M. Nesse and George C. Williams. Nesse is a practicing physician and associate professor of psychiatry at the University of Michigan Medical School and Williams is a professor emeritus of ecology and evolutionary biology at the State University of New York at Stony Brook. Together they have put forth a very compelling case for [the usefulness of evolutionary thought in modern medicine](#). [This book is extremely readable and stimulating and is bound to make one look at illness in new light](#).

The introductory chapters are written in a very clear and non technical way, offering a primer on the basic principles of evolutionary biology, an area that has been sorely neglected by the medical profession. The authors then go on to their main premise: that diseases must be understood from the perspective of evolutionary biology. [This new view of thinking emphasizes not only how diseases occur, but also why they continue to exist and have not been eradicated by natural selection](#). This theme is explored by identifying and explaining how an adaptation or trait serves

its purpose, and how both genes and the environment influence this outcome. Throughout the book it is stressed that these explanations can and should be tested.

Many hypotheses are provided, some supported with empirical evidence, of the major causes of diseases including: defenses, infection, novel environments, genes, design compromises and evolutionary legacies.

After the introduction, the next chapter provides an explanation of the functional approach to the signs and symptoms of disease. For example, the authors address how a fever can be beneficial as it raises body temperature to interfere with the chemistry of some pathogens, thereby killing them. Nesse and Williams state that in some cases medications may not be required to reduce fever and may in fact prolong the time of illness. Thus, it is important to make a distinction between the defensive mechanisms of our body and those that are not.

Accordingly, the book proceeds to explore the perpetual arms race between hosts and parasites, including bacteria and viruses.

Microorganisms evolve very quickly, often changing more in a single day than the entire human race can in a thousand years.

This grossly unfair handicap has left humans in an ever-lasting struggle with bacteria and viruses despite our highly effective immune system. In this case, the authors address the improper management of bacterial infections with penicillin and the reemergence of tuberculosis and other infectious diseases in more-resistant-to-treatment and deadlier forms that result from a swift evolution. Every individual needs to come to grips with evolutionary biology or risk becoming a victim of it.

Nesse and Williams then continue by exploring how some of our health problems may be the result of evolutionary hangovers from the Environment of Evolutionary Adaptation (EEA) back in the Stone Age. For example, dyslexia was not a problem in the past as there were no books to read.

However, it may have been advantageous because it allowed a quicker, better understanding of the objects being viewed since dyslexics process information in different areas of the brain than do non-dyslexics. Furthermore, our predisposition to eat too much fat or drink too much alcohol may be explained by the scarcity of these consumables in the EEA, when it made sense to have as much as possible when these were available.

These are examples of illnesses caused by our "novel (modern) environment," for which our 'Stone Age' bodies are not adapted.

The next chapter examines diseases that are influenced by the modern environment and genetics, such as myopia. Nesse and Williams show that while genetically influenced, the modern environment, especially the reading of books, is the cause of the epidemic of myopia that modern humans experience.

However, it is also possible that myopia is an adaptive characteristic under certain conditions where those who concentrated on things small and up-close might well identify and process food sources overlooked by others.

The final few sections are more thought-provoking and depict the mechanisms involved in illness and health in a new light.

First, the authors argue that an allergic reaction, characterized by an over-active immune system, operates on the principle that an overreaction to something harmless is better than an underreaction to a real threat. By analogy, jumping and fleeing at the sight of a rope lying on the ground may be a little embarrassing since the rope is not a snake, but this little harmless error is better than being too slow to escape from the danger a real snake may present itself. Following this topic, the issue of cancer is addressed and specifically the rationale for cancers of female reproductive organs. From a historical perspective, these cancers are less common in women that have a 'Stone Age' life pattern with late menarche, early menopause and an overall lower number of menstrual periods than average. Next, the authors postulate that there may also be an evolutionary reason to welcome morning sickness. Nesse and Williams provide evidence that nausea and food aversions during pregnancy have evolved to impose dietary restrictions on the mother so as to correspond with periods of fetal vulnerability and thereby minimize fetal exposure to food toxins. Finally, a particularly intriguing chapter examines the possibility of an evolutionary contribution to psychological disorders such as excessive anxiety or depression.

Overall, *Why We Get Sick* offers a novel way of thinking about health and illness. The authors do not argue that evolution is the main cause of why we have certain diseases, but they have done a brilliant job in exploring this side of the argument.

Through a carefully detailed and lively discourse, the authors have applied evidence and insights from the principles of evolutionary biology to the dilemmas of modern medicine. Their framework is well organized and stimulates readers to consider how an evolutionary perspective can shed light on a multitude of problems. Many physicians are not familiar with this standpoint and thus Nesse and Williams encourage students and physicians to study more genetics and evolutionary biology to look for the evolutionary and not the proximate causes of disease.

As physicians it is essential that one explore an evolutionary approach for the successful understanding and treatment of disease.

- **Review: Why We Get Sick**

(Published in the UK as 'Evolution and Healing')

From: **Margaret Henderson** at CSHL Library

I just finished reading the following book and I wanted to let others know about it.

This book is a fascinating look at why our human history and prehistory is important in any research about disease and health. The authors have written a highly readable book about the new field of Darwinian medicine - finding evolutionary explanations for why we get sick. It involves the study of why certain traits from our past can cause disease today, and why some traits that are maladaptive today, may have been a help to our ancestors, the early hunter-gatherers.

There are sections on injury and infection, genetic diseases, cancer, pregnancy, aging, and psychiatric problems. Having recently had two children, I was very interested in the theories about 'morning sickness' and the fight between the mother and fetus. The authors discuss the theories of several researchers. For example one theory suggests that 'morning sickness' could be an adaptation to keep us away from strong tasting foods which are usually high in toxins during the critical first few months of pregnancy. There are also evolutionary explanations for why we crave fat, sugar, and salt.

The authors are very careful to stress that they are not just another medical fad. They want to work with the medical establishment to provide better treatment and understanding of illness. It has recently been shown that running a fever has a function in healing of certain illnesses. With the help of Darwinian medicine, a doctor would know when to let a fever run its course and when it is best to bring a fever down with medication.

I recommend this book for any library collection. [Doctors in hospitals and at medical schools should be aware of it.](#) Any public library patron would enjoy reading it and find it highly informative. And students of any discipline would find it interesting and I'm sure would get ideas about how evolution effects all sorts of things in our daily life.

Internet Source: <http://www.ghsl.nwu.edu/BLAB/BLA>

- **Why Evolution Is Important to Our Health**, August 02 2005

Both authors are scientists of the highest caliber, and "Why We Get Sick" is a marvelous, important, and valuable read. The book's purpose is to include functional evolutionary explanations into ordinary medicine, a project that is only slowly coming to be. [The key to unlocking so many mysteries behind so many diseases is to look beyond proximate causes and look instead for functional, often evolutionary, causes of disease and dysfunction.](#) This requirement demands that we don't stop at signs and symptoms of disease, but that we understand how the disease disrupts the function of organisms. [Only by a functional understanding of disease, which requires an evolutionary perspective, can we both prevent and treat disease more quickly, accurately, and thoroughly.](#)

The classic case is fever. Hopefully, we all know that most fevers are generally good for us (to a degree), namely that it is the body's own defense mechanism to raise the body's temperature to help kill pathogens.

Some fevers, obviously, need to be treated with aspirin, but by doing so, you may actually prolong the disease. If we understand that fevers play a vital evolutionary role in helping us ward off pathogens, we'll not want to reduce a fever unless absolutely necessary (e.g., very high temperatures). Our body's own immune system is a marvel of evolution at work; and we need to learn to work with it, not work around it, much less against it. Certainly we ought not be taking antibiotics for viral infections, yet patients demand it, and doctors give in. There are health consequences to this slipshod type of medicine.

If we understand, similarly, that being biped is relatively recent in our evolutionary history, and we understand how our visceral girdle is designed for quadrupeds, not bipeds, then the fact that so many of us get back pain should not come as a surprise. And, the more sedentary and unexercised this girdle becomes, the more prone to back disorders (e.g., herniated discs) we become. Part of the evolutionary scheme of things is preventative as well as curative, so rigorous exercise of our midriff girdle will do much to prevent back disorders resulting from flabby girdles. By taking the evolutionary function into account, we are better able to prevent as well as treat most disorders.

These are just two examples of a plethora of diseases that, when given their functional aetiology, give a fuller account of what steps are necessary to keep us healthy and which steps are necessary to treat illnesses. The authors maintain that we must get to the true, real, and functional cause of most disorders before we have a real grasp of disease itself, thereby opening the door to both conventional and evolutionary prevention and treatment. I can't possibly do justice to the depth and breadth of [this very important work](#). While I believe it should be in every doctor's library (like "Darwinian Psychiatry" should be in every psychiatrist's library), it is also one book most health consumers need to understand. Some parts are challenging reading, but it's worth it.

I do have several criticisms. First, [the book is not the finest in scientific writing for the layperson](#). Many doubly compound sentences (and subjects) would have been better developed with a shorter, simpler sentential writing style. Second, no footnotes; there are notes at the end of the text, and no bibliography. Third, the organization and presentation in the first part of the book could be better, with implications made explicit. These criticisms, while not major, do affect the overall rating of the book.

- **Stimulating, important, clear.**, March 02 2004

From an evolutionary standpoint, it is reasonable to ask why we are plagued with disease, both physical and "mental", and why we age. It is not so hard to understand if the disease is due to viruses or bacteria, which evolve along with us in an evolutionary arms race. For this reason, some scientists have postulated that many illnesses ranging from heart disease to schizophrenia are also due to living organisms, and certainly

there is increasing evidence for the importance of this viewpoint. Nesse and Williams provide other answers. Some of these answers - changes in environment and habits, rare mutations - are straight forward; others are more subtle and interesting. More than anything, there are inevitably tradeoffs. The gene which causes sickle cell anemia helps protect against malaria. In a few instances, an evolutionary perspective provides immediate suggestions for changes in medical practice, in the care of newborns and in the treatment of fever. More significantly, it has a role to play in the guidance of future research aimed at specific diseases. [The book falls somewhere between a popular explication, and an original contribution, the contribution primarily being that it organizes many separate findings, and sets them out in a more general framework, while posing a host of possible PhD research questions. Much of the background information in Why We Get Sick is of great interest, and I only wish there was more background on the immune system. The writing is competent, and almost always clear.](#)

- **Evolutionary thinking is critical to managing disease**, October 05 2003

There is a growing realization that many diseases are related to or caused by pathogens. Lack of understanding of evolution of microorganisms makes us ineffective at treating disease.

The evolution of antibiotic resistance is a good case in point. Working with advanced electromagnetic technologies to eliminate pathogens quickly demonstrates that evolution of microorganisms can occur quickly enough to affect treatment during the course of treating a single episode of a disease in a single patient. There needs to be a new field of the science of internal ecology of the body that builds understanding of the ecosystems of the microbiological agents that outnumber our cells.

That said, [Nesse and Williams give an easily readable primer on some of the fundamental evolutionary thinking essential for successful understanding and treatment of disease. It is unfortunate that more physicians are not deeply familiar with these issues.](#) The improper handling of disease with current antibiotics makes the organisms that cause them more deadly. This could easily be minimized by correctly approaching treatment from a base of understanding of evolutionary biology.

While this book is a good step into the deep waters of internal ecology, its easy reading makes it somewhat superficial. To start getting the real scoop, you need to read Ewald's work. A good starting point is *Plague Time: How Stealth Infections Cause Cancer, Heart Disease, and Other Deadly Ailments*.

As one simple example, *Plague Time* points out that the Borna virus is usually associated with Bipolar disease. After working with a few individuals with Bipolar disease, I've found they invariably have the Borna

virus. This is untreatable by conventional medicine. Using electromagnetic techniques, the virus can be eliminated or reduced in number. This results in immediate cessation of a manic/depressive episode in some people. There are numerous other examples of these issues in heart disease, cancer, auto-immune diseases, and so forth.

The fact that microorganisms are becoming more resistant to treatment and getting deadlier from improper management, combined with the fact that [many diseases are caused by unrecognized pathogens, means that every individual needs to come to grips with evolutionary biology or risk becoming a victim of it.](#)

- **Practically reads itself**, January 05 2003

[This book is extremely readable, and hard to put down.](#) The authors make a very compelling case for the usefulness of a evolutionary perspective in medicine. I have a couple [minor complaints](#) (but don't let this discourage you). [The authors seem to move freely between fact and speculation,](#) without making clear distinctions. Not a problem if you're paying attention, but they may sometimes give the impression that there is more data to support a contention than there actually is. [Anyway, I highly recommend this book - it's easy to read, stimulating, and bound to make you look at illness and health in a new way.](#)

- **Stimulating Perspectives on Sickness**, March 15 2002

[" Why We Get Sick"](#) is [a discussion on novel way of thinking about sickness, an epiphany on the perseverance of human vulnerability.](#) The book addresses where disease come from and why we get such diseases. Nesse and Williams carefully state 6 major causes of diseases: Defenses, infection, novel environments, genes, design compromises, and evolutionary legacies. Our immune system is the frontier battlefield of any intruders. Studies have shown that at the first point of contraction, the immune system proliferate T-cells against the HIV virus. These immune cells fight the best they can to prohibit HIV settling onto the CD-4 cells. The only reason the immune system loses is because the HIV virus is simply too smart that they mutate into other forms and fool the T-cells. The first sign of the cold virus triggers series of defensive action-fever and sneezing are actually not illness, but defensive/immunological responses against the virus.

Bacteria can evolve as much in a day as we can in a thousand years, and this gives us a grossly unfair handicap in the arms race. That's right, according to the authors of this book, we are in an ever-lasting struggle with bacteria and virus because they evolve so much faster than we can imagine. TB disappeared more than 40 years ago after the discovery of antibiotics. TB is now coming back with an even more potent form-a kind that no longer can be treated by the old antibiotics. Evolution of the virus plays a significant role here. The possible treatment would be

chemical mimetics, synthesizing structurally similar compound to treat the new strain.

The more I read the more I'm refreshed by the authors. They discussed the cause of allergy and why some people are so allergic to plants and pollen while others are completely immune to them. The book also makes distinction between virus and toxins. How does the body identify novel toxins? What is the significance of maleness and femaleness? These are questions we all address but of which we never consider in the evolutionary point of view. The authors do not argue that evolution is the main cause of why we have allergy, AIDS, influenza and gene defects, but they have done a brilliant job in exploring the matter in this side of the argument.

- Review of. .. *Why We Get Sick: The New Science of Darwinian Medicine*, by Randolph M. Nesse, MD and George C. Williams, PhD.

This very user-friendly book begins with a series of questions that I had been asking for many years when I first picked it up: why do we get sick? More exactly, "Why, in a body of such exquisite design, are there a thousand flaws and frailties that make us vulnerable to disease?" I could hardly believe that someone had written a whole book about this!

Nesse and Williams present an amazingly clear set of answers to questions that I had almost completely given up any hope of answering in this lifetime. Through every chapter of the book, I found myself nodding and slapping my forehead and saying, "Of course!" By the end, I actually felt deeply satisfied, as though someone had put to rest a very old mystery for me. I am very grateful to them for it.

"Darwinian medicine" is the secret ingredient, the scientific perspective that makes the book work and provides such enlightening answers to otherwise unapproachable questions. Nesse and Williams have spent a lot of time figuring out how natural selection accounts for the delicate compromises that constitute human physiology, the imperfections that are built into the system. One peculiarity of human frailty after another is made sensible. By the end of the book, I was accustomed to the unusual perspective and starting to apply it to even more questions. My understanding of health has deepened substantially since then.

- (From Publisher's book back cover) The next time you get sick, consider this before you pick up the aspirin: your body may be doing exactly what it's supposed to. In this groundbreaking book, two pioneers of the emerging science of Darwinian medicine argue that illness as well as the factors that predispose us toward it are subject to the same laws of natural selection that otherwise make our bodies such miracles of design. Among the concerns they raise: When may a fever be beneficial?
Why do pregnant women get morning sickness precisely when they are supposed to be **nourishing** their developing babies?
How do certain viruses "manipulate" their hosts into infecting others?

What evolutionary factors may be responsible for depression and panic disorder?

Deftly summarizing the latest research on disorders ranging from allergies to Alzheimer's, and from cancer to Huntington's chorea, *Why We Get Sick* answers these questions and more. The result is a book that will revolutionize our attitudes toward illness and will intrigue and instruct lay persons and medical practitioners alike.

