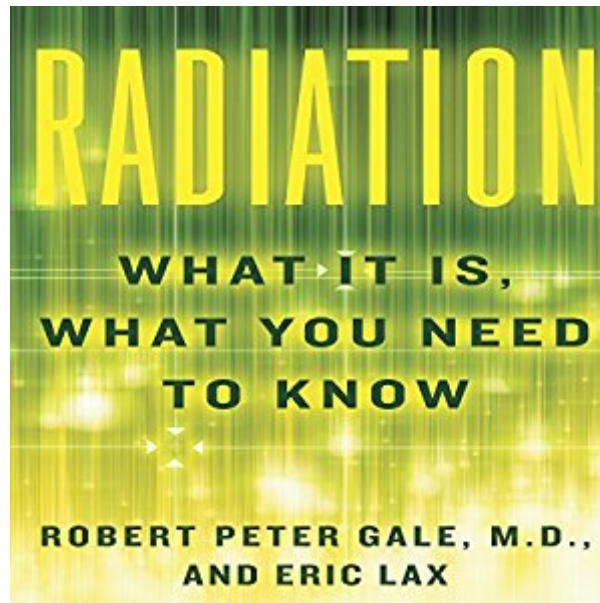




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# **Radiation: What It Is, What You Need To Know**



## Synopsis

The essential guide to radiation: the good, the bad, and the utterly fascinating, explained with unprecedented clarity. Earth, born in a nuclear explosion, is a radioactive planet; without radiation, life would not exist. And while radiation can be dangerous, it is also deeply misunderstood and often mistakenly feared. Now Robert Peter Gale, M.D. - the doctor to whom concerned governments turned in the wake of the Chernobyl and Fukushima - in collaboration with medical writer Eric Lax draws on an exceptional depth of knowledge to correct myths and establish facts. Exploring what have become trigger words for anxiety - nuclear energy and nuclear weapons, uranium, plutonium, iodine-131, mammogram, X-ray, CT scan, threats to the food chain - the authors demystify the science and dangers of radiation, and examine its myriad benefits, from safely sterilizing our food to the relatively low-risk fuel alternative of nuclear energy. This is the book for all listeners who have asked themselves questions such as: What kinds of radiation, and what degree of exposure, cause cancer? What aftereffects have nuclear accidents and bombs had? Does radiation increase the likelihood of birth defects? And how does radiation work? Hugely illuminating, *Radiation* is the definitive road map to our post-Chernobyl, post-Fukushima world.

## Book Information

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## Customer Reviews

*Radiation: What It Is, What You Need to Know* by Robert Peter Gale, M.D., and Eric Lax "Radiation" is an even-handed, educational and accessible book on radiation. The book covers many forms of radiation like microwaves and radio waves which have insufficient energy to alter cells to the more

energetic forms known as ionizing radiations that can alter the structure of atoms. Scientist, physician, and author of twenty-two medical books, Robert Peter Gale, has teamed up with accomplished author Eric Lax to produce a readable and interesting book on an often misunderstood topic, radiation. This enlightening 288-page book is composed by the following nine chapters: 1. Assessing the Risks, 2. Radiation from Discovery to Today, 3. The Nature of Radiation, 4. Radiation and Cancer, 5. Genetic Diseases, Birth Defects, and Irradiated Food, 6. Radiation and Medicine, 7. Bombs, 8. Nuclear Power and Radioactive Waste, and Summing Up.

**Positives:**

1. A well-researched, well-written and even-handed book. Accessible for the masses.
2. An excellent educational tool that addresses a much misunderstood topic, radiation. "The specter of radiation is so frightening to many people that it eclipses reality."
3. Understanding the main differences between the two main type of radiation: ionizing (which can cause cancer) and nonionizing (generally little harm with the exception of ultraviolet radiations).
4. The main focus of the book is to reduce the gap between what we fear and what is real about radiation. Mission accomplished.
5. The book is full of interesting facts, "Radon-222 and related radionuclides are estimated to be the most common cause of lung cancer deaths in nonsmokers."
6. The book examines some of the cancers that ionizing radiations can cause: lung, breast, thyroid, and leukemia to name a few. "Cells in the bone marrow are especially sensitive to cancer-causing mutations from ionizing radiation."
7. There are many examples provided throughout the book. The two main examples are the Chernobyl reactor building and the Fukushima Daiichi nuclear power facility. "The Chernobyl reactor building was destroyed by a steam explosion, and part of the Fukushima reactor building was destroyed by an explosion of highly flammable hydrogen gas."
8. How radioactivity interacts with humans (dose). "Scientists agree that above a certain dose (usually about 50 or 100 mSv) there is a linear relationship between radiation dose and cancer risk: the higher the dose, the greater the risk."
9. The authors seamlessly provide historical scientific context into the narrative. "In 1914 Rutherford would prove that gamma rays were a form of light similar to X-rays but with a far shorter wavelength and thus penetrated deeper than the other rays or particles."
10. The difference between fission and fusion. "The difference between fission and fusion is that fusion requires a great deal more energy to start the chain reaction, but fusion also yields vastly more energy--a hydrogen (fusion) bomb is roughly one thousand times more powerful than an atomic (fission) bomb."
11. Thought-provoking issues, "people concerned about global warming are often firmly opposed to nuclear energy, yet it is the only immediately available energy source able to substantially reduce carbon dioxide emissions, albeit with some inherent but potentially solvable problems."
12. Chemistry plays a pivotal role, "All elements with a higher number in the periodic table than thallium (atomic number 81) have

radioactive isotopes, and all isotopes of elements from polonium (number 84) and higher are radioactive".<sup>13</sup>. The authors did a good job of establishing what we know to a high degree of certainty in some areas and where lack convincing data. "Finally, we lack convincing data that early detection of thyroid cancer results in a health benefit."<sup>14</sup>. Putting the number of deaths that can be attributed to radioactive releases in perspective. "radiation-induced genetic abnormalities are not passed from the affected persons to their children, as studies of exposed Japanese mothers and their children make clear."<sup>15</sup>. Some of the well known causes of cancer, "But smoking a cigarette is, in some regards, like intentionally inhaling a small nuclear weapon into your lungs. Cigarette manufacturers have known about the presence of polonium-210 in tobacco since the 1960s." And some factors that don't cause cancer, "Nonionizing radiations, like those associated with microwaves and cell phones, are not convincingly associated with an increased cancer risk."<sup>16</sup>. The difference between genetic disorders and birth defects. "Changes in the number of chromosomes are also important. For example, children with Down syndrome have an extra chromosome 21, whereas girls with Turner syndrome are missing one X-chromosome."<sup>17</sup>. And what's not to love about evolution, "We may wonder why whales and dolphins living in water have their bone marrow stem cells in bone cavities. This is because they derive from terrestrial ancestors."<sup>18</sup>. Interesting topic of food irradiation. "Food irradiation has the potential to save millions more lives than it harms, especially since it very probably does no harm."<sup>19</sup>. Medical applications of radiation, "The conclusion that people at high risk for lung cancer should have screening radiological studies remains controversial but presently favors screening."<sup>20</sup>. A look at nuclear weapons. "About 50 percent of the energy released by the A-bombs was blast energy, about 35 percent was thermal energy, and only about 15 percent was radiation, most of it neutrinos that did not contaminate the area."<sup>21</sup>. An excellent summary chapter, an engaging Questions and Answers section.<sup>22</sup>. Bibliography provided.

Negatives: 1. The book warranted more charts and diagrams within the narrative of the book. 2. Intended for the masses the book lacks depth. 3. The book needed more citations. 4. Free radicals is a fairly hot topic and warranted at the very least a citation. In summary, I enjoyed reading this book. It's well-written, well-researched and it takes a complex topic such as radiation and makes it not only accessible but quite enjoyable to read. The authors treated the topic even handedly and really did a good job of educating the public of what to fear and what is real about radiation. The book lacks depth, warranted more citations and would have been better served with more diagrams as part of the main narrative of the book. That being said, this book achieved its main goal of closing the gap between fear and knowledge. I highly recommend it! Further recommendations: "Nuclear Energy: What Everyone Needs to Know" by Charles D. Ferguson,

"Energy for Future Presidents: The Science Behind the Headlines by Muller, Richard A." by Richard A. Muller, "Clean Break: The Story of Germany's Energy Transformation and What Americans Can Learn from It" by Osha Gray Davidson, "The Crash Course: The Unsustainable Future Of Our Economy, Energy, And Environment" by Chris Martenson, "The Making of the Atomic Bomb: 25th Anniversary Edition" by Richard Rhodes, and "The Manhattan Project: The Birth of the Atomic Bomb in the Words of Its Creators, Eyewitnesses, and Historians" by Cynthia C. Kelly.

**The Good:**Very informative book explaining almost anything a non-expert might want to know about radiation.  
**Written by one of the world's foremost experts on radiation.**  
**The Bad:**The writing was often confusing or rambling. If you are writing a book about a complex, controversial, and often incorrectly represented topic (like this), it is critical that the writing, editing, examples, etc. be rock solid and crystal clear. Sadly, sometimes they weren't. This isn't a page-turner; but it isn't a dry pedantic textbook either. It is readable, but you have to work at it.

It is a pleasure to find this book relevant and factual. It is written by a physician with excellent credentials and experience in the field of leukemia. By first addressing the radiation effects of the survivors of the Hiroshima / Nagasaki atomic bombs studied in a joint USA-Japanese study still ongoing, the book shows how little were the effects and why. After further explanations based on Chernobyl and Three Mile Island, the book addresses the survivors of the Fukushima massive tsunami waves to explain ( page 132) why "any impact of radiation released at Fukushima is extremely unlikely". This was confirmed upon completion on April 2, 2014 by the United Nations' study of Fukushima by their international technical group, originally formed to study the atomic bomb effects. **AND THE BOOK IS READABLE !!**

This book puts the radiation health risk of nuclear power in perspective. It points out that the risks of climate change from fossil fuel burning outweigh the potential health risks associated with nuclear power. This is a sorely needed message in that the public thinks that nuclear power is a thousand times more dangerous than coal burning but the data shows that the opposite is in fact the reality.

Really good read. I learned a lot. Since radiation affects us more than we realize this is a good book to read to find out how radiation works and what are the affects of radiation and how dangerous it is and in what circumstances it is most dangerous.

Gale contributes care and expertise and we lay readers are very fortunate to have a person of his calibre making this contribution to public education on an issue more generally shouted about by people with far less knowledge. Apart from expertise, the book is also brilliantly written with plenty of thought going into each explanation of complex topics.

Provides good insights on the nature of Radiation, types of radioactivity, and sources of radioactivity. It outlines the facts about radioactivity and the misconceptions about radioactivity many people have. Easy to read and understand, and well worth the price.

Brand new as expected. In perfect condition.

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