Books

Personal science: cancer and the environment


Living Downstream is yet another book that attempts to revitalize the public environmental consciousness by evoking the ideas and persona of Rachel Carson and her book Silent Spring (Carson 1962). Much like its recent predecessor, Our Stolen Future (Colborn et al. 1997), Living Downstream describes a long list of adverse effects on both human health and on the environment, suggests that these are due to environmental contaminants, and argues that action must be taken. However, in contrast to Our Stolen Future, which claimed that the most serious effects of environmental contaminants are on the endocrine system, Living Downstream claims that their cancer-causing effects are of most concern.

Although the subtitle of the book is An Ecologist Looks at Cancer and the Environment, the author's perspective seems to be more that of someone affected personally by cancer. This perspective is evident not only from the subject matter but also from the way in which the author interweaves the technical material with descriptions of her own experiences with cancer and those of close friends, relatives, and others. Her passion about these experiences is revealed in her choice of words. For example, she describes deaths from environmental contaminants as "a form of homicide." She also asserts that current risk management practices "show reckless disregard for human life."

The author starts with a discussion of cancer statistics and the assertion that there has been a large increase in cancer incidence in the United States in the past 40-50 years. Subsequent chapters detail associations of various synthetic environmental chemicals with cancer in animal populations, in humans exposed occupationally, and in humans exposed environmentally. She examines evidence that chemical contaminants that are found in food, in air, and in drinking water are associated with cancer. This evidence is quite varied and includes results of wildlife field studies, human epidemiological investigations, and laboratory research—including both whole-animal and cell culture studies.

Although the author does not reference every piece of evidence or every conclusion, she does provide an extensive list of citations at the end of the book that cover almost every page. In addition, it is clear that she has received input from a number of scientists and other concerned individuals about her subject. Overall, the book reflects the author's large volume of research covering a wide range of topics.

One feature that will benefit the less technically trained reader is the simplified explanations of a number of biological phenomena, such as the way that interactions between xenobiotics and receptors influence the potential toxicity of these foreign chemicals. Readability of the book is also enhanced by the insertion of descriptions of nature and of the changes that have occurred to the landscape during the author's lifetime, especially in the area where she grew up.
In light of these positive features, if the book had been presented as a personal account of the author's views and how she had arrived at them, it could be considered successful. However, because the author clearly aims to provide a scientifically defensible case that environmental contaminants, and not other factors (e.g., diet and lifestyle), are the most significant causes of cancer, the book must be held to a different standard. A close reading of the book indicates that it does not meet this standard.

One weakness of the book is that the author selectively chooses the evidence she presents, as is reflected in the citations, which largely reflect one point of view. For example, the author does not address strong evidence that high-dose animal studies of some chemicals are not relevant to humans or to low-dose exposures. She also does not discuss the growing consensus that studies of some animal cancers are not applicable to humans. A summary of this consensus can be found in the recent report of the Commission on Risk Assessment and Risk Management (Presidential Congressional Commission 1997).

Even in the few cases in which the author presents data that do not support her viewpoint, she presents these data inadequately. These alternatives are given little attention (or are sometimes relegated to the source notes in the back), and what attention is given is devoted to rebutting them. However, similar scrutiny is not provided for studies she cites in support of her view.

A related difficulty is the emphasis on the large number of possible associations between environmental contaminants and cancer rather than on their quality. A look at the citations reveals that although some conclusions come from peer-reviewed articles, many appear to be drawn from less valid sources, such as newsletters, environmental organization reports, quotations in books or popular articles, and other nonscientific sources. Moreover, one problem with citing studies, even peer-reviewed ones, that have not been validated is that they may later be shown to be insupportable. An example is a recent laboratory study of the synergistic estrogenic effects of pesticides (Arnold et al. 1996) that was later withdrawn by the authors (McLachlan 1997). This problem is even more common for epidemiological studies, which are often followed by others with conflicting results.

In addition, the author treats almost any chemical that has been linked to cancer as if it is a carcinogen. Thus, associations with chemicals that have been labeled as possible or suspected carcinogens appear to be given the same weight as those for which the evidence of carcinogenicity is more compelling. Similarly, the author appears to assign equal weights to epidemiological studies of varying validity in supporting her conclusions. Indeed, many less technical readers may be left with the idea that all cancers are caused by environmental contaminants. Statements from the author such as "...a woman with breast cancer in northeastern New Jersey cannot know for certainty whether she is dying because of the air wafting down from the factory stacks or because of the water contaminated by the dump site" (p. 71) suggest that she may also believe this idea.

Because of the sheer mass of information that is presented, it is difficult for the reader to check any significant proportion of the sources. And because of the limited number of references to alternative data and explanations in the book, it is hard for the reader to know what other information is available and where the scientific consensus may lie. For example, the reader might find it helpful to know that the author's basic premise—that the large increase in cancer incidence cited is entirely real and not artificial—is widely disputed (i.e., the increased incidence may result from increased screening and other factors).

Perhaps as disappointing as the lack of scientific rigor was the conclusion of the book. Having identified the problem in hundreds of pages, the author devotes only a few pages of the last chapter to possible solutions. Furthermore, these solutions are already well known: the precautionary principle (any suggestion of harm should result in action), reverse onus (demonstrate no harm before action is taken), and selecting less toxic alternatives. If the author feels so strongly about the carcinogenic potential of environmental contaminants, she should have called for drastic and immediate actions on the part of both individuals and industries. These actions might include significant lifestyle changes, such as rapid phaseout of combustion engines and tight restrictions on nontoxic energy use, and severe limits on industrial discharges.

Overall, this book does not add significantly to our understanding of the risks of cancer from environmental contaminants. Readers who are convinced that the dangers from these chemicals are greatly underestimated will find much to support their opinions in this book. Those who believe that the risks are overstated are unlikely to change their minds after reading this volume. For those who may have not made up their minds, this book can be read as a personal account of one individual's approach to the issue.

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References cited