

All of these topics are dealt with in 227 pages, so this is not a book for specialist readers — many of whom will find, as I did, some deficiencies in the scientific discussions and a few errors of fact or interpretation. However, this broad coverage, together with Burdon's ability to write in a straightforward and engaging manner, should ensure that a lay audience will find it a useful scientific introduction to the effects of the environment on health.

For this target audience, a significant strength of the book is its generally balanced discussion of the health risks posed by environmental agents. For example, although Burdon emphasizes concerns about the potential risk of cancer from environmental radiation and chemicals, this is balanced by a discussion of the endogenous risk from chemical radical attack on DNA during normal cellular metabolism. Are there significant omissions or ambiguities in the book? I will address two that I thought to be important.

First, given that risks of cancer from genotoxic environmental agents generally involve low levels of exposure, I was surprised to find so little discussion of a long-standing debate concerning dose and response. There is a school of thought (E. J. Calabrese and L. A. Baldwin *Nature* **421**, 691–692; 2003) that, at these low doses, there is an initial dose interval where cancer risk may be discounted (a threshold for risk) or where there may even be health benefits for the exposed individual (hormesis). In general, these proposals have not been viewed favourably by the national and international scientific bodies that consider risks from physical and chemical genotoxic agents. A discussion of the scientific components of the debate would have been most valuable.

My second point concerns one of the central arguments on the contribution of environmental factors to human cancer risk. Burdon emphasizes proposals that environmental factors can account for 80–90% of human cancers, and that the increasing cancer burden in the population “parallels the gradual industrialisation of the world and the widespread introduction of new synthetic chemicals into the workplace”. Although he refers to difficulties in quantifying the potential impact of environmental carcinogens and the importance of other environmental influences such as diet, I sense a degree of ambiguity in his approach. Consequently, lay readers could be forgiven for interpreting some parts of the text as reflecting scientific support for the view that involuntary exposure to environmental carcinogens is a major determining factor in human cancer risk. In my opinion, it is unlikely to be so.

In particular, although there is qualified acceptance of the view that heritable factors may account for 10–20% of cancer in Western populations, this does not imply that the remaining 80–90% of cases can be attributed

Exhibition

Unnatural causes

Successive technological revolutions have had an impact on both the natural world and society, radically changing their relationship. The Tenth International Biennale of Photography, entitled *In Nature* and showing in Turin, Italy, until 12 October, reflects the individual relationships of more than 30 artists with nature in an era of scientific dominance.

Death is a frequent theme in this powerful exhibition. For example, British documentary photographer Clive Landon recorded the horror of the livestock slaughter and burning during the 2001 outbreak of foot-and-mouth disease. One of his photographs recalls the pastoral ideal of a John Constable painting — but a closer look reveals that all the cows are dead.

Kiev artist Ilya Chichkan responds to the darkness of modern Ukrainian history. Ten years ago he ‘borrowed’ the deformed fetuses from mothers living in Kiev during and after the Chernobyl nuclear accident. The fetuses were preserved in formalin at the University of Kiev's medical school. Chichkan dressed them in jewels, like the sleeping princes of Ukrainian legend, and photographed them, as shown here, in the serene poses of a normal sleeping child, imposing an anachronistic dignity. **Alison Abbott**



I. CHICHKAN

to environmental carcinogens. Although exposure to carcinogens, especially tobacco smoke, is certainly important, the non-genetic component of cancer incidence in a given population incorporates a broad range of interacting elements that may be expected to vary over time with social and economic change. These include population structure and lifestyle-related factors such as diet, reproduction and certain forms of infection (R. N. Hoover *N. Engl. J. Med.* **343**, 135–136; 2000 and www.iarc.fr/WCR).

Given their importance to a major theme of the book, these issues could have been discussed with greater clarity.

Overall, however, I found *The Suffering Gene* to be a readable and reasonably balanced introduction to DNA-related environmental issues. The discussion is a little speculative or lacking in depth in places, but given the range of issues considered, this is probably inevitable. ■

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