

tion in the genetic analysis of tumour cells, dealt with (inadequately) in less than ten pages? Why is there no mention of the profound analysis of tumorigenic mutations in *Drosophila*? (*Drosophila* isn't even in the index.) The answer in each case, must, I fear, be that the choice of articles was determined by the Editor's personal range of interest and by the catchment area from which he was able to collect contributions. The end result is a heterogeneous collection of articles varying, as usual, both in their quality and in the depth of their analysis. Two or three of the fourteen chapters are good reviews of their subjects (although, of course, already dated); but as a balanced overview of current research on genes determining cancer, to say nothing of genes associated in other ways with cancer, the book fails. To succeed within so small a compass, a book of this kind must select the most important *general* features of contemporary research in the area and expound them in an intellectually coherent way. A collection of disparate essays by specialists writing in detail about their own particular experimental interests won't do.

One further point. There is no over-riding need to have historical introductions to books or chapters, but, if one does decide to have them, they should be accurate. This involves some serious work. The historical survey of genetic instability in tumours with which this book begins is a travesty.

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Programmed Cell Death in Tumours and Tissues, by I. D. Bowen and S. M. Bowen. *Chapman & Hall*. Pp. 268. £38, *hardback*

The death of cells cannot be said to be as important as their birth, yet cell death clearly matters in cell biology, and not merely as the pathological consequence of trauma; particularly in development, as the large-scale reorganisation of tissues is dependent on the death of cells. Broadly, two mechanisms of cell death are recognised: necrosis and apoptosis. The former results from membrane damage and consequent ion flux, with perhaps the major mechanism causing cell damage being changes in intracellular calcium concentrations. The latter differs crucially in that at a very early stage nuclear DNA is fragmented, without major changes in membrane permeability. Apoptosis, the 'programmed cell death' of the title, is the subject of this book.

However, those expecting a clear account of the mechanisms and role of apoptosis, as I was, will be disappointed. Although there is much that is useful here, after twice reading the book I felt that I had not learned much about apoptosis beyond what is in, for example,

Duvall and Wyllie's short review in 'Immunology Today'. Of course, at book length, this account must contain much more material. However, I found much that was confusing in this book, and above all I am not really sure what it is about. There might, for example, be detailed accounts of apoptosis in tissue development, whilst in fact there are only brief allusions to, say, tadpole tail resorption to exemplify apoptosis in development. Similarly, there might be detailed accounts of apoptosis in human tumours, with careful distinction between apoptosis and necrosis, but there are not.

It is often assumed that apoptosis is a phenomenon under genetic control (there is evidence that macromolecular synthesis is required) and here we find this assumption taken as fact: 'The concept of programmed cell death implies genetic control' (p. 3) becomes 'Given the existence of specific DNA sequences which when activated bring about physiological cell death...' (p. 57) and 'Killer genes had to be selected early on in metazoan evolution...' (p. 176). However, there is no good evidence for this, certainly none presented here, and so surely there should be a more cautious approach and detailed examination of such evidence as there is.

What we do have, at excessive length, is an account of some aspects of cytokine biology and cellular immunology, loosely related to apoptosis. Now it is very clearly recognised that killing by cytolytic cells is by apoptosis, as probably is killing by tumour necrosis factor, and so quite plainly there is a good case for inclusion of some of this material in the book. But when the authors are reduced to statements such as '...it may seem strange to include growth factors [colony stimulating factors] in a book on cell death...' (p. 170) and 'Although these interleukins [5 & 7] have no obvious connection with cell death, they may be worth mentioning...' (p. 174) it does look as though there is a good deal of padding out. Indeed, most of the material in these sections of the book seems entirely irrelevant: for example, ten pages on interferon, five pages on the origin of natural killer cells and so on.

Some minor quibbles I have include the plethora of terms used for apoptosis, which are not always clearly distinguished from necrosis: 'cell murder', 'cell suicide', 'suicidal cell death', 'programmed cell death', 'physiological cell death', 'induced cell death'; too many trivial errors (including two spelling errors on the back cover); some wild statements ('...genetically dictated apoptotic death... should be of interest to oncologists, in that similar mechanisms might be therapeutically activated...').

I don't want to appear entirely negative. This book is flawed, chiefly by including material I regard as redundant at the expense of a fuller discussion of more relevant topics. But it does bring together a wealth of information important to the understanding of cell death, and is a useful addition to the cell biology literature.

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