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## Neoplasia and Cell Differentiation



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Editor

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47 figures and 7 tables



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## Preface

There is an increasing awareness, nowadays, of the possibility that epigenetic mechanisms might operate in neoplastic systems. Epigenetic systems share several interesting features with neoplastic systems [1], and the developmental path of tumours is said to correspond closely with that of embryos [2]. There are also important points of difference between the systems, such as for example, in regulation and supercellular organisation which play a prominent part in embryonic development but which are conspicuously absent in neoplastic systems [3]. It has been suggested that neoplastic transformation might be a pathological counterpart of normal differentiation, and that it might arise by a misprogramming of gene activity by epigenetic mechanisms [4].

This book is therefore devoted to a discussion of some epigenetic processes most relevant to the study of neoplasia. The first seven chapters deal with the problems of nuclear differentiation in normal development and in neoplasia, the molecular basis of the operation of epigenetic mechanisms, and the roles played by cell surfaces in embryogenesis, and in neoplastic development and dissemination.

The considerable emphasis placed here on the problems of regeneration is due to the fact that the question of dedifferentiation is central to the problem of neoplasia. It has been observed that many tumours show a progressive anaplasia. The degree of anaplasia is often used as a criterion for assessing the malignancy of tumours. It also forms the basis of histological grading of neoplasms, which is used as a guide in the treatment and prognosis [5, 6]. But are these anaplastic changes analogous to true dedifferentiation which one encounters in regeneration systems? A critical appraisal of the state of differentiation in tumours might therefore be of value to those

investigating neoplastic phenomena as well as to students of embryology. Hence, the remaining chapters of the book deal with the problems of differentiation and organisation of tumours *in vitro*, either on their own or in association with embryonic cells. Such experiments have, in fact, provided us with considerable information about the growth characteristics, invasive ability, and the degree of malignancy of tumours. Although not described in detail in this book, tumour and embryonic cell interactions have been used recently to evolve a biological system of grading of tumours which can be used to assess the malignancy of tumours and also as an aid to prognosis [7].

Another aspect of the question of differentiation, which has exciting possibilities, is: If tumours did dedifferentiate, can they be induced to redifferentiate? Can neoplastic growth and differentiation be controlled by epigenetic influences? It was suggested some years ago that the “individuation field”, the persistence of which was postulated to be responsible for regeneration, might inhibit growth and promote differentiation of tumours [8, 9]. Although this method of inducing tumour differentiation has not been particularly successful [10–12], other methods such as the combination of tumour tissues with embryonic organisers etc. appear to have achieved some degree of success [13]. These questions have been discussed in some detail. A chapter on teratomas is also included, and this hardly requires justification. WILLIS [14] believes that teratomas are produced from foci of pluripotent embryonic cells. The wide spectrum of differentiation seen in teratomas supports such a view. It has even been suggested that their development is comparable to embryonic development itself with respect to their ‘programme of development’.

It is hoped that this book will be helpful to workers engaged in cancer and embryological researches, and will stimulate co-operative efforts between workers in the two fields. For lack of space, it has not been possible to include articles on such topics as embryonic inductions, competence, growth, regulation, morphogenesis etc. It is hoped to produce a second volume dealing with some of these topics if the response of the readership to the present volume is encouraging.

I wish to thank the authors for their valuable contributions, and the publishers, Karger AG, for their cordial co-operation and excellence of production.

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