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 Book Reviews
 

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**Hollaender, A. (ed.): Genetic Engineering for Nitrogen Fixation.** New York, London: Plenum Press 1977. 538 pp., 81 figs., 46 tabs. Hard bound DM 120,—

The world-wide demand for nitrogen in agricultural food production and the increasing costs of nitrogenous fertilizers have highly stimulated research on the mechanisms and practical implications of biological dinitrogen fixation. However, dinitrogen fixation is limited to prokaryotic organisms, and higher plants can only profit from the nitrogen fixed if they live in some kind of association with dinitrogen fixing prokaryotes. The most important and highly evolved associations are found in the root nodule symbioses of leguminous plants with bacteria of the genus *Rhizobium*. The question to be asked is whether there might be future possibilities of extending the use of dinitrogen fixation to other plants. The existence of more loosely associated dinitrogen fixing bacteria in the rhizosphere may have practical implications, but more speculative future applications have been suggested. Better insight into the specific recognition processes between *Rhizobium* cells and the root hairs of leguminous plants might lead to the possibility of overcoming the specific infection barriers so that *Rhizobium* strains might be developed which form nodules on other plants. The exciting possibilities of genetic engineering might enable us to introduce the *nif* genes, which code for the dinitrogen fixing enzyme system, directly into higher plants. Such ideas, if put forward in an uncritical way, may easily lead to unwarranted suggestions, in which the methods of science are forgotten for the speculation and sensation of science fiction. It is the great merit of the present volume that it discusses the possibilities of genetic engineering for biological dinitrogen fixation in a thorough way which clearly shows the possibilities and the difficulties while always avoiding the pitfalls of too speculative or unsubstantiated suggestions. The chapters, which are based on lectures presented at a symposium at the Brookhaven National Laboratory, provide a clear review of modern research on dinitrogen fixing systems as well as thorough discussion of the possibilities for genetic engineering and DNA transfer (e.g. by introduction of plasmids) in higher plants. These papers enable us to obtain a realistic impression about future practical applications. Moreover the discussions are not limited to the aspects of increased dinitrogen fixation for agricultural productivity but, in some reviews of round table discussions in which the press was involved as a window for the public, the environmental and legal aspects are discussed. The book may be recommended to all those who are interested in this multidisciplinary approach to biological dinitrogen fixation and as a contribution to public discussion of the impact of recombinant DNA research.

A. Quispel, Leiden

**Ohno, S.: Major Sex-Determining Genes, Monographs on Endocrinology.**

Berlin-Heidelberg-New York: Springer 1979. 140 pp., 34 figs., 6 tabs. Cloth bound US \$ 21.50

These monographs are primarily of interest only to the specialist: they go into such detail that readers from other fields of research will not be interested. The wide knowledge and interests of the author are obvious by the outline of the book but at the same

time it can be said, as a form of criticism, that the monographs represent almost exclusively the view of S. Ohno. In order to obtain a balanced picture one should read A. McLaren's review article on sexual differentiation (vol. 9, Series Results and Problems in Cell Differentiation) since it provides additional points of view. The actual content of the monograph is narrower than the title appears to promise: it deals exclusively with mammalian sex determining genes. In this context, however, the discussion is very broad and touches even such marginal topics as behavioural questions and possible mechanisms of the evolution of sexual dimorphism. Such questions are considered within the first chapters which are amusing for the reader although they appear somewhat one-sided with respect to the background of argumentation.

The subsequent chapters become more specific and require, at least in part, some background knowledge. The second part of the book is specifically dedicated to the genetic elements of sex determination in mammals and focusses on the present state of knowledge on localization and function and action of the H-Y antigen. Although the function of the H-Y antigen appears at first glance rather simple and straightforward, it nevertheless emerges that a series of additional genetic elements must be involved in its expression and function. It is one of the basic conclusions of the author that two regulatory systems act in sex determination of mammals, one on the primary sex determination, the other on secondary sex determination. Both might be controlled by a single main regulatory gene each.

In this central second part of the monograph an initial evaluation of the genome structure of mammals is followed by a chapter on the cytogenetics of mammalian sex chromosomes. This is of essential importance in the context of discussing the chromosomal location of the H-Y antigen site and its regulatory elements. In view of the extended cytogenetic information on sex chromosomes it is the more surprising that a final decision on the actual location of the H-Y antigen site has not yet been achieved.

A review of the history of the identification of the H-Y antigen due to its immunological properties and its specific testis-organizing function closes this second part.

The third part of the book deals with the question of regulation of hormone induced secondary sex determination. Since a straightforward concept must necessarily be precluded due to our deficient knowledge about the character and function of hormone receptors, the discussion in this part of the book as a consequence can hardly be expected to display a clear picture of the genes participating in this process. The current available data however might allow the consideration of the X chromosomal *Tfm* locus as a master regulatory gene for secondary sexual differentiation. Its role in H-Y antigen expression is discussed in a final chapter which preferentially considers our state of knowledge of nuclear and cytosol hormone receptor proteins. Obviously these receptor proteins must play an important role in balancing sexual differentiation processes.

In my opinion this book does not provide the full range of information expected. It is nevertheless worth being extensively read because of its content in information and concepts, both of which cover a wide range of phenomena at the genetic and the biochemical level.

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