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Book Reviews

Genetic Engineering, Vol. 4. Edited by R. WILLIAMSON. Academic Press Inc. (London) Ltd. 24–28 Oval Road, London NW1 7DX, England (1983). £11.80; $22.00. ISBN 0 12 270304 9.

There have been several attempts to fill the gap between general introductory text books on recombinant DNA technology and the vast and fragmentary technical literature on the subject. The first three volumes of the Genetic Engineering series have slipped into this niche more snugly than their competitors through a winning combination of price, timeliness and quality. The fourth in the series seems destined to continue their success. As before, each of the three contributions deals with a restricted area of the field, and attempts to cover all its aspects, not as a technical manual, but rather as a summary and guide to more detailed sources in the literature. The opening article (R. F. Lathe, J. P. Lecocq and R. Everett) deals with the nitty gritty of cutting, splicing, reorganizing and mutating DNA *in vitro*. Not for the curious layman this one, but for the initiated, the authors have drawn together a vast array of technical tricks with commendable clarity. If you are already a cloner, with genes to manipulate, this is an ideal aid to planning your strategy. The authors are from the Strasbourg group, which has a reputation for genetic gymnastics of this kind. At the risk of being pedantic I might point out a weakness in the section on DNA methylation in plants. Far more is known about which restriction enzymes are sensitive to plant DNA methylation than the authors suggest.

The second chapter, on cloning and expression of polypeptide hormones (R. K. Craig and L. Hall), and the third, an expression of eukaryotic genes in *E. coli* (T. J. R. Harris), deal with methods whereby rare or inaccessible eukaryote proteins of clinical value can be produced in bacteria. Unfortunately much of the hormone chapter repeats an earlier contribution on cDNA cloning. More emphasis might well have been laid upon new techniques that have been introduced since the earlier article. Some of the new vectors, for example, deserved a full description in preference to a rehash of conventional cDNA cloning. This said, the beginning and end of this chapter do convey some of the exciting possibilities in this branch of biology. Particularly fascinating is the use of cloning as a tool for discovering and analysing families of peptides that are processed from a single parent polypeptide. The full power of this technology is now being applied to the neuropeptides, and we can surely look forward to a review of this fast-moving field in subsequent volumes of the series.

The final chapter (T. J. Harris) is a well-written and comprehensive guide to the problems of expressing cloned genes in *E. coli*. In order to breach the prokaryote/eukaryote divide, the engineers have successfully spliced known bacterial promoters on to eukaryotic genes. Transcription *per se*, however, only solves part of the problem. Less is known about the factors that reduce or enhance rates of transcription, or about mRNA stability and translational efficiency. Problems are also posed by protein processing and modification. Some of these difficulties might be alleviated if eukaryotic hosts were used, and it is clear that this possibility is being actively pursued.

The development of genetic engineering is still very much in progress. It is the attractive feature of these books that they capture the hum of excitement, and convey

it to the reader. As long as there is life and optimism in the field, the series is bound to be a success.

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Genetic Engineering of Plants – An Agricultural Perspective. Edited by T. KOSUGE, C. P. MEREDITH and A. HOLLAENDER. Plenum Press, 233 Spring Street, New York, N.Y. (1983). $69.50. ISBN 0 306 41353 1.

The demand for food continues to grow, with a potential doubling of the world's population in the next 40 years. The problem facing plant breeders and agronomists is not only how to produce the mass of food required to sustain the world's population, but also the economics of that food production. To these ends, the improvement of a variety of characters in crop plants is sought by the breeders. Apart from a general desire to develop plants with a higher yield potential, a range of more specific characters are desired, such as resistance to pests and herbicides, tolerance to environmental extremes (water stress, salinity, temperature), decreased dependence on fertilizers and improved nutritional value of plant products. While conventional plant breeding programmes have made, and continue to make, significant advances towards these aims, attention is now turning to the newly emerging technologies of plant cell and gene manipulation to provide some input into these breeding programmes.

Genetic Engineering of Plants – An Agricultural Perspective represents the proceedings of a meeting held at the University of California, Davis, in August 1982, one aim of which was to bring together plant breeders and cell biologists to help establish a dialogue between both groups of workers. The flavour of this volume suggests that the meeting's aim was realized to a large extent, with most contributors directing their discussion towards the common goal. By choosing a good cross-section of contributors representing topics within the whole spectrum, the editors have succeeded in providing a volume which is both informative and interesting to read.

The emphasis of the book is on plant gene and cell manipulation. Several articles describe the progress being made on the isolation and characterization of plant genes, including those encoding ribulosebisphosphate carboxylase, alcohol dehydrogenase, seed storage proteins and sucrose synthetase. Transposable DNA sequences in maize, including those contained in the mitochondria of male sterile plants, are also discussed. The possibility of using transposable DNA sequences as vectors for the delivery of new genes into plant cells is raised. Other vectors for gene transfer which are discussed include both RNA and DNA plant viruses and, in an excellent review by Depicker *et al.*, the Ti plasmid of *Agrobacterium tumefaciens*. The rapid progress being made on the characterization and manipulation of plant genes inevitably means that some of these articles will soon be out of date. However, they are valuable in that they provide a framework for discussions of the direction in which the work can, or should, proceed.

The book contains several articles describing the use of cell culture techniques for transformation studies, somatic cell hybridization, mutant selection and the production of haploids. Several examples where such techniques have played a role in plant breeding are cited, and prospects for future input are critically evaluated. Physiological and genetic factors involved in host–pathogen interactions and in stress tolerance (drought and salt) are discussed. These papers tend to emphasize our lack of knowledge of the biochemistry of these processes, and the importance of considering the whole plant in any attempt to increase the tolerance levels of crop plants.

The plant breeders are represented largely by N. W. Simmonds, who provides a very