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Book review

Phytochemistry in the Genomics and Post-Genomics Eras
Recent Advances in Phytochemistry, Vol. 36; J.T. Romero, R.A. Dixon (Eds.), Pergamon, Amsterdam, 2002, 258 pages, ISBN 0-08-044116-5, €165

This volume is opportune as I found to my advantage recently. Invited to give a lecture on Phytochemistry in the Post-Genomic Age to an audience of natural product chemists, I was able to make extensive use of this volume in preparing a talk! The Phytochemical Society of North America were visionary in organising a seminal conference on the subject in Oklahoma City, OK, USA in August 2001 and this volume is the result. It focuses on the early appreciation of the ability of Genomic science to facilitate a global view of cellular processes. Key to this are the programmes aimed at determining the function of all the genes in the reference organisms, Arabidopsis and now rice where the genome is known, and for those species such as maize, wheat, tomato and Medicago where large scale EST information is being gathered. Essentially, the Post-Genomics of the title means functional genomics in the context of this volume and the Phytochemistry means acceleration of the understanding of the biosynthesis of natural products and the attendant benefits to nutrition, health medicine and overall quality of life in a global sense. Thus there are review chapters on bioinformatics for genomics, chapters dealing with the application of post-genomic technology and chapters dealing with specific case studies on synthesis of, for example, flavonoids, saponins, alkaloids and glucosinolates. Across the board, successful applications of the various technologies to accelerate progress in gene discovery, elucidation of cognate protein function, pathway engineering and metabolite profiling are described. All the authors are first rate scientists at the forefront of developments in post-genomic Phytochemistry.

One of the areas of accelerating science has been in the area of gene discovery. Several chapters highlight the contribution of mutagenesis and gene tagging that has brought this about. In the past, progress was slow since many enzymes in secondary metabolism were difficult to purify and functionally identify, with a few notable and heroic exceptions. The cytochrome P450 gene family is a classic example and it is pleasing that a contribution from the Feldmann lab is present, they having pioneered functional genomics of this vital group of proteins constituting major roles in secondary metabolism. This family crops up in other chapters while detailed molecular studies of other enzyme families such as polyketide synthases, dioxygenases and various other oxidoreductases and transferases are also to be found throughout the volume. The contribution of phytochemistry to this functional genomics is emphasised and is indeed highlighted in two ways. Identification of the cognate protein function in many of these cases has been through the use of heterologous expression of cDNAs from EST programmes. In all these cases the authors point to the multidisciplinary nature of the work and the essential role of chemistry to produce substrates and design assays to establish function. The other burgeoning area is use of metabolomics to profile the products of genetic perturbation and this too is well represented in the volume.

The editors have done a fine job assembling such a volume. They contribute an informative preface and express their enjoyment at working with the authors of the chapters. This is manifested in the final product, which is highly recommended to both experts and natural product scientists who wish to learn more about genomic biology. It certainly gives a comprehensive insight into the realities of functional genomics and related studies in a relatively concise way and always with an air of enthusiasm.

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