



BOOK REVIEW

Plant Hormone Signal Perception and Transduction, edited by A. R. SMITH, A. W. BERRY, N. V. J. HARPHAM, I. E. MOSHKOV, G. V. NOVIKOVA, O. N. KULAEVA and M. A. HALL, Kluwer, Dordrecht, 1996, 246 pp., £67.50. ISBN 0-7923-3768-9.

This volume is a collection of papers, some of which have already been published in a volume of the journal *Plant Growth Regulation*, that were presented at an International symposium on Plant Hormone Signal Perception and Transduction held in Moscow in September 1994. Faced with the ever-increasing numbers of potential signals in plants this volume deals with familiar territory, the classic plant hormones. Thus, there are 13 papers directly on auxin and fusicoccin, seven on cytokinin, two on abscisic acid, three on ethylene and miscellaneous others on aspects of signal transduction. Gibberellins may be absent, but it is pleasing to see extensive coverage of cytokinins which have so often been the 'Cinderella' subject in such treatises on plant hormones.

The approaches to understanding hormone action that are described are mainly biochemical, complementing the enormous strides made recently through use of *Arabidopsis* mutants and molecular biology to define signal perception and transduction pathways in plants. Featured are the long and often heroic efforts to chemically tag and isolate receptor proteins for each of the classes of hormones. These have eventually proven successful and some consensus is emerging on the role of each of the polypeptides identified by such methodologies. Particularly impressive are the achievements reported on the identification of auxin and fusicoccin receptors. These are, of course, indirectly related in that the binding of the respective ligand results in modulation of ion channels. This is a theme which is increasingly being observed with signalling systems in plant cells, where multiple signals may share some commonality in transduction mech-

anisms. Similar efforts described on the biochemical identification of the ethylene receptor are also commendable in the light of the great advances made through mutational analysis and also conform somewhat to this generality.

There are also papers which examine the downstream events by the identification of target genes and the controlling elements within their promoters. These types of studies indicate that multiple signals can lead to the same subset of genes being activated. There is currently much work directed at delineating the transduction pathways involved. The success with elucidating these in relation to light perception may be accompanied soon by understanding those in response to the hormones. The huge success with ethylene will hopefully be reiterated with the other hormones soon. Making such connections are the descriptions of a number of studies that identify possible components of signal transduction pathways, such as, G-proteins, 14-3-3 proteins, phospholipases and protein kinases. These are at an early, but exciting, stage and augur well for further breakthroughs in this area. This excitement is nicely captured in a final overview paper.

One depreciating side to the volume for the newcomer is another example of a slightly disturbing trend—there is no index! While the volume will be instantly accessible to those who have dabbled in the field, it makes it difficult for someone coming to the field for the first time. This is a pity because for the non specialist it is a good example of how to persevere with difficult targets in biochemistry. In any event, this is a very useful collection of papers which highlight a turning point in the understanding of plant hormones, a subject which of course goes back to Darwin.

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