Book reviews

Michell, R.H.; Putney, J.W. Jr. (eds.): Inositol Lipids in Cellular Signaling. Series Current Communications in Molecular Biology, 1st edn. Cold Spring Harbor/NY: Cold Spring Harbor Laboratory Press 1987. XI/165 pp., figs and tabs.

This latest publication in the series Current Communications in Molecular Biology put out by the Cold Spring Harbor Laboratory, is the result of a meeting of a small group of researchers brought together to consider some key aspects of the role of inositol lipids in transmembrane signaling. It is fitting that R.H. Michell was one of the organizers for this gathering and a co-editor of this book, as he was the first (in 1975) to show that inositol lipid hydrolysis somehow gives rise to an increase in cytosolic Ca^{2+}, and therefore he set the stage for this entire field of research.

A perusal of the 28 chapters presented in this book shows how many hormones and neurotransmitters use the inositol lipid signaling system in mammalian and avian cells. The system is involved in protein and fluid secretion, glycogen degradation, platelet and neutrophil behavior, photoreceptor, fertilization and cell growth, a very wide variety of cellular events. Each of the chapters presents aspects of the effects of various stimuli on phosphatidylinositol-4,5-biphosphate metabolism and the role of the breakdown products, diacylglycerol and inositol-1,4,5-triphosphate, in activating protein kinase and releasing calcium ions, respectively. Many interesting points are made in this book. For instance it is pointed out that several mammalian tissues as well as avian erythrocytes are able to synthesize inositol(1,3,4,5,6)pentaphosphate from inositol(1,4,5,6)tetraphosphate, and that this synthetic pathway is distinct from that involving agonist dependent hydrolysis of phosphatidylinositol(4,5)biphosphate. Just where the pathways converge awaits further research on the synthesis of inositol (1,4,5,6)tetraphosphate. Several chapters deal in various ways with the role of a guanine nucleotide binding protein in the regulation of phospholipase C-catalyzed hydrolysis of phosphoinositides. It seems that hormones act by binding first to a receptor, which in turn effects the guanine nucleotide binding protein, and which then leads to activation of phosphatidylinositol-4,5-biphosphate breakdown. Clearly guanine nucleotides play an important role in the inositol lipid signaling process, a fact which explains why almost half of the chapters presented in this book are devoted to the effects of guanine nucleotides and the guanine binding proteins. This then is the most hotly pursued area in this field at the moment, and it is dealt with in great depth in this book. The book finishes with a chapter on inositol lipid metabolism in the central nervous system. While the brain is by far the most heterogeneous and rich in types of chemical transduction known, and therefore cannot be used as a model for any particular one, it too has phosphoinositide-related second-messenger systems. It has a muscarinic postsynaptic receptor linked to phosphoinositide turnover.

The book is a rich source of material for anyone interested in the field, be it for teaching or research, or even for the beginner in either area, and is recommended for your library shelf.

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Plucknett, D. L.; Smith, N. J. H.; Williams, N. M.; Anishetty N. M.: Gene Banks and the World's Food. Princeton NJ: Princeton University Press 1987. 247 pp., 43 figs., 20 tabs. $ 35.00.

Those who still need to be convinced of the important function botanical gardens of the world have in ensuring the survival of mankind should read this book. It is dedicated to the memory of Nikolai Vavilov, the Russian geneticist and biogeographer, and describes all the aspects of germ plasm preservation and exchange necessary for maintaining the genetic diversity of plants.

According to current estimates, by the year 2000 the world will need an agriculture production 60% higher than the world harvest of 1980. It is not surprising, therefore, that the four authors of this book point out that we must not take the present supply of seeds and other vegetative planting material for granted. Erosion of our most important world heritage, the genetic diversity of our crop plants and their wild relatives, is imminent. In this book, the authors describe some of the lesser known cases of harvest failures due to genetic simplification of farm lands. They also show why gene banks are crucial in the global effort to conserve the eroding gene pools of crop plants. It becomes quite clear that plant genetic diversity is not evenly distributed over the world, with the tropical regions being the richest reservoirs of both known and yet unknown genes of wild species. The breeding of the IR36 line by the International Rice Research Institute (Los Baños, Philippines), is an excellent example of the use of genetic resources (rice germ plasm) in exciting and innovative plant breeding. "The bottom line in germplasm conservation is its effectiveness in serving agriculture now and in the future." Gene banks will deliver dividents that will eventually be used profitably by future generations. The growth in the number of gene banks in the last decade, especially those found in tropical and developing countries, has to a large extent been due to the International Board for Plant Genetic Resources (IBPGR), which was founded in 1974 by the FAO. The network of gene banks under the jurisdiction of the FAO require stable funding: maintaining gene pools is a long-term undertaking which needs steady support.

This book, enriched with five appendices that provide the reader with the latest available information in a nutshell, is an excellent supplement to the book of Zohary and Hopf. It is also a significant contribution to the discussion on the integration of biotechnology in maintaining genetic resources: the need for working partnerships between biotechnologists, plant breeders, and germ plasm specialists is emphasized. At this moment, over 2.5 million crop accessions are being held in germ plasm collections throughout the world – these include 1.2 million cereal samples, 368,000 food legume samples, 215,000 forage legume and grass samples, 137,000 vegetable samples, and 74,000 clones of root crops. Many gaps still remain, especially for wild species of the tropics and mountain regions. IBPGR is stressing the importance of collecting land races in isolated and remote areas. An improvement in disease and pest resistance, and tolerance to adverse soil conditions and extreme and unfavorable climates are the goals of future breeding programs. Germ plasm collections will therefore be very useful in raising agricultural productivity.

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