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Book review

Neurotransmitters in Plant Life
V.V. Roshchina; Science Publishers, Enfield, New Hampshire, 2000, 283 pp., ISBN 1-57808-142-4 $87.50

This book is definitely coming at the right time. Although the title might sound far-fetched, it is becoming clear that molecules known as neurotrasnmitters are of extreme importance for plant cells too. Victoria V. Roshchina extensively reviews all available data related to acetylcholine, catecholamines, serotonin, and histamine in plant cells. The first chapter deals with the synthesis, metabolism, and occurrence of these neurotransmitters in plants. Subsequent chapters focus on diverse responses of plant cells to these compounds and highlights physiological roles of neurotransmitters in plants. The author is also trying to give, from place to place, introductory information about roles of these substances in neuronal cells. However, the latter data are slightly out of date.

This book is very useful for those who would like to enter this rather forgotten field of plant biology. It provides any potential reader with an extensive and well-organized source of information using almost all accessible sources. A majority of reviewed data was published in less-known and difficult accessible journals. But this book may also dissappoint; especially those readers who would expect well-founded molecular biology data. However, it is important to keep in mind that such data are simply not available yet. One reason for this situation is that this field was never taken seriously by the mainstream of plant biologists. Nevertheless, there are emerging signs which suggest that this field has great prospects. For instance, the latest advances of molecular biology, especially the currently available genome projects, have surprisingly revealed that plants express several proteins analogous to those which regulate and drive vesicle-mediated synaptic transmission in neurons. Here we can mention especially glutamate receptors, synaptotagmis, and copines. Importantly, these proteins are missing from unicellular organisms. However, there are also other relevant membrane trafficking molecules shared by animals, humans and plants, but missing from unicellular eukaryotes, like annexins, tetraspanins, and secretory carrier membrane proteins (SCAMPs). Moreover, there are several other neurologically active compounds of plant origin, which are not mentioned in this book, like BMAA, kainate, nicotine, cocaine, caffeine, and endocannabinoids. All available data seem to converge towards a concept according that higher plant cells use some form of neuronal cell-to-cell communication allowing them to harmonize their indeterminate growth and development according to the actual environmental resources and conditions.

For many years, plant biologists have been puzzled with examples of telecommunication in plants. We can just mention phenomena like rapid effects of root exposure to salinity and water stress on the leaf stomata, systemic acquired resistance, and mechano-sensitive leaves of *Mimosa*. It is becoming obvious, that plants are capable of rapid long-distance signalling and that their growth and development has some degree of neural-like coordination. Recently, a number of exciting discoveries in plant cell biology indicate that some aspects of cell-to-cell communication in higher plants show, surprisingly, neuronal-like features. We can just hope that the book '*Neurotransmitters in Plant Life*' by Victoria V. Roshchina will stimulate new studies devoted to this exciting field of plant biology.

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