



Signalomics: Diversity and Methods of Analysis of Systemic Signals in Plants

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Résumé en anglais

We provide a brief definition and history of signals, pointing out how differences in body plan between plants and animals require fundamentally different signaling mechanisms, and then list the diversity of chemical and physical signals along with their pathways of transmission, providing details on molecular signals and focusing on the phloem and xylem as being the main conduits for (rapid) systemic signaling. The two major electrical (action potentials and variation potentials) as well as hydraulic signals are then described. The latter part of the chapter deals with methods of analysis of molecular signals, including accessing the phloem and identifying the array of gene products transported therein. A description is provided of the modern methods used in metabolomics and phenotyping to analyze the metabolic consequences of signal action. Conventional techniques for analyzing electrical and hydraulic signals and their ionic components using electrodes are then furnished. Finally we describe novel techniques developed recently in the animal field using fluorescence to monitor real-time changes in membrane potential, which could be adapted for plants to open up new vistas in our understanding of electrical signals in plants.

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