

# **MECHANISM OF CYTOKININ TRANSPORT ACROSS PLASMA MEMBRANE AND THEIR METABOLISM IN TOBACCO BY-2 CULTURED CELLS**

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Cytokinins (CKs) are plant hormones that play a major role in a number of developmental processes in plants. Those include promotion of cell division, active growth and differentiation, and maintenance of sink-source relationships, as well as control of environmental stress responses. Native CKs are low-molecular derivatives of adenine which seem to act either as paracrine or as long-distance signals. Due to their numerous physiological effects, plants have to precisely control the occurrence of bioactive CK molecules on the levels of the whole plant, its organs, tissues as well as single cells. To achieve this, a concerted action of metabolism and transport processes is required.

Studies of the kinetics of CK translocation across plasma membrane in BY-2 suspension-grown tobacco cells suggested the existence of energy-dependent, partially selective transport routes for CK bases and CK ribosides. HPLC analysis of the metabolites of accumulated CKs pointed at their fast degradation or metabolic conversion into physiologically inactive forms. The prevalent ways of inactivation were the degradation to adenine and phosphorylation or phosphoribosyl transfer to form the nucleotide relevant to the particular, [<sup>3</sup>H]-labelled CK. Analysis of crude extracts of CK oxidase/dehydrogenase enzymes from BY-2 revealed their highest affinity towards isopentenyladenine and found their activity dependent on concentration of externally supplied CK.

Together these results suggest a close link between the ability of plant cell to transport CKs across plasma membrane and its capability of a prompt metabolic inactivation of these signalling molecules. They also highlight the rapidity and robustness of metabolic changes in cells related to CKs.