relation to the emission of the 'daughter-nucleoli'. They also permit us to affirm that the amphinucleoli, even though they do not have RNA which is cytochemically discloseable, do, however, possess, RNA at a very high rate of turnover. There are even seats of analogous processes[8], in the growing oocytes of *Limnaea stagnalis*, the so-called 'para-nucleolus' (without vacuoles and which does not incorporate uridin-H^3) and the 'amphinucleolus' (which becomes vacuolate and incorporates uridin-H^3). The different sizes and the different density of the granulations shown under the electron microscope in the oocytes of *Patella coerulea* give support to the idea that the ribonucleoproteins have a different ultrastructural expression in the primary nucleolus and in the amphinucleoli.

With reference to the recent research of GOESSENS[9], which demonstrated in the 'centres fibrillaires' of the nucleoli of the tumoral cells of Ehrlich the presence of DNA, although in very small quantity, we are not able to confirm analogous results in the material we undertook to examine. As to the RNA of the primary nucleolus, we have positive indications for its presence in order to prepare the proteic yolk in the cytoplasm, at the present stage, we have no indications for the meaning to be attributed to the RNA of the amphinucleoli.

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Biphasic Regulation of Transport Through Plant Cell Membranes by Kinetin and its Possible Relation to Directed Transport Between Source and Sink

J. ŠONKA[1]

Abteilung Biologie II der Universität Ulm, Oberer Eselsberg, D–7900 Ulm (German Federal Republic, BRD), 24 November 1975.

Summary. The significance of a biphasic dose-response curve of kinetin for the source-sink relation is shown. Such a regulator can create simultaneously both source and sink.

LÜTTGE[2] has recently reviewed the 'source-sink hypothesis' of transport in plants (based on the work of ARISZ[3]). He used the term 'source-sink gradient' to describe how a substance may diffuse from a region of higher concentration (source) to a region of lower concentration (sink) through the symplast. A diffusion region is present between source and sink. However, in order that source and sink should possess some sort of stability, there must not only be a concentration gradient in the diffusion space, but both source and sink must be capable of being enclosed so that submission and uptake of the substance may be regulated, and only concentrations outside these enclosed spaces are relevant for the diffusion. One must therefore search for a mechanism allowing simultaneous regulation at both sites.

The attraction of substances by kinetin[4] was described in terms of a single control point, i.e. that of the sink. The possibility simultaneously to regulate both processes, uptake in the sink and submission in the source, can be found by interpreting 2 previous papers[5,6]. A biphasic dose-response curve was found in experiments on the

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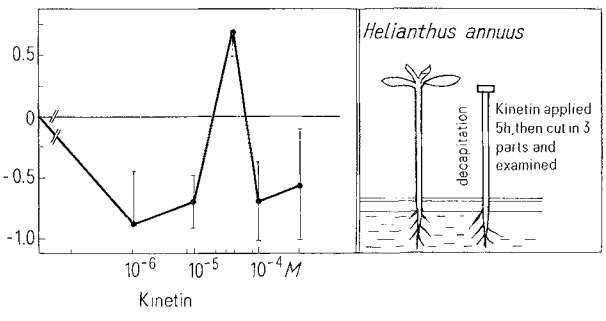

Fig. 1. Short review of the results from a previous paper[5]. Right: Data about the method. Potassium content of hypocotyl segments was measured by means of flame photometry. Left: Dose-response dependence of the potassium content of the hypocotyls upon the concentration of the kinetin solution. No significant difference between the respective segments could be found. Since an excess of kinetin (in comparison with the naturally occurring amount) had to be applied, no natural conditions with respect to gradients can be created. The resulting curve does not simulate natural relations of transport regulation but shows the reaction of cells.

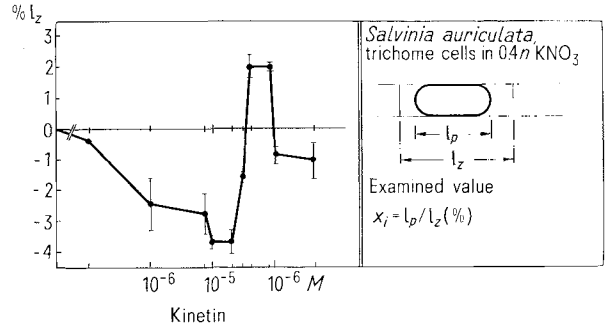

Fig. 2. Short review of the results of a previous paper[6]. Right: Data about the method (plasmometric measurements). Left: Dose-response dependence of the degree of plasmolysis upon the concentration of kinetin in the pretreatment medium (water-3 h). Since the correlation of the plasmolytic behaviour of the cells with changes of their potassium content could easily be shown, this curve can be compared with the curve from Figure 1. Measurements on single cells and on complex parts of plant tissue gave the same results.

attraction of potassium by kinetin in the hypocotyls of *Helianthus annuus*[5] (Figure 1). In *Salvinia auriculata*, the dependence of both plasmolysis and potassium content on some kinins was found to follow a similar dose-response curve[6] (Figure 2).

From these experimental data the following concept can be derived (compare its graphical form in Figure 3): Making the initial supposition of a hormone with a monotone gradient in the tissue, and a biphasic dose-response dependence of the transport of some substance on hormone concentration, there must then exist in the tissue both regions 1. which submit and 2. regions which take up the substance 1. into and 2. out of the diffusion space. This is a purely logical statement based on some not very unlikely premises. Knowledge of the distance and compartment over which such a mode of transport can occur must be provided experimentally. However, the difficulty of finding useful experimental systems for this purpose has to be pointed out. Some authors report results about regulated transport of substances between cells without plasmatic connections[7–9]. The regulation of the submission in such systems is also very probable. Experiments with strophantine[6] led to the supposition that this regulation may only conceivably be carried out by the membranes. This is the reason (in the case of the plasma-lemma) for considering the apoplasmatic space as a diffusion space between source and sink which then are particular cells.

In conclusion, the proposed hypothesis can be examined in every system in the plant where the transported substance moves from the source to the diffusion space and from that to the sink over regulatable sites. A dominating role of the membranes in such a process is very probable.

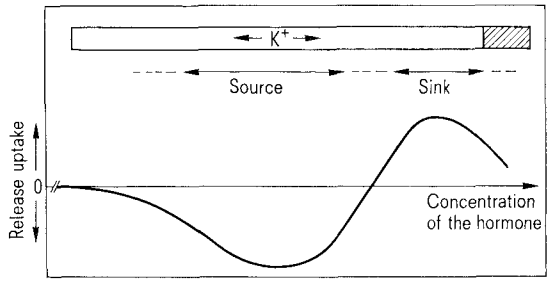

Fig. 3. Projection of a dose-response curve introduced above along a hypothetical part of tissue with the resulting responses (source, sink) on the different hormone concentration (site of the hormone production is hatched).

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The Accessory Salivary Gland as the Source of Water in the Saliva of Hemiptera: Heteroptera

P. W. Miles and Danuta Slowiak

Waite Agricultural Research Institute, Department of Entomology, University of Adelaide, Glen Osmond (South Australia 5064), 9 February 1976.

Summary. Ablation of the accessory salivary glands of a pentatomid and of a coreid reduced quantitatively the flow of alkaline, watery saliva that can be induced by topical application of pilocarpine.

It has been assumed that the accessory salivary gland in the Heteroptera – and, where one has been identified, in the Homoptera – functions to recycle or excrete ingested water[1,2]. The evidence, although often strong, has so far remained circumstantial. At the same time, digestive enzymes have been reported in the accessory gland of mirids[3] and polyphenol oxidases and peroxidases have been shown to be secreted by the accessory gland of Heteroptera[4]. The two functions: excretion of excess water and secretion of salivary enzymes would not seem entirely compatible and hence direct evidence was sought for the function of the accessory gland in contributing to salivary water.

Incubation of the accessory gland of *Poecilometis punctiventris* (Stål) (formerly *Eumecopus punctiventris* Stål[5]) (Pentatomidae), or of the whole salivary apparatus, either on its own or still attached to the head capsule, with 10^{-8} *M* 5-hydroxytryptamine in the saline used by Berridge and Prince[6] for Caliphora salivary glands did not result in secretion of saliva in vitro. A saline developed in this laboratory for maximum longevity of muscular tissues in vitro (cricket sperm, cockroach heart, and a variety of structures from Heteroptera)[7] kept salivary glands of *Poecilometis* contracting rythmically for over 24 h, but again addition of 5-HT at 10^{-8} *M* or higher concentration failed to elicit discharge of saliva from the salivary ducts.

Secretion of saliva by intact Heteroptera and ticks can be induced with pilocarpine, injected as the nitrate[4] or applied topically as the free base[8]. Pilocarpine functions in vertebrates as a parasympathomimetic, acting selectively on tissues innervated by post-ganglionic cholinergic nerves; its stimulation of salivation in Hemiptera and ticks points, therefore, to central neural control of salivation in these organisms. The innervation of the salivary glands of *Poecilometis* proved complex, the accessory gland receiving fine connexions from the suboesophageal salivary nerve, the prothoracic part of the ventral ganglionic mass, and part of the stomatogastric system innervating the pericardial muscles[9].

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