

## P-23

### The Cytotoxic Mechanisms of *Bacillus thuringiensis* $\delta$ -endotoxin, a Bioinsecticide : Effect on $K^+$ Channel of Insect Cell Lines.

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The cytotoxicological effect of *Bt*  $\delta$ -endotoxin, well-known as a bioinsecticide, was investigated on ion channel of insect cell lines. This study attempted to evaluate the specificity by simple experiment to measure the cell swelling using lepidopteran cell lines in isotonic solution containing only one cation.

Cell swelling was stimulated in KCl-sucrose isotonic solution as well as TC-100 media containing solubilized crystal  $\delta$ -endotoxin. It suggested that the cell swelling by *Bt* toxin have a relation to  $K^+$  channel. The cell swelling may be due to the stimulation  $K^+$  influx and simultaneously the penetration of  $H_2O$  induced by *Bt* toxin, because the stimulation of swelling was observed with the solubilized toxin in KCl-sucrose isotonic solution, but not in sucrose isotonic solution. Moreover the specific  $K^+$  channel blocker, such as 4-aminopyrimidine(4-AP) and ouabain, showed the significant effect on the cell swelling induced by *Bt* toxin. The increase of the cell swelling induced by 4-AP suggested to be caused by the block of  $K^+$  efflux through  $K^+$  leak channels. The inhibition of cell swelling by ouabain, which is the well-known inhibitor of  $Na^+$ ,  $K^+$ -ATPase, suggested to be due to decrease of  $K^+$  influx following diminishment of  $Na^+$ ,  $K^+$ -ATPase activities.

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