

**SL204**

**EFFECTS OF PROTEIN KINASES ON PROTEIN  
PHOSPHORYLATION AND PLANT DEVELOPMENT**

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**ABSTRACT**

The effect of activator and inhibitor of the second messenger-mediated signal transduction system in animals was investigated to determine possible interactions with plant cell development. To determine whether PKC-like isozymes were involved in the development of plant cells the physiological effects of phorbol esters and the distribution of PKC-like protein was examined in several plant species. Development of adventitious shoot was significantly promoted by treatment with TPA. In contrast, treatment of mature somatic embryo with mTPA, a negative control of TPA, was effective in decreasing kinetin-induced adventitious shoot development. Antibodies raised against the  $\alpha$ -,  $\beta$ -,  $\delta$ - and  $\epsilon$ -PKC polypeptides were used to test for the presence of PKC in the zygotic embryo of *Brassica rapa*, *Zea mays*, and *Ginkgo biloba*. Western blot analysis with anti-PKC antibodies identified three major bands, 34-, 46- and 54-kDa, in plant species. Moreover, the protein expression and phosphorylation of stathmin-like protein was also investigated in plant species. On the immunoblots, a single 19-kDa protein was detected in rapid cycling *Brassica rapa* somatic cells by the 3038 polyclonal antibody prepared against a synthetic polypeptide of rat stathmin. Transgenic rapid cycling *Brassica rapa* was also used as tools for studying the mechanism of hormone action in plant cells.