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BRIEF COMMUNICATION

The effect of chloramphenicol on the growth and xylogenesis in callus of *Haplopappus gracilis*

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Abstract

The effect of chloramphenicol (CP) on the differentiation of callus cells of *Haplopappus gracilis* into tracheary elements (TE) was studied. CP (1 mg l^{-1}) added to the medium stimulating the differentiation was shown to have an inhibitory effect. This observation points to the importance of the impaired functions of mitochondria in the processes leading to the differentiation of callus cells into TE.

Exocystosis of vesicles which contain cellulose synthesizing enzymes important for cell wall building was shown to depend on calcium-dependent phospholipid-binding proteins (Blackbourn *et al.* 1991). The state of mitochondria may affect changes in the intracellular Ca^{2+} level and in that way influence exocytosis. CP, a well-known inhibitor of protein synthesis on 70S ribosomes, was also found to inhibit animal cell differentiation (Laeng *et al.* 1988, Korohoda *et al.* 1993). In this paper the effect of CP on the differentiation of callus cells into TE was studied.

Callus tissue of *Haplopappus gracilis* (Nutt.) A. Gray was cultured in the dark at 27 ± 1 °C on a basic nutrient medium, solidified with agar, prepared according to Eriksson (1965). Cells of the callus do not differentiate: only in very old cultures some of the cells develop into TE. For experiments callus tissue was cultured on agar medium without sucrose which stimulated differentiation of callus cells (Kuternozińska *et al.* 1988). Other pieces of tissue were grown on medium without sucrose, but supplemented with CP (1 mg l^{-1}). The control callus was cultured on

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the basic medium. The number of TE in 100 mg of fresh mass was estimated 5 d after transfering the callus onto changed culture media as described in Kuternozińska *et al.* (1991).

The number of callus cells differentiating into TE after 5 d of culture on medium without sucrose increased significantly (more than three times) in comparison to the cells of control tissue (Fig. 1) where the number of TE did not exceed one hundred per 100 mg of tissue. CP added to the medium at the concentration of 1 mg l^{-1} inhibited differentiation of the cells into TE caused by lack of sucrose.

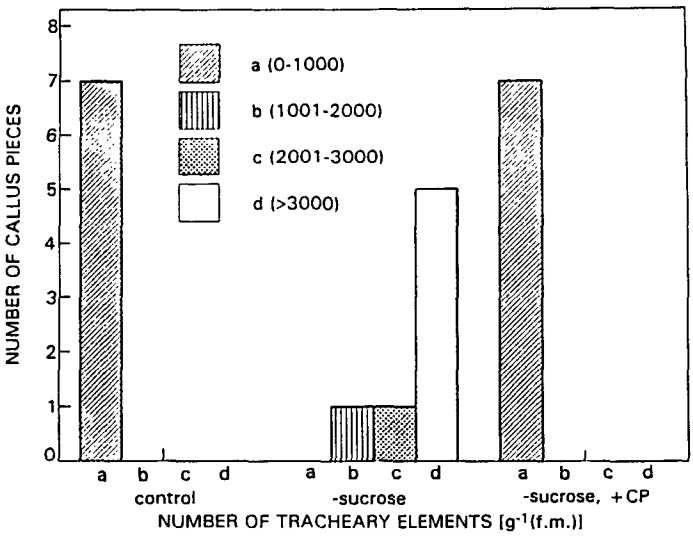

Fig. 1. The effect of chloramphenicol (CP) on the number of tracheary elements (TE) in the callus tissue of *Haplopappus gracilis* after 5 d of culture on medium without sucrose. Seven pieces of tissue were grown on control and changed media (*-sucrose* - callus grown on medium without sucrose; *-sucrose + CP* - callus grown on medium without sucrose but to which CP at the concentration of 1 mg l^{-1} was added).

These results show that CP inhibits differentiation of callus cells into TE even though the culture conditions favour the differentiation (stress caused by sucrose starvation). Cells of the studied callus do not contain chloroplasts, they only contain 70S ribosomes, mitochondria and proplastides. These observations point to the importance of impaired functions of mitochondria for differentiation processes occuring in plant cells. It does not mean that proteins whose synthesis was blocked by CP are directly involved in the processes leading to cell differentiation into TE. We cannot exclude the possibility that proteins involved in other processes (*e.g.* calcium release from mitochondria) can also influence the differentiation. Many enzymes which guarantee a regular course of events occuring in cells are built from several subunits encoded by both nuclear and organelle DNA (Van den Bogert *et al.* 1988). Interference with those processes may also lead to the inhibition of the differentiation. The state of mitochondrial genome seems to be important not only for

differentiation (Laeng *et al.* 1988, Korohoda *et al.* 1993) but also for such processes as utilization of polysaccharides by yeast (Parikh *et al.* 1987) and cell aging (Richter 1988).

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