

The involvement of protein *N*-glycosylation in growth processes of *Linum usitatissimum* L.

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Abstract

The effect of tunicamycin, the inhibitor of protein *N*-glycosylation, on the root and hypocotyl growth of flax seedlings (*Linum usitatissimum* L.) was studied. It is known that tunicamycin inhibits the first stage of the formation of the oligosaccharide precursor, which is necessary to initiate the synthesis of *N*-glycoproteins by inhibiting the activity of *N*-acetylglucosamine phosphotransferase. The blocking by tunicamycin (25 μM) the early stages of *N*-glycoprotein formation induced growth inhibition in flax seedlings depending on the age of the plants. So one-day-old seedlings, tunicamycin significantly suppressed the growth of hypocotyls and main roots but the inhibitory effect of the antibiotic on the roots was more significant. The tunicamycin effect on the hypocotyl growth began to appear 60 h after using the inhibitor, while the roots completely stopped growth after 30 h. In two-day-old tunicamycin-treated seedlings, hypocotyl elongation proceeded at approximately the same rate as in untreated plants and suppression of root growth was manifested only for 60 h. The vital staining of ER (Endoplasmic Reticulum)-structures of control and tunicamycin-treated one-day-old flax seedlings by using of ER-TrackerTM Green dye revealed the growth inhibition was accompanied by the changes in the ER morphology. These results indicate the accumulation of misfolded proteins in the ER-lumen, due to an interruption in *N*-glycosylation of proteins. Thus, it is obvious that the process of *N*-glycosylation is necessary for the normal growth and development of flax seedlings, and the plant phenotype will be determined by a change in the status of *N*-glycosylation of specific glycoproteins.

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