DIFFERENT EFFECTS OF SUGARS ON GROWTH REGULATION IN *Arabidopsis thaliana*

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Sugars are not only energy sources, but also important molecular signals that regulate growth, development, and response to environmental stresses. In plants, sucrose (Suc) is the main sugar for systemic transport and a specific signaling pathway for this disaccharide has been described. Although, the underpin sensor and mechanism are still unknown. Besides, it was proposed than Suc could be an antioxidant metabolite, especially when it is present at high concentrations, acting as ROS scavenger. On the other hand, glucose (Glc) is sensed through dependent and independent mechanisms of hexokinase. To gain insights into these subjects, we studied the effects of different sugars on the activation of root meristems (RAM) and redox homeostasis in *Arabidopsis thaliana*. The results showed that exogenous Suc and Glc differently induced the root growth, and fructose in a minor extent, depending on their concentrations. In contrast, trehalose (Tre) was not able to affect the root length. Besides, endogenous increment of Tre/Tre-P levels using a trehalase inhibitor, validamycin-A, did not induce the quiescent meristem. To test the putative protective role of sugars, we analyzed the effect of the different sugars on the inhibition of RAM produced by oxidative stress. The data indicated that only the addition of Suc could override the negative effect of methyl-viologen on root growth. Moreover, we measured the activity of Target Of Rapamycin (TOR), a master integrator of external and internal signals that regulates growth and development in eukaryotes. Results revealed differences on the kinase activity in seedlings grown with distinct sugars. In summary, we propose that sugars regulate growth differently, being their nature and concentration crucial for the effect, through a diverse action on ROS homeostasis.
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