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Indole-3-butyric acid promotes adventitious rooting in *Arabidopsis* thin cell layers

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Adventitious roots (ARs) are post-embryonic roots formed *in planta* by tissues of the primary root in secondary vascular structure and by tissues of the aerial organs. Indole-3-acetic acid (IAA), and its natural precursor indole-3-butyric acid (IBA), control AR formation *in planta* and *in vitro*, however IBA roles is still far to be elucidated. *Arabidopsis* thin cell layers (TCL) consist of stem inflorescence tissue external to the vascular system and 10 µM IBA applied with 0.1 µM Kinetin induce AR formation from stem TCL. In the *Arabidopsis* transversal stem cuttings, it has been hypothesized that the induction of AR formation by exogenous IBA occurs by an interaction with the endogenous IAA content, but there is no information about the interaction between the two auxins in the TCLs. In *Arabidopsis* seedlings, it has been demonstrated that IBA is sufficient to stimulate IAA transport because PIN-FORMED1 (PIN1) IAA-efflux carrier, auxin resistant1 (AUX1) and like auxin resistant3 (lax3) iaa-influx carriers are active also in the presence of iba alone. The weak ethylene-insensitive2/anthranilate synthase alpha1 (*WEI2/ASA1*) and wei7/anthranilate synthase beta1 (*ASB1*), are genes involved in IAA-biosynthesis and required for AR formation in *Arabidopsis* seedlings. It is unknown whether the same genes are involved in AR-formation by TCLs. The aim of the research was to determine the endogenous levels of IBA and IAA at the onset of the culture in *Arabidopsis* TCLs. Another aim was to understand whether IBA alone was able to induce AR formation in TCL, whether the IAA transport by PIN1, LAX3, and AUX1 was affected, whether an IBA conversion into IAA was needed, and whether an IAA biosynthesis by WEI2/ASA1 and WEI7/*ASB1* was also involved. Results indicate that IBA induced AR-formation by conversion into IAA, with this process involving nitric oxide formation and activity, and by positively affecting IAA-transport and ASA1/*ASB1*-mediated IAA-biosynthesis.

Biography

Federica Della Rovere investigated the mechanisms affecting the initiation and development of adventitious roots *in planta* and *in vitro* systems, with a special interest in the genetic control affecting this organogenic process and in the definition of stem cell niche of the apical root meristem in *Arabidopsis*. She is also interested in the somatic embryogenic process in numerous species, and the genetic and hormonal control involved in xylogenesis.

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