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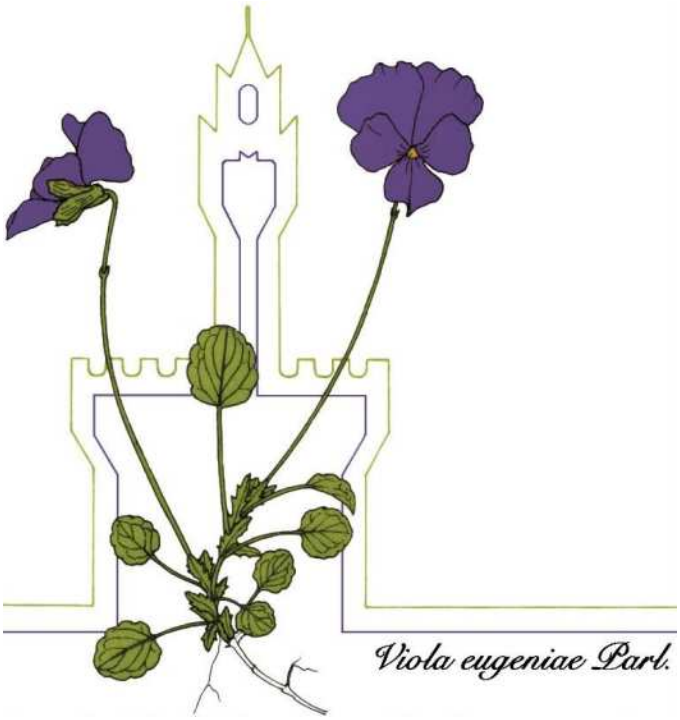

Volume degli abstract

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2 = Jasmonate and nitric oxide roles in the control of xylary cell formation and identity in Arabidopsis seedlings

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In basal hypocotyls of dark-grown Arabidopsis seedlings, xylary cells may form from the pericycle as an alternative to another developmental program, i.e. adventitious roots. It is known that several hormones may induce xylogenesis, as jasmonic acid (JA), indole-3-acetic acid (IAA) and indole-3-butyric acid (IBA), which also affect xylary cell identity. Recent studies with the ethylene (ET)-perception mutant *ein3eil1* and the ET-precursor 1-aminocyclopropane-1-carboxylic acid (ACC) have shown ET involvement in IBA-induced ectopic metaxylem. Nitric oxide (NO) is a reactive free radical molecule, which acts as a messenger in several cell differentiation events, including programmed cell death, moreover it can be produced after IBA/IAA-treatments influencing JA signalling and interacting positively/negatively with ET. To date, NO involvement in ET/JA-mediated xylogenesis has never been investigated.
The aim of the present research was to determine the involvement of JA, ET and NO in the control of endogenous/exogenous auxin-induced xylogenesis through a possible crosstalk mediated by EIN3/EIL1. To this aim, ectopic xylem formation was investigated in the hypocotyl of dark-grown *Arabidopsis* seedlings exposed to various concentrations of JA methyl-ester (JAMe) with/without ACC, IBA or IAA. The xylogenic response in the wild-type (wt) was compared with that of the *ein3eil1* mutant, the NO signal was quantified and the its role evaluated by measuring the effects of treatments with a NO donor/scavenger (SNP/cPTIO).
Results show that the ectopic formation of protoxylem was enhanced in the wt by JAMe when applied alone at a specific concentration (i.e. 10µM), whereas in *ein3eil1* mutant it occurred with any JAMe concentration (i.e. 0.01, 1 and 10 µM). This stimulation of xylary elements mediated by JAMe suggests that a negative interaction between JA and ET-signalling is involved in this developmental program. The negative interaction was confirmed by the reduction in xylogenesis observed in the wt after the combined application of JAMe with ACC, in comparison with JAMe alone. Nitric oxide was detected at early stages of both xylogenesis and adventitious rooting in the hypocotyl pericycle cells and its production was highly enhanced by JAMe at the highest concentration, combined or not with IBA (10 µM). Histological analyses showed that the xylary identity changed when JAMe was applied with each auxin in comparison with treatments with auxin alone. In addition, the IBA/IAA-induced adventitious rooting was increased by the same JAMe concentration enhancing xylogenesis when applied alone. This suggests a role for JA in modulating both developmental programs (adventitious rooting and xylogenesis) in the same target cells (hypocotyl pericycle cells), through an interaction with NO, as summarized in the model proposed (Fig. 1).

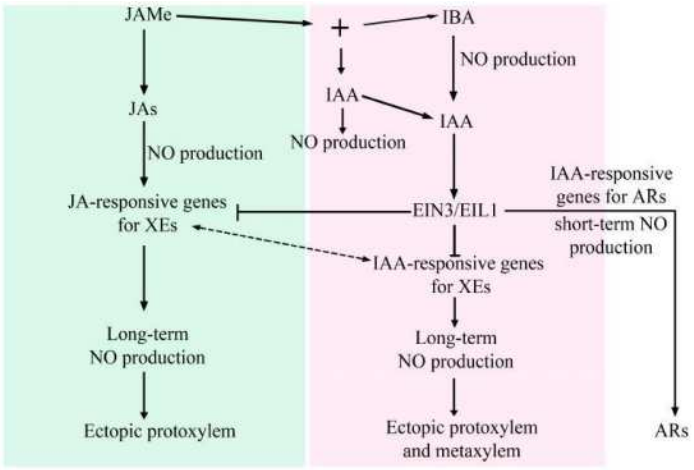

Fig. 1. Proposed model for JAs and IAA/IBA roles in the formation of ectopic xylary cells from the hypocotyl pericycle derivatives in Arabidopsis seedlings cultured with JAMe and with or without auxins.

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