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杨树试管苗嫩茎生根过程中内源IAA的免疫金银定位

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Immunogold Silver Localization of Indole-3-acetic Acid (IAA) During the Rhizogenesis of *In Vitro* Poplar

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摘要 生长素类物质在木本植物生根过程中发挥重要作用。杨树生根与生长素的关系及生根过程中内源激素的变化已有大量报道, 而生根过程中生长素的组织定位分析则尚未见报道。该文应用免疫化学分析方法对741杨(*Populus alba* × (*P. davidiana* × *P. simonii*) × *P. tomentosa*)嫩茎生根过程中内源IAA在组织中的分布进行了研究。结果显示, 741杨的嫩茎在无外源激素的1/2MS培养基上诱导10天后可生根, 14天后生根率达100%。诱导前, 嫩茎基部组织中几乎没有IAA信号; 诱导8天后, 嫩茎基部维管组织中有大量的IAA积累, 而且中部的维管组织中也有明显的IAA信号(主要分布在韧皮部和维管形成层); 10天后, 形成不定根原基, 此时IAA主要分布在根原基; 12天后, 根原基分化成不定根并突破表皮, IAA在不定根中的分布主要集中在根尖和中柱。该文对741杨的嫩茎生根过程中IAA的组织分布特点及运输途径进行了讨论。

关键词: 不定根 吲哚乙酸 免疫金银定位 741杨 嫩茎

Abstract: Endogenous auxin, or indole-3-acetic acid (IAA), plays a central role during root induction in woody plants. The relationship between auxin and root formation and the changes in levels of endogenous hormones in the rhizogenesis of poplar has been studied for many years, but the tissue-specific localization of auxin in rhizogenesis has not been reported. We investigated the distribution of endogenous IAA in shoots of poplar *in vitro* using immunocytochemistry during root induction. Poplar 741 shoots were rooted at day 10 of *in vitro* culture on 1/2 MS medium without exogenous growth regulators. The rooting rate was up to 100% at day 14. Before root induction, a weak signal was detected throughout the basal region of the freshly excised shoots. At 8 days after induction, a strong IAA immune reaction was observed in the vascular bundle tissues of the basal region of the shoots, and the vascular bundle tissues of the middle region also showed an IAA signal mainly distributed in phloem and vascular cambium. At 10 days after induction, the cells of the vascular cambium dedifferentiated and developed into visible root primordia, which bore a strong IAA signal. At 12 days after induction, the root primordia developed into adventitious roots and broke through the stem epidermis, with marked IAA signal detected in root tips and root vascular cylinder. We discuss the characteristics of tissue-specific distribution of IAA and the likely transport route during the rhizogenesis of poplar 741 shoots.

Keywords: adventitious root IAA immunogold silver localization poplar 741 shoots

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