

研究论文

IAA和GA3对棉花短纤维突变体纤维长度的离体诱导作用

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收稿日期 2003-12-1 修回日期 2004-4-4 网络版发布日期 接受日期

摘要 以棉花等基因系超短纤维突变体(Ligon Li1)及其野生型(Ligon li1)为材料, 用胚珠离体培养方法, 研究IAA(生长素)和GA3(赤霉素)与纤维细胞伸长的关系。研究表明: (1) 在含单激素IAA或GA3培养基内, 离体诱导突变体胚珠产生的纤维长度分别约为1.86 mm和2.1 mm, 比在对照(不含激素)培养基内的纤维长度分别增长86%和110%, 说明外源激素IAA或GA3对突变体纤维伸长能力的缺损有补偿作用。(2) 在同时含有IAA和GA3两种激素的培养基中, 突变体和野生型胚珠产生的纤维长度分别为3.41 mm和7.23 mm, 是它们在田间自然条件下纤维长度的76%和24.3%, 均显著高于只含一种激素培养基内的纤维长度, 说明IAA与GA3间在诱导纤维伸长上有协同作用, 而且, 这种作用对突变体比对野生型大3.1倍, 即在一定程度上能解除突变体纤维伸长受到的阻碍。(3) 突变体胚珠在含GA3和IAA培养基内经培养21 d后, 胚珠IAA和GA3平均含量, 虽稍高于对照培养基内野生型胚珠的含量, 但明显小于GA3和IAA培养基内野生型胚珠的平均含量, 而且其纤维长度也显著小于野生型的纤维长度。说明在离体培养条件下, 突变体的纤维伸长比野生型需更高的胚珠GA3和IAA水平, 但由于突变体在遗传上的缺损, 外源GA3和IAA尚不能完全解除突变体胚珠纤维伸长受到的限制。这可能与突变体胚珠利用外源激素能力不及野生型胚珠有关。

关键词 [IAA \(生长素\)](#) [GA3 \(赤霉素\)](#) [纤维伸长](#) [胚珠培养](#)

分类号 [S562](#)

Inducement of Fiber Cell Elongation from Ovule of Lintless Mutant (Ligon Cotton, *Gossypium hirsutum* L.) in vitro with IAA and GA3

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Abstract The effects of GA3 and IAA on fiber cell elongation were studied by in vitro cotton ovule culture and by comparison of a lintless mutant (Ligon cotton, Li1) with its wild type (li1) in upland cotton (*Gossypium hirsutum* L.). The results showed that: (1) In the media containing only IAA or GA3, the fiber length of mutant induced by in vitro ovule culture were 1.86 mm or 2.1 mm, increasing significantly 86% or 110% over that in the CK media (without hormone). It was confirmed that each of two hormones had a compensatory effect on deflection of mutant in fiber elongation. (2) Mutant and wild type ovules produced 3.41 mm and 7.23 mm fibers in length respectively when cultured in the IAA+GA3 media, which were 76% and 24.3% of the natural length when grown in the field, and significantly longer than those in the single IAA or GA3 medium. This indicated that there was a good cooperation between IAA and GA3 in the inducement of fiber elongation, which effect was 3.1 times more in the culture of mutant ovule than in the culture of wild type ovule, suggesting that cooperation effect of the two hormones could alleviate the restriction of fiber elongation caused by some defects of mutant in some degree. (3) The mutant ovules cultured 21 days in the GA3+IAA media contained a little higher content of GA3 and IAA than the wild type ovules in the CK media, but much lower than the average content of that in the IAA+GA3 media, moreover, the former had significant shorter fiber than the latter. This indicated that the high contents of GA3 and IAA were necessary for mutant fiber elongation, but by which the restriction of fiber elongation in mutant still could not be completely alleviated because there might be some other unknown inhibitory factor(s) to make mutant ovule lower ability in utilization of exogenous hormones than wild type ovule.

Key words [IAA \(Indole-3-acetic acid\)](#) [GA3 \(Gibberellic acid\)](#) [Fiber elongation](#) [Ovule culture](#)

DOI:

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