

研究论文

4个棉花ADF基因的分子鉴定及其差异表达

张成伟*, 郭林林*, 王秀兰, 张辉, 石海燕, 许文亮, 李学宝

华中师范大学生命科学学院, 武汉 430079

收稿日期 2006-5-12 修回日期 2006-8-25 网络版发布日期 2007-3-13 接受日期

摘要

肌动蛋白解聚合因子 (actin-depolymerizing factor, ADF) 是一种在真核生物中广泛存在的低分子量的肌动蛋白结合蛋白, 它在调控细胞内肌动蛋白纤维的解聚合和再聚合中起着关键作用。我们在棉纤维 cDNA 文库中分离克隆了 4 个 ADF 基因 (cDNAs), 分别命名为 GhADF2, GhADF3, GhADF4, GhADF5。GhADF2 cDNA 长度为 705 bp, 编码 139 个氨基酸; GhADF3 cDNA 长度为 819 bp, 编码 139 个氨基酸; GhADF4 cDNA 长度为 804 bp, 编码 143 个氨基酸; GhADF5 cDNA 长度为 644 bp, 编码 141 个氨基酸。分析表明, GhADF2 与 GhADF3 的氨基酸序列同源性为 99%。而且, GhADF2/3 与矮牵牛 PeADF2 之间的氨基酸序列同源性也高达 89%。GhADF4 与拟南芥 AtADF6 的亲缘关系较近, 二者的氨基酸序列同源性为 78%。GhADF5 与拟南芥 AtADF5 的亲缘关系较近, 氨基酸序列的同源性为 83%。上述结果表明植物 ADF 基因在进化中具有高度保守性。RT-PCR 分析表明, GhADF2 在纤维中优势表达, 而 GhADF5 基因则在子叶中表达量最高。另一方面, GhADF3 和 GhADF4 似乎不具有组织特异性或偏爱性表达。同一组织中不同 GhADF 基因表达量有较大的差异, 表明它们可能涉及棉花不同组织生长发育过程的调节。而且, 在进化过程中, 各 ADF 同分异构体之间可能发展形成某种功能上的差异性。

关键词 [棉花 ADF 基因](#); [肌动蛋白解聚合因子](#); [序列分析](#); [分子进化](#); [基因差异表达](#)

分类号

扩展功能

本文信息

- ▶ [Supporting info](#)
- ▶ [PDF\(419KB\)](#)
- ▶ [\[HTML全文\]\(269KB\)](#)
- ▶ [参考文献](#)

服务与反馈

- ▶ [把本文推荐给朋友](#)
- ▶ [加入我的书架](#)
- ▶ [加入引用管理器](#)
- ▶ [复制索引](#)
- ▶ [Email Alert](#)
- ▶ [文章反馈](#)
- ▶ [浏览反馈信息](#)

相关信息

- ▶ [本刊中 包含](#)
- ▶ [“棉花 ADF 基因; 肌动蛋白解聚合因子; 序列分析; 分子进化; 基因差异表达” 的相关文章](#)
- ▶ [本文作者相关文章](#)

- [张成伟](#)
- [郭林林](#)
- [王秀兰](#)
- [张辉](#)
- [石海燕](#)
- [许文亮](#)
- [李学宝](#)

Molecular Characterization of Four ADF Genes Differentially Expressed in Cotton

Chengwei Zhang*, Linlin Guo*, Xiulan Wang, Hui Zhang, Haiyan Shi, Wenliang Xu, Xuebao Li

College of Life Science, Central China Normal University, Wuhan 430079, China

Abstract

<P>Actin depolymerizing factor (ADF), highly conserved in all eukaryotic cells, is a low molecular mass of actin-binding protein, which plays a key role in modulating the polymerizing and depolymerizing of the actin filaments. Four cDNAs (designated GhADF2, GhADF3, GhADF4, and GhADF5, respectively) encoding ADF proteins were isolated from cotton (Gossypium hirsutum) fiber cDNA library. GhADF2 cDNA is 705 bp in length and deduces a protein with 139 amino acids. GhADF3 cDNA is 819 bp in length and encodes a protein of 139 amino acids. GhADF4 cDNA is 804 bp in length and deduces a protein with 143 amino acids. GhADF5 cDNA is 644 bp in length and encodes a protein of 141 amino acids. The molecular evolutionary relationship of these

genes was analyzed by means of bioinformatics. GhADF2 is closely related to GhADF3 (99% identity) and GhADF4 is closely related to AtADF6 (78% identity), and GhADF5 is closely related to AtADF5 (83% identity). These results demonstrated that the plant ADF genes are highly conserved in structure. RT-PCR analysis showed that GhADF2 is predominantly expressed in fiber, whereas, GhADF5 is mainly expressed in cotyledons. On the other hand, it seems that GhADF3 and GhADF4 have no tissue specificity. Expression levels of different ADF genes may vary considerably in the same cell type, suggesting that they might be involved in regulating tissue development of cotton and the each ADF isoform may diverge to form the functional difference from the other ADFs during evolution.

Key words [cotton ADF gene](#) [actin-depolymerizing factor](#) [sequence analysis](#) [molecular evolution](#) [gene different expression](#)

DOI:

通讯作者 李学宝 xbli@mail.ccnu.edu.cn