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研究论文

小麦TaLon1基因克隆与分析

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摘要 在酵母和人类中，依赖于ATP的Lon蛋白酶起着降解线粒体内非正常蛋白质和维持线粒体DNA的稳定等重要作用。本研究应用RT-PCR和RACE技术，克隆了小麦Lon蛋白酶家族的一个基因，命名为TaLon1。TaLon1和籼稻Lon1、玉米Lon1的相似性分别为94%和92%。表达分析表明，TaLon1在小麦根、叶和花药中均表现组成型表达，表明该基因在小麦的生长发育过程中很重要，起着类似管家基因的作用。在菜豆上已经间接证明Lon蛋白酶与细胞质雄性不育有一定的相关性。但在本研究中，TaLon1的表达在小麦K型细胞质雄性不育系和其他正常的品系之间没有差别。与大肠杆菌和酵母中的lon基因不同，TaLon1不能被90 min的42℃热激所诱导。另外250 mmol/L NaCl处理后，该基因的表达量下降。

关键词 Lon蛋白酶,蛋白质降解,小麦,细胞质雄性不育

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Molecular Cloning and Characterization of TaLon1 Gene in Wheat

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Abstract The ATP-dependent Lon protease plays an important role in removal of the abnormal proteins and maintaining mtDNA integrity in yeast and human. In this paper, using RT-PCR and RACE techniques, a gene that encodes a product belonging to the Lon protease family was isolated from wheat. This gene, designated as TaLon1 with similarity of 94% to Lon1 in indica rice and 92% to Lon1 in maize, was predicted to encode an 886 amino acid protein. TaLon1 showed a constitutive expression pattern in wheat, which indicating its housekeeping role in wheat. It has been indirectly demonstrated that the Lon protease was probably relevant to cytoplasmic male sterility (CMS) in common bean. But there was no difference in expression of TaLon1 between CMS lines with Agiolops kotschyi cytoplasm and normal lines in wheat. Unlike the lon gene in yeast and E. coli, the TaLon1 didn’t respond to heat-shock at 42℃ for 90 min. Furthermore, the expression of TaLon1 was reduced by salt treatment with 250 mmol/L NaCl for 24 h.

Key words Lon protease Protein degradation Triticum aestivum L. Cytoplasimic male sterility

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