

# E.coli核糖体蛋白质S12依赖链霉素突变抑制λN基因表达的分子机制

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收稿日期 修回日期 网络版发布日期 接受日期

摘要 本文利用PCR方法克隆了E. coli T83依赖链霉素(streptomycin dependent, Smd)菌株中编码突变的核糖体蛋白质S12的rpsLd基因,并进行了DNA序列分析,发现第42位密码子由编码赖氨酸(Lys, K)的AAA变为编码谷氨酰胺(Gln, Q)的CAA。依据Garnier原理预测了突变对S12蛋白质二级结构形成趋势的影响。结果表明,突变使第42位氨基酸及其相连肽段的β-转折形成趋势明显上升,相邻几个亚结构域(subdomain)的相对位置有所改变, S12蛋白质分子的整体构象随之改变。进而以核糖体RNA (rRNA)与核糖体蛋白质结构和功能相互适应为出发点,讨论S12蛋白质Smd突变抑制λN基因表达的分子机制。

关键词 [核糖体蛋白质S12](#) [Smd突变](#) [λN基因](#)

分类号

## Molecular Mechanism of Suppressing λN Gene's Expression in E. coli Ribosomal Protein S12 Streptomycin-dependent Mutant

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### Abstract

Using the polymerase chain reaction (PCR) method, the rpsLd gene was amplified and cloned, which encodes the streptomycin-dependent (Sm<sup>d</sup>) mutant of ribosomal protein S12 in E. coli T83. The result of DNA sequencing showed an AAA to CAA mutation at codon 42, leading to the substitution of glutamine (Gln, Q) for lysine (Lys, K). According to the principle of Garnier, we predicted that there might be alterations in the secondary structural propensity of protein S12 due to the mutation. The outcome indicated that the β-turn propensity at position 42 and its nearby region was increased evidently and the relative position of relevant subdomains were changed. As a result, the special conformation of the whole protein S12 was influenced. In view of that ribosomal proteins and ribosomal RNAs (rRNA) mutually adapted in structures and functions, the probable molecular mechanism that how protein S12 Smd mutant in E. coli T83 suppressed λN gene's expression is discussed.

Key words [Ribosomal protein S12](#) [Streptomycin-dependent mutant](#) [λN gene](#)

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