

银环蛇心脏毒素类似物cDNA的克隆 Cloning and Characterization of cDNAs of Cardiotoxin-like Protein in Bungarus multicinctus Venom Gland

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摘要 采用SMART技术和RT-PCR方法, 从同一个银环蛇毒腺中克隆到了5种尚未报道过的心脏毒素类似物全长cDNA序列(MNCTL1-a、MNCTL1-b、MNCTL1-c、MNCTL1-d和MNCTL2)。5种序列中, MNCTL1-b、MNCTL1-c、MNCTL1-d和MNCTL2的长度均为505 bp, 包括5'非翻译区32 bp, 3'非翻译区212 bp和其余261 bp组成的一个完整开放阅读框; MNCTL1-a由于3'非翻译区24 bp的缺失, 全长cDNA仅为481 bp。所得序列编码区部分与已报道的银环蛇心脏毒素类似物(cardiotoxin-like protein)编码区cDNA序列的同源性达95.8%以上。我们克隆到的序列编码85个氨基酸组成的心脏毒素类似物前体, 包括20个氨基酸的信号肽和65个氨基酸的成熟肽, 与已知的心脏毒素类似物氨基酸组成有很高的同源性。运用Antheport V4.5软件分析, 发现编码的蛋白质与眼镜蛇毒中心心脏毒素有相似的结构和性质, 推测它们可能有类似心脏毒素的功能。本研究首次报道了从同一个体的银环蛇毒腺中克隆到多个心脏毒素类似物全长cDNA序列, 提示银环蛇心脏毒素类似物基因在该种蛇基因组中有多个拷贝, 并在毒腺细胞中同时转录。

Abstract:The venom of elapid snakes contains a number of small proteins that display a broad spectrum of pharmacological activities. In study on the neurotoxin from the venom gland of Bungarus multicinctus, five cDNA sequences (MNCTL1-a, MNCTL1-b, MNCTL1-c, MNCTL1-d and MNCTL2) encoding two novel proteins were obtained from the total RNA by reverse transcription-polymerase chain reaction. Among them, four sequences (MNCTL1-b, MNCTL1-c, MNCTL1-d and MNCTL2) are at the length of 505 bp, composing of a 32 bp 5' -untranslational region, a 212 bp 3' -untranslational region, and a 261 bp open reading frame which encodes a 20 amino acids of signal peptide and a 65 amino acids of mature peptide. But the sequence of MNCTL1-a has only 481 bp because of a 24 bp deletion in 3' -untranslational region. Comparison between cDNA sequences obtained here and that of cardiotoxin-like protein reported by Chang previously shows a homological value above 95.8%. Computer simulation based on deduced amino acid sequences reveals that both proteins encoded by these cDNAs and cardiotoxin-like protein share similar molecular characters, suggesting their functional similarity. This result implies that multicopy genes existing in the genome of Bungarus multicinctus encode cardiotoxin-like proteins.

关键词 [心脏毒素类似物](#) [银环蛇](#) [全长cDNA](#) **Key words** [cardiotoxin-like protein](#) [Bungarus multicinctus](#) [full-length cDNA](#)

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Abstract

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