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研究论文

H1N1流感病毒聚合酶片段的CpG抑制及其对密码子偏爱性的影响

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摘要:

H1N1流感病毒的聚合酶具有RNA复制、转录等功能，并且对流感病毒片段包装、子代繁殖及宿主适应性等有着重要作用。通过分析人、猪及禽类H1N1流感病毒聚合酶片段的二核苷酸频率及同义密码子的偏爱性，发现不同宿主中，流感病毒聚合酶片段的CpG频率最低，且均被强烈抑制；通过三类宿主间的比较发现，人流感病毒抑制最为强烈，且其CpG频率随年份呈下降趋势，但2009年毒株的CpG频率突然上升。比较同义密码子使用频率发现，含有CpG的同义密码子相对使用频率均小于1，证明CpG抑制作用是影响同义密码子偏爱性的一个重要因素。以上结果暗示，CpG抑制对H1N1流感病毒的进化及跨宿主传播可能有重要影响。

关键词: H1N1 CpG抑制 同义密码子偏爱性 聚合酶

The CpG Suppression of Polymerase Segments and Its Impact on Codon Usage Bias in H1N1 Influenza Virus

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Abstract:

The polymerase segments of H1N1 influenza virus are functional for catalyzing viral RNA transcription and replication, which also play a crucial role for the virus genome packaging, propagating and host adaption. In this research, the dinucleotide frequency and synonymous codon bias in the polymerase segments of the H1N1 influenza virus which were isolated from human, avian and swain were analyzed. The results showed that the frequency of the CpG dinucleotides were the lowest and were intensively suppressed across all 3 segments. The cross host comparison showed that the lowest CpG frequency was in human H1N1 influenza virus and the trend of CpG frequency was decreasing with the years. However, the frequency raised in year 2009 which accords with the evidence that the human H1N1 virus was transmitted from foreign hosts. Analyzing the relative synonymous codon usage (RSCU) in the polymerase segments, the frequency of the codons with CpG dinucleotides were all less than 1, which indicated CpG suppression was the main factor of the synonymous codon usage in H1N1 influenza virus genome. In summary, these results indicate that the CpG suppression have important impacts on the evolution and transmission of H1N1 influenza virus.

Keywords: CpG suppression Synonymous codon usage bias Polymerase

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