J Med Virol. 2012 Mar;84(3):526-35. doi: 10.1002/jmv.23221.

The 40-80 nt region in the 5'-NCR of genome is a critical target for inactivating poliovirus by chlorine dioxide

Min Jin [1], Zu-Guo Zhao, Xin-Wei Wang, Zhi-Qiang Shen, Lu Xu, Yun-Mei Yu, Zhi-Gang Qiu, Zhao-Li Chen, Jing-Feng Wang, Ai-Hua Huang, Jun-Wen Li

Affiliations

PMID: 22246842 DOI: 10.1002/jmv.23221

Abstract

Chemical disinfection is the most common method used to inactivate viruses from drinking water throughout the world. In this study, cell culture, ELISA, RT-PCR, and spot hybridization were employed to investigate the mechanism underlying chlorine dioxide (ClO(2))-induced inactivation of Poliovirus type 1 (PV1), which was also confirmed by recombinant viral genome RNA infection models. The results suggested that ClO(2) inactivated PV1 primarily by disrupting the 5'-non-coding region (5'-NCR) of the PV1 genome. Further study revealed that ClO(2) degraded specifically the 40-80 nucleotides (nt) region in the 5'-NCR. Recombinant viral genome RNA infection models confirmed that PV1 RNA lacking this 40-80 nt region was not infectious. This study not only elucidated the mechanism of PV1 inactivation by ClO(2), but also defined the critical genetic target for the disinfectant to inactivate Poliovirus. This study also provides a strategy by which rapid, accurate, and molecular methods based on sensitive genetic targets may be established for evaluating the effects of disinfectants on viruses.

Related information

PubChem Compound (MeSH Keyword)

LinkOut - more resources

Full Text Sources

Ovid Technologies, Inc.

Wiley

Research Materials

NCI CPTC Antibody Characterization Program