Global Molecular Epidemiology of Foot-and-Mouth Disease Virus Type C

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ABSTRACT

The epidemiology of foot-and-mouth disease (FMD) continues to be a major concern for international animal health, as it can cause serious economic losses worldwide. Due to recent outbreaks of FMD in Europe, the need to understand the molecular epidemiology of the virus has increased. This review presents an overview of the molecular epidemiology of FMDV C, which is the most widespread serotype of FMDV, covering the period from 1964 to 2005.

INTRODUCTION

Historically foot-and-mouth disease (FMD) virus (FMDV) C has had a more geographic distribution compared to other types or subtypes. It has been found throughout Europe, Africa, the Middle East, and parts of Asia. However, outbreaks in other regions are less frequent and the reasons for this are unclear.

RESULTS

Total RNA was extracted from 460 samples and the VP1 region on both DNA strands (Table 1). Two to three sequencing primers were used to ensure coverage of the VP1 region. Amplicons were sequenced using the DTS Quick Start Kit (Invitrogen) and the resulting sequences were aligned with a reference sequence. The alignment was used to construct a maximum-likelihood tree (Fig.1).

DISCUSSION

The results of the molecular epidemiology of FMDV C are presented in Fig.1. The tree shows the relationships between 146 complete VP1 sequences of FMDV C. The tree is rooted with the Vaccine strain (C3/Indaial/Brazil/71 and C3/Indaial/Brazil/71 (K01202)). The tree shows that the isolates can be divided into two major lineages, C1 and C2, with several subgroups. The C1 lineage is further divided into four subgroups, C1A, C1B, C1C, and C1D.

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Fig.1: Mid-point rooted Neighbor-joining tree showing the relationships between 146 complete VP1 sequences of FMDV C. The tree is rooted with the Vaccine strain (C3/Indaial/Brazil/71 and C3/Indaial/Brazil/71 (K01202)). The tree shows that the isolates can be divided into two major lineages, C1 and C2, with several subgroups. The C1 lineage is further divided into four subgroups, C1A, C1B, C1C, and C1D.