



A Wide-Ranging Antiviral Response in Wild Boar Cells Is Triggered by Non-coding Synthetic RNAs From the Foot-and-Mouth Disease Virus Genome

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OPEN ACCESS

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Specialty section:

This article was submitted to
Veterinary Epidemiology and
Economics,
a section of the journal
Frontiers in Veterinary Science

Received: 14 April 2020

Accepted: 30 June 2020

Published: 04 August 2020

Citation:

Rodríguez Pulido M, H. B. R and
Sáiz M (2020) A Wide-Ranging
Antiviral Response in Wild Boar Cells
Is Triggered by Non-coding Synthetic
RNAs From the Foot-and-Mouth
Disease Virus Genome.
Front. Vet. Sci. 7:495.
doi: 10.3389/fvets.2020.00495

Foot-and-mouth disease virus (FMDV) is the causative agent of a highly contagious viral disease that affects multiple cloven-hooved hosts including important livestock (pigs, cattle, sheep and goats) as well as several wild animal species. Crossover of FMDV between domestic and wildlife populations may prolong virus circulation during outbreaks. The wild boar (*Sus scrofa*) is considered a reservoir of various pathogens that can infect other wildlife, domestic animals, and humans. As wild boar and domestic pigs are susceptible to the same pathogens and can infect each other, infected wild boar populations may represent a threat to the pig industry and to international trade. The ncRNAs are synthetic non-coding RNA transcripts, mimicking structural domains in the FMDV genome, known to exert a broad-spectrum antiviral and immunomodulatory effect in swine, bovine and mice cells. Here, we show the type I interferon-dependent, robust and broad range antiviral activity induced by the ncRNAs in a cell line derived from wild boar lung cells (WSL). Transfection of WSL cells with the ncRNAs exerted a protective effect against infection with FMDV, vesicular stomatitis virus (VSV), swine vesicular disease virus (SVDV) and African swine fever virus (ASFV). Our results prove the biological activity of the ncRNAs in cells of an FMDV wild animal host species against a variety of viruses affecting pigs, including relevant viral pathogens of epizootic risk.

Keywords: foot-and-mouth-disease virus, antivirals, wild boar, non-coding RNA, wildlife

INTRODUCTION

Foot-and-mouth disease (FMD) is a severe, highly contagious and transboundary viral disease that has a significant economic impact affecting the production of livestock and disrupting regional and international trade in animals and animal products. The causative agent of FMD is foot-and-mouth disease virus (FMDV), a member of the family *Picornaviridae*. FMDV isolates are classified into seven different serotypes and all of them have been found in wildlife (1). The capacity of the wild boar (*Sus scrofa*) for FMDV transmission has been reported and the prolonged viral secretion along with mild clinical disease raised the concern that wild boars may spread FMD (2, 3). However, our knowledge on the clinical manifestations of FMD in wild boars and their actual contribution to transmission during field outbreaks is very limited (4–6).