Foot-and-mouth Disease Virus
Current Research and Emerging Trends

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Foot-and-mouth disease virus (FMDV) maintains a continuing fascination not only because of its worldwide implications for economic development, but also because it makes us relive the events of an outbreak of disease upon unsuspecting areas of our planet. On top of this, many fundamental questions about its replication, transmission, detection, spread and persistence do not yet have an answer, since the virus displays unique features even when compared with its closest picornavirus relatives. As with other small viruses, FMDV is endowed with complex biological behaviour for an apparently simple pathogen.

An invitation to produce a book similar in content to the 2004 book is a clear sign that not only the first edition was well received by the scientific community, but also that many problems and questions remain, and that the unsolved issues have a very relevant scientific and economic impact in our increasingly global world. Unanswered questions are, for example, the limited knowledge about host range determinants, or the lack of cost-effective vaccines, as alternatives to the chemically inactivated conventional vaccines. The limited amount of funding devoted to FMDV research in the EU is surprising considering the potential economic impact of a disease outbreak within the EU or in neighbouring countries.

A very important change regarding the social perception of the disease has taken place since 2004. Perhaps as a result of the terrible images of mass animal slaughtering during the 2001 European epidemic, witnessed on television by the public at large, there is a growing trend to consider alternative means to deal with the disease. In particular, the non-vaccination policy and the possibility of new types of antiviral interventions are gaining impetus, and gradually diminishing the traditional support for a slaughter-based control strategy. This is reflected in renewed effort on vaccine designs and the consideration of antiviral agents to control or prevent the infection, either by administering the agents alone or as a complement to vaccination or other immunization-based interventions. This book reflects this trend by including a chapter on antiviral therapies that was not even considered in the 2004 version where small molecule inhibitors or RNA interference or silencing (to name just two points) were not even mentioned.

In planning the new volume, we have done our best as authors to invite those experts that in our view have contributed either recently or historically to construct the body of current knowledge on FMDV. Of course, they are not the only ones in this endeavour, and we apologize for any omissions of experts that could have been invited as authors. Many names are listed in a remarkable number of references that should serve as further reading to complement the core information gained by reading the 18 chapters. This book is not a reprint or even an updated version of the 2004 book. While many topics have been retained, each chapter has been written afresh, so as to include recent progress as evidenced by the large number of references to publications of the last decade. It is our hope that the present book will provide an updated overview of several interconnected aspects of FMDV and its disease, including the structure of the viral particle and encoded proteins, expression of the genetic material, natural habitats of the virus, diagnostic procedures, epidemiological spread, and control measures. As in the 2004 book, great attention has been paid to what is known, and what is not, regarding the
innate and acquired immune responses elicited by
the virus and their implications for classical vac-
cines improvement and the development of new
immunization strategies.

We thank all authors for their timely contribu-
tions, and for reflecting recent developments as well
as historical developments by many devoted scien-
tists some of whom, unfortunately, are no longer
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Foot-and-mouth disease (FMD) is an acute infectious disease caused by a virus of which there are 7 types, which produce similar symptoms and can only. On introduction to a herd or flock the Foot and Mouth Disease (FMD) virus can spread very rapidly by direct and indirect transmission. Affected animals have a high temperature, which is followed by the development of blisters chiefly in the mouth and on the feet. However, in some species (notably sheep and goats), the disease is frequently less severe or occurs as a subclinical infection. The disease is not usually fatal in adult animals, although many young animals may die. However, it causes severe pain and distress, especially in cattle; animals may be left permanently lame and the product Foot-and-mouth disease (FMD) or hoof-and-mouth disease (HMD) is an infectious and sometimes fatal viral disease that affects cloven-hoofed animals, including domestic and wild bovids. The virus causes a high fever lasting two to six days, followed by blisters inside the mouth and on the feet that may rupture and cause lameness. FMD has very severe implications for animal farming, since it is highly infectious and can be spread by infected animals comparatively easily through contact with contaminated Foot-and-mouth disease viruses (FMDVs) are a species within the genus Aphthovirus of the family Picornaviridae. The nature and organization of the genome, mode of replication, and structure of the virion are, in general, similar to other viruses in the family. The subdivision of the Picornaviridae into four genera, Enterovirus, Rhinovirus, Cardiovirus, and Aphthovirus, was originally based on physicochemical properties such as susceptibility to acid inactivation, buoyant density of CsCl solution, and the nucleotide composition.