Foot-and-mouth Disease Virus

Current Research and Emerging Trends

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Preface

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 vaccines improvement and the development of new immunization strategies.

We thank all authors for their timely contributions, and for reflecting recent developments as well as historical developments by many devoted scientists some of whom, unfortunately, are no longer among us. Finally, our appreciation goes also to Caister Academic Press, and in particular to Hugh Griffin, for his friendly and constructive work in the planning and production of this book.

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