Food-Borne Viruses
Progress and Challenges
Emerging Issues in Food Safety
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Food-Borne Viruses
Progress and Challenges

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Contributors
Food-borne viruses, in particular noroviruses, are the most common known causes of food-associated illnesses in much of the world. In the United States alone, public health experts estimate more than 9 million cases of norovirus infections annually. From restaurants to cruise ships, noroviruses have few boundaries, being transmitted mostly by infected humans, especially after they handle food. Although not nearly as prevalent, a variety of other enteric viruses have food-borne disease potential as well and many more are likely to emerge.

Written by a cadre of the world’s leading virologists, this book provides state of the science information regarding the evolution and future development of viruses with food-borne potential, the role of viruses in global food-borne illnesses, the challenges and opportunities in developing methods to detect viruses in foods, our current understanding of virus binding on and inactivation in foods, and the application of risk analysis to reducing the risk of food-associated viral illnesses. I know of no other single source that provides such an in-depth, forward-thinking treatise on this subject. It is required reading for anyone interested in not just food-borne viruses but in food-borne disease in general. I commend Marion Koopmans for leading the development of this volume and thank her two collaborators, Dean Cliver and Albert Bosch, for their contributions as Editors. This is truly a benchmark contribution in an area of major significance for the safety of foods.

MICHAEL P. DOYLE, Series Editor
Emerging Issues in Food Safety
Illness following consumption of food that was contaminated with viruses has been recognized as early as 1914, when four cases of paralytic illness were described among children in an English community who drank raw milk from a common source. That illness was poliomyelitis, later found to be caused by a small virus belonging to a family of viruses that was named Picornaviridae (pico = small; RNA is the genome type). Almost a century later, food-borne viral diseases are recognized as a major health concern, but the extent of the problem is poorly defined. Noroviruses and hepatitis A virus, causing vomiting and diarrhea (noroviruses) or liver disease (hepatitis A virus), are the most commonly detected food-borne viruses, and their epidemiology appears to be changing: noroviruses change rapidly over time in a manner similar to influenza A viruses, and increasing levels of hygiene have resulted in an increased susceptibility of populations in high-income countries to hepatitis A that may be imported via food. New viruses are discovered regularly as more is learned about pathogens, and with them new questions arise about the potential for food-borne transmission. The emergence of SARS coronavirus, Nipah virus, and avian influenza viruses from animal reservoirs has illustrated that local food habits may contribute to the spread of pathogens from wild animals to humans and has also shown how difficult it is to determine if food-borne transmission may lead to further dissemination. The global export of foods has more than tripled in the past two decades, resulting in increased risk for large-scale, international outbreaks that are difficult to detect. While regulations are in place to monitor the microbiological quality of food, the criteria in use have been developed based on properties of bacteria, not viruses. Viruses behave quite differently and may remain intact under circumstances in which bacterial contaminants
would be killed. In addition, their detection in food requires specialized expertise that is not yet available in most laboratories charged with quality control of food.

What do we know about the recognized food-borne viruses, and what are the gaps? Which lessons can we learn from the past about early detection and control of (emerging) viral infections? What are the challenges in developing reliable ways of detecting if food is contaminated with viruses? What is the role of viral changes through mutation and recombination on their biological properties and epidemiology? These are some of the questions addressed in this book. Chapters have been written by leading scientists in the field, who have been encouraged to provide a challenging in-depth discussion and share their vision for future directions of their field of work. In addition, this book tries to bring scientists and risk managers together by giving a brief background for the methods that have been developed to help decide the best options for controlling food-borne disease and what is needed before these can be used for viral food-borne disease. In short, this book is recommended reading for anyone interested in and/or working on aspects of food-borne viral illness.

Enjoy!

MARION KOOPMANS
DEAN O. CLIVER
ALBERT BOSCH
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