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BOOK REVIEW

Albert Bosch

Bert L. Semler, Eckard Wimmer (eds): Molecular biology of picornaviruses

ASM Press, Washington, DC. 2002. 502 pp. 28 cm×22 cm (ISBN: 1-55581-210-4) US $189.95

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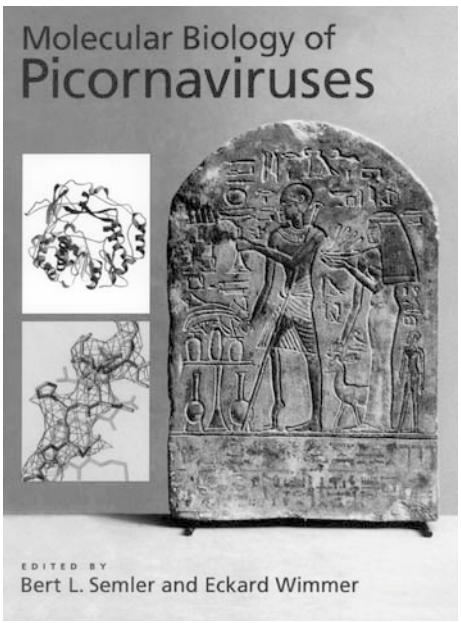
This long-awaited book has finally appeared, with considerable delay with regard to the original scheduled publication date, to replace the 1989 *Molecular aspects of icornavirus infection and detection*, edited by Semler and Ehrenfelf . Over the last decade, research in the field of picornavirus has certainly exploded. The remarkable studies carried out have placed picornavirus research at the forefront of discoveries in molecular virology, yielding a wealth of information on nearly all aspects of picornavirus biology and disease. We must not forget that we are dealing with a very wide family that includes both historically and currently significant pathogens.

Molecular biology of the picornaviruses offers an up-to-date, in-depth analysis of all major aspects of picornavirus research. The book summarizes, in a single, readily accessible volume, the many significant accomplishments in picornavirus research and provides a road map of the path to future discoveries. The contributions are from leading researchers in the field who gather at a biennial, and widely praised, meeting hosted by the European Study Group on the Molecular Biology of Picornaviruses (EUROPIC)



The first section of the book (“Historical perspective”) provides a glimpse into the history of picornavirus research, which logically focuses mostly on the struggle with poliomyelitis (the title of this introductory chapter is “History of poliomyelitis and poliomyelitis research”), whose soon-to-be eradication is discussed in the final section of the book (“Global eradication of poliovirus”; Chap. 38, Global eradication of poliovirus: history and rationale; and Chap. 39, The mechanism of poliovirus eradication). A one-chapter section (“Taxonomy”) reviews the current, complicated status of picornavirus taxonomy (Chap. 2, Molecular and biological basis of picornavirus taxonomy). The third section (“Virion structure”) deals with the structure of picornavirus virions and, after a general overview, provides detailed information on the structure of rhinoviruses and foot-and-mouth disease virus. The spotlight then moves to the mechanism of entry of picornavirus into its cellular hosts (“Virus entry”), to which six chapters are devoted. Extensive new data on the receptors of a variety of picornaviruses, such as rhino-, coxsackie-, echo- and aphtoviruses, are presented. The section closes with valuable information on the tissue culture adaptation of some picornaviruses (Chap. 11, Foot-and-mouth disease virus-receptor interactions: role in pathogenesis and tissue culture adaptation). Next come two chapters devoted to viral genomes, which include a set of alignments and comparative profiles of picornavirus genera (Chap. 12, Picornavirus genome: an overview; Chap. 13, Alignments and comparative profiles of picornavirus genera). The sections “Initiation of translation” and “Proteolytic processing” provide—in five chapters—an overall perspective and detailed reviews on the proteins involved, the processing determinants, and the functions

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of the picornavirus proteolytic cleavage products and the responsible proteinases. Picornavirus replication is the subject of the following five-chapter section (''Viral RNA replication''). General mechanisms for picornavirus RNA replication and genetics are reviewed in Chap. 19 (Possible unifying mechanism of picornavirus genome replication) and Chap. 22 (Picornavirus genetics: an overview) Chapter 23 (Error frequencies of picornavirus RNA polymerases: evolutionary implications for virus populations) is devoted to the error frequencies of the RNA polymerases and the quasispecies distribution of picornavirus populations). The next sections discuss the mechanisms of cellular shutoff triggered by virus infection (''Shutoff of host cell translation and transcription''), and the diagnosis, pathogenesis, immunology and treatment of picornavirus diseases (''Pathogenicity''). The following two-chapter section (''Cell-free synthesis and cell-free genetics of poliovirus'') reports on two processes of the polioviral life cycle that were successfully reproduced in the cell-free system, recombination and complementation (Chap. 36, Cell-free genetics of poliovirus), and describes the general mechanism used by picornaviruses and positive-strand RNA viruses to ensure the efficient replication of their genomes (Chap. 37, Poliovirus RNA replication and genetic complementation in cell-free reactions). The aforementioned final section (''Global eradication of poliovirus'') discusses the current situation regarding global eradication of poliomyelitis, which is a major challenge in public health and will undoubtedly be one of the highest achievements of humankind.

As the editors state, ''Considering that human picornaviruses alone cause an estimated 6 billion infections per year in humans, inflicting misery, debilitation, and even death, these viruses will remain a challenge to humankind.'' *Molecular biology of picornaviruses* is a major work in the field of picornaviruses that I strongly recommend to anybody interested in virology.