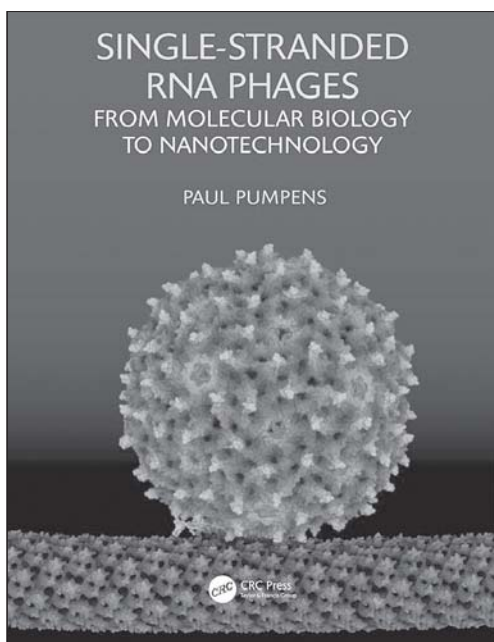


SINGLE-STRANDED RNA PHAGES & VIRUS-LIKE PARTICLES



Paul Pumpens



First of all, we are talking about publications in the priority areas of agrobiological science. In this regard, I would also like to mention the cooperation with the Academic Library of the University of Latvia (Director — Doctor of Philology Venta Kocere), which began thanks to Ambassador Extraordinary and Plenipotentiary of Latvia to Ukraine Juris Poikans. The first 23 books in English and Latvian were received on August 9, 2021. The book by Paul Pumpens, one of the founders of molecular biology in Latvia, a graduate of the Faculty of Chemistry of the University of Latvia in 1970, Professor of the Faculty of Biology of the University of Latvia from 1999 to 2013, became the most unique in terms of demand for the needs of fundamental natural science and branch education. The author is known internationally as the leader of the team that cloned the genome of the hepatitis B virus and expressed the genes of the hepatitis B virus in bacterial cells. During his creative life, his scientific interests included the development of new recombinant vaccines and diagnostic reagents along with the development of tools for gene therapy based on virus-like particles.

In his book «Single-stranded RNA phages: From molecular biology to nanotechnology», P. Pumpens characterizes single-stranded RNA phages (formerly the family *Leviviridae* and orders *Norzivirales* and *Timlovirales* of the class *Leviviricetes* by the current international nomenclature of viruses) in reference form. The RNA

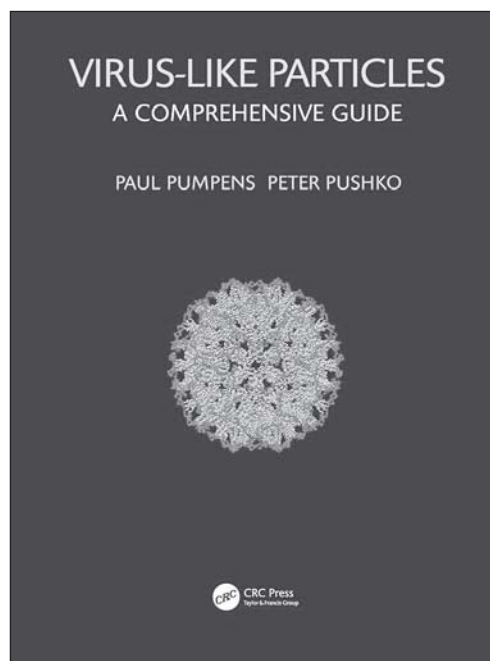
phages were first discovered in 1961, and thanks to that, the early steps in the development of molecular biology were made: the genetic code and the general mechanisms of translation and replication were established. The author paid considerable attention to the use of RNA phages and their products adapted to nanotechnology, vaccinology, gene discovery, evolutionary research, and environmental studies. A special consideration is given to the creation of new vaccines, gene therapy vectors, drug delivery, and diagnostic tools exploring the significance of RNA-phage-derived products, as well as revolutionary advances in protein binding and bioimaging protocols.

Regarding the main differences between this edition and similar ones, they are: a) it is the first comprehensive study concerning single-stranded RNA-phages; b) it contains a rather extensive and, most importantly, contextual historical essay regarding the formation and development of molecular biology, which summarizes the position and role of RNA-phages in the evolution of scientific thought about life; c) it systematically demonstrates on a broad scientific and practical basis how products obtained from RNA phages have contributed to progress in nanotechnology; d) it provides a generalized report on the generative value of products obtained from RNA-phages in evolutionary and ecological studies. In addition, the epigraphs and quotations used by the author at the beginning of each chapter of the book, which go beyond the classical approaches to this type of publication, can be of professional interest.

Paul Pumpens prepared his following book together with his younger colleague and good friend, Doctor of molecular biology Peter Pushko, a graduate of the University of Latvia in 1984, since 2010 — the president and chief scientific director of the biopharmaceutical company for the development of innovative vaccines for new infectious diseases and cancer Medigen Inc. (Frederick, Maryland, USA). His work includes the development of the RNA vector system from



Peter Pushko



the replicon of the Venezuelan equine encephalitis virus (VEE) and the preparation of an experimental vaccine against the Ebola, Marburg, and Lassa hemorrhagic fever viruses, as well as the development of recombinant virus-like particles (VLPs) as a vaccine against influenza. Among the current scientific priorities of the scientist: the development of vaccines for new viruses,

such as pandemic influenza and alpha-, arena-, and flaviviruses.

In the new edition («Virus-like particles: a comprehensive guide»), the authors have offered a sort of systematic guide to VLPs and their use as vaccines, therapeutics, and nanomaterials and nanodevices. The grouping of VLPs is done according to the existing international nomenclature, which corresponds to the most modern taxonomy of viruses and the Baltimore classification based on the structure of the viral genome and the mechanism of mRNA synthesis. Accordingly, each of the Baltimore classes of taxa serves as the basis for the appropriate section. At the same time, the term «VLP» is used as a universal designation of virus-, core-, or capsid-like structures, which have become an important component of molecular virology at the current stage of development. As for the three-dimensional structures, expression systems, and nanotechnology applications, they are presented relative to VLPs in the context of the original viruses. This reveals their evolutionary potential as the latest vaccines and, separately, as medical interventions. The book consists of 38 chapters in 7

sections with a preface, prologue, and epilogue. To sum up, the novelty of the publication is as follows: a) it is the first for the VLP nanotechnology area to qualify by the current taxonomy of viruses; b) it provides a descriptive analysis of specific structural properties and interrelationships between virions and VLPs; c) it provides an explanation of the generation and characteristics of VLPs produced by different expression systems; d) it offers an up-to-date overview of VLPs as a vaccine and delivery tools, and e) it reveals the relationship between VLPs and novel organic and inorganic nanomaterials. In addition, the authors offer the reader original quotations for each chapter under the general epigraph, taken from Rainis, a famous Latvian poet: «What changes, endures».

Pumpens, P. (2020). *Single-stranded RNA phages: From molecular biology to nanotechnology* (1st ed.). CRC Press. <https://doi.org/10.1201/9780429001208>

Pumpens, P., & Pushko, P. (2022). *Virus-Like Particles: A Comprehensive Guide* (1st ed.). CRC Press. <https://doi.org/10.1201/b22819>

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