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Altri autori (Persone)	Comas GarciaMauricio Rosales MendozaSergio
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Nota di contenuto	Viral RNA as a Branched Polymer -- RNA Multiscale Simulations as an Interplay of Electrostatic, Mechanical Properties, and Structures Inside Viruses -- Establishing the Length Limit of RNA Packaged In Vitro by Spherical Virus-Like Particles -- The Multiple Regulatory Roles of Single-stranded RNA Viral Genomes in Virion Formation and Infection -- Creating Artificial Viruses using Self-assembled Proteins and Polypeptides -- Construction of Higher-order VLP-based Materials and

Their Effect on Diffusion and Partitioning -- Assembly of Coronaviruses and CoV-like-particles -- Norovirus – A Viral Capsid in Perpetual Flux -- Structural Alterations in Non-enveloped Viruses During Disassembly -- Physical Virology with Atomic Force and Fluorescence Microscopies: Stability, Disassembly and Genome Release -- Virus Mechanics: A Structure-Based Biological Perspective -- Cryo-electron Microscopy and Cryo-electron Tomography of Viruses -- Bacteriophage Lambda as a Nano Theranostic Platform -- Therapeutic Interfering Particles (tips): Escape-Resistant Antiviral Against SARS-CoV-2.

Sommario/riassunto

This book highlights key findings generated during the past years from the main disciplines that constitute Physical Virology, from theoretical physics and simulations to material sciences and vaccines development to structural biology. Each chapter is written by world-class scientists from these areas and is a comprehensive review of where this field stands, as well as the future of Physical Virology. The diversity in the formal training of these scientists results in solving common problems using very distinct approaches, which can produce surprising findings. The multi- and interdisciplinary nature of this field has created a remarkable community that aims at understanding how viruses work and how they can be used in material sciences, chemistry, and biomedicine. Furthermore, the development of Physical Virology has resulted in technological advances that have shaped other fields; for example, it would be impossible to think about the development of Cryo-EM to solve the structure of complex viruses with atomic resolution without the contribution of scientists that created the field of Physical Virology. In the past decade, there has been a great success in the generation of viral systems that can encapsulate drugs, non-viral genetic material, or nanoparticles, as well as in the chemical and genetical modification of virions. Without any doubt in the immediate future, some of these technologies will jump from the bench to the market, creating a revolution in translational and biomedical sciences. The book provides key perspectives for the field, derived from expert's opinions.
