

Preface

It is an exciting time to study virology! The world of viruses is much greater and more diverse than previously recognized. Discoveries such as the Mimivirus and its virophage, have stimulated new discussions on the definition of viruses, their place in the current view of the tree of life, and their inherent and derived "interactomics" defined as the molecules and the processes by which virus gene products interact with themselves and with the host's cellular gene products to bring about changes in phenotypes, and of their own evolution. Viruses are also facilitating the development and creation of new materials and powerful tools for gene and genome engineering. However, viral diseases continue to plague us, our animals and crop plants; sadly, in the last decade, diseases such as SARS, H1N1 influenza, Nipah virus disease have wreaked havoc around the world as have Cassava Mosaic and Brown Streak virus diseases in Eastern and Southern Africa. Ebola, Chikungunya, and West Nile viruses have reemerged and the AIDS epidemic continues to sweep across sub-Saharan Africa and parts of Asia.

This book explores several concepts fundamental to Virology. While most texts focus on the pathogenesis and clinical aspect of viral diseases or the molecular biology of viral replication, we present viruses not only as formidable foes, but also as entities that can be beneficial to their hosts and humankind, and as entities that are helping to shape the Tree of Life. A complete overview of modern virology is intended, not a comprehensive or encyclopedia treatment of these topics. It is hoped that this overview with sufficient documentation for more indepth study will be of value to anyone learning Virology at any stage; a novice trying to understand the basic principles for the first time, an intermediate student of Virology preparing to study more advanced areas in the discipline, or anyone who has ended their formal education, but has maintained an interest in the discipline. An elementary knowledge of molecular biology is assumed, especially of the basic structures of nucleic acids and proteins, of the genetic code, and the processes involved in transcription and protein synthesis.

The volume comprises 13 chapters. The first chapter provides a general introduction on the history of the discipline. Subsequent four chapters cover the basic aspects of virology including the structure of viruses, the organization of their genomes, and basic strategies in replication and expression.

Principles are emphasized in these chapters, along with the diversity and versatility of viruses. The five chapters that follow examine virus examples, from a cross section of hosts, to illustrate the principles as well as the diversity of viruses, how they cause disease and how their hosts react to such disease, exploring developments in the field of host-microbe interactions in recent years. We then explore the medical and agricultural importance of viruses and how viruses can be surprisingly beneficial to their hosts.

The book is the product of a corporative effort. We wish to express our appreciation to all the contributing authors. We are especially grateful to members of the editorial team, Jill Leonard, Linda Versteeg-Buschman, Halima Williams, Joslyn Paguio, Pat Gonzalez, and Stalin Viswanathan, for providing support, feedback, and guidance during the process. Gratitude is extended to many of our colleagues for their advice and helpful discussions. Finally, we are indebted to all who have helped shape our careers over the years, especially our students.

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