

Preface

I teach undergraduate students, most of whom are biology, molecular biology, biochemistry, or neuroscience majors. Most undergraduate virology textbooks do not have enough molecular and cellular content for my virology elective. In contrast, most virology textbooks with substantial molecular and cellular content are written for more advanced audiences. There is a singular book from the 1990s that fits this niche, namely *The Biology of Viruses* by Dr. Bruce A Voyles. But by 2017, it was time for a book of similar scope and focus but incorporating contemporary research.

The book is organized according to the stages of a virus replication cycle, with a few additional chapters to take into account themes in molecular and cellular virology that are especially interesting to undergraduates. These include immunology as it pertains to viral infections and medical applications of molecular and cellular virology. In our age of rising antibiotic resistance and a renaissance in phage research spurred by CRISPR-Cas and other biotechnological innovations, I decided that it would be best to keep the phages front and center even though other authors may have relegated them to an appendix or online materials.

The book is intended to give faculty choices about customizing the assigned reading. For example, faculty whose course goals emphasize molecular biology may want to use all the content about the gene expression and genome replications strategies. In contrast, faculty whose course goals emphasize cell biology may want to use only the simplest model viruses in those chapters so that they can instead assign more content about autophagy, signal transduction, apoptosis, and the cell cycle.

I have not made any attempt to be comprehensive; such a book would have defeated the purpose of its utility for a typical undergraduate course. Instead, I have focused on a few models to give undergraduate readers a taste of the diversity of virology and to lay down examples for comparison. Throughout this book I have favored HIV as an example because its molecular biology has been worked out in intensive detail, using experimental procedures that are understandable by current undergraduates. I also chose to write so much about HIV in order to encourage LGBTQ students and students from the global south to identify with molecular biology. When HIV was not a good choice, I selected models that most interest my students. Throughout, I wrote about ideas derived from contemporary research findings in order to inspire students to love the creation of new knowledge.

I hope that faculty and students will enjoy using this book, and I look forward to hearing from readers.