Preface

Hepatitis can result from infection with multiple genetically distinct viruses. In 1974, the observation was made that transfusion-associated hepatitis was being transmitted by a virus distinct from hepatitis A and B viruses. After 15 years of intense efforts, a molecular clone of hepatitis C virus (HCV) was isolated by Michael Houghton and colleagues at Chiron. This was quickly followed by the development of diagnostics to screen the blood supply for contamination with HCV. Despite these advances, HCV remains a major public health concern, with 71 million chronically infected people who are at risk for progression to cirrhosis, liver cancer, and end-stage liver disease.

For 10 years following the discovery of HCV, progress was limited because of the inability to grow the virus in human cells and permissiveness to only the chimpanzee animal model. In 1997, isolation of an HCV molecular clone that was infectious in chimpanzees, but not in cell culture, was then followed by the development of subgenomic HCV replicons that could replicate in human cells. Finally, in 2005, an HCV isolate was identified that could complete its entire infectious life cycle in human cells.

Since the development of these HCV model systems, the field has witnessed remarkable progress in understanding the basic virology and immunological responses to infection. This has culminated in the development of drug therapeutics that are >95% effective against all HCV genotypes. This success has resulted from an intellectual partnership among clinicians, industry, and academicians (and their funding agencies). This book details what we have learned about hepatitis C, beginning with the discovery of the causative agent (HCV), the physical and genetic properties of the virus, the development of model systems to study HCV, and details of the HCV life cycle. We then discuss the innate and adaptive immune responses that are critical to control HCV infection and why they fail to clear the infection and provide protective immunity. Finally, we discuss the clinical features of hepatitis C, the current standard of treatment, public health challenges in identifying and treating infected individuals, and the need for development of a vaccine to prevent HCV infection. A common theme in these chapters is that despite our progress in understanding much about this infection and how to treat it, there are still many important aspects of virus–host responses that we do not know and many challenges that remain in eradicating HCV.

We thank the authors of these chapters not only for their contributions to the book, but also for their many important research contributions. They are leaders in the field. We also thank Barbara Acosta and Richard Sever at Cold Spring Harbor Laboratory Press, without whom this book could not have been completed.

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