

Preface for the second edition

A second edition of a science book is an indication that it deals with a timely subject that attracts the interest of the scientific community. Virtually each of the topics (ranging from origin of life, role of viruses in biological evolution, quasispecies dynamics, to its implications for viral disease emergence and control, or how cancer cell adaptation resembles the rapidly evolving RNA viruses) maintain their interest. Despite promise of eradication of several viral diseases, the problems of selection of escape mutants, and the inaccessibility of treatments in many areas of the world persist. Furthermore, recognition of differences among individual components of biological collectivities (be them viruses or cells) is becoming increasingly apparent. "Complexity" is the key term, and the one that provides a mystery dose to the understanding of populations as wholes. This is what the second edition of *Virus as Populations* is about.

My main task for the second edition has been to update observations, emphasize some points, correct mistakes, and add literature references. Each chapter should be understandable in its own, although I have aimed at connecting concepts through references to other chapters. The new edition is faithful to the conviction that the main interest of this book lies in the concepts, as the supporting experiments and models change month after month. I was very pleased

that Elsevier was positive about the updating of *Virus as Populations*; book preparation was facilitated by the generous and efficient involvement of Pat Gonzalez, Kattie Washington, and Linda Versteeg-Buschman.

The Acknowledgment section of the first edition remains entirely valid. Some scientists who contributed to the foundations of the topics covered in this book are no longer with us. John J. Holland (1929–2013) and Christof K. Biebricher (1941–2009) passed away before the first edition was written. Unfortunately, the great Manfred Eigen (1927–2019) has to be added. One of his last (probably the very last) pieces of scientific writing was his Foreword for volume 293 of *Current Topics in Microbiology and Immunology* that I edited with Peter Schuster. In that volume, as well as in pages 317 to 498 of volume 47 of *European Biophysics Journal* (dedicated to him on the occasion of his 90th birthday), the width of Eigen's contributions to molecular evolution becomes evident. Without Eigen, Holland, and Biebricher, this book would not exist. Equally sad was the passing away of José Antonio Melero (1949–2018), an outstanding virologist and colleague from Instituto de Salud Carlos III who maintained a vivid interest in science and virology, including the subjects of this book.

Virus as Populations could not have been written without the involvement and generous help

of Celia Perales (now with her own group), Ana Isabel de Avila, and Isabel Gallego, with the participation María Eugenia Soria of Celia's team. My deepest appreciation goes to them and to the students who have been or are involved in our research.

It is my hope that this book continues being a useful introduction to students of many

scientific areas, as well as to professionals whose experience tells them that it is time to understand biological entities (mainly, but not only viruses) at the population level.

Esteban Domingo

Cantoblanco, Madrid, September 2011