

THE HUMAN RETROVIRUSES

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Foreword

Until about 1950 RNA tumor viruses, as retroviruses were then called, were only known in chickens. Although the mouse mammary tumor virus had been discovered in the 1930s, it was still called the mouse mammary tumor agent at that time and was not considered a true RNA tumor virus. The discovery by Gross of mouse (murine) leukemia virus established that RNA tumor viruses also existed in mammals. Soon other strains of murine leukemia virus were found, and it was shown that the chicken Rous sarcoma virus could cause tumors in mammals. However, in spite of much effort, it still took a long time to find human retroviruses. Now we know of HTLV-1 and -2, HIV-1 and -2, and human spumaretroviruses. Furthermore, although hepatitis B virus is not classified as a retrovirus, its mode of replication has important homologies to that of retroviruses, including reverse transcription. I call it a pararetrovirus.

Retroviruses are important to humans. Some 200 million people are infected with hepatitis B virus, over 10 million are infected with HIV-1, and an unknown total number of others are infected with HIV-2 and HTLV-1 and -II. In addition, we know that the human genome is full of retrovirus-related proviruses (endogenous retroviruses) and other sequences related to retroviruses and that over 10% of the human genome is the result of reverse transcription. Furthermore, modified murine retroviruses have been used as vectors to mark human tumor-infiltrating lymphocytes that were injected into human cancer patients, and proposals are being considered to use murine retrovirus vectors to treat human adenosine deaminase deficiency. Therefore, retroviruses can cause human disease and can also be used to treat human disease.

Recently, Simon Wain-Hobson of the Institut Pasteur reviewed in *Nature* (343, 706, 1990) *Retrovirus Biology and Human Disease* edited by R. C. Gallo and F. Wong-Staal. Wain-Hobson wrote that "this one (volume) is about on target but is bound to be *depassé* within a year or so. . . .

Perhaps the only solution is to produce frequent reviews and volumes like this one." The present volume provides a response to this suggestion. It certainly should provide more evidence for Wain-Hobson's assertion that "this is a fascinating field." Furthermore, based on previous history, I expect that retrovirology will continue to be fascinating and to need further volumes updating the field.

The chapter titles of this book indicate wide coverage of the traditional human retroviruses and their closest primate relatives. The authors are primarily from the United States; there are also some Japanese authors and one English author. This book should be useful to researchers in the field. It also records the status of the field as of Spring 1990 and the tremendous amount of work and new knowledge that has been gained in the past decade.

In appreciating this knowledge, we must remember that investigation of human retroviruses was based on previous results of basic research with animal retroviruses and with other nonhuman materials. We need to keep the entire field of biomedical and life sciences strong and healthy. We cannot tell what results will be most immediately relevant to future human problems. The only thing of which we can be sure is that we will need all the information and wisdom we can secure to deal with the problems that we know will face us in the future.

Howard M. Temin

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Part I

Molecular Biology