

Immunology and Evolution of Infectious Disease

Steven A. Frank

From HIV to influenza, the battle between infectious agents and the immune system is at the heart of disease. Knowledge of how and why parasites vary to escape recognition by the immune system is central to vaccine design, the control of epidemics, and our fundamental understanding of parasite ecology and evolution. As the first comprehensive synthesis of parasite variation at the molecular, population, and evolutionary levels, this book is essential reading for students and researchers throughout biology and biomedicine.

The author uses an evolutionary perspective to meld the terms and findings of molecular biology, immunology, pathogen biology, and population dynamics. This multidisciplinary approach offers newcomers a readable introduction while giving specialists an invaluable guide to allied subjects. Every aspect of the immune response is presented in the functional context of parasite recognition and defense--an emphasis that gives structure to a tremendous amount of data and brings into sharp focus the great complexity of immunology. The problems that end each chapter set the challenge for future research, and the text includes extensive discussion of HIV, influenza, foot-and-mouth disease, and many other pathogens.

This is the only book that treats in an integrated way all factors affecting variation in infectious disease. It is a superb teaching tool and a rich source of ideas for new and experienced researchers. For molecular biologists, immunologists, and evolutionary biologists, this book provides new insight into infectious agents, immunity, and the evolution of infectious disease.

Steven A. Frank is Professor of Evolutionary Biology at the University of California, Irvine, and the author of *Foundations of Social Evolution* (Princeton).



"Steven Frank provides us with a profound insight into the Darwinian evolutionary dynamics between parasite and host, told from an immunological slant. It is essential reading to understand why infections cause disease."--Robin A. Weiss, Fellow of the Royal Society, Wohl Virion Centre, University College London

"This book is a real gem. Very readable, it is a teaching and research text that will be widely adopted at both the undergraduate and graduate levels. It will also provide a wonderful source of ideas for researchers working on infectious diseases, population ecology, and evolutionary biology."--Roy Anderson, Fellow of the Royal Society, Imperial College, London

"This is an extremely stimulating and hugely ambitious book. It distils key essentials from the ever increasing avalanche of largely undigested molecular and immunological data to answer important questions about the natural history of antigenic variation in an evolutionary context. Frank gives us the missing part of the field: what it all means. His synthesis cuts across large areas of modern biology and is just the sort of thing the field needs."--Andrew Read, University of Edinburgh

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