

# **Genetic Control of Natural Resistance to Infection and Malignancy**

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**Edited by**

**Emil Skamene**

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# GENETIC CONTROL OF NATURAL RESISTANCE TO INFECTION AND MALIGNANCY

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## PREFACE

History provides numerous examples of variable susceptibility of human populations to viral, bacterial, and parasitic infections both during epidemics and in the endemic areas of the world. Although the influence of environmental factors must be considered in any explanation of such variability, it has recently become clear, mainly on the basis of studying experimental infections in inbred animals, that genetic factors play the decisive role in individual susceptibility. Similarly, most tumor biologists believe that there are multiple mechanisms that influence the growth and spread of cells transformed to the neoplastic state and that most of them are, in a broad sense, genetically influenced.

In principle, the entire basis of susceptibility or resistance to infection and malignancy is genetically determined but, because of the immense variety of offenders and the complexities of host defenses, few common patterns of resistance are discernible. Thus, we are compelled to study step-wise processes affecting individual organisms and cancer cell types with the hope of extending the studies to other infections and malignancies and to other hosts.

Genetic studies have, in the last few years, proved to be a most valuable tool for analysis of host resistance processes. This volume provides a review and discussion of a large body of information on various models of genetic resistance that have recently been discovered. Interaction of geneticists with investigators studying mechanisms of host defense to infection and malignancy, such as occurred at the symposium, that formed the basis for this volume, proves mutually beneficial. Thus, several polymorphic systems controlling genetic resistance among populations of inbred animals were defined by formal genetic analysis and located on the chromosomal map. Similarly, well-defined defects in host defenses in certain animal sublines were traced to single mutations in the genome of such strains. Another, perhaps more important, aspect of this interaction is an understanding of the action of genes controlling host resistance. In this case, genetic analysis is not the aim but serves to probe the processes that lead to successful host defense. As yet, there is not a single case in which the phenotypic expression of a host resistance gene has been identified at the molecular level. However, the cellular mechanisms of their action are clearly different from adaptive, specific immune responses and they mostly seem to fit into the category of natural or noninduced resistance.

It is apparent from this volume that systems of genetic resistance are all-important, not only in the first-line surveillance of infections and tumors, but also by their strong influence on the success of chemotherapy and immunotherapy. Thus, it is hoped that further analysis of these systems will lead to their more successful manipulation in favor of the host.

*Emil Skamene*  
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