Volume Preface to the Second Edition

Pathogenic fungi are widely distributed and can infect many organisms, particularly humans but also other vertebrates and insects. The interaction of these pathogens with their host is of considerable interest for basic research, but also for many applications in medicine and plant protection. Understanding the pathogenesis of fungal infections and the interaction of fungi with their hosts is an expanding field of current research. The intention of the current volume VI of the series Mycota was not to give an overview about human and zoopathogenic fungi. Rather, it was our intention to point to some important and specific interactions of fungal pathogens with their respective hosts, including the description of the application of techniques of functional genomics.

The understanding of the biochemical and physiological reactions mediated by fungi is a prerequisite to elucidate infection mechanisms and to understand infection processes that lead to disease. In particular, the switch of a fungus from being a harmless commensal or saprophyte to becoming an aggressive pathogen represents a key question of modern fungal research. This emerging area of research is fostered by the increasing medical relevance of fungal infections. The characterization of the interaction of pathogenic fungi with their animal hosts includes the identification of virulence factors. Furthermore, the study of virulence mechanisms will help identify the novel and unique escape strategies of pathogens.

This volume VI of the Mycota series covers three major and important areas of the field human and animal relationship. The first part summarizes the current understanding of pathogenic fungi and reports important physiological reactions that are relevant for pathogen–host interaction, ultimately leading to a description of the pathophysiological reactions. The characterization of strategies utilized by human pathogenic and entomopathogenic fungi reveals common principles which are utilized by fungi to survive in competent hosts. The second part covers modern, state of the art technology that is currently used to study fungus–host interactions. Transcriptomics and proteomics represent highly relevant techniques that are used for the simultaneous analysis of both gene expression and protein formation patterns to define specific life-stages of the pathogen. These data contribute to a molecular understanding of the communication between pathogen and host. The third area of this volume addresses the characterization of the host response towards pathogenic fungi. The host utilizes a powerful and highly efficient immune system to combat invading pathogens. The innate immune response forms a major barrier against fungi and pathogens. This defence system responds immediately to infection and the sequential response includes activation of the complement system and recognition of the pathogen by toll-like receptors. These aspects represent a developing and highly interesting area of research. Clinical aspects are covered in one chapter and demonstrate how pathogenic fungi, specifically dermatophytes, colonize different niches and hosts, and how they undermine the host immune response. The state of the art reviews written by experts in the field provide the reader with a comprehensive overview about different research topics. We would be glad if the

reader shared with us the excitement to follow this interesting area of research. We are in particular grateful for the excellent contributions made by the different authors of the chapters who joined us in preparing this volume.

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