

NEWSCORNER

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The 8th volume of the Mycota series edited by K. Esser is intended to give an updated overview of contemporary topics of the biology of the fungal cell, to facilitate dissemination of information within and between the many research domains of fungal cell biology. In the first part of this volume, a sample of topics on how the fungal organism behaves in different environmental situations are analysed. N. P. Money describes the biomechanism of fungal mycelium growth. Although fungal growth is under genetic control, environmental factors are intimately involved in this process. New biomechanical tools which enable the measurement of the individual hyphal forces are described, and they allow one to address the question of fungal control of these attributes. Other fundamental characteristics of living organisms are polarised growth and division. These phenomena have been extensively studied at the genetic, biochemical and cellular level in baker's yeast *Saccharomyces cerevisiae*. Y. J. Sheu and M. Snyder give an interesting overview of the different morphogenetic pathways involved in cellular division and apical growth. The study of the genes hierarchically controlling these two morphogenetic pathways supports the idea that they do not act in a linear succession, but in a complex network where several genes can be involved in various cellular processes. Knowledge acquired from a model organism such as *S. cerevisiae* is very helpful for the study of fungal organisms which are more difficult to study. Although pathways cannot be transposed from one organism to another, they give nevertheless clues to help elucidate them. An interesting example of conserved signal transduction is given by A. J. Brown and N. A. R. Grow who describe the conserved signal transduction pathway responses to ambient pH in *Aspergillus nidulans, S. cerevisiae* and *Candida albicans.* In this example, the findings for *A. nidulans* gave a pattern which helps to elucidate the order of the different genes involved in other organisms. Another example is given by the MAP kinase module, where the same regulation process of protein kinases is implied in various signal transduction pathways such as responses to stress, pheromones, and nitrogen starvation. For phytopathogenic fungi, attachment to the substratum and development of the fungal hypha is essential for penetration of the plant tissue. The influence of ions on the binding capacity of the fungal spores is described by B. D. Shaw and H. C. Hoch, whereas recent advances in cellular studies, and to a lesser extent molecular studies, of infection of plants and especially of appressorium function or plant-pathogen interactions at the haustorium interface are given by A. R. Hardham.

The second part of this volume looks at the fungal cell in a structural continuum from proteins involved in growth and pattern development, the molecular connections between the extra and intracellular domains, to the molecular pattern of genomes. Although the cellular and molecular data presented in this book were obtained at a time when fungal genome data were just becoming available, they are no less exciting or important. For example, the synthesis and regulation of hydrophobins, one of the sole truly fungal characteristics, is given by N. J. Talbot. The physical characteristics and the suspected role of these proteins in aerial hyphal growth is very well presented. Although hydrophobins have been shown to play a key role in the aerial growth of fungal mycelium, their presence in all filamentous basidiomycete- or ascomycete-producing aerial hypha is not known.

Pathogenic fungi interact with human host cells through the interaction with the extracellular matrix (ECM) of these cells. Some fungi such as *C. albicans* bind to several components of the human ECM, i.e. fibronectin, laminin, collagen or vitronectin. The interaction of the fungus with these components and the complexity of these interactions are well described by W. LaJean Chaffin. The cytoskeleton, in interaction with the plasma membrane and the cell wall, is also of prime importance for cellular morphogenesis and organelle mobility. Our understanding of these highly complex interactions, presented by I. B. Heath, is still far from complete, in spite of the intensive research devoted to them. Organelle mobility uses the backbone formed by the cytoskeleton but requires mechanochemical enzymes such as myosin for actin-dependent transport, or kinesin and dynein for microtubule-dependent transport. Interestingly there are differences in transport mechanisms between yeast cells and mycelial fungi which are discussed by I. H. Lee and M. Plamann. The last chapter, by J. W. Bennet and J. Arnold, presents the openings, potentials but also the problems which are inherent to the massif genomic data of various fungi which will be, or are already, available. They also point out that as the history of the various mutants differs from one organism to another, the absence of a common gene nomenclature could be a source of future problems.

The genomic and proteomic data which are now in the pipeline will, in the near future, give new openings in fungal research. It is therefore essential to have a good understanding of the cellular processes at the root of fungal cell life. This volume of the Mycota series responds to this need by giving a very interesting and up to date review of some of the important cellular processes of fungal cell biology.

Diederik van Tuinen, INRA, Dijon, France