

## **Summary**

**Johannes Müller and Annemarie Polak**

### **Classification and taxonomy of fungi pathogenesis in warm-blooded hosts**

The kingdom of fungi is described with emphasis on fungi pathogenesis in warm-blooded hosts. The various growth forms of the most frequent causative agents of fungal infections are described and their classification based on characteristics of their sexual life cycle and on their DNA/RNA pattern is summarized in various tables.

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**Key Words:** Taxonomy, pathogenic fungi, *Zygomycota*, *Ascomycota*, *Basidiomycota*.

## **Summary**

**Reinhard Kappe and Dagmar Rimek**

### **Fungal diseases**

In this chapter, we present concise reviews on the clinical manifestations of the complete set of human fungal infections known today. Emphasis is given to the clinical symptoms. The classification corresponds to the body sites affected, from systemic to superficial. Within the groups, the order of presentation follows the order of prevalence and overall importance of the fungal infections. Short paragraphs on the ecology of the causative fungi and the epidemiology of the corresponding diseases, including the mode of acquisition, the susceptible population, and the geographical distribution, precede each clinical entity.

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**Key Words:** Candidosis, cryptococcosis, aspergillosis, zygomycosis, fusariosis, scedosporiosis, pseudallescheriosis, pneumocystosis, histoplasmosis, coccidioidomycosis, blastomycosis, paracoccidioidomycosis, penicilliosis, sporotrichosis, chromoblastomycosis, phaeohyphomycosis, eumycetoma, basidiobolomycosis, conidiobolomycosis, lobomycosis, dermatophytosis, pityriasis versicolor, tinea nigra, white piedra, black piedra, systemic, invasive, cutaneous, subcutaneous, superficial, fungal, mycotic.

## Summary

**Reinhard Kappe and Dagmar Rimek**

### Diagnosis of fungal diseases

In this chapter, we focus on diagnostic laboratory methods that are necessary and suitable for providing physicians with a timely and accurate diagnosis of fungal diseases. After discussing some pre-analytical aspects, the complete set of methods, i.e., microscopy, histopathology, culture, antigen detection, DNA detection, and antibody detection, is concisely described. Identification techniques depend on the fungal group involved. Therefore, separate paragraphs are dedicated to the identification of yeasts and filamentous fungi, which include molds, dermatophytes, and dimorphic fungi.

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**Key Words:** Calcofluor white, Grocott-Gomori, *Candida* mannan antigen, *Aspergillus* galactomannan, *Cryptococcus* glucuronoxylomannan, beta-glucan, real time PCR, mycoserology, PFGE, RAPD; CSF, cerebrospinal fluid; BAL, bronchoalveolar lavage fluid; KOH, potassium hydroxide.

## Summary

**Annemarie Polak**

### **Antifungal therapy - state of the art at the beginning of the 21<sup>st</sup> century**

The most relevant information on the present state of the art of antifungal chemotherapy is reviewed in this chapter. For dermatomycoses a variety of topical antifungals are available, and safe and efficacious systemic treatment, especially with the fungicidal drug terbinafine, is possible. The duration of treatment can be drastically reduced. Substantial progress in the armamentarium of drugs for invasive fungal infections has been made, and a new class of antifungals, echinocandins, is now in clinical use. The following drugs in oral and/or intravenous formulations are available: the broad spectrum polyene amphotericin B with its new “clothes”; the sterol biosynthesis inhibitors fluconazole, itraconazole, and voriconazole; the glucan synthase inhibitor caspofungin; and the combination partner flucytosine. New therapy schedules have been studied; combination therapy has found a significant place in the treatment of severely compromised patients, and the field of prevention and empiric therapy is fast moving. Guidelines exist nowadays for the treatment of various fungal diseases and maintenance therapy. New approaches interfering with host defenses or pathogenicity of fungal cells are being investigated, and molecular biologists are looking for new targets studying the genomics of pathogenic fungi.

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**Key Words:** Invasive fungal infections, dermatomycoses, amphotericin B, fluconazole, flucytosine, itraconazole, voriconazole, caspofungin, terbinafine, ciclopirox, amorolfine.

## Summary

Michael Seibold and Kathrin Tintelnot

### Susceptibility testing of fungi – current status and open questions

The increase of fungal infections and the improvement of therapeutical options demand reliable antifungal susceptibility testing. *In vitro* susceptibility testing of fungi – in contrast to bacteria – is not yet established as a routine method. The NCCLS (National Committee for Clinical Laboratory Standards) guidelines for susceptibility testing of yeasts (and proposed for hyphomycetes) are most important for standardization. Meanwhile, essential parts of this test procedure are accepted, but it should still be improved. The concept of using only one test medium for all drugs and test organisms is not realized so far. There are also some test situations that prevent the NCCLS standard from being applied. Based on our experience, this article describes the NCCLS methods and their modifications. It places emphasis on lipophilic drugs showing controversies despite standardization. Furthermore, the prediction of MICs on the clinical outcome is discussed. Since there are some pitfalls in testing antifungals, this should be done in experienced laboratories only. The MIC has to be regarded as only one, but an important, factor in the management of fungal diseases. Host-, drug-, and pathogen-specific data should be considered simultaneously.

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**Key Words:** Antifungal susceptibility testing, standardization, hyphomycetes, yeasts, *in vitro* – *in vivo* correlation, lipophilic drugs.



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