

## Mycology across medical fields: syllabus

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## Syllabus

### **Mycology basics:**

- Nomenclature and taxonomy of human pathogenic fungi
- Fungal cell structure, organization and physiology
- Must-know laboratory procedures: microscopy, staining, culture, histopathology
- Principles of fungal genetics

### **Antifungal agents and susceptibility testing:**

- Classes of antifungals: Polyenes, triazoles, echinocandins, allylamines
- Novel antifungals: olorofim, fosmanogepix, ibrexafungerp
- Mechanisms of action
- Pharmacokinetics and pharmacodynamics
- Mechanisms of resistance
- Antifungal susceptibility testing
- Therapeutic drug monitoring

### **Antifungal immunology and immune deficiency:**

- Antifungal immunity
- Work-up for immune deficiency in a patient with invasive fungal disease
- Immune modulation as a treatment strategy

### **Invasive fungal disease in critically ill patients:**

- Invasive candidiasis
  - Epidemiology
  - Diagnosis: culture and non-culture-based methods
  - Treatment guidelines: prophylactic, preemptive and targeted treatment
- Invasive aspergillosis in patients with COPD
- Trauma-associated mold disease
- Fungal diseases in burn patients

### **Hematology and stem cell transplantation**

- Invasive mold diseases in patients with hematologic malignancies: Aspergillus and non-Aspergillus mold diseases
- Epidemiology
- Clinical and radiological manifestations
- Biomarkers: galactomannan and PCR
- Approaches to management:
  - Prophylactic treatment
  - Diagnostic/biomarker-driven approach
  - Empirical treatment
- Antifungal treatment and monitoring response
- Non-pharmacologic prevention of mold diseases

### **Skin and skin-structure mycoses**

- Pathogens
  - Dermatophytes
  - Candida and non-Candida yeasts: Malassezia, Microascus (Scopulariopsis)
  - Non-dermatophyte molds: Aspergillus spp., Fusarium spp., Mucorales
- Subcutaneous infections
  - Eumycetoma
  - Chromoblastomycosis
  - Sporotrichosis
- Epidemiology
- Host susceptibility
- Diagnosis
- Clinical manifestations
- Treatment

### **Fungal infections of upper airways and ears**

- Fungal sinusitis
  - Allergic fungal sinusitis
  - Invasive fungal sinusitis
  - Chronic granulomatous invasive fungal sinusitis
- Rhino-orbital-cerebral mucormycosis
- Fungal otitis
- Base of skull osteomyelitis

### **Ocular fungal disease**

- Chorioretinitis
- Endogenous endophthalmitis
- Exogenous endophthalmitis
- Fungal keratitis

### **Endemic and travel related mycoses**

- Histoplasmosis
- Coccidioidomycoses
- Blastomycoses
- Paracoccidioidomycoses
- Emergomycoses

### **Post-viral fungal diseases**

- Influenza-associated pulmonary aspergillosis
- COVID-associated pulmonary aspergillosis
- COVID-associated mucormycosis

### **Fungal diseases of the central nervous system**

- Cryptococcal meningoencephalitis
- Post-neurosurgical infections:
  - Post operative meningitis, brain abscess and ventricular shunt infections
- CNS involvement in endemic mycoses: coccidioidomycosis, blastomycoses, histoplasmosis
- Cerebral aspergillosis, mucormycosis and fusariosis

- Outbreaks of fungal CNS infections related to non-sterile injection

### **Vulvovaginal candidiasis**

- Sporadic, recurrent, and chronic VVC
- Epidemiology
- Host susceptibility
- Diagnosis
- Treatment
- Prevention

### **Treatment guidelines for invasive fungal diseases**

- Formulating treatment guidelines
- Grading system for recommendations
- Real world impact of guidelines
- Guidelines for invasive candidiasis
- Guidelines for aspergillosis
- Guidelines for mucormycosis

### **Infections in pediatric patients**

- How pediatric patients differ from adults with respect to IFD:
  - Epidemiology, host susceptibility
  - Clinical manifestations
  - Antifungal drug response
- Pharmacokinetics and pharmacodynamics in pediatrics