S10.4a New mechanism and detection methods for azole-resistant Aspergillus fumigatus
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S10.4 Emerging antifungal resistant fungi, September 24, 2022, 10:10-12:00 PM
The most studied azole-resistant mechanism of Aspergillus fumigatus is excision of the drug for CYP15A, the target enzyme of triazole antifungal substances. Typically, the resistance caused by the designated azole acid substitution of CYP15A has a specific pattern depending on the substrate. While using non-cyp15A azole-resistant mechanisms can be discovered with major focus on developing novel methods for prompt diagnosis and effective drug treatment. In our previous study, we reported that mutations of 196, which disrupts HmgCoA reductase, the rate-limiting enzyme in ergosterol biosynthesis, would be the mechanism conferring azole drug resistance (ID: 2016). On the other hand, different azole susceptible patterns have been reported even among the strains possessing in CYP15A. In this way, the overall picture of molecular mechanisms inducing azole resistance remains unclear.

We have already reported simple and rapid detection methods for A. fumigatus possessing CYP15A mutation using an enzyme-linked assay (SLAC; 2022). Furthermore, using MALDI-TOF-MS, we are developing a discrimination model to detect azole-resistant A. fumigatus.

S10.4b Pathology, physiology, and management of chronic pulmonary Aspergillosis
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S10.4 Emerging antifungal resistant fungi, September 24, 2022, 10:10-12:00 PM
Chronic pulmonary aspergillosis (CPA) is a complex disease that is difficult to diagnose and resistant to treatment. Many cases are missed and have unfortunate outcomes in clinical settings. Although CPA has long been classified into several types based on pathological findings, it is not always possible to make a pathological diagnosis in all cases, so a clinical diagnosis is often required. In addition, making a diagnosis relying on clinical symptoms by infections caused by other agents, even by common agents, making treatment further difficult. The diagnosis of CPA requires clinical symptoms and findings, radiological, serological, and histological findings, together with the histological confirmation of CPA diagnosis. The majority of treatment is corticosteroid therapy with azoles, and indications and therapeutic evidence for echinocandins, and polyene are limited. The development of novel antifungals with different mechanisms of action from conventional agents is also essential. Azole-resistance of Aspergillus is caused by long-term treatment in another issue. It has been reported that resistant strains have been found in CPA patients treated with long-term azole therapy, mutations in the cyp15A and others have also been identified as the mechanism of lower MIC values of strains. This presentation will focus on epidemiology, pathogenesis, diagnosis, and management including drug resistance in CPA patients.

S10.4c Successful treatment of mucormycosis in hematology diseases
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The diagnosis of mucormycosis relies upon the identification of organisms in tissue by histopathology with culture confirmation. However, culture often yields no growth, and histopathological identification of an organism with a structure typical of Mucorales may prove the only evidence of infection. PCR-based technique may contribute to the early diagnosis of mucormycosis. We developed a new antigen test. We searched for nucleic or membrane-bound proteins of Rhizopus oryzae, Rhizopus oryzae-specific antigen, 25 kDa) was detected at significantly higher concentrations in serum and in lung homogenates of the A. fumigatus-infected mice as compared to the uninfected mice. And we will show a case of hematology disease with diagnosis using RAP test and successful treatment with Liposomal amphotericin B. Our study indicates that protein RAP may be a promising biomarker of R. oryzae infection.

S10.4d A unique clinical appearance of Candida auris infection in Japan
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S10.4 Emerging antifungal resistant fungi, September 24, 2022, 10:10-12:00 PM
It has only been 15 years since Candida auris was reported isolated from the ear canal of a 70-year-old Japanese woman in Tokyo, and no record of an isolate corresponding to this species has been found prior to 1996. It is a high public health priority concern in several regions of the world. This is because the fungus is multidrug-resistant and can acquire resistance to all three major groups of current antifungal drugs (azoles, echinocandins, and amphotericin B). Outcomes in healthcare facilities are also a concern. The main reasons for this are as follows: unlike other Candida spp., that primarily inhabit the digestive and urinary systems, C. auris readily colonizes patient skin and ear canals for several weeks on dry, desiccating surfaces, contributing to infections in outpatients in healthcare facilities. In Japan, C. auris was first identified in 2009 in a discharge from the ear canal of a patient admitted to a Japanese hospital, and since then, all isolates have come from the ear canal, with only few reported strains. For reasons unknown, as of 2022, C. auris has not been reported as a cause of invasive disease in Japan, and no nosocomial infections have occurred. Whole genome analysis suggests that all Japanese isolates belong to Clife II, infecting drug resistance and clinical characteristics.

In this symposium, I will present the current status of C. auris infection in Japan, the first country where C. auris infection originated, together with its unique clinical features and molecular epidemiological analysis.

S10.5a Fungal respiratory infections in cystic fibrosis patients in the Middle East
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S10.5 Fungal respiratory infections in Cystic Fibrosis, September 24, 2022, 10:10-12:00 PM
Cystic Fibrosis (CF) is among the most common genetic disorders, which involve multiple organs including the respiratory tract. CF is caused by a defect in the transmembrane conductance regulator (CFTR), which is critical for water and ion transport across epithelial cell membranes. A mutation of the cystic fibrosis transmembrane conductance regulator gene (CFTR) results in disturbances of fluid transport in epithelial tissues throughout the body. CF patients generally have an increased risk for infections due to microbial pathogens. Additionally, a highly variable genotype, as well as the use of chronic antibiotics, may contribute to bacterial and fungal infections.

In our previous study, we reported that patients with CF had a higher prevalence of fungal infections compared to healthy controls. We also found that fungal infections were associated with a decrease in lung function and increased hospitalization. Furthermore, we observed that fungal infections were more frequent in patients with a history of antibiotic use, which is consistent with previous studies demonstrating the role of antibiotics in promoting fungal infections in CF patients.

Our current study aims to further investigate the prevalence of fungal infections in CF patients in the Middle East, with a focus on the identification of fungal species and the evaluation of clinical outcomes associated with these infections. We expect to contribute to the understanding of fungal infections in CF patients in the Middle East and to improve management strategies to reduce the impact of fungal infections on the health and quality of life of CF patients.