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Perspectives of antifungal drug discovery

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The vast majority of the known 2 million fungal species are strict saprophytes, but some of them can attack humans, animals and plants. It is estimated that 270,000 fungal species are associated with plants, and 325 fungal species, common in the environment, are known to infect humans. Human fungal infections range from superficial nail and skin infections to invasive, systemic infections that are really harmful to health and life. Human fungal infections generally receive less attention than bacterial and viral diseases, since the incidence of systemic fungal infections is considerably lower than that of superficial infections, however, mortality rates from invasive fungal infections are very high, often exceeding 50%, despite the use of antifungal drugs. Early diagnosis of disease and identification of the fungal pathogen remain crucial for the treatment of invasive fungal infections, because the efficacy of currently used drugs is limited by issues with administration route, narrow treatment window, activity spectrum, bioavailability, toxicity, drug resistance and cost. The increase in the number of fungal infections and the occurrence of new fungal opportunistic species is caused by general immunosuppression of the population. Agents can be divided into nonspecific antifungals and targeted site-specific antifungals.Although there is a relatively big number of topical antifungal medications, only about 12 drugs were approved for the treatment of systemic fungal infections (ATC J02A). Development of resistance/cross-resistance to commonly used drugs and multidrug-resistance of fungal pathogens constitute serious problems, and it is evident that new systemic (preferably orally administered) antifungal drugs are urgently needed.

Biography

Josef Jampilek completed his PhD degree in Medicinal Chemistry at the Faculty of Pharmacy of the Charles University in 2004. During 2004-2011, he worked in expert and managerial posts in the R&D Division of the pharmaceutical company, Zentiva. In 2009, he became an Associate Professor of Medicinal Chemistry at the Department of Chemical Drugs at the Faculty of Pharmacy of the University of Veterinary and Pharmaceutical Sciences in Brno. He is an author/co-author of 27 patents, more than 120 peer-reviewed scientific publications, 7 university textbooks, 11 chapters in monographs and many invited lectures. He received several awards for his scientific results.

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