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DISEASES OF EMERGING FUNGAL PATHOGENS TO ANIMALS

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Abstract: In animals the unprecedented number of fungal diseases has been recentlyinvestigated that influenced the loss of enormousbiodiversity of animals and plants from the planetearth. The fungal spores are spread in the environment mainly through anthropogenic activities.Additionally, the different reproductive modes in fungi are also the major concern for theemergence of pathogenicity.These pathogens poses a serious threat to the plants and animalcausing serious diseases and continuously deteriorating the biodiversity, food security andeconomies of the globes. Opportunistic fungal pathogens spread diseases from local infection tofatal disseminated diseases such as aspergillosis, cryptococcosis etc.by melanized fungi. In this chapter emphasis is given on emerging infectious diseases in variety ofanimals.

INTRODUCTION

The complex relationships among the environment, fungi, and human beings are based on the strategies of giving and taking opportunities. Certainly, it is well understood that fungi put a huge impact on our daily lives both positive and negative manners. Fungi is heterotrophic in nature that dwells on decaying organic matter and also cause widespread severe disease in a variety of animals like bats, frogs etc. (https://www.ncbi.nlm.nih.gov/books/NBK549988/pdf/Bookshelf_NBK549988.pdf).

The fungal kingdom comprised an enormous diversityof taxa with varied ecological niches, life-cycle strategies,and morphologies. However, there is scarce information about the actual biodiversity of fungi. It is estimated that approximately 1.5 million of fungal speciesare known and out of them only about 5% wereformally classified (Vandeputte *et al*., 2012). Fungi also inhabit the hostile and extreme conditions such as an Antarctic fungus *Cryomycesantarcticus* has been shown to survive under space stationvirtual Mars conditions (Onofri *et al*., 2015). In recent past earlier researchers reported that the concurrent appearance of phylogenetically distant strains of *Candida auris*on three continents may be one of the first exampleof a novel fungal pathogenic strain emerging due to global warming effects (Casadevall *et al*., 2019). In the biosphere, fungi suitably played a pivotal role as decomposer of various organic matter, which permits the utilization of several nutrients and elementsdead organisms (Jones *et al*., 2011; Fisher *et al*., 2020). Most of fungi inhabit as parasites for plants, animals, human, and other fungi. The pathogenic fungiare having potential to cause extensive damage and losses to agricultureand forestry and animals. These include variety of diseases like aspergillosis, candidosis,cryptococcosis etc. Fungal spores are alsoact as source of allergies and can cause allergic reactions (Vandeputte *et al*., 2012). However,there are various factors that trigger the emergence and re-emergence of infectious diseases inthe public health including animals. These factors may be increase in the population, technological and industrial development, environmental changes, resistance of microbes againstdrugs, sudden outbreak

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of fatal diseases at local and global levels etc. (Lederberg et. al., 1992).The present chapter highlights the infectious diseases caused by environmental fungi in animals.

The fungal diseases in animals are becoming a serious issue at global level. Theprevention of epidemic diseases is the prime concern for the workers in this particular area.Curing of the disease may be possible by means of using the antibiotics against the fungalspecies. However, sometimes the pathogen become resistant to particular antibiotics hence,broad spectrum antibiotics could be useful for the mitigation of fungal disease in animals. Thechytridiomycosis is a serious disease of amphibian. Various studies have reported regarding theimmunization, disinfection, and the use of bio-control are effective means for the control of thisdisease (McMahon et. al., 2014; Jaime Bosch et. al., 2015). Other fatal disease likecoccidioidomycosis is an important re-emerging disease of public health of Sothern-west ofUnited States. The infestation of this disease can be cured by using the vaccination (Warnock,2006). Another possible control measures are required to reduce the exposure of animals in thecontaminated environment (Smith, 2006). There is need to decontaminate the slaughterhouses. It would be possible by using antifungal agents such as alcohol with with hypochlorite solution and aldehyde solution. Currently the antifungal azoles are morebeneficial for the veterinary surgeons. Another broad spectrum antifungal antibiotic such asvoriconazole is very much useful against the variety of fungal pathogens infecting the animals (Smith, 2006).

CONCLUSIONS AND FUTURE PROSPECTS

In recent past various organisms have been emerged as newpathogens. It is essential to establish microbial diagnosis because of the organisms havepotentially variable susceptibilities against antifungal drugs. Host alteration susceptible toinfection, diagnostic methods and changes in climatic condition influences the mode of infection.It is very important to investigate the fungal spores and their concentration in order to counteractthe fungal infection that causes emerging diseases in wild and domestic animals.Integrated approaches based on theory and practical aspects ofepidemiology, prediction of climate change, genomic analyses are the warranted for thereduction of fungal pathogenicity.

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