

Letter to the Editor

A fungus among us: The strange tale of *Chondrostereum Purpureum* - A plant pathogen that found a new home in humans: A correspondence

Fungi have evolved over millions of years to survive in a wide range of environments, and they have developed various mechanisms to adapt to different habitats and niches. Fungi that cause disease in plants, animals, or humans have evolved specific traits that allow them to infect and colonize their hosts, often through the production of enzymes and toxins that break down and weaken host tissues [1].

While there exist millions of different species of fungi, only a select few possess the four key attributes required to successfully infect and invade animal or human hosts [Fig. 1]: tolerance to high temperature, capability to enter and establish itself within the host's system, ability to degrade and absorb host's tissue, and the ability to withstand and counteract the host's immune response [2]. While individuals with weakened immune systems are considered to be at a greater risk of contracting fungal infections, it is not uncommon for otherwise healthy and immune-competent individuals to develop fungal infections as well, particularly when exposed to a high level of fungal spores. Fungal invasion poses distinct challenges for both plants and animals due to differences in their structural and systemic makeup. Despite these differences, plant and animal cells share a similar cellular structure [2].

Chondrostereum purpureum is a plant pathogen that causes a disease called silver leaf disease in trees and shrubs, particularly in the rose family. While infections with this fungus are common in plants, cases of human infection are extremely rare [3]. Recently, Dutta S et al., from India reported the world's first case of human infection by plant fungus - *Chondrostereum purpureum* [3]. The patient is a 61-year-old plant mycologist from Kolkata, India, who developed an infection caused by *Chondrostereum purpureum* after working with various plant fungi for his research project. The patient had symptoms including hoarseness of voice, cough, recurrent pharyngitis, fatigue, difficulty swallowing, and anorexia. CT scan of his neck revealed the presence of a right paratracheal abscess, which was drained and tested for the presence of the fungus. Both Gram stain and LCB (Lactophenol cotton blue) mount preparation was performed and round and tubular fungal elements were observed. The fungus could not be identified phenotypically and genomic sequencing revealed it as *Chondrostereum purpureum*. The treatment for the infection involved draining the pus entirely, after which the patient was administered oral voriconazole.

In recent decades, numerous new pathogenic fungi have emerged, with *Candida auris* being a notable example of a multidrug-resistant fungus that has become a significant global threat. Garcia-Solache and Casadevall's theory suggests that certain thermally intolerant fungi have the potential to acquire the ability to survive at body temperatures, thereby posing a greater risk to human health [4,5]. Despite following different evolutionary pathways, there is growing evidence of animal and human infection caused by phytopathogens. Factors such as global warming, changes to ecosystems, increased international travel and

commerce, and unplanned urbanization may have contributed not only to the emergence of new fungal infections but also a range of zoonotic viral and bacterial diseases. Typically, phytopathogens are opportunistic pathogens that lack specificity for humans and animals, and are therefore considered to pose a greater risk to immunocompromised populations [4]. In addition, the increasing use of antifungal drugs in agriculture and medicine may also play a role in the evolution of resistant fungal strains. Fungi have the ability to develop resistance to drugs through genetic mutations or by acquiring resistance genes from other organisms, and this can lead to the emergence of drug-resistant strains that are more difficult to control [5].

Diagnosis of fungal infections typically involves traditional methods but molecular techniques can help in rapid detection and identification of uncommon and rare organisms, particularly when traditional morphological examination is not possible or when morphological data is inconclusive [3]. Accurate identification of fungus species is essential for effective treatment, as many fungal pathogens are resistant to various antifungal medications, and treatment recommendations should be made based on individual clinical experiences with each case. In the case of rare fungi, recurrence and potential morbidity are important factors to consider, and patients require long-term oral antifungal therapy and regular follow-up to detect any signs of recurrence [3]. With limited treatment options available, there is a critical need for the development of new antifungal agents and improved diagnostic methods.

In conclusion, the emergence of plant fungi as potential human pathogens has raised concerns among the healthcare system worldwide. The ability of plant fungi to cross the species barrier and infect humans is alarming and highlights the need for further research to understand the

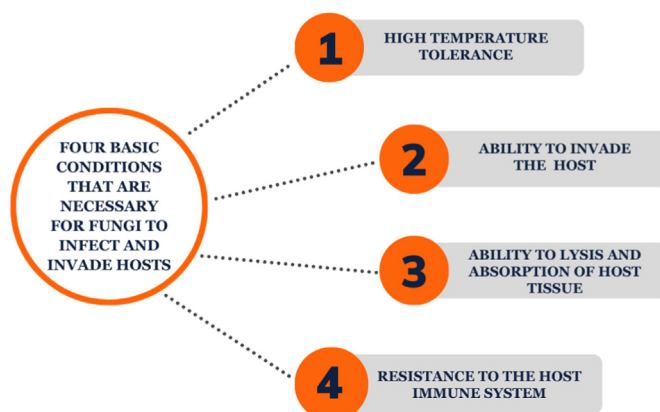


Fig. 1. Four basic conditions required for fungal invasion and infection of hosts.

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mechanisms involved. Furthermore, understanding the cross-kingdom pathogenicity of plant fungi is crucial for developing effective control measures to prevent and contain these infections.

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