Environmental surveillance of Aspergillus fumigatus in Dutch agricultural crops

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Methods: We investigated A. fumigatus resistance at multi-environmental sites including the compost, strawberry, and potato, where farmers usedazole fungicides for crop protection.

Results: On average 105 A. fumigatus CFU/g was recovered of which roughly half were itraconazole and tebuconazole resistant. Similar random repeat-mediated resistance mechanisms were found in colonies cultured from these environmental sites as reported in clinical azole-resistant isolates.

Conclusions: Our results suggest that not only azole-containing plant-waste material but also other agricultural crops can be hotspots for resistance selection in A. fumigatus and underscores the need to further investigate transmission routes.

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The immune response to fungal infections is complex and involves various components of the immune system. Understanding the mechanisms of fungal adhesion and evasion strategies is crucial for developing effective antifungal therapies. This review aims to summarize the latest findings in the field of fungal adhesion and evasion, highlighting potential therapeutic targets.

1. Fungal Adhesion Strategies

Fungi use diverse adhesion strategies to establish initial contact with host cells. These strategies include the production of extracellular matrix (ECM) components, such as polysaccharides and proteoglycans, which facilitate adhesion to host surfaces. Fungi also employ specialized organelles, such as pseudohyphae and pseudo pods, to enhance adhesion and invasion. Additionally, fungal cells can change their morphology and form structures like microcolonies, which aid in the colonization of host tissues.

2. Fungal Evasion Strategies

Fungi have evolved various mechanisms to evade host immune responses. These strategies include the induction of immune tolerance, the modulation of innate and adaptive immune responses, and the inhibition of phagocytosis. Fungi also exploit the host cell microenvironment to establish a niche that promotes their survival and proliferation.

3. Therapeutic Opportunities

Understanding the fungal adhesion and evasion mechanisms provides opportunities for the development of targeted therapies. Strategies that aim to block fungal adhesion or enhance fungal phagocytosis could be effective in combating fungal infections. Additionally, targeting the fungal mechanisms that evade host immune responses may lead to novel therapeutic approaches.

4. Conclusion

The interplay between fungal adhesion and evasion is a dynamic and complex process that is crucial for the establishment and persistence of fungal infections. Further research is needed to fully understand the molecular mechanisms involved in fungal adhesion and evasion, and to develop effective therapeutic strategies.