

***In vitro* infection models to study fungal-host interactions.**

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Abstract

Fungal infections (mycoses) affect over a billion people per year. Approximately two million of these infections are life-threatening, especially for patients with a compromised immune system. Fungi of the genera *Aspergillus*, *Candida*, *Histoplasma*, and *Cryptococcus* are opportunistic pathogens that contribute to a substantial number of mycoses. To optimize the diagnosis and treatment of mycoses, we need to understand the complex fungal-host interplay during pathogenesis, the fungal attributes causing virulence, and how the host resists infection via immunological defenses. *In vitro* models can be used to mimic fungal infections of various tissues and organs and the corresponding immune responses at near-physiological conditions. Furthermore, models can include fungal interactions with the host-microbiota to mimic the *in vivo* situation on skin and mucosal surfaces. This article reviews currently used *in vitro* models of fungal infections ranging from cell monolayers to microfluidic 3D organ-on-chip (OOC) platforms. We also discuss how OOC models can expand the toolbox for investigating interactions of fungi and their human hosts in the future.

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