Keeping *Candida* commensal: How lactobacilli antagonize pathogenicity of *Candida albicans* in an *in vitro* gut model.

Graf K, Last A, Gratz R, Allert S, Linde S, Westermann M, Gröger M, Mosig AS, Gresnigt MS, Hube B (2019) Keeping *Candida* commensal: How lactobacilli antagonize pathogenicity of *Candida albicans* in an *in vitro* gut model. *Dis Model Mech* 12(9), dmm039719.

Abstract

The intestine is the primary reservoir of Candida albicans that can cause systemic infections in immunocompromised patients. In this reservoir, the fungus exists as a harmless commensal. However, antibiotic treatment can disturb the bacterial microbiota, facilitating fungal overgrowth and favor pathogenicity. Current in vitro gut models used to study C. albicans' pathogenesis investigate the state where C. albicans behaves as a pathogen rather than a commensal. We present a novel in vitro gut model where the fungal pathogenicity is reduced to a minimum by increasing the biological complexity. In this model, enterocytes represent the epithelial barrier and goblet cells limit C. albicans adhesion and invasion. Significant protection against C. albicans-induced necrotic damage was achieved by the introduction of a microbiota of antagonistic lactobacilli. We demonstrated a time-, dose-, and species-dependent protective effect against C.

albicans-induced cytotoxicity. This required bacterial growth, which relied on the presence of host cells, but was not dependent on the competition for adhesion sites. Lactobacillus rhamnosus reduced hyphal elongation, a key virulence attribute. Furthermore, bacterial-driven shedding of hyphae from the epithelial surface, associated with apoptotic epithelial cells, was identified as a main and novel mechanism of damage protection. However, host cell apoptosis was not the driving mechanism behind shedding. Collectively, we established an in vitro gut model, which can be used to experimentally dissect commensal-like interactions of C. albicans with a bacterial microbiota and the host epithelial barrier. We also discovered fungal shedding as a novel mechanism by which bacteria contribute to the protection of epithelial surfaces.

Involved units

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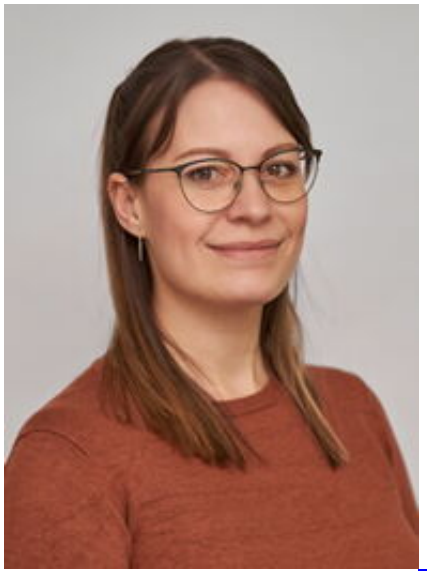

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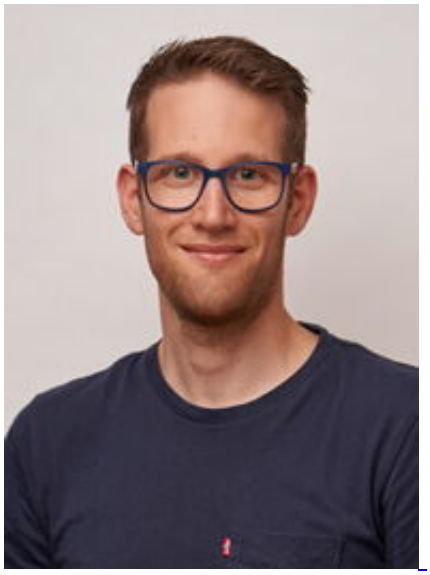

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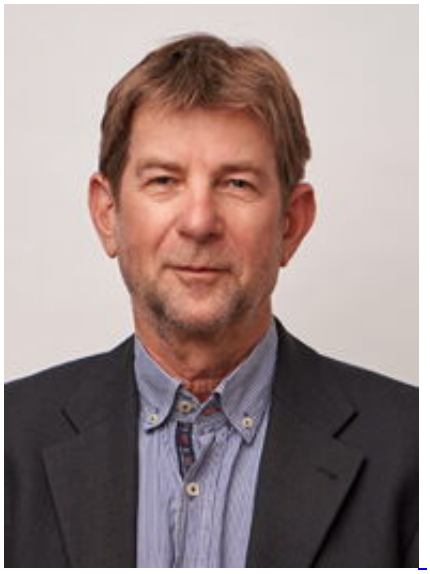

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Topics

Damage to the host

In vitro infection models with physiological relevance

Fungal-host-microbiota interactions

Identifier

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