Antifungal defense of probiotic *Lactobacillus rhamnosus* GG is mediated by blocking adhesion and nutrient depletion.

Mailänder-Sánchez D, Braunsdorf C, Grumaz C, Müller C, Lorenz S, Stevens P, Wagener J, Hebecker B, Hube B, Bracher F, Sohn K, Schaller M (2017) Antifungal defense of probiotic *Lactobacillus rhamnosus* GG is mediated by blocking adhesion and nutrient depletion. *PLOS ONE* 12(10), e0184438.

Details

Abstract

Candida albicans is an inhabitant of mucosal surfaces in healthy individuals but also the most common cause of fungal nosocomial blood stream infections, associated with high morbidity and mortality. As such life-threatening infections often disseminate from superficial mucosal infections we aimed to study the use of probiotic Lactobacillus rhamnosus GG (LGG) in prevention of mucosal C. albicans infections. Here, we demonstrate that LGG protects oral epithelial tissue from damage caused by C. albicans in our in vitro model of oral candidiasis. Furthermore, we provide insights into the mechanisms behind this protection and dissect direct and indirect effects of LGG on C. albicans pathogenicity. C. albicans viability was not affected by LGG. Instead, transcriptional profiling using RNA-Seq indicated dramatic metabolic reprogramming of C. albicans. Additionally,

LGG had a significant impact on major virulence attributes, including adhesion, invasion, and hyphal extension, whose reduction, consequently, prevented epithelial damage. This was accompanied by glucose depletion and repression of ergosterol synthesis, caused by LGG, but also due to blocked adhesion sites. Therefore, LGG protects oral epithelia against C. albicans infection by preventing fungal adhesion, invasion and damage, driven, at least in parts, by metabolic reprogramming due to nutrient limitation caused by LGG.

Involved units

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Topics

Fungal-host-microbiota interactions

Identifier

doi: 10.1371/journal.pone.0184438

PMID: 29023454