Candida and Candidiasis

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POSTER ABSTRACT BOOK

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BLOCK B

The Community State Type I dominated by *Lactobacillus crispatus* is the most effective vaginal microbiota in counteracting *Candida albicans* infection *in vitro*

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Abstract

The lactobacilli-dominated vaginal microbiota plays a key role in protecting the host against fungal pathogens such as *Candida (C.) albicans*. In this work, we developed four artificial human vaginal microbiotas reproducing the major *Lactobacillus*-dominated Community State Types (CSTs) found in healthy women as identified by Ravel and co-workers. Among these, the artificial CST I (aCST I), dominated by *Lactobacillus crispatus*, showed remarkable protective effects in an *in vitro* model of *C. albicans* infection. Co-infection with aCST I significantly reduced epithelial damage induced by the reference *C. albicans* strain and three clinical isolates, with protection entirely attributable to *L. crispatus*. Transcriptomic analyses revealed that *L. crispatus* strongly suppressed fungal virulence by downregulating key genes involved in hyphal growth, adhesion, and pathogenicity (e.g., *ECE1*, *ALS3*, *HWP1*, *HYR1*). It also induced an iron starvation response in *C. albicans*, marked by upregulation of iron acquisition genes and downregulation of *ALS3*, a ferritin-binding protein, alongside inhibition of fungal cell cycle progression. Moreover, presence of the aCST I microbiota modulated host immunity, reducing IL-1 receptor antagonist (IL-1RA) and β-defensin-2 levels during infection. Comparative analysis with human-derived CST I confirmed the model's translational validity. In contrast, aCST III, dominated by *L. iners*, enhanced fungal adhesion and failed to protect, while aCST II and aCST V showed only partial effects. Overall, our study highlights *L. crispatus* as a potent antifungal and immunomodulatory agent and supports the use of synthetic vaginal microbiotas. These findings could advance our understanding of host-microbe-pathogen interactions and developing microbiota-based interventions against fungal vaginal infections.