Candida glabrata Biofilms

Candidiasis have globally increased over the last years, being a major cause of morbidity and mortality, especially in immunosuppressed and hospitalized patients. Candida albicans remains to be the most common species responsible in candidiasis, but Candida glabrata has appeared as second most common Candida in the USA and the third in Europe. Biofilms of this species are extremely difficult to eradicate and are a source of many recalcitrant infections.

- To evaluate how C. glabrata cells try to adjust their biofilm composition in response to an antifungal drug treatment based on a series of profiles of eight genes’ expression - BGL2, FKS1, FKS2, GAS2, KHN1, UPG1, XOG1 and MNN2 - known to be related to the production of β-1,3, β-1,6-glucans and mannans.

Methods

1. Biofilm cells recovery

C. glabrata strains:
- C. glabrata ATCC2001 (wild-type)
- C. glabrata 562123 (urinary tract)
- C. glabrata 534784 (vaginal tract)

2. Real Time-qPCR Analysis

C. glabrata ATCC2001
- Overexpressed mostly BGL2, GAS2, XOG1 genes;
- Mcf was responsible for the induction of the highest overexpressions.

C. glabrata 534784
- Higher capacity to rapidly alter the genes expression after a stress induced by any of the drugs;
- BGL2, GAS2, FKS1, FKS2 and XOG1 changes, especially when in the presence of Flu and both echinocandins;
- Mcf responsible for the highest variations in the genes expressions.

Results

The gene expression profiles were dependent on the strain, gene and drug, revealing high Candida glabrata intra-strains variations;

- As it is known, β-1,3 glucans are important means of matrix protection to the Candida biofilm cells. The overexpression of the genes, related to their regulation, showed an attempt of the cells to increase glucans production for the biofilm matrices, in order to protect them against the drugs pressure;

- This work demonstrates the plasticity of biofilm cells and the high capacity of C. glabrata cells to adapt and respond properly to any antifungal drug aggression, which can explain, to some degree, the particular high virulence associated to this species.

Conclusion

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