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Is micafungin uniformly active against *C. albicans* biofilms showing different degree of metabolic activity?

eP238

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INTRODUCTION

A considerable variability in terms of metabolic activity in preformed *C. albicans* biofilms has been observed (Poster P0012, ECCMID 2014), with up to 30% of the isolates exhibiting high metabolic activity.

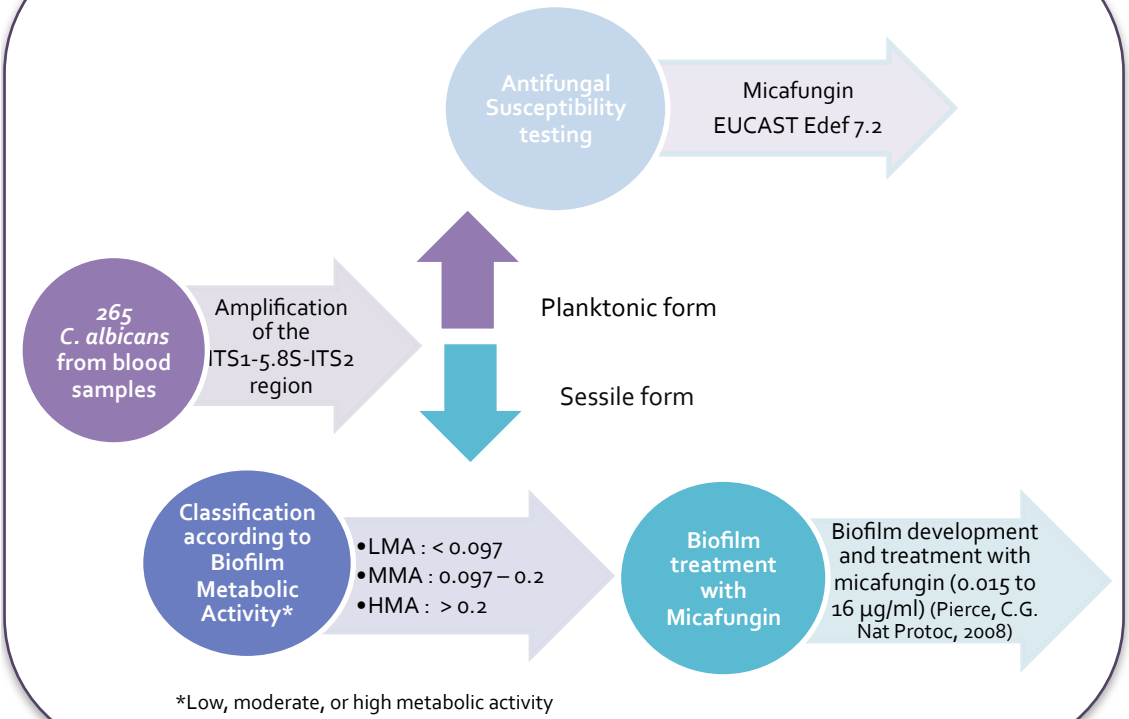
Biofilm metabolic activity is proportional to the number of *Candida* cells present; therefore, we hypothesize that the metabolic activity may be a surrogate marker of cell division and fungal wall biosynthesis.

It is unknown whether the antibiofilm activity of micafungin depends on the metabolic activity.

OBJECTIVE

We studied whether the antifungal activity of micafungin against *C. albicans* preformed biofilms is dependent on the metabolic activity.

METHODS



*Low, moderate, or high metabolic activity

RESULTS

Activity of micafungin against *C. albicans* planktonic and sessile cells:

Micafungin was very active against most of the isolates in the planktonic form, and only 1.5% of the isolates were resistant. Micafungin was more active against planktonic cells than against sessile cells (MIC_{50} = 0.015 µg/ml vs. 16 µg/ml) (Table).

TABLE. MIC_{50} of micafungin for the *C. albicans* isolates in planktonic and biofilm forms .

Biofilm metabolic activity	No.	MIC_{50} (Range) in µg/mL	
		Planktonic cells	Biofilms
LMA	70	0.015 (0.015 – 0.03)	32 (0.015 - 32)
MMA	105	0.015 (0.015 - 1)	16 (0.015 – 32)
HMA	90	0.015 (0.015 – 0.03)	2 (0.015 – 32)
Overall	265	0.015 (0.015 - 1)	16 (0.015 - 32)

However, micafungin was not consistently active against all *C. albicans* biofilms and LMA isolates were significantly less susceptible to micafungin than MMA or HMA isolates (P<0.05).

Micafungin achieves a physiological concentration of 4 µg/ml in serum. The percentage of LMA biofilm forming strains showing a MIC ≥4 µg/ml was higher than the percentage of MMA or HMA biofilm forming strains (70% vs. 55%; Figure).

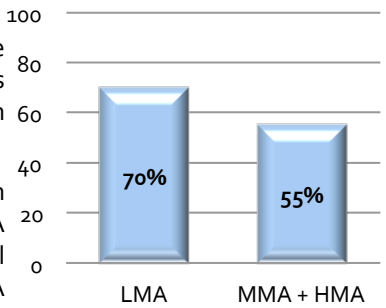


FIGURE. Percentage of strains showing LMA or MMA/HMA biofilms showing a micafungin MIC ≥4 µg/ml

CONCLUSIONS

- Antifungal activity of micafungin against *C. albicans* biofilms in vitro was dependent on metabolic activity.
- High metabolic active biofilms were more susceptible to micafungin than low metabolic active biofilms.
- Our results suggest that metabolic activity should be studied in future evaluations of micafungin for the eradication of *C. albicans* biofilms (e.g. antifungal lock therapy).