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ePoster Viewing
Antifungal drug susceptibility and resistance

Is micafungin uniformly active against Candida albicans biofilms showing different degrees of metabolic activity?

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Objectives: The ability to form biofilm enables *Candida* spp. to cause catheter-related candidemia, a disease that requires the catheter to be removed. The use of agents with *in vitro* activity against *C. albicans* biofilms, such as micafungin, could obviate catheter removal. The metabolic activity of *C. albicans* biofilms is strain-dependent. Cell wall formation seems to be more prominent in biofilms with high metabolic activity. It remains unknown whether biofilms with high metabolic activity are more susceptible to micafungin, a drug that inhibits cell wall formation. We studied the antifungal activity of micafungin against *C. albicans* biofilms with different degrees of metabolic activity.

Methods: We studied 265 *C. albicans* isolates causing fungemia in 246 patients admitted to Gregorio Marañon Hospital, Madrid, Spain from January 2007 to June 2013. All strains were classified according to the metabolic activity biofilm (measured using XTT) as having low, moderate, and high metabolic activity (LMA, MMA, and HMA) (Table). Micafungin MICs for planktonic cells were assessed using the EUCAST E.Def 7.2. The activity of micafungin against sessile cells was assessed using the XTT reduction assay; MIC ($SMIC_{80}$) was defined as an 80% reduction in metabolic activity compared with the control well.

Results: Micafungin was very active against planktonic cells; it was more active against planktonic cells than against sessile cells (MIC_{50} = 0.015 µg/mL vs. 16 µg/mL) (Table). In contrast, micafungin was not consistently active against all *C. albicans* biofilms. LMA isolates were significantly less susceptible to micafungin than MMA or HMA isolates (P<0.05) (Table).

Conclusions: We showed that the antifungal activity of micafungin against *C. albicans* biofilms was dependent on metabolic activity. HMA isolates were more susceptible to micafungin than LMA isolates. Our results suggest that the metabolic activity of biofilm should be studied in future evaluations of micafungin for the eradication of *C. albicans* biofilms (e.g. antifungal lock therapy).

Biofilm metabolic activity	N	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)