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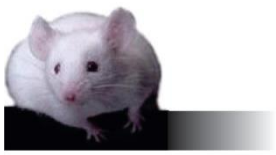

Biodynamics

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Candida albicans PLANKTONIC AND SESSILE CELLS TREATED WITH BIOSYNTHESIZED SILVER NANOPARTICLES

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Candida albicans is a normal commensal of the gastrointestinal microbiota in healthy individuals; however, as an opportunistic pathogen, is the most common etiological agent of candidiasis. *C. albicans* has the ability to form biofilms and morphogenetic conversions between yeast and hyphal morphologies contribute to biofilm development. These attached communities of sessile cells are surrounded by a protective exopolymeric matrix that effectively shelters *Candida* against the action of antifungals (ATFs). As fungi are eukaryotic, research and development of new ATFs agents have been difficult due to the limited number of selective targets, also leading to toxicity. Silver nanoparticles (AgNPs) were considered, in recent years, particularly attractive for the production of a new type of antimicrobials. Although the highly antibacterial effect of AgNPs has been described, their mechanism of action is yet to be fully elucidated. This study firstly evaluated the activity of biosynthesized AgNPs in *C. albicans* planktonic cells and then, the effect over biofilms.

The AgNPs were synthesized by an extracellular bioprocess. These were formed from reduction of silver ions by the supernatant of *Pseudomonas aeruginosa*, and were characterized by Ultraviolet-visible spectroscopy (UV-vis), dynamic light scattering (DLS) and transmission electron microscopy (TEM), *as was described* by Quinteros *et al. (*2016). Minimum inhibitory concentration (MIC), minimum fungicidal concentration for planktonic cells (MFC) and minimum inhibitory concentration of biofilm (MBIC) were determined by the AgNPs and amphotericin B (AmB) against *albicans* using the plate microdilution technique. Biofilm formation (48 h incubation) was tested by 96-well plate adhesion and crystal violet (CV) staining (0.1 OD595nm = 1BBU). Viable cells were determined by enumerating the colony-forming units per milliliter (CFU/ml) and the results showed a good correlation with the CV assay.

Our results demonstrate that AgNPs had a stronger inhibition of *C. albicans* planktonic cells. The MIC results showed that AgNPs were fungicidal against *C. albicans* SC5314 (0.037 pM) and *C. albicans* L20 (0.15 pM) at very low concentrations compared to silver standard ($AgNO_3$ 4 x 10^7 pM and 2 x10^7 pM, respectively) or AmB (2.7 x 10^5 pM). Biofilm reduction of both strains was obtained; however, sessile cells were not completely removed. These results are promising for the future application, due to the high activity observed at verylow concentrations. Nanoparticles are now considered a viable alternative to antibiotics and seem to have a high potential to solve the problem of the emergence of bacterial multidrug resistance.