



CALIFORNIA SCIENCE & ENGINEERING FAIR 2018 PROJECT SUMMARY

Name(s) Angelynn H. Nguyen	Project Number 38374
Project Title Determining if the Acidity of the Growth Medium Affects Candida albicans' Biofilm's Mechanism	
Objectives/Goals Candida albicans have been recognized as the most prevalent fungal species in humans. When C. albicans form a biofilm they become resistant to typical antifungal treatments. This project is an exploration as to which concentration of antifungals, can effectively target and eliminate C. albicans in suspension and with a biofilm in an environment of pH 6 and pH 5. Abstract Methods/Materials During the suspension experiment, different concentrations of Amphotericin B and Clotrimazole were added to a solution of C. albicans and YPD media, with HCl acid added to four groups. One group was the negative control. The test tubes were placed on a shaker. Then the absorbance level of the fungus solution was determined. During the biofilm experiments, silicon were weighed then placed in a well dish. Next, C. albicans and YPD was added to the well dishes and treated with the conditions from part one. The well dishes were placed on a shaker, then the YPD media was extracted. The silicon was weighed again to determine the mass of the fungus. The absorbance level and the fungus weight was converted to number of C. albicans cells. The experiments were repeated five times to reduce random errors. Results After experimentation, it was determined that the fungus cells with the presence of a biofilm had a significantly larger amount of C. albicans cells in comparison to the fungus in suspension. Both tests show that for the 2 μ L Clotrimazole condition, the environment of pH 6 was more effective, while the acidic environment was for the 20 μ L condition. As for the Amphotericin B, at 2 μ L, the acidic environment was more effective, while the antifungal at 20 μ L was more effective in the environment of pH 6. Conclusions/Discussion The data indicates that Clotrimazole does not stimulate the ERG11 gene as expected, hence the antifungal would eliminate the cells. Amphotericin B more efficiently killed the C. albicans cells in decreased concentrations, which is possibly due to HCl degrading the cell's biofilm. Ultimately, Clotrimazole is more effective than Amphotericin B, therefore it is recommended to use Clotrimazole in the concentration of 2 μ L or apply acid (vinegar) before adding the antifungal. This research could transform the field of science by providing a more efficient way of eliminating fungus, which would benefit many patients that suffer from fungus infections.	
Summary Statement This research tested how antimicrobials, specifically Amphotericin B and Clotrimazole, target Candida albicans in suspension and with the presence of a biofilm, in environments of pH 5 and pH 6.	
Help Received My mentor helped by supplying materials for the experiment and reviewing my conclusions.	