



**CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY**

Name(s) David K. Tang-Quan	Project Number S1724
Project Title Evaluating the Role of the ESCRT Complex in Host/Cell Interaction and Stress Response of Candida albicans (Year 3)	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The fungus <i>Candida albicans</i> can enter the bloodstream in immunocompromised patients, infecting most organs of the body and resulting in disseminated candidiasis, which has a 50% mortality rate, even with treatment. The body utilizes a variety of defense mechanisms to prevent candidiasis and it is hypothesized that the Endosomal Sorting Complex Required for Transport (ESCRT) is integral as a protein sorting and transport apparatus in <i>C. albicans</i>. For <i>C. albicans</i> to colonize patients and cause disease, it must be able to withstand these stressors and invade the host cells.</p> <p>Methods/Materials An endocytosis assay with ESCRT insertion mutants was completed to determine the role of the complex in epithelial cell invasion. Then, stress tests were conducted on the ESCRT mutants as well as on the insertion mutants from the HOG1 kinase pathway. Stressors included: protamine (antimicrobial peptides), SDS (cell membrane), H₂O₂ (oxidative), NaCl (HOG1 pathway), Congo Red and Calcofluor White (cell wall), and CuSO₄ (ion).</p> <p>Results The endocytosis assay revealed that the ESCRT-1 and ESCRT-3 complexes are important for <i>C. albicans</i> invasion, while ESCRT-0 and ESCRT-3 are important for <i>C. albicans</i> ability to withstand stress. The ESCRT-2 complex did not play a role in either cell invasion or stress response. Results did show a correlation between disruption of the ESCRT complex and a negative impact on <i>C. albicans</i> ability to withstand stress and invade the cell.</p> <p>Conclusions/Discussion Overall, early or late gene inhibition in the ESCRT complex can severely impair <i>C. albicans</i> normal function. Most significantly, the HOG1 pathway and the ESCRT complex proved to play a key role in <i>C. albicans</i> general stress response. These discoveries open up the exciting possibility of significantly decreasing the 50% mortality rate of disseminated candidiasis.</p>	
Summary Statement This study focuses on discovering the genes that control various responses of the fungus <i>Candida albicans</i> in order to decrease the mortality rate of the disease it causes.	
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