

Proposal

Title – Identifying Phenotypes in Overexpression of Putative Kinases in *Cryptococcus neoformans*.

Program of Study – Genetics

Presentation Type – Choose one of the following: Power Point

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Category – Choose one of the following: Experimental Basic.

Abstract:

Cryptococcus neoformans persists in the central nervous system via the utilization of carbon sources mainly from sugars like glucose. In a prior study assessing the role of pyruvate kinase in the central nervous system persistence by *C. neoformans*, we observed the delayed appearance of *pyk1*Δ colonies on glucose-containing medium. When the *C. neoformans* grew on glucose containing media, another possible kinase which activates only when the *pyk1*Δ suppressor mutant was deleted, was brought into question as the possible substitute for the *pyk1* gene. The colonies appeared as one of three different morphotypes: filamentous, pseudohyphal, or yeast. Increased filamentation and haploid fruiting has been observed with overexpression of *STE12* in *C. neoformans*.² This observation leads us to believe that this gene coding for the kinase is located in the MAT locus of chromosome 5 in the *C. neoformans* Serotype A strain, H99. Due to the filamentous nature of many of the *pyk1*Δ suppressor mutants,

We hypothesize that a partial genome duplication may be responsible for suppression of the *pyk1*Δ mutant glucose utilization phenotype, and that the likely area of duplication centers around the MAT locus on Chromosome 5. A

possible genetic basis for the expression of a different kinase's growth phenotypes will be assessed using novel molecular approaches. Different putative genes, found using various microarray data, will be amplified and transformed into *Cryptococcus neoformans pyk1Δ* gene mutants. Overexpression of the putative rescue genes in *C. neoformans* may show the same phenotypes of the original *pyk1Δ* mutant phenotypes of delayed growth on glucose containing media and a complete loss of virulence in the host.

Christian worldview integration:

When working with a fungal pathogen like *Cryptococcus neoformans*, we need to be mindful of the effects on the world. When *C. neoformans* infects a host, the person goes through a very painful experience with the symptoms associated with the disease, Cryptococcosis. This is a disease that infects and claims the lives of over 750,000 people in the world per year. When performing our research, the foremost thought is that every step we get closer to figuring out how this fungal pathogen works, the closer we are to finding an effective way to treat individuals to which treatment is inaccessible or unavailable. Our Christian Worldview is used in our scientific method because of our motivation to not perform this research merely for the glory that may be associated with the possibly significant research but rather to bring the glory to God for the opportunity that he has given us to study this important fungal pathogen. It gives us an opportunity to serve those that may not be as fortunate and provide hope to them that we may find something to help them. This in following the way that Jesus helped those that were less fortunate because we need to love them and show them the love that Christ showed us first on the cross. This research will not only affect 3rd world countries but will have an effect on the

people infected with the same disease here in the USA. We look forward to the day where patients presenting with this disease will not have to go through months of treatment that have terrible effects on the body not to mention how expensive the treatment is.