Lisa Jones February 21, 2012

The Qin research proposal aims to add new information to the multitude of data on cellular aging in *Saccharomyces cerevisiae.* The Qin project hypothesizes that cellular aging occurs as a result of the complex interactions that transpire between genes and proteins. According to Qin cellular aging largely occurs because of the negative effects of random alterations that ultimately cause disruptions in the gene/protein network. Through this research new information about the effects of cellular aging and associations resulting from gene/protein interactions will be revealed such as; the relationship between robustness and the rate of cellular aging, forecast new genes that are associated with cellular aging, find mutual attributes that are common to genes that are involved with phenotypic capacitors and cellular aging, and to utilize the statistical data of genes involved in aging and to study how they impact robustness. The mechanism of aging is one of science’s greatest mysteries. Although the mechanism of cellular aging is unknown, a large number of genes involved in the process are known; along with some interactions with proteins and other genes. Genes that are known to be involved in cellular aging have been found through many high throughput screening processes. These genes are known to be involved in aging because either the deletion or insertion, results in the cell living a longer or shorter life span than usually expected. Cellular aging is essentially the decrease in a cell’s capability to grow and reproduce over time which leads to senescence and cell death. According to the Qin proposal cellular aging is thought to be proportional to the robustness in gene protein interaction networks. Robustness is defined as the ability of cells to continue homeostatic equilibrium while facing damaging environmental, polymorphic, and genetic alterations. Robustness can be estimated by using Gompertz model. In using Gompertz model the result of robustness in regards to the rate of aging would be quantified statistically in a curve. Gompertz model is a mathematical model that is used to determine the rate of mortality. This would be the best model to use because it would be dealing with a sample size that is less than 100. Gompertz model uses several parameters to estimate the rate of aging such as; m is the mortality rate, s is portion of the population that survives (survival rate), t is time, I is the initial mortality rate (which means the probability of death at time 0), and there is also the Gompertz coefficient that is the rate of aging.

This proposal would bring forth new information that is relevant to the aging process. Although this research would be conducted in yeast, this information could be applied to humans because humans and yeasts are orthologuous. With this information serious debilitating diseases that result from aging could be cured. I am very interested in seeing the results of this research. I am just sad that I am graduating this year and do not have the opportunity to work in the lab and see the results. This research will be groundbreaking.