Is robustness connected to cellular aging in yeast?

cd

Introduction:

Main topic:

The effect of robustness on cellular aging, or RLS in the yeast Saccharomyces cerevisiae.

Hypothesis:

It is hypothesized that robustness and several different proxies will be directly correlated to replicative life span in Sacchoromyces Cerevisiae.

Method:

Using R statistical software, we are able to examine each robustness proxy to determine its relationship with replicative life span. This will ultimately determine whether or not that proxy is correlated with a shorter or longer lifespan.

In order to understand the mechanisms of aging as accurately as possible, the organism Saccharomyces Cervisiae was observed because of its similar complex internal cell structure to higher-level eukaryotes In yeast Saccharomyces Cerevisiae, aging is known as replicative life span or RLS; replicative life span is determined by the number of cell divisions that occur prior to senescence (when diploid cells can no longer divide). I studied the effect of robustness on RLS in S. cerevisiae. Previous research has provided evidence that cellular aging is an emergent property of gene networks. These gene networks allow the cell to adapt and survive, and thus depicts the robustness of the cell. As a cell’s network robustness decreases, it will be less able to adapt against external perturbations. As a result, functionality of protein activities are depleted; Aging is basically the increase of chance of dying with age.

Protein robustness, the ability of a cell to maintain homeostasis, was found to have a positive correlation with RLS, indicating an increased lifespan in prior studies. It is hypothesized that robustness and several different proxies will be correlated to replicative life span in Saccharomyces Cerevisiae. The robustness proxies examined are morphological plasticity robustness and gene expression plasticity. These proxies are a way to measure the robustness of a system.

