Comparing the Success Rate of Different Anhydrobiotic Proteins Originating from R. varieornatus in E. coli BL21 Using Bacterial Transformation

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Tardigrades are one of the many organisms that have the capability of surviving extreme environments. They do this by going into a stasis known as cryptobiosis including the lack of water known as anhydrobiosis. During this state, up to 95% of the tardigrade's metabolism shuts down. During this state, the tardigrades create three different kinds of proteins: Secretory Abundant Heat Soluble Proteins (SAHS), Cytoplasmic Abundant Heat Soluble Proteins (CAHS), and Mitochondrial Abundant Heat Soluble Proteins (MAHS). Once water is reintroduced, the organism can restart its metabolism and "come back to life." In this experiment we used two different plasmids that created SAHS proteins 1 and 6. These plasmids were then transformed into E. coli BL21. We hypothesized that because the proteins were secretory, the trial with both plasmids together would have a greater survival rate after desiccation than a trial with one or no SAHSs. To do this, we transformed the plasmids into the bacteria, desiccated the bacteria, rehydrated them, an plated the results. After counting the colonies and calculating the number of alive cells, our data showed that the empty vector had a higher survival rate than the SAHS plasmids. By doing an ANOVA test with an alpha value of 0.05, the P value for our experiment was 0.000392, showing that our data was statistically significant. The F statistic was calculated to be 14.22, indicating the differences between the averages is large. Finally, the ? squared was calculated to be 0.85, meaning the independent variable explains 85% of the variance from the average. According to the data, our hypothesis was not supported. The data showed that the tardigrade DNA did not improve the survival rate of the E. coli after desiccation.

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