David Cheung

Pymaceuticals Challenge

Final Analysis:

1. Based on the final tumor volume box plot comparison between the four-drug regimen: Ramicane, Capmulin, Infubinol, and Ceftamin, we can observe that Ramicane and Capomulin generally have a lower final tumor volume amount compared to Infubinol and Ceftamin. This suggests that Ramicane and Capomulin are better treatments for squamous cell carcinoma. From inspection, we can see that treatments Ramicane and Capmulin have no significant difference from one another as their box plots overlap each other. This can be confirmed using a two-sample t test with a p-value threshold of .05. From the t test, we can see that the p-value is .768 between the two drugs; thus, we cannot reject the null hypothesis of them having any difference. Finally, we should also examine the outlier presented in Infubinol because one data point exhibits an extraordinarily low final tumor volume compared with the rest of the data in the group. The abnormality could be caused by data collection error, or some factors related to the mouse itself.

2. Based on a single observation of Campmulin treatment of a mouse, we can see that the total tumor volume decreased over time. With further examinations, we can see if all mice experience the same decline and determine whether Campulin is effective in treating SSC.

3. Based on the scatterplot and regression line created using the average tumor volume against weight in the Capomulin regimen, we can observe that the tumor volume and the weight of a mouse have a strong positive correlation where r = .84. This shows that mice that are heavier in weight generally have a higher average tumor volume when using the Capomulin regimen. We can also use r^2, the correlation of determination, to examine how well the weight of the mouse explains the variability in the average tumor volume. With an r^2 value of .70, only 70% of the variability in average tumor volume can be explained by the weight of the mouse, and the other 30% is explained by other factors. Finally, it is important to note that we need further experimentation to determine whether there are any causal relationships between these variables.