Analysis of Pymaceuticals SCC Drug Treatments

Matplotlib Homework - The Power of Plots

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Date: September 22, 2019

For this assignment, I was tasked with analyzing the data collected on various drug treatments for skin cancer on mice.

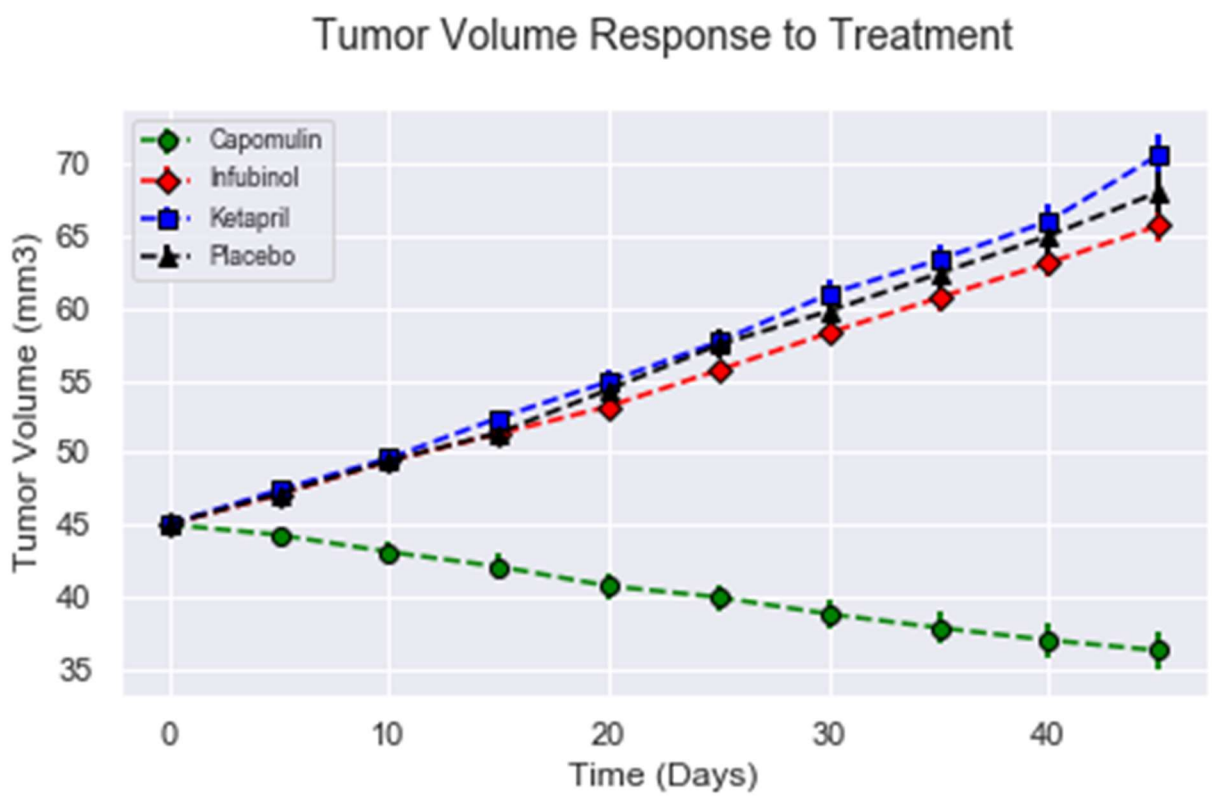
Pymaceuticals Inc. is a burgeoning pharmaceutical company based out of San Diego, CA. Pymaceuticals specializes in drug-based, anti-cancer pharmaceuticals. In their most recent efforts, they've since begun screening for potential treatments to squamous cell carcinoma (SCC), a commonly occurring form of skin cancer.

I've been given access to the complete data from their most recent animal study. In this study, 250 mice were treated through a variety of drug regimens over the course of 45 days. Their physiological responses were then monitored over the course of that time. My objective is to analyze the data to show how four treatments (Capomulin, Infubinol, Ketapril, and Placebo) compare.

Below are four graphs:

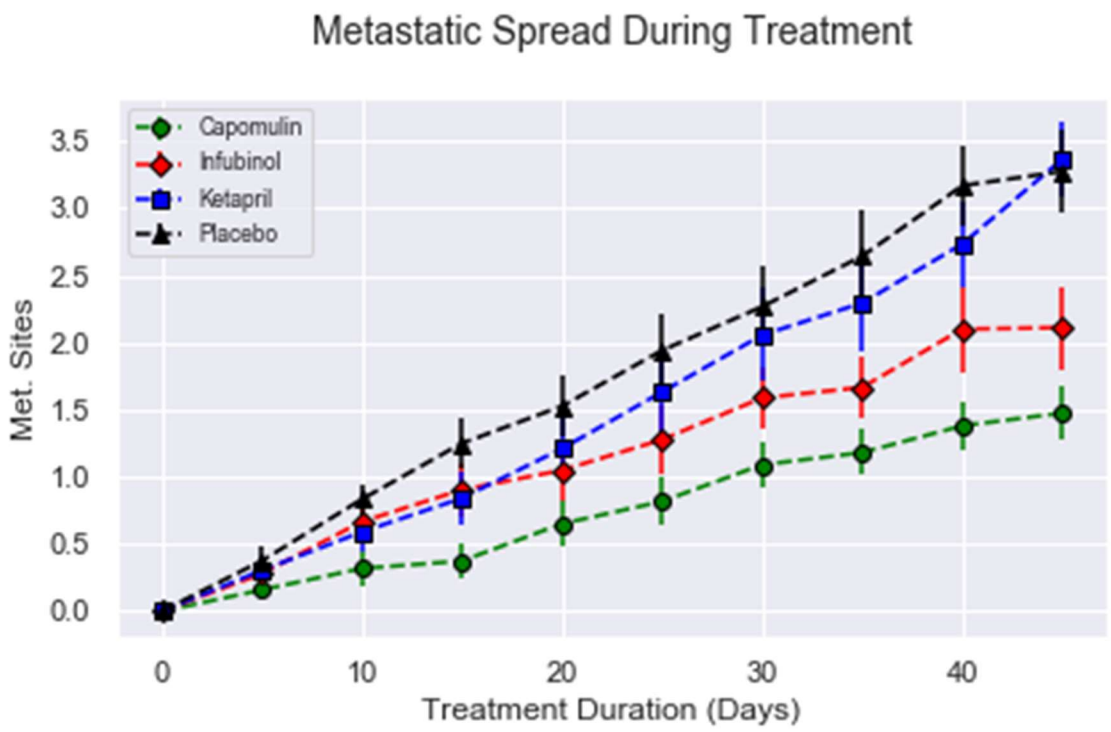
1. "Tumor Volume Response to Treatment"
2. "Metastatic Spread During Treatment"
3. "Survival Rate During Treatment"
4. "Percent Change of Tumor Volume Over 45 Day Treatment"

Under each graph, observations are documented based on the data from the graphs.



Observation:

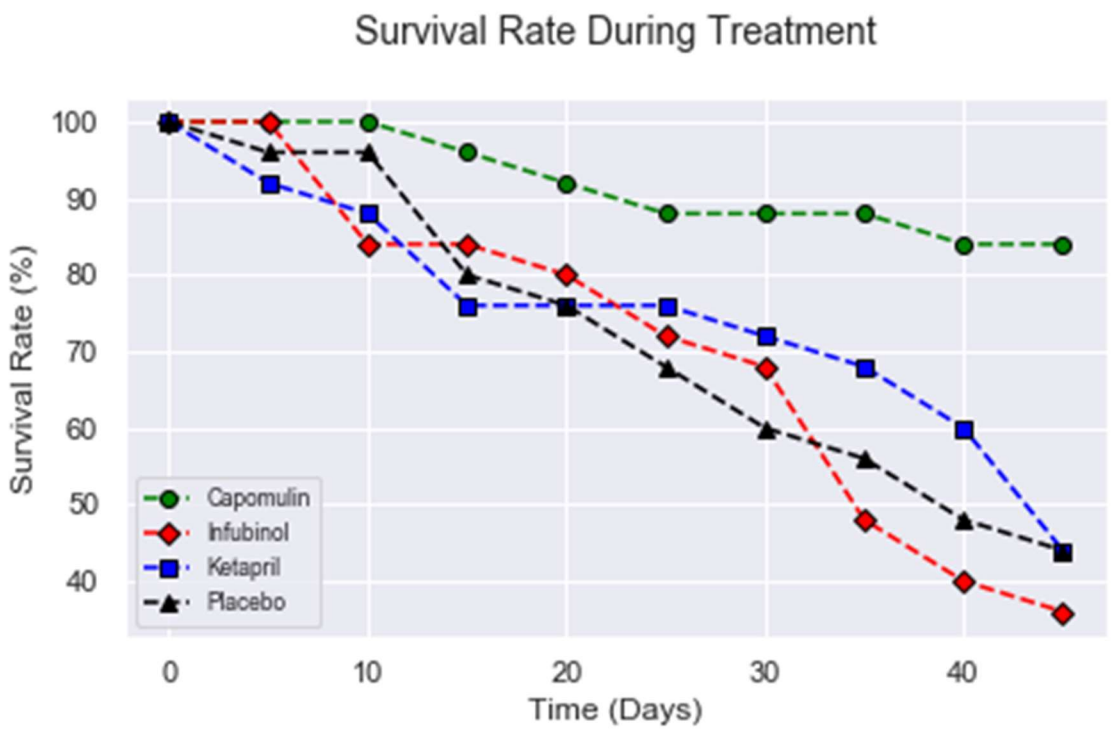
As seen in the above graph, "Tumor Volume Response to Treatment", the drug Capomulin (show in green) was the most effective in decreasing the tumor volume in the mice out of the other drugs being analyzed (Infubinol, Ketapril, and Placebo). The drugs Infubinol and Ketapril did not significantly change the tumor volume in the mice being treated by the respective drug. As seen in the graph, the Infubinol line data (red) and the Ketapril line data (blue) are very close to the tumor volume data for the mice that did not undergo any actual drug treatment (Placebo).



Observation:

Although the mice that underwent the four treatments Capomulin, Infubinol, Ketapril, and Placebo all had an increase in metastatic sites, it can be seen from the graph above ("Metastatic Spread During Treatment") that Capomulin slowed down the spread of the metastatic sites in the treated mice. Infubinol was also effective in slowing the spread of the metastatic sites in comparison with the control mice (placebo) while Ketapril did not seem to have a significant effect on the spread of the cancerous sites.

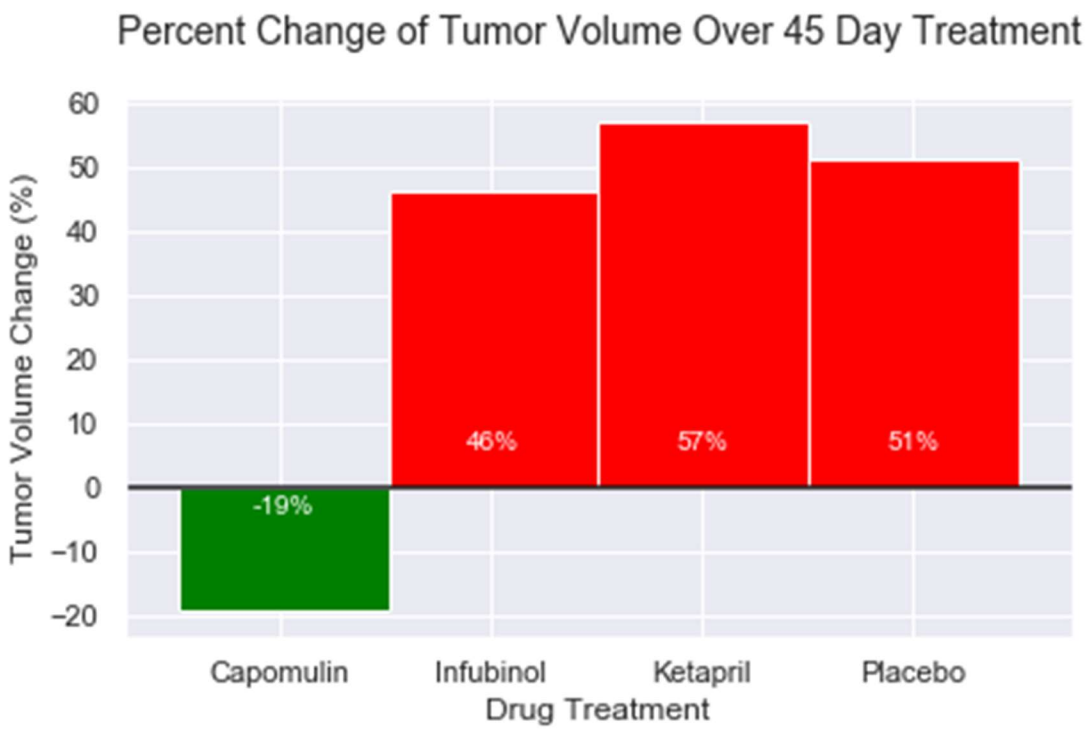
When looking at the two graphs, "Tumor Volume Response to Treatment" and "Metastatic Spread During Treatment", Capomulin is the most successful in decreasing the tumor volume in the mice as well as slowing down the spread of metastatic sites. Though Infubinol was not as effective in decreasing the volume of the tumor, the drug was decently effective in slowing down the spread of cancerous cells. The drug Ketapril does not seem to have much effect on the cancerous cells.



Observations:

In the above graph, "Survival Rate During Treatment", the mice that underwent the Capomulin drug treatment had the highest survival rate in comparison to the mice that underwent the Infubinol, Ketapril, and Placebo drug treatments. The mice that underwent the Infubinol treatment (red) seem to have the lowest survival rate.

Though Infubinol was decently effective in slowing down the spread of cancerous cells, this graph shows that Infubinol was detrimental to the survival rate of the mouse being treated. It would seem that the mice that underwent the Infubinol treatment had a lower survival rate than the control mice (Placebo).



Observation:

As seen in the above graph, "Percent Change of Tumor Volume Over 45 Day Treatment", Capomulin was the most effective in decreasing the tumor volume in the treated mice. The mice that underwent the other treatments (Infubinol, Ketapril, and Placebo) all had around a 50% tumor volume change (red) while Capomulin had a negative 19% tumor volume change (green).

Conclusion

Based on the data collected and analyzed, the Capomulin drug is the most effective at treating squamous cell carcinoma in mice in comparison to the drugs Infubinol and Ketapril. However, for a more robust study, all the drugs should be analyzed to see if Capomulin is the most effective out of all the drug treatments.