Data Analysis for Tumor Treatment Drugs Trial with Rats

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Experiment Description

For 45 days, 248 rats were treated with different drugs to reduce / prevent tumors. Every 5 days each induvial was tested and the results recorded for further study and conclusions.

Data Description

	Mouse ID	Timepoint	Tumor Volume (mm3)	Metastatic Sites	Drug
892	a203	35	61.931650	2	Infubinol
885	a203	0	45.000000	0	Infubinol
886	a203	5	48.508468	0	Infubinol

Mouse ID: Is the name of the individual in the population

Timepoint: Marks the time in days when the data sample was collected. Experiment starts at day 0 and ends at day 45

Tumor Volume: Represent the size of the tumor(mm3) measured at a specific timepoint during the experiment

Metastatic Site: Shows how many more tumors appeared during the experiment

Drug: Is the name of the drug being used to treat a specific individual in the population

Total population after Data Cleaning: **248 Individuals**
Experiment length: **45 Days**
Drugs Tested: **Capomulin, Ceftamin, Infubinol, Ketapril, Naftisol, Placebo, Propriva, Ramicane, Stelasyn, Zoniferol**

Data Considerations

While inspecting the data supplied by the laboratory, I found that one single mouse was treated with 2 different drugs. Since we are not studying interactions between drugs but

how each drug performs individually that datapoint might interfere with our results so it was discarded completely.

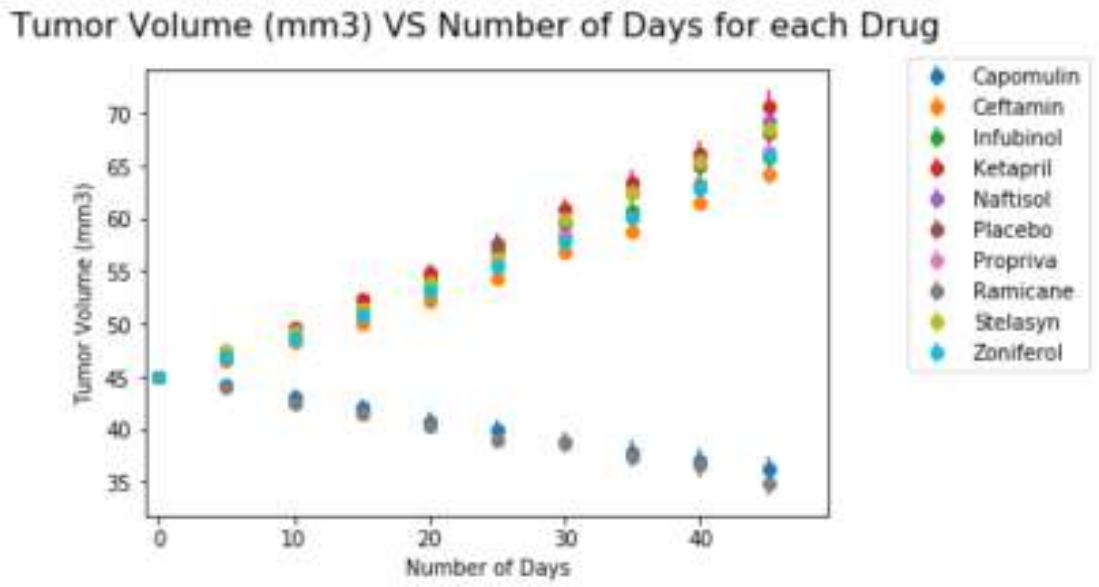
Drug Efficiency Criteria

We considered 3 different aspects to measure a drug efficiency:

1- Change in size (volume mm3) of tumor during treatment.
2- The number of new tumors that appeared during treatment (metastatic sites)
3- Survival rate of individuals being treated with different drugs

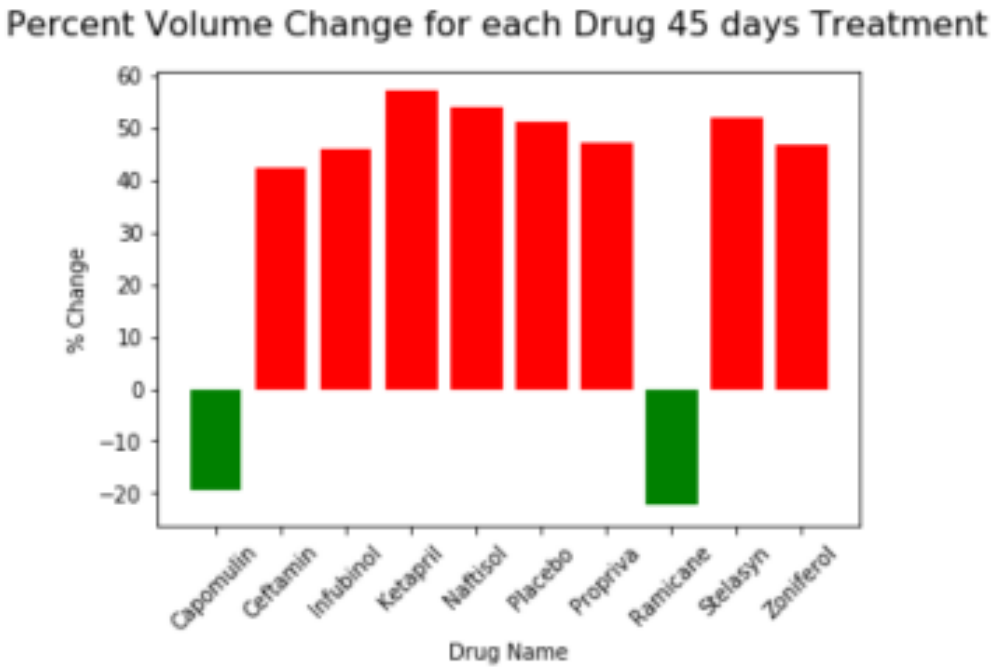
Trial Results

Change in Size



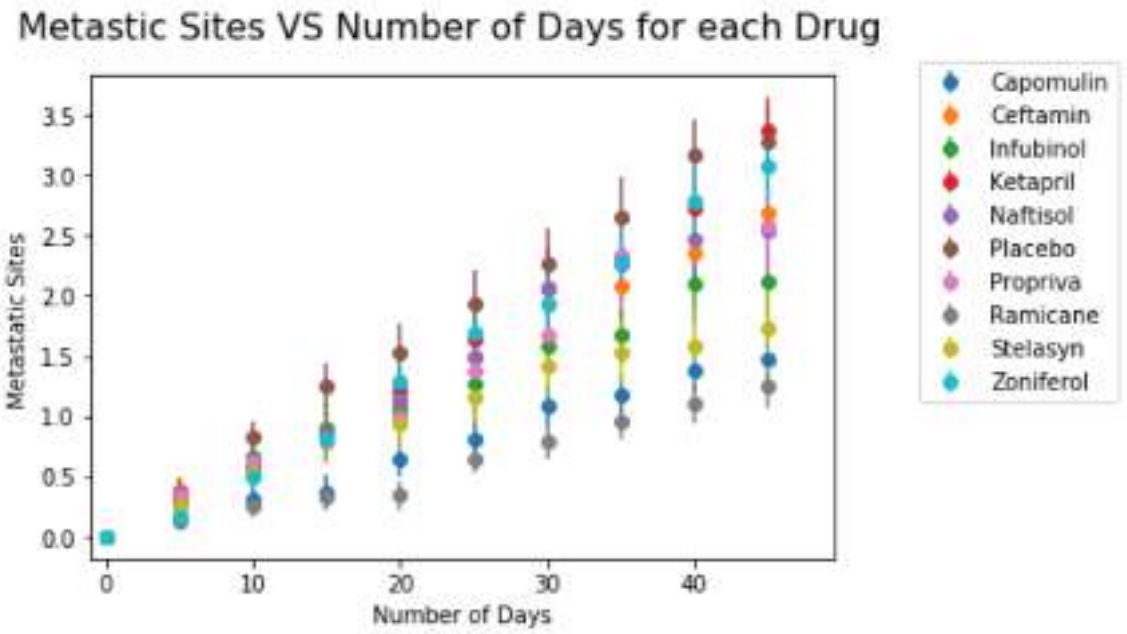
As we can se in the chart above almost every drug performed the same the only two drugs that were able to reduce the volume of the tumor were:

Capomulin and Ramicane



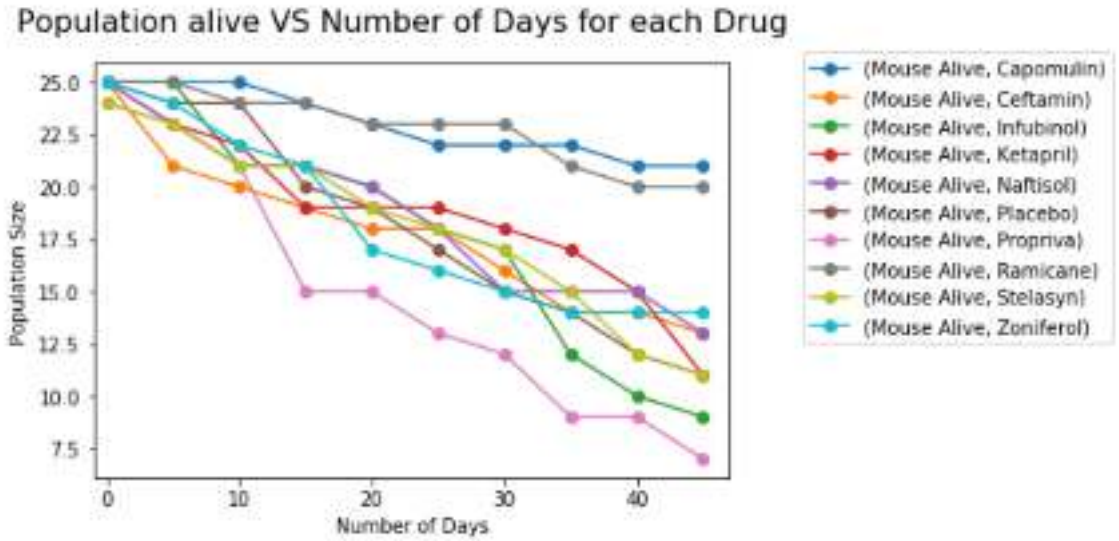
Both Capomulin and Ramicane were able to reduce the size of the tumors by almost 20% in 45 days.

Metastatic Sites

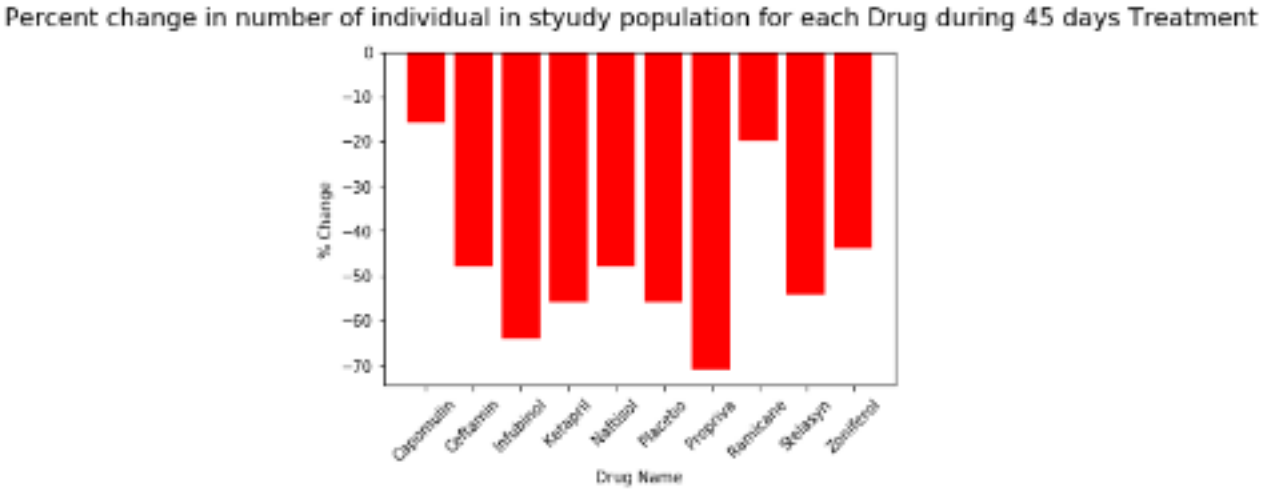


In the chart above we can see that the best performing two drugs keeping metastatic sites number low were Capomulin and Ramincane.
Stelasym also performed well.

Survival rate of Individuals



In the chart above we can see again that the only two drugs that were able to revert the downtrend keeping the number of individuals in the population pretty steady over time were Capomulin and Ramicane for all the rest of the drugs we can see a clear decline in the number of individuals over time.
The worst performing treating drug that performed very well as a rat poison were Propriva and Infubinol those drugs killed around 70% and 50% of the rats in just 35 days.



Conclusions

Of all the drugs tested during this experiment the only 2 that proved to have a positive impact were Capomulin and Ramicane.
Infubional and Propriva performed worse than the placebo when keeping the rats alive during the experiment with almost 65% and 70% percent of mortality rate.
Even though there is not enough data to determine quality of life for the sick rats that survived longer than others, we can see that Capomulin and Ramicane not only did a good job keeping rats alive, but it also decreased the size of the tumors and kept the metastatic sites number under control.