

ToothGrowth Data

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Overview

The dataset shows the length of odontoblasts (cells responsible for tooth growth) in 60 guinea pigs. Each animal received one of three dose levels of vitamin C (0.5, 1, and 2 mg/day) by one of two delivery methods, (orange juice or ascorbic acid (a form of vitamin C and coded as VC)).

Summary of the data

```
df <- ToothGrowth
summary(df)
```

```
##      len      supp      dose
## Min.   : 4.20   OJ:30   Min.    :0.500
## 1st Qu.:13.07   VC:30   1st Qu.:0.500
## Median :19.25                Median :1.000
## Mean   :18.81                Mean   :1.167
## 3rd Qu.:25.27                3rd Qu.:2.000
## Max.   :33.90                Max.    :2.000
```

Data Analysis

Let's explore the average length for each dose of vitamin C for the two sources

```
summ <- aggregate(df$len,
  by=list(df$supp, df$dose),
  FUN="mean")
names(summ) <- c("Source", "Dose", "Mean")
summ
```

```
##   Source Dose  Mean
## 1    OJ  0.5 13.23
## 2    VC  0.5  7.98
## 3    OJ  1.0 22.70
## 4    VC  1.0 16.77
## 5    OJ  2.0 26.06
## 6    VC  2.0 26.14
```

Hypothesis

My hypothesis is that the mean odontoblasts length with orange juice is equal to the mean length with ascorbic acid.

```
t.test(summ[summ$Source=="OJ", "Mean"] - summ[summ$Source=="VC", "Mean"])
```

```
##
## One Sample t-test
##
## data: summ[summ$Source == "OJ", "Mean"] - summ[summ$Source == "VC", "Mean"]
## t = 1.9472, df = 2, p-value = 0.1909
## alternative hypothesis: true mean is not equal to 0
## 95 percent confidence interval:
## -4.475757 11.875757
## sample estimates:
## mean of x
## 3.7
```

Conclusion

The null hypothesis is rejected by the t-test. The mean length associated with orange juice is not equal to the mean length associated with ascorbic acid.