

ADS2 Mock Coding Challenge 2

Semester 2, 2023-24

Treatment for type 1 diabetes (T1D)

Your team developed an insulinomimetic that can be used to substitute insulin in patients with T1D. You induced T1D in mice by injecting them with streptozotocin (this drug destroys pancreatic β -cells, which abrogates insulin production and leads to the loss of control over glucose metabolism). Subsequently, mice were injected with vehicle or this novel drug in 2 possible concentrations. Their blood glucose level (mM) was measured before the injection and 1 hour after.

Answer the questions below and provide clear and reproducible code as well as your comments.

Import, check, and organize the data appropriately. Treat data and reformat columns if needed.

```
getwd()
```

```
## [1] "C:/Users/Administrator/Desktop"
```

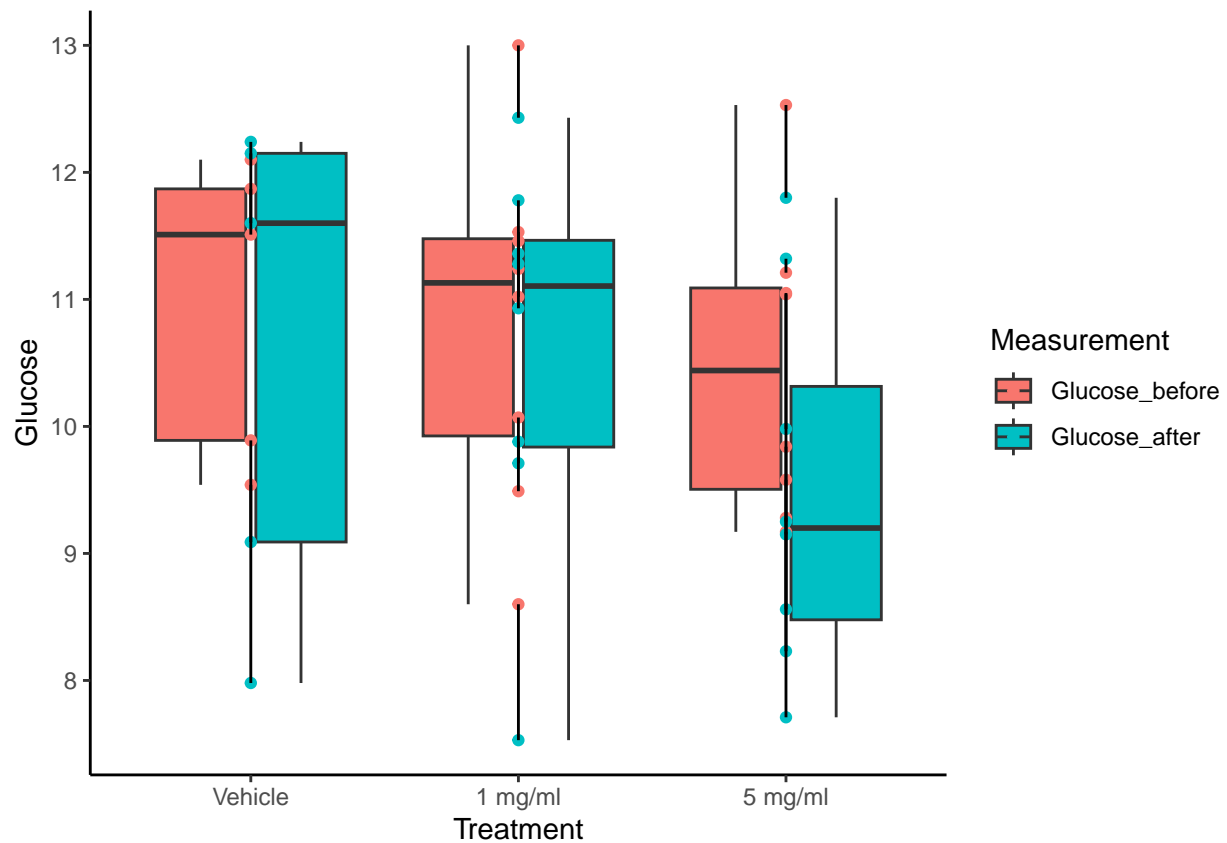
```
drug_df<-read.csv("t1d_drug.csv")  
which(is.na(drug_df$Glucose))
```

```
## [1] 32 37 38 39 40 47 48 52 53
```

```
drug_df_clean<-drug_df[-c(which(is.na(drug_df$Glucose))-30,which(is.na(drug_df$Glucose))),]  
drug_df_clean$Measurement<-factor(drug_df_clean$Measurement,levels=c("Glucose_before","Glucose_after"))  
drug_df_clean$Treatment<-factor(drug_df_clean$Treatment,levels=c("Vehicle", "1 mg/ml", "5 mg/ml"))
```

Plot the data in a useful way.

```
library(ggplot2)  
# create plot using ggplot() and geom_boxplot() functions  
ggplot(drug_df_clean, aes(Treatment, Glucose, fill=Measurement)) +  
  geom_boxplot()  
  
# geom_point() is used to make points at data values  
geom_point(aes(Treatment, Glucose,group=Measurement,color=Measurement)) +  
  
# geom_line() joins the paired datapoints  
geom_line(aes(group=ID)) +  
  theme_classic()
```



Choose, justify, state the statistical hypotheses, and carry out an appropriate test to answer whether the drug is useful.

Present and discuss your results. Is this novel drug useful? What would you suggest doing next?