Exercises

Research with Computational Biology (ReComBio)

August 26, 2024

Part 1: Introduction to R and the R Syntax

Chapter 3: Data visualization

Load library ggplot2

```
library(ggplot2)
```

Load dataframe

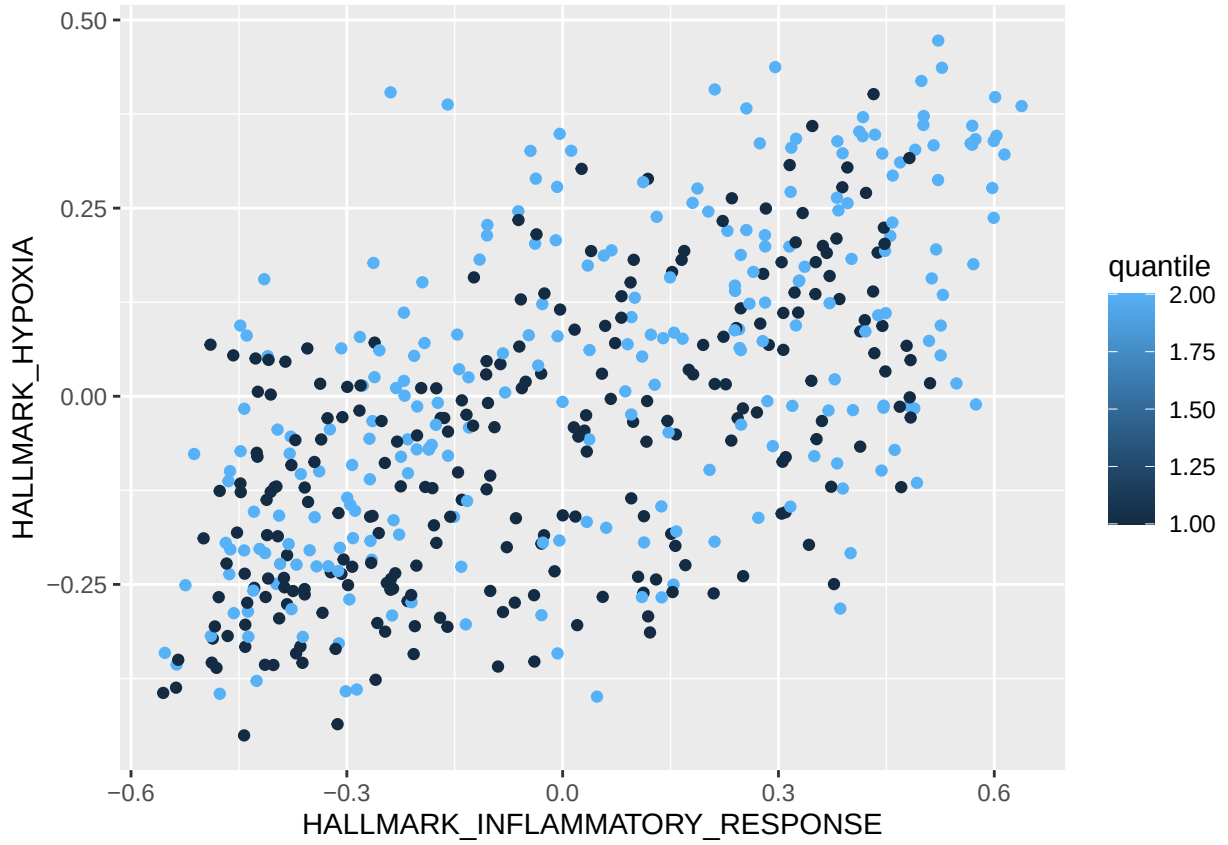
```
r2_gse62564_GSVA_Metadata <- readRDS("~/Desktop/r2_gse62564_GSVA_Metadata_exercise.rds")
```

Question 1

Use R plot functions to visualize the correlation between Hallmark Hypoxia and Hallmark Inflammatory Response

Solution: HALLMARK_INFLAMMATORY_RESPONSE vs. HALLMARK_HYPOXIA

```
qplot(HALLMARK_INFLAMMATORY_RESPONSE, HALLMARK_HYPOXIA,
      data = r2_gse62564_GSVA_Metadata,
      colour=quantile,
      ylab = "HALLMARK_HYPOXIA",
      xlab = "HALLMARK_INFLAMMATORY_RESPONSE")
```

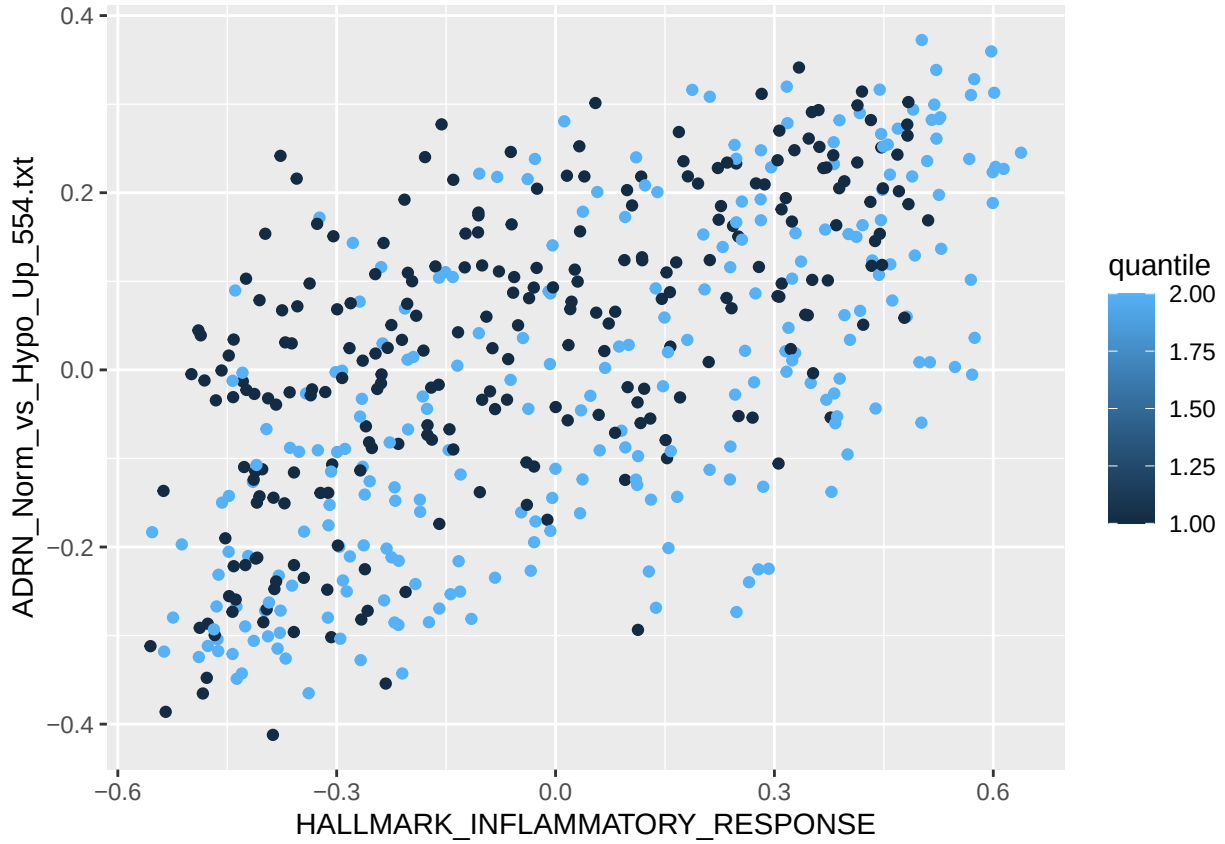


Question 2

Use R plot functions to visualize the correlation between Hallmark Hypoxia and Hallmark Inflammatory Response

Solution: HALLMARK_INFLAMMATORY_RESPONSE vs. ADRN_Norm_vs_Hypo_Up_554.txt

```
qplot(HALLMARK_INFLAMMATORY_RESPONSE, ADRN_Norm_vs_Hypo_Up_554.txt,
      data = r2_gse62564_GSVA_Metadata,
      colour=quantile,
      xlab = "HALLMARK_INFLAMMATORY_RESPONSE",
      ylab = "ADRN_Norm_vs_Hypo_Up_554.txt")
```

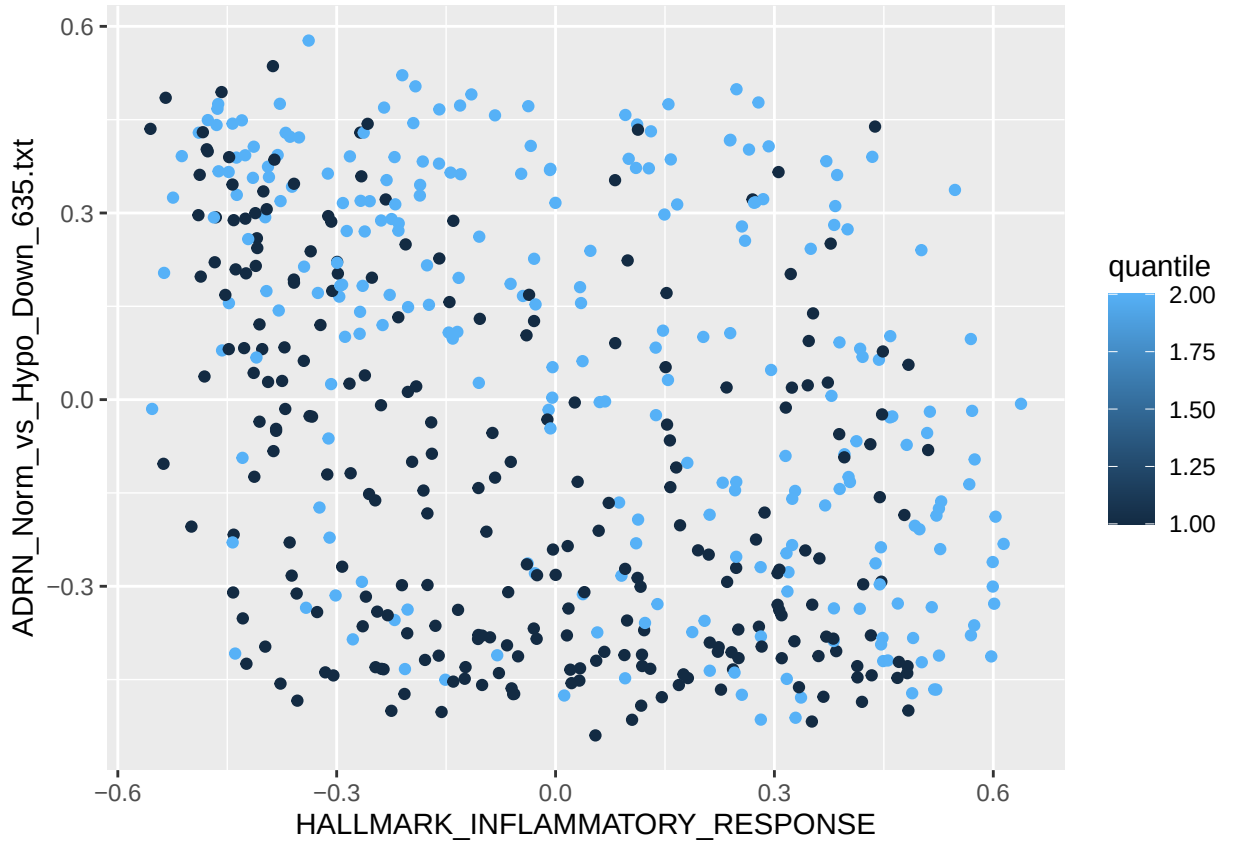


Question 3

Use R plot functions to visualize the correlation between Hallmark Hypoxia and Hallmark Inflammatory Response

Solution: HALLMARK_INFLAMMATORY_RESPONSE vs. ADRN_Norm_vs_Hypo_Down_635.txt

```
qplot(HALLMARK_INFLAMMATORY_RESPONSE, ADRN_Norm_vs_Hypo_Down_635.txt,
      data = r2_gse62564_GSVA_Metadata,
      colour=quantile,
      ylab = "ADRN_Norm_vs_Hypo_Down_635.txt",
      xlab = "HALLMARK_INFLAMMATORY_RESPONSE")
```



Question 4

From the analysis of questions 1-3, choose the correct option:

- ☐ HALLMARK_INFLAMMATORY_RESPONSE and HALLMARK_HYPOXIA have a positive correlation because hypoxia is always beneficial in the tumor microenvironment
- ☐ HALLMARK_INFLAMMATORY_RESPONSE and ADRN_Norm_vs_Hypo_Up_554.txt have a positive correlation because hypoxia upregulation in this case, is beneficial in the tumor microenvironment
- ☐ HALLMARK_INFLAMMATORY_RESPONSE and ADRN_Norm_vs_Hypo_Up_554.txt have a positive correlation because hypoxia upregulation has a negative impact on survival
- ☐ HALLMARK_INFLAMMATORY_RESPONSE and ADRN_Norm_vs_Hypo_Down_635.txt have a negative correlation because hypoxia upregulation in this case, is not beneficial in the tumor microenvironment

Question 5

Which gene expression group has worse survival probability?

- ☐ High HIF1A expression
- ☐ Low HIF1A expression

Question 6

Which phenotype score group has worse survival probability?

- ☐ High Hallmark Hypoxia
- ☐ Low Hallmark Hypoxia

Question 7

Which phenotype score group has worse survival probability?

- ☐ High Hallmark Inflammatory Response
- ☐ Low Hallmark Inflammatory Response

Question 8

Plot the survival curve of the MYCN status variable. Which MYCN status has worse survival outcome?

- ☐ Individuals with MYCN amplification
- ☐ Individuals without MYCN amplification
- ☐ The MYCN group with unknown MYCN status

Question 9

Plot the survival curve of the INSS stage variable. Which INSS stage has worse survival outcome?

- ☐ INSS Stage I
- ☐ INSS Stage II
- ☐ INSS Stage III
- ☐ INSS Stage IV
- ☐ INSS Stage IV A

Question 10

Mark TRUE or FALSE.

- ☐ The higher the age at diagnosis the greater the HIF1A expression difference between HR and non-HR
- ☐ The lower the age at diagnosis the greater the HIF1A expression difference between HR and non-HR