

Intro to R for Biologists

Session 5

Data Visualisation

Irina & Rao

05/05/2021

Trinity 2021

INTRO TO R FOR BIOLOGISTS

► Data Visualisation

- Plotting continued from Session 4
- Statistics
- Problem set from Session 4
- Heatmaps
- Colours
- Q & A

Basic statistics

- Correlations – `cor()`, `cor.test()`

- T-test (parametric):

- Unpaired 2-group t-test

`t.test(y~x)` # where y is numeric and x is a binary factor

`t.test(y1, y2)` # where y1 and y2 are numeric

- Paired 2-group t-test

`t.test(y1, y2, paired=TRUE)` # where y1 & y2 are numeric

- Non-parametric tests:

- Unpaired 2-group Mann-Whitney U Test

`wilcox.test(y~A)` # where y is numeric and A is A binary factor

`wilcox.test(y, x)` # where y and x are numeric

- Paired 2-group Wilcoxon Signed Rank Test

`wilcox.test(y1, y2, paired=TRUE)` # where y1 and y2 are numeric

- More than 2 groups - analysis of variance (ANOVA, parametric)

`aov()`, `anova()`

Adding statistics to the plots

```
library(ggpubr)
```

- Perform the test

```
compare_means(formula, data, method =  
  "wilcox.test", paired = FALSE, group.by =  
  NULL, ref.group = NULL, ...)
```

```
*method = "t.test", "anova"
```

- Or just add the significance levels to the plot

```
stat_compare_means(mapping = NULL,  
  comparisons = NULL, hide.ns = FALSE, label =  
  NULL, label.x = NULL, label.y = NULL, ...)
```

Adding statistics to the plots - alternatively

```
library(ggsignif)

stat_signif(mapping = NULL, data = NULL,
position = "identity", na.rm = FALSE,
show.legend = NA, inherit.aes =
TRUE, comparisons = NULL, test =
"wilcox.test", test.args = NULL, annotations
= NULL, map_signif_level = FALSE ...)

map_signif_level = c("***"=0.001, "**"=0.01,
"*"=0.05)
```

**Let's
explore
practically**



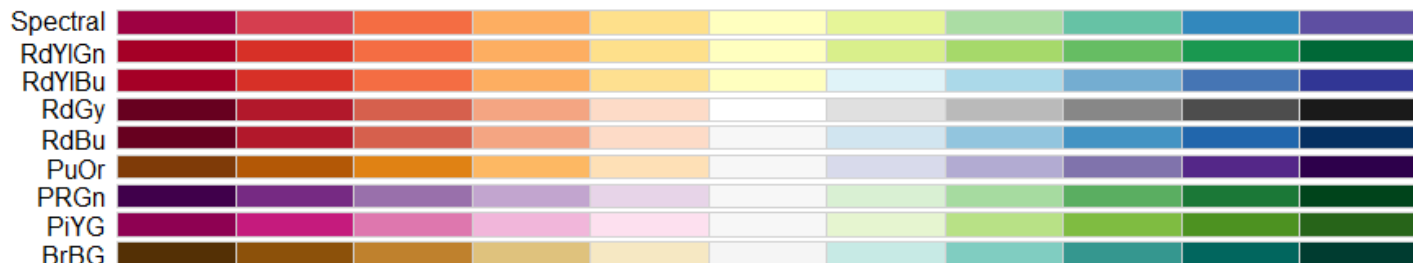
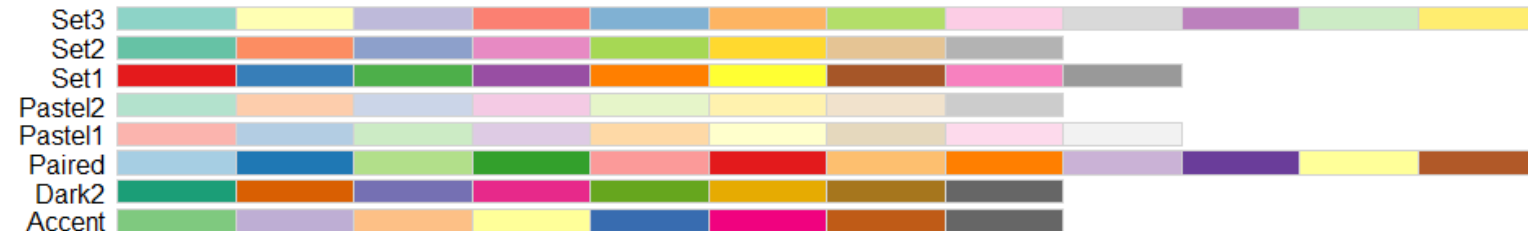
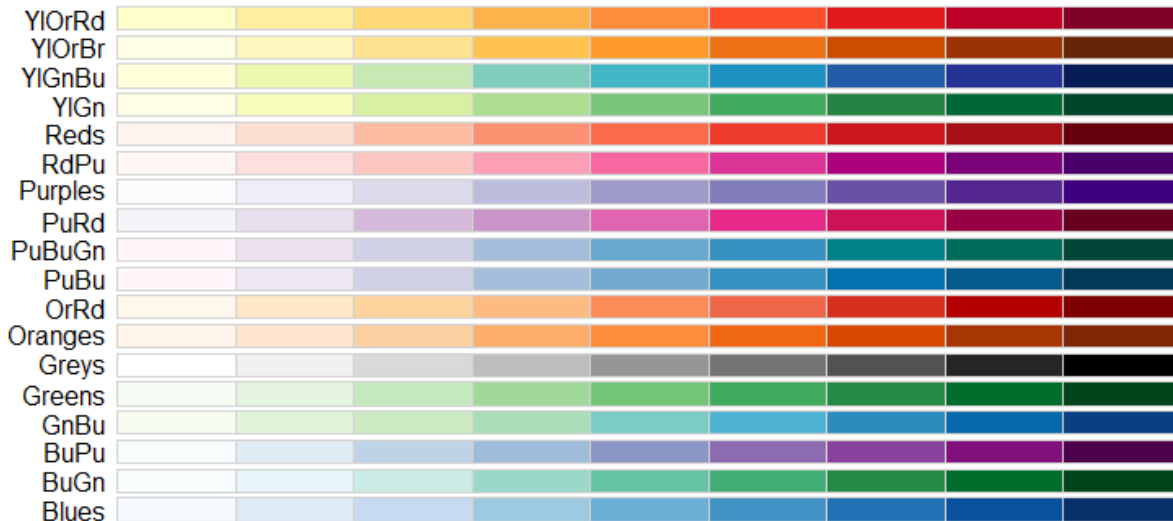
Colours in R

- Represented as named colours (e.g. “red”, “mediumspringgreen”) or hexadecimal code (e.g. “#FF0000FF”, “#00FA9AFF”)

white	aliceblue	antiquewhite	antiquewhite1	antiquewhite2	antiquewhite3	antiquewhite4	aquamarine	aquamarine1	aquamarine2
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bisque	bisque4	blue	brown	blanchedalmond	brown1	blue	burlywood	burlywood1	burlywood2
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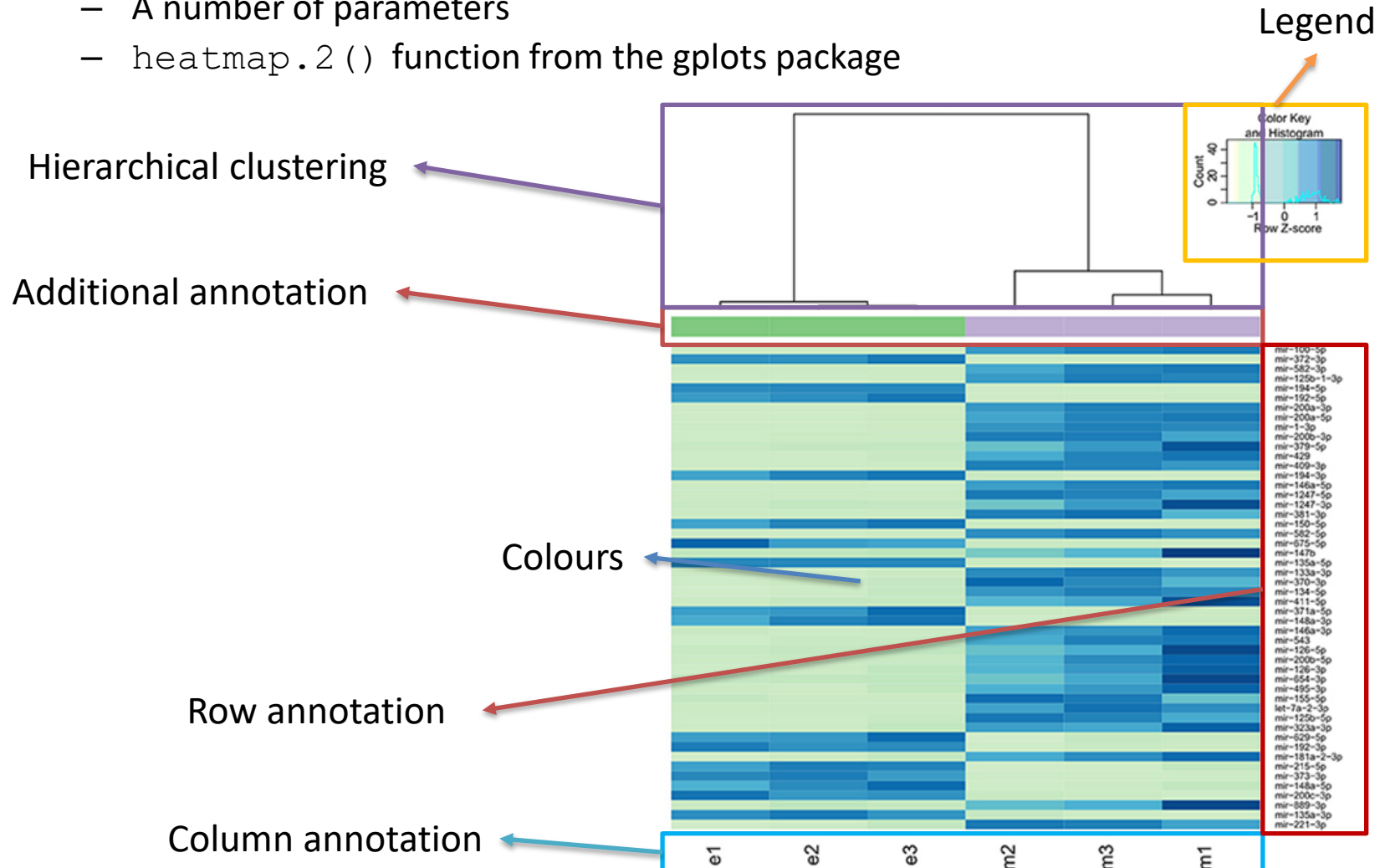
Colours in R

- Palettes – a set of colours that can be used together
- RColorBrewer package
 - Sequential
 - Qualitative
 - Diverging
- <https://github.com/EmilHvitfeldt/r-color-palettes> for a huge list of palettes and the packages they come in

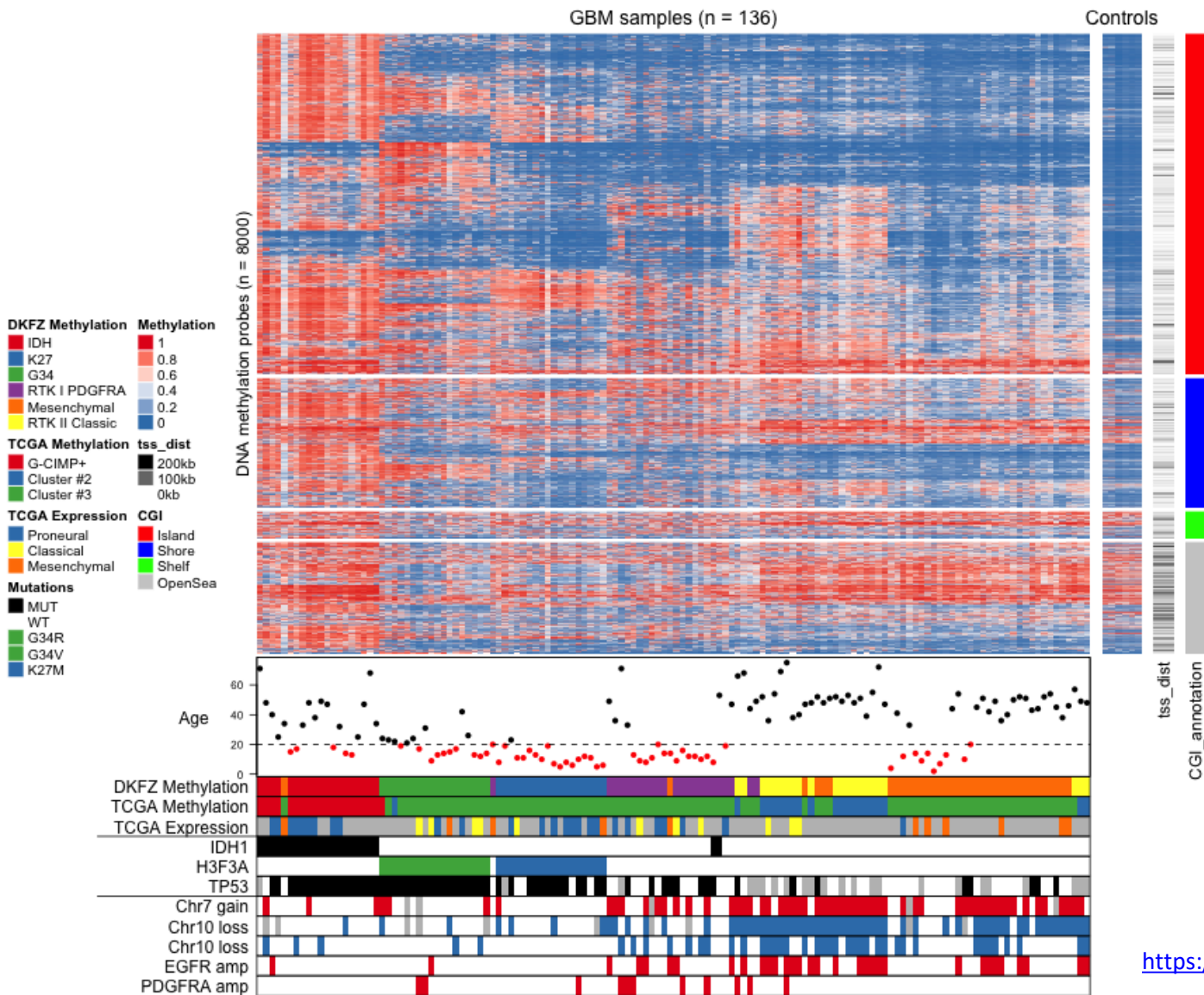


Heatmaps

- Useful for displaying multidimensional data
 - A number of parameters
 - `heatmap.2()` function from the `gplots` package



A lot of information can be conveyed!



- A more complicated example with the Complex Heatmap package

**Let's
explore
practically**



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Address the tasks in breakout rooms!

Useful references

- <https://github.com/EmilHvitfeldt/r-color-palettes> - a huge list of R palettes
- <https://colorbrewer2.org/> - RColorBrewer package based on this tool by Cynthia Brewer
- <https://jokergoo.github.io/ComplexHeatmap-reference/book/> - R package to produce Complex Heatmaps