Introduction to R Markdown

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What is Markdown?

- Lightweight markup language
- Write text and 'tag' elements for formatting later
  - Similar to LaTeX or HTML, but much simpler
- Can be used to create many types of output

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- Lightweight markup language
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- Time for a live demo
  - `example_1-layout.md`

What is R Markdown?

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What is R Markdown?

- Basically **R** + Markdown
- You can include blocks of code
- Allows you to keep in a single document:
  - Code
  - Explainatory text
  - Output e.g. tables, figures

Vignette examples

Literate Programming & Live Documents

> *"The main idea is to regard a program as a communication to human beings rather than as a set of instructions to a computer." - Donald Knuth*

- Combines 'human readable' prose with source code in a single document
- Analyses can be easily understood and repeated
- Facilitates repeatable research by allowing workflows to be regularly tested for robustness over time

Repeatability vs Reproducibility

- Can you get my results from my data?

How can R Markdown help?

- How often do you have code/ideas/figures spread across multiple files?
- An example
  - https://doi.org/10.1186/1471-2105-11-208
- Look at Supplementary File 2

R Code Chunks

- example_2-codechunks.Rmd
- example_3-chunkOptions.Rmd
- example_4-simplePipeline.Rmd

sessionInfo()

- Just because you can run a script later, doesn't mean it gives the same answers!
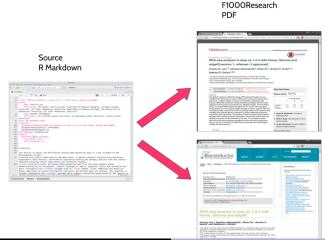 - R changes
  - Packages change
  - Locale settings etc

Publishing with R Markdown

Bioconductor Workflows

- Educational documents detailing how to use multiple packages
- Regularly checked on Bioconductor servers
  - Ensures changes in component tools are identified quickly
  - Allows rapid updates by author
  - Provides users a platform to easily access the complete suite of tools
- Difficult to get credit

F1000Research

- F1000Research provides a citable, peer-reviewed publication platform
- Intention is for the same document to be submitted to both platforms - updates are possible

BiocWorkflowTools

```r
source("https://bioconductor.org/biocLite.R")
biocLite("BiocWorkflowTools")
```

Conclusions

- R Markdown is great for:
    - Lab book / journal recording
    - Reports
    - Supplementary materials

- As a princple document for journal articles - we're not there yet!

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