

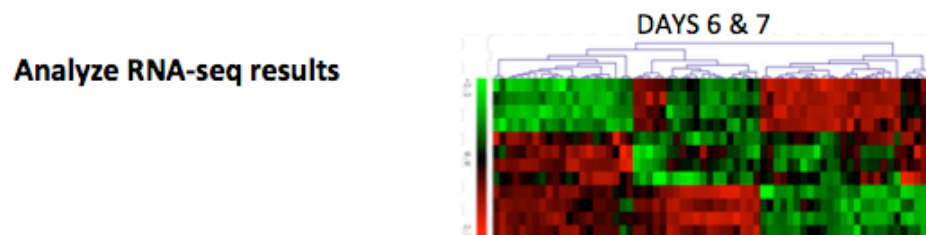
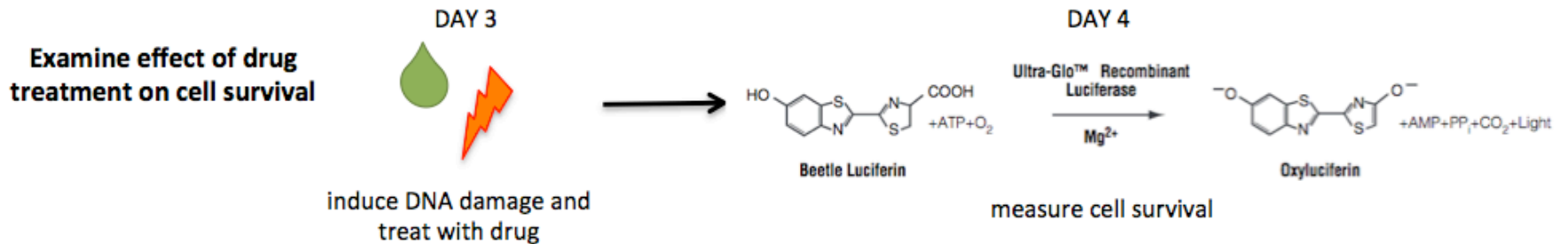
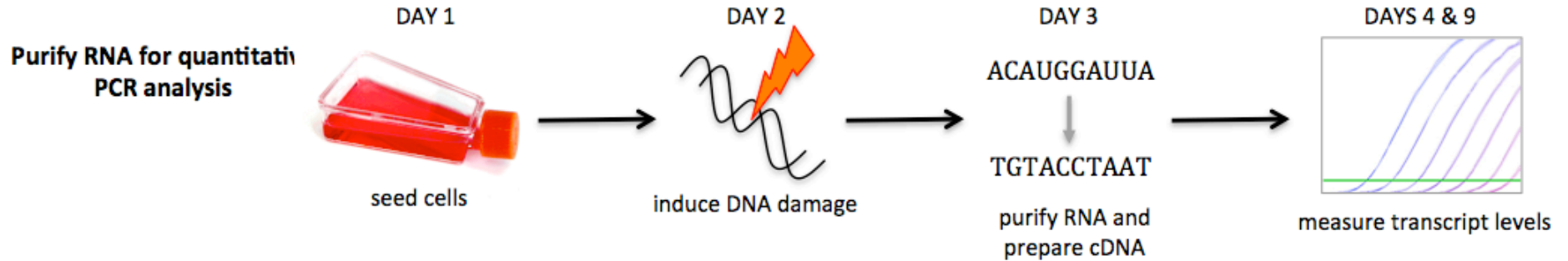
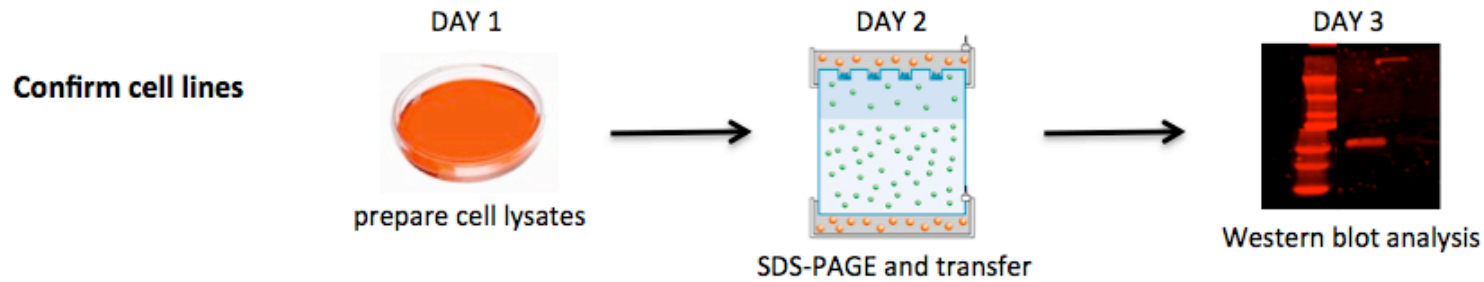
M2D6: Intro to R Clustering

04/05/2017

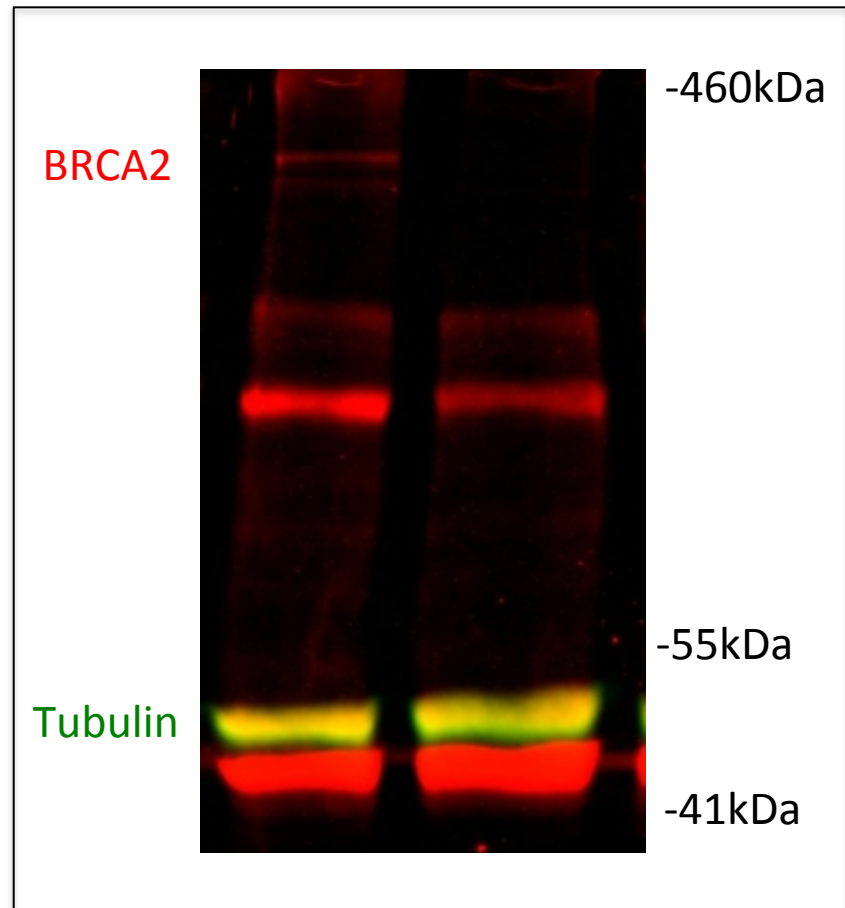
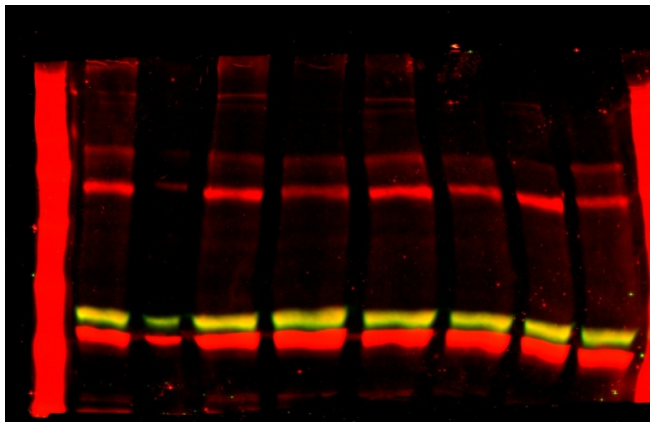
1. Prelab Discussion
2. Intro to R Exercise
3. Peer review Mod2 methods



M2: Experimental overview



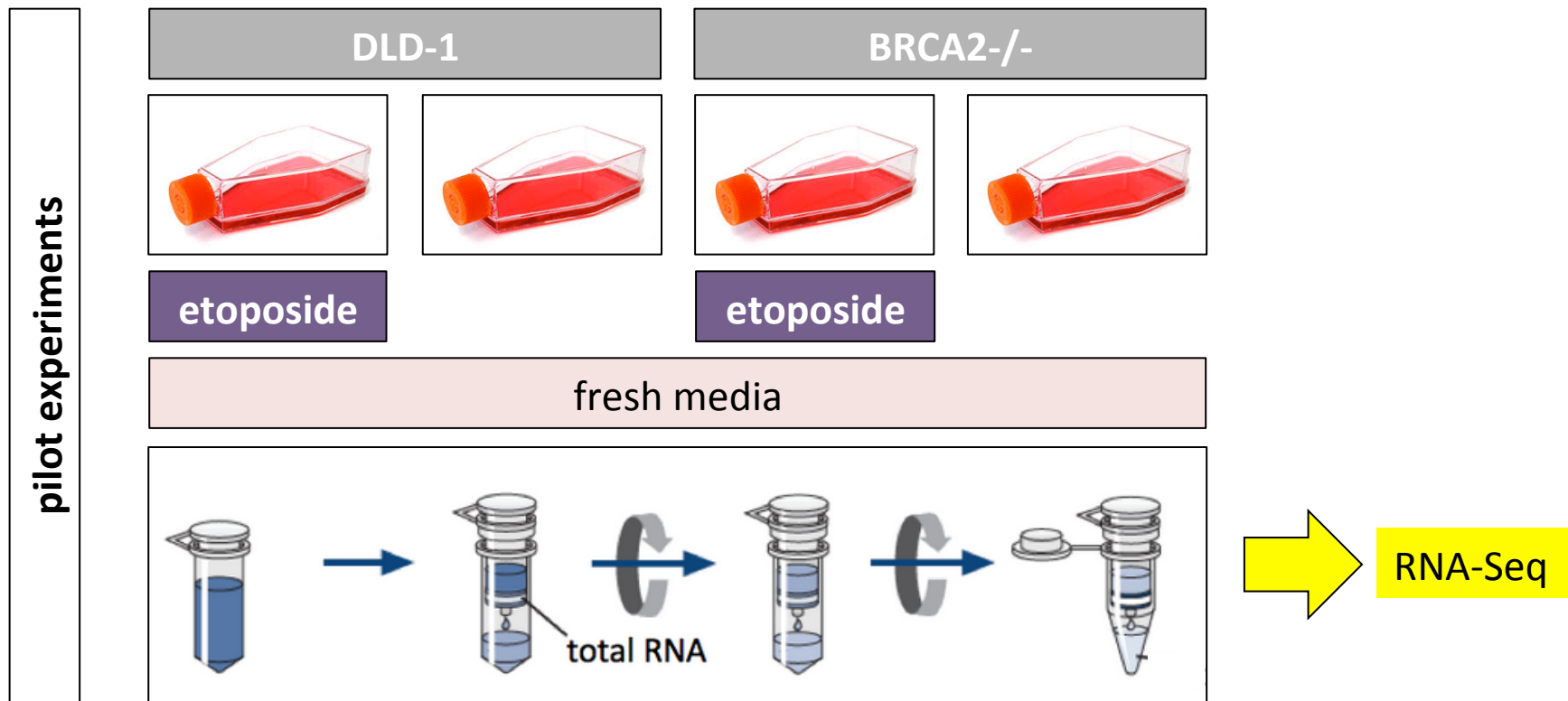
Repeat Western Blots worked! (kind of)





Let's analyze RNA-Seq data

- With qPCR, you looked at p21 transcript levels (norm. to GAPDH)
- With RNA-Seq, we'll peek into the entire transcriptome



First things first: programming language R

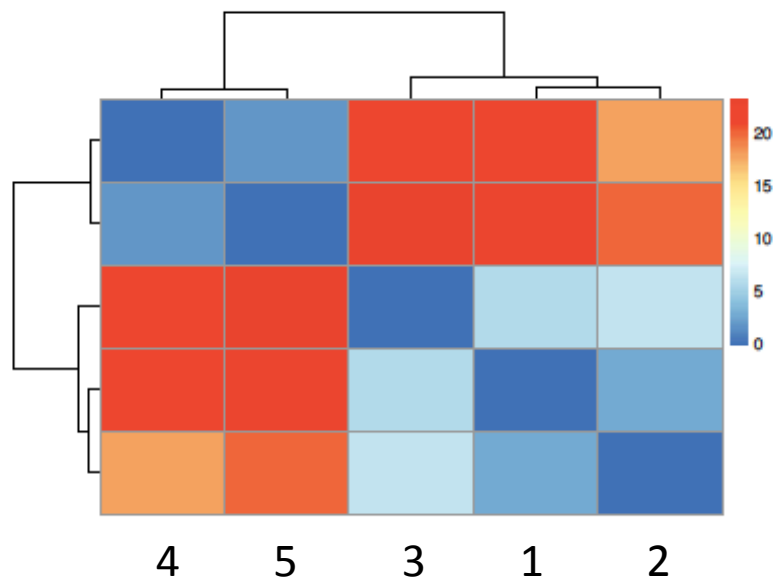
The image shows the RStudio interface with four panels highlighted by blue boxes and labeled with white text:

- editor**: The top-left panel showing a script file named "20.109_RNAseq_Analysis_Day6.Rmd". The script content includes a title, author, date, output type, and a code chunk for setting up the environment and running a plot.
- workspace**: The top-right panel showing the Environment and History tabs. The Environment tab displays a variable "b" of type "num [1:3]" with values 3, 4, and 5.
- console**: The bottom-left panel showing the R console output. It displays the download of the "pheatmap" package and the execution of the following R code:

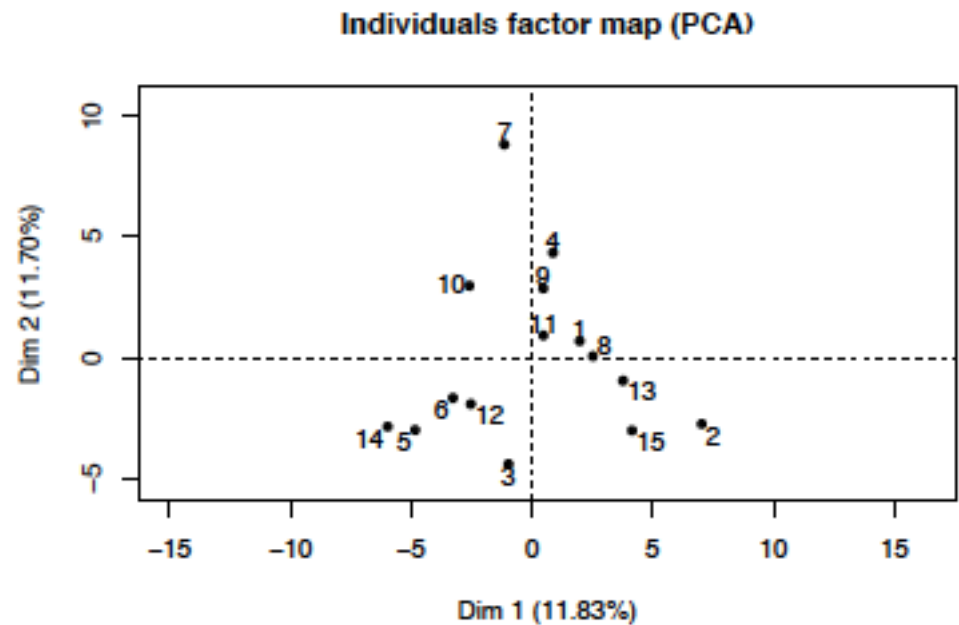
```
> library("pheatmap", lib.loc="~/Library/R/3.3/library")  
> b=c(3,4,5)  
> |
```
- packages, help**: The bottom-right panel showing the Packages tab. It displays a list of installed and available packages, including "memoise", "mime", "munsell", "org.Hs.eg.db", "pheatmap", "plogr", "plyr", "RColorBrewer", "Rcpp", "RcppArmadillo", "RCurl", "reshape2", "RSQLite", and "S4Vectors".

First things first: clustering

heat map
dendrogram

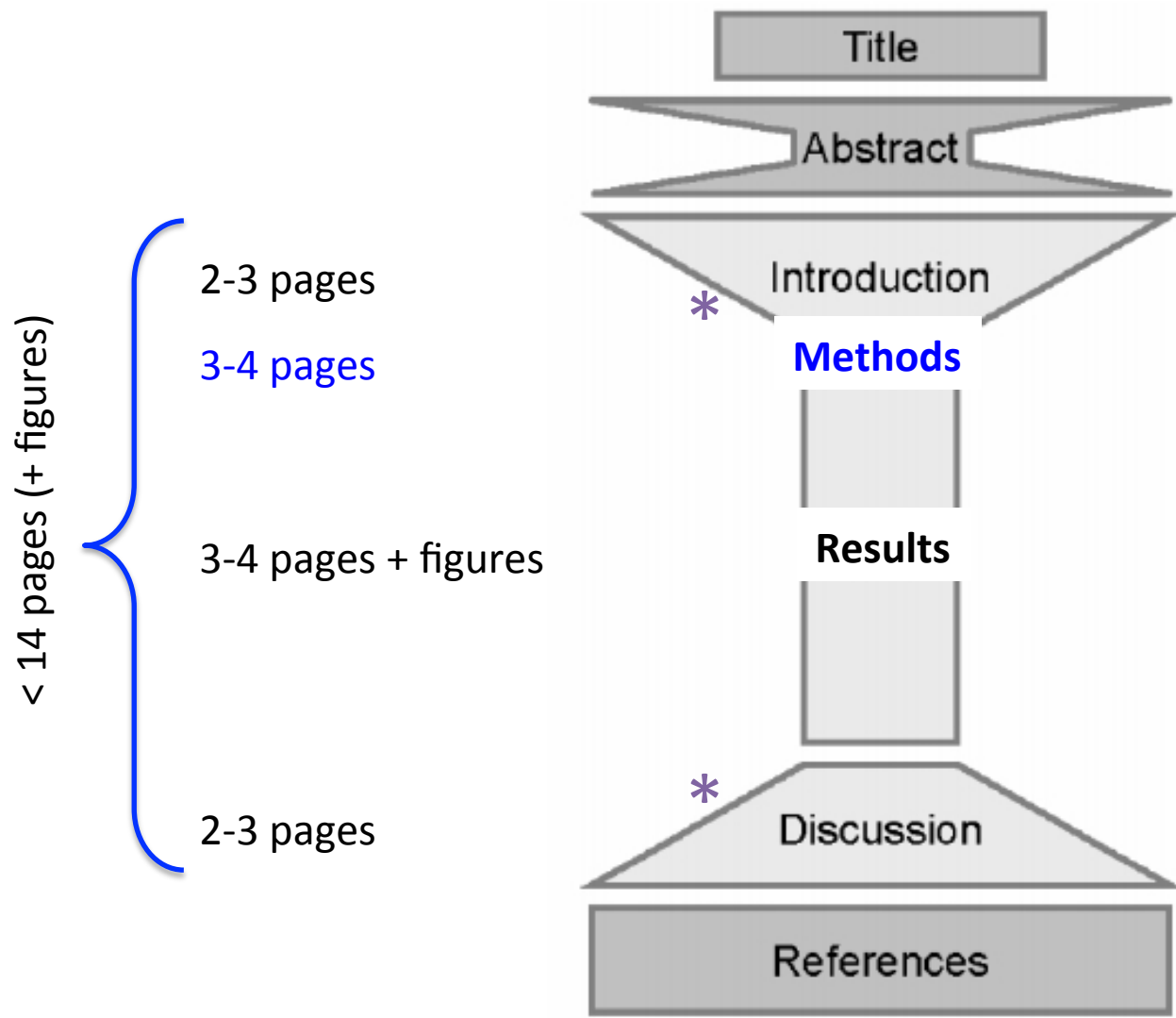


Principal component analysis



dimension 1 explains 11.83% difference

M2 research article is due Saturday, April 22



What experimental question will you ask in Module 2?

How does DNA repair affect the ability of cancer chemotherapy drugs to kill cancer cells?

How does cancer chemotherapy affect gene expression?

This raises the following questions

- How does DNA get damaged?
- What is DNA repair?
- Why does DNA repair exist?

What goes into the Introduction?

**one example:
improving chemotherapy**

- General background: motivation
- Specific background: focused context
 - minimal essential information
 - define all key terms
- Knowledge gap, central question
- **hypothesis**
- Preview of results
- ... and of implications

- Don't forget references

The meat of your paper

- Figures and captions
 - Decide on these first
 - Use subpanels
 - Text: limited on figure, explicit in caption
 - reasonable size
 - descriptive title
 - caption purely descriptive of image
 - intro sentence in caption
- Results
 - **Topic/purpose/introductory sentence**
 - What you did: experiments and expectations, including controls
 - What you found:
 - **transition to next figure/result**

What goes into the Discussion?

- **recapitulating the result**
- Interpret
- Put in context: how does this fit with other studies?
- Highlight significance: how might this impact this/other field?
- Discuss controversial or surprising results
- Describes caveats and suggest remedy
- Conjecture (one layer only!) implications
- Propose future work, identify new questions that arise
- Follow same order as in Figures/Results
- Make sure you come **back to big picture** introduced in intro
- Don't overreach / overpromise!

Today in lab:

1. Get lab computer and work through R studio exercise with your group
 2. Make sure to take notes and save images where noted.
 3. You should have enough time in lab today to finish peer review methods homework for M2D7!
- HW due M2D7: Peer Review Methods, submit legible comments (typed or hand written) that address all topic in the HW prompt