

Contents



- Course and webpage
- Overview of R
- Data formats
- Data frames
- Important functions
- Tips

Quick checkups





If you don't recognize the correlation you see in the figure above, I would highly recommend you to read the following paper;)

Yanai, I., Lercher, M. A hypothesis is a liability. Genome Biol 21, 231 (2020).

- Masks and social-distancing
- Coffe and tea breaks
- Webpage structure
- Plots from drop-down
- Times mentioned in schedule are **super** arbitrary



- Derived from a statistical programming language called S
- You can write your own functions
- Powerful and flexible.
- Available for all platforms
- **GUI** with **Rstudio**
- RMarkdown: Embedding codes and results together



Data Formats



• Wide format

	Sample_1	Sample_2	Sample_3	Sample_4
ENSG00000000003	321	303	204	492
ENSG00000000005	0	0	0	0
ENSG00000000419	696	660	472	951
ENSG00000000457	59	54	44	109
ENSG00000000460	399	405	236	445
ENSG00000000938	0	0	0	0

- familiarity
- conveniency
- you see more data

Data Formats



• Long format

		Sample	_ID	Gene		count		
		Sample	_1	ENSG0000	0000003	321		
		Sample	_1	ENSG0000	0000005	0		
		Sample	_1	ENSG0000	0000419	696		
		Sample	_1	ENSG0000	0000457	59		
		Sample	_1	ENSG0000	0000460	399		
		Sample	_1	ENSG0000	0000938	0		
Sample_ID	Sample	_Name	Tim	e Replica	te Cell	Gene		count
Sample_1	t0_A		t0	Α	A431	ENSGO	0000000003	321
Sample_1	t0_A		t0	Α	A431	ENSGO	00000000005	0
Sample_1	t0_A		t0	Α	A431	ENSGO	00000000419	696
Sample_1	t0_A		t0	Α	A431	ENSGO	0000000457	59

Data Formats



• Long format

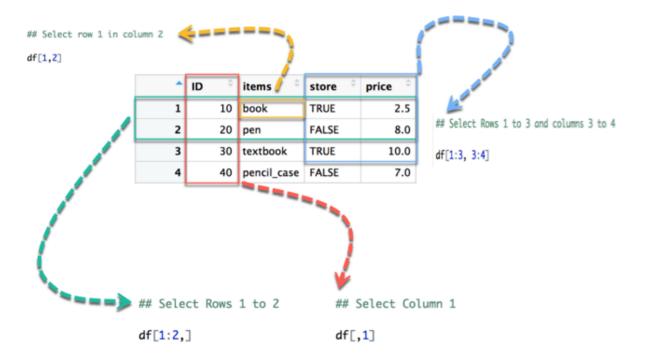
Sample_ID	Sample_Name	Time	Replicate	Cell	Gene	count
Sample_1	t0_A	t0	Α	A431	ENSG00000000003	321
Sample_1	t0_A	t0	Α	A431	ENSG00000000005	0
Sample_1	t0_A	t0	Α	A431	ENSG00000000419	696
Sample_1	t0_A	t0	Α	A431	ENSG00000000457	59
Sample_1	t0_A	t0	Α	A431	ENSG00000000460	399
Sample_1	t0_A	t0	Α	A431	ENSG0000000938	0

- easier to add data to the existing
- Most databases store and maintain in long-formats due to its efficiency
- R tools like ggplot require data in long format.

Data Frames



• Let us take a quick look into data.frame in R:



- imported files re usually in data.frame
- Structured matrix with row.names and colnames
- Probably most used data.type in Biology!

Vectors



```
n \leftarrow c(2,3,4,2,1,2,4,5,10,11,8,9)
print(n)
## [1] 2 3 4 2 1 2 4 5 10 11 8 9
z < - n + 3
print(z)
## [1] 5 6 7 5 4 5 7 8 13 14 11 12
z < - n + 3
mean(z)
## [1] 8.083333
s <- c("I", "love", "Batman")</pre>
print(s)
## [1] "I" "love" "Batman"
```

Vector types



- int stands for *integers*
- **dbl** stands for *doubles* or real numbers
- chr stands for *character* vectors or strings
- dttm stands for date and time,
- lgl stands for *logical* with just TRUE or FALSE
- fctr stands for factors which R uses to state categorical variables.
- date stands for dates

You can find what kind of vectors you have or imported by using the function class()

