

Journal Club Assignment for “Seq’ing the Cure: Neuroscience Edition”

How to Approach Reading Research Articles

For this homework assignment you will be analyzing the following research article:

- Kramer, N.J., M.S. Haney, D.W. Morgens, *et al.* 2018. CRISPR-Cas9 screens in human cells and primary neurons identify modifiers of C9ORF72 dipeptide-repeat-protein toxicity. *Nature Genetics* 50(4): 603–12. <<https://doi.org/10.1038/s41588-018-0070-7>>

Research articles can be frustrating for novice readers, but learning how to read such articles is an important skill to acquire. The following recommended sequence of steps may help you approach reading primary scientific literature.

1. Focus on the data.
2. Get the big picture first. You do not need to read a scientific article straight through from start to finish. Get a birds-eye view before you delve into the details.
 - a. Read the abstract.
 - b. Skim the figures. Look at the figure legend titles, axes, techniques, etc.
 - c. Read the introduction.
3. Work to understand each figure and fill out your Figure Facts table (explained further below) as you progress.
 - a. Use the written results portion to supplement your understanding of the figures.
 - b. If you do not understand a technique or require clarification use the methods section (sometimes available online only).
 - c. Always check for supplemental figures or data.
4. Read the discussion with a critical eye. Do the data support the authors’ claims?

Assignment

This homework assignment will be used to cultivate your writing and critical thinking skills, ensure you understand the paper, and aid you in the journal club discussion. There are three parts to the assignment, which are explained in further detail below:

1. *Figure Facts Table*: Analyze two figures from Kramer *et al.* (2018) by using a Figure Facts table. All aspects of the figures you choose must be addressed to receive any credit. (Worth 40% of the assignment.)
2. *Personal Reflection*: All questions must be answered and limited to 250 words to receive any credit. (Worth 40% of the assignment.)
3. *Lay-Audience Abstract*: This must be written in your own words, without jargon, in four sentences or less. (Worth 20% of the assignment.)

1. Figure Facts Table

Fill out a Figure Facts table for at least two figures (see template on next page). The Figure Facts template is adapted from Round and Campbell (2013), “Figure Facts: Encouraging Undergraduate to Take a Data-Centered Approach to Reading Primary Literature,” *CBE-LSE*. 12(1): 39–46. You may do more figures if you find the table useful, but this is not required and will not factor into your grade for the assignment. Only the first two will be graded.

For each panel in a figure (Panel *a*, Panel *b*, etc.), describe the technique and experimental paradigm that is being used. Then in the final column of the table, for each panel describe what the data literally show, and then explain the importance of the data; in other words, provide the “big picture” of what the data show.

Table 1. Figure Facts table template.

Figure #	Panel	Technique:	These data show:

2. Personal Reflection

Please answer the following questions as a personal reflection.

1. Discuss why the authors used RNA sequencing in this paper. What kind of questions were they trying to address?
2. Now that you've finished the paper, do you think CRISPR/Cas KO genetic screens are useful for identifying novel therapeutic targets? Why or why not?
3. Did you like the article? Why or why not?
4. *Metacognitive reflection:* Reflect on your learning and your ability to analyze the research in this article. Are you improving in your research article analysis with our practice? What strategies are working best for you and how can you continue to improve?
5. Reading research articles is tough! We encourage a “growth mindset”; in other words, all of us can master research article analysis through hard work, good strategies and feedback. Discuss how well you are doing at applying a growth mindset as you tackle these research articles.

Note: Below are a practical short read on having a growth mindset and a recent research article on its benefits in education.)

- Dweck, C. (2016). What having a “growth mindset” actually means [webpage]. *Harvard Business Review*. <<https://hbr.org/2016/01/what-having-a-growth-mindset-actually-means>>
- Yeager, D.S., P. Hanselman, G.M. Walton, *et al.* (2019). A national experiment reveals where a growth mindset improves achievement. *Nature* 573: 364–369. <<https://doi.org/10.1038/s41586-019-1466-y>>

3. Lay-Audience Abstract

In four sentences or less, write an abstract for a lay audience. Your paragraph should summarize the article in your own words at a level that any non-scientist could understand (no jargon). Strive to make the complex scientific concepts and techniques clear, but remain accurate. As a scientist, you should promote an accurate understanding by avoiding hyperbole and present only realistic interpretations of the potential of the work.