

PULSE EXPERIENTIAL TEAM ASSIGNMENT

Team #: 46

1. Title of your PULSE experiential assignment.

Provide a creative and informative title.

Puzzling Pathologies in 15 Minutes

2. Please summarize your PULSE experiential assignment (max 300 words).

Provide a non-technical (lay) summary of your PULSE assignment. Prompts to think about: What is the topic? What is the format? Why did you choose this topic and format? The summary for lay audience is a brief and accessible summary of the assignment that is used to explain complex ideas, technical writing and scientific terms to people who do not have prior knowledge of the subject (e.g., high school science level). This summary should include the importance, impact, and content of your assignment to a broader audience.

[Team 23 is an example of an informative lay summary.]

My PULSE experiential assignment focuses on epilepsy and is presented as a podcast designed for students in grade 12 science or first year university who are interested in entering the medical field. These students usually have a basic understanding of neurons and action potentials, but are looking to build on that knowledge in a way that is still easy to follow. Western University, in affiliation with London Health Sciences Centre's University Hospital, is home to one of the leading epilepsy units in North America, showing how relevant and actively studied this condition is.

I also chose epilepsy because it is more common than commonly thought, affecting about 1 percent of the global population. It is also something I have a personal connection with, as a family member of mine had epilepsy when I was younger. At the time, I only understood it at a basic level and did not have access to clear, engaging explanations of what was happening in the brain. That experience influenced me to create something that could help others in a similar position.

I chose a podcast format because it is accessible and popular among students. It allows listeners to explore topics at their own pace while still engaging with more detailed ideas. Since there are no visuals, I focused on explaining concepts clearly while keeping enough depth to make the content meaningful.

Even without a direct connection to epilepsy, listeners can still learn key concepts such as potassium efflux in action potentials and the roles of glutamate and GABA in brain signaling. Overall, this assignment helps bridge basic biology and more advanced medical understanding in an approachable way.

3. Provide up to 6 keywords relevant to your PULSE experiential assignment.

3-6 keywords are ideal.

Epilepsy, Seizures, Action Potentials, Brain Activity, Awareness

4. Identify the course topic with which your PULSE assignment most aligns.

Refer to the various topics outlined under 'Course content and Schedule' in the syllabus (e.g. Inflammation).

Diseases of the Central Nervous System
5. What are the learning outcomes? <i>There should be a minimum of 2 learning outcomes for your assignments. For further information on learning outcomes, the Centre for Teaching and Learning offers information: https://teaching.uwo.ca/curriculum/coursedesign/learning-outcomes.html</i>
• Understand the basic biological mechanisms behind epilepsy, including how abnormal electrical activity in the brain leads to seizures and Glutamate-GABA's role in epilepsy. • Explain how neurons and action potentials are involved in normal brain function and how these processes are disrupted in epilepsy. • Describe the different types of seizures and how they may present, using clear, non-technical language appropriate for beginner-level learners. • Apply foundational knowledge of epilepsy to recognize its real-world impact and importance in healthcare and everyday life.
6. Why did the team select the chosen topic and the medium? How will the topic and medium of choice help learners?
I chose epilepsy as the topic partly because of a personal connection. A family member of mine had epilepsy when I was younger, which meant I had to learn about the condition early on. At the time, most explanations I found were either too basic or too technical, and I did not have access to resources that clearly explained what was happening in the brain. Because of that experience, I wanted to create something that could help younger students understand epilepsy in a clearer and more engaging way. I wish I had access to a resource like this when I was first learning about it. I chose a podcast as the medium because it is an accessible and popular way for younger audiences to learn about new topics. Podcasts allow listeners to engage with information in a more relaxed and conversational format, and they can be listened to anywhere, such as while commuting or studying. This format also allows complex ideas to be broken down into simpler explanations without overwhelming the listener. Overall, using a podcast helps make the topic more approachable and engaging for students who are just beginning to explore medical or scientific concepts.
7. Did the team use an artificial intelligence (AI) technology tool? If so, which AI technology tool(s) did the team use? What other technology tools did the team use? Is the technology tool novel? Is the team using this technology tool in a novel fashion? If the team did not use technology tool, why did the team decide against using the technology tool(s)? <i>Please include details (e.g., for what purpose was the tool used for? Why was the tool the best tool to use for your assignment? Are there alternative tools that were considered?)</i>
Yes I used ChatGPT for a few things: Use: • Creating analogies for the information I researched. Why? Analogies are a great way to simplify concepts in a big-picture way through shared experiences. I use a few analogies in my script and have trouble making

analogies on the spot. I also use AI to create analogies for me when I am studying to help me reinforce the concept. • Creating a format for my podcast. Why? I was not sure how to format or progress through my research without an outline of what to cover in what order. My original plan was to have segments for each part, but I ended up blending them all into one and smoothly transitioning through each one. • Creating a catchy title. Why? I wanted a title that would stick with the audience. I took a few inspirations from ChatGPT and edited them into my final title Puzzling Pathologies.
8. How is your PULSE experiential assignment innovative and/or novel? <i>Describe what about the PULSE assignment is innovative/novel. Is there a particular component or content that is innovative/novel? How is it different from other content that already exists?</i>
One of the main ways this assignment is innovative is through its use of a podcast to teach a complex medical topic like epilepsy at an intermediate level. Educational content in this area is often either too advanced, with a high barrier to entry, or too simplified and lacking meaningful detail. This podcast aims to fill that gap by providing explanations that are detailed enough to be informative, while still being accessible to students who only have a basic science background. It is also novel in how it prioritizes accessibility. Many epilepsy resources for younger audiences rely on visual formats such as diagrams, slides, or written documents. While these can be effective, they are not always accessible to everyone. A podcast allows visually impaired students to engage with the same content in a meaningful way, without missing out on key information. This creates a more inclusive learning experience for everyone.
9. If you used an AI tool, please copy and paste the prompt(s)/question(s) used along with the output(s)/answer(s) from the AI tool. <i>The response here is to allow others to replicate the team's work. If the prompts/outputs are lengthy (over 1 page), please attach it as a separate document and note below [Please see attached document].</i>
[Please see attached document]
10. If you did not use an AI tool, please attach a copy of the team's notes to the assignment. <i>The response here is to allow others to observe the 'behind the scenes' team's work.</i>
[Please see attached document]
11. How did the team ensure the veracity of the information presented in the PULSE assignment? <i>The response should highlight how the team has ensured that the information presented in the assignment is evidence-based and not spreading misinformation. You should specifically mention which databases (if any) or textbook materials you used, and how you kept track of the sources/references for each claim. If AI provided you with false information, please describe how the team has fact-checked the AI response and the legitimate (scientific) sources you used. A reference document should be provided in the reference section (15. References) below. Please ensure to include in-text citations in your assignment where applicable.</i>

To ensure the accuracy and reliability of the information presented in our PULSE assignment, I took several steps to make sure all content was evidence based and properly supported. First, I only used AI as a tool for creative brainstorming, such as organizing ideas or planning the structure of the podcast. I did not rely on AI to provide any scientific or medical information. Any concepts or explanations included in the assignment were verified independently using credible academic sources. All scientific information was gathered from peer reviewed journal articles found through Google Scholar. I specifically avoided using encyclopedias or websites without clear authorship, as these are not always reliable for detailed scientific topics. By focusing on published research papers, I ensured that the information was accurate, current, and supported by evidence within the scientific community. To keep track of sources, I maintained a reference list and made sure that each major claim or concept discussed in the podcast could be traced back to a credible source. When reviewing information, I cross checked key ideas across multiple papers to confirm consistency and reduce the risk of including incorrect or misleading details. I hope this approach ensured that the assignment is grounded in scientifically legitimate research and does not spread misinformation while still presenting the content in an understandable way for the audience

12. Write a meaningful team reflection about the PULSE session (max 250 words).

Prompts to help your team write the reflection: Were there any team/individual biases that surfaced when creating content for the assignment? Did the team implement any practices to ensure the content was equitable, diverse, and/or inclusive? How has the PULSE assignment helped with the team's learning? If the team had to estimate, how long did the assignment take? What worked well for your team? What would the team do differently next time? What were the opportunities and challenges with creating the PULSE assignment to help others' learning? Were there any barriers or limitations?

Reflection: Since I worked independently on this assignment, there were no major team biases that affected the content. I also made an effort to keep the material equitable and diverse by using research papers from different parts of the world, rather than relying on a single perspective.

This PULSE assignment helped me better understand and solidify key concepts like action potentials, as well as the roles of glutamate and GABA, especially in terms of what happens when these systems do not function properly. It took me about a week to complete, and overall the process was very helpful for reinforcing my learning. One of the main challenges I faced was developing the right tone for the podcast. I had to figure out how to explain complex ideas clearly while still sounding natural and engaging, similar to an actual podcast.

If I were to do this again, I would change how I approached my research. I spent too much time reading a small number of papers in full detail and ended up reusing the same sources across different parts of the assignment. Unfortunately, this may give the impression of a poorly-researched product, which I would disagree with.

13. Write the contributions of individual team members using unique initials.

Example: All team members contributed to the design of the prompts used in the technology tool, ChatGPT (GPT-3.5). T.K and T.K2 fact checked the information presented by ChatGPT

using published literature on PubMed (PMID 29211319, 32477271). Y.Z finalized and formatted the final infographic and compiled the prompts and outputs. P.E was involved in...

F.B: All contributions

15. References

Please provide a numbered reference list with Nature citation style. [Please feel free to use citation management software (i.e., free citation manager, e.g., Zotero and Mendeley)]

1. **Akyuz, E., Polat, A. K., Eroglu, E., Kullu, I., Angelopoulou, E. & Paudel, Y. N.** Revisiting the role of neurotransmitters in epilepsy: An updated review. *Life Sci.* **265**, 118826 (2021).
2. **Boonyakitanont, P. et al.** A review of feature extraction and performance evaluation in epileptic seizure detection using EEG. *Biomed. Signal Process. Control* **57**, 101702 (2020).
3. **DiNuzzo, M. et al.** Physiological bases of the K⁺ and the glutamate/GABA hypotheses of epilepsy. *Epilepsy Res.* **108**, 995–1012 (2014).
4. **Sarlo, G. L. & Holton, K. F.** Brain concentrations of glutamate and GABA in human epilepsy: A review. *Seizure* **91**, 213–227 (2021)
5. **Stafstrom, C. E.** Epilepsy: a review of selected clinical syndromes and advances in basic science. *J. Cereb. Blood Flow Metab.* **26**, 983–1004 (2006).

16. Annotated Bibliography

An annotated bibliography is a list of sources (books, articles, websites, etc.) that you used for your project. Each entry has two parts:

1. *Citation* – written in the required citation style (same formatting and order as the Nature citation style in your list of references).
2. *Annotation* – a short paragraph that summarizes, evaluates, and explains how the source is useful for your assignment.

Why do this?

- Helps you keep track of your research.
- Shows your instructor you read and understood your sources.
- Develops critical thinking by requiring you to evaluate the quality and relevance of each source.

Write the annotation (about 150–200 words each)

- *Summary*: Briefly describe the main argument or purpose of the source.
- *Evaluation*: Comment on the credibility, strengths, or weaknesses of the source.
- *Relevance*: Explain how you will use this source in your assignment.

1. **Akyuz, E., Polat, A. K., Eroglu, E., Kullu, I., Angelopoulou, E. & Paudel, Y. N.** Revisiting the role of neurotransmitters in epilepsy: An updated review. *Life Sci.* **265**, 118826 (2021).

- a. This review helped me explain the basic physiology of how neurons communicate, especially how electrical signals and neurotransmitters work together to regulate brain activity. It clearly describes how neurons generate action potentials and release neurotransmitters across synapses, and it emphasizes the importance of maintaining a balance between glutamate driven excitation and GABA mediated inhibition. The paper also explains how disruptions in this balance can make neurons fire too easily, which is important for understanding how seizures develop. Since this is a recent peer reviewed article published in a reputable scientific journal, it is a credible and reliable source for explaining normal brain function. I used it to support my section on neuronal communication and to show how changes in neurotransmitter signaling can lead to the hyperexcitability seen in epilepsy.

2. **Boonyakitanont, P. et al.** A review of feature extraction and performance evaluation in epileptic seizure detection using EEG. *Biomed. Signal Process. Control* **57**, 101702 (2020).

- a. This review helped me explain how EEG is used to detect seizures by analyzing abnormal electrical patterns in the brain. It describes how seizures create changes in amplitude, frequency, and signal complexity, and how different feature extraction methods can identify these patterns. The paper also explains how specific EEG features, such as sharper power spectra or higher signal energy, help distinguish seizure activity from normal brain signals. Because it is a peer reviewed article focused

on EEG analysis and signal processing, it is a credible and technically strong source. I used it to support my explanation of how EEG works, what abnormal seizure patterns look like, and how these features are used in seizure detection.

3. **DiNuzzo, M. et al.** Physiological bases of the K⁺ and the glutamate/GABA hypotheses of epilepsy. *Epilepsy Res.* **108**, 995–1012 (2014).
 - a. This article helped me explain the role of astrocytes in regulating potassium and glutamate levels in the brain and why this matters for epilepsy. It describes how impaired glutamate clearance can cause neurons to become overly excited and fire in large bursts, and how metabolic problems like abnormal glycogen buildup can make the brain even more vulnerable to seizures. The paper also connects these mechanisms to treatment by discussing how targeting astrocyte function or glutamate regulation could help reduce seizure activity. Since this is a peer reviewed scientific paper published in a reputable epilepsy research journal, it is a credible and detailed source. I used it to explain glial involvement in epilepsy, the metabolic side of hyperexcitability, and how these ideas relate to therapeutic approaches.
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