PULSE EXPERIENTIAL TEAM ASSIGNMENT

Team #: 28

1. Title of your PULSE experiential assignment.

Provide a creative and informative title.

ALS EXPLORER

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 audiences 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.]

We chose to present our topic of Amyotrophic Lateral Sclerosis (ALS) by creating an interactive educational website called ALS Explorer to provide users with a better understanding of ALS and its effects on the body. The website includes general information on ALS, such as the etiology, pathogenesis, symptoms, epidemiology, and prognosis. Each section was written and formatted to make it as accessible and clear as possible, so that users can learn and retain the content more easily.

To help reinforce the information, we also included a 'Games' section where we have a crossword puzzle, jeopardy, quiz, and matching game for users to test their knowledge on the content they have learned. Additionally, we included a case study which features both a 3D model and a histological representation of ALS. We added this case study to challenge users as it requires them to apply their pathology and etiology knowledge to a clinical scenario. This is a good application of knowledge as it requires a deeper understanding and problem solving approach as compared to simply memorizing the information.

We chose ALS as our topic as it is part of the Diseases of the CNS unit, meaning we could reinforce the concepts, which are on Exam 4, while working on this project. We also chose to focus on ALS because it is a disease that affects many people and currently has no cure. Increasing awareness can help educate more people on the disease and its impact on patients. Although many people have heard about ALS through the Ice Bucket Challenge, many have not been taught about the disease or its effects on the body. By creating this website, we hope to make this information on ALS more accessible and deepen our user's understanding of ALS in a meaningful and educational way.

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

3-6 keywords are ideal.

ALS, Neurodegenerative Disease, Genetic Mutations, Clinical Pathology, Motor Neurons

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).

The course content our topic aligns with the most is the Diseases of the Central Nervous System content, specifically Neurodegenerative diseases.

5. What are the learning outcomes?

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

1) Have a basic understanding of the pathogenesis and etiology of ALS
2) Identify the common causes and symptoms of ALS and explain how it progresses over time
3) Describe the epidemiology of ALS including risk factors
4) Investigate various signs & symptoms of ALS through the interactive case study

6. Why did the team select the chosen topic and the medium? How will the topic and medium of choice help learners?

When choosing a topic, we first considered how it could support our preparation for the Pathology 3500 final exam. After reviewing the lecture schedule, we chose to focus on a central nervous system disorder, as it aligned well with course content being taught at the same time, which reinforces our learning. We specifically selected ALS because it is a condition that deserves greater awareness, particularly given that there is currently no cure. While there are some ALS awareness campaigns such as the Ice Bucket Challenge on social media, not everyone fully understands what ALS is, so we wanted to create a resource that clearly explains the disease and its impact. We chose to present our project as a website because it is highly interactive, allowing users to actively engage with the content rather than passively view it. In addition to the informational sections of it, a website allows us to include various ALS-related games, make learning more engaging and help reinforce key concepts in a memorable way.

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)?

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?)

Google AI studio was used for the development of the website. Once we had gathered all the necessary research and had come up with our game designs we used Google AI studio to 'vibe code'. By using AI we were able to still bring our vision of the website to life even if we did not have traditional coding skills on hand. We believe that the use of AI in our project was novel in the way that we did not use it to come up with our ideas or research, but rather for it to bring our ideas to reality.

8. How is your PULSE experiential assignment innovative and/or novel?

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?

A particular component of our website which is particularly innovative is the interactive case study. Unlike a regular written case study, ours features a 3d model and interactive histology slides. The 3d model is there to showcase the different symptoms that can occur in ALS throughout the entire body. The Histology slides are meant as a challenge for the website user to test their knowledge. The Case study and games were purposely designed to keep a website user engaged in our topic and confound their learning.

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.

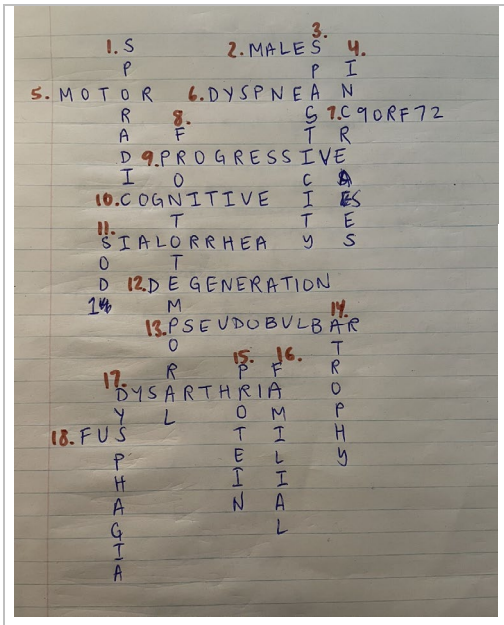
The response here is to allow others to replicate the team's work. If the prompts/outputs are lengthy (over 1 page), please attach it as a separate document and note below [Please see attached document].

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.

The response here is to allow others to observe the 'behind the scenes' team's work.

For the game development and general information, no AI was used.
Crossword Planning:



Across:

2. Males - Individuals who are more commonly affected by sporadic ALS

5. Motor - The type of neurons primarily affected by ALS

6. Dyspnea - A symptom of ALS involving difficulty breathing

7. C9ORF72 - The most common genetic mutation associated with familial ALS

9. Progressive - A disease that worsens over time, such as ALS

10. Cognitive - Although ALS patients experience physical declines, their _____ abilities are retained

11. Sialorrhea - A symptom of ALS in which a difficulty swallowing saliva causes drooling

12. Degeneration - The loss of neuron structure or function over time

13. Pseudobulbar - A type of involuntary emotional expression seen in some ALS patients, such as sudden laughing or crying known as the _____ effect

17. Dysarthria - A symptom of ALS in which muscle weakness makes it difficult to speak clearly

18. FUS - A protein involved in RNA binding and associated with ALS pathology

Down:

1. Sporadic - A type of ALS that affects those without a known family history of the disease

3. Spasticity - Muscle stiffness caused by damage to upper motor neurons

4. Increases - After the age of 64, the risk of developing ALS _____ with age until around age 74

8. Frontotemporal - A type of dementia that occurs in some ALS patients, affecting their personality and behaviour

11. SOD1 - A gene mutation that can trigger misfolded proteins

14. Atrophy - The loss of muscle mass resulting from reduced nerve stimulation

15. Protein - A molecule that can misfold and accumulate in the neurons of a person with ALS

16. Familial - A type of ALS that is inherited genetically

17. Dysphagia - A symptom seen is later stages of ALS causing difficulty swallowing

The Matching game: What is the medial term for drooling, a symptom of ALS → sialorrhea

Gene mutation on chromosome 21 which can trigger unfolded protein response and cause apoptosis → SOD1

Most cases of ALS are of this nature → sporadic

ALS → Amyotrophic lateral sclerosis

Gene mutation → excessive exercising

Medical term for trouble swallowing, a symptom of ALS → dysphagia

Mutations in these genes causes trouble in RNA binding → TDP43 & FUS

The Case study: John was a 62-year-old male with a three-year history of progressively worsening muscle weakness, beginning in his right arm and eventually involving all limbs, speech, and swallowing, who died from respiratory failure. Throughout the course of his illness, he remained cognitively aware but became completely dependent on assistance for daily activities. A clinical diagnosis of ALS had been made based on neurological examination and supportive EMG findings. You are a pathologist assigned to confirm the diagnosis of whether John had ALS. Upon examining spinal cord tissue samples, histological analysis reveals a marked loss of lower motor neurons in the **anterior horn**, along with degeneration of the **corticospinal tracts**.

11. How did the team ensure the veracity of the information presented in the PULSE assignment?

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.

To ensure that the information we included in our website was correct, we used credible scientific sources, including textbooks and journals. This includes the Robbins Basic Pathology textbook, as well as official websites from medical organizations, and peer-reviewed journal articles.

We used peer-reviewed articles such as Hardiman et al. (2017) and Longinetti & Fang (2019) to support information in our epidemiology, pathogenesis, and clinical progression sections. From these sources, we found evidence-based information on the mechanisms behind motor neuron degeneration as well as patterns of disease occurrence in different populations.

For information on disease mechanisms, pathology, and clinical presentation, we used academic texts, such as Amyotrophic Lateral Sclerosis (Mitsumoto et al., 2005) and Robbins Basic Pathology (Kumar et al., 2018).

Information about signs, symptoms, and disease progression were taken from reputable medical organization sites including the National Institute of Neurological Disorders and Stroke (NINDS) and the Muscular Dystrophy Association (MDA). These sites provide recent and medically reviewed education resources for patients.

Any information that was generated with the help of AI tools was verified and fact-checked using these sources in order to ensure accuracy and relevance.

Each of our team members ensured that all content in their sections were correct and that there were scientific and reliable sources to verify all information included. All of the sources that we used to complete this project are cited Vancouver style.

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?

Our team worked together to complete this assignment and we divided the work between us by using our individual interests and skills to determine who would complete each section. This meant that certain group members explained more content, while others designed games, or created case studies based on their interests and skills. One challenge that we faced was deciding how to present all of the content in a way that was easy and clear to understand, as it was difficult for us to simplify certain complex information about the pathology of ALS while keeping it accurate. We dealt with this problem by helping each other edit their content and having friends with no prior knowledge on the topic read it to ensure they understood the information. If we completed this assignment again, one thing we would change is to create the interactive games earlier so that we could test them and make sure the layout and functionality were effective. Through completing this project, we had to take our knowledge on ALS and explain and organize it in order to teach it to others which greatly deepened our understanding of the topic. Overall, this assignment helped us build on our knowledge of neurodegenerative disease as well as our organization and collaboration skills and we hope that our project helps others learn and understand ALS.

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…

All team members did equal amounts of research put in the informational sections of the website. Each member fact-checked their respective sections with credible sources.
For the game designs/case study: Matching game = L, Case study = C, Crossword = M, Jeopardy and Quiz = All
All team members contributed to prompting Google AI studio for the website creation.

14. Other comments (Optional)

Any comments the team would like to let the coordinator and/or TAs know.

Annotations in **vancouver:**

1. Hardiman O, Al-Chalabi A, Chio A, Corr EM, Logroscino G, Robberecht W, et al. Amyotrophic lateral sclerosis. Nature Reviews Disease Primers [Internet]. 2017 Oct 5;3(1). Available from: https://www.nature.com/articles/nrdp201771

   This source on ALS provides information on early symptoms, disease progression, and later-stage complications. It describes how initial signs such as muscle twitching, cramps, stiffness, and weakness can progress to significant impairments in speech, swallowing, and breathing. The source also explains that individuals eventually lose voluntary muscle control and mobility, while often maintaining cognitive awareness. It also mentions that some may develop frontotemporal dementia (FTD-ALS). This source is credible as it is published by a reputable government organization specializing in neurological disorders.

2. Kumar V, Abbas AK, Aster JC. Robbins Basic Pathology. 10th ed. Philadelphia, Pennsylvania Elsevier; 2018.

   This textbook provides detailed information on the pathology of a variety of diseases, including ALS. It describes how progressive degeneration of upper and lower motor neurons leads to muscle weakness, atrophy, and loss of voluntary movement. It is used as a core textbook in the Pathology 3500 course, making its content relevant and reliable.

3. Longinetti E, Fang F. Epidemiology of amyotrophic lateral sclerosis. Current Opinion in Neurology [Internet]. 2019 Oct;32(5):771–6. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6735526/

   This source explains the epidemiology of ALS including its incidence, prevalence, and potential risk factors. It highlights patterns in disease distribution, such as age of onset and geographic variation, and discusses possible environmental and genetic influences on ALS development. As a peer-reviewed article, it is a credible and up-to-date source. It is useful for understanding population-level trends and risk factors of ALS.

4. Mitsumoto H, Przedborski S, Gordon PH, editors. Amyotrophic Lateral Sclerosis. New York: Taylor & Francis Group; 2005.

This source is a comprehensive academic text on ALS, covering its pathophysiology, clinical presentation, diagnosis, and management. This source was used for its information on the likely pathogenesis of ALS as well as some parts of the prognosis. It provides in-depth discussion of motor neuron degeneration and the biological mechanisms contributing to disease progression. As an edited volume by experts in the field, it is a credible resource, useful for gaining detailed, research-based insight into ALS beyond general overviews.

5. Muscular Dystrophy Association. Amyotrophic Lateral Sclerosis (ALS) - Stages of ALS | Muscular Dystrophy Association [Internet]. Muscular Dystrophy Association. 2019. Available from: https://www.mda.org/disease/amyotrophic-lateral-sclerosis/signs-and-symptoms/stages-of-als

   This source outlines the general stages of amyotrophic lateral sclerosis (ALS), showing the dramatic progression from mild muscle weakness and twitching till widespread paralysis and respiratory impairment. A unique aspect of this source is that it highlights assistance devices and caregiving supports appropriate for each stage of the disease. As a nonprofit organization focused on neuromuscular diseases, the Muscular Dystrophy Association is a credible source that provides patient-centered information. It is useful for understanding the practical progression of ALS and the level of care required at each stage.

6. National Institute of Neurological Disorders and Stroke. Amyotrophic lateral sclerosis (ALS) [Internet]. www.ninds.nih.gov. NIH; 2024. Available from: https://www.ninds.nih.gov/health-information/disorders/amyotrophic-lateral-sclerosis-als

   This source provides a comprehensive overview of ALS, including its epidemiology, genetic factors, pathophysiology, clinical presentation, and current treatment approaches. It highlights the complex mechanisms underlying motor neuron degeneration and discusses both sporadic and familial forms of the disease. As a peer-reviewed article published in Nature Reviews Disease Primers, it is a credible and in-depth source, making it valuable for gaining a deeper scientific understanding of ALS.

7. Portal S. Scholars Portal [Internet]. Scholarsportal.info. 2026 [cited 2026 Apr 8]. Available from: https://journals.scholarsportal.info/pdf/0148639x/v59i0001/10_iiaalsieap.xml_en

   This source is a scholarly journal article accessed through Scholars Portal that discusses amyotrophic lateral sclerosis (ALS), focusing on its clinical features, underlying mechanisms, or epidemiology. It contributes to understanding ALS as

a progressive neurodegenerative disease involving motor neuron degeneration, leading to muscle weakness and eventual respiratory failure. As an academic journal article accessed through a university database, it is a credible and peer-reviewed source. It is useful for providing more detailed, research-based insight into ALS, complementing general overviews with more specific scientific evidence.