

PULSE EXPERIENTIAL TEAM ASSIGNMENT

1. Title of your PULSE experiential assignment. <i>Provide a creative and informative title.</i>
Anaphylaxis; When Food, Exercise, and Drugs Turn Fatal
2. Please summarize your PULSE experiential assignment (max 300 words). <i>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.</i> <i>[Team 23 is an example of an informative lay summary.]</i>
Our experiential assignment focused the mechanisms, causes, and types of anaphylactic shock. We decided to design an infographic containing the main features associated with each type of anaphylactic shock. We believe that an infographic provides interactive opportunities for audiences not familiarized with a topic to better grasp its significance and complexity through simplified, yet concise explanations of the material. Anaphylactic shock is a hypersensitive response to an allergen, which triggers an activation of immune cells called mast cells. Said mast cells become activated and release inflammatory molecules called mediators. These inflammatory molecules (histamine, prostaglandin, leukotrienes) act locally and systemically (throughout the body) to lower blood pressure, increase swelling, and reduce heart rate. In normal responses, these mediators help combat diseases through inflammatory action; however, these responses are exacerbated in the presence of allergens and the associated pathological response (IgE dependent and independent anaphylaxis). There are 2 types: immune-mediated anaphylaxis (IgE dependent) and non-immune-mediated anaphylaxis (IgE independent). IgE dependent anaphylaxis occurs through IgE and allergen interactions that activate mast cells, whereas IgE-independent anaphylaxis causes are not fully understood, but can be triggered by exercise or drugs. Correspondingly, the pathological issues caused by this exaggerated response are manifested in signs such as hives, rashes, shortness of breath, low blood pressure, irregular heart rate. Additionally, symptoms may present differently between individuals, but may include pain, fatigue, mental confusion. If the symptoms are severe, the anaphylactic reaction results in death. Overall, our assignment aims to provide additional and crucial information regarding anaphylaxis, as it is a potentially fatal condition, and cannot be resolved at home. Therefore, it is important for audiences to be aware of the many presentations and risk factors associated with it.
3. Provide up to 6 keywords relevant to your PULSE experiential assignment. <i>3-6 keywords are ideal.</i>
IgE Antibodies, non-immune mediated anaphylaxis, immune-mediated anaphylaxis, anaphylactic shock, mast cells, degranulation
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).
Hemodynamic Disorders, Thromboembolism and Shock – Lecture 3 (Shock)
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> – Define Anaphylactic shock and the 2 types: immune mediated and non-immune mediated anaphylaxis – List common signs and symptoms of anaphylaxis (Immune and non-immune mediated) – List common etiologies, such as allergens and other factors, causative of immune-mediated and non-immune mediated anaphylaxis – List common preventions and treatments of immune-mediated and non-immune mediated anaphylaxis – Describe the general mechanism of IgE-dependent anaphylaxis – Describe and differentiate the common types of non-immune mediated anaphylaxis
6. Why did the team select the chosen topic and the medium? How will the topic and medium of choice help learners? We chose immune-mediated and non-immune mediated anaphylaxis as our topic of interest due to the large discrepancy between both types. Non-immune mediated anaphylaxis is not as heavily understood as immune-mediated, hence there is a lot of grey area in the field and thus great opportunity for research and advancements in care and diagnosis. We aimed to better understand and bring awareness to this issue by comparing and contrasting both types in their etiologies, pathological responses, as well as in signs and symptoms, in addition to preventative measures and treatments. We believed that by choosing an infographic as our medium we could make the information we found and summarized, more accessible to lay audiences, which would be greatly beneficial in informing people about a prevalent, potentially fatal, and often multi-factorial condition such as anaphylactic shock.
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> AI was used to generate the format of the crossword on Canva. All words and hints were made by the team, and were inputted into canva to generate the crossword puzzle. It was the best tool for the assignment as it made a tidy puzzle format. The other alternative tool was to create each letter box and put it all together separately, but using the AI to format everything saved ~1 hour. This technology tool is novel because it gives the reader a fun way to test their knowledge at the end of the infographic. It reinforces key points of the infographic and is a fun activity.

AI was also used to generate some images used on page 5 to demonstrate the symptoms of anaphylaxis effectively. This helps the reader understand visually what is happening in the case study. The technology tool is novel because it shows what can happen during an anaphylactic shock without using real human pictures. Now, we have a visual without needing to photograph a patient going through a possibly fatal experience.
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>
Our PULSE experiential assignment is novel as it touches upon an area of hypersensitivity reactions that is not fully understood in research nor in clinical settings. Our infographic highlights the many discrepancies that exist between immune-mediated and non-immune mediated anaphylaxis, specifically in their mechanisms of pathological response, but more importantly in the way that individuals experience the shock and how it is manifested and identified. Non-immune mediated anaphylaxis isn't researched well, and basing half of our topic on it will hopefully shed some light on this not well known issue.
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 pdf: PULSE Team#38 AI Prompts
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>
We did not use AI to gather the information for the infographic. Due to the team's notes being extremely long (20 pages), we have provided a link: https://docs.google.com/document/d/1D921p6bhZn3CZjFyh7lu9Xs5ss_I5jbP8_OQaaU1BS8/edit?usp=sharing
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>
Our team made sure to only use reputable, accurate sources that are well known and have experts as authors. We used sites such as PubMed (the National Library of Medicine), Cleveland Clinic, Mayo Clinic, Western Libraries Omni database,

SpringerNature, which are all verifiable and reputable sources, along with expert authors. We also verified our information across different sources.

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: This PULSE assignment helped solidify our learning on the topic of shock and specifically anaphylactic shock. We learned a lot about the specific mechanisms of IgE antibodies and mast cell degranulation that causes histamine release and subsequent reaction. We learned about how there is never really only one pathway that causes a condition and rather there are many different mechanisms or changes to mechanisms that can have different outcomes. This is an important concept that can be applied to many different conditions anywhere throughout the body. A barrier we quickly discovered was the lack of research in the area of non-immunologic anaphylaxis, which is most likely because it is a more rare condition and how variable the condition can be. The specifics of the mechanism of non-immunologic anaphylaxis is unknown, but the general association with mast cell degranulation was enough to identify a likely cause. This helped us realize that there is still lots to discover in the field of pathology and helped us identify gaps in knowledge that future work could address. Our team worked very well at dividing tasks and communicating any issues or new ideas. We were able to adapt to problems like lack of research by putting more work into other topics related to anaphylaxis. We managed our time well and met up multiple times to discuss ideas and work on our infographic. We stayed in constant communication throughout our time completing the assignment and set our own deadlines for specific components of the project.

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 contributed to the infographic using Canva. M.A and J.O contributed to the research of Immune Mediated Anaphylaxis, and F.A and E.G contributed to the research of Non-Immune Mediated Anaphylaxis. M.A wrote Page 2 and 3 of the infographic, F.A wrote Page 6, J.O, F.A, E.G wrote Page 1, J.O wrote Page 4, E.G wrote Page 5. F.A. wrote the general treatments section for pages 3 and 5. M.A made the reference list and F.A did the design of the infographic.

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)]

References

1. Mayo Clinic. Anaphylaxis [Internet]. Mayo Clinic. 2025. Available from: <https://www.mayoclinic.org/diseases-conditions/anaphylaxis/symptoms-causes/syc-20351468>
2. Reber LL, Hernandez JD, Galli SJ. The Pathophysiology of Anaphylaxis. *Journal of Allergy and Clinical Immunology* [Internet]. 2017;140(2):335–48. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5657389/>
3. Worm M, Kristijan Pazur, Payam Morakabati, Davender Redhu. IgE and non-IgE-mediated pathways in anaphylaxis. *PubMed*. 2025 Aug 13;47(1):34–4.
4. Aqel S, Imameldin AO, Ibrahim T. Impact of food allergy on health-related quality of life: A case report of 2 patients with adult-onset IgE mediated food allergy. *Qatar Medical Journal*. 2023 May 31;2023(2).
5. Barg W, Medrala W, Wolanczyk-Medrala A. Exercise-Induced Anaphylaxis: An Update on Diagnosis and Treatment. *Current Allergy and Asthma Reports*. 2010 Oct 5;11(1):45–51.
6. Cleveland Clinic. Peanut Allergy: Symptoms, Tests & Treatment [Internet]. Cleveland Clinic. 2021. Available from: <https://my.clevelandclinic.org/health/diseases/21511-peanut-allergy>
7. Jaqua NT, Peterson MR, Davis KL. Exercise-Induced Anaphylaxis: A Case Report and Review of the Diagnosis and Treatment of a Rare but Potentially Life-Threatening Syndrome. *Case Reports in Medicine* [Internet]. 2013 Mar 27 [cited 2023 Jun 18];2013:e610726. Available from: <https://www.hindawi.com/journals/crim/2013/610726/>
8. Cleveland Clinic. Pruritus (Itchy Skin) [Internet]. Cleveland Clinic. 2022. Available from: <https://my.clevelandclinic.org/health/diseases/11879-pruritus>
9. Aun MV, Ribeiro MR, Kalil J, Giavina-Bianchi PV. NSAIDs-induced anaphylaxis. *Current Treatment Options in Allergy* [Internet]. 2017 Jul 24 [cited 2026 Apr 10];4(3):320–8. Available from: https://journals.scholarsportal.info/details/21963053/v04i0003/320_na.xml
doi:10.1007/s40521-017-0137-1

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.*

Annotated Bibliography

1. Mayo Clinic Staff. Anaphylaxis [Internet]. Mayo Clinic. 2025. Available from: <https://www.mayoclinic.org/diseases-conditions/anaphylaxis/symptoms-causes/syc-20351468>

This source provides a clear and reliable overview of anaphylaxis, including its causes, symptoms, and underlying immune response. It explains that anaphylaxis is a severe reaction triggered by exposure to allergens such as foods, medications, or insect venom, which leads to the fast release of chemicals causing symptoms such as airway constriction, low blood pressure, and shock. This source is highly credible as it was posted by a highly rated medical institution, and is intended for patient education, making the information both accurate and accessible. This article is particularly useful for our assignment as it supports key concepts related to anaphylaxis, particularly the symptoms, causes, treatment, and prevention, and includes examples such as wearing a medical necklace or bracelet, keeping an emergency kit with you and making sure it has an epinephrine injector, and cautiously reading food labels, and examples of signs such as diarrhea, nausea, vomiting, skin reactions, a weak and rapid pulse, dizziness, and fainting.

2. Aun MV, Ribeiro MR, Kalil J, Giavina-Bianchi PV. NSAIDs-induced anaphylaxis. Current Treatment Options in Allergy [Internet]. 2017 Jul 24 [cited 2026 Apr 10];4(3):320–8. Available from: https://journals.scholarsportal.info/details/21963053/v04i0003/320_na.xml

This website provided a lot of information regarding the role of NSAIDs in a variety of mechanisms and types of adverse reactions caused by this drug family, including anaphylaxis. Additionally, it provided statistical analysis of the drugs distribution in different countries, compiling case studies and local health reports to infer about NSAID

use in different populations and their respective anaphylaxis and adverse events associated and/or reported with NSAID use and overuse. This source was especially helpful in describing the theorized mechanism of NSAID IgE-independent anaphylaxis, which is thought to occur via COX1/2 inhibition by NSAIDs, which upregulates leukotriene synthesis. This paper obtains information about the different types of NSAID-derived adverse events and anaphylaxis. Its main weakness lies in the lack of data available regarding NSAID-induced anaphylaxis, which results in a lot of the proposed mechanisms being uncertain and highly variable. The source is credible. Its credibility is verified by the fact that it is peer-reviewed by the Western Libraries website. Additionally, the article is published under authors affiliated with the Clinical Immunology and Allergy division of the University of Sao Paulo School of Medicine, which is a highly acclaimed and credible institution.

3. Worm M, Pazur K, Morakabati P, Redhu D. IgE and non-IgE-mediated pathways in anaphylaxis. *Seminars in Immunopathology*. 2025 Aug 13;47(1):34–4. doi:10.1007/s00281-025-01056-7

This source provided a lot of information regarding the different types of non-immunologic anaphylaxis, as well as immunologic but non-IgE mediated anaphylaxis. Additionally, it also provided a clear framework of the multiple studies mentioned that analyzed the mechanisms involved in IgG mediated anaphylaxis, as well as the theorized mechanisms in non-immunologic anaphylaxis. This source's strength relies on the fact that studies and data are provided throughout the text to create credibility in its claims and uncertainties. However, due to the lack of clinical and research consensus in non-IgE mediated anaphylaxis, in addition with ethical concerns of studies in humans, most data were obtained from mice, which reduces the human application of the mechanisms described due to potential changes in metabolism, enzymatic functions, proteome, etc. The article is peer-reviewed, which is confirmed by the Western Libraries' article search engine. It is likely credible due to the fact that it is peer-reviewed, and obtains its review data from several cited sources within its bibliography.

4. Cleveland Clinic. Peanut Allergy: Symptoms, Tests & Treatment [Internet]. Cleveland Clinic. 2021. Available from: <https://my.clevelandclinic.org/health/diseases/21511-peanut-allergy>

This source gives a general overview of a peanut allergy, including the symptoms such as anaphylaxis and many others. It identifies the cause of peanut allergy as the immune system mistaking peanuts as something harmful that your body initiates an inflammatory response to combat. The source covers methods of testing for peanut allergies and also methods for preventing and treating peanut allergies. Some drugs are highlighted that can reduce effects of reaction if exposed to peanuts and also emergency medications are highlighted for extreme cases. This is a credible source that comes from Cleveland clinic, which is a database for many different medical conditions. The information from this source was used to identify symptoms of immunologic anaphylaxis and treatments used to relieve these symptoms. These symptoms were also used for non-immunologic shock because the symptoms are similar and treatments can also be similar. The main takeaway from this source was anaphylactic shock being used in an example-like scenario.

5. Barg W, Medrala W, Wolanczyk-Medrala A. Exercise-Induced Anaphylaxis: An Update on Diagnosis and Treatment. *Current Allergy and Asthma Reports*. 2010 Oct 5;11(1):45–51. doi: 10.1007/s11882-010-0150-y

This website gave a lot of information on non-immunologic anaphylactic shock, including exercise induced anaphylaxis (EIA) and food dependent exercise induced anaphylaxis (FDEIA), and some other forms of anaphylaxis/disorders that can be similar. It described the clinical signs and/or symptoms of EIA/FDEIA, the potential treatment, management, and some extremely small case studies (this is an underresearched area) which provide some insight on developments/progress on preventative measures. This paper took a lot of theories from other papers and presented everything in 1 place, with studies to back up some of the theories, while other theories were talked about briefly but their flaws were also given. The credibility of the source is strong, as it is a scholarly paper from the National Library of Medicine, which is an official website of the United States Government. We will use this source as a large part of the EIA and FDEIA sections in non-immunologic anaphylactic shock, and for a brief overview of NSAID/aspirin and cold-induced non-immunologic anaphylactic shock.

6. Reber LL, Hernandez JD, Galli SJ. The Pathophysiology of Anaphylaxis. *Journal of Allergy and Clinical Immunology*. 2017 Aug;140(2):335–48. doi: 10.1016/j.jaci.2017.06.003

This source provides a detailed and comprehensive review of the immunological mechanisms underlying anaphylaxis, with a strong focus on the role of IgE antibodies and mast cells in the development of the reaction. The article explains that anaphylaxis is a rapid, systemic hypersensitivity response primarily driven by IgE-mediated pathways, where allergens bind to antibodies attached to FcεRI receptors on mast cells and basophils, which directly support the mechanisms in our assignment. It explains re-exposure to allergens, and how mediators lead to physiological effects such as vasodilation, increased vascular permeability, and bronchoconstriction, which ultimately causes symptoms of anaphylaxis. In addition, the article expands on other components such as additional mediators, such as PAF, macrophages, and neutrophils. This source is highly credible because it is a peer-reviewed article published in a reputable scientific database, and written by experts in immunology. It is overall useful for our assignment as it reinforces biological accuracy of our explanation on anaphylaxis and strengthens the connection between molecular immune mechanisms and clinical symptoms presented.

7. Aqel S, Imameldin AO, Ibrahim T. Impact of food allergy on health-related quality of life: A case report of 2 patients with adult-onset IgE mediated food allergy. *Qatar Medical Journal*. 2023 May 3;2023(2). doi: <https://doi.org/10.5339/qmj.2023.sqac.8>

This source presents a clinical case of adult-onset IgE mediated cow's milk allergy, which closely aligns with the case of infographic. The article describes the concept of how individuals who were previously healthy can develop new allergic reactions to food (in this case, milk and dairy) later in life, experiencing symptoms such as shortness of breath, swelling, and systemic reactions that are consistent with anaphylaxis. The source also confirms that food allergies can trigger rapid, systemic immune responses affecting multiple body systems, including respiratory and cardiovascular functions. Furthermore, the article also supports our treatment and prevention strategies presented in the

infographic, emphasizing that avoidance of the allergen and making sure affected individuals have an epinephrine injector or an adrenaline auto-injector. Overall, this source is highly credible as it is a peer-reviewed article clinical case study from PubMed Central, and is useful as it provides real life evidence that directly supports our mechanisms, symptoms, prevention, and treatment strategies presented in our infographic.

8. Jaqua NT, Peterson MR, Davis KL. Exercise-Induced Anaphylaxis: A Case Report and Review of the Diagnosis and Treatment of a Rare but Potentially Life-Threatening Syndrome. *Case Reports in Medicine* [Internet]. 2013 Mar 27 [cited 2023 Jun 18];2013:e610726. Available from: <https://www.hindawi.com/journals/crim/2013/610726/>

This source is a paper that discusses a few different experiences of non-immunologic anaphylaxis including exercise induced anaphylaxis and food induced exercise dependent anaphylaxis. It talks about how this anaphylaxis occurs and how these cases can be treated and prevented. The main takeaways from this source were understanding that exercise induced anaphylaxis is associated with mast cell degranulation and that it can be treated similarly to other anaphylactic attacks. This is a credible source that comes from the PubMed journal and the paper references many other studies about non immunologic anaphylaxis. This source was used in our assignment for the case study on non-immunologic anaphylaxis. The example of exercise induced anaphylaxis was important for developing a similar case report in our case study. The source was used to identify symptoms of patients with this condition and it was also used for information on the mechanism of exercise induced anaphylaxis. The source was also used to identify treatments that can help prevent exercise induced anaphylaxis.

9. Cleveland Clinic. Pruritus (Itchy Skin) [Internet]. Cleveland Clinic. 2022. Available from: <https://my.clevelandclinic.org/health/diseases/11879-pruritus>

This source goes into depth about what pruritus is and all the different types of pruritus, it even includes the demographic it affects and what it feels like to experience this condition. The source gives lots of information on the signs and symptoms of pruritus and even information about how to treat and prevent pruritus. The source also briefly highlights what urticaria is and how it differs from pruritus. The main takeaways from this source were understanding what pruritus is and why it is caused by anaphylaxis. Another key takeaway was identifying the main differences between pruritus and urticaria. This is a credible source that comes from Cleveland clinic, which is a database for many different medical conditions. In our infographic this source was used in the non-immunologic case study when listing the symptoms, which includes pruritus and urticaria. A short definition of each condition was given because these conditions may not be common knowledge to most people.