

PULSE EXPERIENTIAL TEAM ASSIGNMENT

Team #: 47

1. Title of your PULSE experiential assignment.

Provide a creative and informative title.

The Healing Journey: A Tissue's Story After Injury

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 assignment explores how the body heals after tissue injury, using a skin laceration as a running example to illustrate broader principles of inflammation and repair. These processes are central in pathology because they determine whether damaged tissue is restored, replaced by scar, or progress toward chronic dysfunction. The project links prior concepts of cell injury with healing by showing how the regenerative capacity of different cell types, the integrity of the extracellular matrix (the structural scaffold around cells), and local wound conditions collectively influence whether repair occurs predominantly by regeneration, by connective tissue deposition, or by a combination of both.

The assignment takes the form of a short explanatory video that follows the “healing journey” of a single forearm wound. The video introduces two major healing mechanisms—regrowth of normal epithelial cells and connective tissue-based scar formation—and then ties these to three key determinants: what kinds of cells were injured, whether the extracellular matrix in the dermis remains intact or is disrupted, and contextual factors such as wound size, contamination, and whether the wound edges can be approximated. The same clinical example is used throughout so that viewers can observe the wound transition through the major stages of cutaneous healing: hemostasis and scab formation, the inflammatory phase and removal of necrotic tissue, formation of granulation tissue and new capillaries, re-epithelialization, and finally remodeling into a mature scar.

I chose a video format because a visual, stepwise narrative of one wound makes an abstract topic more concrete and easier to retain than a written description alone. The video addresses concepts that are highly relevant to clinical medicine. It helps explain why surgical incisions usually heal with relatively fine scars, why extensive tissue loss or impaired blood supply increase the risk of delayed or nonhealing wounds, and how seemingly simple injuries can progress to chronic scars or other long-term complications [1].
3. Provide up to 6 keywords relevant to your PULSE experiential assignment. <i>3-6 keywords are ideal.</i>
TISSUE REPAIR EXTRACELLULAR MATRIX REGENERATION SCARRING INFLAMMATION PROLIFERATION
4. Identify the course topic with which your PULSE assignment most aligns. <i>Refer to the various topics outlined under 'Course content and Schedule' in the syllabus (e.g. Inflammation).</i>
Tissue Repair
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>
1. Describe the overall sequence of events in cutaneous wound healing from initial injury to final scar. 2. Differentiate between regeneration and connective-tissue-based repair (scarring) in terms of process and outcome. 3. Classify the epidermis and dermis based on the regenerative capacity of their main cell types. 4. Explain how the integrity of the extracellular matrix influences whether a wound can heal by regeneration alone or requires scar formation. 5. Compare healing by first intention and second intention, using tissue loss and wound edge approximation as key criteria. 6. Identify clinical situations in which impaired wound conditions (e.g., large tissue loss or poor blood supply) are likely to result in delayed healing or problematic scars.

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

The topic and format were chosen to make a complex pathological process feel more concrete and clinically relevant. Framing the content as a short video centered on a single skin laceration creates a clear narrative. Core concepts such as regeneration, connective tissue repair, cell type, extracellular matrix integrity, and wound conditions are introduced first and then applied step by step to a realistic case. This structure helps bridge the gap between abstract pathology concepts and how they shape the outcome of a common injury.

Using a video also supports learning by pairing explanations with visuals. Diagrams, wound images, and labelled cross sections show which tissue layers are involved and how the wound evolves over time, making the sequence of events easier to follow than text alone. This approach can reduce cognitive load, draw attention to key stages and structures, and clarify timing, for example when granulation tissue forms.

Anchoring everything in a single case also encourages transfer. Once learners understand how these mechanisms play out in a forearm laceration, they are better equipped to apply the same reasoning to other situations such as surgical wounds, trauma, or chronic ulcers.

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?)

AI tools were used in this project, mainly to support visual design and generate images. I worked with 3 different generative AI platforms, Chat GPT, Perplexity AI, and Gemeni, to help create images and diagrams that matched the specific cutaneous wound case I designed. These tools were very useful for producing wound illustrations and simple schematics that aligned closely with the scenario and the stages of cutaneous healing I wanted to highlight.

I rotated between the three free AI tools because each one imposed a limit on how many images could be generated within a certain time frame, often allowing only a few images per session. Using several options in parallel lets me obtain enough visuals and refine them until they are clear, anatomically reasonable, and consistent with the narrative of the video. Beyond AI, I also used Canva as my standard slide-creation and video-editing software to assemble the presentation, add text overlays, and produce the final video.

The technologies themselves are not new, and I do not think my use of them is radically novel; however, they were applied in a practical way to support a student-created case, allowing rapid generation of tailored visuals that would have

been time-consuming to draw from scratch. I expect that, if other students were given similar instructions and access to comparable AI tools, they would be able to achieve similar results in terms of case specific diagrams and illustrations.

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?

I approached the PULSE experiential assignment using a case-based, clinically grounded format to guide the learning process. Instead of presenting wound healing as separate phases to memorize, I structured everything around a single patient scenario, which helped connect each stage as part of one continuous process. One aspect I found particularly innovative was how I linked microscopic mechanisms to visible clinical features. For example, I connected cellular activity and extracellular changes to things like scab formation, tissue appearance, and eventual scar development. This made the content feel more practical and easier to understand. Compared to more traditional lecture-style material, which often feels segmented and abstract, this approach allowed me to focus on application and continuity. Following one injury over time made it easier to see how each phase builds on the last, rather than treating them as isolated concepts.

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].

I drafted the key points for each slide and then used them as prompts in various AI tools to generate supporting images. I refined the outputs iteratively, adjusting the prompts until the visuals aligned with what I wanted to convey.

Please see the attached document for the full history.

[AI TOOL USAGE](#)

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.

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.

I ensured the accuracy of the information presented in the PULSE assignment by grounding the project primarily in course materials and peer-reviewed scientific literature, while using AI only as a starting point for draft text or visuals that were later carefully checked and corrected. First, the official lecture notes on tissue repair and cutaneous wound healing were reviewed closely and used as the main framework for the assignment, including key concepts such as the distinction between regeneration and connective tissue deposition, the role of the extracellular matrix, and the major phases of wound healing. To strengthen and verify this foundation, the team cross-checked concepts against multiple peer-reviewed sources from PubMed and PMC, including review articles on wound healing [2], tissue repair [3], re-epithelialization [4], granulation tissue [5], macrophage activity [6], extracellular matrix remodeling [7], and scar formation [8].

AI-generated explanations and diagrams were not accepted at face value. Instead, each statement, timeline, and visual detail was compared against the lecture notes and supporting scholarly articles, and anything inaccurate, incomplete, or inconsistent was revised or regenerated. This process helped ensure that the final content remained biologically accurate, aligned with course expectations, and supported by current evidence rather than by a single source or unverified AI output.

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: The PULSE assignment turned into a useful exercise in both content design and self-reflection. I initially planned to focus on events and patterns in acute and chronic inflammation, but after reviewing existing PULSE projects on the course website, I noticed that much of what I was intending to cover overlapped with an existing resource on inflammation and tissue repair. To avoid duplicating content and to contribute something distinct, I shifted the focus to tissue repair, using a single cutaneous wound as the anchor for the video. This choice pushed me to think more carefully about how regeneration, scarring, extracellular matrix integrity, and wound conditions fit together as one coherent story rather than as isolated facts. Developing the video helped solidify my understanding far more than passive studying would have. Translating lecture material into a non-technical explanation forced me to

clarify what each phase of healing actually looks like and to check that the sequence made sense to someone without a pathology background. It also made me more aware of my own assumptions. I tried to use examples and language that would feel generally applicable rather than tied to one demographic or clinical setting. In total, the assignment likely took 20–25 hours, including planning, scripting, image generation, editing, and revisions. What worked well was building everything around one consistent case, which kept the narrative focused. If I were to repeat the project, I would start the visual planning earlier and explore more ways to represent a wider range of patients and wound contexts, so the resource feels even more inclusive and broadly relevant.

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...

N.U completed this assignment independently. N.UI designed the case example, developed the storyboard, wrote and revised the script, created and curated visuals, fact-checked the content using course materials and external references, and assembled and edited the final video.

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. Marshall, C. D. *et al.* Cutaneous Scarring: Basic Science, Current Treatments, and Future Directions. *Advances in Wound Care* **7**, 29–45 (2016).
2. Wilkinson, H. N. & Hardman, M. J. Wound healing: cellular mechanisms and pathological outcomes. *Open Biology* **10**, 200223 (2020).
3. Midwood, K. S., Williams, L. V. & Schwarzbauer, J. E. Tissue repair and the dynamics of the extracellular matrix. *The International Journal of Biochemistry & Cell Biology* **36**, 1031–1037 (2004).
4. Ben Amar, M. & Wu, M. Re-epithelialization: advancing epithelium frontier during wound healing. *Journal of The Royal Society Interface* **11**, 20131038 (2014).
5. Flanagan, M. The characteristics and formation of granulation tissue. *Journal of Wound Care* **7**, 508–510 (1998).
6. Feng, Y. *et al.* Direct and Indirect Roles of Macrophages in Hypertrophic Scar Formation. *Frontiers in Physiology* **10**, 1101 (2019).
7. Almine, J. F., Wise, S. G. & Weiss, A. S. Elastin signaling in wound repair. *Birth Defects Research Part C: Embryo Today: Reviews* **96**, 248–257 (2012).
8. Atala, A., Irvine, D. J., Moses, M. & Shaunak, S. Wound Healing Versus Regeneration: Role of the Tissue Environment in Regenerative Medicine. *MRS Bulletin* **35**, 597–606 (2010).

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. Marshall, C. D. *et al.* Cutaneous Scarring: Basic Science, Current Treatments, and Future Directions. *Advances in Wound Care* 7, 29–45 (2016).

This review explains how cutaneous scars form after skin injury and outlines the biological processes that underlie normal and pathological scarring. It discusses the roles of fibroblasts, skin stem cells, inflammation, and extracellular matrix remodeling, while also reviewing current and emerging anti-scarring therapies.

This is a credible, high-quality review from a peer-reviewed journal, and it is especially strong because it synthesizes multiple levels of evidence into one accessible overview. Its major strength is breadth, as it connects basic science with clinical translation. A limitation is that it is a review rather than original experimental research, so it is best used for general framework and background rather than for primary data. I used this source to support the overall explanation that wounds often heal by a combination of regeneration and scar formation. It was also useful when discussing why the forearm laceration heals with a scar even in a healthy young adult.

2. Wilkinson, H. N. & Hardman, M. J. Wound healing: cellular mechanisms and pathological outcomes. *Open Biology* 10, 200223 (2020).

This review describes the cellular basis of wound healing and explains how coordinated cellular behavior allows damaged tissue to repair. It also discusses how disruption of normal healing responses can lead to chronic, non-healing wounds and other pathological outcomes. The article frames wound repair as a dynamic process involving multiple cell types and tightly regulated steps. This is a strong and very current review

from a peer-reviewed source, making it highly credible for the pathology assignment. Its main strength is that it links normal repair mechanisms to the clinical consequences of impaired healing. Since it is a review, it summarizes rather than presents primary experimental data. This source supported the explanation of why factors such as age, blood supply, and tissue damage influence whether healing is normal or pathological.

3. Midwood, K. S., Williams, L. V. & Schwarzbauer, J. E. Tissue repair and the dynamics of the extracellular matrix. *The International Journal of Biochemistry & Cell Biology* 36, 1031–1037 (2004).

This article explains how tissue repair depends on the synthesis and remodeling of the extracellular matrix, which replaces damaged tissue and provides structural support for healing. It emphasizes that the extracellular matrix is not passive; it actively regulates cell behavior during inflammation, re-epithelialization, and contraction. The article also highlights matricellular proteins as important regulators of repair. This is a strong and highly cited review article. One of the main strengths is that it explains the extracellular matrix as both a scaffold and a signaling system, which makes it especially useful for understanding dermal repair. The article is older, but the concepts are foundational and remain relevant. This source was helpful when explaining why the dermis cannot simply regenerate after a laceration and why connective tissue deposition is needed.

4. Ben Amar, M. & Wu, M. Re-epithelialization: advancing epithelium frontier during wound healing. *Journal of The Royal Society Interface* 11, 20131038 (2014).

This article focuses on re-epithelialization, the process in which epithelial cells migrate and proliferate to restore the skin surface after injury. It explains the mechanics of epithelial sheet movement, wound-edge behavior, and the factors that influence closure of the wound surface. The paper emphasizes the importance of this process in restoring barrier function after cutaneous injury. This is a credible and useful review that is especially strong for explaining one specific stage of wound healing in detail. It provides depth on epithelial closure, which makes it ideal for targeted discussion. The limitation is that it is narrower than a general wound-healing review, so it works best as a supporting source rather than the only source used. This source was helpful when describing how the epidermis regenerates over the forearm wound. It supports the part of the video explaining that epithelial migration helps restore surface continuity even while the dermis heals by scar formation.

5. Flanagan, M. The characteristics and formation of granulation tissue. *Journal of Wound Care* 7, 508–510 (1998).

This article describes the formation, appearance, and properties of granulation tissue during wound healing. It explains that granulation tissue consists of new capillaries, fibroblasts, extracellular matrix, and inflammatory cells, and that it provides the repair scaffold for later scar formation. The article also highlights the classic appearance of

granulation tissue in healing wounds. This is a highly relevant and practical source because it addresses the exact tissue type central to the proliferative phase. The main weakness is that it is significantly older, but the information remains foundational and reliable. This supported the explanation on what granulation tissue is and why it matters in the healing of the forearm laceration.

6. Feng, Y. et al. Direct and Indirect Roles of Macrophages in Hypertrophic Scar Formation. *Frontiers in Physiology* 10, 1101 (2019).

This review discusses how macrophages contribute to hypertrophic scar formation through both direct and indirect mechanisms. It shows that macrophages influence inflammation, fibroblast activity, extracellular matrix deposition, and the overall fibrotic healing response. The article links immune activity to the development of excessive scarring. It is a strong and modern review that is very credible for this pathology assignment. Its major strength is that it connects immune regulation to abnormal scar formation, which is a clinically relevant angle. Because it focuses specifically on hypertrophic scars, it is narrower than a general wound-healing review but very useful for scar-related discussion. It helps support the idea that macrophages are not just cleanup cells but also regulators of repair.

7. Almine, J. F., Wise, S. G. & Weiss, A. S. Elastin signaling in wound repair. *Birth Defects Research Part C: Embryo Today: Reviews* 96, 248–257 (2012).

This article examines the role of elastin in wound healing, showing that elastin is involved not only as a structural matrix protein but also as a signaling molecule. It discusses how elastin-related signals affect repair processes and tissue organization during healing. The paper broadens the understanding of extracellular matrix biology in repair.

Evaluation: This is a credible peer-reviewed review that helps add depth to extracellular matrix discussions. Its main strength is its focus on elastin as an active participant in wound repair rather than a passive scaffold. The limitation is that it is relatively specialized, so it is limited to be used as a supporting source rather than a core overview. This source was useful when discussing the extracellular matrix in the dermis and how matrix components contribute to repair and remodeling.

8. Atala, A., Irvine, D. J., Moses, M. & Shaunak, S. Wound Healing Versus Regeneration: Role of the Tissue Environment in Regenerative Medicine. *MRS Bulletin* 35, 597–606 (2010).

This article compares wound healing with true regeneration and argues that the tissue environment strongly influences which repair pathway occurs. It explains that adult tissues often heal through scar formation rather than complete regeneration because the local wound environment affects cell behavior and matrix repair. The article places wound repair in the broader context of regenerative medicine. This is a very useful conceptual review because it directly addresses the key distinction between

regeneration and connective tissue deposition. The main limitation is that it is broader and more theoretical than some of the stage-specific wound-healing papers. This supports the explanation of why the epidermis can regenerate while the dermis heals by scar formation. It is one of the best sources for the conceptual foundation of the project